INTERACTIVE MODEL ASSESSING MEDIATING ROLES OF RESILIENCE AND SELF-EFFICACY ON DYADIC COPING AND QUALITY OF LIFE AMONG COUPLES WITH CERVICAL CANCER

CHUNTAO WANG

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR DOCTOR DEGREE OF PHILOSOPHY
(INTERNATIONAL PROGRAM)
IN NURSING SCIENCE
FACULTY OF NURSING
BURAPHA UNIVERSITY
2024

-

CHUNTAO WANG

ดุษฎีนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต (หลักสูตรนานาชาติ)
สาขาวิชาพยาบาลศาสตร์
คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
2567

INTERACTIVE MODEL ASSESSING MEDIATING ROLES OF RESILIENCE AND SELF-EFFICACY ON DYADIC COPING AND QUALITY OF LIFE AMONG COUPLES WITH CERVICAL CANCER

CHUNTAO WANG

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR DOCTOR DEGREE OF PHILOSOPHY
(INTERNATIONAL PROGRAM)
IN NURSING SCIENCE
FACULTY OF NURSING
BURAPHA UNIVERSITY
2024

The Dissertation of Chuntao Wang has been approved by the examining committee to be partial fulfillment of the requirements for the Doctor Degree of Philosophy (International Program) in Nursing Science of Burapha University

Advisory Committee

Principal advisor

.....

(Professor Dr. Chintana Wacharasin)

Co-advisor

.....

(Associate Professor Dr. Pornpat Hengudomsub)

Examining Committee

.....

Principal examiner

(Professor Dr. Rutja Phuphaibul)

.....

Member

(Professor Dr. Chintana Wacharasin)

.....

Member

(Associate Professor Dr. Pornpat Hengudomsub)

.....

Member

(Assistant Professor Dr. Khemaradee Masingboon)

.....

External Member

(Associate Professor Dr. Arpaporn Powwattana)

.....

Dean of the Faculty of Nursing

(Associate Professor Dr. Pornchai Jullamate)

.....

This Dissertation has been approved by Graduate School Burapha University to be partial fulfillment of the requirements for the Doctor Degree of Philosophy (International Program) in Nursing Science of Burapha University

.....

Dean of Graduate School

(Associate Professor Dr. Witawat Jangiam)

.....

62810068: MAJOR: NURSING SCIENCE; Ph.D. (NURSING SCIENCE)

KEYWORDS: MEDIATING ROLES / RESILIENCE / SELF-EFFICACY / DYADIC COPING / QUALITY OF LIFE / CERVICAL CANCER/COUPLES

CHUNTAO WANG : INTERACTIVE MODEL ASSESSING MEDIATING ROLES OF RESILIENCE AND SELF-EFFICACY ON DYADIC COPING AND QUALITY OF LIFE AMONG COUPLES WITH CERVICAL CANCER. ADVISORY COMMITTEE: CHINTANA WACHARASIN, Ph.D. PORNPAT HENGUDOMSUB, Ph.D. 2024.

Cervical cancer is the most common malignancy worldwide. According to the Theory of Dyadic Illness Management, cancer is viewed as a dyadic stressor for patients and their spouses because of the impact on both sides of the dyads. The mechanism of how patients with cervical cancer and their spouses influence each other in coping with dyadic stress has not been clarified. This study aimed to examine the mediating effects of resilience and self-efficacy within the dyadic appraisal and dyadic coping, as well as dyadic coping and quality of life (QoL) for patients with cervical cancer and their spousal caregivers. Additionally, the research sought to construct an Actor-Partner Interdependence Mediated Model incorporating resilience and self-efficacy in the dyadic dynamics of cervical cancer patient-caregiver relationships. This study recruited 636 participants from hospitals within Jiangsu Province via systematic sampling. Data collection was conducted using a comprehensive questionnaire packet. The model was tested using Structural Equation Modeling with AMOS software. The results indicated that the final model provided an adequate fit to the empirical data (χ 2 = 13.424, p = .201, df = 10, χ^2 / df = 1.342, GFI = .992, NFI=.992, CFI=.998, RMSEA=.033, RMR=.023). Behavioral responses of patients with cervical cancer and their spousal caregivers in coping with the disease are interrelated and mutually influential, and resilience and self-efficacy have Actor-Partner Interdependence mediating effects between dyadic appraisal and dyadic coping, and dyadic coping and QoL of patients with cervical cancer and their spousal caregivers. These findings suggest that nurses could develop intervention programs to enhance the QoL for couples dealing with cervical cancer. The programs would focus on improving the couples' QoL status, boosting their resilience and self-efficacy.

Additionally, nurses could suggest appropriate dyadic coping strategies and help inhibit negative dyadic appraisals. Implementing these interventions may contribute to an improvement in the quality of life for couples affected by cervical cancer.

ACKNOWLEDGEMENTS

The successful completion of this dissertation was made possible thanks to the unwavering support and encouragement from various individuals and organizations. I am immensely grateful to my major advisor, Professor Dr. Chintana Wacharasin, for her unwavering support throughout this challenging and enriching journey. Her guidance and encouragement have played a pivotal role in shaping my research interests and staying true to my values. I would also like to extend my heartfelt thanks to my co-advisor, Associate Professor Dr. Pornpat Hengudomsub, for her expertise and strong support, which have greatly contributed to the completion of this dissertation.

I am grateful for the valuable guidance and advice provided by my principal examiner, Professor Dr. Rutja Phuphaibul, and I appreciate the insightful comments from Dr. Arpaporn Powwattana that have enhanced the quality of my research. Additionally, I would also like to acknowledge the unwavering support of Dr. Pornchai Jullamatel, the Dean of the Faculty of Nursing. His assistance and support during challenging times have been truly invaluable. I would like to express my sincere gratitude to all the nursing faculty members in the PhD program, including Dr. Nujjaree Chaimongkol, Dr.Wannee Deoisres, Dr. Khemaradee Msingboon, and Dr. Aporn Deenan, for their help throughout this journey. I am very grateful to my PhD classmates, friends and colleagues at Jiangsu Vocational College of Medical for their support. Their assistance was crucial throughout my studies and the development of my thesis. Furthermore, I would like to express my deepest gratitude to the nurses and staff at the hospitals who allowed me to conduct the research. I would also like to thank all the couples who volunteered to participate in this study, whose cooperation was crucial to the success of this study.

Finally, my appreciation extends to all my family members. I am especially grateful to my father, mother, my husband Chen Hao, my son Chen Yixuan, and my daughter Chen Yiduo for their unwavering support and understanding. Their love and encouragement have significantly contributed to my academic success, and I am eternally grateful for their presence in my life.

Chuntao Wang

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHARPTER 1

INTRODUCTION

Statements of the problem

Cancer has emerged as a formidable public health challenge worldwide. Recent statistics from the International Agency for Research on Cancer indicate a staggering 19.3 million new cases and nearly 10 million fatalities globally in 2020. This includes an estimated 604,000 new instances of cervical cancer and 342,000 resultant deaths (Di Mattei et al., 2021; Kayser et al., 2018; Sung et al., 2021). Projections suggest that cervical cancer deaths could surpass 470,000 by 2030 (Koh et al., 2019). Cervical cancer ranks as the fourth deadliest cancer among women globally and disproportionately affects those in less developed regions, where approximately 85% of these deaths occur due to inadequate access to screening, vaccinations, and treatments (Bray et al., 2018). In China, cervical cancer accounts for an estimated 98,900 new cases annually with nearly 30,500 deaths.

While cervical cancer may often be asymptomatic in its early stages, more advanced cases can present symptoms such as intermenstrual bleeding, malodorous vaginal discharge, and postmenopausal bleeding. Preventable through routine screenings, cervical cancer treatment has become more effective with scientific and technological advancements alongside research progress. Treatment options are tailored according to the clinical staging of the cancer and the patient's overall health, primarily encompassing surgery, radiotherapy, chemotherapy, targeted therapy, and immunotherapy (Bhatla et al., 2021; Cohen et al., 2019). Surgical options include hysterectomy with related procedures and peripheral lymph node dissection. Chemotherapy remains a standard approach for patients with lymph node metastases or advanced-stage disease. However, the multifaceted nature of these treatments can lead to physical discomfort as well as psychological distress, including anxiety and

stress (Cohen et al., 2019).

Despite improved survival rates from cervical cancer treatments, researchers have identified numerous side effects associated with these treatments. Evidence from studies on cervical cancer treatments indicates that patients may endure a spectrum of disease- and treatment-related symptoms, along with both short- and long-term side effects. These can include depression, anxiety, hair loss, fatigue, urinary and anorectal symptoms such as incontinence, constipation, and rectal bleeding, chronic pelvic pain, lower-extremity lymphedema, menopausal symptoms, and sexual dysfunction (Cohen et al., 2019). Sexual dysfunction is particularly impactful due to the cancer's location; it affects female reproductive capabilities and hormonal functions, which can significantly influence both physiological and psychological aspects of a woman's life, severely affecting their quality of life (QoL). The risk and severity of sexual dysfunction can be influenced by various factors, such as the specific treatment method used. For example, a radical hysterectomy may result in significant vaginal canal shortening, while pelvic exenteration involves the complete removal of the vagina. Both surgery and radiotherapy can potentially damage the sacral nerve, altering the delicate sensations of reproductive tissues and thus affecting sexual sensation and response. Additionally, radiotherapy can cause the vaginal mucosa to become dry, susceptible to trauma, stenosed, and less expansible. It may also result in ovarian function loss, leading to infertility, vaginal atrophy, and the loss of hormonal functions (Osei Appiah et al., 2021). Instances of sexual dysfunction include pain during sexual activity (32.9%), altered sexual behavior (25.9%), and vaginal canal stenosis (75.2%)(Osei Appiah et al., 2021). Other studies have reported treatment side effects such as decreased libido, pain during intercourse, dyspareunia, insufficient lubrication, vaginal stenosis, a shortened vagina, and reduced elasticity (Shylasree et al., 2021; Wiltink et al., 2020). As a result, a lack of sexual desire and a loss of interest in sex have been significant concerns for cervical cancer survivors (Boa & Grénman, 2018). Patients with cervical cancer who experience impaired

sexual function report a lower QoL compared to those with normal sexual function (Bae & Park, 2016; Carter et al., 2010).

Cervical cancer staging and treatment are crucial aspects in managing this disease. The staging of cervical cancer is determined based on the size of the tumor, its depth of invasion, and whether it has spread to other tissues or organs. The International Federation of Gynecology and Obstetrics (FIGO) staging system is widely used in classifying cervical cancer into four stages: I, II, III, and IV, with further subdivision into subtypes to accurately describe the extent and distribution of the cancer. Treatment plans for cervical cancer depend on the stage of the disease, overall patient condition, and individualized needs. Early-stage cervical cancer (Stage I) can be treated with minimally invasive procedures, radiation therapy, or chemotherapy. Radiation therapy is commonly used as the main treatment modality for intermediate to advanced stages (II, III, and IV), often in combination with chemotherapy. Late-stage cervical cancer (Stage IV), which is considered incurable, focuses on palliative care to relieve symptoms and improve the QoL (Bhatla et al., 2021; Cohen et al., 2019). Treatment options may include procedures such as radiofrequency ablation, cryotherapy, chemotherapy, and symptom management approaches. It is essential to tailor the treatment plan according to the specific patient's needs and regularly assess treatment outcomes while providing comprehensive support. Individualized and comprehensive treatment strategies can improve survival rates and QoL for patients with cervical cancer (Sung et al., 2021).

Different stages of cervical cancer have an impact on coping strategies and QoL for couples who are impacted. Because of the generally better prognosis for cervical cancer in its early stages (Stages I and II), patients are encouraged to take an active approach to their care and lifestyle modifications. Couples that actively participate in treatment decision-making, seek information, and keep a positive attitude are examples of adaptive coping styles. By participating in health-promoting activities, patients can maintain their partner's QoL as well, strengthening the couple's

psychological resilience (Levkovich et al., 2023). However, as cervical cancer advances to Stages III and IV, patients may become increasingly distressed and change their coping mechanisms due to the looming unknown. Later phases necessitate more invasive therapies, which are linked to a higher risk of side effects and a decline in both mental and physical health (Pfaendler et al., 2015). Stress can make it difficult for couples to stick to their prior, adaptive coping practices, which might force them to turn to unhealthy coping techniques like denial and emotional disengagement. While there may be short-term respite from such responses, the patient's and their partner's QoL typically declines as a result (Shajahan Ahamed & Degu, 2023).The cost of treating advanced cervical cancer, in addition to income loss and taking on more care obligations, might lead to extra stress and a possible decline in QoL (Dau et al., 2023). The financial burden needs to be addressed because it has an impact on the mental health of the patient and the caregiver, which lowers the couple's overall level of life satisfaction (Dau et al., 2023).

For several decades, the study of stress and coping strategies primarily centered on the individual, neglecting the reciprocal influential processes inherent in relational contexts according to the Stress and Coping Theory (Lazarus & Folkman, 1984). The emphasis was confined to the stressed individual and the potential impact of partner support in alleviating their stress. However, it was not until the past two decades that scholars embraced a more systemic outlook and transitioned from perceiving stressors as solely affecting one partner to affecting both partners. Consequently, stress within couples ceased to be conceptualized as an individual phenomenon and instead became recognized as a dyadic affair. Cancer is increasingly recognized as a disease that impacts the entire family network. Spouses play a crucial role as social supporters and caregivers for cancer patients. They make substantial contributions to the patients' ability to cope with the effects of cancer, undergo treatment, and maintain their health (Thewes et al., 2016; Ustaalioglu et al., 2018). Spouses provide support in treatment administration, medication compliance,

psychological and emotional support, daily activities, diet management, physical symptom management, financial management, and household duties (Girgis et al., 2013). Spouse caregivers have become an essential part of the home healthcare team. They are being asked to conduct clinical care responsibilities that well-trained health professionals previously performed. As the responsibilities of caregiving increase, spouses experience a range of functional, physical, psychological, social, and spiritual burdens that may surpass those of their ill partners (Northouse & McCorkle, 2015; Ochoa et al., 2020). Over time, these burdens can deplete their emotional and psychological resources, making them more vulnerable to significant distress (Zetin & Dursun, 2020), ultimately impacting their QoL (Li et al., 2018).

An increasing number of studies have shown a significant impact on the QoL not only for cancer patients themselves but also for their partners (Duggleby et al., 2015; Patterson et al., 2013). Chen et al. (2004) found that patients' QoL is influenced by their partners' QoL, particularly in the social and functional domains. In other words, the stress experienced by couples is a dyadic relationship, rather than an individual phenomenon (Bodenmann, 1995; Bodenmann, 1997). This can occur when both partners are directly exposed to the same stressors or when a stressor initially affects one partner but eventually spreads to the relationship and ultimately impacts the other partner. Therefore, it is imperative to implement interventions to improve the QoL of patients with cervical cancer.

Cancer is a stressful event involving patients and partners. Taking patients and partners as a dyad in illness treatment is important to optimize their joint health (Lyons & Lee, 2018; Lyons et al., 2015). Taking a dyadic perspective to this problem, one can depict the way in which a couple approaches a disease in regard to both partners' mutual influence on each other, as well as how they each cope with stress. Kayser et al. (2007), describe cancer as a disease in which both partners suffer from it. Cancer affects the patient's physical, psychological, and social wellbeing, as well as his/her partner (Bodenmann, 1995; Zhang et al., 2020). When partners cope with each

other's stress resulting from circumstances outside the relationship. This form of stress management is called dyadic coping (DC; Bodenmann, 1995). Dyadic coping refers to how patients and their partners interact to cope with cancer (Berg & Upchurch, 2007), which aims to maintain or restore individual and dyadic homeostasis, both partners' well-being, and the couple's QoL. Bodenmann (1995) divided dyadic coping into positive and negative dyadic coping dimensions. Positive dyadic coping forms positively impact both partners and their relationship, including stress communication (SC), supportive dyadic coping (SDC), delegated dyadic coping (DDC), and common dyadic coping (CDC). Negative dyadic coping (NDC) forms include hostile, ambivalent, and superficial efforts to assist the stressed partner. Evidence suggested that greater levels of positive dyadic coping are related to higher levels of relationship satisfaction, higher relationship quality, and QoL (Bryan et al., 2005). According to Ernst et al. (2017), the dyadic coping of hematological cancer patients and their partners, later on, affects their own mental QoL. Additionally, dyadic coping is a significant predictor of dyadic mental health (Regan et al., 2014).

In patients with cervical cancer and spousal caregivers facing the burden of cancer diagnosis and treatment, cognitive appraisals are critical contributors to their wellbeing. Patients can adapt to changes in physio-psycho-social-spiritual aspects through their own resilience and self-efficacy. The patients with cervical cancer and spousal caregivers' cancer-related appraisals have been associated with their use of coping strategies (Franks & Roesch, 2006) and QoL (Northouse et al., 2002). Nonetheless, several critical knowledge gaps remain, such as it focused mainly on the individual, without considering the influential reciprocal processes that are part of relational contexts. Cancer has increasingly been conceptualized as a relational stressor due to its effect on both patients and spousal caregivers (Berg & Upchurch, 2007; Kayser et al., 2007). To understand better how dyads are affected by illness, Lyons and Lee proposed a Theory of Dyadic Illness Management (TDIM; Lyons & Lee, 2018), integrating dyadic appraisal and dyadic management with dyadic health.

In summary, the model argues that the theory's core purpose is to optimize the health of both members of the dyad by balancing their health and demands. Furthermore, it is claimed that shared dyadic appraisal of patient symptoms leads to improved dyadic health, with the interpersonal and familial setting also playing a role. The idea does not prioritize one member's health over another's, but it does recognize the significance of balancing the health of cervical cancer sufferers and their spousal caregivers.

Based on the Stress and Coping Theory (Lazarus & Folkman, 1984), the Theory of Dyadic Illness Management (Lyons & Lee, 2018) and empirical research results, a shared dyadic appraisal of patient symptoms dyadic appraisals leads to more positive dyadic coping and better dyadic physical and mental health. However, there is still a lack of research on the impact of cervical cancer on the QoL of patients and caregivers from the dyadic level. Therefore, it is necessary to take patients with cervical cancer and spouse caregivers as a dyad to explore their QoL factors. It is also necessary to explore the relationship between dyadic appraisal, dyadic coping, and QoL among couples coping with cervical cancer. This will facilitate the design of a dyadic intervention program. This study will investigate whether dyadic appraisals are associated with dyadic coping and QoL in care dyads living with cervical cancer.

According to the Theory of Dyadic Illness Management, dyadic individuals with intimate relationships (such as patients and spousal caregivers) are interdependent in the process of coping with cancer. Individual coping resources, cognition, and emotion will affect their own health outcomes and affect partners' health outcomes. Therefore, it is necessary to explore the impact of individual coping resources on the QoL at the dyadic level and the intermediary role of cognitive evaluation to provide empirical research support for improving patients' QoL with cervical cancer and spousal caregivers.

When individuals face stressful events and adversity such as cancer, resilience can help them improve their ability to deal with stressful events, reduce the

spiritual blow caused by this event, promote the adaptation process and improve their QoL (Sinclair & Britt, 2013). Resilience can be regarded as an individual's ability to maintain or restore relatively stable psychological and physical functions in the face of stressful life events and adversity (Sinclair & Britt, 2013). Resilience, defined as individuals' ability to effectively cope and adapt to difficulties, adversity, trauma, or threats, is an important internal resource. Dyadic appraisal also has a significant effect on resilience. When couples engage in dyadic appraisal, they jointly evaluate the challenges and stressors associated with cervical cancer. This shared appraisal can enhance their understanding of the situation, promote shared meaning-making, and foster a sense of unity and cohesiveness. Through this process, couples can develop a shared sense of purpose and perseverance, ultimately strengthening their resilience as a unit (McAninch et al., 2023b). Previous studies (Seiler & Jenewein, 2019) have established that resilience can play a protective role, mitigating the adverse effects of negative events and minimizing the impact of a cancer diagnosis. In the context of cancer patients, resilience has been positively associated with improved disease adaptation, clinical outcomes, and higher QoL (Matzka et al., 2016; Popa-Velea et al., 2017). A study focusing on cancer patients undergoing allogeneic stem cell transplantation found that patients with higher levels of resilience reported better physical, psychological, and social functioning, as well as QoL when compared to their less resilient counterparts (Schumacher et al., 2014). Fradelos et al.(2018) found that resilience played a valuable resource in coping with cervical cancer; it was considered as a multidimensional process that contains, among others natural interaction of attributes. Research in cancer spousal caregivers also found that high resilience can promote spousal caregivers' adaptation to diseases, improve coping ability, reduce anxiety and depression, and improve the QoL (Sun et al., 2021). Lim et al.(2014) confirmed that high-level resilience could help patients and their spousal caregivers cope successfully and improve their resilience in the process of positive coping.

Dyadic appraisal and dyadic coping are interconnected processes that can significantly impact the self-efficacy of couples facing cervical cancer (Lyons & Lee, 2018). Self-efficacy is the basis of behavior change and represents the response to achieving goals (Bandura, 1977). Dyadic coping, which encompasses the collaborative efforts of partners to manage stressors, plays a crucial role in bolstering self-efficacy. When couples engage in effective dyadic coping, they work together to identify and implement coping strategies that align with their unique circumstances. This joint process allows partners to provide mutual support, encouragement, and validation, which can enhance their self-efficacy beliefs (Berg & Upchurch, 2007; Revenson, 2005). By engaging in effective dyadic coping, couples not only enhance their self-efficacy but also foster a sense of shared control and problem-solving capacity. This shared efficacy can empower couples in their ability to cope with the challenges of cervical cancer, leading to better psychological well-being and overall QoL (Bodenmann, 2005; Traa et al., 2015).

Self-efficacy theory is also widely used in cancer patients, improving QoL (Kreitler et al., 2010). This hypothesis has been tested with cancer patients, whereas self-efficacy is positively related to the QoL (Lev & Owen, 2010). In addition, within a sample of survivors with Latina breast cancer, higher levels of self-efficacy were related to the better overall QoL as well as better social, emotional, functional well-being domains, less burden of breast cancer symptoms, and less cancer-specific distress (Baik et al., 2020). Tong et al.(2021) found that the combination of bundled nursing and peer support can effectively improve the psychological status of patients with cervical cancer receiving chemotherapy, improve their self-efficacy and then improve their QoL. Research on caregivers of cancer patients shows that caregivers with higher self-efficacy have a much lower risk for depression (Yates et al., 1999), and caregivers have lower levels of strain, increased positive mood, and decreased negative attitude (Keefe et al., 2003). Among young and middle-aged couples facing lymphoma, patients and their spousal caregivers' dyadic coping scores were

significantly associated with their self-efficacy (An et al., 2021). For the sake of comparability and the multifaceted challenges faced by patients and caregivers, a general self-efficacy scale was chosen to measure overall belief in abilities across various contexts in this study on couples with cervical cancer. This decision was based on the widespread use and validation of the scale, allowing for comprehensive insights into the mediating roles of self-efficacy on dyadic coping and QoL.

However, at present, there are many related studies on coping strategies and QoL of patients with cervical cancer, from the research on the influencing factors of patients' QoL to the intervention research to improve patients' QoL. At the same time, the research on coping strategies and QoL of patients' spousal caregivers has also begun to attract the attention of scholars. The study found that psychological intervention on the spousal caregivers of patients with cervical cancer can improve the psychological pressure of patients' spousal caregivers and improve the QoL of patients and the whole family. However, most relevant studies are isolated from the individual perspective to select patients with cervical cancer or their spousal caregivers for research, which lacks the internal relationship of couples' paired data from the dyadic perspective. The purposes of this study were to explore the mechanism of dyadic appraisal, dyadic coping, and QoL between patients with cervical cancer and their spousal caregivers, and to analyze whether resilience and self-efficacy can mediate the dyadic appraisal and dyadic coping of patients with cervical cancer and their spousal caregivers, as well as the relationship between dyadic coping and QoL. It will help nurses to change their cognition of spouse support, let the spouse participate in the treatment and nursing of patients, guide patients and spousal caregivers to adopt positive dyadic coping, avoid negative dyadic coping, and pay attention to the critical role of a spouse as non-professional social support for patients with cervical cancer, which can be used for clinical Community and home care actively carry out "husband and wife centered" health intervention research, to improve the dyadic coping ability of patients with cervical cancer and their spousal caregivers, and then improve their

QoL.

Research objectives

1. To describe the current state of dyadic appraisal, resilience, dyadic coping, self-efficacy and QoL among patients with cervical cancer and their spousal caregivers.

2. To investigate the correlations between dyadic appraisal, resilience, dyadic coping, self-efficacy and QoL among patients with cervical cancer and their spousal caregivers.

3. To examine resilience as a mediating factor between dyadic appraisal and dyadic coping among patients with cervical cancer and their spousal caregivers.

4. To assess the role of self-efficacy as a mediator between dyadic coping and QoL among patients with cervical cancer and their spousal caregivers.

Research hypotheses

1. One partner's dyadic appraisal is negatively associated with their own dyadic coping (actor effect) and their partner's dyadic coping (partner effect).

2. One partner's dyadic appraisal is negatively associated with their own resilience (actor effect) and their partner's resilience (partner effect).

3. One partner's resilience is positively associated with their own dyadic coping (actor effect) and their partner's dyadic coping (partner effect).

4. One partner's dyadic coping is positively associated with their own QoL (actor effect) and their partner's QoL (partner effect).

5. One partner's dyadic coping is positively associated with their own self-efficacy (actor effect) and their partner's self-efficacy (partner effect).

6. One partner's self-efficacy is positively associated with their own QoL (actor effect) and their partner's QoL (partner effect).

7. One partner's resilience mediates the association between: (a) their own

dyadic appraisal and their own dyadic coping (actor-actor mediated effects); (b) their own dyadic appraisal and their partner's dyadic coping (actor-partner mediated effects); (c) their partner's dyadic appraisal and their own dyadic coping (partner-actor mediated effects); and (d) their partner's dyadic appraisal and their partner's dyadic coping (partner-partner mediated effects).

8. One partner's self-efficacy mediates the association between: (a) their own dyadic coping and their own QoL (actor-actor mediated effects); (b) their own dyadic coping and their partner's QoL (actor-partner mediated effects); (c) their partner's dyadic coping and their own QoL (partner-actor mediated effects); and (d) their partner's dyadic coping and their partner's QoL (partner-partner mediated effects).

Conceptual framework

The conceptual framework for this study is constructed upon the robust foundations of the Stress and Coping Theory (Lazarus & Folkman, 1984), complemented the Theory of Dyadic Illness Management (Lyons & Lee, 2018), and fortified by a comprehensive synthesis of extant research. The hypothesized actor-partner interdependence mediation model of resilience and self-efficacy in a dyadic coping model among cervical cancer couples focuses on the relationships among the following five factors leading to patients' and their spousal caregivers' QoL, including dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL.

Lazarus and Folkman's (1984) transactional model of stress and coping is suitable to provide theoretical support for understanding coping among patients with cervical cancer and their spousal caregivers. The stress and coping theory explained three concepts: appraisal, coping, and QoL. It emphasizes that stress emerges when the person appraises the relationship between the person and the environment as exceeding his/her resources and as threatening wellbeing. Patients' or their spousal caregivers' cognitive appraisals of the cancer experience are important factors in their

overall well-being. Primary appraisals are judgments of the importance of cancer, such as how a cancer diagnosis affects their lives and livelihood, whereas secondary appraisals are assessments of their abilities to manage the illness's repercussions. The primary and secondary appraisals are thought to have an impact on an individual's choice of coping behaviors in a given situation. The usage of coping techniques (Franks & Roesch, 2006) and QoL (Northouse et al., 2002) have been linked to patients' or their spousal caregivers' cancer-related appraisals, Coping is defined as a behavioral, cognitive, or social response to assessments. It describes a person's efforts to "manage (lower, minimize, master, or tolerate) the internal or external demands of the person's environment interaction" (Folkman et al., 1986).

In recent decades, scholars have shifted from a singular focus on individual stressors to a recognition of their dyadic impact, embracing a more systemic view. Couples' stress was no longer seen as an individual issue, but rather as a dyadic one (Bodenmann, 1995; Bodenmann, 1997; Lyons et al., 1998). The Theory of Dyadic Illness Management (Lyons & Lee, 2018) focuses on the patient-care partner dyad as the unit of attention, rather than an individualistic perspective of illness. This theory further explains the concepts of appraisal, coping, and QoL from a dyadic perspective: dyadic appraisal, dyadic coping, and dyadic health (QoL). Dyadic appraisal is conceptualized as the magnitude (i.e., how much do patients and their spousal caregivers differ in their appraisal) and direction (i.e., who appraises the patient symptom higher or lower) of symptom incongruence. Dyadic coping refers to the common response and strategy of patients and their spousal caregivers in the face of cervical cancer. Dyadic health (QoL) focuses on both the physical and mental health (Cohen et al., 2019) of dyadic members in the face of diagnosis and treatment of cervical cancer.

The transactional model of stress and coping posits that both external (e.g., environmental challenges) and internal factors (e.g., resilience, self-efficacy) significantly influence the coping process. Contemporary research suggests that

elevated levels of resilience bolster an individual's capacity to endure adversities, facilitate the adoption of constructive coping strategies, and ultimately contribute to favorable outcomes (Steinhardt et al., 2015). Similarly, self-efficacy has been observed to play a crucial role in enhancing the QoL for cancer patients, underscoring its potential as a therapeutic target (Kreitler et al., 2010).

Within our hypothesized model, dyadic appraisal—comprising the perceptions of both patients and their spousal caregivers—is conceptualized as an exogenous variable that shapes QoL through personal and partner-related dyadic coping mechanisms. Dyadic coping, in turn, is considered an endogenous variable influenced directly by dyadic appraisal or indirectly via individual resilience. It is theorized that dyadic coping exerts a direct impact on QoL or does so indirectly through self-efficacy. Furthermore, the model proposes a mediating role for resilience between dyadic appraisal and dyadic coping, as well as for self-efficacy between dyadic coping and QoL among couples dealing with cervical cancer.

Dyadic data analysis presents a unique characteristic where measurements reflect not only individual characteristics but also those of the individual's partner. Since partner data are interdependent, traditional analysis methods that assume independence among individuals are not appropriate for studying dyadic data. To tackle this issue, the Actor-Partner Interdependence Model (APIM) has been proposed as an effective strategy for analyzing dyadic data. APIM considers the dyad as the unit of analysis, evaluating the associations between personal variables at the individual level. This analysis distinguishes actor effects, which represent the influence of an individual's independent variable on their own outcome, partner effects, which represent the impact of an individual's independent variable on their partner's outcome, and interaction effects, which capture the interactions within and between actor and partner variables (Cook & Kenny, 2005). Furthermore, the inclusion of a mediator variable in the APIM leads to the Actor-Partner Interdependence Mediation Model (APIMeM; Ledermann & Bodenmann, 2006). This dyadic data analysis

technique allows for the simultaneous estimation of partner interdependence and examines both the direct and indirect effects of partner variables, while still reflecting the effects of an individual's own traits on their own outcomes.

Drawing from the foundational transactional model of stress and coping, and integrating the dyadic perspective from the Theory of Dyadic Illness Management, our research introduces an innovative dyadic coping framework. The proposed actor-partner interdependence mediation model elucidates the interplay between resilience and self-efficacy in shaping dyadic coping and QoL among couples facing cervical cancer. This model is graphically represented in Figure 1.

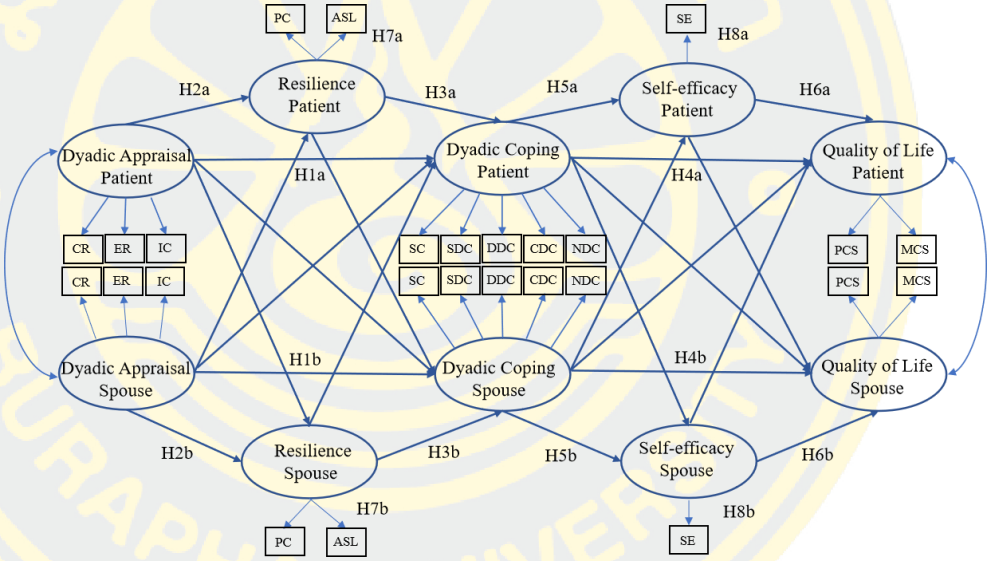


Figure 1 Hypothesized actor-partner interdependence mediation model of resilience and self-efficacy on a dyadic coping and quality of life model among couples with cervical cancer.

CR: Cognitive representation; ER: Emotional representation; IC: Illness comprehensibility; SC: Stress communication; SDC: Supportive dyadic coping; DDC: Delegated dyadic coping; CDC: Common dyadic coping; NDC: Negative dyadic coping; PCS: Physical component summary; MCS: Mental component summary; PC: Personal competence; ASL: Acceptance of self and life; SE: Self-efficacy.

Scope of the research

This investigation employed a descriptive, cross-sectional design to explore the causal relationships between dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL among both patients diagnosed with cervical cancer and their spousal caregivers. The study encompassed participants who were preparing to receive treatment modalities such as surgery, radiotherapy, or chemotherapy. The participant cohort was drawn from inpatient oncology and gynecology departments across five tertiary hospitals in Jiangsu Province, China. The timeframe for data collection extended from August 2022 to August 2023.

Definition of terms

Dyadic appraisal refers to the process by which patients with cervical cancer and their spousal caregivers use past knowledge and experience to assess and explain current symptoms or illness, and to communicate these insights with each other in the face of cervical cancer. Dyadic appraisal consists of three components: cognitive representation, emotional representation, and illness comprehensibility. Dyadic appraisal was measured by the brief illness perception questionnaire (Broadbent et al., 2006).

Dyadic coping refers to the common response and strategy of patients with cervical cancer and their spousal caregivers in the face of dyad stressful events. In this study, it refers to the SC, CDC, DCD, SDC and NDC behaviors of patients with cervical cancer and their spousal caregivers in the face of the pressure related to cancer diagnosis and treatment. Dyadic coping was measured by the dyadic coping inventory (Gmelch et al., 2008), which was translated to Chinese version (Luo et al., 2017).

Quality of Life (QoL) refers to the cognition and satisfaction of patients with cervical cancer and their spousal caregivers on their physical and psychological well-being in the process of coping with stress. It was measured by using the 12-item

Short-Form health survey (Ware et al., 1996).

Self-efficacy refers to the individuals' general self-efficacy in this study, specifically refers to the overall confidence of patients with cervical cancer and their spousal caregivers in their ability to take specific actions and overcome obstacles in specific situations. It was measured by using the general self-efficacy Scale (Schwarzer & Jerusalem, 1995) .

Resilience, within the context of patients with cervical cancer and their spousal caregivers, is defined as the capacity to navigate and overcome challenges by leveraging inherent abilities and fostering positive psychological attributes. It involves effectively utilizing both internal and external resources, actively adapting to the challenges posed by the illness, and promoting healing and adjustment. In the context of cervical cancer, resilience refers to an individual's personal competence and/or acceptance of self and life, which are thought to be modifiable and to promote successful adaptation to cancer. Resilience was measured by the Resilience Scale-14 (Wagnild & Yong, 1993), which was translated to Chinese version (Chung et al., 2020) .

CHARPTER 2

LITERATURE REVIEWS

This chapter aims to present a thorough literature review, focusing on key studies that provide relevant information and empirical evidence for the current study. The literature review is organized into four main sections. The first section includes an overview of cervical cancer, addressing its impacts and exploring cultural beliefs pertaining to this condition within the context of China. The second part addresses the concept of QoL in patients with cervical cancer and their spousal caregivers. The third part presents the theory that informed the study and the hypothesized dyadic coping model among cervical cancer couples. The fourth part presents factors related to the QoL in patients with cervical cancer and their spousal caregivers containing dyadic appraisal, resilience, dyadic coping, and self-efficacy.

Overview of cervical cancer

Prevalence and incidence of cervical cancer

A cervical cancer develops when cancer cells form in the cervix tissues. According to the World Health Organization (2020), cervical cancer is still one of the most frequent malignancies among women worldwide, ranking fourth after breast, colorectal, and lung cancer. The Global Cancer 2020 report estimates that around 604,000 new cases and 342,000 deaths occur due to cervical cancer annually in the world (Sung et al., 2021). It is projected that the prevalence of death from cervical cancer will exceed 470,000 by 2030. It has the second-highest incidence and mortality rate among female malignancies, second only to breast cancer, and is the first most common malignant tumor of the female reproductive system in the world (Broadbent et al., 2006). In high-income countries, the incidence rate and mortality rate of cervical cancer have dropped by more than half in the past 30 years due to the

widespread popularity of screening and vaccination. Due to economic constraints, screening and treatment cannot be carried out, in 2015, approximately 90% of cervical cancer deaths occurred in low- and middle-income countries, and its mortality is 18 times higher than that of developed countries (Cohen et al., 2019). Cervical cancer risk was 0.9% for women in high-income countries and 1.6% in low- and middle-income countries across their lifetimes (under the age 74), whereas the risk of mortality from cervical cancer for women in high-income countries was 0.3% and 9% in low- and middle-income countries (Cohen et al., 2019).

The incidence and mortality attributed to cancer have risen steadily in China since 2010. In China, cervical cancer mortality rates grew with age in all places at all times. Mortality rose steadily in both urban and rural areas before accelerating. It has showed a clear increase trend in death rates, with the 50–54 age group in urban regions and the 40–44 age group in rural areas leading the way. In both urban and rural locations, mortality rates before the 55–59 age group were at their greatest levels in the 2014–2018 period (Guo et al., 2021). In 2017, China accounted for 11.9 % cervical cancer mortality and 12.3 % of cervical cancer disability-adjusted life years due to its vast population (Guo et al., 2021). Cervical cancer incidence and mortality fluctuate significantly across the country due to the country's huge territory and unequal degrees of economic development (Guo et al., 2021). Cervical cancer incidence was also rising, and it was considerably greater in rural inhabitants than in urban residents, putting a strain on China's economy and health.

Several studies (Thapa et al., 2018; Xie et al., 2013) reported that, for global health status or overall QoL, patients with stage I, II, and III of cancer have a higher QoL than stage IV. The advanced stage of cancer negatively impacted the global QoL, and patients with early-stage cancer reported better QoL. The treatment of cervical cancer is determined by the International Federation of Obstetrics and gynecology (FIGO), which is a clinical staging system (Grigsby et al., 2020). Cervical cancer is classified into four stages: Stage I, Stage II, Stage III, and Stage IV. The definition of

a stage I neoplasm has ruptured the cervical lining but is still contained within the uterus. Stage II tumor has spread beyond the uterus to adjacent tissues, but the invasion does not extend beyond the pelvic wall. A stage III malignancy may have progressed to the pelvic wall, caused kidney malfunction, or spread to adjacent lymph nodes. When cervical cancer has reached stage IV, it has spread to the bladder, rectum, or distal body (Grigsby et al., 2020).

There are five standard treatment techniques for patients with cervical cancer: surgery, radiotherapy, chemotherapy, targeted therapy, and immunotherapy. The new treatment is undergoing clinical trials. All these treatments may have side effects. The standard treatment for patients with cervical cancer with FIGO stage IA-IIA1 is radical hysterectomy, lymph node dissection, and/or radiotherapy with or without chemotherapy (Bhatla et al., 2021). Radiotherapy can be used for patients with surgical or anesthetic contraindications. Radiotherapy can be used as an alternative to surgery or as the first step in treatment for individuals who cannot undergo surgery (Vordermark, 2016). Cisplatin-based concurrent chemoradiotherapy is the first treatment for patients with IB3 and IIA2. The treatment for locally advanced cervical cancer includes platinum-based chemotherapy and radiation therapy (CRT), including brachytherapy and external beam radiation therapy (EBRT) (Bhatla et al., 2021; Robin et al., 2016). Brachytherapy is very important for the curative effect; studies have found that the result is inferior if external beam radiotherapy is used instead (Holschneider et al., 2019). A positive prognosis is associated with the early detection of cervical cancer. A patient with localized cervical cancer has a 5-year relative survival rate of 92%, while an individual with the disease spreading nearby organs, tissues, or lymph nodes has a 56% relative survival rate, while an individual with the disease reaching distant body parts has a 17% relative survival rate (MacCosham, 2021). The guidelines confirm that effective treatment for cervical cancer (including surgery and concurrent radiotherapy and chemotherapy) can cure 80% of early cases (stage I-II) and 60% of stage III cases (Cohen et al.,

2019). Most patients with cervical cancer are in an advanced stage at the time of diagnosis due to the lack of cervical cancer screening among women in a developing country. Multiple treatment measures such as concurrent radiotherapy and chemotherapy will bring patients a series of physiological and psychological symptoms and seriously affect their QoL (Cohen et al., 2019).

Psychological and emotional consequences on couples with cervical cancer

Cervical cancer poses significant psychological and emotional challenges that go beyond the initial shock of diagnosis. The vague early symptoms make timely detection difficult, highlighting the importance of heightened awareness and regular screenings. In advanced stages, distressing symptoms like vaginal bleeding, pelvic pain, and painful intercourse emerge, accompanied by additional burdens such as anorexia, discomfort, fatigue, insomnia, and constipation, creating a complex landscape of emotional distress (Cohen et al., 2019; Kim et al., 2015). The combination of surgery, radiotherapy, and chemotherapy introduces a range of symptoms that significantly impact the QoL. Long-term consequences, including bladder dysfunction, intestinal dysfunction, sexual dysfunction, and lymphedema, underline the multifaceted nature of the challenges faced by patients (Andreyev, 2007; Mirabeau-Beale & Viswanathan, 2014; Tiwari et al., 2013; Yang et al., 2014). Urinary complications such as dysuria and hematuria become prominent contributors to the overall diminished QoL after surgery or chemoradiotherapy (Katepratoom et al., 2014; Vistad et al., 2006; Wit & Horenblas, 2014). Lymphedema, resulting from pelvic lymph node dissection or radiotherapy, presents a persistent physical challenge that worsens over time. Apart from its physical manifestations, lymphedema contributes to heightened anxiety, depression, and decreased self-confidence, intensifying the emotional toll on patients' QoL (Ferrandina et al., 2012a; Rajandram et al., 2011). The anticipation of treatment, coupled with tangible physical symptoms and side effects, triggers fear and anxiety, amplifying the emotional burden and

further compromising QoL (Fang et al., 2019; Peerawong et al., 2020). The loss of fertility due to cervical cancer presents a profound psychological challenge for women. Apart from the physical implications, this loss triggers complications such as depression, anxiety, suicidal ideation, anger, shame, and diminished self-esteem (Laganà et al., 2017; Yaman & Ayaz, 2016). Recognizing this emotional burden becomes crucial, emphasizing the need for comprehensive support and targeted interventions to address the complex interplay of psychological and emotional consequences in patients with cervical cancer.

The impact of cancer extends beyond the individual patient and affects the entire family network when a family member is diagnosed. Spouses, often the primary family caregivers, play pivotal roles in providing indispensable support and care throughout the cancer journey (Thewes et al., 2016). This role, while essential, takes a considerable emotional and psychological toll on spouses. The daily lives of family caregivers, including male partners, are frequently disrupted by the demands of their caregiving responsibilities, as demonstrated in studies (Teskereci & Kulakaç, 2018). These disruptions go beyond simple routine adjustments and manifest as substantial changes in lifestyle and roles. The dynamics of the caregiver's life undergo a profound shift, reflecting the challenging nature of their responsibilities (Teskereci & Kulakaç, 2018).

The psychological strain on caregivers, particularly male partners, is evident in their coping strategies. Studies, such as the one conducted by Lopez et al. (2012), suggest that male partners often downplay disruptions, focusing on tasks and internalizing stress. This coping mechanism may contribute to the emotional challenges caregivers face, including increased anxiety, depression, and complications in their intimate relationships, as highlighted in research on caregivers of women with gynecological cancers (2014). Spousal caregivers, including husbands, may attempt to conceal the inherent burden of their caregiving role to alleviate their partners' concerns (Wagner et al., 2011). However, this attempt to shield their loved ones from

additional distress may inadvertently exacerbate the psychological toll on the caregivers themselves. In the context of male partners caring for patients with cervical cancer, a sense of shared vulnerability emerges as a recurring theme. Studies, such as the one by Oldertrøen Solli et al. (2019), reveal that these caregivers often express feelings of loneliness, changes in sexual relationships, and a collective sense of vulnerability. This shared experience further accentuates the psychological and emotional challenges faced by family caregivers in the context of cervical cancer.

The cumulative effect of these psychological and emotional consequences underscores the importance of comprehensive support systems for family caregivers, acknowledging the multifaceted challenges they navigate while providing essential care to their loved ones fighting cancer.

Physical and functional challenges faced by couples with cervical cancer

The physical challenges associated with cervical cancer and its treatments encompass a range of manifestations that significantly impact the functional aspects of patients' lives. Surgical interventions and chemoradiotherapy introduce long-term sequelae in the urinary system, leading to complications such as micturition dysfunction, dysuria, hematuria, ureteral stenosis, and the potential development of vesicovaginal fistula (Katepratoom et al., 2014; Wit & Horenblas, 2014). These challenges in the urinary system are substantial contributors to a diminished QoL for patients. Brachytherapy, while an effective treatment, comes with its own set of challenges, including an increased incidence of vaginal dryness and sexual diseases, adversely affecting sexual function (Lalos et al., 2009). These physical changes underscore the interconnectedness of physical health and overall well-being in patients with cervical cancer.

Connective tissue changes resulting from lymphatic vessel injury during surgery or radiotherapy contribute to the development of lymphedema in the lower extremities. This condition not only causes physical discomfort but also worsens over

time, presenting a persistent challenge to patients' physical well-being (Rajandram et al., 2011). Sexual dysfunction emerges as a significant physical challenge post-cervical cancer treatment. Surgery, chemotherapy, and radiotherapy contribute to issues such as a shortened vagina, vaginal dryness, decreased libido, and dyspareunia (Correia et al., 2020; Wu et al., 2021). The type of treatment, with radiotherapy having long-term negative impacts, further complicates the physical and functional aspects of patients' lives (Frumovitz et al., 2005). The association between compromised sexual health and reduced quality of life is clearly established, with research consistently showing that individuals afflicted by sexual dysfunction after cervical cancer treatment tend to report a lower quality of life in comparison to those who retain normal sexual functioning. This highlights the critical nature of addressing sexual health as a key component of comprehensive care in this patient population (Bae & Park, 2016; Carter et al., 2010). This emphasizes the importance of addressing sexual health as an integral component of comprehensive care for patients with cervical cancer, aiming to improve both physical function and overall well-being.

The realm of caregiving for family members battling cancer, particularly when assuming the role of a spouse, demands active involvement in a spectrum of caregiving responsibilities. Family caregivers, especially spouses, find themselves at the forefront of treatment administration, medication compliance, and the day-to-day management of physical symptoms (Girgis et al., 2013). This active participation underscores the crucial role these caregivers play in ensuring the well-being of their loved ones throughout the challenging journey of cancer. However, the multifaceted nature of these caregiving responsibilities imposes a significant toll on family caregivers, encompassing functional, physical, psychological, social, and even spiritual dimensions (Girgis et al., 2013). The amalgamation of these burdens paints a comprehensive picture of the challenges faced by those who selflessly provide care. The functional impact is evident as caregivers navigate the intricacies of daily care tasks, often leading to changes in their own physical health, psychological well-being,

and social interactions.

The long-term commitment to caregiving and the associated burdens took a toll on the emotional and psychological resources of family caregivers. As noted by Zetin & Dursun (2020), the sustained nature of these caregiving responsibilities can lead to the gradual depletion of emotional and psychological reserves. This depletion, in turn, renders caregivers more vulnerable to high-stress experiences, highlighting the need for ongoing support mechanisms to sustain their well-being. The stress associated with caregiving responsibilities not only impacts emotional and psychological well-being but can also escalate the morbidity and mortality risk for caregivers (Govina et al., 2015; Hlabangana & Hearn, 2020; Johansen et al., 2018). The toll on caregivers' physical health becomes particularly pronounced, underlining the urgency of addressing the holistic well-being of those who undertake the demanding role of family caregiving.

In conclusion, the physical and functional challenges faced by family caregivers, especially spouses, extend beyond the immediate caregiving tasks. The intricate interplay of these challenges, encompassing various dimensions of well-being, emphasizes the necessity for targeted interventions and support structures to ensure the health and resilience of those who shoulder the responsibilities of caring for their loved ones with cancer.

Impact on Relationship Dynamics and Communication

The onset of cervical cancer can lead to a profound reordering of relationship dynamics, casting partners into unaccustomed roles that can shift the balance of mutual support and dependence (Levkovich et al., 2023). For example, a partner who becomes a caregiver may also face the emotional burden of providing psychological support, grappling with their fears even as they manage medical appointments, treatment side effects, and daily care routines (Secinti et al., 2023). Similarly, if the patient was the primary source of income, the other partner may now take on this role, which can add financial strain to the emotional and health-related

stresses already present (Van Houtven et al., 2023).

Interpersonal stressors, if not managed with proactive strategies and effective coping mechanisms, can manifest as heightened conflict and reciprocal resentment (Li et al., 2023). Such emotional responses, while natural, can erode the foundational support system that relationships provide. Regular stress management techniques, possibly guided by a mental health professional, can be beneficial in these scenarios (Zhou et al., 2023). Moreover, communication challenges can arise when couples are confronted with the need to discuss complex issues like prognosis, treatment options, and personal fears (Ramos et al., 2023). It might be difficult for both partners to find a language that articulates their internal experiences without inadvertently inflicting pain or worry on each other. This dynamic can be compounded if one or both partners have a preference for non-communication as a coping strategy, further entrenching feelings of isolation and loneliness (Ramos et al., 2023). Couples' therapy or communication workshops specifically designed for those coping with illness can foster a more open and constructive dialogue (Parthipan et al., 2023).

The intimacy between couples is not exclusively compromised in the physical sense; emotional intimacy can also suffer as shared experiences become dominated by the illness (Jonsdottir et al., 2021). To address these changes, couples might need to engage with therapists who specialize in sexual health and intimacy post-diagnosis to explore new ways of connecting both physically and emotionally (Di Mattei et al., 2021). Creative pursuits, shared goals, and the reaffirmation of love and commitment outside the context of illness can reinforce emotional bonds (Jonsdottir et al., 2021). Furthermore, open communication should encompass not just the exchange of words but also the acknowledgment of the other's effort and struggle. Validating one's partner's challenges, acknowledging sacrifices, and expressing gratitude can fortify the relationship against the erosive effects of illness-related strains (Hawkey et al., 2021).

Lastly, support groups and counseling can provide frameworks for understanding and navigating these altered dynamics (Chen et al., 2023). Encouraging both the patient and their partner to actively participate in such groups can lead to shared experiences with other affected couples, offering lessons in resilience and adaptation (Wan et al., 2023). These resources often underline the importance of mutual self-care and create an external support network to rely on when internal resources are depleted (Parthipan et al., 2023).

In conclusion, the changes in relationship dynamics and communication presented by cervical cancer necessitate multifaceted interventions that aim to strengthen the partnership in the context of new roles, stressors, and communicative challenges. Maintaining a healthy relationship dynamic amidst illness strengthens not only the bond between partners but also the individual's capacity to confront and survive cancer.

Cultural beliefs about cervical cancer in China

Confucianism and collectivism have had a major influence on Chinese marital customs (Marshall, 2008; Tang, 2015). Marriage and family are important in Confucianism because they are considered as the cornerstone of societal peace (Yiu et al., 2021). Fulfilling established gender roles is regarded to be the key to maintaining effective relationships and family peace. Typically, husbands are responsible for maintaining a job, while wives are responsible for caring for the children and managing everyday domestic responsibilities (Li et al., 2020). Women in Chinese society may help their male spouses during times of stress due to the emphasis on predefined gender roles (Li et al., 2020). Collectivism is linked to attaining interpersonal peace by sacrificing one's own interests for the good of the group (Shneor et al., 2021). Furthermore, partners are not required to communicate personal concerns or stressful experiences in accordance with Chinese familial harmony (Kim et al., 2008). China has experienced extraordinary social and economic changes in the previous three decades, which has altered modern living for Chinese families (Zhang

et al., 2013). Despite the fact that economic reforms have improved living standards, most Chinese couples are now forced to become dual-career couples (Fang, 2021) due to economic stress (Cai et al., 2021) and work-family conflicts (Zhang et al., 2013), The conventional paradigm of seeking supporters (husband as earner) and support providers (wife as housewife) is changing as a result of the new dual career model, which impacts couples' stress and coping behavior, and hence affects couples' QoL (Xu et al., 2016).

Cultural taboos surrounding sexuality in Asian cultures have limited our understanding of the frequency of sexual dysfunction among patients with cervical cancer (Lee et al., 2015). Taoism and Confucianism, influential native religions and philosophies in China, have shaped women's perceptions and behaviors regarding sexuality (Colonnello & Jannini, 2020). The Yin-Yang theory, a central concept in Taoism, posits that sexual activity facilitates the exchange of Yin and Yang energies. According to Taoist beliefs, women lose energy during sexual activity, while men absorb it, resulting in extended lifespans (Wu & Zheng, 2021). Consequently, Taoist teachings suggest that Chinese women should limit or abstain from sexual engagement following a cervical cancer diagnosis and treatment, aiming to restore the Yin element, prevent harm to reproductive organs, and facilitate postoperative recovery. Additionally, it is believed that continued sexual involvement may deplete their male partners' Yang energy (Molassiotis et al., 2000). In contrast, Confucian views predominantly revolve around sexual adjustments in the context of reproduction and childbirth. Since cervical cancer treatments may lead to infertility, patients may perceive no need to resume sexual activity thereafter (Molassiotis et al., 2000). These cultural beliefs have contributed to misconceptions surrounding sexuality in China. It is crucial to consider the Chinese cultural context when exploring dyadic coping and QoL in research, to identify the factors impacting the dyadic coping of patients with cervical cancer and their spouses in China.

The existing research highlights the complex nature of the factors that

influence dyadic coping, with a particular focus on patients with cervical cancer and their spousal caregivers. However, the mechanisms driving these influencing factors remain inadequately understood. The scarcity of studies investigating the influencing factors of dyadic coping specifically in the context of cervical cancer demonstrates the need for further exploration in this area.

Quality of life among couples with cervical cancer

General effects of cervical cancer on QoL

In the context of cervical cancer, the concept of QoL offers a comprehensive assessment of an individual's physical, psychological, and social well-being. The evolving biological, psychological, and social medical model, along with advancements in therapies and improved survival rates, have led to a growing recognition among researchers of the significance of QoL as a primary measure for assessing the influence of the disease and treatment-related side effects, surpassing the sole emphasis on survival benefits (Zhao et al., 2021).

The term QoL was first proposed in the 1920s and widely studied. Until 1958, the American economist John K. Galbraith defined it as: various favorable factors that can bring people physical and mental pleasure and comfortable life (Campbell et al., 1976). Since then, the research on the QoL has involved the fields of sociology, economics, demography, psychology, medicine and nursing. Therefore, different scholars put forward different opinions on the QoL from different perspectives. Campbell (1976) defines the QoL as an individual's overall feeling of life happiness. In 1996, the QoL research group of the World Health Organization defined QoL as the experience of individuals in different cultural factors and value systems about their goals, expectations, standards and concerns (The Whoqol, 1998). It also emphasizes that the QoL is an individual's subjective experience, which reflects patient-centered thinking. It is not a fixed standard but can vary with individuals. It is related to the individual's cultural factors, value system and social standards. People from different countries, cultures and social backgrounds have a different

understanding of the QoL (Cai et al., 2017; Teo et al., 2018). QoL is a reflection of patients' personal assessments of their satisfaction with their present situation, taking into account individual expectations and concerns. To provide more effective support to those in need, healthcare professionals should consider QoL within the framework of diverse customs, backgrounds, and cultures (Cai et al., 2017).

Cancer is associated with various perceptions and beliefs in Chinese culture, including notions of bad luck, stress, suffering, and death (Yeh et al., 2021). Additionally, there is a widespread belief that cancer arises from an imbalance between yin and yang, as well as disharmonious relationships in society (Lee et al., 2013). Consequently, individuals diagnosed with cancer in Chinese culture often hesitate to disclose their condition to maintain their dignity, which can lead to increased levels of stress, intrusive thoughts, and inadequate social support (Chow et al., 2018). Chow et al. (2018) conducted a study focusing on Chinese women with cervical cancer and found that they may experience higher levels of stress compared to women with other types of cancer. This could be attributed to the fact that cervical cancer is associated with the female reproductive system, and discussions about sexuality are considered taboo and shameful in Chinese culture. Consequently, cervical cancer carries a social stigma due to its association with multiple sexual partners and early sexual activity, which negatively impacts patients' psychological well-being and QoL. In light of these cultural considerations, it becomes crucial to investigate the QoL of patients with cervical cancer and the factors that influence their QoL in the Chinese cultural context. Furthermore, there is a growing interest in studying the QoL of cervical cancer survivors. Previous research has indicated that both patients with cervical cancer and their caregivers tend to have lower QoL compared to the general population.

Differences in QoL of cervical cancer based on cancer stage

Cervical cancer can be broadly classified into early-stage (Stages I and II) and advanced-stage (Stages III and IV), and the QoL differs based on the cancer stage.

Early-stage cervical cancer is generally associated with a better QoL, while advanced stages are characterized by more pronounced symptoms and treatment side effects, leading to a decreased QoL.

Early-stage cervical cancer

Physical symptoms and side effects of treatment: Individuals with early-stage cervical cancer commonly experience physical symptoms that can impact their QoL. These symptoms may include abnormal bleeding, pelvic pain, and urinary issues (Li et al., 2017). Surgical interventions, such as a hysterectomy or removal of lymph nodes, may lead to post-operative complications and physical discomfort (Fleming et al., 2016; Li et al., 2017). For example, some patients may experience pain, fatigue, and discomfort during the recovery period (Fleming et al., 2016). Radiation therapy, either external beam radiation or brachytherapy, is another common treatment modality for early-stage cervical cancer (Li et al., 2017). However, it can cause side effects that affect individuals' physical well-being and overall QoL. These side effects may include fatigue, skin irritation, gastrointestinal symptoms (e.g., nausea, diarrhea), urinary symptoms (e.g., frequency, urgency), and vaginal dryness (Li et al., 2017; Lu & Burke, 2000).

The diagnosis of early-stage cervical cancer can be emotionally distressing for individuals, resulting in heightened fear and anxiety. Patients may experience concerns about the effectiveness of treatment, potential disease recurrence, and the impact on fertility. The fear of treatment effectiveness often stems from uncertainty about the outcomes and side effects of treatment. Individuals may worry about the success of surgery or radiation therapy in eradicating the cancer cells and preventing disease progression (Messelt et al., 2021). This fear can contribute to heightened levels of anxiety and emotional distress, which can further impact their overall QoL. Additionally, the potential impact on fertility can be a significant concern for patients diagnosed with early-stage cervical cancer. The treatment modalities, such as surgery or radiation therapy, may affect reproductive organs and impair fertility. This can lead

to emotional distress, especially among younger individuals who may have desired future pregnancies (Ferrandina et al., 2012b).

The diagnosis and treatment of early-stage cervical cancer can have profound social implications, causing changes in intimate relationships, communication patterns, and support dynamics. Spousal caregivers may experience additional stress and emotional burden as they navigate the uncertainties that come with the diagnosing (Wang et al., 2023). Diagnosing and treating early-stage cervical cancer can significantly impact the dynamics of intimate relationships. The diagnosis itself can bring about feelings of fear, uncertainty, and anxiety, which often extends to the spousal caregivers as well (Zhi et al., 2024). Spousal caregivers may experience a range of emotions, such as guilt, helplessness, or sadness, as they grapple with the potential loss, changes in intimacy, and the challenges of supporting their loved one through treatment (Song et al., 2021). This additional emotional burden can strain the relationship and lead to changes in communication patterns, decreased sexual activity, and increased levels of stress.

Advanced-stage cervical cancer

Patients with advanced cervical cancer may experience more severe physical symptoms, including pelvic or back pain, weight loss, lymphedema, and urinary or bowel problems (Levkovich et al., 2023; Zhou et al., 2023). The side effects of aggressive treatments, such as chemotherapy or radiation therapy, can exacerbate these symptoms (Katepratoom et al., 2014; Wu et al., 2021). In advanced-stage cervical cancer, the tumor has spread beyond the cervix to nearby tissues or distant organs. This progression can result in more pronounced physical symptoms than early-stage cervical cancer. Pelvic or back pain is a common symptom reported by patients with advanced-stage disease (Keefe et al., 2003; Porter et al., 2008). Lymphedema can occur in advanced-stage cervical cancer. Lymph nodes play a crucial role in filtering waste products and fluids from the body, but cancer cells can obstruct the lymphatic system, leading to fluid buildup and swelling (Tiwari et al.,

2013). This can cause discomfort, restricted movement, and difficulties in daily activities. Patients also commonly experience urinary or bowel problems, including episodes of frequency, urgency, incontinence, and constipation (Kim et al., 2015; Robin et al., 2016). Weight loss is another common symptom of advanced-stage cervical cancer, caused by tumor growth disrupting appetite, swallowing, and metabolism. Furthermore, aggressive treatments like chemotherapy or radiation therapy can worsen this weight loss due to decreased appetite, nausea, and gastrointestinal problems (Meernik et al., 2021). These issues can significantly impact a person's QoL and require supportive interventions.

Patients with advanced-stage cervical cancer may face the emotional burden of a poor prognosis, leading to increased fear, sadness, and existential concerns (Meernik et al., 2021). Coping with the impending loss of life and preparing for end-of-life decisions can further impact QoL (Wang et al., 2023). Receiving a diagnosis of advanced-stage cervical cancer often comes with the realization that the disease has progressed to a stage where the chances of a favorable outcome are lower (Meernik et al., 2021). This poor prognosis can have significant psychological implications for individuals and their spouses. The emotional burden may include feelings of fear, anxiety, sadness, anger, hopelessness, and a sense of loss (Meernik et al., 2021). Facing the prospect of a shortened lifespan and uncertain future can lead to existential concerns and a reevaluation of one's life priorities and goals (Shajahan Ahamed & Degu, 2023). Coping with the emotional impact of a poor prognosis requires individuals to navigate complex psychological challenges. They may experience heightened distress, increased difficulties in managing daily activities, and disruptions in sleep patterns (Meernik et al., 2021). The uncertainty and existential concerns can lead to a range of mechanisms, such as seeking social support, engaging in spiritual or religious practices, or finding meaning in the face of adversity (Chen et al., 2023; Choi et al., 2023). However, some individuals may also struggle with maladaptive coping strategies, including denial or avoidance, which can interfere with their overall

QoL (Ernst et al., 2017; Wang et al., 2023).

Relationships may suffer greatly as a result of the demands of advanced-stage cervical cancer and associated therapies (Reblin et al., 2019). The relationships that exist between individuals and their family members, particularly spousal caregivers, can be impacted by changes in roles and duties, increasing caregiving requirements, and anticipatory grieving (Reblin et al., 2019; Zhi et al., 2024). In relationships, managing advanced-stage cervical cancer may need adjustments to roles and duties. Partners' or family members' interactions may change as a result of the patient's increasing need for care and support about cervical cancer (Oldertroen Solli et al., 2019). According to Wang et al. (2023), the healthy spouses who are caring for their spouses may choose to assume caregiving duties, including helping with everyday tasks, scheduling doctor appointments, and offering emotional support. Relationship tension and routine disruption might result from these changes. Relationship tensions may also result from the increasing demand for spousal caregiving (Wang et al., 2023). The difficulties of giving care can lead to emotional tiredness, tension, and a sense of being overwhelmed in caregivers. As a result, they may spend less time together, communicate less, and experience feelings of resentment or irritation from their spousal caregivers(Wang et al., 2023; Zetin & Dursun, 2020).

Factors related to quality of life of couples with cervical cancer

The diagnosis of cervical cancer and the subsequent treatment-related side effects significantly affect the QoL of individuals. As cervical cancer is predominantly associated with women, the disease itself, along with the physical and psychological consequences of treatment, have profound effects on patients' overall well-being and QoL. Typically, patients with cervical cancer may show no symptoms or signs in its early stages, but routine screenings and pelvic exams may detect it. Or the patient is accompanied by watery leucorrhea or bleeding after sexual intercourse, which is usually challenging to be recognized by the patient (Cohen et al., 2019). The main

symptoms and signs of advanced cervical cancer include vaginal bleeding, abnormal vaginal secretions, pelvic pain and painful intercourse. It may also be accompanied by anorexia, discomfort, fatigue, insomnia, constipation and so on (Kim et al., 2015). The superposition of side effects of surgery and radiotherapy, and chemotherapy makes patients suffer from multiple symptoms, which influenced their QoL. In the long-term outcomes of patients with cervical cancer, the main side effects include bladder dysfunction (Mirabeau-Beale & Viswanathan, 2014), intestinal dysfunction , sexual dysfunction (Yang et al., 2014), lymphedema (Tiwari et al., 2013). With surgery or chemoradiotherapy, the urinary system will risk long-term sequelae, which will significantly affect QoL. The main manifestations of patients undergoing radical hysterectomy are micturition dysfunction. After chemoradiotherapy, there may be urinary complications affecting QoL, such as dysuria (painful urination), hematuria (blood in the urine), ureteral stenosis (narrowing of the ureter), decreased bladder compliance, vesicovaginal or ureterovaginal fistula (abnormal connections between the bladder or ureter and the vagina), and hemorrhagic cystitis (inflammation of the bladder accompanied by bleeding).(Katepratoom et al., 2014; Wit & Horenblas, 2014). With surgery or chemoradiotherapy, the urinary system will risk long-term sequelae, which will significantly affect QoL. The main manifestations of patients undergoing radical hysterectomy are micturition dysfunction. After chemoradiotherapy, there may be urinary complications affecting QoL, such as dysuria, hematuria, ureteral stenosis, decreased bladder compliance, hemorrhagic cystitis, vesicovaginal and ureterovaginal fistula (Vistad et al., 2006). A prospective study showed that one year after brachytherapy, the incidence of vaginal dryness and sexual diseases increased, mainly characterized by dyspareunia and reduced libido (Lalos et al., 2009). The change of connective tissue is caused by injury of the lymphatic vessels during pelvic lymph node dissection or radiotherapy, leading to lymphatic obstruction, which can cause lymphedema of the lower extremities, and the lymphedema will deteriorate over time. Several studies demonstrated that the

symptoms caused by lymphedema are a serious treatment sequel (Rajandram et al., 2011). In addition, low-grade lymphedema is associated with increased anxiety and depression, resulting in decreased self-confidence, all of which have the greatest impact on patients' QoL (Ferrandina et al., 2012).

The physical symptoms, side effects of surgery, multi-cycle chemotherapy, and long-term radiotherapy can cause considerable pain and psychological suffering for patients, with cervical cancer, even when their survival period is extended (Fang et al., 2019). Furthermore, the period of waiting for treatment can provoke anxiety due to fear and misunderstandings regarding the treatment process. These anxieties, along with resultant physical symptoms and emotional distress, significantly affect the QoL of patients (Peerawong et al., 2020).

Cancer is gradually conceptualized as a disease that affects the entire family network. The diagnosis and treatment of cancer in one family member significantly impact cancer patients themselves and their principal family caregivers, especially their spouses (Manne & Sharon, 1998). Spouses are the most critical social supporters and caregivers of cancer patients (Thewes et al., 2016). They play essential roles in supporting patients to cope with the effects of cancer and its treatment and to maintain their health (Ustaalioglu et al., 2018). They assist patients in treatment administration, medication compliance, psychological and emotional support, activities of daily living, diet management, physical symptom management, financial management, and housework duties(Girgis et al., 2013; Given et al., 2004; Le et al., 2003) . Therefore, spouses often face functional, physical, psychological, social, and spiritual burdens (Grant et al., 2013). In the long run, these burdens tend to deplete their emotional and psychological resources, making them more vulnerable to extremely high experiences (Zetin & Dursun, 2020), which finally impeded their QoL (Li et al., 2018). Some studies have shown that the stress caused by these burdens can increase the morbidity and mortality risk of spouses (Govina et al., 2015; Hlabangana & Hearn, 2020; Johansen et al., 2018).

Theory related to stress and coping

The determination of factors influencing the QoL in patients with cervical cancer and their spousal caregivers is complex and multifaceted. Gaining a comprehensive understanding of these factors can provide a valuable framework for healthcare professionals working with this population. Hence, an innovative model has been developed that combines the stress and coping theory (Lazarus & Folkman, 1984) with the Theory of Dyadic Illness Management (Lyons & Lee, 2018), and synthesizes relevant research evidence. To examine the relationship between dyadic variables, the Actor-Partner Interdependence Mediation Model proposed by Ledermann et al. (2011) will be employed.

Transactional model of stress and coping theory

Lazarus and Folkman's (1984) transactional model of stress and coping has been widely embraced in nursing research, providing a valuable theoretical framework for understanding coping mechanisms among patients with cervical cancer and their spousal caregivers. According to the stress and coping theory, a range of personal and environmental factors initially influence how individuals appraise and cope with the challenges of illness, ultimately impacting their long-term QoL. Stress arises when there is a perceived imbalance between the demands of a person's environment and their available resources, leading to a sense of threat to their well-being. Lazarus and Folkman's theory (1984) suggests that cognitive appraisals of the cancer experience, conducted by patients or their spousal caregivers, play a critical role in determining their overall well-being. The theory distinguishes between two types of appraisals: primary and secondary. Primary appraisals involve evaluating the significance of the cancer diagnosis, including the perceived threat it poses to one's life and livelihood. Secondary appraisals involve assessing one's perceived ability to manage the consequences of the illness. Coping, in turn, refers to the behavioral, cognitive, or social responses individuals employ based on these appraisals, aiming to

manage or tolerate the internal and external demands of the person-environment transaction (Folkman et al., 1986). Notably, patients and spousal caregivers' appraisals of cancer have been linked to their utilization of coping strategies (Franks & Roesch, 2006) and their subsequent QoL (Northouse et al., 2002). Both external (e.g., environmental) and internal (e.g., resilience, self-efficacy) factors may influence the process. High-level resilience can improve the individual's ability to withstand pressure, promote them to adopt positive coping styles, and promote a good outcome (Steinhardt et al., 2015). Self-efficacy also has been observed in cancer patients, which can improve QoL (Kreitler et al., 2010). Nonetheless, several critical knowledge gaps remain. Over the past two decades, scholars have increasingly adopted a systemic perspective, moving away from the notion that stressors only affect one partner in a couple. Instead, there has been a growing recognition that stress in couples should be understood as a dyadic rather than an individual phenomenon (Bodenmann, 1995; Bodenmann, 1997; Lyons et al., 1998). By adopting this interpersonal viewpoint, researchers have gained a fresh understanding of how couples navigate not only everyday stressors but also significant life events.

The Theory of Dyadic Illness Management

Scholars have modified their views on stressors from impacting simply one partner to influencing both in the previous two decades, adopting a more systemic perspective. Couples' stress was no longer seen as an individual issue, but rather as a dyadic one affair (Bodenmann, 1995; Bodenmann, 1997; Lyons et al., 1998). The Theory of Dyadic Sickness Management (Lyons & Lee, 2018) focuses on the patient-care partner dyad as the unit of attention, rather than an individualistic perspective of illness. The primary objective of this theory is to promote the holistic health and well-being of individuals by recognizing disease as a dyadic phenomenon. It emphasizes the significance of ensuring the well-being of both partners in a relationship (Lyons & Lee, 2018). According to the hypothesis, jointly assessing patient symptoms within the dyad leads to increased collaboration in illness treatment behaviors, resulting in

improved physical and mental health over time. However, the dyad's ability to navigate disease can be hindered by a lack of shared understanding. This theory is underpinned by three main principles: dyadic appraisal, dyadic management, and dyadic health. Dyadic appraisal refers to the magnitude and direction of symptom incongruence between the patient and the care partner. It involves understanding how much the patient and care partner disagree in their appraisals of symptoms, as well as who appraises the symptoms as higher or lower. Dyadic management encompasses various behaviors such as decision-making, managing changes in function, handling compounded signals and side effects, addressing symptoms, and maintaining overall health habits. Dyadic health focuses on the physical and mental well-being of both members of the dyad. It acknowledges that the health of both individuals can influence how they evaluate and cope with illness over time (Cohen et al., 2019). Despite increased attention on the care dyad in recent years, there is still a scarcity of research on how physical and mental health co-vary within the dyad over time, especially in life-threatening situations such as cervical cancer. This research approach highlights the importance of the patient and care partner working together as a unit to assess and manage the experience of illness.

The Actor-Partner Interdependence Model and Actor-Partner Interdependence Mediated Model

The present study employs the Actor-Partner Interdependence Model to depict the direct effects among variables, while incorporating the Actor-Partner Interdependence Mediation Model to elucidate the indirect effects of resilience and self-efficacy on a dyadic coping and QoL model within couples with cervical cancer (Ledermann & Bodenmann, 2006). Data collected from two individuals in a given system is referred to as dyadic data (e.g., the relationships such as patient and caregiver, romantic partners, tutor and student). Close relationships, according to the Interdependence Theory (Kelley & Thibaut, 1978), are characterized by significant interdependence, which is defined as the amount to which intimate partners influence

one other. In other words, two scores of the same variable obtained from relationship partners are more similar to (or different from) values obtained from individuals who are not in a relationship. This is known as interdependence (or non-independence)(Kenny et al., 2020). Like many other interpersonal phenomena (Petrocchi et al., 2019; 2021), dyadic coping necessitates consideration of the influential reciprocal processes and co-regulation of reactions between partners. Data resulting from these processes are interdependent, which means that one individual's variables are likely to be related to the other's; therefore, it is critical to account for this interdependence to ensure that significant effects can be assigned to the independent variables (Cook & Kenny, 2005). These data demand a specific set of analysis procedures that take into account their non-independence (Kenny et al., 2020). The Actor-Partner Interdependence Model is the most famous statistical methodologies used to study interpersonal phenomena (Kenny, 2018). The APIM provides a valuable framework for analyzing dyadic data, taking into account the interdependence between partners within a couple. This model acknowledges that the attributes and behaviors of one member can impact both their own outcome variable (actor effect) and the outcome variable of their partner (partner effect). It has gained significant popularity in research areas such as marriage and family studies (Cook & Kenny, 2005).

The Actor Partner Interdependence Mediation Model (Ledermann et al., 2011) is an extension of the conventional APIM, designed to assess connections between three pairs of variables from each partner (as depicted in Figure 2). This dyadic data analytic approach allows for the evaluation of actor and partner effects within three sets of variables: X (predictors), Y (outcomes), and M (mediators). Actor effects represent associations between one's variable and another variable within the same individual, while partner effects refer to associations between one's variable and the partner's variable. In addition to accounting for partner interdependence and examining the impact of predictors on outcomes, the APIMeM also incorporates the

traditional mediation model's direct and indirect effects, resulting in a total of 12 routes. Furthermore, the model enables the estimation of residual covariance between variable pairs. By utilizing the APIMeM, this study aims to comprehensively analyze dyadic relationship data (Ledermann et al., 2011). In this study, we will employ the APIMeM to examine a multiple mediator model, incorporating both actor and partner mediating factors within the same model.

In this study, multiple potential paths were analyzed to examine the indirect effects and identify sets of indirect effects that could best explain the direct impacts on the QoL for patients with cervical cancer and their spousal caregivers. The hypotheses posited that the actor effect represented the influence of dyadic appraisal within cervical cancer couples on their individual dyadic coping and the impact of individual dyadic coping on their respective QoL. Additionally, the partner effect was considered as the influence of each individual's dyadic appraisal on the dyadic coping and the subsequent impact of dyadic coping on the QoL of the other member in the dyad. Resilience and self-efficacy were hypothesized to act as mediating factors between dyadic appraisal and individual dyadic coping, as well as between dyadic coping and individual QoL.

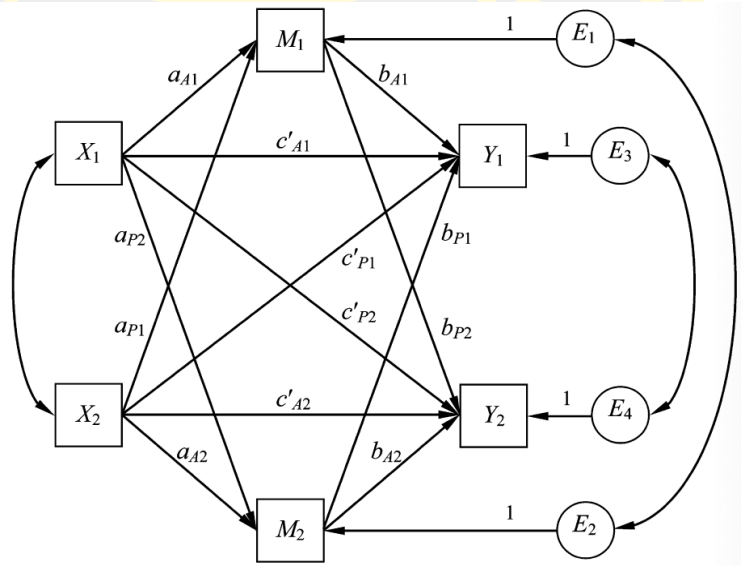


Figure 2 The Actor Partner Interdependence Mediation Model

Factors influencing the quality of life in couples with cervical cancer

The factors that are related to QoL in patients with cervical cancer and their spousal caregivers are indicated based on the stress and coping theory (Lazarus & Folkman, 1984), the Theory of Dyadic Illness Management (Lyons & Lee, 2018) and empirical studies. Factors that are associated with QoL in patients with cervical cancer and their spousal caregivers in this study include dyadic appraisal, resilience, dyadic coping, and self-efficacy.

Dyadic appraisal

Dyadic appraisal is the process of patients and their partners taking advantage of past knowledge and experience to analyze and explain the current symptoms or illness and share the threat with each other. Lazarus and Folkman's (1984) proposed a stress and coping model that consists of two appraisals. The first appraisal involves evaluating the harmfulness or threat associated with a situation (primary appraisal), while the second appraisal focuses on the perceived control or ability to change the situation (secondary appraisal). In the case of cancer, research suggests that it affects not only patients but also their spousal caregivers, impacting various aspects of their physical, psychological, and social well-being (Helgeson et al., 2018). Therefore, it is crucial to consider the dyadic nature of the appraisal process, taking into account the perspectives of both the patient and their spousal caregiver.

In the disease process, dyadic appraisal of disease and its linked difficulties plays a vital role (Lyons & Lee, 2020). Berg and Upchurch (2007) defined dyadic appraisal as "ours" vs. "mine" illness representation, ownership, or shared stresses, which can range from partner non-involvement to partner over-involvement. Couples' sickness representations, for example, address concerns like "Is the illness controllable?" and "What are the illness's consequences?"(Cano et al., 2005; Li & Loke, 2014; McPherson et al., 2008) revealed that dyadic appraisal of illness differed by symptom, stage of illness, and kind of dyad, as well as other contextual factors

(Cano et al., 2005; Li & Loke, 2014).

The Theory of Dyadic Illness Management (Lyons & Lee, 2018) demonstrated that from conception to analysis and interpretation, the incongruence in illness appraisal (i.e., the degree and direction of difference between patient and care partner) becomes the focus. It means that the focus of this theory turns away from symptom intensity and toward the degree to which the members of the dyad are on the same page when it comes to assessing sickness. As a result, shared appraisal within the dyad is critical to maximizing dyadic health. Patients and spousal caregivers can benefit from shared dyadic evaluation by dealing with the dyad pressure generated by disease together, and then promoting dyadic health (Lyons et al., 2020).

Inconsistency in dyadic appraisal, on the other hand, may lead to less collaboration in dyadic management behaviors and have negative consequences for dyadic health. Previous research on stroke couples has focused on the discrepancy between survivors' and spousal caregivers' perceptions of the condition, particularly in survivors' memory and reasoning abilities (McCarthy et al., 2018). According to qualitative research, wives tend to exaggerate the severity of the patient's condition, preventing the patient from engaging in certain activities and making the survivors feel belittled (McCarthy & Lyons, 2015). It is investigated whether such inconsistency between stroke couples is linked to the spousal caregivers' poor health such as depressive symptoms (partial r = .426; $p < .05$) (McCarthy et al., 2018). Lyons et al. (2020) investigated the correlation between changes in dyadic appraisal and physical and mental health in 109 lung cancer family care dyads. The study unveiled that greater incongruence in symptom appraisals was linked to poorer physical health outcomes for both patients and care partners. Importantly, an augmented level of incongruence in appraising the patient's pain interference was associated with a decline in the patient's physical health over time.

After initially identifying or acknowledging symptoms, the appraisal of these symptoms can become intricate and can be influenced by several factors,

including response-shift bias, protective buffering, social restriction, and cognitive blunting (Lee et al., 2013; Lepore & Revenson, 2007; Soriano et al., 2018). Similarly, care partners experience difficulties assessing patient symptoms, such as pain and dyspnea, which are often challenging to perceive or differentiate from normal aging processes (Broberger et al., 2005). When a dyad lacks a shared appraisal of the patient's symptoms, it can impede their ability to collaborate and manage the illness together, resulting in clinical and interpersonal obstacles (Berg et al., 2008; Lee et al., 2017), posing clinical and interpersonal obstacles (Li & Loke, 2014). A study by Lyons et al. (2016) demonstrated that the dyadic evaluation and coping strategies among lung cancer patients strongly predicted the mental health outcomes of both individuals within the dyad. The study also accounted for covariates, such as contextual circumstances, and found a significant association ($p < .001$).

Literature reviews reveal that dyadic illness appraisal profoundly influences the QoL for both patients and their spousal caregivers. Current dyadic health models propose that optimal outcomes, such as enhanced QoL, arise when both patients and partners perceive an illness as a shared experience (Badr & Acitelli, 2017; Berg & Upchurch, 2007; Helgeson et al., 2018). Specifically, when partners view the illness as a joint challenge to be managed collaboratively, it is considered especially advantageous for patients because such partners tend to offer more beneficial support types to patients, such as collaborative assistance instead of protective buffering (Helgeson et al., 2018).

Resilience

Resilience is an internal coping recourse, and in many studies, resilience refers to individuals' ability to positively cope and adapt from difficulty, adversity, major traumatic or threatening events (Sinclair & Britt, 2013). When individuals face stressful events and adversity in life, resilience, a biological instinct of self-protection, will be displayed, and help them improve their ability to deal with stressful events, resist the unfavorable influence of the environment, promote the adaptation process

and improve their QoL (Sinclair & Britt, 2013). In recent years, with the rise of positive psychology, the variable of resilience has been widely valued by scholars. Resilience plays an important role in the process of psychological adaptation, which explains why some people are overwhelmed and unable to adapt in the face of major stressful and traumatic events, while others respond calmly and achieve a positive outcome. At present, there is no unified definition of resilience. Generally speaking, resilience mainly includes process definition, result definition and trait definition. The process definition refers to that resilience is a process of dynamic change, which is a process of continuous coordination and good adaptation between individuals and traumatic events such as stress and adversity(Gillespie et al., 2009). The result definition refers to that resilience is the result of good adaptation of individuals after experiencing adversity, trauma and setback (Ovaska-Stafford et al., 2021). The trait definition refers to the ability of individuals to recover from major traumatic and threatening events and adapt well (Sinclair & Britt, 2013). This study adopts the last definition: trait definition. Resilience consists of two basic elements: recovery and sustainability. Recovery refers to the ability of individuals to bounce back and recover fully from the physical and psychological harm caused by stressful events. Sustainability refers to the ability of individuals to endure and continue forward in the whole stressful event. Previous studies have found that the trait of resilience is not a fixed and unchangeable personality feature, and the level of resilience can change. It can change through the changes of family, environmental factors, physical and mental perfection and time (Zautra, 2009).

In addition to the deterioration of physical symptoms and side effects of treatment, cancer patients also need to fight against recurrent psychological distress and fear of death. Although resilience cannot help patients avoid a series of suffering caused by cancer, it can help patients better adapt to major adversity and maintain physical and mental health. As a new concept in recent years, resilience has become a hot topic (Seiler & Jenewein, 2019; Sun et al., 2021). Research has shown that

resilience can reduce the shock of a cancer diagnosis and protect individuals from negative events' adverse effects (Seiler & Jenewein, 2019). There is growing evidence linking resilience in cancer patients to better adapting to cancer, better mental health, better treatment outcomes and higher QoL (Duan-Porter et al., 2016; Martin et al., 2016; Wenzel et al., 2002; Ye et al., 2017). More specifically, there is an evidence that resilience predicts patients' fatigue due to treatment (Wenzel et al., 2002). A good resilience can support patients in reducing treatment-induced damage to their bodies, reducing the duration of their treatment (Hou et al., 2010), and maintaining a relatively good psychological state, which is associated with high QoL (Strauss et al., 2007). A pilot study assessed resilience in patients after allogeneic stem cell transplantation shown that resilience is positively correlated with QoL and social functioning. A high degree of resilience is associated with less anxiety(p =.008) and depression (p <.001), higher physical (p =.041), emotional(p =.030), and social functioning (p =.003), and a higher QoL compared to a low degree of resilience (p <.001) (Schumacher et al., 2014). Popa-Velea et al. (2017) showed that the resilience of cancer patients was positively correlated with QoL (p <.001), and resilience played an intermediary role between positive coping style (r=0.73,p <.01) and QoL (p <.001). In contrast, cancer patients who reported a lower degree of resilience suffered from lower QoL, such as more depression, distress (Ye et al., 2017), and cancer-related fatigue (Zou et al., 2018).

Studies in cancer caregivers also found that high resilience can promote caregivers' adaptation to diseases, improve coping ability, reduce anxiety and depression and improve QoL (Hwang et al., 2017; Simeon & Jones, 2015). A study focused on caregivers of cancer survivors also found that resilience can help caregivers better cope with stress and adapt to the new environment. Caregivers with low levels of resilience have greater psychological distress, greater caregiver burden(β =0.203; 95% CI, - 0.374 – 0.018) and poorer QoL(β =0.431; 95% CI, 0.683 – 0.207) (Zetin & Dursun, 2020). A spousal caregiver who resides with the

patient is more likely to suffer from depression or anxiety, ultimately lowering QoL (Shaffer et al., 2017). Based on a review of the literature, resilience has direct and indirect effects on spouse caregivers' QoL and caregiver burden (Sun et al., 2021). A high level of resilience can reduce the negative effects of stressful events on spousal caregivers, make them more optimistic, and experience less care burden and helplessness, which positively promotes the QoL of spousal caregivers (Sun et al., 2021).

Studies on the resilience of cancer patients and their spousal caregivers confirm that (Lim et al., 2014) resilience affects the individual coping ability, and affects each other in the process of a couple coping together. The patient's resilience will directly and positively affect the spouse's resilience level, and then affect the spouse's coping ability and finally affect the patient itself. Patients' appraisal of illness can significantly predict their resilience. A high level of resilience is the key factor to improve the dyadic coping ability of patients and their spousal caregivers (Popa-Velea et al., 2017).

Research indicates that individuals with resilience tend to be engaged and proactive in their interpersonal connections, which in turn generates more positive reactions from their peers (Hou & Lam, 2014). Resilience is very important in the study of the dyadic relationship. Popa-Velea et al. (2017) found that resilience significantly enhances the dyadic coping skills of spousal caregivers for cancer patients, which in turn positively affects the QoL for both parties (standardized beta = -0.31, t = -3.49, $p < .001$). Study (Lim et al., 2014) on the resilience of cancer survivor-spouse dyads (including breast, colorectal, and prostate cancer) confirm that resilience not only affects their own coping ability but also affects each other in the process of dyadic coping. The patient's resilience will directly and positively affect the spouse's resilience level, then affect the spouse's coping ability, and finally, affect them own. Study (Lim et al., 2014) confirmed that resilience and dyadic coping are cause and effect and influence each other. A high level of resilience can help patients,

and their spousal caregivers cope successfully and improve their resilience in the process of positive coping.

In all, resilience has a positive effect on dyadic coping among cancer patients and their spouses. High degree of resilience could positively improve the QoL of patients and their spouses through improve the dyadic coping ability of couples.

Dyadic coping

Dyadic coping refers to the shared response and approach used by patients and their spousal caregivers when confronted with dyadic stressful circumstances. Prior to the 1970s, when scientists began studying stress, they concentrated on individuals' efforts and personal capacities for dealing with stressful living conditions (Berg & Upchurch, 2007). Stress and coping are primarily conceptualized in terms of the transaction model (Lazarus & Folkman, 1984), which emphasizes individual cognitive and emotional expression during the stress coping process and emphasizes individual coping behavior. This model assumes that individuals experience stress when they perceive their available resources are insufficient to meet the needs of specific situations and cope with stress through emotion- or problem-centered restraining behaviors (Lazarus & Folkman, 1984).

However, academics investigating stress management have stressed the importance of the social context and the involvement of significant others in managing stressful experiences since the early 1990s. While stress theories focused on the individual suggest social origins and environmental impacts of personal coping strategies, contemporary perspectives introduce an explicitly interactive framework, highlighting the interdependent nature of stress and coping processes within couple dynamics (Bodenmann, 1997). In the interactive realm of stress and coping, partners' stress is perceived to be inherently reciprocal. The stress experiences of spousal caregivers are interconnected, as the stress of one partner inevitably affects the other (Revenson & Lepore, 2012). Viewing stress and coping as interpersonal events

transforms individual coping responsibility into a mutual process at the couple level, where stress emotions, cognitive evaluations, and coping actions are collectively managed by partners (Bodenmann, 2005). Bodenmann (1997) invented the term "dyadic coping" in 1997, defining it as "all efforts made by both parties to confront and handle stressful circumstances, as well as the pressure exerted on one party (indirect dyadic pressure) or both parties (dyadic pressure)."

Bodenmann (2005) also defined ‘dyadic stress’, which means that stressful events or encounters always directly affect both partners either, if both partners are faced by the same stressor or when the stress originates from within the relationship, or indirectly when one partner's stress overflows into the relationship and affects both partners in that way. Dyadic stress occurs when both partners are directly or indirectly affected by stressful situations (Bodenmann, 1995). Direct dyadic stress can occur when external or internal stress affects the couple as a whole (e.g., birth of a child, problems with relatives). Indirect dyadic stress, on the other hand, can transpire when one partner’s individual stress (e.g., work stress) is not solved or handled improperly, subsequently impacting the other partner. Cancer is such a dyadic stressor that not only threatens the patients’ QoL, including his/her physical, psychological, and social aspects, but also stressful for the other partner. The partner has to worry about the patient, adapt to the patients’ illness, provide support and caring, experience important restrictions in social life, might suffer from economic consequences, and/or is threatened by the insecure future.

In the dyadic perspective, "focusing only on the illness participation of patients and ignoring the participation of partners" is outdated. Scholars encourage cancer to be regarded as a stressful event involving patients and partners. Taking patients and partners as a dyad in illness treatment is very important to optimize their joint health (Lyons & Lee, 2018; Lyons et al., 2015). Cancer is regarded as a 'we-disease' (Kayser et al., 2007), a dyadic stressor impacting not only the patient's QoL across physical, psychological, and social domains but also imposing stress on the

partner (Bodenmann, 1995; Coyne & Smith, 1991; Zhang et al., 2020). Through this dyadic understanding of stress that highlights the interdependence of partners' stress experiences, couples respond to both personal and shared stressors, triggering coping mechanisms for challenges that arise from both within and outside the relationship. Adopting an interpersonal perspective provides couples with fresh insights into managing daily stressors and significant life challenges. Dyadic coping refers to partners managing stressors that originate from situations beyond their relationship (Bodenmann, 1995).

Different theories have different definitions for the understanding of the essence of dyadic coping. The Systemic-Transactional Model (STM) integrates the views of several theories and holds that supportive DC is that partners support each other through the joint efforts of individuals and each other during illness stress event (Bodenmann, 1995). The DC model consists of positive and negative DC dimensions. Positive DC forms positively impact both partners and their relationship, including supportive, delegated, and common DC. Negative DC forms include hostile, ambivalent, and superficial efforts to assist the stressed partner. It also emphasized the stress communication process as a DC dimension. It includes collaborative and individual mechanisms intended to assist one partner or to help partners cope with stress together (Falconier & Kuhn, 2019). Studies have found that more positive dyadic coping styles are associated with higher relationship satisfaction, healthy couples' behavior, higher relationship quality and higher QoL (Bryan et al., 2005).

In healthy couples, evidence suggested that greater levels of positive DC are related to higher levels of relationship satisfaction, higher relationship quality, and QoL (Bryan et al., 2005). Meier et al. (2011) found that DC was also associated with QoL in couples with one partner suffering from chronic obstructive pulmonary disease. In more detail, patients' QoL was mainly influenced by their own delegated DC ($r = .40$, $p < .05$) and negative DC of partners ($r = -0.49$, $p < .05$) and their stress

communication (r = −0.35, $p < .05$). Partners' QoL was positively impacted by their own delegated DC (r = 0.40, $p < .05$) and patients' delegated DC (r = 0.40, $p < .05$) and negatively influenced by their own negative DC (r = 0.40, $p < .05$), patients' negative DC (r = −0.32, $p < .05$), and patients' stress communication.

Ernst et al.(2017) reported that the dyadic coping strategies employed by hematological cancer patients and their partners subsequently impact their individual mental QoL. Furthermore, the dyadic coping behaviors of both hematological cancer patients and their partners were found to influence the partners' mental and physical QoL over time. The findings revealed that lower social and functional QoL scores were correlated with higher levels of insecure attachment in oneself and one' s partner, mediated by diminished use of CDC. Surprisingly, a higher reported engagement in CDC by one' s partner correlated with a reduction in one' s own functional QoL. While CDC generally contributes positively to QoL, it can also be experienced as emotionally draining (Crangle. et al., 2020).

Research (Berkhuysen et al., 1999) has shown that overprotective behavior by partners is linked to a smaller increase in self-efficacy among Dutch patients with coronary disease ($p = .03$). A study (An et al., 2021) of 243 lymphoma patients and their spouses showed that their dyadic coping scores were significantly associated with their self-efficacy (r = 0.523, $p < .01$) and their spouse's self-efficacy (r = 0.175, $p < .01$). Saita et al. (2015) research on early breast cancer patients showed that the higher patients' self-efficacy, the more inclined to adopt positive coping strategies($\beta = 0.38$, $p < 0.01$). Fuochi et al. (2018) shows that the higher the self-efficacy of patients, the more inclined they are to adopt the individual coping style of facing alone and the communication strategy of avoidance. Research on cancer patients and spousal caregivers shows that spousal caregivers with high self-efficacy have more active participation in coping behavior. In contrast, spousal caregivers with low self-efficacy are more inclined to adopt negative coping strategies of protection buffer. At the same

time, Bachner et al.(2014) showed that the higher caregivers' self-efficacy, the more communication and coping related to stress between patients. Falconier & Kuhn (2019) assert that within the realm of illness, behaviors like overprotection, protective buffering, and hostile/ambivalent dyadic coping are associated with diminished self-efficacy, control, physical and emotional health, and relationship satisfaction, no matter which partner is giving or receiving care.

Evidence suggested that dyadic coping is positive related to QoL of patients and their spousal caregivers. which means that positive DC are related to higher levels of QoL. In addition, dyadic coping has a positive effect on self-efficacy among patients and their spousal caregivers.

Self-efficacy

Self-efficacy refers to the individuals' general self-efficacy in this study, which means the overall confidence of patients and their spousal caregivers in their ability to take specific actions and overcome obstacles in specific situations. Self-efficacy is one of the interesting psychological problems for researchers (Bandura, 1977). As a motivational theory, Self-efficacy is basis of behavior change and represents the response to an attempt to achieve goals (Bandura, 1977). This is a belief that a person can effectively and completely carry out a behavior necessary to reach a expected goal, that is, to achieve the expected outcome (Clark & Dodge, 1999). Self-efficacy can predict specific behaviors and also lead to specific behavior (Bandura, 1977; Clark & Dodge, 1999). Bandura (1977) also believes that individuals' belief in their ability to overcome specific challenges can promote individuals to overcome obstacles. Self-efficacy is not a broad concept. Individuals have a sense of self-efficacy for different challenges and tasks. For example, a person may have a high level of self-efficacy to learn cooking, but a low self-efficacy in sports activities. It is believed that individuals with higher disease-related self-efficacy, or individuals who believe they have the ability to cope with their disease, have more realistic goals and lower levels of anxiety and depression (Tennstedt, 2000).

The theory of self-efficacy has been observed in many fields, including health (Bandura, 1985), chronic disease (Marks & Allegrante, 2005), pain (Manning & Wright, 1983), smoking behavior (Garcia et al., 1990), postsurgical recovery of diseases (Schwarzer & SchrÖder, 1997), and phycological states (Benight & Bandura, 2004) such as fatigue, anxiety, stress, arousal, and mood states. Self-efficacy theory is also widely used in cancer patients, which can improve QoL (Kreitler et al., 2010). This hypothesis has been tested with cancer patients whereas self-efficacy has been shown to be positively related to QoL (Lev & Owen, 2010). In addition, within a sample of survivors with Latina breast cancer, higher levels of self-efficacy were related to better overall QoL as well as better social, emotional, functional well-being domains, less burden of breast cancer symptom and less cancer-specific distress (Baik et al., 2020).

Research (Rottmann et al., 2010) involving 684 breast cancer patients identified self-efficacy as a significant predictor of emotional well-being and an actively adaptive approach to managing the disease. According to Thornton et. al (2021), self-efficacy is directly correlated with aspects such as physical activity, symptom management, mental health, nutrition, sexual health, and fertility preservation. They concluded that self-efficacy influences behavior modification, health preservation, and holistic well-being. This trait can evolve with time and through targeted interventions, enhancing the management of cancer therapy symptoms.

There are also many studies on the self-efficacy of patients with cervical cancer. Many of studies focus on patients without cervical cancer screening, including descriptive studies and intervention studies. Ghalavandi et al. (2020) noted that women's knowledge and self-efficacy are associated with the practice of pap smear testing, and improving women's self-efficacy can promote effective programs for women's related health behaviors regarding CC screening. Yang et al.(2014) used questionnaires to measure anxiety and depression hope and general self-efficacy and

other possible correlates in 224 patients with cervical cancer. Through hierarchical regression analyses, the researchers showed that general self-efficacy hope, optimism and as a whole accounted for 31.3% of depression and 35.6% of anxiety, which meant that general self-efficacy and hope, optimism were significantly associated with depression respectively. Tong et al. (2021) suggested examining how bundled nursing coupled with peer support affects the psychological well-being and self-efficacy of patients with cervical cancer undergoing chemotherapy. This intervention can effectively improve the psychological status of patients with cervical cancer receiving chemotherapy and improve their self-efficacy and QoL.

In health care research, self-efficacy is identified as a determinant of health outcomes. It is posited that this influence manifests through alterations in stress responses and caregiving behaviors in the oncology context. Family caregivers are pivotal to health care delivery, often referred to as 'the hidden patient' (Roche & Palmer, 2009).

Self-efficacy has been identified as a factor influencing health outcomes in health care research (Bandura, 1977). This is assumed to occur as a result of the stress response (Zhang & Schwarzer, 1995) and behavioral changes, both of which are associated with cancer caring (O'Leary, 1992). Family caregivers, commonly known as the hidden patient (Roche & Palmer, 2009), are critical to health care delivery (National Cancer Institute, 2019). Goren et al. (2014) reported the health impairments experienced by caregivers of cancer patients, including increased healthcare utilization, work challenges, stress-related illnesses, and poorer health-related QoL. Segrin et al. (2018) have described the interdependence between cancer patients and their caregivers, in which one person’s psychological and physical distress will affect the distress and QoL in the other (Segrin et al., 2018; Segrin et al., 2020). Research on caregivers of cancer patients shows that caregivers with higher self-efficacy have a much lower risk for depression (Yates et al., 1999), and caregivers have lower levels of strain, increased positive mood, and decreased negative mood (Keefe et al., 2003).

At present, there are more and more studies on self-efficacy, mainly analyzing the self-efficacy level and intervention methods of patients with different diseases. The quantitative evaluation of self-efficacy mainly adopts the general self-efficacy scale and caregiver self-efficacy questionnaire: 1) the general self-efficacy scale (GSES) was compiled by Schwarzer et al. and Sinicized by Zhang and Schwarzer (1995). The scale has been widely used to evaluate the level of individual self-efficacy in various fields α The coefficient is 0.75 ~ 0.90 (Wang et al., 2001); 2) Family caregivers' self-efficacy questionnaire was prepared by Fortinsky et al. (2002), which has not been tested for reliability and validity and has not been popularized and applied. In view of this, the GSES was used in this study to evaluate the level of self-efficacy of patients with cervical cancer and their spousal caregivers.

According to the research, self-efficacy has a beneficial effect on patients' and spousal caregivers' QoL. Individuals who express a greater sense of self-efficacy in their abilities to manage the obstacles associated with cancer and cancer caring report less frequent and intense sadness and anxiety symptoms, a higher QoL, and less caregiver burden (Badr & Krebs, 2013; Porter et al., 2008).

Summary

This study mostly has dealt with various aspects of QoL of patients with cervical cancer and their spousal caregivers, multiple factors relating to QoL of patients with cervical cancer and their spousal caregivers should be verified simultaneously. A new dyadic coping theory is proposed in our research, which will explore the mechanism between the dyadic appraisal, dyadic coping and QoL of patients with cervical cancer and their spousal caregivers, as well as the mediating effect of resilience and self-efficacy in the process of dyadic coping, so as to actively carry out the "husband and wife centered" health intervention research in the nursing field, so as to improve the dyadic coping ability of patients with cervical cancer and their spousal caregivers, then improve the QoL of patients, spousal caregivers and the

whole family. It also provides a basis for the research and health services of the QoL of patients with other chronic diseases and their spousal caregivers.

In the hypothesized model, patients' and their spousal caregivers' dyadic appraisal are defined as exogenous variables, which influence patients' and their spousal caregiver' QoL through their own and partner's dyadic coping. Both patients' and their spousal caregivers' dyadic coping are endogenous variables. Thus, it is posited that dyadic appraisal directly or through their own's resilience indirectly influence patients' and their spousal caregivers' dyadic coping. Patients' and their spousal caregivers' dyadic coping directly or through their own's self-efficacy indirectly influence patients' and their spousal caregivers' QoL. As well as, it is posited that resilience has a mediating effect between dyadic appraisal and dyadic coping and self-efficacy has a mediating effect between dyadic coping and QoL among patients with cervical cancer and their spousal caregivers.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the research methodology including research design, population, sample, sample size, research instruments, procedures data collection, and data analysis.

Research design

This study utilized a descriptive cross-sectional design. SEM was used to test the hypotheses of the actor-partner interdependent mediation model of resilience and self-efficacy on a dyadic coping and QoL models among cervical cancer couples and to test the predictors for the predictive relationship between patients' and spousal caregivers' dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL.

Setting of the study

This study recruited patients diagnosed with cervical cancer and their spouse caregivers. Patients with cervical cancer included those who have recently received a diagnosis of cervical cancer and subsequently admitted to the hospital for a range of treatments, including surgery, radiotherapy, or chemotherapy after their initial admission. Spousal caregivers were informal caregivers who were the patient's primary caregivers and who accompanied the patients throughout their hospitalization. The study was conducted in the oncology or gynecological departments of regional hospitals located in Jiangsu Province, China. Patients who visit regional hospitals in Jiangsu Province for medical care can be thought of as reasonably representative of the population in Jiangsu. In terms of demography, socioeconomic standing, and cultural heritage, the population of Jiangsu is diversified, making it one of China's most populated provinces. Hence, the traits of

the patients who are treated at these facilities can offer important insights into the province's general healthcare needs and trends. A total of 36 hospitals, distributed across different regions (Northern: 6 hospitals, Central: 12 hospitals, Southern: 12 hospitals, Eastern: 6 hospitals), were included in the study due to their patient population with cervical cancer. Each of these hospitals can provide cancer treatment availability.

Population and participants

The target population was patients with cervical cancer and their spousal caregivers attending the gynecological departments of six regional hospitals. The participants consisted of patients with cervical cancer and their spousal caregivers in the gynecological departments of six regional hospitals, including Yancheng NO.1 people's hospital, Jianhu People's Hospital, Affiliated Hospital of Jiangsu University, Suzhou first people's hospital, Affiliated Hospital of Jiangnan University, Affiliated Hospital of Xuzhou Medical University.

The patients with cervical cancer with inclusion criteria as the following:

1) Diagnosed with cervical cancer by clinical diagnosis and pathological analysis;

2) Being at least 18 years old;

3) Hospitalized for treatments;

4) Have married and living with their spouses;

5) Able to understand and read Chinese.

The Inclusion criteria for spousal caregivers:

1) Be currently married or in common-law relationships;

2) Be at least 18 years old;

3) Be able to understand and read Chinese.

The exclusion criteria for patients with cervical cancer:

1) Having other malignant tumors;

2) Having cancer recurrence or complicated with other severe diseases;

3) being Diagnosed with cognitive impairment by a doctor.

The exclusion criteria for spouse's caregivers:

1) Being unable to provide care for patients;

2) Diagnosed with cognitive impairment by doctor.

Sample size calculation

The sample size estimation for this study relied on the application of a structural equation model testing approach. As Hair et al.'s (2010) recommendation, a minimum sample size of at least five respondents per estimated parameter or a ratio of 10 respondents per parameter was considered appropriate. A medium sample size was employed in this study. The study encompassed a total of 69 estimated parameters, including 34 errors, 18 factor loadings, 16 path coefficients, and 1 variance covariance. Following the recommended guidelines, a sample size range of 345-690 was determined for a 5-10:1 ratio. However, to account for a 10% dropout rate attributed to attrition, the sample size was adjusted to 390-759. Hence, the final sample size for this study was 642 (321 couples) (Hair et al., 2010).

The survey data were collected by registered nurses and research assistants with research experience. Research assistants recruited participants from gynecology wards in five tertiary hospitals in Jiangsu Province. Participants were selected using a convenience sampling method before their first treatment. Participants who fulfilled the inclusion criteria were recruited for the study. The researcher and research assistants apprised them of the study's objectives, potential risks, benefits, and their option to withdraw from the study at any point. Then the participants were then asked to sign consent forms and be given the questionnaires which take approximately 15-30 minutes to complete. Participants each received an RMB 10 gift card for participation.

Sampling technique

As the aim of this study was to explore the influence of patients with cervical cancer and their spousal caregivers on their individual health outcomes and mutual health outcomes, it was concluded that the APIM would be the most suitable statistical model. Moreover, this model offers the advantage of accounting for the interdependence between dyad members' scores on crucial study outcomes, ensuring control over non-independence (Cook & Kenny, 2005; Kenny et al., 2020). Furthermore, the most appropriate model for testing these hypotheses regarding indirect effects was determined to be the Actor-Partner Interdependence Mediated Model (O'Neill, 2019). Prior to implementing the APIM and APIMeM, an assessment of the non-independence and distinguishability of dyads was conducted (Kenny et al., 2020; Ledermann et al., 2011). Before modeling the APIM and APIMeM, the non-independence and distinguishability of dyads were evaluated (Kenny et al., 2020; Ledermann et al., 2011).

The study employed a cluster random sampling method to recruit patients with cervical cancer and their spousal caregivers from various regional hospitals. Initially, the 36 hospitals were categorized into four clusters based on their geographical location: Northern (consisting of 6 hospitals), Central (comprising 12 hospitals), Southern (including 12 hospitals), and Eastern (comprising 6 hospitals). Subsequently, hospitals were randomly selected from each region in proportion to their representation. There were the Northern region (1 hospitals,108 samples), central region (2 hospitals, 212 samples), Southern region (2 hospitals, 216 samples) and Eastern region (1 hospitals, 106 samples). Hospitals in six regions were randomly selected: Yancheng NO.1 people's hospital, Jianhu People's Hospital, Affiliated Hospital of Jiangsu University, Suzhou first people's hospital, Affiliated Hospital of Jiangnan University, Affiliated Hospital of Xuzhou Medical University. Finally, each hospital recruited couples who met the criteria until enough participants were recruited. The couples were recruited through the following systematic sampling

technique: 1) The researcher provided a list of all the patients with cervical cancer and their spousal caregivers who met the inclusion criteria; 2) When target patients and their spousal caregivers came to the gynecological ward, the researcher communicated with them, and if they were willing to take part in the study, the researcher wrote down a new list of their names; 3) the researcher randomly selected every fourth person on the new list without replacement. A total of 642 samples (321 dyads) from six hospitals participated.

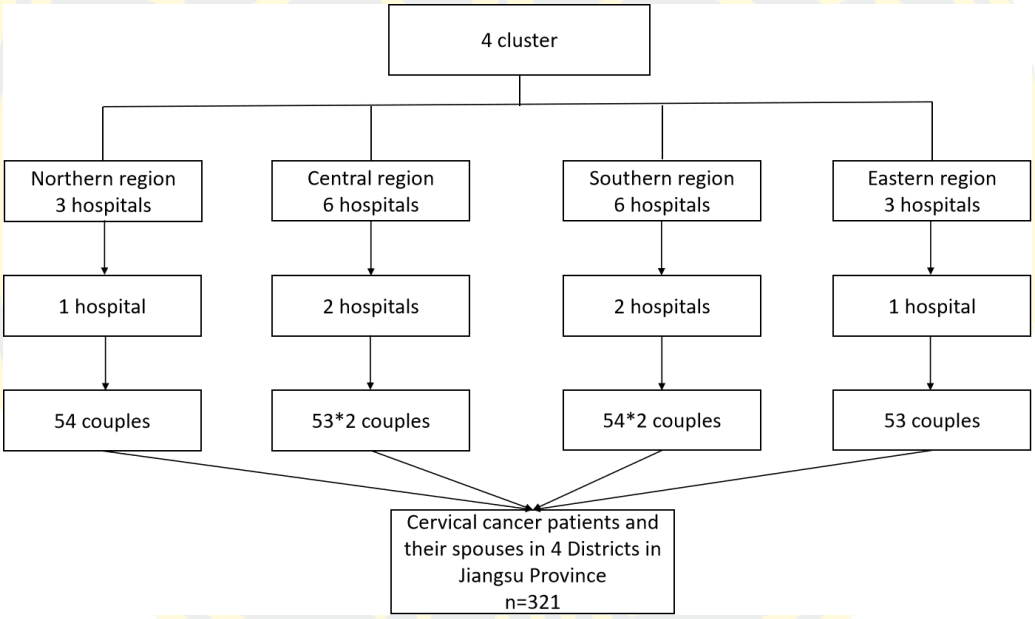


Figure 3 A cluster random sampling technique of this study.

Research instruments

Data were collected through 6 instruments: Demographic record form, The Brief Illness Perception Questionnaire [BIPQ], The Resilience Scale-14 [RS-14], Dyadic Coping Inventory [DCI], The 12-item Short-Form health survey [SF-12], and The General Self-Efficacy Scale [GSES], details of these instruments were described below.

The demographic record form was developed to collect general information from CC patients and their spousal caregivers. The main elements of the patient demographic record form included age, educational level, religion, marital status, place of residence, length of marriage occupational status, medical payment method, family income, stage of CC, time of diagnosis, and type of treatment modality, which were collected directly from the participants or from their medical records. Information obtained regarding demographic characteristics of the spousal caregivers comprised of age, religion, education level, occupational status, length of marriage, and place of residence.

The Brief Illness Perception Questionnaire [BIPQ] was used to evaluate the dyadic appraisal of patients with cervical cancer and their spousal caregivers. The scale included 9 items covering three aspects (Broadbent et al., 2006): cognitive representation (items 1, 2, 3, 4, 5), emotional representation (items 6, 8) and illness comprehensibility (item 7). The ninth item is about the causal relationship of etiology ("please list the three most important factors according to the subsequence, and you believe that these three factors lead to your or your spouse's disease"). Except for item 9, other items are scored with an 11-point Likert Type scale (range: 0-10, the reverse score entry is 3, 4, 7 items), with a total score of 0~80. The higher scores indicated more cognitive or emotional illness representations. The Chinese version of BIPQ has been published on the official website. In the current sample, Cronbach's coefficients were 0.959 for patients with cervical cancer and 0.911 for their spousal caregivers, respectively (see Table 1; Internal consistency coefficients).

Table 1 Internal consistency coefficients: Cronbach's alpha (n = 315 couples)

Variable	Subscale	Alpha	
		CC Patients	Spousal caregivers
BIPQ	Inventory Total Score	0.959	0.911
	Cognitive Representation Subscale	0.945	0.871
	Emotional Representation Subscale	0.916	0.885
RS-14	Inventory Total Score	0.957	0.952
	Personal Competence	0.941	0.935
	Acceptance of Self and Life	0.861	0.846
DCI	Inventory Total Score	0.957	0.969
	Stress Communication	0.935	0.931
	Supportive Dyadic Coping	0.928	0.959
	Delegated Dyadic Coping	0.840	0.888
	Common Dyadic Coping	0.899	0.914
	Negative Dyadic Coping	0.927	0.931
GSES	Inventory Total Score	0.960	0.965
SF-12	Inventory Total Score	0.895	0.806
	Physical Component Summary	0.852	0.825
	Mental Component Summary	0.810	0.677

The Resilience Scale-14 [RS-14] was utilized to measure the resilience of patients with cervical cancer and their spousal caregivers (Wagnild, 2009), This scale was a shortened version of the original 25-item Resilience Scale (Wagnild & Yong, 1993). The RS-14 consists of 14 items and a two-factor structure: personal competence and acceptance of self and life. Respondents rate their agreement on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree," with total scores ranging from 14 to 98. Higher scores indicate higher levels of resilience. The Chinese version of the RS-14 was developed by Chung et al. (2020). In the current sample, the Cronbach's α coefficients were found to 0.957 for patients with cervical cancer and 0.952 for their spousal caregivers, indicating high internal consistency (see Table 1; Internal consistency coefficients).

Dyadic Coping Inventory [DCI] was employed to assess dyadic coping in this study (Bodenmann & Randall, 2012). It comprises a 37-item questionnaire that measures how couples actively support and assist each other during times of stress. The questionnaire utilizes a 5-point Likert Scale, with responses ranging from "very

rarely" (1) to "very often" (5). It includes subscales for SC (8 items), SDC (10 items), DDC (4 items), CDC (5 items), and NDC (8 items). Additionally, there are two single items assessing satisfaction with and efficiency of dyadic coping. It comprises a 37-item questionnaire that measures how couples actively support and assist each other during times of stress. Xu et al.(2016) made cross-cultural adjustments among 474 Chinese couples, with a grade 5 rating of 37 items in six dimensions, and the Cronbach's α coefficient of 0.51 to 0.80. Subsequently, Chinese DCI have applied to gynecological cancer patients and their caregivers in 2017 with good confidence. In the current sample, the Cronbach's coefficients were 0.957 for patients with cervical cancer and 0.969 for the spousal caregivers, respectively (see Table 1; Internal consistency coefficients).

The General Self-efficacy Scale [GSES] was used to measure self-efficacy (Zhang & Schwarzer, 1995). It is a 10-item scale that measures general self-efficacy. Each question is scored from 1 (quite wrong) to 4 (quite right), and the total scores range from 10 to 40. According to the total score, the sense of self-efficacy is divided into 3 levels, that is, 10-19 is divided into low level, 20-30 is divided into medium level, 31-40 is divided into higher level. Higher scores indicated a greater perception of self-efficacy. The Chinese version of GSES was developed by Zhang and Schwerzer (1995). In the current sample, the Cronbach's coefficients were 0.960 for the patients and 0.965 for the spousal caregivers respectively (see Table 1; Internal consistency coefficients).

The 12-item Short-Form health survey [SF-12] was used to measure the QoL of patients with cervical cancer and their spousal caregivers (Ware et al., 1996). This scale is a simplified version of the SF-36, which was developed at the Boston Health Institute, New England Medical Center, and is widely used internationally, and translated into Chinese version(Ware et al., 1993). It comprises eight distinct health domains, namely general health (GH), physical functioning (PF), role-physical (RP), bodily pain (BP), role-emotional (RE), mental health (MH), vitality (VT), and social

functioning (SF). The SF-12 provides two validated summary scores: the physical component summary (PCS), calculated from GH, PF, RP, and BP, and the mental component summary (MCS), calculated from SF, RE, MH, and VT. Standard scoring algorithms (Ware et al., 2002) are employed to determine the scores for each sub-dimension. The SF-12 summary scores, which indicate QoL, were measured on a scale ranging from 0 to 100, with higher scores indicating better QoL (Ware et al., 2002). The items of the Chinese version of SF-12 were directly adapted from the Chinese version of SF-36. In the present study, the Chinese version of SF-12 demonstrated strong validity and reliability for assessing QoL, as evidenced by Cronbach's coefficients of 0.895 for patients with cervical cancer and 0.806 for caregivers.

According to the User's manual for the SF-12V2 health survey (Maruish, 2012), it is necessary to convert the raw score of each item into a range of 0-100 scores using the provided formula: transformed scale score = (Actual raw score-loweset possible raw score)/Possible raw score range*100 Subsequently, a Z score transformation was performed on the 0-100 scores by subtracting the mean of the U.S. general population and dividing the result by the standard deviation of the specific domain scales. The final step involves converting the Z score to a T score (M = 50, SD = 10) by multiplying each Z score by 10 and adding 50.

Protection of research participants

This study has received approval from the Institutional Review Board (IRB) committee at Burapha University (No. IRB3-067/2565), as well as the IRB of regional hospitals. After obtaining permission, patients with cervical cancer and their spousal caregivers were recruited to participate in the study. All participants were clearly informed about the purposes of the study, the data collecting procedure, and the duration of the study. Patients with cervical cancer and their spousal caregivers were requested to provide their consent by signing a participant information statement and

a consent form. Prior to affixing their signatures, the participants were extended an invitation to partake in the study and were provided with a comprehensive elucidation of all facets of the research, encompassing the research aims, potential hazards, advantages of involvement, and the prerogative to withdraw from the study. The questionnaires were administered by researchers and research assistants, and participants were allotted ample time to complete the questionnaire. Participants were afforded the autonomy to decline responding to any survey inquiries or discontinue their involvement in the study without incurring any adverse repercussions. Furthermore, all collected data was exclusively utilized for research objectives, with written records being securely maintained and subsequently eradicated upon publication of the research project. The data underwent analysis through the utilization of code numbers, and all outcomes were presented in the form of aggregated data.

Data collection procedures

The questionnaire package was digitized into an online survey format. Participants were required to sign a consent form prior to completing the questionnaire.

1. Prior to initiating the study, the researcher secured the hospitals' permission, gained entry to the relevant departments, fostered trust with the participants, regularly reviewed data collection progress, and promptly implemented necessary adjustments.

2. Data were collected by research assistants who possessed significant experience in research methodologies. They underwent standardized training to ensure familiarity with the questionnaire content, comprehensively understand the study's objectives, research ethics, and competently instruct patients with cervical cancer and their spousal caregivers on completing the questionnaire individually.

3. The researcher contacted the head nurse in each hospital to inform them

about the study and request their assistance.

4. Eligible participants who met the inclusion criteria were enrolled in the study. The researcher and the assistants reached out to willing participants to provide an introduction and explain the study's objectives, potential risks, benefits, and the participants' right to voluntarily withdraw at any point.

5. Upon obtaining participants' consent, the researcher distributed the questionnaires. The questionnaire could be completed via two methods. Participants had the option to either scan a QR code to access and complete the questionnaire online or to manually fill out a paper version with a pen, each method taking an estimated 15-30 minutes to complete.

6. Upon completion of the questionnaires, the research assistants verified their completion and expressed gratitude to the participants for their involvement

7. Prior to analysis, each questionnaire was coded, two-person data entry was employed, and professional analysts were engaged to guarantee both the authenticity and objectivity of the data.

8. To uphold COVID-19 prevention guidelines during interviews, the study enforced specific protocols: 1) Mandatory mask-wearing for all participants and researchers; 2) Hand sanitization with alcohol-based sanitizer or soap washing required for participants and researchers before and after each interview; 3) A minimum safe distance of one meter was to be maintained by all individuals; 4) Disinfection of pens and frequently-touched items prior to transfer to subsequent participants; 5) Separate storage for completed and blank questionnaires; 6) Daily ultraviolet disinfection of the data storage area.

Data analysis

The data were analyzed using IBM SPSS Statistics (version 23.0) and IBM AMOS (version 24.0) software, A $p < .05$ was considered statistically significant.

1. Descriptive statistics generated as means, standard deviations for

continuous variables as well as proportions and counts for categorical variables, to understand the demographic characteristics, cancer-related characteristics, dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL.

2. The paired t-test was employed to evaluate whether there were significant differences in dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL scores between patients with cervical cancer and their spousal caregivers. Furthermore, after categorizing the independent variables found in general demographic and disease-related data, one-way ANOVA or independent samples t-test was utilized to compare differences in the mean values of each variable across different groups.

3. Pearson's correlation analyses were conducted to investigate the relationships between dyadic appraisal, dyadic coping, resilience, self-efficacy, and QoL in patient-spouse dyads. Pearson's correlation analyses allowed us to interpret the direction and strength of any potential correlations between the pairs of variables.

4. Structural equation modeling (SEM) was utilized to evaluate the proposed model's impact on the QoL in patients with cervical cancer and their spousal caregivers. Prior to testing the model, we ensured that assumptions critical to SEM-such as outlier detection, normality, and linearity-were met, drawing on the methodological frameworks outlined in "Using Multivariate Statistics" (Tabachnick et al., 2013) and "Multivariate Data Analysis" (Hair et al., 2013). The identification of univariate outliers was conducted using Z-scores for each variable, with scores beyond the range of -3.29 to 3.29 flagged as outliers. Furthermore, Mahalanobis' distance was employed to detect multivariate outliers, with cases yielding a $p < .001$ against the Chi-square statistic being classified as such.

5. Following the established dyadic data analysis procedures by Kenny et al. (2020), maximum likelihood estimation was utilized for SEM path analysis within AMOS. The Actor-Partner Interdependence Model (Ledermann & Bodenmann, 2006) and Actor-Partner Interdependence Mediation Model (Ledermann et al., 2011) were

applied. This dyad-modeling strategy allowed for simultaneous consideration of both partners' variables, effectively capturing the interdependent nature of the dyadic data.

6. Model fit indices were utilized to assess the adequacy of the models in all SEM analyses. These indices included the chi-square statistic (CMIN), degrees of freedom (df), comparative fit index (CFI), goodness-of-fit index (GFI), Tucker-Lewis index (TLI), normed fit index (NFI), root mean square residual (RMR), and root mean square error of approximation (RMSEA). A non-significant chi-square statistic ($p > .05$) indicates a highly satisfactory fit. The acceptance criterion for CMIN/df was set at less than 2.0. The CFI, GFI, TLI, and NFI values range from 0 to 1, with values above 0.90 suggesting a reasonably good fit and values exceeding 0.95 indicating a very good fit. (Byrne, 2001). The range of RMSEA values extends from 0 to 1, with values below .06 indicating a favorable fit according to Hu and Bentler (1999), values between .06 and the more rigorous upper limit of .07 indicating a mediocre fit (Steiger, 2007) , and values exceeding .10 being deemed unacceptable based on Byrne's (2001) classification. Nested model comparisons were assessed using chi-square difference tests.

CHAPTER 4

RESULTS

This chapter delineates the findings of the investigation, structured into six distinct sections. The initial section delineates the strategy employed for data management. The subsequent section provides a comprehensive description of the demographic and clinical profiles of the patients with cervical cancer and their spousal caregivers. The third section presents a detailed statistical analysis of the primary study variables, which include dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL for both patients with cervical cancer and their spousal caregivers. The fourth part addresses the testing of assumptions pertinent to the SEM analysis. Subsequently, the fifth section examines the hypothesized relationships between variable pairs. The final section is dedicated to the evaluation of the proposed mediation models

Part 1 Data management

Treatment of outliers

Univariate outliers refer to instances where an extreme value is observed on a single variable, and their assessment can be conducted using standardized scores, namely Z-scores (Tabachnick et al., 2013). If the standardized scores exceed 3.29 or fall below -3.29, indicating a lack of association with other Z-scores, these values are considered potential outliers. Following this criterion, there exist four univariate outliers, specifically cases #36, #43, #53, and #73. Conversely, multivariate outliers pertain to instances characterized by an atypical combination of scores on two or more variables (Tabachnick et al., 2013). The present study employed Mahalanobis distance as a means of evaluating multivariate outliers. Mahalanobis distance refers to the distance between a particular case and the centroid of the remaining cases, serving as a measure of multivariate distance for identifying outliers (Tabachnick et al., 2013) . In this study, the number of variables was three (#34, 92, 219), and any range

with a chi-square statistic probability value below .001 was deemed an outlier. The original questionnaires were thoroughly examined to assess both univariate and multivariate outliers. It was found that two multivariate outliers had not been identified during the analysis of univariate outliers. The presence of multivariate outliers can arise when multiple distinct populations are combined within the same sample (Hair et al., 2013; Tabachnick et al., 2013). Subsequently, after reevaluating the original data and questionnaires, four univariate outliers and three multivariate outliers were excluded from further analysis. As a result, a total of 315 dyads were included in the assessment of the multivariate normal distribution.

Part 2 Demographic and clinical characteristics

Demographic and medical information of all patients with cervical cancer and their spousal caregivers are presented in Table 2. The patients with cervical cancer have a mean age of 55.13 years (SD =11.76, range = 26-80 years), while their spousal caregivers have a mean age of 56.23 years (SD = 11.81, range = 28-80 years). In terms of marital status distribution, the most represented group consists of couples who have been married for more than 30 years (183, 58.1%). The education level of the patients with cervical cancer is relatively low, with only 19.4% having a high school education or more (61/315), whereas their spousal caregivers mostly have a junior high school education (133, 42.2%). The majority of the patients with cervical cancer and their spousal caregivers are currently employed, with employees accounting for 65.4% and 83.5% respectively (206/315; 263/315). The majority of participants reside in rural areas (133, 42.2%). Most participants rely on medical insurance to pay for their medical bills (300/315, 95.2%), and 79.8% report monthly incomes of less than 5000 RMB. A large proportion of participants (58.7% for patients; 74.0% for caregivers) have not heard of the human papillomavirus vaccine (HPV vaccine) for preventing cervical cancer. Similarly, a significant percentage of participants (85.8% for patients; 93.7% for caregivers) are unaware or have limited

knowledge about the government's free cervical cancer rescreening program. In terms of the stage of cervical cancer, 79.0% (249/315) of participants were diagnosed with cancer below stage II. The majority of patients have squamous carcinoma (81.9%), and the upcoming treatment options are based on surgery alone or surgery combined with chemotherapy and radiotherapy (78.1%).

Table 2 Sociodemographic characteristics and clinical data of couples with cervical cancer

Characteristics	Patients with cervical cancer (n= 315)	Spousal caregivers (n= 315)
Age (years)		
⩽40	49 (15.6)	43 (13.7)
40-60	158 (50.2)	150 (47.6)
⩾60	108 (34.2)	122 (38.7)
Marital status		
Married within 20 years	52 (16.5)	-
Married within 20~30 years	80 (25.4)	-
Married for over 30 years	183 (58.1)	-
Education level		
Elementary school or less	154 (48.9)	93 (29.5)
Junior high school	100 (31.7)	133 (42.2)
High school or more	61 (19.4)	89 (28.3)
Occupation, n (%)		
Unemployed	78 (24.8)	18 (5.7)
Employed	206 (65.4)	263 (83.5)
Retired	31 (9.8)	34 (10.8)
Residence, n (%)		
Rural	133 (42.2)	-
Town	68 (21.6)	-
County	68 (21.6)	-
City	46 (14.6)	-
Monthly income (RMB [US $]), n (%)		
⩽3000 (410.8)	116 (36.8)	-
3000~5000 (410.18-684.80)	107 (34.0)	-
⩾5000 (684.80)	92 (29.2)	-
Health Care Payment method		
Self-supporting	15 (4.8)	-
Medical insurance for urban residents	134 (42.5)	-
New rural cooperative medical care system	166 (52.7)	-
Heard of the HPV vaccine		

Characteristics	Patients with cervical cancer (n= 315)	Spousal caregivers (n= 315)
Yes	130 (41.3)	82 (26.0)
No	185 (58.7)	233 (74.0)
Understand the national free screening service for cervical cancer		
Don't know at all	118 (37.5)	165 (52.4)
Know some	152 (48.3)	130 (41.3)
Know	45 (14.2)	20 (6.3)
Menopausal status		
Yes	212 (67.3)	-
No	103 (32.7)	-
Stage of cervical cancer, n (%)		
Precancerous lesion	31 (9.8)	-
Stage I	93 (29.5)	-
Stage II	125 (39.7)	-
Stage III	53 (16.8)	-
Stage IV	13 (4.2)	-
Pathological type		
Squamous cell carcinoma	258 (81.9)	-
Adenocarcinoma	23 (7.3)	-
Other	31 (9.8)	-
Precancerous lesion	3 (1.0)	-
Treatment method		
Surgical Treatment	124 (39.4)	-
Surgery + Radiotherapy +Chemotherapy	122 (38.7)	-
Radiotherapy + Chemotherapy	69 (21.9)	-

Note: HPV, human papillomavirus; CC, cervical cancer.

Part 3 Descriptive statistics of primary study variables

There were five primary variables for this study: QoL, dyadic appraisal, resilience, self-efficacy and dyadic coping among patients with cervical cancer and their spousal caregivers. Descriptive statistics for each of these variables were presented as follows.

Dyadic appraisal

Status of dyadic appraisal in patients with cervical cancer and their spouse caregivers. The paired sample t-test was employed to examine potential disparities in dyadic appraisal between patients with cervical cancer and their spouse caregivers. The findings indicated that there was no significant difference in overall

dyadic appraisal (p >.05). However, patients and spouses differed significantly in their cognitive and emotional representations (p <.05), while the illness comprehensibility was similar (p >.05). See Table 3.

Table 3 Descriptive characteristics for dyadic appraisal among couples with cervical cancer (n = 315).

Variable	Patients with cervical cancer (n= 315)	Spousal caregivers (n= 315)	*t*	*p-value*
	M(SD)	M(SD)		
Dyadic appraisal				
Total	43.64 ± 24.15	43.96 ± 20.50	1.71	.088
Cognitive representation	27.11 ± 15.15	26.28 ± 13.36	-2.43	.016
Emotional representation	11.43 ± 6.97	12.12 ± 6.28	-2.19	.029
Illness comprehensibility	5.11 ± 3.38	5.52 ± 3.04	-0.45	.655

Comparison of dyadic appraisal scores in patients with cervical cancer and their spousal caregivers with different characteristics. The results of the one-way multivariate analysis are shown in Table 4. Education, heard of HPV vaccine, the stage of cervical cancer, pathological type, and treatment method were significantly associated with the dyadic appraisal of spousal caregivers (p <.05), whereas no statistically significant difference was observed in the changes of variables in patients with cervical cancer (p >.05). For spousal caregivers, those who have a high school education or higher, those who have heard of HPV vaccine, those who were diagnosed at the precancerous stage, and those who were treated with surgery only had lower levels of scores on dyadic appraisal.

Table 4 Comparison level of dyadic appraisal in different characteristics of couples with cervical cancer (n = 315).

Characteristics	Dyadic appraisal of Patients		Dyadic appraisal of Spouses	
	M(SD)	t/F	M(SD)	t/F
Age (years)				
⩽40	43.29 (22.75)	0.112	40.26 (20.52)	2.270
40~59	43.15 (24.46)		42.65 (20.39)	
⩾60	44.54 (24.5)		46.89 (20.42)	
Marital status				
Married within 20 years	44.96 (22.30)	0.146	43.27 (19.04)	0.063
Married within 20~30 years	44.13 (25.28)		44.55 (21.59)	
Married for over 30 years	43.06 (24.26)		43.9 (20.52)	
Education				
Elementary school and below	45.04 (24.87)	0.572	49.77 (22.86)	6.055**
Junior high school	41.75 (23.27)		42.72 (19.72)	
High school and above	43.23 (23.87)		39.74 (17.73)	
Occupation				
Unemployment	43.27 (24.56)	0.235	46.72 (23.52)	0.263
Employed	44.17 (23.66)		43.61 (20.66)	
Retired	41.06 (26.82)		45.21 (17.91)	
Residence				
Rural	45.68 (25.15)	2.547	46.67 (21.12)	2.264
Town	41.83 (23.44)		43.05 (20.76)	
County	47.31 (24.74)		44.14 (20.41)	
City	36.55 (20.45)		38.25 (17.93)	
Payment method of medical expenses				
Self-supporting	41.13 (20.67)	1.546	42.13 (15.00)	0.441
New rural cooperative medical care system	46.42 (23.01)		45.20 (19.38)	
Medical insurance for urban residents	41.63 (25.21)		43.13 (21.81)	
Monthly income (RMB)				
< 3000	44.15 (24.73)	0.299	43.46 (22.45)	0.211
3000~5000	42.21 (26.24)		45.01 (20.04)	
> 5000	44.68 (20.82)		43.38 (18.54)	
Heard of the HPV vaccine				
Yes	42.71 (24.53)	-0.577	39.46 (18.75)	-2.326*
No	44.30 (23.92)		45.55 (20.89)	
Understand the national free screening service for cervical cancer				
Don't know at all	44.45 (23.22)	1.572	44.99 (20.81)	0.444
Know some	44.76 (24.21)		42.75 (20.30)	
Know	37.76 (25.98)		43.30 (19.71)	

Characteristics	Dyadic appraisal of Patients		Dyadic appraisal of Spouses	
	M(SD)	t/F	M(SD)	t/F
Menopausal status				
Yes	44.15 (25.27)	0.562	44.44 (21.53)	0.626
No	42.60 (21.74)		42.98 (18.26)	
Stage of cervical cancer				
Precancerous lesion	35.06 (22.97)	1.463	34.26 (18.83)	2.642*
Stage I	43.15 (24.95)		44.52 (20.57)	
Stage II	45.79 (23.57)		45.50 (20.92)	
Stage III	42.96 (24.78)		42.85 (20.03)	
Stage IV	49.77 (21.96)		52.92 (15.64)	
Pathological type				
Squamous cell carcinoma	44.47 (24.37)	1.659	45.14 (20.62)	2.795*
Adenocarcinoma	43.87 (23.00)		41.65 (19.57)	
Other	57.33 (0.58)		55.00 (6.56)	
Precancerous lesion	35.32 (23.06)		34.77 (18.92)	
Treatment method				
Surgical Treatment	40.38 (23.84)	2.470	41.11 (19.89)	3.051*
Surgery + Radiotherapy + Chemotherapy	44.35 (24.27)		44.20 (20.38)	
Radiotherapy + Chemotherapy	48.26 (23.96)		48.65 (21.19)	

*p < .05, **p <.01

Table 5 Descriptive characteristics for resilience among couples with cervical cancer (n = 315)

Variable	Patients with cervical cancer (n= 315)	Spousal caregivers (n= 315)	*t*	*p*
	M(SD)	M(SD)		
Resilience				
Total	63.86 ± 19.71	71.42 ± 17.14	-8.83	<.001
Personal competence	45.16 ± 14.14	50.47 ± 12.84	-8.36	<.001
Acceptance of oneself and life	18.7 ± 5.94	20.96 ± 4.68	-8.33	<.001

Resilience

Status of resilience in patients with cervical cancer and their spouse caregivers. As presented in Table 5, the paired-sample t-test showed that the spousal

caregivers of patients with cervical cancer scored higher than the patients in terms of total resilience, personal competence and acceptance of oneself and life, and the differences between the couples were statistically significant (all $p < .001$).

Comparison of resilience scores in patients with cervical cancer and their spousal caregivers with different characteristics. The results of the one-way multivariate analysis are shown in Table 6. Residence and treatment methods were significantly associated with the resilience of patients with cervical cancer ($p < .05$). Additionally, education, residence, monthly income, and treatment methods were significantly associated with the resilience of spousal caregivers ($p < .05$). Furthermore, patients with cervical cancer who reside in the city, and undergo exclusively surgical treatment have shown increased levels of resilience scores. Similarly, spousal caregivers who possess a high school education or above, reside in the city, have a monthly income of 5,000 RMB or above, and receive exclusively surgical treatment have exhibited higher levels of resilience scores.

Table 6 Comparison level of Resilience in different characteristics of couples with cervical cancer (n = 315)

Characteristics	Resilience of Patients		Resilience of Spouses	
	M(SD)	t/F	M(SD)	t/F
Age (years)				
≤40	62.63 (22.37)	0.114	74.07 (19.02)	0.791
40~59	64.15 (19.83)		71.59 (17.48)	
≥60	63.98 (18.39)		70.28 (16.01)	
Marital status				
Married within 20 years	62.87 (22.02)	0.227	73.69 (17.66)	1.236
Married within 20~30 years	63.05 (22.35)		69.1 (19.01)	
Married for over 30 years	64.49 (17.79)		71.79 (16.08)	
Education				
Elementary school and below	62.27 (20.24)	1.283	66.44 (16.38)	8.911***
Junior high school	64.44 (20.05)		71.24 (18.71)	

Characteristics	Resilience of Patients		Resilience of Spouses	
	M(SD)	t/F	M(SD)	t/F
High school and above	66.92 (17.57)		76.90 (13.62)	
Occupation				
Employed	64.26 (21.87)	0.071	68.78 (16.92)	0.926
Unemployed	63.57(18.77)		71.16 (17.19)	
Retired	64.77 (20.76)		74.85 (16.87)	
Residence				
Rural	60.23 (20.26)	3.331*	67.20 (17.72)	5.394***
Town	66.68 (20.38)		74.75 (17.02)	
County	64.08 (19.74)		72.56 (16.84)	
City	69.15 (15.94)		76.49 (13.87)	
Payment method of medical expenses				
Self-supporting	62.33 (17.67)	0.462	69.80 (14.06)	1.942
New rural cooperative medical care system	65.09 (18.98)		73.63 (16.40)	
Medical insurance for urban residents	63.00 (20.5)		69.79 (17.84)	
Monthly income (RMB)				
< 3000	61.44 (20.62)	1.913	68.16 (18.08)	6.269**
3000~5000	63.94 (20.40)		70.68 (17.20)	
> 5000	66.80 (17.39)		76.39 (14.71)	
Heard of the HPV vaccine				
Yes	64.95 (19.79)	0.822	73.78 (18.69)	1.452
No	63.09 (19.67)		70.59 (16.51)	
Understand the national free screening service for cervical cancer				
Don't know at all	62.96 (19.03)	1.431	71.66 (15.72)	0.248
Know some	63.20 (20.13)		70.80 (18.59)	
Know	68.44 (19.86)		73.50 (19.09)	
Menopausal status				
Yes	63.38 (19.75)	-0.613	70.12 (17.32)	-1.947
No	64.83(19.68)		74.11(16.51)	
Stage of cervical cancer				
Precancerous lesion	70.16 (22.29)	1.022	77.45 (17.99)	1.099
Stage I	63.49 (18.89)		71.20 (16.96)	
Stage II	63.71 (20.28)		70.62 (17.69)	
Stage III	61.36 (19.61)		70.23 (16.24)	
Stage IV	63.00 (11.80)		71.23 (13.54)	
Pathological type				
Squamous cell carcinoma	63.12 (19.59)	1.463	70.45 (16.88)	1.749
Adenocarcinoma	65.65 (17.62)		73.83 (18.45)	
Other	52.33 (14.57)		74.33 (10.02)	

Characteristics	Resilience of Patients		Resilience of Spouses	
	M(SD)	t/F	M(SD)	t/F
Precancerous lesion	69.77 (21.91)		77.45 (18.04)	
Treatment method				
Surgical Treatment	67.38 (19.51)	3.828*	74.55 (16.71)	3.538*
Surgery + Radiotherapy + Chemotherapy	62.64 (19.27)		69.76 (16.78)	
Radiotherapy + Chemotherapy	59.68 (20.05)		68.74 (17.88)	

*p < .05; **p <.01; ***p <.001

Table 7 Descriptive characteristics for dyadic coping among couples with cervical cancer (n = 315)

Variable	Patients with cervical cancer (n= 315)	Spousal caregivers (n= 315)	*t*	*p*
	M(SD)	M(SD)		
Dyadic coping				
Total	126.17 ± 22.49	129.9 ± 22.42	-3.742	<.001
Stress communicated	27.77 ± 7.31	28.83 ± 6.39	-2.807	.005
Supportive dyadic coping	35.06 ± 8.50	37.16 ± 7.73	-4.870	<.001
Delegated dyadic coping	14.68 ± 3.07	14.90 ± 2.98	-1.349	.178
Common dyadic coping	17.79 ± 4.08	17.69 ± 4.28	0.613	.540
Negative dyadic coping	30.86 ± 6.44	31.33 ± 6.46	-1.555	.121
Evaluation of dyadic coping	7.59 ± 1.59	7.56 ±1.74	0.394	.694

Dyadic coping

Status of dyadic coping in patients with cervical cancer and their spouse caregivers. The total dyadic coping scores of patients with cervical cancer ranged from 64 to 175, with a mean score of (126.17 ± 22.49). Similarly, the total dyadic coping scores of spousal caregivers ranged from 67 to 175, with a mean score of (129.9 ± 22.42). Paired t-tests revealed significant differences in total dyadic coping, SC, and SDC scores between patients with cervical cancer and their spouse

caregivers ($p < .05$). However, there was no significant differences in DDC, CDC, NDC and evaluation of dyadic coping scores between couples. See Table 7 for details.

Comparison of dyadic coping scores in patients with cervical cancer and their spousal caregivers with different characteristics. The findings of the one-way multivariate analysis are presented in Table 8. A statistically significant difference was observed in the dyadic coping of patients with cervical cancer, with residence, monthly income, and treatment method serving as influential factors ($p <.05$). Similarly, a statistically significant difference was found in the dyadic coping of spousal caregivers with monthly income, heard of the HPV vaccine, and treatment method being significant variables ($p <.05$). For patients with cervical cancer, those who lived in the city, had monthly incomes of 5,000 RMB or above, and had received only surgical treatment had higher levels of scores on dyadic coping, Similarly, spousal caregivers with monthly incomes of 5,000 RMB or above, possessing heard of HPV vaccine, and receiving exclusively surgical treatment demonstrated higher levels of dyadic coping scores.

Table 8 Comparison level of dyadic coping in different characteristics of couples with cervical cancer (n = 315)

Characteristics	Dyadic coping of Patients		Dyadic coping of Spouses	
	M(SD)	t/F	M(SD)	t/F
Age (years)				
⩽40	128.65 (19.96)	0.358	132.16 (24.53)	0.607
40~59	125.59 (23.00)		128.51 (22.09)	
⩾60	125.87 (22.95)		130.82 (22.12)	
Marital status				
Married within 20 years	128.33 (20.53)	0.901	131.62 (22.19)	2.487
Married within 20~30 years	123.41 (25.22)		125.10 (24.21)	
Married for over 30 years	126.75 (21.76)		131.52 (21.47)	
Education				
Elementary school and below	123.18 (23.95)	2.833	126.05 (24.66)	2.317

Characteristics	Dyadic coping of Patients		Dyadic coping of Spouses	
	M(SD)	t/F	M(SD)	t/F
Junior high school	128.26 (22.56)		130.49 (21.80)	
High school and above	130.26 (17.27)		133.06 (20.45)	
Occupation				
Unmployed	126.72 (24.63)	0.298	131.44 (22.29)	0.237
Retired	128.74 (26.42)		132.06 (22.20)	
Employed	125.57 (21.06)		129.52 (22.52)	
Residence				
Rural	121.89 (23.16)	4.513**	127.02 (23.70)	1.376
Town	129.16 (22.88)		132.76 (23.32)	
County	125.19 (22.21)		130.81 (18.27)	
City	134.22 (18.21)		132.56 (22.29)	
Payment method of medical expenses				
Self-supporting	126.4 (26.18)	0.433	127.73 (20.08)	0.086
New rural cooperative medical care system	127.50 (21.58)		129.78 (21.15)	
Medical insurance for urban residents	125.07 (22.95)		130.20 (23.68)	
Monthly income (RMB)				
< 3000	122.28 (25.14)	3.596*	125.16 (22.76)	5.855**
3000~5000	126.55 (22.81)		130.06 (23.18)	
> 5000	130.61 (17.38)		135.71 (19.76)	
Heard of the HPV vaccine				
Yes	127.01 (22.00)	0.557	135.11 (21.20)	2.465*
No	125.57 (22.87)		128.07 (22.59)	
Understand the national free screening service for cervical cancer				
Don’t know at all	125.31 (23.44)	2.861	128.70 (22.94)	0.512
Know some	124.66 (21.20)		131.10 (20.73)	
Know	133.51 (23.30)		132.05 (28.57)	
Menopausal status				
Yes	124.91 (23.39)	-1.492	130.01 (22.33)	0.124
No	128.75 (20.39)		129.68 (22.70)	
Stage of cervical cancer				
Precancerous lesion	134.06 (18.32)	2.179	126.74 (31.09)	1.135
Stage I	126.42 (21.88)		130.14 (22.64)	
Stage II	126.89 (22.54)		132.60 (20.79)	
Stage III	119.53 (24.36)		125.66 (19.88)	
Stage IV	125.62 (23.35)		127.15 (20.76)	
Pathological type				
Squamous cell carcinoma	125.00 (22.98)	1.450	129.93 (21.44)	0.610
Adenocarcinoma	130.30 (20.70)		134.61 (20.53)	

Characteristics	Dyadic coping of Patients		Dyadic coping of Spouses	
	M(SD)	t/F	M(SD)	t/F
Other	124.00 (15.72)		129.33 (10.97)	
Precancerous lesion	132.97 (19.18)		126.26 (31.19)	
Treatment method				
Surgical Treatment	131.52 (20.43)	6.665***	134.27 (23.65)	4.184*
Surgery + Radiotherapy + Chemotherapy	124.08 (23.63)		127.87 (22.33)	
Radiotherapy + Chemotherapy	120.23 (22.17)		125.65 (19.00)	

*p < .05, **p <.01, ***p <.001

Self-efficacy

Status of self-efficacy in patients with cervical cancer and their spouse caregivers. The paired samples t-test was used to analyze whether there were differences in the general self-efficacy of patients with cervical cancer and their spouse caregivers. The results showed that the spousal caregivers of patients with cervical cancer scored higher than the patients in terms of total general self-efficacy (p <.001). See Table 9.

Table 9 Descriptive characteristics for the general self-efficacy among couples with cervical cancer (n = 315)

Variable	Patients with Cervical cancer (n= 315)	Spousal caregivers (n= 315)	*t*	*p*
	M(SD)	M(SD)		
The General Self-Efficacy	23.56 ± 6.66	25.95 ± 7.11	-6.50	<.001

Comparison of Self-efficacy scores in patients with cervical cancer and their spousal caregivers with different characteristics. The findings of the one-way multivariate analysis are presented in Table 10. The results indicate significant associations between the self-efficacy of patients with cervical cancer and factors such as heard of HPV vaccine, menopausal status, stage of cervical cancer, pathological type, and treatment method (p <.05). Furthermore, the self-efficacy of spousal caregivers was found to be significantly associated with factors including education,

residence, heard of HPV vaccine, and treatment method (p <.05). Patients with cervical cancer who were heard of HPV vaccine, were not menopausal, have been diagnosed at the precancerous stage, and have undergone surgery as their sole treatment, exhibit higher levels of self-efficacy scores. Similarly, spousal caregivers with a high school education or above, residing in the town, who were heard of HPV vaccine, and have been treated exclusively with surgery, also demonstrate elevated levels of self-efficacy scores.

Table 10 Comparison level of Self-efficacy in different characteristics of couples with cervical cancer (n = 315)

Characteristics	Self-efficacy of Patients		Resilience of Spousal caregivers	
	M(SD)	t/F	M(SD)	t/F
Age (years)				
⩽40	25.35 (7.10)	2.131	26.93 (6.95)	0.514
40~59	23.30 (6.91)		25.91 (7.38)	
⩾60	23.13 (5.96)		25.66 (6.86)	
Marital status				
Married within 20 years	25.17 (6.71)	1.876	26.50 (6.16)	0.919
Married within 20~30 years	23.40 (7.42)		25.04 (7.88)	
Married for over 30 years	23.17 (6.24)		26.19 (7.01)	
Education				
Elementary school and below	23.46 (6.63)	0.941	23.77 (6.72)	6.438**
Junior high school	23.10 (7.17)		26.74 (7.48)	
High school and above	24.56 (5.78)		27.04 (6.49)	
Occupation				
Unmployed	24.73 (6.49)	2.178	25.33 (7.12)	0.375
Employed	23.35 (6.71)		25.87 (7.08)	
Retired	22.00 (6.41)		26.88 (7.50)	
Residence				
Rural	22.74 (6.67)	2.583	24.63 (7.45)	2.815*
Town	25.49 (7.18)		27.25 (7.02)	
County	23.14 (6.55)		26.98 (6.56)	
City	23.80 (5.76)		26.44 (6.61)	
Payment method of medical expenses				
Self-supporting	22.13 (6.70)	0.501	23.47 (6.19)	1.152

Characteristics	Self-efficacy of Patients		Resilience of Spousal caregivers	
	M(SD)	t/F	M(SD)	t/F
New rural cooperative medical care system	23.40 (6.53)		25.79 (6.75)	
Medical insurance for urban residents	23.81 (6.77)		26.30 (7.45)	
Monthly income (RMB)				
< 3000	22.73 (6.14)	1.981	24.88 (7.35)	2.940
3000~5000	23.58 (6.85)		25.97 (7.52)	
> 5000	24.58 (6.98)		27.27 (6.09)	
Heard of the HPV vaccine				
Yes	24.48 (6.41)	2.081*	27.78 (6.73)	2.739**
No	22.91 (6.77)		25.30 (7.15)	
Understand the national free screening service for cervical cancer				
Don't know at all	23.24 (6.63)	1.740	25.41 (7.00)	1.969
Know some	23.30 (6.71)		26.22 (6.92)	
Know	25.27 (6.44)		28.60 (8.79)	
Menopausal status				
Yes	22.99 (6.57)	-2.187*	25.60 (7.23)	-1.255
No	24.73 (6.71)		26.67 (6.83)	
Stage of cervical cancer				
Precancerous lesion	27.45 (8.76)	3.226*	27.71 (8.79)	0.546
Stage I	23.00 (6.37)		25.6 (6.77)	
Stage II	23.04 (6.43)		25.85 (7.24)	
Stage III	23.79 (6.10)		25.74 (6.47)	
Stage IV	22.31 (4.61)		26.08 (6.76)	
Pathological type				
Squamous cell carcinoma	23.22 (6.29)	4.473**	25.76 (6.90)	0.611
Adenocarcinoma	22.43 (6.31)		26.39 (7.27)	
Other	20.33 (4.51)		23.67 (1.53)	
Precancerous lesion	27.52 (8.63)		27.39 (8.95)	
Treatment method				
Surgical Treatment	25.21 (7.65)	6.516**	27.19 (7.73)	3.580*
Surgery + Radiotherapy + Chemotherapy	22.51 (5.65)		24.79 (6.51)	
Radiotherapy + Chemotherapy	22.45 (5.80)		25.78 (6.70)	

*p < .05, **p <.01

Quality of life

Status of quality of life among patients with cervical cancer and their

spouse caregivers. The paired sample t-test was used to analyze whether there was any difference in the QoL between the patients with cervical cancer and their spouse caregivers. The results showed that the physical (PCS), mental (MCS) and overall QoL scores of the spouse caregivers were higher than those of the patients with cervical cancer, and the differences between the couples were statistically significant (all $p < .01$). See Table 11.

Table 11 Descriptive characteristics for quality of life among couples with cervical cancer (n = 315)

Variable	Patients with Cervical cancer (n= 315) M(SD)	Spousal caregivers (n= 315) M(SD)	*t*	*p*
Quality of life				
Physical component summary	39.66 ± 9.72	59.08 ± 9.82	-26.16	<.001
Physical functioning	40.60 ± 11.56	66.96 ± 11.25	-30.80	<.001
Role-physical	40.26 ± 10.77	51.78 ± 7.18	-16.40	<.001
Bodily pain	40.33 ± 11.54	51.78 ± 9.02	-15.44	<.001
General health	34.94 ± 12.60	49.20 ± 13.30	-15.91	<.001
Mental component summary	42.19 ± 10.11	43.87 ± 9.54	-2.69	.01
Vitality	48.77 ± 10.45	55.38 ± 12.39	-7.63	<.001
Social functioning	37.01 ± 12.44	44.26 ± 12.06	-8.41	<.001
Role-emotional	38.01 ± 8.88	46.58 ± 10.34	-13.86	<.001
Mental health	43.06 ± 11.91	49.81 ± 9.18	-9.06	<.001

Comparison of quality of life scores in patients with cervical cancer and their spouse caregivers with different characteristics. The results of the one-way multivariate analysis are shown in Table 12. Age, occupation status, understand the national free screening service for cervical cancer, menopausal status, the stage of

cervical cancer, and pathological type were significantly associated with physical QoL (PCS) of patients with cervical cancer. Additionally, occupation status, the stage of cervical cancer, and pathological type were significantly associated with mental QoL (MCS) of patients with cervical cancer (p <.05). Furthermore, a statistically significant difference was observed in spousal caregivers' physical QoL (PCS) based on age, marital status, education level, monthly income, heard of the HPV vaccine (p <.05) while a statistically significant difference was found in the spousal caregivers' mental QoL (MCS) based on monthly income and payment method (p <.05), whereas no statistically significant difference was observed in the changes of other demographic variables in the physical QoL (PCS) and mental QoL (MCS) scores of patients with cervical cancer and their spousal caregivers (p >.05).

For patients with cervical cancer, those who less than 40 years old, those who were unemployed, those who were understand the national free screening service for cervical cancer, those who were not menopausal, those who were diagnosed at the precancerous stage, and those who were treated with surgery only had higher levels of scores on the physical QoL (PCS), whereas those who were unemployed and those who were diagnosed with precancerous lesions scored at higher levels on the mental QoL (MCS). Whereas spousal caregivers of patients with cervical cancer who less than 40 years old, married for less than 20 years, with a high school education or higher, and with monthly incomes of 5,000 RMB or more scored higher on the physical QoL (PCS), spousal caregivers who had a monthly income of 5,000 RMB or more and had medical insurance had higher scores on the mental QoL (MCS).

Table 12 Comparison level of the quality of life in different characteristics of couples with cervical cancer (n = 315)

Characteristics	QoL-PCS of Patients		QoL-PCS of Spouses		QoL-MCS of Patients		QoL-MCS of Spouses	
	M(SD)	t/F	M(SD)	t/F	M(SD)	t/F	M(SD)	t/F
Age (years), n (%)								
≤40	42.58 (9.10)	4.512*	61.79 (9.00)	6.217**	43.73 (10.11)	1.901	44.25 (9.21)	0.403
40-60	40.05 (9.70)		60.19 (9.35)		41.1 (10.63)		44.25 (10.26)	
≥60	37.75 (9.71)		56.75 (10.24)		43.07 (9.21)		43.26 (8.73)	
Marital status, n (%)								
Married within 20 years	42.02 (9.16)	2.509	62.16 (8.61)	3.472*	43.76 (10.20)	2.997	45.02 (8.85)	1.467
Married within 20~30 years	40.22 (9.72)		59.23 (9.77)		39.89 (10.09)		42.38 (10.65)	
Married for over 30 years	38.74 (9.79)		58.14 (10.03)		42.74 (9.99)		44.19 (9.18)	
Education level, n (%)								
Elementary school or less	39.65 (9.44)	0.106	57.15 (10.98)	4.689**	43.29 (9.87)	2.706	43.38 (9.68)	0.667
Junior high school	39.94 (10.41)		58.8 (9.84)		40.31 (10.55)		43.55 (10.12)	
High school or more	39.21 (9.39)		61.51 (7.94)		42.47 (9.69)		44.85 (8.46)	
Occupation, n (%)								
Unemployed	42.32 (9.38)	8.029***	57.17 (12.37)	1.479	44.91 (10.14)	4.149*	43.9 (11.38)	0.016
Employed	39.45 (9.46)		58.89 (9.93)		41.49 (10.01)		43.9 (9.35)	
Retired	34.3 (10.19)		61.56 (6.87)		39.95 (9.73)		43.6 (10.25)	
Residence, n (%)								
Rural	39.14 (9.58)	1.613	57.45(10.7)	2.438	42.11(10.35)	0.676	42.75 (9.46)	1.953
Town	41.76 (10.03)		59.5 (9.69)		41.69 (9.29)		43.43 (10.19)	

Characteristics	QoL-PCS of Patients		QoL-PCS of Spouses		QoL-MCS of Patients		QoL-MCS of Spouses	
	M(SD)	t/F	M(SD)	t/F	M(SD)	t/F	M(SD)	t/F
County	38.24 (9.89)		61.1 (8.14)		41.40 (10.93)		44.57 (10.05)	
City	40.15 (9.33)		60.2 (9.12)		43.85 (9.51)		46.27 (7.95)	
Monthly income (RMB [US $]), n (%)								
⩽3000 (410.8)	39.55 (9.45)	0.033	57.58 (11.03)	3.265*	41.84 (9.03)	0.117	42.17 (9.98)	5.912**
3000~5000 (410.18-684.80)	39.58 (9.55)		59.01 (9.44)		42.47 (11.13)		43.38 (9.6)	
⩾5000 (684.80)	39.88 (10.33)		61.05 (8.28)		42.3 (10.27)		46.59 (8.32)	
Payment method								
Self-supporting	36.55 (8.73)	1.177	61.97 (5.42)	1.866	39.13 (7.70)	1.004	43.93 (9.26)	3.521*
Medical insurance for urban Residents	40.35 (9.76)		59.9 (8.76)		41.85 (10.32)		45.48 (8.21)	
New rural cooperative medical care system	39.38 (9.76)		58.15 (10.82)		42.74 (10.12)		42.56 (10.37)	
Heard of the HPV vaccine								
Yes	40.66 (9.98)	1.541	61.48 (8.25)	2.877**	41.32 (9.23)	-1.304	43.43 (8.66)	-0.484
No	38.95 (9.50)		58.23 (10.20)		42.79 (10.67)		44.02 (9.84)	
Understand the national free screening service for cervical cancer								
Don't know at all	39.92 (9.37)	3.484*	57.88 (9.93)	2.602	43.42 (9.39)	2.494	44.97 (9.07)	2.425
Know some	38.52 (9.95)		60.4 (9.74)		40.87 (10.11)		42.77 (10.13)	
Know	42.80 (9.28)		60.4 (8.54)		43.39 (11.55)		41.87 (8.56)	
Menopausal status								
Yes	38.72 (9.66)	-2.481*	59.09 (9.78)	0.038	41.51 (10.12)	-1.717	43.23 (9.76)	-1.717
No	41.59 (9.61)		59.05 (9.95)		43.59 (10.01)		45.19 (8.96)	

Characteristics	QoL-PCS of Patients		QoL-PCS of Spouses		QoL-MCS of Patients		QoL-MCS of Spouses	
	M(SD)	t/F	M(SD)	t/F	M(SD)	t/F	M(SD)	t/F
Stage of cervical cancer, n (%)								
Precancerous lesion	45.90 (9.69)	3.992**	59.55 (9.75)	0.421	46.57 (10.26)	2.725*	42.29 (10.00)	1.030
Stage I	39.53 (8.51)		59.58 (9.71)		40.29 (10.58)		45.25 (9.4)	
Stage II	38.93 (9.63)		58.77 (9.94)		41.86 (9.79)		43.67 (9.51)	
Stage III	37.83 (10.64)		58.09 (10.11)		43.84 (9.88)		42.54 (9.64)	
Stage IV	40.13 (10.64)		61.38 (9.29)		41.68 (7.13)		45.12 (9.11)	
Pathological type								
Squamous cell carcinoma	39.24 (9.56)	4.732**	58.67 (9.81)	2.000	42.23 (10.10)	5.489* *	44.23 (9.43)	1.498
Adenocarcinoma	37.17 (9.01)		63. 70 (7.17)		37.44 (7.28)		43.10 (9.54)	
Other	34.73 (6.09)		55.63 (22.4)		29.43 (7.35)		33.95(10.84)	
Precancerous lesion	45.44 (10.03)		59.4 (9.76)		46.62 (10.05)		42.42 (10.05)	
Treatment method								
Surgical Treatment	41.86 (9.94)	6.772**	60.13(9.4)	1.368	42.94 (10.57)	0.622	45.4 (9.65)	2.866
Surgery + Radiotherapy + Chemotherapy	39.08 (9.15)		58.71 (9.80)		41.51 (10.12)		43.2 (9.42)	
Radiotherapy+ Chemotherapy	36.73 (9.51)		57.82 (10.53)		42.03 (9.29)		42.3 (9.28)	

*p < .05, **p <.01, ***p < .001

Part 4 Assumption testing for the Structural Equation Modeling analysis

Defining Variables

In the statistical analyses described below, dyadic appraisal was assessed using the Brief Illness Perception Questionnaire (BIPQ). Self-efficacy was assessed using the general self-efficacy scale (GSES) total score. Dyadic coping was comprised of SC, SDC, DDC, CDC, and NDC subscale scores of the Dyadic Coping Inventory (DCI). Resilience was assessed using the personal competence, and acceptance of self and life subscale scores of the Resilience Scale-14 (RS-14). QoL was comprised of the physical component summary (PCS) and the mental component summary (MCS) subscale scores of the 12-item Short-Form health survey (SF-12).

Test of Normality and Linearity

All variables in the model underwent testing for normal distribution through the examination of statistics and the utilization of graphical methods. The W/S test and Kolmogorov-Smirnov test were employed to assess normality. In the W/S test, a skewness distribution with zero skew and a kurtosis distribution with zero peak were observed, with critical ratios falling within the range of -1.96 to 1.96, indicating a normal distribution (Hair et al., 2013; Tabachnick et al., 2013). The same outcome was obtained from the Kolmogorov-Smirnov test, which necessitates a probability greater than .05 to accept the normality of the data. However, for each variable, the probability was found to be smaller than .01 (Table 10). The aforementioned evidence suggests that the assumption of normality in this study has been violated. In cases where continuous variables exhibit non-normal distributions, the AMOS program offers bootstrapping as a viable analysis option. Bootstrapping is a resampling technique that generates pseudo-multiple samples. Consequently, the subsequent hypothesis testing has evaluated the model of all variables using the bootstrap method (Kline, 2015).

The linearity assumption was assessed using the Pearson correlation coefficient (Tabachnick et al., 2013), which revealed that the dyadic relationships between the study variables did not exhibit a non-zero correlation. The majority of variables demonstrated a linear relationship. Additionally, the multicollinearity

assumption was tested by evaluating the tolerance and variance inflation factor (VIF) values. The results confirmed the absence of multicollinearity, as the tolerance values exceeded .10 and the VIF values did not surpass 10 (Hair et al., 2013). The minimum tolerance value observed was .24, indicating that no tolerance values fell below .10. The maximum VIF value recorded was 4.13.

Correlations Matrix of Study Variables

In the context of dyadic analyses, the assessment of the test of non-independence holds great importance as it determines the likelihood of detecting correlations between scores contributed by members of each dyad (Kenny et al., 2020). The significant variables were incorporated as control variables in the partial correlation. Table 13 displays the partial correlations among both the dependent and independent variables. Examination of all variables in the current research indicates non-independence, thereby suggesting that dyads, rather than individuals, should be regarded as the unit of analysis in subsequent studies. Consequently, the dyad was chosen as the unit of analysis in the present study, with the sample size matching the number of dyads (n = 315).

Table 13 Correlations among dyadic appraisal, resilience, dyadic coping, self-efficacy, and quality of life while controlling for the effect of sociodemographic variables (n=315)

Variables		**Patients with cervical cancer**						**Spousal caregivers**			
		1	2	3	4	5	6	7	8	9	10
Patients with cervical cancer	1. Dyadic appraisal	1									
	2. Resilience	-0.643***									
	3. Dyadic coping	-0.561***	0.6***								
	4. Self-efficacy	-0.347***	0.451***	0.39***							
	5. Quality of life	-0.309***	0.39***	0.346***	0.517***						
Spousal caregivers	6. Dyadic appraisal	0.773***	-0.616***	-0.506***	-0.352***	-0.281***					
	7. Resilience	-0.54***	0.635***	0.577***	0.484***	0.347***	-0.474***				
	8. Dyadic coping	-0.417***	0.39***	0.69***	0.368***	0.242***	-0.381***	0.541***			
	9. Self-efficacy	-0.328***	0.387***	0.487***	0.53***	0.444***	-0.315***	0.68***	0.509***		
	10. Quality of life	-0.125*	0.181**	0.115*	0.139*	0.272***	-0.119*	0.263***	0.163**	0.223***	1

Adjusted: All variables. $p < .05$, $^{**}p < .01$, $^{***}p < .001$

Tests of Distinguishability

Before undertaking dyadic analyses, it is imperative to establish the distinguishability of the dyad members (Kenny et al., 2020). Distinguishability refers to the presence of a variable that allows researchers to differentiate between the two individuals within the dyad, such as husbands and wives. Conversely, an indistinguishable dyad lacks variable that enable researchers to differentiate between the two individuals, such as identical twins. It is highly recommended to perform a test of distinguishability, as it can empirically confirm the distinguishability, provide a concise model, and enhance the statistical power of the analysis (Kenny et al., 2020; Ledermann et al., 2011). Kenny et al.(2020) proposed utilizing an omnibus test of distinguishability, which constrains means, variances, and covariances to be equal across sexes, for assessing distinguishability. If the chi-square test yields significant ($p < .05$), it implies distinguishability among dyad members; consequently, dyadic analysis is warranted. If the chi-square test does not reach significance ($p > .05$), it indicates that dyad members are indistinguishable; thereby rendering the use of dyadic analyses statistically unnecessary.

The omnibus test of distinguishability indicated that the dyad members were distinguished. Thus, for dyadic appraisal, resilience, and dyadic coping, as well as dyadic coping, self-efficacy, and QoL, it is statistically necessary to conduct dyadic analyses. While it is advisable to acquire the results of distinguishability tests before employing dyadic data analyses, it is equally important to present dyadic analyses independently of the outcomes of these tests, as suggested by past research (Kenny et al., 2020). In the current study, data were collected from patients with cervical cancer and their spousal caregivers. The dyad members were theoretically and statistically distinguishable, justifying the acceptance of dyadic data analyses. After evaluating these assumptions, it was deemed appropriate to perform SEM analyses using the present dataset.

Planned Analyses

The Actor-Partner Interdependence Model has been suggested as the most suitable approaches for examining dyadic data. It analyses treat the dyad as the primary unit of analysis, exploring associations between individual variables at the dyad member level. This includes examining concurrent and partner effects between

pairs of study variables, such as dyadic appraisal and resilience, resilience and dyadic coping, dyadic appraisal and dyadic coping, dyadic coping and self-efficacy, self-efficacy and QoL, and dyadic coping and QoL.

The inclusion of a mediator variable in the APIMeM (Ledermann & Bodenmann, 2006) allows for the estimation of actor and partner mediation effects at the individual level within dyadic relationships. Utilizing APIMeM analyses, this study aimed to examine whether resilience mediates the relationship between dyadic appraisal and dyadic coping, as well as whether self-efficacy mediates the association between dyadic coping and QoL. As depicted in Figure 3 of the APIMeM, this model enables the evaluation of four types of mediated effects: two actor-actor mediated effects, two actor-partner mediated effects, two partner-actor mediated effects, and two partner-partner mediated effects. The assessment of APIMs with distinguishable dyad partners was conducted through structural equation modeling (SEM) analyses, as outlined by Kenny and Acitelli (2001). Maximum likelihood estimation (MLE) was employed for all dyadic analyses in the present study.

Part 5 Hypothesized relationships between pairs of variables

Hypothesis 1 One partner's dyadic appraisal is negatively associated with their own dyadic coping (actor effect) and their partner's dyadic coping (partner effect). As depicted in Figure 4, the APIM with dyadic appraisal of patients with cervical cancer and their spousal caregivers as the exogenous variables (predictor variables) and dyadic coping of patients with cervical cancer and their spousal caregivers as the endogenous variables (criterion variables) was used to evaluate the actor and partner effects specific to the first hypothesis.

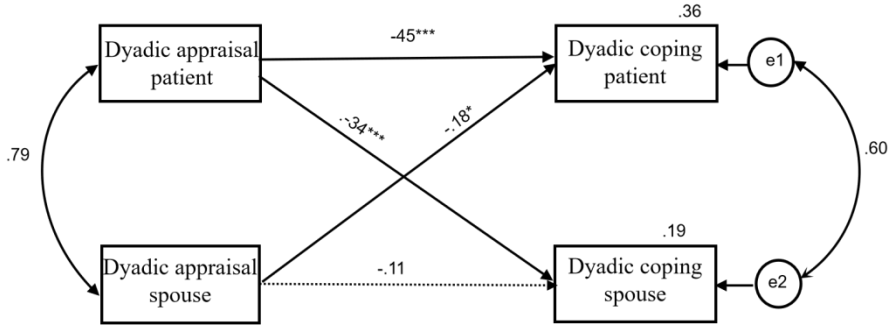


Figure 4 Dyadic appraisal and dyadic coping actor-partner interdependence model with Standardized Estimates

The standardized model of the APIM was tested according to distinguishable dyads. For distinguishable dyads, Kenny et al.(2020) suggest the following steps for testing: 1) to estimate a saturated model; 2) to test whether the two actor effects of the model are equal to the two partner effects. If the actor and partner effects are equal, then the model will be tested by indistinguishable dyads. If not equal, the absolute value of both actor effects is greater than 0.10, APIM model with phantom variables was estimated, and the two k values were estimated; 3) to test whether the two k values were equal, and if there is no difference between the two k-values, one k-value is used; 4) to calculate the confidence interval of k-value, evaluate whether to fix k-value as 0, 0.5, 1, or -1 (Kenny & Ledermann, 2010), and fix k-value as 0, 0.5, 1, or -1. if 0, 0.5, 1, or -1 is within the confidence interval, test the model fit, and judge whether the model supports a particular pairwise model.

In the study, actor effects between dyadic appraisal and dyadic coping were negative and significant for patients with cervical cancer ($p < .001$), more elevated scores on dyadic appraisal were associated with less positive dyadic coping. However, not significant for spousal caregivers ($p > .05$). Conversely, the partner effects between dyadic appraisal and dyadic coping were found to be negative and statistically significant for both patients with cervical cancer ($p < .05$) and spousal caregivers ($p < .001$). Specifically, dyadic appraisal of patients with cervical cancer was significantly related to spousal caregivers' dyadic coping, while spousal caregivers' dyadic appraisal was significantly related to patients' dyadic coping. Moreover, higher scores on personal dyadic appraisal were associated with less level dyadic coping in the partner.

The overall APIM model, considering distinguishable dyads, is a saturated model [$\chi2(0) = .000$]; as a result, measures of fit cannot be calculated (Kenny et al., 2020). The model was first restricted to equalize the actor effect, and partner effect, in order to verify whether patients with cervical cancer and spousal caregivers are distinguishable dyads. The results indicated that $\chi2\ (1) = 17.492$, $p < .001$, which is below the suggested threshold of 0.20 proposed by Kenny et al.(2020) suggesting that this should be considered a distinguishable dyadic relationship for further pairwise pattern analysis. Additionally, both actor effects had absolute values greater than 0.10, leading to the estimation of the APIM model with the inclusion of a ghost variable

and the estimation of two k-values.

For pairwise pattern testing, confidence intervals were estimated by bootstrap repeated sampling 5000 times. The k-value for patients with cervical cancer is 0. 398 (95% CI: 0.057 - 1.027), indicating a likely couple-pattern mode. Conversely, the k-value for spousal caregivers is 3.023 (95% CI: -7.175 - 131.122), suggesting that the spousal caregivers' pairwise mode is the partner-only pattern. In order to verify whether the paired mode is the couple-pattern mode for patients with cervical cancer and the partner-only pattern for spousal caregivers, restricting k equal to 1 for patients with cervical cancer and 0 for spousal caregivers, it was found that $\chi 2$ (1) = 12.576, p = .002, the chi-square change was not significant, supporting the effect of dyadic appraisal on dyadic coping as the couple-pattern mode for patients with cervical cancer and the partner-only pattern for spousal caregivers. That is to say, the dyadic coping of patients with cervical cancer is influenced by themselves and their spousal caregivers' dyadic appraisal while the spousal caregivers' dyadic coping is only influenced by dyadic appraisal of patients with cervical cancer.

Hypothesis 2 One partner's dyadic appraisal is negatively associated with their own resilience (actor effect) and their partner's resilience (partner effect). As depicted in Figure 5, the APIM with dyadic appraisal of patients with cervical cancer and their spousal caregivers as the exogenous variables (predictor variables) and resilience of patients with cervical cancer and their spousal caregivers as the endogenous variables (criterion variables) was used to evaluate the actor and partner effects specific to the second hypothesis.

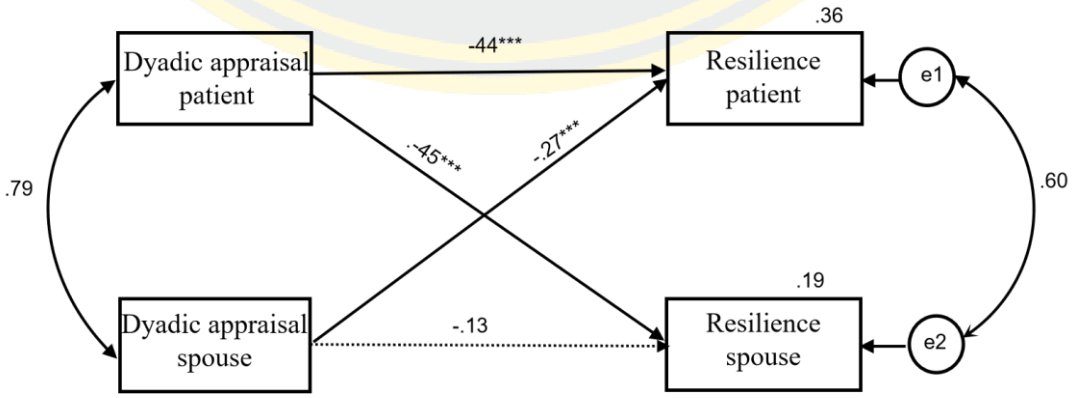


Figure 5 Dyadic appraisal and resilience Actor-Partner Interdependence Model with standardized estimates

The methodology employed in this study is consistent with that of hypothetical model I. The findings indicate that there were negative and significant actor effects between dyadic appraisal and resilience for patients with cervical cancer (p <.001), suggesting that higher scores on dyadic appraisal were associated with lower levels of resilience. However, these effects were not found to be significant for spousal caregivers (p >.05). On the other hand, partner effects between dyadic appraisal and resilience were found to be negative and significant for both patients with cervical cancer (p < .001) and spousal caregivers (p < .001). This suggests that dyadic appraisal of patients with cervical cancer significantly influenced the resilience of their spousal caregivers, while the dyadic appraisal of spousal caregivers also had a significant impact on resilience of patients with cervical cancer. More elevated scores on personal dyadic appraisal were associated with the partner's low level of resilience.

The model was first restricted to equalize the actor effect, and partner effect, in order to verify whether patients with cervical cancer and spousal caregivers are distinguishable dyads. The results indicated that $\chi 2$ (0) = 11.155, p =.004, indicating that the observed relationship falls below the recommended threshold of 0.20 as proposed. Consequently, this suggests that further investigation into the pairwise patterns is warranted. To assess the confidence intervals for the pairwise pattern testing, a bootstrap repeated sampling method was employed, with 5000 times. The k-value for patients with cervical cancer is 0. 620 (95% CI: 0. 233-1.367), indicating a likely couple-pattern. Conversely, the k-value for spousal caregivers is 3.425 (95% CI: 0.860 -54.575), suggesting a partner-only. In order to verify whether the paired mode is the couple-pattern mode for patients with cervical cancer and the partner-only pattern for spousal caregivers, restricting k equal to 1 for patients with cervical cancer and 0 for spousal caregivers, it was found that $\chi 2(1) = 5.005$, p = .082, the chi-square change was not significant, supporting the effect of dyadic appraisal on resilience as the couple-pattern mode for patients with cervical cancer and the partner-only pattern for spousal caregivers. That is to say, the resilience of patients with cervical cancer is influenced by themselves and their spousal caregivers' dyadic appraisal while the spousal caregivers' resilience is only influenced by dyadic appraisal of patients with cervical cancer.

Hypothesis 3 One partner's resilience is positively associated with their own

dyadic coping (actor effect) and their partner's dyadic coping (partner effect). The research utilized the APIM to examine the actor and partner effects related to the third hypothesis. This analysis involved considering the resilience of patients with cervical cancer and their spousal caregivers as exogenous variables (predictor variables), and the dyadic coping of patients with cervical cancer and their spousal caregivers as endogenous variables (criterion variables), as depicted in Figure 6.

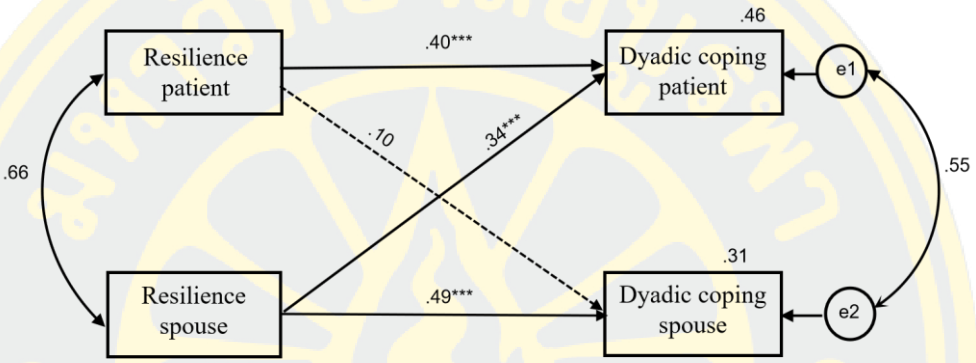


Figure 6 Resilience and dyadic coping Actor-Partner Interdependence Model with Standardized Estimates.

The study found that there were positive and significant actor effects between resilience and dyadic coping for both patients with cervical cancer ($p < .001$) and spousal caregivers ($p < .001$). This means that higher levels of resilience were associated with higher lever dyadic coping. Additionally, there were positive and significant partner effects between resilience and dyadic coping for patients with cervical cancer ($p <.001$). The resilience of spousal caregivers was significantly related to the dyadic coping of patients with cervical cancer, however, this relationship was not significant between the resilience of patients with cervical cancer and dyadic coping of spousal caregivers ($p > .05$).

The model was first restricted to equalize the actor effect, and partner effect, in order to verify whether patients with cervical cancer and spousal caregivers are distinguishable dyads. The findings revealed a significant $\chi 2$ (0) = 14.408, p =.001, indicating that the observed relationship falls below the recommended threshold of 0.20. Consequently, this suggests that further investigation into the pairwise patterns is warranted. To assess the confidence intervals for the pairwise pattern testing, a

bootstrap repeated sampling method was employed, with 5000 iterations.

The k-value for patients with cervical cancer is 0.845 (95% CI: 0.410-1.530), indicating a likely couple pattern. Conversely, the k-value for spousal caregivers is 0.212 (95% CI: -0.045-0.629), suggesting an actor-only pattern. To verify these findings, a chi-square test was conducted, restricting k to 1 for patients with cervical cancer and 0 for spousal caregivers. The results showed $\chi 2(1) = 2.752$, $p = .253$. The chi-square change was not significant, which supported the resilience on dyadic coping as the couple pattern for patients with cervical cancer and the actor-only model for spousal caregivers. That is, dyadic coping in patients with cervical cancer was influenced by both self and spousal caregiver resilience, whereas dyadic coping in spousal caregivers was influenced only by their own resilience.

Hypothesis 4 One partner's dyadic coping is positively associated with their own QoL (actor effect) and their partner's QoL (partner effect). The study employed the APIM to assess the actor and partner effects pertaining to the seventh hypothesis, utilizing dyadic coping of patients with cervical cancer and their spousal caregivers as exogenous variables (predictor variables) and QoL of patients with cervical cancer and their spousal caregivers as endogenous variables (criterion variables), as illustrated in Figure 7.

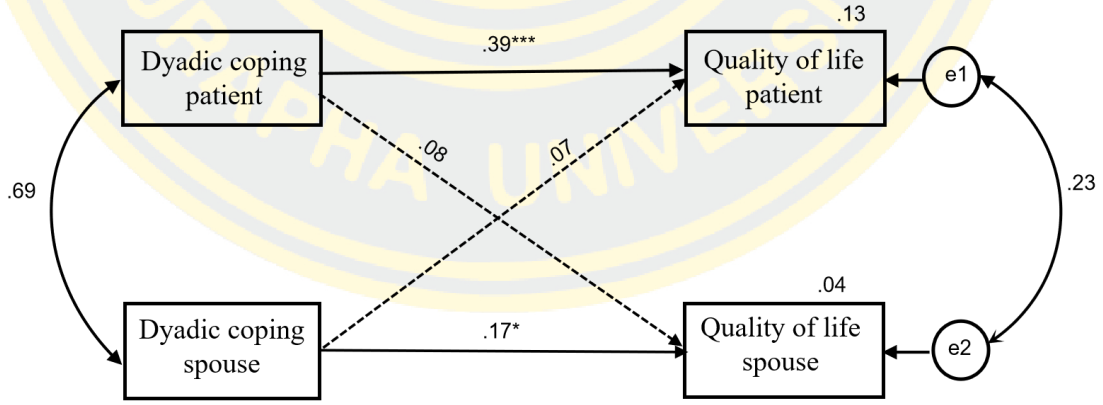


Figure 7 Dyadic Coping and quality of life Actor-Partner Interdependence Model with Standardized Estimates

The study revealed statistically significant actor effects between dyadic coping and QoL for both colorectal cancer patients ($p < .001$) and spousal caregivers ($p = .023$). This implies that higher levels of individual dyadic coping were linked to

improved QoL for the individuals themselves. Moreover, no significant partner effects were observed between dyadic coping and QoL for both patients with cervical cancer ($p < .528$) and spousal caregivers ($p = .656$).

The model was first restricted to equalize the actor effect, and partner effect, in order to verify whether patients with cervical cancer and spousal caregivers are distinguishable dyads. The findings revealed a significant $\chi 2$ (1) = 5.378, p =.068, indicating that the observed relationship falls below the recommended threshold of 0.20. Consequently, this suggests that further investigation into the pairwise patterns is warranted. To assess the confidence intervals for the pairwise pattern testing, a bootstrap repeated sampling method was employed, with 5000 iterations. The k-value for patients with cervical cancer is -0.118 (95% CI: -0.433-0.563), including 0, indicating a likely actor-only pattern. Similarly, the k-value for spousal caregivers is 0.197 (95% CI: -0.500-3.583), including 0, suggesting an actor-only pattern. To confirm these findings, a chi-square test was conducted, with k constrained to 0 for both patients with cervical cancer and spousal caregivers. The results indicated $\chi 2(2) = 51.296$, p <.001. The lack of significant chi-square change supports the notion that dyadic coping on QoL operates as an actor-only model for both patients with cervical cancer and spousal caregivers. In other words, QoL in patients with cervical cancer and spousal caregivers is solely influenced by their own dyadic coping strategies.

Hypothesis 5 One partner's dyadic coping is positively associated with their own self-efficacy (actor effect) and their partner's self-efficacy (partner effect). As depicted in Figure 8, the APIM with dyadic coping of patients with cervical cancer and their spousal caregivers as the exogenous variables (predictor variables) and self-efficacy of patients with cervical cancer and their spousal caregivers as the endogenous variables (criterion variables) was used to evaluate the actor and partner effects specific to the fifth hypothesis.

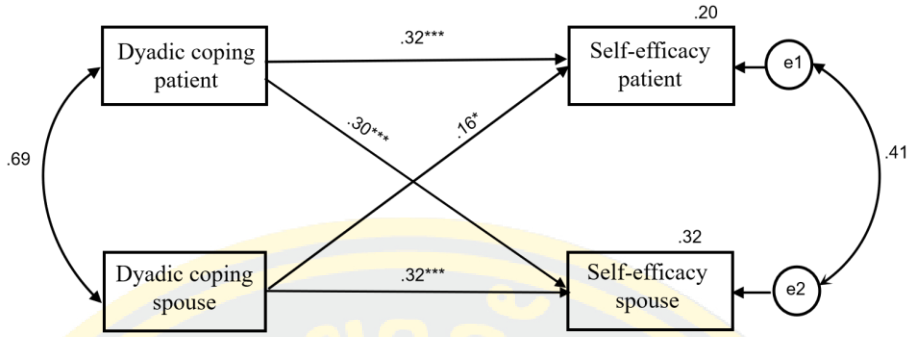


Figure 8 Dyadic coping and self-efficacy Actor-Partner Interdependence Model with Standardized Estimates

The study found that there were positive and significant actor effects between dyadic coping and self-efficacy for both patients with cervical cancer ($p < .001$) and spousal caregivers ($p < .001$). This means that higher scores on dyadic coping were associated with higher levels of self-efficacy. Additionally, there were positive and significant partner effects between dyadic coping and self-efficacy for both patients with cervical cancer ($p < .05$) and spousal caregivers ($p < .001$). This indicates that dyadic coping of patients with cervical cancer was significantly related to spousal caregivers' self-efficacy, and vice versa, spousal caregivers' dyadic coping was significantly related to self-efficacy of patients with cervical cancer.

The model was first restricted to equalize the actor effect, and partner effect, in order to verify whether patients with cervical cancer and spousal caregivers are distinguishable dyads. The results indicated that $\chi 2$ (1) = 6.071, p = .048 which is below the suggested threshold of 0.20, suggesting that this should be considered a distinguishable dyadic relationship for further pairwise pattern analysis. Additionally, both actor effects had absolute values greater than 0.10, leading to the estimation of the APIM model with the inclusion of a ghost variable and the estimation of two k-values.

To conduct pairwise pattern testing, confidence intervals were computed through bootstrap repeated sampling, with a total of 5000 iterations. The k-value for patients with cervical cancer was determined to be 0.486 (95% CI: -.001 - 1.778), with the inclusion of 1, indicating a probable couple pattern. Conversely, the k-value for spousal caregivers was found to be 0.938 (95% CI: 0.247 - 4.421), also including 1, suggesting that the spousal caregivers' pairwise mode represents the couple-pattern

mode. To determine whether the paired mode serves as the couple-pattern mode for both patients with cervical cancer and spousal caregivers, the value of k was restricted to 1. The analysis revealed that $\chi 2(2) = 2.191$, $p = .344$, indicating that the chi-square change was not statistically significant. This finding supports the notion that dyadic coping has an impact on self-efficacy as the couple-pattern mode for both patients with cervical cancer and spousal caregivers. In other words, the self-efficacy of patients with cervical cancer and spousal caregivers is influenced by their own coping strategies as well as those of their partners.

Hypothesis 6 One partner's self-efficacy is positively associated with their own QoL (actor effect) and their partner's QoL (partner effect). As depicted in Figure 9, the APIM with resilience of patients with cervical cancer and their spousal caregivers as the exogenous variables (predictor variables) and QoL of patients with cervical cancer and their spousal caregivers as the endogenous variables (criterion variables) was used to evaluate the actor and partner effects specific to the sixth hypothesis.

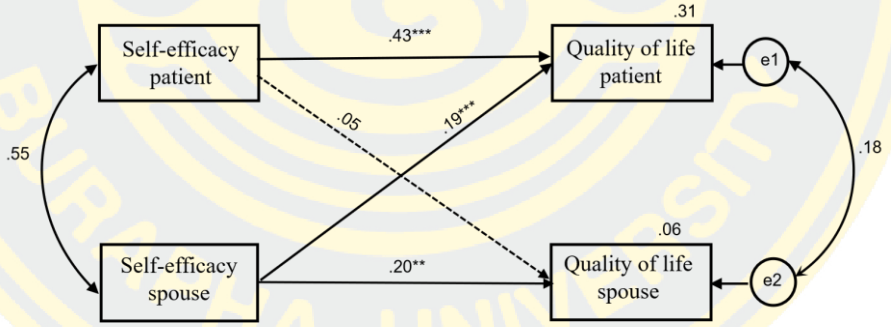


Figure 9 Self-efficacy and quality of life Actor-Partner Interdependence Model with Standardized Estimates

The methodology employed in this study is consistent with that of hypothetical model I. The findings indicate that there were positive and significant actor effects between resilience and QoL for patients with cervical cancer ($p < .001$) and spousal caregivers, suggesting that higher scores on resilience were associated with high levels of QoL for both patients with cervical cancer and spousal caregivers. On the other hand, a positive and significant association was observed between resilience and QoL among patients with cervical cancer ($p < .001$), while no significant association was found among spousal caregivers ($p = .424$). These findings

indicate that the resilience of spousal caregivers significantly influenced the QoL of patients with cervical cancer, whereas the resilience of patients with cervical cancer did not significantly impact the QoL of their spousal caregivers. Higher levels of resilience among spousal caregivers were associated with higher QoL among patients with cervical cancer.

As above, the model was restricted to equalize the actor effect and partner effect, in order to verify whether patients with cervical cancer and spousal caregivers are distinguishable dyads. The results indicated that $\chi 2$ (1) = 22.384, p <.001, indicating that the observed relationship falls below the recommended threshold of 0.20. Consequently, this suggests that further investigation into the pairwise patterns is warranted. To assess the confidence intervals for the pairwise pattern testing, a bootstrap repeated sampling method was employed, with 5000 times. The k-value for patients with cervical cancer is 0.433 (95% CI: 0.144-0.862), including 0.5, indicating a likely mix pattern. Conversely, the k-value for spousal caregivers is 0.258 (95% CI: -0.237 -1.474), including 0,1, 0 is selected as the best one, suggesting a partner-only pattern. In order to verify whether the paired mode is the couple pattern for patients with cervical cancer and the partner-only pattern for spousal caregivers, restricting k equal to 0.5 for patients with cervical cancer and 0 for spousal caregivers, it was found that $\chi 2(2)$ = 19.992, p = .001, the chi-square change was not significant, supporting the effect of resilience on QoL as the couple-pattern for patients with cervical cancer and the partner-only pattern for spousal caregivers. That is to say, the QoL of patients with cervical cancer is influenced by themselves and their spousal caregivers' resilience while the spousal caregivers' QoL is only influenced by resilience of patients with cervical cancer.

Part 6 Hypothesized Mediation Models

The APIMeM employed in this study was designed to evaluate the mediation effects within couples, specifically examining whether partner effects between dyadic appraisal and dyadic coping were fully mediated, and whether actor effects between the same variables were partially mediated. Furthermore, the model assessed the full mediation of partner effects and the partial mediation of actor effects in the relationship between dyadic coping and QoL. According to the measures of overall model fit index, the final model demonstrated an excellent fit to the data, as

evidenced by the following indices: $\chi 2(1) = 13.424$; $p = .20$; CMIN/df =1.342; CFI = .998; GFI = .992; TLI =.991; NFI =.992 and RMSEA = .033. Notably, this model accounted for 33% of the variance in QoL among patients with cervical cancer and only 6% of the variance in QoL among their spousal caregivers (Figure 10).

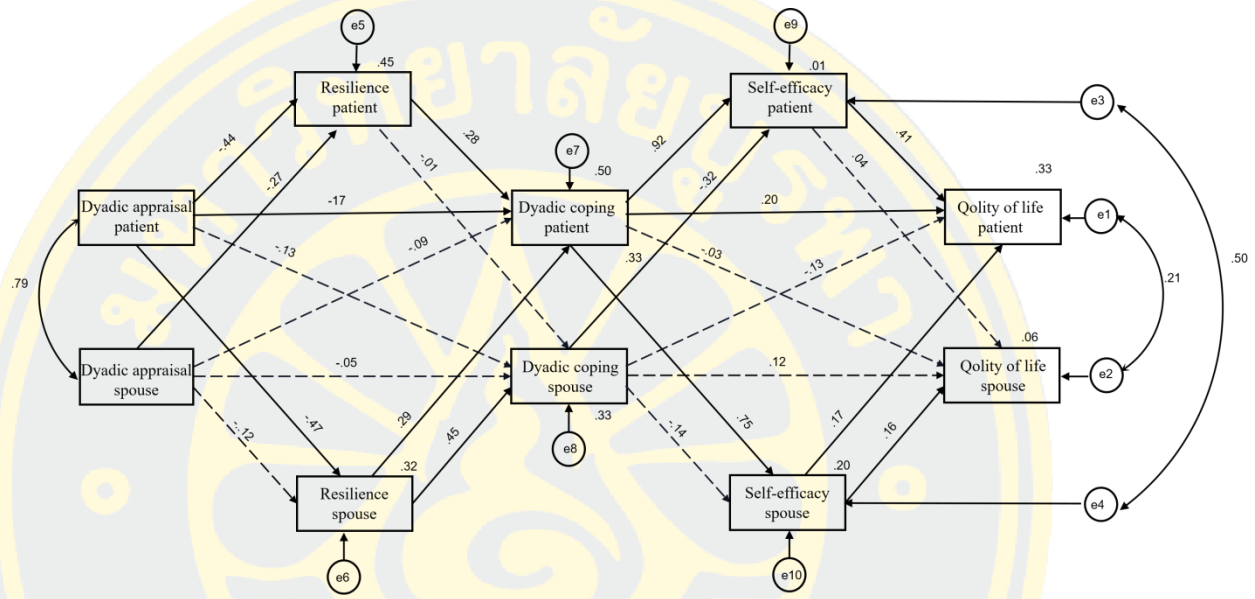


Figure 10 Dyadic Coping, self-efficacy and quality of life Actor-Partner Interdependence Mediation Model with Standardized Estimates

Hypothesis 7 One partner's resilience mediates the association between: (a) their own dyadic appraisal and their own dyadic coping (actor-actor mediated effects); (b) their own dyadic appraisal and their partner's dyadic coping (actor-partner mediated effects); (c) their partner's dyadic appraisal and their own dyadic coping (partner-actor mediated effects); and (d) their partner's dyadic appraisal and their partner's dyadic coping (partner-partner mediated effects). APIMeM was employed to evaluate the seventh hypothesis, which aimed to assess mediation on a partner level, thus focusing on individual rather than dyadic effects. Figure 10 illustrates that dyadic appraisal constitutes the exogenous (predictor) variables, while resilience serves as the mediator, and dyadic coping comprises the endogenous (outcome) variables. The mediation analysis proceeded in a three-step process: (1) selecting an appropriate model, (2) evaluating direct effects, and (3) examining indirect effects via

bootstrapping (Ledermann & Macho, 2009).

The APIM used to assess the association between dyadic appraisal and dyadic coping included two actor and two partner effects. The actor effects between dyadic appraisal and dyadic coping were significant for patients with cervical cancer (p < .001) but not significant for spousal caregivers (p >.05). However, the partner effects between dyadic appraisal and dyadic coping were significant for both patients with cervical cancer (p = .015) and spousal caregivers (p <.001). The APIMeM depicted in Figure 7 possesses six degrees of freedom (df). According to Bodenmann et al. (2007), when the model adequately fits the data, direct partner effects between exogenous (dyadic appraisal) and endogenous (dyadic coping) variables are statistically insignificant in models with six degrees of freedom. Complete mediation is established when the direct effects between the exogenous and endogenous variables are not significant, while partial mediation is established when these direct effects are significant (Bodenmann et al., 2007; Ledermann et al., 2010).

Testing direct effects

Associations between dyadic appraisal and resilience. As depicted in Figure 10, actor effects between dyadic appraisal and resilience were negative and significant for patients with cervical cancer (p <.001) but not significant for spousal caregivers (p > .05). Higher levels of dyadic appraisal for patients with cervical cancer were associated with increased personal reports of resilience. The standardized beta coefficients indicate that as dyadic appraisal increased by one standard deviation, resilience decreased by .44 standard deviations for patients with cervical cancer. The partner effect between dyadic appraisal and dyadic coping was negative and significant for patients with cervical cancer (p <.001) and spousal caregivers (p <.001). The standardized beta coefficients indicate that as dyadic appraisal of patients with cervical cancer increased by one standard deviation, resilience decreased by .47 standard deviations for spousal caregivers, while spousal caregivers' dyadic appraisal increased by one standard deviation, resilience decreased by .27 standard deviations for patients with cervical cancer.

Associations between resilience and dyadic coping. Actor effects between resilience and dyadic coping were positive and significant for both patients with cervical cancer and spousal caregivers (p < .001), see Figure 10. The standardized

beta coefficients indicate that for both patients with cervical cancer and spousal caregivers, a one-standard deviation increase in reported resilience corresponds to a 0.28 standard deviation increase in dyadic coping for patients with cervical cancer and a 0.45 standard deviation increase for spousal caregivers. The partner effect between spousal caregivers' resilience to dyadic coping of patients with cervical cancer was positive and significant ($p < .001$). However, the partner effect between resilience of patients with cervical cancer to spousal caregivers' dyadic coping was positive but not significant ($p = .911$).

Associations between dyadic appraisal and dyadic coping. As depicted in Figure 10, actor effects between dyadic appraisal and dyadic coping were negative and significant for patients with cervical cancer (p =.009) and negative but no significant for spousal caregivers (p =.505). The standardized beta coefficients indicate that as dyadic appraisal increased by one standard deviation, dyadic coping decreased by .17 standard deviations for patients with cervical cancer. Specifically, the standardized path from dyadic appraisal of patients with cervical cancer to dyadic coping of patients with cervical cancer decreased from -0.45 in the APIM to -0.17 in the present APIMeM model. The partner effect between dyadic appraisal and dyadic coping was positive but not significant ($p = .099$ and .131). These findings suggest the existence of partial mediation in actor effects for patients with cervical cancer. This is evident as the direct effects between dyadic appraisal and dyadic coping, while significant, diminish in magnitude once resilience (mediator variables) is introduced into the model. However, the direct effects between dyadic appraisal and resilience for spousal caregivers were not significant (β = -.12, p =.084), indicating no mediating effect on dyadic coping through resilience. Significance tests to assess whether mediation was significant are presented below.

Testing indirect effects

Eight straightforward indirect effects were evident in the APIMeM: two actor-actor (DAp→RSp→DCp; DAs→RSs→DCs), two actor partner (DAs →RSs→DCp; DAp→RSp→DCs), two partner-actor (DAs→RSp→DCp; DAp→RSs→DCs), and two partner-partner (DAp→RSs→DCp; DAs→RSp→DCs). As previously mentioned, the examination of dyadic appraisal and dyadic coping in patients indicates the existence of partial mediation, while the examination of dyadic

appraisal and dyadic coping in spousal caregivers suggests complete mediation. To evaluate the significance of this mediation, significance tests were conducted. In the present analyses, bootstrapping was employed as it offers a more accurate estimation of the confidence interval for indirect effects (Sadler et al., 2011).

Table 14 The total effects, total indirect effects, simple indirect effects, and direct effects on dyadic appraisal, resilience, and dyadic coping for the patients with cervical cancer dyad members as distinguishable

Effect	Estimate	SE	Bias-Corrected 95 % CI		*P*
			LLCI	ULCI	
Patient actor effect					
Total effect	-0.293	0.080	-0.457	-0.147	<.001
Total IE	-0.259	0.042	-0.341	-0.179	<.001
Actor-actor simple IE (DAp →RSp →DCp)	-0.122	0.032	-0.192	-0.064	<.001
Partner-partner simple IE (DAp→RSs →DCp)	-0.137	0.035	-0.205	-0.072	<.001
Direct effect	-0.167	0.066	-0.303	-0.045	.009
Spouse actor effect					
Total effect	-0.106	0.081	-0.264	0.053	.194
Total IE	-0.055	0.036	-0.127	0.015	.126
Actor-actor simple IE (DAs →RSs →DCs)	-0.053	0.031	-0.117	0.006	.077
Partner-partner simple IE (DAs →RSp →DCs)	-0.002	0.022	-0.046	0.046	.888
Direct effect	-0.051	0.077	-0.202	0.103	.493
Patient partner effect					
Total effect	-0.198	0.071	-0.338	-0.058	.008
Total IE	-0.109	0.039	-0.190	-0.038	.003
Actor-partner actor simple IE (DAs →RSs →DCp)	-0.034	0.021	-0.079	0.004	.077
Partner-actor simple IE (DAs →RSp →DCp)	-0.075	0.030	-0.141	-0.026	.001
Direct effect	-0.089	0.062	-0.21	0.037	.160
Spouse partner effect					
Total effect	-0.350	0.074	-0.501	-0.207	<.001
Total IE	-0.216	0.044	-0.303	-0.131	<.001
Actor-partner actor simple IE (DAp →RSp →DCs)	-0.003	0.035	-0.072	0.067	.888
Partner-actor simple IE (DAp →RSs →DCs)	-0.212	0.043	-0.299	-0.133	<.001
Direct effect	-0.134	0.074	-0.281	0.011	.070

Note. IE = indirect effect; SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit; APIMeM = Actor-Partner Interdependence Mediation Model. DAp = dyadic appraisal of patients with cervical cancer; RSp = resilience of patients with cervical cancer; DCp = dyadic coping of patients with cervical cancer; RSs = resilience of spousal caregivers; DAs = dyadic appraisal of spousal caregivers; DCs = dyadic coping of spousal caregivers.

The evaluation of the eight indirect effects in the APIMeM model (Sadler et al., 2011) utilized bias-corrected bootstrap values provided by AMOS. The significance of these indirect effects was tested using bias-corrected bootstrapping confidence intervals, which were based on standardized indirect effects. The resulting p-values and bias-corrected 95% confidence intervals are presented in Table 14. Among the actor-actor relationships examined, one actor-actor (DAp→RSp→DCp), two partner-actor (DAs→RSp→DCp; DAp→RSs→DCs), and one partner-partner (DAp→RSs→DCp) were found to be statistically significant as its bias-corrected 95% confidence interval did not include zero.

These findings suggest that (a) the relationship between dyadic appraisal of patients with cervical cancer and their own dyadic coping was significantly mediated by their own resilience, (b) the association between dyadic appraisal of spousal caregivers and dyadic coping of patients with cervical cancer was significantly mediated by resilience of patients with cervical cancer, (c) the association between dyadic appraisal of patients with cervical cancer and dyadic coping of spousal caregivers was significantly mediated by resilience of spousal caregivers and (d) the association between dyadic appraisal of patients with cervical cancer and dyadic coping of patients with cervical cancer was significantly mediated by resilience of spousal caregivers. Thus, the seventh hypothesis was partially supported. One actor-actor mediated effect was significant; personal reports of resilience explained the association between personal dyadic appraisal and dyadic coping in patients with cervical cancer. Two partner-actor mediated effect was significant; resilience of patients with cervical cancer explained the association between dyadic appraisal of spousal caregivers and dyadic coping of patients with cervical cancer, while resilience of spousal caregivers explained the association between dyadic appraisal of patients with cervical cancer and dyadic coping of spousal caregivers. Moreover, one partner-partner mediated effect was significant; resilience of spousal caregivers did

significantly mediate the association between dyadic appraisal and dyadic coping in patients with cervical cancer.

Hypothesis 8 One partner's self-efficacy mediates the association between: (a) their own dyadic coping and their own QoL (actor-actor mediated effects); (b) their own dyadic coping and their partner's QoL (actor-partner mediated effects); (c) their partner's dyadic coping and their own QoL (partner-actor mediated effects); and (d) their partner's dyadic coping and their partner's QoL (partner-partner mediated effects). The APIMeM was employed to examine the hypothesis, which assessed mediation at the partner level, specifically focusing on individual effects rather than dyadic effects. As illustrated in Figure 10, dyadic coping serves as the exogenous (predictor) variables, self-efficacy serves as the mediator variables, and QoL represents the endogenous (outcome) variables. The mediation analyses were conducted as outlined below.

The current study employed the APIM to examine the relationship between dyadic coping and QoL. The analysis revealed two actor effects and two partner effects. Specifically, the actor effects indicated a significant association between dyadic coping and QoL for patients with cervical cancer (p = .002), while no significant association was found for spousal caregivers (p = .141). Conversely, the partner effects did not yield significant results for both patients with cervical cancer (p = .057) and spousal caregivers (p = .725) in relation to dyadic coping and QoL.

Testing direct effects

Associations between dyadic coping and self-efficacy. As depicted in Figure 10, actor effects between dyadic coping and self-efficacy were positive and significant for patients with cervical cancer (p < .001) but not significant for spousal caregivers (p =.155). Higher levels of dyadic coping for patients with cervical cancer were associated with increased personal self-efficacy. The standardized beta coefficients indicate that as dyadic coping increased by one standard deviation, self-efficacy increased by .92 standard deviations for patients with cervical cancer. The partner effect between dyadic coping and self-efficacy was negative and significant for patients with cervical cancer (p <.01) and positive and significant for spousal caregivers (p <.001). The standardized beta coefficients indicate that as dyadic coping of patients with cervical cancer increased by one standard deviation, self-efficacy

increased by .75 standard deviations for spousal caregivers, while spousal caregivers' dyadic coping increased by one standard deviation, self-efficacy decreased by .32 standard deviations for patients with cervical cancer.

Associations between self-efficacy and QoL. As depicted in Figure 10, actor effects between self-efficacy and QoL were positive and significant for both patients with cervical cancer ($p < .001$) and spousal caregivers ($p = .025$). The standardized beta coefficients indicate that for both patients with cervical cancer and spousal caregivers, as reports of self-efficacy increased by one standard deviation, QoL increased by .41 standard deviations for patients with cervical cancer and by .16 standard deviations for spousal caregivers. The partner effect between spousal caregivers' self-efficacy to QoL of patients with cervical cancer was positive and significant ($p < .01$). However, the partner effect between self-efficacy of patients with cervical cancer to spousal caregivers' QoL was positive but not significant ($p = .520$).

Associations between dyadic coping and QoL. As depicted in Figure 10, actor effects between dyadic coping and QoL were positive and significant for patients with cervical cancer ($p = .002$) and positive but not significant for spousal caregivers ($p = .141$). The standardized beta coefficients indicate that as dyadic coping increased by one standard deviation, QoL increased by .20 standard deviations for patients with cervical cancer. Specifically, the standardized path from dyadic coping of patients with cervical cancer to QoL of patients with cervical cancer decreased from -.39 in the APIM to -.20 in the present APIMeM model. The partner effect between dyadic coping and QoL was not significant ($p = .725$ and .057). These findings indicate the presence of partial mediation of actor effects for patients with cervical cancer because the direct effects between dyadic coping and QoL were significant but smaller in size once self-efficacy (mediator variables) was included in the model. However, the direct effects between dyadic coping and self-efficacy for spousal caregivers were not significant ($\beta = -.12$, $p = .084$), indicating no mediating effect on QoL through self-efficacy. Significance tests to assess whether mediation was significant are presented below.

Table 15 The total effects, total indirect effects, simple indirect effects, and direct

effects on dyadic coping, self-efficacy and quality of life for the patients with cervical cancer dyad members as distinguishable

Effect	Estimate	SE	Bias-Corrected 95 % CI		P
			LLCI	ULCI	
Patient actor effect					
Total effect	0.616	0.141	0.380	0.932	<.001
Total IE	0.509	0.111	0.329	0.766	<.001
Actor-actor simple IE (DCp→SEp →QoLp)	0.379	0.095	0.231	0.603	<.001
Partner-partner simple IE (DCp →SEs →QoLp)	0.130	0.058	0.026	0.257	.012
Direct effect	0.204	0.080	0.049	0.361	.010
Spouse actor effect					
Total effect	0.080	0.083	-0.098	0.225	.364
Total IE	-0.036	0.036	-0.125	0.014	.182
Actor-actor simple IE (DCs → SEs →QoLs)	-0.022	0.027	-0.091	0.013	.266
Partner-partner simple IE (DCs →SEp → QoLs)	-0.014	0.023	-0.072	0.024	.460
Direct effect	0.116	0.074	-0.038	0.250	.126
Patient partner effect					
Total effect	-0.283	0.121	-0.550	-0.076	.006
Total IE	-0.153	0.079	-0.336	-0.034	.009
Actor-partner actor simple IE (DCs → SEs →QoLp)	-0.023	0.024	-0.081	0.016	.260
Partner-actor simple IE (DCs →SEp → QoLp)	-0.130	0.068	-0.292	-0.031	.006
Direct effect	-0.130	0.080	-0.285	0.029	.107
Spouse partner effect					
Total effect	0.134	0.085	-0.014	0.319	.078
Total IE	0.162	0.080	0.028	0.348	.021
Actor-partner actor simple IE (DCp → SEp →QoLs)	0.040	0.058	-0.068	0.165	.460
Partner-actor simple IE (DCp →SEs→ QoLs)	0.123	0.067	0.012	0.278	.026
Direct effect	-0.028	0.080	-0.183	0.130	.745

Note. IE = indirect effect; SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit; APIMeM = Actor-Partner Interdependence Mediation Model. DCp = dyadic coping of patients with cervical cancer; SEp = self-efficacy of patients with cervical cancer; QoLp = quality of life of patients with cervical cancer; SEs = self-efficacy of spousal caregivers; DCs =dyadic coping of spousal caregivers; QoLs = quality of life of spousal caregivers.

Testing indirect effects

Eight simple indirect effects were present in the APIMeM: two actor-actor (DCp → Sep → QoLp; DCs → SEs → QoLs), two actor partners (DCs

→ SEs → QoLp; DCp → SEp → QoLs), two partner-actor (DCs → SEp→ QoLp; DCp → SEs → QoLs), and two partner-partner (DCp → SEs → QoLp; DCs → Sep → QoLs). It is worth noting that the findings suggest partial mediation in the relationship between dyadic coping and QoL for patients with cervical cancer while no mediation was found for dyadic coping and QoL among spousal caregivers. To determine the significance of these mediations, significance tests were conducted, employing bootstrapping as it offers a more accurate estimation of the confidence interval for indirect effects in the current analyses (Sadler et al., 2011).

Bias-corrected bootstrap values provided by AMOS were used to evaluate the eight indirect effects present in the APIMeM model (Sadler et al., 2011). The bias-corrected 95% bootstrapping confidence intervals based on standardized indirect effects and the corresponding p-values are presented in Table 15. Bias-corrected bootstrapping confidence intervals were used to test the significance of the indirect effects. Based on bias-corrected bootstrap findings, one actor-actor (DCp → SEp → QoLp), two partner-actor (DCs → SEp → QoLp; DCp → SEs → QoLs), and one partner-partner (DCp → SEs → QoLp) were statistically significant; the bias-corrected 95% CI did not include zero.

The evaluation of the eight indirect effects in the APIMeM model (Sadler et al., 2011) utilized bias-corrected bootstrap values provided by AMOS. The significance of the indirect effects was tested using bias-corrected bootstrapping confidence intervals, which were based on standardized indirect effects. The resulting p-values and bias-corrected 95% confidence intervals are presented in Table 15. Among the actor-actor relationships, one actor-actor (DCp → SEp → QoLp), two partner-actor (DCs → SEp → QoLp; DCp → SEs → QoLs), and one partner-partner (DCp → SEs → QoLp) were found to be statistically significant as its bias-corrected 95% confidence interval did not include zero.

These findings indicate that (a) the association between dyadic coping of patients with cervical cancer and their own QoL was significantly mediated by their own self-efficacy, (b) the association between dyadic coping of spousal caregivers and QoL of patients with cervical cancer was significantly mediated by self-efficacy of patients with cervical cancer, (c) the association between dyadic coping of patients

with cervical cancer and QoL of spousal caregivers was significantly mediated by self-efficacy of spousal caregivers and (d) the association between dyadic coping and QoL in patients with cervical cancer was significantly mediated by self-efficacy of spousal caregivers. Thus, the eighth hypothesis was partially supported. One actor-actor mediated effect was significant; personal reports of self-efficacy explained the association between personal dyadic coping and QoL in patients with cervical cancer. Two partner-actor mediated effect was significant; self-efficacy of patients with cervical cancer explained the association between dyadic coping of spousal caregivers and QoL of patients with cervical cancer, while self-efficacy of patients with cervical cancer explained the association between dyadic coping of patients with cervical cancer and QoL of spousal caregivers. Moreover, one partner-partner mediated effect was significant; self-efficacy of spousal caregivers did significantly mediate the association between dyadic coping and QoL in patients with cervical cancer.

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter provides a conclusion and discussion of the study, comprising three distinct sections. The initial section offers a concise summary of the study, while the subsequent section delves into a comprehensive discussion of the research findings. The final section outlines the study's strengths and limitations, explores the implications of the findings, and provides recommendations for future research endeavors.

Summary of the study

The aim of this research was to investigate the mechanisms underlying dyadic appraisal, dyadic coping, and QoL in couples with cervical cancer. Additionally, this research sought to explore the potential intermediary roles of resilience and self-efficacy in the relationships between dyadic appraisal and coping, and between dyadic coping and QoL, respectively.

This research employed a descriptive cross-sectional methodology. A cluster random sampling technique was used to select patients with cervical cancer and their spousal caregivers from regional hospitals. Following the established inclusion criteria, 636 participants consisting of patients with cervical cancer and their spousal caregivers were recruited from 18 communities across four districts in Jiangsu province, China. This study was conducted from August 2022 to August 2023. Data collection involved six questionnaires, including the demographic record form, the Brief Illness Perception Questionnaire (BIPQ), the Resilience Scale-14 (RS-14), the Dyadic Coping Inventory (DCI), the 12-item Short-Form Health Survey (SF-12), and the General Self-Efficacy Scale (GSES). The reliability of the instruments was confirmed with Cronbach’s alpha coefficients: .83 for the BIPQ, .91 for both the RS-14 and DCI, .86 for SF-12, and .70 for the GSES. Following data cleaning and assumption verification for analysis, the sample was narrowed to 315 dyads. Six outliers were excluded from the data set.

The age of participants was between 26 to 80 years. Their mean age was 55

years for patients with cervical cancer and 56 years for spousal caregivers. The majority of couples had been married for more than 30 years (183, 58.1%). Only 19.4% of patients with cervical cancer and 28.3% of spousal caregivers had a high education or more. The couples were mainly currently employed, with 65.4% of the patients with cervical cancer employed and 83.5% of the spousal caregivers employed. The majority of participants resided in rural areas (42.2%). A significant proportion of participants relied on medical insurance to cover their medical expenses (95.2%), and a substantial percentage reported monthly incomes below 5000 RMB (79.8%). A considerable number of participants, both patients and caregivers, were unaware of the human papillomavirus vaccine for cervical cancer prevention (58.7% for patients; 74.0% for caregivers). Similarly, a significant majority of participants, both patients and caregivers, had limited knowledge or were unaware of the government's free cervical cancer rescreening program (85.8% for patients; 93.7% for caregivers). In terms of cervical cancer stage, the majority of participants were diagnosed at stage II or below (79.0%). 81.9% of the patients were squamous carcinoma, and 78.1% of patients were based on surgery alone and surgery combined with chemotherapy and radiotherapy.

All participants completed measures to assess dyadic appraisal, resilience, dyadic coping, self-efficacy, and QoL. Hypotheses were tested using SEM. The findings provided partial support for the hypothesis. The APIM analyses tested the actor and partner effects between dyadic appraisal and dyadic coping; dyadic appraisal and resilience; resilience and dyadic coping; dyadic coping and self-efficacy; self-efficacy and QoL; dyadic coping and QoL. The result showed that dyadic appraisal in patients with cervical cancer was associated with their own and partners' dyadic coping, and dyadic appraisal in spousal caregivers was only associated with their partner's dyadic coping; Dyadic appraisal in patients with cervical cancer was associated with their own and partners' resilience, and dyadic appraisal in spousal caregivers was only associated with their partner's resilience. Resilience in patients with cervical cancer was associated with their own dyadic coping, and resilience in spousal caregivers was associated with their own and partner's dyadic coping; Dyadic coping in one partner was associated with their own and partners' self-efficacy; Self-efficacy in patients with cervical cancer was

associated with their own QoL, and self-efficacy in spousal caregivers was associated with their own and partner's QoL; Dyadic coping in one partner was only associated with their own QoL.

The APIMeM analysis revealed significant mediation effects in the study. In the first mediation relationship, the researchers found that one partner's resilience partially mediated the relationship between their dyadic appraisal and dyadic coping. Specifically, the resilience of patients with cervical cancer played a significant mediating role in the dynamic between the patients' dyadic appraisal and their dyadic coping. Additionally, the patients' resilience influenced the relationship between spousal caregivers' dyadic appraisal and the patients' dyadic coping. Moreover, the resilience of spousal caregivers played a significant mediating role in the correlation between the patients' dyadic appraisal and the caregivers' dyadic coping. Furthermore, the spousal caregivers' resilience acted as a significant mediator in the correlation between the patients' dyadic appraisal and the patients' dyadic coping. The second mediation relationship focused on the role of self-efficacy by one partner in explaining the association between their own dyadic coping and their QoL. The findings showed that patients' self-efficacy played a crucial mediating role in clarifying the link between their dyadic coping and their QoL. Moreover, two significant partner-actor mediated effects were observed in the study. Firstly, patients' self-efficacy clarified the relationship between their spouses' dyadic coping and their own QoL. Secondly, spousal caregivers' self-efficacy acted as a significant mediator between patients' dyadic coping and their own QoL. Additionally, a notable partner-partner mediated effect was identified, with the spousal caregivers' self-efficacy significantly mediating the relationship between the patients' dyadic coping and the patients' QoL.

Discussion of findings

1. Factors in Couples with Cervical Cancer: Current Status and Discussion

Dyadic Appraisal

Level of dyadic appraisal in couples with cervical cancer. Dyadic appraisal can be understood as a shared illness representation, involving the

perception and understanding of illness by both individuals in the dyad. It can also encompass an approach of shared illness ownership, emphasizing the collective experience with an "ours" rather than "mine" perspective, as well as shared stressors (Berg & Upchurch, 2007). In this study, the total scores of dyadic appraisal of patients with cervical cancer and their spousal caregivers were (43.64 ± 24.15) and (43.96 ± 20.50), respectively, indicating that the dyadic appraisal of patients with cervical cancer and their spousal caregivers was at a middle level. This may be due to the type of disease and the participants. The study population predominantly consists of patients with cervical cancer and their spousal caregivers who are aged 40 years or older. These dyads, having cohabitated for numerous years, engage in a collaborative assessment of their illness when confronted with severe health challenges. Meanwhile, the total score of the dyadic appraisal for patients and spousal caregivers is the same, but the score of cognitive representation dimension of patients (27.11 ± 15.15) was higher than that of spousal caregivers (26.28 ± 13.36), while the score of emotional representation dimension of patients (11.43 ± 6.97) was lower than that of spousal caregivers (12.12 ± 6.28). This indicates that patients and their spousal caregivers have different cognitive and emotional attitudes towards the disease, which reflects the different ways in which patients and their spousal caregivers handle the disease. According to a previous study (Karademas et al., 2010), spousal caregivers are usually more pessimistic about the severity of the disease than cancer patients, but more objective about the ability of individuals to control the disease. Therefore, spousal caregivers will exhibit a more positive emotional attitude when facing the threat of disease and heavy pressure, while patients with cervical cancer who directly experience pain and suffering from the disease, will exhibit higher cognitive scores. These differences underscore the need for interventions that are tailored to address the specific cognitive and emotional needs of both patients and caregivers. For instance, providing caregivers with targeted emotional support could alleviate their distress, while patients may benefit from detailed information about their condition and treatment options. Moreover, further investigation into the impact of tailored educational interventions on dyadic appraisal could provide valuable information for healthcare providers. In conclusion, this study contributes to a growing body of evidence that emphasizes the distinct yet interconnected experiences of patients and

their spousal caregivers, reinforcing the importance of dyadic-focused healthcare approaches.

Demographic and clinical factors of dyadic appraisal in couples with cervical cancer. According to the results of the one-way multivariate analysis, there are differences in the dyadic appraisal level of spousal caregivers in terms of education, heard of HPV vaccine, the stage of cervical cancer, pathological type, and treatment method were significantly associated with the dyadic appraisal of spousal caregivers. Dyadic appraisal involves evaluating available home resources by patients and their spousal caregivers. For spousal caregivers, those who have a high school education or higher are more likely to use various resources to search the information on the disease and those who have heard of the HPV vaccine may have more understanding about cervical cancer before getting sick, therefore, have positive appraisals of the illness. In addition, patients and spouses may appraise the illness context similarly or differently about patient symptoms (Lyons et al., 2016), and this study found that patients who were diagnosed at the precancerous stage and who were treated with surgery only, their spousal caregivers had lower levels of scores on dyadic appraisal. This may be because most of the serious symptoms occur in the late stage of cancer, and most diseases in the late stages of cancer may have more complex treatment methods. After diagnosis, spousal caregivers of patients with cervical cancer are most concerned about the disease progress and prognosis. Spousal caregivers may be more clearly aware of the serious negative consequences of the disease when they experience physiological and psychological problems in the late stage of the disease (Karabulutlu et al., 2019).

Resilience

Level of resilience in couples with cervical cancer. In this study, patients with cervical cancer and their spousal caregivers had a moderate level of resilience, the total scores of patients with cervical cancer and their spousal caregivers in our study were (63.86 ± 19.71) and (71.42 ± 17.14), respectively. The scores of resilience of patients with cervical cancer were lower compared with the level of resilience (70.57±12.14) reported in China among women with abnormal cervical cancer screening results (Wang et al., 2022). This may be due to the fact that the participants in this study were newly diagnosed with cervical cancer, a stage in which they face a

range of physical and psychological stressors (Mamguem et al., 2019). In addition, 65.8% of the participants in this study are younger than 60 years old, and 65.4% of the participants were still employed to work, they also had to work or raise children while treating diseases. Thus, may bear more responsibilities and pressures from family and society, and are prone to physical and mental fatigue, which affects their level of psychological resilience. Meanwhile, the total score and each dimension score of the resilience of patients was lower than that of spousal caregivers. This may be due to gender role differences, female patients with the disease are usually emotionally fragile and have poor resilience. At the same time, in China's cultural environment, women usually need to balance work and family. When diagnosed with cervical cancer and become patients, the lack of social role will reduce their adaptability, thereby affecting their resilience level. The results show that spousal caregivers report significantly higher resilience scores overall, as well as in the subcategories of personal competence and acceptance of oneself and life. This suggests that spousal caregivers may have a stronger capacity for coping with the stress associated with their partner's illness compared to the patients themselves. The spouse, as the main caregiver and decision-making resource for patients with cervical cancer, can quickly recover after experiencing the stressful stage of cancer diagnosis, and then provide emotional and behavioral support for patients (Kaliampos & Roussi, 2018).

Demographic and clinical factors of resilience in couples with cervical cancer. In the process of disease treatment, spousal caregivers have a good level of disease perception and control, and their resilience is usually good, which can help patients make effective decisions and meet their needs (Padilla-Ruiz et al., 2019). Further analysis reveals nuanced insights into the resilience levels of patients with cervical cancer and their spousal caregivers across various demographic and clinical characteristics. The lack of significant differences in resilience scores with respect to age and marital status suggests that individual psychological factors may more influence resilience than these demographic variables. This observation corroborates the research conducted by Górska et al. (2022), which identified a complex association between resilience and individual coping strategies, rather than a significant correlation with factors pertaining to age. Interestingly, education emerged

as a significant determinant of resilience among caregivers, with those having lower educational attainment reporting significantly reduced resilience. This aligns with Górska et al. (2022) findings that education may equip individuals with better cognitive tools to manage stress and adapt to challenges. The disparity in resilience based on educational levels underscores the need for support programs that are accessible and tailored to individuals with varying educational backgrounds. Further analysis of resilience scores among patients with cervical cancer and their spousal caregivers with varying characteristics reveals a significant association with factors such as residence and treatment methods ($p < .05$). Patients residing in urban areas and those undergoing solely surgical treatment exhibited elevated resilience scores. This could be attributed to better access to healthcare resources and support systems in urban settings, which may bolster an individual's capacity to cope with illness-related stress (Cohen & Wills, 1985). Moreover, receiving chemotherapy and/or radiotherapy has negative effects on patients, patients may face more problems such as hair loss, nausea, and vomiting. The chemotherapy and/or radiotherapy stage requires multiple hospital admissions. The correlation between lower income and reduced resilience, especially among caregivers, suggests that financial strain may compound the stress associated with caregiving. This finding is in line with recent literature which indicates that financial hardship can exacerbate psychological distress (Meernik et al., 2021). This suggests that social role in resilience, potentially by providing better access to information, resources, and social support networks which are crucial for effective coping and adaptation during health crises (Luthar et al., 2000). This process can stimulate the patient's psychological recovery process and lead to a higher level of resilience in patients and their spousal caregivers (Huang et al., 2019). In addition, it is recommended that medical staff should be timely observed and alleviate patients' adverse emotional reactions, expand the awareness and participation rate of screening, and strengthen efficient and sufficient education of prevention and home-based self-management methods are the keys to improving resilience of the affected women.

Dyadic Coping

Level of dyadic coping in couples with cervical cancer. Dyadic coping

refers to the communication and response strategies that couples employ to navigate stressors and enhance marital stability. This study found that both patients with cervical cancer and their spousal caregivers exhibited typical levels of dyadic coping. Patients diagnosed with cervical cancer often encounter various physical, psychological, social, and spiritual changes as a consequence of the illness, which can generate stress. As a result, patients may collaborate with their spousal caregivers to jointly manage the stress, thereby fostering dyadic coping patterns (Vellone et al., 2014). In addition, the total score of dyadic coping of patients with cervical cancer (126.17 ± 22.49) was lower than that of spousal caregivers (129.9 ± 22.42). This may be because men tend to focus on a problem-solving style during the coping process, while women tend to adopt an emotionally centered coping style, emphasizing interpersonal communication and paying attention to the emotions of others, and are more likely to adopt negative emotional coping styles, such as confrontation, control and other negative tendencies (Hagedoorn et al., 2008). Moreover, the score of the supportive dyadic coping dimension of patients with cervical cancer (35.06 ± 8.50) was lower than that of spousal caregivers (37.16 ± 7.73), which was similar to the results of Regan et al (2014). This indicates that diseases reduce the self-care ability of patients with cervical cancer, and patients require more support and assistance. As the closest and most important supporters, their husbands not only adopt supportive coping methods but also tend to adopt protective coping strategies to avoid increasing patients' concerns (Li et al., 2015).

Demographic and clinical factors of dyadic coping in couples with cervical cancer. According to the research results, our research found that residence, monthly income, heard of the HPV vaccine, and treatment method were significantly associated with the level of dyadic coping. For spousal caregivers, those who have heard of the HPV vaccine may have more understanding about cervical cancer before getting sick and, therefore, have better coping with cancer outcomes. For patients with cervical cancer, those who reside in rural areas may have insufficient medical resources and disease information for treating diseases and may be misconceptions about the understanding of diseases, which limits patients' ability to participate in treatment and decision-making, thus leading to low level of dyadic coping (Min et al., 2020). Moreover, this study found that both patients and their spousal caregivers who

have a monthly income of 3000 RMB or below and receive surgery treatment only present a low level of dyadic coping. Patients who only use surgery for treatment can have a clearer understanding of the disease treatment process when compared to patients who combine radiotherapy, chemotherapy, and surgery, therefore, they can have a more optimistic attitude to the disease prognosis and their own condition and are more inclined to adopt proactive coping style (Min et al., 2020). The lower the monthly income, the greater the economic pressure on patients and their spousal caregivers, which can lead to more severe anxiety and depression, affecting communication and coping between both patients and their spousal caregivers, and thus they may be more likely to adopt negative coping methods (Rusu et al., 2018). Healthcare professionals should consider these findings when providing care for patients with cervical cancer and their spousal caregivers. Efforts should be made to educate spousal caregivers about the HPV vaccine and provide them with the necessary information to support their partners. Additionally, healthcare providers should ensure that patients in rural areas have access to adequate medical resources and accurate disease information. Lastly, individuals with lower incomes should be provided with appropriate support services to alleviate economic pressure and enhance coping abilities.

Self-efficacy

Level of self-efficacy in couples with cervical cancer. Self-efficacy is a significant factor in influencing the QoL among both cancer patients and their caregivers. It particularly contributes to enhancing the perception of benefits derived from the cancer experience and reducing anxiety and/or depression in cancer patients and family caregiver dyads (Cao et al., 2022). In the current study, the self-efficacy score of patients with cervical cancer and their spousal caregivers was (23.56 ± 6.66) and (25.95 ± 7.11), respectively, which was lower than the norm (28.63 ± 6.18) of the scale (Schwarzer & Born, 1997). This may be due to patients with cervical cancer and their spousal caregivers facing difficult pressure and setbacks when patients become ill, thus having a low level of self-efficacy. In addition, this study also found that spousal caregivers scored higher than the patients in terms of total general self-efficacy. It might be related to Confucian social ethics, which emphasizes the subordination of wives to their husbands, one of the Five Cardinal Relationships

(Han, 2012; Woods & Lamond, 2011). Additionally, Chinese culture endorses a more traditional concept of gender roles compared to Western cultures (Hu & Scott, 2014). Therefore, women in China are more likely to consistently fulfill their domestic roles. However, the responsibility of caring for a cervical cancer patient can be extremely stressful for their spouse, who may find themselves thrust into a caregiving role unprepared. In this situation, spousal caregivers often experience feelings of helplessness and emotional overwhelm, as they are unable to provide assistance to themselves or their wives with the diagnosis (Lewis et al., 2022).

Demographic and clinical factors of self-efficacy in couples with cervical cancer. In this study, self-efficacy was connected to factors such as education, residence, heard of the HPV vaccine, menopausal status, stage of cervical cancer, pathological type, and treatment method. Patients who were not menopausal, have been diagnosed at the precancerous stage, and have undergone surgery as their sole treatment, exhibit higher levels of self-efficacy scores. It may be because most late-stage patients have severe symptoms and significant emotional changes after menopause. Therefore, patients may experience negative psychology and negative evaluations after becoming ill, which seriously affects their self-awareness and reduces their self-efficacy. Similarly, spousal caregivers with a high school education or above and residing in the town also demonstrate elevated levels of self-efficacy scores. Individuals with high levels of education or residing in the town usually have a certain social status and relatively stable careers, therefore, caregivers will have good self-efficacy and are adept at using positive coping resources and emotional adjustment strategies. Moreover, both patients and their spousal caregivers who have heard of the HPV vaccine and receive surgery treatment only may have more understanding about cervical cancer before getting sick, and can have a clearer understanding of the disease treatment process, therefore, they can present high level of self-efficacy in this study. Patients will recover at a higher rate and have more faith in their ability to recover from disease when their caregivers are more confident (Molloy et al., 2008). Furthermore, the results of this study suggest that the change from spouse to spousal caregiver may affect the relationship between the cervical cancer survivor and their caregiver. This may because the majority of the care of patients is typically provided by a spouse, which can put a great deal of physical and

mental pressure on them (Goldzweig et al., 2019). It is recommended that clinical medical staff actively implement effective interventions such as knowledge and sensitivity about the coping strategies to improve spousal caregivers' self-efficacy and assist spousal caregivers of patients with cervical cancer to deal with the disease.

Quality of life

Level of quality of life in couples with cervical cancer. In general, QoL is viewed as a holistic notion that encompasses sentiments of health as well as those related to disease or treatment, as well as physical, psychological, and social well-being (Felce & Perry, 1995). A previous study by Lin et al. (2020) revealed that there is a mutual impact on the QoL of cancer patients and their family caregivers, it is anticipated that cancer patients' daily lives and those who care for them will be significant disrupted (Kamau et al., 2007). In the current analysis, we found that patients with cervical cancer had poor QoL, the score of PCS was (39.66 ± 9.72), suggesting that the disease and its treatments likely lead to substantial impairments in physical functioning, role limitations due to physical health problems, bodily pain, and general health perceptions of patients. However, the higher physical QoL scores (59.08 ± 9.82) among spousal caregivers compared to the US norm could reflect the early stage of the cancer diagnosis, where caregiving demands are not yet fully realized (Ware et al., 2002). Healthier may self-select into caregiving roles, potentially skewing the sample towards those with better physical health. Over time, however, these scores may decline as the stress and responsibilities of caregiving increase (Fredriksen-Goldsen et al., 2023). The mental component summary also shows a significant difference, albeit smaller, with patients scoring lower than caregivers (42.19 ± 10.11 vs. 43.87 ± 9.54, t = -2.69, p = .01). This indicates that the psychological impact of cervical cancer is notable and extends beyond the patients to affect their spouses' mental well-being, albeit to a lesser degree.

The score of QoL in patients was lower compared with the level of PCS (45.36±0.17) and MCS (46.16±0.99) reported in the United States among patients with cervical cancer (Shah et al., 2020). The reasons may be that our participants only came from Jiangsu province, China, and cannot represent the status of QoL of the whole country. Moreover, the results showed that the PCS, MCS and overall QoL scores of the spouse caregivers were higher than those of the patients with cervical

cancer. Although caregivers are involved in every step of cancer care and management, they need to endure tremendous caregiving stress, which may have a detrimental effect on their physical and mental health (Saimaldaher & Wazqar, 2020), most patients with cervical cancer suffer directly from the disease, and may face various physiological, psychological, and social health problems, such as loneliness, anxiety, depression, post-traumatic stress disorder, therefore, will exhibit a low level of QoL.

The results call for a holistic approach to cancer care that not only focuses on treating the disease but also on supporting the QoL for both patients and their caregivers. Interventions could include comprehensive rehabilitation programs tailored to improve physical function, pain management strategies, psychological support such as counseling or support groups, and social support services to enhance role functioning and social integration. In conclusion, this study provides clear evidence that cervical cancer significantly reduces QoL for patients and also impacts their spousal caregivers. Addressing these QoL issues is essential for comprehensive patient-centered care and caregiver support.

Demographic and clinical factors of quality of life in couples with cervical cancer. In this study, participants who unemployed, have a monthly income of 5000 RMB or above, unemployed, and have been diagnosed at the precancerous stage, exhibit higher levels of physical QoL (PCS) and mental QoL (MCS) scores. This indicates that the economic level is still an important factor affecting the QoL of patients and their spousal caregivers. Most late-stage patients have severe conditions, worst functions, and poor prognosis, and their spousal caregivers need to spend more energy and time, constantly worrying about the prognosis and treatment of their wives conditions. They have a strong fear of cancer recurrence or metastasis, are prone to anxiety and panic of losing their loved ones, and thus have poor PCS and MCS. Participants who aged 40 or below, married within 20 years, have a high school education or above, heard of the HPV vaccine, understand the national free screening service for cervical cancer, without menopausal status, and have undergone surgery as their sole treatment, exhibit higher levels of PCS scores. This indicates that the older the age, the less physical strength of patients, and the easier it is for the body and mind to overdraw. The longer the marriage, the more exhausted the couple will be in

dealing with marital issues, and tend to adopt behaviors such as avoidance, compromise, and obedience. The lower the patient's educational level, the lower their cognitive level, communication ability, ability to obtain support, and stress regulation ability will also decrease, thus exhibiting a low level of QoL. Participants who have heard of the HPV vaccine, understand the national free screening service for cervical cancer, without menopausal status, and receive surgery treatment only may have more understanding about cervical cancer before getting sick, and can have a clearer understanding of the disease treatment process, therefore, they can present a high level of QoL in this study. Finally, participants who have medical insurance for urban residents, exhibit higher levels of MSC scores. This indicates that people with this insurance can reimburse the expensive treatment costs caused by surgery, chemotherapy, and radiation therapy, reducing the economic burden, and thus obtaining more psychological satisfaction. In recent years, QoL has already played a significant role in monitoring the course of cancer treatment and its prognosis or effects on rehabilitation (Gu et al., 2020).

Clinically, these results underscore the necessity for a multidisciplinary approach to support patients with cervical cancer and their caregivers. Interventions should be sensitive to the age, socioeconomic status, and clinical profile of patients. Moreover, enhancing caregiver support through education and financial assistance programs is crucial. In conclusion, this study emphasizes that the QoL in patients with cervical cancer and their caregivers is multifaceted and influenced by a complex interplay of demographic, socioeconomic, and clinical factors. Addressing these factors holistically is vital for improving outcomes for both patients and caregivers.

2.The Actor-Partner Effect of Interactions Among Factors

Dyadic Appraisal and Dyadic Coping. This part explored the relationship between dyadic appraisal and dyadic coping in patients with cervical cancer and spousal caregivers. Dyadic appraisal of patients with cervical cancer significantly predicted their own dyadic coping as well as that of their spousal caregivers. That is, the dyadic appraisal among patients with CC revealed a significant actor effect on their own dyadic coping, as well as a significant partner effect on the dyadic coping of spousal caregivers, aligning with prior research findings (Magsamen-Conrad et al., 2015). It is important to highlight that the dyadic appraisal of spousal caregivers was

solely found to negatively predict the dyadic coping of patients with cervical cancer, while its prediction of their own dyadic coping was not supported. In other words, a significant partner effect was observed between the dyadic appraisal of spousal caregivers and the dyadic coping of patients with cervical cancer, while an insignificant actor effect was observed in relation to their own dyadic coping.

This approach emphasizes joint cooperation and active participation by both partners in response to stressors (Basinger et al., 2021). According to Lyons' TDIM (Lyons & Lee, 2018), dyadic appraisal and dyadic coping behaviors are mutually influential, ultimately impacting the management behaviors of both patients and their partners. The promotion of joint participation in illness management behaviors among spousal caregivers of cancer patients can be facilitated through shared dyadic appraisal, which involves the consistent evaluation of the disease by both partners. Previous research has demonstrated that the outcomes of shared evaluations significantly impact patients' interactions in daily management, encompassing medical decision-making and daily life care (Tu et al., 2021). However, it is important to note that inconsistencies in dyadic appraisal may lead to divergent management behaviors within the couple and potentially affect the mental health of the partner (Zhang et al., 2020). Lee et al.(2017) conducted a study to investigate the influence of disparities in dyadic appraisal between heart failure patients and their caregivers on their coping strategies for managing the illness. The findings revealed a significant correlation between the divergent appraisal levels of patients and caregivers and their coping behaviors toward the symptoms of the condition. In conclusion, considering that dyadic appraisal results in couples have an impact on illness management behavior, this suggests that nurses should pay attention to the consistency of dyadic appraisal results of their cervical cancer conditions. Healthcare professionals can increase the content of couple communication training for patients with cervical cancer by asking both spousal caregivers to record their own appraisal results of the disease to provide further supportive intervention programs. In addition, the results indicated that the dyadic coping of spousal caregivers was solely influenced by the patients' dyadic appraisal, rather than their own appraisal, which contradicts the outcomes of prior research studies. Given that spousal caregivers do not personally experience cancer, their perception of the disease is comparatively lower than that of

the actual cancer patients. Additionally, female patients tend to undergo emotional distress when confronted with a severe illness, which significantly affects their family members. The husband and wife, as a cohesive dyadic unit, confront the challenges of the disease jointly and gradually develop mechanisms for managing the situation upon the patient's cancer diagnosis. Husbands provide appropriate psychological and social support as intimate allies and assume the role of caregivers.

Dyadic Appraisal and Resilience. Resilience encompasses two primary elements: a cognitive aspect involving cognitive flexibility, attention, effective memory, and executive functioning; and an emotional aspect encompassing flexibility in emotional stimulus processing, emotional control, effective emotion management skills, positive perceptions, and positive affect (Kumpfer, 2002). The present study reveals that dyadic appraisal has a significant negative predictive effect on resilience, which is consistent with the results of previous studies on patients with chronic diseases (Basinger et al., 2021).

The mechanism of action can be interpreted using the Self-regulatory model. Higher scores on the dyadic appraisal represent a stronger negative perception of the disease by the individual. Research (Basinger et al., 2021) have shown that patients with gynecologic cancer tend to suffer from depression, anxiety, and other negative emotional disturbances. A cancer diagnosis can lead to the development of negative emotions such as fear, despair, disgust, and depression, which can lead to an increase in subconscious discomfort, which in turn can lead to coping behaviors. Cameron et al.(2018) demonstrated that resilience is related to the regulation of an individual's emotions. As a result of the patient's self-perceived inability to cope with the health threat, the individual develops associated negative emotions and will have a more difficult time recovering from the impact of the stressor, and resilience is compromised as a result. The resilience model suggests that if resilience factors from outside or within the individual are not able to balance the challenges posed by the stressor, it may lead to an imbalance or disruption of the individual's homeostasis (Flach, 1988). Resilience is a dynamic process, and the internal resilience influencing factors of an individual include five aspects: mental, cognitive, behavioral, emotional, and physical, and the negative resilience factors will weaken the individual's ability to adapt in adversity (Kumpfer, 2002).

This study showed that the predictive role of the spouse caregiver's own dyadic appraisal on resilience was not confirmed. This may be because the participants were patients with cervical cancer who had been diagnosed for the first time and had not yet received surgery, chemotherapy, and other related treatments. During the pre-treatment period, the spousal caregivers had not yet faced the financial problems of long-term treatment, and had not yet intuitively felt the severe side effects of surgery, chemotherapy and other related treatments, such as nausea, vomiting, fatigue and neurotoxicity, so that the spousal caregivers did not have a sufficient assessment of their own and their own current situation. In addition, spousal caregivers have an insufficient knowledge base related to gynecological cancers. The results of the general data showed that 74% of spousal caregivers were unaware of the HPV vaccine, and nearly half of the spousal caregivers were unaware of the screening policies related to cervical cancer in China. Inadequate knowledge of cervical cancer disease may result in spousal caregivers being more influenced by the patient's own assessment of the disease and less by their own dyadic appraisal.

When women learn of their diagnosis of cervical cancer, they are prone to fear of disease progression and more pronounced mood swings (Dinkel & Herschbach, 2018). Couples are often fearful of the assessment of their condition due to the immense stress associated with the cancer disease, which may add to their psychological stress. Study (Sihvola et al., 2021) has shown that multiple mental and physical burdens have a negative impact on the level of resilience. The couple's relationship as a dyad, with the male caregivers taking on a variety of responsibilities, and their own resilience was affected by the patient's self-assessment results. Follow-up studies should increase the sample size to confirm the predictive role of spousal caregivers' own dyadic appraisal on their own resilience.

Resilience and Dyadic Coping. The individual resilience of both patients with cervical cancer and their spousal caregivers significantly predicted their own dyadic coping. Specifically, the results demonstrated that higher levels of resilience were associated with higher levels of dyadic coping. Additionally, the resilience of spousal caregivers had a significant positive predictive effect on the dyadic coping of patients with cervical cancer. The resilience of the spousal caregiver had a significant positive predictive effect on the dyadic coping of patients with cervical cancer.

Specifically, the resilience of the spousal caregiver demonstrated a significant partner effect on the dyadic coping of the other individual, with higher levels of resilience in the caregiver corresponding to higher levels of dyadic coping in the partner. Notably, the predictive effect of the patients' resilience on the dyadic coping of the spousal caregivers was not supported, indicating no significant partner effect between the patients' own resilience and the dyadic coping of the spouse caregivers.

Research (Sihvola et al., 2021) has demonstrated a negative correlation between the level of resilience exhibited by patients with cervical cancer and their experience of negative emotions, particularly intrinsic depression. These negative emotions, including depression and stress, are significant contributors to the development of adverse dyadic coping patterns. Individuals possessing these traits are more likely to engage in negative dyadic coping behaviors and display fewer positive dyadic coping behaviors (Landolt et al., 2023). Resilience, as a positive intrinsic psychological resource, holds the potential to alleviate negative emotions among patients with cervical cancer and their spousal caregivers, thereby facilitating improved adaptation to their current circumstances (Helgeson et al., 2018). Cancer poses a considerable source of stress for both patients and their spousal caregivers, resulting in alterations in familial and societal responsibilities, constraints in sexual functioning, and a compromised quality of sexual life. The anticipation of disease management interventions, such as surgery and radiotherapy, may impose a psychological burden on both patients with cervical cancer and their spousal caregivers, particularly in the context of surgical treatment. The psychological repercussions of hysterectomy, which entails the complete loss of female fertility, maybe even more pronounced for patients and their spousal caregivers. At the same time, the high stress levels associated with the disease may affect the quality of communication and feelings of togetherness between spousal caregivers, negatively affecting their relationship (Birditt et al., 2016). Resilience is commonly regarded as a protective mechanism that individuals employ when confronted with adversity. In instances where individuals perceive negative evaluations from their own bodies, they persistently engage in self-restoration and self-construction, while adopting positive coping strategies and methods, ultimately facilitating gradual recovery from adverse circumstances (Crane et al., 2019). Particularly in the face of cancer, a formidable

stressor, resilience plays a pivotal role in attaining intrinsic equilibrium and personal transformation, thereby establishing a safeguarding buffer that further encourages patients and their partners to embrace positive behavioral coping mechanisms. Communication is widely recognized as the initial and fundamental step in fostering positive disease control.

Research has demonstrated that an individual's coping styles can be influenced by their level of resilience, with low resilience patients with cervical cancer tending to adopt negative coping styles, such as avoiding communication (Jiang et al., 2022). Conversely, a higher level of resilience can mitigate the occurrence of negative coping strategies, particularly those of the avoidance type. Moreover, resilience can assist patients in effectively managing the stress associated with their illness and alleviating negative emotions, ultimately enhancing their capacity for positive dyadic coping (Bolton et al., 2016).

Furthermore, the findings of this study indicate that the dyadic coping strategies employed by spousal caregivers were solely influenced by their individual resilience, while the resilience of the patients did not have a significant impact. This observation may be attributed to gender disparities. Gender theory posits that individuals acquire their societal gender roles by assimilating the prescribed behavioral norms associated with both genders within their cultural context. In the context of traditional Chinese society and culture, the prevailing belief that "men are strong and women are weak" and that "men dominate the external sphere while women dominate the internal sphere" predominates, with the majority of men occupying a dominant position in society and the family, and occupying an oppressive position in gender relations (Chen & Xia, 2023). The disparity in family status contributes to a tendency for spousal caregivers to adopt coping styles aligned with their individual perspectives. When confronted with cancer as a stressor, men perceive themselves as the guardians of their families, subduing their own emotional fluctuations and embracing problem-solving approaches when confronted with setbacks. Concurrently, research indicates that men often resort to avoidance and other evasive coping strategies to address internal family conflicts (Chen et al., 2021). Shaped by traditional cultural norms, individuals of Chinese descent exhibit greater reservation and introversion, displaying limited proficiency in emotional expression

and frequently resorting to avoidance tactics.

Moreover, patients experiencing significant financial distress must not only contend with the challenges of cancer treatment and prognosis but also grapple with the affordability of such treatment and the immense financial strain it places on their families. These various factors contribute to an increased sense of personal burden among patients, resulting in reduced self-expression and a decreased willingness to engage in discussions about their illness with their partners (Chen et al., 2023). The utilization of avoidant coping mechanisms by both patients and their spousal caregivers further hinders the timely assessment of the patient's internal burden and impedes a comprehensive understanding of their internal thoughts by the caregiving spouse. Spousal caregivers' coping styles are therefore less influenced by the patients.

Dyadic Coping and Quality of Life. This part aimed to examine the relationship between dyadic coping and QoL of a sample of patients with cervical cancer and their spousal caregivers. The findings indicated a significant actor effect between dyadic coping and QoL in individuals diagnosed with cervical cancer and their spousal caregivers. Specifically, the dyadic coping strategies employed by patients with cervical cancer and their spousal caregivers positively predicted their own QoL. Notably, higher levels of individual dyadic coping were associated with higher levels of QoL for the individuals themselves. The significant association between one’s own dyadic coping and one’s own QoL provides support for the actor-oriented perspective (Kenny & Cook, 1999). This is similar to the research results of Suo et al.(2021) on breast cancer couples, who pointed out that the positive dyadic coping of breast cancer patients and their spousal caregivers can positively predict their post-traumatic growth. Studies have demonstrated that enhancing levels of post-traumatic growth can expedite the recuperation of cancer patients and enhance the couples' QoL (Lim, 2019). Concurrently, the TDIM (Lyons & Lee, 2018) has been substantiated, positing that couples' adoption of positive common coping strategies can foster emotional communication between patients and their spousal caregivers, exemplified by reciprocal emotional disclosure. This, in turn, can fortify the quality of marital or intimate relationships and bolster the physical and psychological well-being of both individuals involved.

Furthermore, the non-significant partner effects between dyadic coping of

patients with cervical cancer and spousal caregivers' QoL indicate that the current findings are not compatible with the couple-oriented perspective in which each individual's QoL is predicted by both their own and their partner's dyadic coping (Kenny & Cook, 1999). Of note, the association between dyadic coping of patients with cervical cancer and QoL of patients with cervical cancer was significantly larger than the association between dyadic coping of patients with cervical cancer and spousal caregivers' QoL. Similarly, the association between spousal caregivers' dyadic coping and spousal caregivers' QoL was significantly larger than the association between spousal caregivers' dyadic coping and QoL of patients with cervical cancer. This finding offers further evidence to support the notion that an individual's QoL is more accurately predicted by their own personal dyadic coping strategies rather than those of their partner. This contradicts previous research findings, which have demonstrated a significant partner effect between dyadic coping and QoL in cancer patients. The study conducted by Ştefănuţ et al.(2023) revealed that when patients reported higher levels of negative dyadic coping behaviors from their caregivers, the caregivers themselves reported significantly higher levels of QoL (partner effect). Additionally, the presence of supportive dyadic coping behaviors from the partner had a significant positive impact on the QoL of the caregivers themselves (partner effect).

The focus of this study was on individuals who were newly diagnosed with cervical cancer. In this current research, the participants were in the early stage of identifying symptoms, which may have resulted in a lack of established collaborative coping strategies. Instead, they showed a preference for independently addressing the emotional consequences (Lyons et al., 2022). The initial months following a cancer diagnosis are a critical period during which individuals experience various changes in their physical, psychological, social, spiritual, and existential aspects due to the illness (Mamguem et al., 2019). These transformations may present as stressors for patients, leading to the utilization of specific coping mechanisms such as problem-focused and emotion-focused strategies (Falconier & Kuhn, 2019). Drawing on the developmental-contextual coping model, it is hypothesized that the observed phenomenon can be explained by the temporal progression of dyadic coping, whereby the effectiveness of coping mechanisms may vary across different stages of illness

management (Berg & Upchurch, 2007).

Dyadic Coping and Self-efficacy. The findings indicate a positive and significant actor effect between dyadic coping and self-efficacy in individuals diagnosed with cervical cancer and their spousal caregivers. Furthermore, noteworthy and statistically significant partner effects were observed in the relationship between dyadic coping and self-efficacy for both individuals diagnosed with CC and their spousal caregivers. These findings suggest a significant association between the dyadic coping strategies employed by patients with cervical cancer and the self-efficacy levels of their spousal caregivers, as well as a reciprocal relationship where the dyadic coping strategies of spousal caregivers significantly impact the self-efficacy of patients with cervical cancer.

The diagnosis of cancer is a notable stressor (Mamguem et al., 2019) that individuals must contend with. In the realm of cancer management, self-efficacy serves as an internal motivator, ensuring active responses to stressors rather than avoidance (Karademas et al., 2023). Furthermore, stressors impact not only individuals with cancer but also those within their social networks, particularly their spousal caregivers. Both the patient and their spousal caregivers must navigate the stress induced by the illness, leading to the adoption of a dyadic coping model (Valente et al., 2021). The Communal Coping and Adjustment model posits that dyadic coping will alter the patient's living environment, thereby affecting their internal driving forces to cope with stress, such as self-efficacy (Helgeson et al., 2018). The present study provides further support for the aforementioned perspectives. Specifically, it reveals that dyadic coping has a direct and positive impact on own and partners' self-efficacy among both patients with CC and their spousal caregivers, aligning with findings from prior research conducted on individuals with cardiovascular conditions (Rapelli et al., 2022). The mechanisms underlying these associations can be elucidated through the relationship-focused model and the communal coping model (Delongis et al.,2018; Lyons et al., 1998). By embracing constructive coping strategies such as active engagement and communal coping, couples are able to actively engage in the management of the disease, openly express their emotions, and collaboratively address challenges (Chen et al., 2019).

Self-efficacy and Quality of Life. The findings provided partial support for

the sixth hypothesis, which predicted that higher levels of self-efficacy in individuals were associated with higher levels of their own QoL, while higher levels of self-efficacy in spousal caregivers were associated with higher levels of QoL in patients with cervical cancer but no significant partner effect between self-efficacy of patients with cervical cancer and their partners' QoL. Therefore, the actor-oriented perspective was substantiated, while the couple-oriented perspective was only partially substantiated, as evidenced by the significant prediction of QoL of patients with cervical cancer by partners' self-efficacy. However, the prediction of spousal caregivers' QoL by self-efficacy of patients with cervical cancer was not supported. This may be due to the participants included in this study are newly diagnosed cancer patients and their caregivers. The first few months after a person is diagnosed with cancer is a critical period during which they initially face a series of physical, psychological, social, spiritual and existential changes brought on by the disease (Mamguem et al., 2019). And the spousal caregivers have not yet experienced the complex process of caregiving and the strong burden of caregiving, so their QoL is more influenced by their self-efficacy, and the self-efficacy of patients does not have any impact on the QoL of their spousal caregivers. In the early stage of the disease, encouragement from the spouse will greatly enhance the patient's confidence in fighting the disease, so both the patient's self-efficacy and the spouse's self-efficacy will greatly influence her QoL.

Self-efficacy is a cognitive construct characterized by the belief in one's capability to attain desired outcomes through autonomous action, leveraging one's inherent abilities and acquired skills. Individuals possessing a heightened level of self-efficacy exhibit greater certainty in executing planned courses of action, thereby increasing the likelihood of goal attainment (Chirico et al., 2017). Consequently, self-efficacy assumes a pivotal role in fostering favorable health outcomes and promoting healthy behaviors (Chin et al., 2021). Numerous investigations have documented a positive association between self-efficacy and QoL among cancer patients (Choi et al., 2023; Liu et al., 2022). The present study's findings align with prior research (Kwak et al., 2021), thereby reinforcing the existing body of knowledge in this domain. For example, Chin et al. also revealed that self-efficacy beliefs significantly and positively influence the QoL of cancer patients (Chin et al., 2021). Self-efficacy plays a crucial

role in determining patient health outcomes, as individuals with higher self-efficacy tend to assume greater responsibility in adopting behaviors that effectively address chemotherapy-related symptoms and enhance their QoL.

In addition, individuals diagnosed with cancer often require caregiving and emotional support from their spousal caregivers, who typically serve as the primary informal caregivers (Li et al., 2013). Consequently, implementing a couple-coping intervention for cancer patients would yield substantial improvements in self-efficacy and QoL compared to interventions solely focused on the patient. Previous studies reported that couple-coping intervention is more effective than individual coping intervention for improving self-efficacy and the QoL in patients with resected lung cancer (Chen et al., 2017). Therefore, self-efficacy was shown in the present study as an important predictor of QoL in couples coping with the stress of a new cancer diagnosis. Interventions may improve health-related QoL in patients with cervical cancer if they increase self-efficacy for both patients and their spousal caregivers, and practitioners might like to consider using couple based coping intervention strategies to improve self-efficacy and QoL in patients with cervical cancer.

3.The Mediating Effect of Resilience and Self-efficacy on Dyadic Appraisal, Dyadic Coping and Quality of Life among Couples with Cervical Cancer

The Mediating Effect of Resilience in the Association between Dyadic Appraisal and Dyadic Coping. Results indicated that patients with cervical cancer actor-mediated effects were significant; both resilience of patients with cervical cancer and their spousal caregivers partially explain the association between dyadic appraisal of patients with cervical cancer and their own dyadic coping.

The first result is that the resilience of patients with cervical cancer played a role as a mediator between their dyadic appraisal and their own dyadic coping. More specifically, at an individual level, resilience partially mediates the relationship between dyadic appraisal and dyadic coping in patients with cervical cancer. The level of dyadic appraisal negatively predicted the resilience of these patients, while resilience positively predicted their adoption of dyadic coping strategies. In other words, patients with a lower ability to assess the stress caused by the disease exhibited higher levels of resilience, which in turn resulted in the adoption of more positive

dyadic coping strategies. The results align with prior research indicating that resilience plays a crucial role in moderating the extent to which patients engage in dyadic coping. Resilience, defined as the active process by which individuals adapt positively to adversity, can effectively mitigate the negative impact of stressors, delay the onset of distress for patients and their family members, and sustain a healthy psychological state. Investigating the moderating influence of dyadic appraisal on resilience may shed light on the underlying mechanisms through which resilience operates (Broeders et al., 2021).

The post-acute stress exposure recovery phase is a pivotal period in which mental resilience plays a crucial role. Findings from studies investigating the brain mechanisms underlying resilience indicate that individuals with higher levels of resilience are more inclined to employ adaptive cognitive-emotional regulation strategies when faced with negative stressful events, thereby facilitating effective management of adversity. Prominent adjustment strategies encompass diverting attention towards pleasant and effortless aspects rather than excessively fixating on the present circumstances, engaging in introspection to contemplate life challenges, and actively seeking solutions to overcome them. Developing a set of strategies and steps aimed at solving practical problems and revisiting and adjusting self-perceptions; infusing current negative events with positive meaning and constructing positive or active interpretations of stressful situations, which can adjust the impact of stress on an individual's emotions, and consequently reduce physiological responses in stressful situations, reduce negative emotional experiences, and enhance positive emotional experiences (Broeders et al., 2021; Ding et al., 2021). It is noteworthy that the participants chosen for this study were individuals recently diagnosed with cervical cancer, who had not yet encountered a range of adverse occurrences such as post-operative complications resulting from cancer surgery and chemotherapy-induced side effects. Both the patients with cervical cancer and their spousal caregivers exhibited a higher level of optimism regarding the disease's condition and prognosis.

The second actor-mediated pathway is that the resilience of the spousal caregivers of patients with cervical cancer plays a partial mediating role between dyadic appraisal and dyadic coping of patients with cervical cancer. That is, the

patients' dyadic appraisal can not only directly influence their own level of dyadic coping, but also regulate the dyadic coping of patients with cervical cancer by indirectly influencing the resilience of the spousal caregivers. Spousal caregivers of patients with cervical cancer bear greater psychological stress as caregivers during the patient's treatment and have to pay long-term social, spiritual, psychological, and physical costs. In the stage of disease diagnosis of patients with cervical cancer, spousal caregivers pay more attention to the patient's psychological state. If the patient's self-evaluation is negative, it will cause greater psychological distress to the spouse and indirectly affect the level of resilience of the spousal caregivers. In addition, the results of the current study suggested that spousal caregivers are largely involved in patients' treatment decisions based on Chinese family cultural traits and moral responsibilities (Cong, 2004). High levels of spousal caregivers' resilience may help the caregiver to accept the illness and contribute to the use of positive coping measures to positively influence the patient's level of illness acceptance. Studies have shown that in-depth discussions between spousal caregivers and patients with cervical cancer about cancer can reduce psychological stress and increase patients' confidence in overcoming the disease (Venetis et al., 2014). However, self-efficacy of patients with cervical cancer and their spousal caregivers has no significant actor-mediated effects between spousal caregivers' dyadic appraisal and their own dyadic coping.

The study also identified two partner-mediated paths. Specifically, the resilience of patients with cervical cancer and their spousal caregivers served as complete mediators between each other's dyadic appraisal and their respective levels of dyadic coping. In other words, the spousal caregivers' dyadic appraisal influenced dyadic coping of patients with cervical cancer through resilience of patients with cervical cancer, while the dyadic appraisal of patients with cervical cancer influenced the spousal caregivers' level of dyadic coping through spousal caregivers' level of resilience. The dyadic appraisal is an essential precursor to dyadic coping, encompassing coping strategies and necessary resources for coping, with specific coping strategies determined by the outcomes of the dyadic appraisal. According to the principle of reciprocity in social exchange theory, detrimental patterns of interaction within marital couples can gradually undermine positive relationships. Path analysis results indicated that the level of dyadic coping in the spousal caregivers

was only influenced by their own resilience.

As the spousal caregivers take on the responsibility of caregiving, they frequently encounter challenges on their own, making them more vulnerable to self-related factors when external support is lacking. Additionally, within the distinct socio-cultural environment of China, couples often employ the coping mechanism of protective buffering. This approach involves avoiding discussions on pertinent subjects due to the overwhelming stress associated with cancer, potentially heightening their psychological distress and diminishing the occurrence of stressful behaviors during communication. At the same time, a new diagnosis of cancer is a stressful event for both the patients and their spousal caregivers, and there are gender differences in coping strategies for stressful states.

The Mediating Effect of Self-efficacy in the Association between Dyadic Coping and Quality of Life. Results indicated that patients with cervical cancer actor-actor mediated effects were significant; self-efficacy of patients with cervical cancer and their spousal caregivers partly explains the association between dyadic coping of patients with cervical cancer and their own QoL. However, self-efficacy of patients with cervical cancer and their spousal caregivers has no significant actor-actor mediated effects between spousal caregivers' dyadic coping and their own QoL.

The results of the path analysis showed that the patients' own DC could indirectly affect their own QoL through their own and their spousal caregivers' self-efficacy, suggesting that high-quality dyadic coping of patients is a prerequisite for improving the QoL of patients with CC and that a higher level of self-efficacy in the patients themself and in their spousal caregivers is an important guarantee. Enhancing the dyadic coping level of patients contributes to the improvement of the self-efficacy level of patients themselves and their spousal caregivers, which in turn may improve the QoL of patients.

Therefore, the key role of the couple's respective self-efficacy levels in the pathway to improving the patient's QoL should be highly valued, and the couple should be encouraged to adopt positive dyadic coping behaviors, such as SC, SDC, DDC, and CDC, to improve the patient's dyadic coping ability. Nursing staff can take into account the traditional cultural background of China, and be guided by the TDIM (Lyons & Lee, 2018) and resource theory (Aiyu et al., 2015), regarding dyadic coping

and self-efficacy as resources and strategies for coping with stress, and draw on well-established self-efficacy-enhancing intervention programs from previous studies (Zhang et al., 2014) to construct an intervention program for self-efficacy in patients with cervical cancer. In addition, we can construct an intervention program to enhance the self-efficacy level of both spousal caregivers. At the same time, social media platforms or smartphone apps can be used to enrich the forms of self-efficacy interventions for couples, improve couples' cancer coping skills, and thus enhance couples' self-efficacy, reduce patients' stress and caregivers' stress and emotional burden, so that couples' self-efficacy can be maintained and their QoL can be improved.

Studies have shown (Li et al., 2023; Ştefănuţ et al., 2023; Traa et al., 2015) that the coping styles of individuals in couples facing cancer affect not only their own physical and mental health but also their spousal caregivers'. The results of this study showed that there was a partner-mediated effect of self-efficacy in patients with cervical cancer between their spousal caregivers' dyadic coping and QoL of patients with cervical cancer, i.e., self-efficacy in patients with cervical cancer fully mediated between their spousal caregivers' dyadic coping and QoL of patients with cervical cancer. Spousal caregivers' dyadic coping can positively affect patients' self-efficacy, which in turn affects patients' QoL. In addition, the self-efficacy of spousal caregivers had a partner-mediated effect between dyadic coping of patients with cervical cancer and spousal caregivers' QoL, i.e., the self-efficacy of spousal caregivers acted as a full mediator between patients' dyadic coping and spousal caregivers' QoL. Dyadic coping in patients with cervical cancer positively affects the self-efficacy of spousal caregivers, which in turn affects spousal caregivers' QoL.

This research findings provided new insights into the mediation effect of self-efficacy in the relationship between dyadic coping and QoL. This study is the first to explore the relationship among dyadic coping, self-efficacy, and QoL in patients with cervical cancer and their spousal caregivers from China. The results showed an actor–partner mediated effect of self-efficacy between dyadic coping and QoL. Dyadic coping can not only directly affect QoL, but also affect self-efficacy, thereby affecting QoL, if self-efficacy in patients with cervical cancer is enhanced, it will improve the QoL of patients with cervical cancer based on increasing their

spousal caregivers' dyadic coping. The results also showed that improved self-efficacy in spousal caregivers can improve the QoL of spousal caregivers based on increasing their dyadic coping of patients with cervical cancer. Clinically, acknowledging the existence of such relationships aids in improving the QoL of cervical cancer and their spousal caregivers, and this may suggest that interventions for self-efficacy need to be carried out not only to improve self-efficacy but also to observe whether there is a dynamic balance between dyadic coping of patients with cervical cancer and their spousal caregivers' dyadic coping. Helgeson et al. (2018) pointed out that dyadic coping was an extension of traditional social support. Social support means that one person provides resources to assist a second person with his or her problem (Cohen & Wills, 1985b). In contrast, dyadic coping includes not only unilateral support but also collaboration between partners (Lyons et al., 1998). The mediating roles of self-efficacy in the social support and health outcomes of cancer patients have been confirmed in multiple studies (Dong et al., 2017; Wang et al., 2022). Some of these studies indicated that support efforts from one side might make patients feel as though they are burdens and indebted, ultimately undermining their self-efficacy (Thoits, 2011; Uchino, 2009). By comparison, dyadic coping focusing on collaboration might effectively prevent the above problems (Wooldridge et al., 2019). Therefore, in patients with cervical cancer, only emphasizing social support from family members is not sufficient, and mutual support between partners should be established on a dyadic level. All in all, this study suggests that clinical nursing staff can intervene with dyadic coping and self-efficacy directly or indirectly, and then improve the QoL for both patients and their spousal caregivers, enabling better outcomes for a family coping with a cancer diagnosis.

Interestingly, correlation analysis showed that dyadic coping is positively correlated with QoL and self-efficacy, and self-efficacy is positively correlated with QoL, whereas the path in the structural equation model was not significant, that means there were no actor-actor mediated effects in spousal caregiver. This phenomenon occurred because the direct effect of dyadic coping on QoL and self-efficacy were weakened, and the path was no longer significant when self-efficacy served as the mediators. This result was not consistent with previous studies, which showed that dyadic coping significantly influenced caregivers' QoL and self-efficacy,

which was confirmed in patients with different cancer types (Chen et al., 2021; Crangle et al., 2020; Ernst et al., 2017).

According to the developmental-contextual coping model, this may be because of the temporal process of dyadic coping, which means that the effectiveness of dyadic coping may vary across different stages of dealing with an illness (Berg & Upchurch, 2007). In this study, participants were in the initial symptom identification stage; they might not have established cooperative coping modes and may have preferred to deal with the emotional impact independently (Lyons et al., 2022). Thus, when dyadic coping and individual coping abilities (self-efficacy) were considered in one model, the latter might have a greater impact on patients' QoL. Moreover, shared appraisal and mutual support between partners need to be internalized as personal abilities and motivations and then reincorporated into one's own psychological and physiological regulation (Wang et al., 2022).

4.Factors influencing the quality of life for couples with cervical cancer

This study enriches our understanding of the complex interplay between dyadic appraisal, resilience, dyadic coping, self-efficacy and QoL in couples with cervical cancer. While dyadic coping model (Bodenmann, 1997) fosters supportive coping within dyads, our findings reveal a counterintuitive trend: as dyadic appraisal intensifies, positive coping behaviors tend to diminish. This inverse relationship highlights a critical gap between the recognition of stress and the mobilization of supportive coping mechanisms, suggesting a pressing need for interventions that effectively connect these elements. Our investigation reinforces the TDIM, which conceptualizes illness as a shared challenge (Berg & Upchurch, 2007; Revenson & DeLongis, 2011). We observed that negative perceptions of illness can debilitate effective coping, thereby confirming the "actor effect." Additionally, the "partner effects" we detected lend credence to the TDIM's assertion of the interconnected nature of illness management, underscoring the necessity for patient-centered interventions that encompass spouses.

Consistent with recent research on resilience in chronic illness (Falconier et al., 2015), our study demonstrates that dyadic appraisal markedly affects resilience levels in both patients and their partners. This correlation implies that negative appraisals of illness severity may erode the dyad's ability to rebound from stress. This

insight points to the potential efficacy of cognitive-behavioral interventions aimed at reshaping illness perceptions to bolster resilience and enhance stress management within the dyad. Our data corroborate the findings of the study (Smith & Hollinger-Smith, 2015), suggesting that resilience could serve as a mediator in the relationship between dyadic appraisal and coping. The study uncovered that negative appraisals by one partner can reduce their resilience, which in turn impacts the couple's coping strategies. This interdependence underscores the importance of interventions designed to strengthen resilience, thereby potentially fortifying coping mechanisms for both partners in cancer management. Our research findings align with prior studies (Chen et al., 2023; McAninch et al., 2023), suggesting that resilience plays a reciprocal role within dyads confronting chronic illness. The significant "partner effects" we identified suggest that one partner's appraisal can profoundly influence the other partner's resilience. This finding advocates for comprehensive dyadic interventions that address both partners' perceptions and coping strategies. In agreement with Greenwood et al. (2008), our study suggests that resilience plays a crucial role in enhancing QoL for both patients with cervical cancer and their spousal caregivers. By nurturing resilience, couples may better navigate the challenges posed by illness, which could lead to improved well-being and life satisfaction during cervical cancer treatment.

Our results question the traditional view that dyadic coping strategies exert substantial mutual influences within intimate relationships. While individual coping strategies—actor effects—are significant for personal QoL, partner effects seem to have a limited impact on the spouse's QoL (Revenson, 2005; Falconier et al., 2015). This nuanced perspective calls for tailored interventions that promote personal resilience and mutual support within the dyad (Randall & Bodenmann, 2009). In line with previous research (Berg & Upchurch, 2007; Bodenmann et al., 2010), we found that effective dyadic coping correlates with better QoL outcomes. Our findings also support (Greenwood et al., 2008), who posited that individual coping efficacy could indirectly benefit the dyad by contributing to individual QoL, which subsequently enhances relational QoL. Our study extends the work of Revenson et al.(Revenson & DeLongis, 2011) by exploring how dyadic coping mediates between cognitive appraisal of illness and QoL outcomes. We propose that although cognitive appraisal

triggers coping responses, it is the effectiveness of these strategies that ultimately dictates QoL, emphasizing the necessity for interventions that equip couples with practical coping tools.

Bandura's concept of self-efficacy (Bandura, 1977) is pivotal in how coping strategies translate into QoL outcomes. Our research supports Schwarzer and Luszczynska (2008), highlighting self-efficacy's role in health-promoting behaviors. We found that self-efficacy within dyadic coping is crucial, indicating that interventions should also aim to enhance self-efficacy within couples. The reciprocal influence of self-efficacy within dyads is evident from our study, supporting Kayser et al. (2018) regarding the mutual impact of psychosocial variables in dyadic contexts. This underscores the systemic importance of self-efficacy in intimate relationships and supports comprehensive support interventions for both patients and spouses. Following Luszczynska and Schwarzer (2005), bolstering self-efficacy could involve structured skill-building sessions to improve coping abilities. Educational programs may empower patients and partners by elucidating effective illness management strategies (Esperat et al., 2023; Mandelbaum et al., 2023; Whitton et al., 2023). Psychological support, particularly cognitive-behavioral interventions, can strengthen beliefs in one's ability to cope (Folkman & Greer, 2000). Integrating these strategies into care plans could enable healthcare providers to improve individual and dyadic QoL outcomes substantially. Clinical practice implications include developing patient- and couple-centered programs that emphasize enhancing self-efficacy as a central component of effective illness management. Overall, QoL in chronic illness is shaped not only by individual resilience and coping mechanisms but also significantly by dyadic interactions. Interventions aimed at QoL improvement should adopt a holistic approach, recognizing the intricate interplay between dyadic appraisal, resilience, dyadic coping, and self-efficacy to better support couples in jointly managing chronic illness.

Conclusion

This study set out to investigate the intricate interplay among dyadic appraisal, resilience, self-efficacy, dyadic coping, and QoL in the context of couples battling cervical cancer. The primary aim was to unravel the complex web of how

these factors interact and influence one another within a dyadic framework. Our research notably illuminated the critical mediating roles that resilience and self-efficacy play within these relationships. The findings revealed that individuals who perceive greater support and understanding from their partners tend to exhibit higher levels of resilience, which in turn fosters more effective dyadic coping strategies. Further, a strong sense of self-efficacy not only enhanced personal coping mechanisms but also positively influenced the QoL of both partners within the dyad, reinforcing the significance of a mutually supportive approach to managing the illness.

The mediating effects of resilience and self-efficacy are pivotal in understanding how couples cope with cervical cancer. Resilience functions as a buffer, moderating the stressors associated with illness and positively affecting the dyadic coping process which is essential for maintaining a satisfactory QoL under the strains of illness. This study highlights the crucial role of interventions that bolster resilience in both patients and their spouses. Similarly, self-efficacy is vital in empowering both patients and their partners, affording them a stronger sense of control and capability in managing the stressors associated with the illness. Promoting this sense of self-efficacy is, therefore, key in aiding effective stress management and leading to improved outcomes for both individuals within the dyadic relationship. More detail as follows:

The results of the study on the mediating effect of resilience between dyadic appraisal and dyadic coping in patients with cervical cancer and their spousal caregivers revealed that there was one actor-actor mediating effect, two partner-actor mediating effects, and one partner-partner mediating effect that was significant. The specific results are as follows: The actor-actor mediated effect was that resilience of patients with cervical cancer explained the association between dyadic appraisal and dyadic coping in patients with cervical cancer. The partner-actor mediated effect refers to the fact that resilience of patients with cervical cancer explained the association between dyadic appraisal of spousal caregivers and dyadic coping of patients with cervical cancer, while resilience of spousal caregivers explained the association between dyadic appraisal of patients with cervical cancer and dyadic coping of spousal caregivers. Moreover, the partner-partner mediated effect refers to

the fact that resilience of spousal caregivers mediated the association between dyadic appraisal and dyadic coping in patients with cervical cancer.

The findings of the study on the mediating effect of self-efficacy between dyadic coping and QoL in patients with cervical cancer and their spousal caregivers revealed that there was one actor-actor mediating effect, two partner-actor mediating effects, and one partner-partner mediating effect that was significant. The specific results were as follows: The actor-actor mediated effect was that individual's self-efficacy explained the association between personal dyadic coping and QoL in patients with cervical cancer. The partner-actor mediated effect refers to the fact that self-efficacy of patients with cervical cancer explained the association between dyadic coping of spousal caregivers and QoL of spousal caregivers, whereas self-efficacy of spousal caregivers explained the association between dyadic coping of patients with cervical cancer and QoL of spousal caregivers. Moreover, the partner-partner mediated effect refers to the fact that self-efficacy of spousal caregivers mediated the association between dyadic coping and QoL in patients with cervical cancer.

Furthermore, the improvement of dyadic coping strategies, facilitated through enhanced resilience and self-efficacy, unmistakably leads to better QoL outcomes for couples facing the challenges of cervical cancer. The dyadic approach, as part of the treatment and care strategy, ensures that both members of the dyad are considered in conjunction with each other rather than in isolation. Such an inclusive approach not only strengthens the support system for the patient but also acknowledges and addresses the needs of the caregiver. Overall, by focusing on the dyadic unit as a whole and promoting positive coping mechanisms within this framework, we can significantly elevate the standard of care and QoL for both individuals navigating this journey together.

Strengths of the study

The present study's findings possess the attribute of generalizability to the broader population. The data analysis encompassed patients afflicted with cervical cancer and their respective spousal caregivers, who were selected as a sample from six regional hospitals situated across all regions of Jiangsu, China. Consequently, these findings hold potential applicability to female cancer patients and male spousal caregivers within the Chinese context. Based on the perspective of positive

psychology and the theoretical framework of the TDIM, this study explored the relationship and mechanism of resilience and self-efficacy in dyadic appraisal, dyadic coping, and QoL among patients with cervical cancer and their spousal caregivers from the perspective of the dyadic relationship between the husband and the wife at the family level, which provided the basis for the construction of the husband and wife-centered stress coping intervention program. In addition, based on the Actor-Partner Interdependence Mediated Model, the individual and interactive roles of resilience and self-efficacy in couples' coping with stress in patients with cervical cancer can be analyzed at the same time, which is the validation and application of the TDIM in patients with cervical cancer and their spouses, and enriches the research on the dyadic relationship between cervical cancer and their spouses.

Limitations of the study findings

This study possesses certain limitations that warrant acknowledgment. Firstly, the utilization of a cross-sectional design restricts the ability to establish causal inferences, as it was conducted at a singular time point, disregarding potential fluctuations in the QoL experienced by patients with cervical cancer and their spousal caregivers over the course of illness and treatment. Consequently, future research endeavors should adopt a longitudinal research design. Additionally, it is imperative to note that this study was exclusively conducted within Jiangsu province in China, thereby limiting the generalizability of the findings to couples encountering cervical cancer in alternative provinces or countries. The third, data collection was conducted during COVID-19, and due to COVID-19, several hospitals restricted family caregivers to stay with the patients, resulting in a longer period for this data collection and possible bias in population representation.

Implications of the finding

The findings of the current study contribute valuable insights into the mediating effects of resilience and self-efficacy on the relationship between dyadic coping and QoL among couples with cervical cancer in China. Notably, this is the first study to examine the specific mediating role of resilience and self-efficacy in the

dyadic coping and QoL model for cervical cancer couples. These findings hold important implications for nursing practice and nursing education.

For nursing practice, as we know, cervical cancer disease itself and cancer treatment will significantly negatively impact the QoL of patients with cervical cancer and their partners. Under the dyadic perspective of this theory, the patient-care partner dyad must regard as a "unit of care". Nurses need to enhance their evaluation ability, not only to evaluate patients but also to expand the evaluation to the "unit of care". They should pay attention to whether there is improper evaluation, low level of cooperation, weak harmonization of needs, demand coordination, and imbalance in the health of the dyad. Nurses need to have some methods and skills to focus on evaluating two members, promoting teamwork and collaboration, and reframing goals of care to promote the shared goals for the dyad that will optimize dyadic health.

For nursing education, the nursing curriculum should contain knowledge about patients' and their partners' QoL in nursing subjects related to cancer care. Nurses should guide and teach nursing students to pay attention to the emphasis on the health of the dyad as a unit, the balance of health within the unit, and gain the ability to care for the dyad members.

Recommendations for future research

For nursing research, this study puts forward new research ideas for nursing researchers, that is, places greater focus on dyadic health and balance within dyad relationships, develops innovative methods to implement dyadic concepts, and can more widely explore the environmental impact of patient care.

1. This study represents a pioneering effort to examine the mediating effects of resilience and self-efficacy within a dyadic coping and QoL framework among couples affected by cervical cancer in Jiangsu province, China. While this study holds significance, further research is warranted to explore the actual circumstances among cervical cancer couples in China and to implement preventive measures. A multicenter study is imperative for identifying cervical cancer cases among couples residing in various cities across China. Replicating the study under non-COVID-19 circumstances is essential to accurately reflect the prevailing conditions during normal periods.

2. The QoL in couples affected by cervical cancer undergoes changes over time, influenced by the duration of the disease and its corresponding treatments. Consequently, it is imperative to investigate the QoL of both patients with cervical cancer and their spousal caregivers, along with the associated factors, at various stages of the disease and treatment.

3. The future study should develop intervention programs regarding how to improve the couples' QoL status, enhance their resilience and self-efficacy, suggest appropriate dyadic coping and inhibit dyadic appraisal, which may improve cervical cancer couples' QoL.

REFERENCES

Aiyu, L., Xin, T., & Wei, F. (2015). Household Division of Housework for Double-Income Family:Economic Dependence,Gender Ideologies,or Emotional Express? *Chinese Journal Of Sociology*(2), 109-136.

An, H., Chen, C., Du, R., Cheng, C., Wang, P., & Dong, S. (2021). Self-efficacy, psychological distress, and marital quality in young and middle-aged couples facing lymphoma: The mediating effect of dyadic coping. *Psycho-Oncology*, *30*(9), 1492-1501.

Andreyev, J. (2007). Gastrointestinal symptoms after pelvic radiotherapy: a new understanding to improve management of symptomatic patients. *The Lancet Oncology*, *8*(11), 1007-1017.

Bachner, Y. G., Yosef-Sela, N., & Carmel, S. (2014). Open Communication With Terminally Ill Cancer Patients About Illness and Death: A Comparison Between Spouses of Ashkenazi and Sephardi Ethnic Origins. *Cancer Nursing*, *37*(1), 50-58.

Badr, H., & Acitelli, L. K. (2017). Re-thinking dyadic coping in the context of chronic illness. *Current Opinion in Psychology*, *13*, 44-48.

Badr, H., & Krebs, P. (2013). A systematic review and meta-analysis of psychosocial interventions for couples coping with cancer: Couples meta-analysis. *Psycho-Oncology*, *22*(8), 1688-1704.

Bae, H., & Park, H. (2016). Sexual function, depression, and quality of life in patients with cervical cancer. *Supportive Care in Cancer*, *24*(3), 1277-1283.

Baik, S. H., Oswald, L. B., Buitrago, D., Buscemi, J., Iacobelli, F., Perez-Tamayo, A., Guitelman, J., Diaz, A., Penedo, F. J., & Yanez, B. (2020). Cancer-Relevant Self-Efficacy Is Related to Better Health-Related Quality of Life and Lower Cancer-Specific Distress and Symptom Burden Among Latina Breast Cancer Survivors. *International Journal of Behavioral Medicine*, *27*(4), 357-365.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215.

Bandura, A. (1985). Self-efficacy and health. *Behaviour Research & Therapy*, *23*(4), 437-451.

Basinger, E. D., Wehrman, E. C., Delaney, A. L., & McAninch, K. G. (2021). Couples managing chronic illness: A test of the extended theoretical model of communal coping. *Journal of Social and Personal Relationships*, *38*(5), 1611-1632.

Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: the role of perceived self-efficacy. *Behaviour Research and Therapy*, *42*(10), 1129-1148.

Berg, & Upchurch. (2007). A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychological Bulletin*, *133*(6), 920-954.

Berg, C. A., & Upchurch, R. (2007). A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychological Bulletin*, *133*(6), 920-954.

Berg, C. A., Wiebe, D. J., Butner, J., Bloor, L., Bradstreet, C., Upchurch, R., Hayes, J., Stephenson, R., Nail, L., & Patton, G. (2008). Collaborative coping and daily mood in couples dealing with prostate cancer. *Psychol Aging*, *23*(3), 505.

Berkhuysen, M. A., Nieuwland, W., Buunk, B. P., Sanderman, R., & Rispens, P. (1999). Change in self-efficacy during cardiac rehabilitation and the role of perceived overprotectiveness. *Patient Education and Counseling*, *38*(1), 21-32.

Bhatla, N., Aoki, D., Sharma, D. N., & Sankaranarayanan, R. (2021). Cancer of the cervix uteri: 2021 update. *International Journal of Gynecology & Obstetrics*, *155*(S1), 28-44.

Birditt, K. S., Newton, N. J., Cranford, J. A., & Ryan, L. H. (2016). Stress and Negative Relationship Quality among Older Couples: Implications for Blood Pressure. *The Journals of Gerontology: Series B*, *71*(5), 775-785.

Boa, R., & Grénman, S. (2018). Psychosexual health in gynecologic cancer. *International Journal of Gynecology & Obstetrics*, *143*, 147-152.

Bodenmann, G. (1995). A systemic-transactional conceptualization of stress and coping in couples. *Swiss Journal of Psychology*, *54*(1), 34-49.

Bodenmann, G. (1997). Dyadic coping: A systemic-transactional view of stress and coping among couples: Theory and empirical findings. *Revue Européene de Psychologie Appliquée*, *47*, 137-140.

Bodenmann, G., Atkins, D. C., Schär, M., & Poffet, V. (2010). The association between daily stress and sexual activity. *Journal of Family Psychology*, *24*(3), 271-279.

Bodenmann, G., Ledermann, T., & Bradbury, T. N. (2007). Stress, sex, and satisfaction in marriage. *Personal Relationships*, *14*(4), 551-569.

Bodenmann, G., & Randall, A. K. (2012). Common factors in the enhancement of dyadic coping. *Behavior therapy*, *43*(1), 88-98.

Bolton, K. W., Praetorius, R. T., & Smith-Osborne, A. (2016). Resilience Protective Factors in an Older Adult Population: A Qualitative Interpretive Meta-Synthesis. *Social Work Research*, *40*(3), 171-182.

Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians*, *68*(6), 394-424.

Broadbent, E., Petrie, K. J., Main, J., & Weinman, J. (2006). The Brief Illness Perception Questionnaire. *Journal of Psychosomatic Research*, *60*(6), 631-637.

Broberger, E., Tishelman, C., & Essen, L. V. (2005). Discrepancies and Similarities in How Patients with Lung Cancer and Their Professional and Family Caregivers Assess Symptom Occurrence and Symptom Distress. *J Pain Symptom Manage*, *29*(6), 572-583.

Broeders, T. A. A., Schoonheim, M. M., Vink, M., Douw, L., Geurts, J. J. G., van Leeuwen, J. M. C., & Vinkers, C. H. (2021). Dorsal attention network centrality increases during recovery from acute stress exposure. *NeuroImage: Clinical*, *31*, 102721.

Bryan, L., Engblom, M. L., Peters, C. L., Schwerdtfeger, K. L., & Warren, S. E. (2005). Couples Coping with Stress: Emerging Perspectives on Dyadic Coping. *Journal of Couple & Relationship Therapy*, *7*(4), 369-374.

Butow, P. N., Price, M. A., Bell, M. L., Webb, P. M., deFazio, A., The Australian Ovarian Cancer Study, G., The Australian Ovarian Cancer Study Quality of

Life Study, I., & Friedlander, M. (2014). Caring for women with ovarian cancer in the last year of life: A longitudinal study of caregiver quality of life, distress and unmet needs. *Gynecologic Oncology*, *132*(3), 690-697.

Byrne, B. M. (2001). Structural Equation Modeling With AMOS, EQS, and LISREL: Comparative Approaches to Testing for the Factorial Validity of a Measuring Instrument. *International Journal of Testing*, *1*(1), 55-86.

Cai, D., Kunaviktikul, W., Klunklin, A., Sripusanapan, A., & Avant, P. k. (2017). Developing a cultural competence inventory for nurses in China. *International Nursing Review*, *64*(2), 205-214.

Cai, T., Qian, J., Huang, Q., & Yuan, C. (2021). Distinct dyadic coping profiles in Chinese couples with breast cancer. *Supportive Care in Cancer*, *29*(11), 6459-6468.

Cameron, L. D., Carroll, P., & Hamilton, W. K. (2018). Evaluation of an intervention promoting emotion regulation skills for adults with persisting distress due to adverse childhood experiences. *Child abuse & neglect*, *79*, 423-433.

Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). The Quality of American Life: Perceptions, Evaluations, and Satisfactions. *Academy of Management Review*.

Cano, A., Johansen, A. B., & Franz, A. (2005). Multilevel analysis of couple congruence on pain, interference, and disability. *Pain*, *118*(3), 369-379.

Cao, Q., Gong, J., Chen, M., Lin, Y., & Li, Q. (2022). The Dyadic Effects of Self-Efficacy on Quality of Life in Advanced Cancer Patient and Family Caregiver Dyads: The Mediating Role of Benefit Finding, Anxiety, and Depression. *Journal of Oncology*, *2022*, 3073358.

Carter, J., Sonoda, Y., Baser, R. E., Raviv, L., Chi, D. S., Barakat, R. R., Iasonos, A., Brown, C. L., & Abu-Rustum, N. R. (2010). A 2-year prospective study assessing the emotional, sexual, and quality of life concerns of women undergoing radical trachelectomy versus radical hysterectomy for treatment of early-stage cervical cancer. *Gynecologic Oncology*, *119*(2), 358-365.

Chen, Gong, J., Cao, Q., Luo, X., Li, J., & Li, Q. (2021). A literature review of the relationship between dyadic coping and dyadic outcomes in cancer couples. *European Journal of Oncology Nursing*, *54*, 102035.

Chen, G. L., & Xia, D. Y. (2023). Gender responsibility imputation and fatherhood practice in family upbringing. *Journal of University of Science and Technology Beijing (Social Science Edition)*, *39*(5), 598-606.

Chen, H. L., Liu, K., & You, Q. S. (2017). Effects of couple based coping intervention on self-efficacy and quality of life in patients with resected lung cancer. *Patient Education and Counseling*, *100*(12), 2297-2302.

Chen, H., Xu, J., Mao, Y., Sun, L., Sun, Y., & Zhou, Y. (2019). Positive Coping and Resilience as Mediators Between Negative Symptoms and Disability Among Patients With Schizophrenia. *Frontiers in Psychiatry*, *10*, 641.

Chen, J., Tian, Y., Yin, M., Lin, W., Tuersun, Y., Li, L., Yang, J., Wu, F., Kan, Y., Li, X., Gan, Y., Sun, X., Wu, Y., & He, F. (2023). Relationship between self-efficacy and adherence to self-management and medication among patients with chronic diseases in china: a multicentre cross-sectional study. *Journal of Psychosomatic Research*, *164*, 111105.

Chen, M., Gong, J., Cao, Q., Luo, X., Li, J., & Li, Q. (2021). A literature review of the relationship between dyadic coping and dyadic outcomes in cancer couples. *European Journal of Oncology Nursing*, *54*, 102035.

Chen, M. L., Chu, L., & Chen, H. C. (2004). Impact of cancer patients' quality of life on that of spouse caregivers. *Supportive Care in Cancer*, *12*(7), 469-475.

Chen, X., Wang, Z., Zhou, J., & Li, Q. (2023). Intervention and coping strategies for self-perceived burden of patients with cancer: A systematic review. *Asia-Pacific Journal of Oncology Nursing*, *10*(6), 100231.

Chen, X., Xu, X., Wang, T., Qiu, C., & Li, M. (2023). Couple communication quality and family resilience among Chinese gynecologic cancer patients and their spouses: a dyadic study. *Supportive Care in Cancer*, *31*(5), 271.

Chin, C. H., Tseng, L. M., Chao, T. C., Wang, T. J., Wu, S. F., & Liang, S. Y. (2021). Self-care as a mediator between symptom-management self-efficacy and quality of life in women with breast cancer. *PLOS ONE*, *16*(2), e0246430.

Chirico, A., Lucidi, F., Merluzzi, T., Alivernini, F., De Laurentiis, M., Botti, G., & Giordano, A. (2017). A meta-analytic review of the relationship of cancer coping self-efficacy with distress and quality of life. *Oncotarget*, *8*(22), 36800-36811.

Choi, Y. Y., Rha, S. Y., Park, J. S., Song, S. K., & Lee, J. (2023). Cancer coping self-efficacy, symptoms and their relationship with quality of life among cancer survivors. *European Journal of Oncology Nursing*, *66*, 102373.

Chow, K. M., So, W. K. W., Choi, K. C., & Chan, C. W. H. (2018). Sexual function, psychosocial adjustment to illness, and quality of life among Chinese gynaecological cancer survivors. *Psycho-Oncology*, *27*(4), 1257-1263.

Chung, J. O. K., Lam, K. K. W., Ho, K. Y., Cheung, A. T., Ho, L. K., Xei, V. W., Gibson, F., & Li, W. H. C. (2020). Psychometric evaluation of the traditional Chinese version of the resilience Scale-14 and assessment of resilience in Hong Kong adolescents. *Health and Quality of Life Outcomes*, *18*(1), 33.

Clark, N. M., & Dodge, J. A. (1999). Exploring Self-Efficacy as a Predictor of Disease Management. *Health Education & Behavior*, *26*(1), 72-89.

Cohen, P. A., Jhingran, A., Oaknin, A., & Denny, L. (2019). Cervical cancer. *The Lancet*, *393*(10167), 169-182.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*(2), 310-357.

Colonnello, E., & Jannini, E. A. (2020). Impact of Chinese Traditional Culture and Related Social Norms on Current Chinese Sexuality and on the Future of Chinese Sexual Medicine. In D. L. Rowland & E. A. Jannini (Eds.), *Cultural Differences and the Practice of Sexual Medicine: A Guide for Sexual Health Practitioners* (pp. 95-113). Springer International Publishing.

Cong, Y. (2004). Doctor-Family-Patient Relationship: The Chinese Paradigm of Informed Consent. *The Journal of Medicine and Philosophy: A Forum for Bioethics and Philosophy of Medicine*, *29*(2), 149-178.

Cook, W. L., & Kenny, D. A. (2005). The Actor–Partner Interdependence Model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development*, *29*(2), 101-109.

Correia, R. A., Bonfim, C. V. d., Feitosa, K. M. A., Furtado, B. M. A. S. M., Ferreira, D. K. d. S., & Santos, S. L. d. (2020). Sexual dysfunction after cervical cancer treatment. *Revista da Escola de Enfermagem da USP*, *54*, e03636.

Coyne, J. C., & Smith, D. A. (1991). Couples coping with a myocardial infarction: a contextual perspective on wives' distress. *J Pers Soc Psychol*, *61*(3), 404-412.

Crane, M. F., Searle, B. J., Kangas, M., & Nwiran, Y. (2019). How resilience is strengthened by exposure to stressors: the systematic self-reflection model of resilience strengthening. *Anxiety, Stress, & Coping*, *32*(1), 1-17.

Crangle, C. J., Torbit, L. A., Ferguson, S. E., & Hart, T. L. (2020). Dyadic coping mediates the effects of attachment on quality of life among couples facing ovarian cancer. *Journal of Behavioral Medicine*, *43*(4), 564-575.

Dau, H., Trawin, J., Nakisige, C., Payne, B. A., Vidler, M., Singer, J., Orem, J., Smith, L., & Ogilvie, G. (2023). The social and economic impacts of cervical cancer on women and children in low- and middle-income countries: A systematic review. *Int J Gynaecol Obstet*, *160*(3), 751-761.

DeLongis, A., & O'Brien, T. (2018). An interpersonal framework for stress and coping: An application to the families of Alzheimer's patients. Stress and coping in later life families (pp. 221-239).Taylor & Francis.

Di Mattei, V. E., Perego, G., Taranto, P., Mazzetti, M., Marotta, E., Candiani, M., & Salvatore, S. (2021). The Long-Term Effects of Cancer Treatment on Sexuality and Couple Relationships. *Family Process*, *60*(3), 853-865.

Ding, F., Wang, X., Cheng, C., He, J., Zhao, H., Wu, D., & Yao, S. (2021). Psychometric Properties and Measurement Invariance of the Cognitive Emotion Regulation Questionnaire in Chinese Adolescents With and Without Major Depressive Disorder: A Horizontal and Longitudinal Perspective. *Frontiers in Psychiatry*, *12*.

Dinkel, A., & Herschbach, P. (2018). Fear of Progression in Cancer Patients and Survivors. In U. Goerling & A. Mehnert (Eds.), *Psycho-Oncology* (Vol. 210, pp. 13-33). Springer International Publishing.

Dong, X., Li, G., Liu, C., Kong, L., Fang, Y., Kang, X., & Li, P. (2017). The mediating role of resilience in the relationship between social support and posttraumatic growth among colorectal cancer survivors with permanent intestinal ostomies: A structural equation model analysis. *European Journal of Oncology Nursing*, *29*, 47-52.

Duan-Porter, W., Cohen, H. J., Demark-Wahnefried, W., Sloane, R., Pendergast, J. F., Snyder, D. C., & Morey, M. C. (2016). Physical resilience of older cancer survivors: An emerging concept. *Journal of Geriatric Oncology*, 7(6), 471-478.

Duggleby, W., Thomas, J., Montford, K. S., Thomas, R., Nekolaichuk, C., Ghosh, S., Cumming, C., & Tonkin, K. (2015). Transitions of Male Partners of Women With Breast Cancer: Hope, Guilt, and Quality of Life. *Oncology Nursing Forum*, *42*(2), 134-141.

Ernst, J., Hinz, A., Niederwieser, D., Döhner, H., Hönig, K., Vogelhuber, M., Mehnert, A., & Weissflog, G. (2017). Dyadic coping of patients with hematologic malignancies and their partners and its relation to quality of life – a longitudinal study. *Leukemia & Lymphoma*, *58*(3), 655-665.

Esperat, M. C., Hust, C., Song, H., Garcia, M., & McMurry, L. J. (2023). Interprofessional Collaborative Practice: Management of Chronic Disease and Mental Health Issues in Primary Care. *Public Health Reports*, *138*(1_suppl), 29S-35S.

Falconier, M. K., Jackson, J. B., Hilpert, P., & Bodenmann, G. (2015). Dyadic coping and relationship satisfaction: A meta-analysis. *Clinical Psychology Review*, *42*, 28-46.

Falconier, M. K., & Kuhn, R. (2019). Dyadic Coping in Couples: A Conceptual Integration and a Review of the Empirical Literature. *Frontiers in Psychology*, *10*, 571.

Fang, F. (2021). Satisfaction of Division of Household Labour in China. In M.-Y. Kan & S. L. Blair (Eds.), *Contemporary Perspectives in Family Research* (pp. 89-106). Emerald Publishing Limited.

Fang, H., Li, L., Zhou, A., Liang, W., Zeng, Y., & Radiotherapy, D. O. (2019). Correlation Analysis of Anxiety-Quality and Sleep Quality in Patients with Concurrent Radiotherapy and Chemotherapy for Cervical Cancer. *World Journal of Sleep Medicine*, 6(2), 3.

Felce, D., & Perry, J. (1995). Quality of life: its definition and measurement. *Res Dev Disabil*, *16*(1), 51-74.

Ferrandina, G., Mantegna, G., Petrillo, M., Fuoco, G., Venditti, L., Terzano, S., Moruzzi, C., Lorusso, D., Marcellusi, A., & Scambia, G. (2012). Quality of life and emotional distress in early stage and locally advanced cervical cancer patients: A prospective, longitudinal study. *Gynecologic Oncology*, *124*(3), 389-394.

Flach, F. F. (1988). *Resilience: Discovery A New Strength At Times Of Stress*. Ballantine Books.

Fleming, N. D., Ramirez, P. T., Soliman, P. T., Schmeler, K. M., Chisholm, G. B., Nick, A. M., Westin, S. N., & Frumovitz, M. (2016). Quality of life after radical trachelectomy for early-stage cervical cancer: A 5-year prospective evaluation. *Gynecologic Oncology*, *143*(3), 596-603.

Folkman, S., & Greer, S. (2000). Promoting psychological well-being in the face of serious illness: when theory, research and practice inform each other. *Psycho-Oncology*, *9*(1), 11-19.

Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology*, *50*(3), 571-579.

Fortinsky, R. H., Kercher, K., & Burant, C. J. (2002). Measurement and correlates of family caregiver self-efficacy for managing dementia. *Aging & Mental Health*, *6*(2), 153-160.

Fradelos, E. C., Latsou, D., Mitsi, D., Tsaras, K., Lekka, D., Lavdaniti, M., Tzavella, F., & Papathanasiou, I. V. (2018). Assessment of the relation between religiosity, mental health, and psychological resilience in breast cancer patients. *Współczesna Onkologia*, *22*(3), 172-177.

Franks, H. M., & Roesch, S. C. (2006). Appraisals and coping in people living with cancer: a meta-analysis: appaisals and coping. *Psycho-Oncology*, *15*(12), 1027-1037.

Frumovitz, M., Sun, C. C., Schover, L. R., Munsell, M. F., Jhingran, A., Wharton, J. T., Eifel, P., Bevers, T. B., Levenback, C. F., Gershenson, D. M., & Bodurka, D. C. (2005). Quality of Life and Sexual Functioning in Cervical Cancer Survivors. *Journal of Clinical Oncology*, *23*(30), 7428-7436.

Fuochi, G., & Foà, C. (2018). Quality of life, coping strategies, social support and self-efficacy in women after acute myocardial infarction: a mixed methods approach. *Scandinavian Journal of Caring Sciences*, *32*(1), 98-107.

Garcia, M. E., Schmitz, J. M., & Doerfler, L. A. (1990). A fine-grained analysis of the role of self-efficacy in self-initiated attempts to quit smoking. *J Consult Clin Psychol*, *58*(3), 317-322.

Ghalavandi, S., Heidarnia, A., Zarei, F., & Beiranvand, R. (2020). Knowledge, attitude, practice, and self-efficacy of women regarding cervical cancer screening. *Obstetrics & gynecology science*, *64*(2), 216-225.

Gillespie, B. M., Chaboyer, W., & Wallis, M. (2009). The influence of personal characteristics on the resilience of operating room nurses: A predictor study. *International Journal of Nursing Studies*, *46*(7), 968-976.

Girgis, A., Lambert, S., Johnson, C., Waller, A., & Currow, D. (2013). Physical, Psychosocial, Relationship, and Economic Burden of Caring for People With Cancer: A Review. *Journal of Oncology Practice*, *9*(4), 197-202.

Given, B., Wyatt, G., Given, C., Sherwood, P., & Rahbar, M. (2004). Burden and Depression Among Caregivers of Patients With Cancer at the End of Life. *Oncology Nursing Forum*, *31*(6), 1105-1117.

Gmelch, S., Bodenmann, G., Meuwly, N., & Ledermann, T. (2008). Dyadic Coping Inventory (DCI): A questionnaire assessing dyadic coping in couples. *Zeitschrift fur familienforschung (journal of family research)*, 20(2), 185-202.

Goldzweig, G., Schapira, L., Baider, L., Jacobs, J. M., Andritsch, E., & Rottenberg, Y. (2019). Who will care for the caregiver? Distress and depression among spousal caregivers of older patients undergoing treatment for cancer. *Support Care Cancer*, *27*(11), 4221-4227.

Goren, A., Gilloteau, I., Lees, M., & daCosta DiBonaventura, M. (2014). Quantifying the burden of informal caregiving for patients with cancer in Europe. *Supportive Care in Cancer*, *22*(6), 1637-1646.

Górska, S., Singh Roy, A., Whitehall, L., Irvine Fitzpatrick, L., Duffy, N., & Forsyth, K. (2022). A Systematic Review and Correlational Meta-Analysis of Factors Associated With Resilience of Normally Aging, Community-Living Older Adults. *The Gerontologist*, *62*(9), e520-e533.

Govina, O., Kotronoulas, G., Mystakidou, K., Katsaragakis, S., Vlachou, E., & Patiraki, E. (2015). Effects of patient and personal demographic, clinical and psychosocial characteristics on the burden of family members caring for patients with advanced cancer in Greece. *European Journal of Oncology Nursing*, *19*(1), 81-88.

Grant, M., Sun, V., Fujinami, R., Sidhu, R., Otis-Green, S., Juarez, G., Klein, L., & Ferrell, B. (2013). Family caregiver burden, skills preparedness, and quality of life in non-small cell lung cancer. *Oncology Nursing Forum*, *40*(4), 337-346.

Greenwood, N., Mackenzie, A., Cloud, G. C., & Wilson, N. (2008). Informal carers of stroke survivors–factors influencing carers: A systematic review of quantitative studies. *Disability and Rehabilitation*, *30*(18), 1329-1349.

Grigsby, P. W., Massad, L. S., Mutch, D. G., Powell, M. A., Thaker, P. H., McCourt, C., Hagemann, A., Fuh, K., Kuroki, L., Schwarz, J. K., Markovina, S., Lin, A. J., Dehdashti, F., & Siegel, B. A. (2020). FIGO 2018 staging criteria for cervical cancer: Impact on stage migration and survival. *Gynecologic Oncology*, *157*(3), 639-643.

Gu, Z. H., Qiu, T., Yang, S. H., Tian, F. Q., & Wu, H. (2020). A Study on the Psychological Factors Affecting the Quality of Life Among Ovarian Cancer Patients in China. *Cancer Manag Res*, *12*, 905-912.

Guo, M., Xu, J., & Du, J. (2021). Trends in cervical cancer mortality in China from 1989 to 2018: an age-period-cohort study and Joinpoint analysis. *BMC Public Health*, *21*(1), 1329.

Hagedoorn, M., Sanderman, R., Bolks, H. N., Tuinstra, J., & Coyne, J. C. (2008). Distress in couples coping with cancer: a meta-analysis and critical review of role and gender effects. *Psychol Bull*, *134*(1), 1-30.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate Data Analysis: A Global Perspective*.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). Multivariate data analysis: pearson new international edition. *Pearson Schweiz Ag*, 3(2), 128-134.

Han, Q. (2012). An overview of Traditional Chinese family ethics. *Quarterly Journal of Chinese Studies*, *1*(1), 85-99.

Hawkey, A., Ussher, J. M., Perz, J., & Parton, C. (2021). Talking but not always understanding: couple communication about infertility concerns after cancer. *BMC Public Health*, *21*(1), 161.

Helgeson, V. S., Jakubiak, B., Van Vleet, M., & Zajdel, M. (2018). Communal Coping and Adjustment to Chronic Illness: Theory Update and Evidence. *Personality and Social Psychology Review*, *22*(2), 170-195.

Hlabangana, V., & Hearn, J. H. (2020). Depression in partner caregivers of people with neurological conditions; associations with self-compassion and quality of life. *Journal of Mental Health*, *29*(2), 176-181.

Holschneider, C. H., Petereit, D. G., Chu, C., Hsu, I. C., Ioffe, Y. J., Klopp, A. H., Pothuri, B., Chen, L.-m., & Yashar, C. (2019). Brachytherapy: A critical component of primary radiation therapy for cervical cancer. *Brachytherapy*, *18*(2), 123-132.

Hou, W. K., & Lam, J. H. M. (2014). Resilience in the year after cancer diagnosis: a cross-lagged panel analysis of the reciprocity between psychological distress and well-being. *Journal of Behavioral Medicine*, *37*(3), 391-401.

Hou, W. K., Law, C. C., Yin, J., & Fu, Y. T. (2010). Resource loss, resource gain, and psychological resilience and dysfunction following cancer diagnosis: A growth mixture modeling approach. *Health Psychology*, *29*(5), 484-495.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55.

Hu, Y., & Scott, J. (2014). Family and Gender Values in China: Generational, Geographic, and Gender Differences. *Journal of Family Issues*, *37*(9), 1267-1293.

Huang, Y., Huang, Y., Bao, M., Zheng, S., Du, T., & Wu, K. (2019). Psychological resilience of women after breast cancer surgery: a cross-sectional study of associated influencing factors. *Psychol Health Med*, *24*(7), 866-878.

Hwang, I. C., Kim, Y. S., Lee, Y. J., Choi, Y. S., Hwang, S. W., Kim, H. M., & Koh, S. J. (2017). Factors Associated With Caregivers' Resilience in a Terminal Cancer Care Setting. *Am J Hosp Palliat Care*, *35*(4), 677-683.

Jiang, X. J., Chen, L., & Gulimire, N. (2022). Analysis of relationship between coping style and psychological resilience in patients with cervical cancer. *Journal of Xinjiang Medical University*, *45*(7), 796-800.

Johansen, S., Cvancarova, M., & Ruland, C. (2018). The Effect of Cancer Patients' and Their Family Caregivers' Physical and Emotional Symptoms on Caregiver Burden. *Cancer Nursing*, *41*(2), 91-99.

Jonsdottir, J. I., Vilhjalmsson, R., & Svavarsdottir, E. K. (2021). Effectiveness of a couple-based intervention on sexuality and intimacy among women in active cancer treatment: A quasi-experimental study. *European Journal of Oncology Nursing*, *52*, 101975.

Kaliampos, A., & Roussi, P. (2018). Quality of partner support moderates positive affect in patients with cancer. *Psychooncology*, *27*(4), 1298-1304.

Kamau, R. K., Osoti, A. O., & Njuguna, E. M. (2007). Effect of diagnosis and treatment of inoperable cervical cancer on quality of life among women receiving radiotherapy at Kenyatta National Hospital. *East Afr Med J*, *84*(1), 24-30.

Karabulutlu, E. Y., Avcı İ, A., Karayurt, Ö., Gürsoy, A., Köşgeroğlu, N., Tuna, A., Ersin, F., Arıkan, F., & Karaman, S. (2019). Evaluation of Illness Perception of Women with Breast Cancer in Turkey. *Eur J Breast Health*, *15*(2), 98-104.

Karademas, E. C., Simos, P., Pat-Horenczyk, R., Roziner, I., Mazzocco, K., Sousa, B., Stamatakos, G., Tsakou, G., Cardoso, F., Frasquilho, D., Kolokotroni, E., Marzorati, C., Mattson, J., Oliveira-Maia, A. J., Perakis, K., Pettini, G., Vehmanen, L., & Poikonen-Saksela, P. (2023). The Interplay Between Trait Resilience and Coping Self-efficacy in Patients with Breast Cancer: An International Study. *Journal of Clinical Psychology in Medical Settings*, *30*(1), 119-128.

Karademas, E. C., Zarogiannos, A., & Karamvakalis, N. (2010). Cardiac patient-spouse dissimilarities in illness perception: Associations with patient self-rated health and coping strategies. *Psychol Health*, *25*(4), 451-463.

Katepratoom, C., Manchana, T., & Amornwichet, N. (2014). Lower urinary tract dysfunction and quality of life in cervical cancer survivors after concurrent chemoradiation versus radical hysterectomy. *International Urogynecology Journal*, *25*(1), 91-96.

Kayser, K., Acquati, C., Reese, J. B., Mark, K., Wittmann, D., & Karam, E. (2018). A systematic review of dyadic studies examining relationship quality in couples facing colorectal cancer together. *Psycho-Oncology*, *27*(1), 13-21.

Kayser, K., Watson, L. E., & Andrade, J. T. (2007). Cancer as a "we-disease": Examining the process of coping from a relational perspective. *Families, Systems, & Health*, *25*(4), 404-418.

Keefe, F. J., Ahles, T. A., Porter, L. S., Sutton, L. M., McBride, C. M., Pope, M. S., McKinstry, E. T., Furstenberg, C. P., Dalton, J., & Baucom, D. H. (2003). The

self-efficacy of family caregivers for helping cancer patients manage pain at end-of-life. *Pain*, *103*(1), 157-162.

Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal Relations: A Theory of Interdependence*. Hoboken, NJ, USA: Wiley Online Library.

Kenny, D. A. (2018). Reflections on the actor-partner interdependence model. *Personal Relationships*, *25*(2), 160-170.

Kenny, D. A., & Acitelli, L. K. (2001). Accuracy and bias in the perception of the partner in a close relationship. *Journal of Personality and Social Psychology*, *80*(3), 439-448.

Kenny, D. A., & Cook, W. (1999). Partner effects in relationship research: Conceptual issues, analytic difficulties, and illustrations. *Personal Relationships*, *6*(4), 433-448.

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2020). *Dyadic data analysis*. Guilford Publications.

Kenny, D. A., & Ledermann, T. (2010). Detecting, measuring, and testing dyadic patterns in the actor–partner interdependence model. *Journal of Family Psychology*, *24*(3), 359-366.

Kim, H. S., Sherman, D. K., & Taylor, S. E. (2008). Culture and social support. *American Psychologist*, *63*(6), 518-526.

Kim, Y. J., Munsell, M. F., Park, J. C., Meyer, L. A., Sun, C. C., Brown, A. J., Bodurka, D. C., Williams, J. L., Chase, D. M., Bruera, E., & Ramondetta, L. M. (2015). Retrospective review of symptoms and palliative care interventions in women with advanced cervical cancer. *Gynecologic Oncology*, *139*(3), 553-558.

Kline, R. (2015). *Principles and Practice of Structural Equation Modeling, Fourth Edition*. Guilford publications.

Koh, W. J., Abu-Rustum, N. R., Bean, S., Bradley, K., Campos, S. M., Cho, K. R., Chon, H. S., Chu, C., Clark, R., Cohn, D., Crispens, M. A., Damast, S., Dorigo, O., Eifel, P. J., Fisher, C. M., Frederick, P., Gaffney, D. K., Han, E., Huh, W. K., . . . Scavone, J. L. (2019). Cervical Cancer, Version 3.2019, NCCN Clinical Practice Guidelines in Oncology. *Journal of the National Comprehensive Cancer Network*, *17*(1), 64-84.

Kreitler, S., Peleg, D., & Ehrenfeld, M. (2010). Stress, self-efficacy and quality of life in cancer patients. *Psycho-Oncology*, *16*(4), 329-341.

Kumpfer, K. L. (2002). Factors and Processes Contributing to Resilience. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and Development* (pp. 179-224). Kluwer Academic Publishers.

Kwak, Y., Kim, Y., Choi, E. S., & Im, H. J. (2021). Self-efficacy, post-traumatic growth, and quality of life of pediatric cancer survivors: A cross-sectional study. *European Journal of Oncology Nursing*, *54*, 102019.

Laganà, A. S., La Rosa, V. L., Rapisarda, A. M. C., Valenti, G., Sapia, F., Chiofalo, B., Rossetti, D., Ban Frangež, H., Vrtačnik Bokal, E., & Giovanni Vitale, S. (2017). Anxiety and depression in patients with endometriosis: impact and management challenges. *International Journal of Women's Health*, *Volume 9*, 323-330.

Lalos, O., Kjellberg, L., & Lalos, A. (2009). Urinary, climacteric and sexual symptoms 1 year after treatment of cervical cancer without brachytherapy. *Journal of Psychosomatic Obstetrics & Gynecology*, *30*(4), 269-274.

Landolt, S. A., Weitkamp, K., Roth, M., Sisson, N. M., & Bodenmann, G. (2023). Dyadic coping and mental health in couples: A systematic review. *Clinical Psychology Review*, *106*, 102344.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and the coping process* Springer publishing company.

Le, T., Leis, A., Pahwa, P., Wright, K., & Reeder, B. (2003). Quality-of-life issues in patients with ovarian cancer and their caregivers: a review. *Obstetrical & Gynecological Survey*, *58*(11), 749-758.

Ledermann, T., & Bodenmann, G. (2006). Moderator-und Mediatoreffekte bei dyadischen Daten. *Zeitschrift für Sozialpsychologie*, *37*(1), 27-40.

Ledermann, T., Bodenmann, G., Rudaz, M., & Bradbury, T. N. (2010). Stress, Communication, and Marital Quality in Couples. *Family Relations*, *59*(2), 195-206.

Ledermann, T., & Macho, S. (2009). Mediation in dyadic data at the level of the dyads: A structural equation modeling approach. *Journal of Family Psychology*, *23*, 661670.

Ledermann, T., Macho, S., & Kenny, D. A. (2011). Assessing Mediation in Dyadic Data Using the Actor-Partner Interdependence Model. *Structural Equation Modeling: A Multidisciplinary Journal*, *18*(4), 595-612.

Lee, C. S., Gelow, J. M., Bidwell, J. T., Mudd, J. O., Green, J. K., Jurgens, C. Y., & Woodruff-Pak, D. S. (2013). Blunted Responses to Heart Failure Symptoms in Adults With Mild Cognitive Dysfunction. *Journal of Cardiovascular Nursing*, *28*(6), 534-540.

Lee, C. S., Mudd, J. O., Auld, J., Gelow, J. M., Hiatt, S. O., Chien, C. V., Bidwell, J. T., & Lyons, K. S. (2017). Patterns, relevance and predictors of heart failure dyadic symptom appraisal. *European Journal of Cardiovascular Nursing*, *16*(7), 595-604.

Lee, H. Y., Yang, P. N., Lee, D. K., & Ghebre, R. (2015). Cervical Cancer Screening Behavior among Hmong-American Immigrant Women. *American Journal of Health Behavior*, *39*(3), 301-307.

Lepore, S. J., & Revenson, T. A. (2007). Social Constraints on Disclosure and Adjustment to Cancer. *Social and Personality Psychology Compass*, *1*(1), 313-333.

Lev, E. L., & Owen, S. V. (2010). Counseling women with breast cancer using principles developed by Albert Bandura. *Perspectives in Psychiatric Care*, *36*(4), 131-137.

Levkovich, I., Hamama-Raz, Y., & Shinan-Altman, S. (2023). "A kaleidoscope of relationships" — cervical cancer survivors' perspectives on their intimate relationships: A qualitative study. *Palliative & Supportive Care*, *21*(2), 214-223.

Lewis, F. M., Griffith, K. A., Wu, K. C., Shands, M. E., & Zahlis, E. H. (2022). Helping Us Heal: telephone versus in-person marital communication and support counseling for spouse caregivers of wives with breast cancer. *Supportive Care in Cancer*, *30*(1), 793-803.

Li, C. C., Chang, T. C., Tsai, Y. F., & Chen, L. (2017). Quality of life among survivors of early-stage cervical cancer in Taiwan: an exploration of treatment modality differences. *Quality of Life Research*, *26*(10), 2773-2782.

Li, J., Liu, L., Chen, M., Su, W., Yao, T., & Li, X. (2023). Effect of intimacy and dyadic coping on psychological distress in pancreatic cancer patients and spousal caregivers. *Frontiers in Psychology*, *14*, 1040460.

Li, Q., Chiang, V. C., Xu, X., Xu, Y., & Loke, A. Y. (2015). The Experiences of Chinese Couples Living With Cancer: A Focus Group Study. *Cancer Nurs*, *38*(5), 383-394.

Li, Q., & Loke, A. Y. (2014). A literature review on the mutual impact of the spousal caregiver–cancer patients dyads: 'Communication', 'reciprocal influence', and 'caregiver–patient congruence'. *European Journal of Oncology Nursing*, *18*(1), 58-65.

Li, Q. P., Mak, Y. W., & Loke, A. Y. (2013). Spouses' experience of caregiving for cancer patients: a literature review. *International Nursing Review*, *60*(2), 178-187.

Li, X., Cao, H., Curran, M. A., Fang, X., & Zhou, N. (2020). Traditional Gender Ideology, Work Family Conflict, and Marital Quality among Chinese Dual-Earner Couples: A Moderated Mediation Model. *Sex Roles*, *83*(9), 622-635.

Li, Y., Wang, K., Yin, Y., Li, Y., & Li, S. (2018). Relationships between family resilience, breast cancer survivors' individual resilience, and caregiver burden: A cross-sectional study. *International Journal of Nursing Studies*, *88*, 79-84.

Lim, J. W. (2019). The role of post-traumatic growth in promoting healthy behavior for couples coping with cancer. *Supportive Care in Cancer*, *27*(3), 829-838.

Lim, J. W., Shon, E. J., Paek, M., & Daly, B. (2014). The dyadic effects of coping and resilience on psychological distress for cancer survivor couples. *Supportive Care in Cancer*, *22*(12), 3209-3217.

Lin, Y., Hu, C., Xu, Y., Zhao, J., & Li, Q. (2020). The mutual impact and moderating factors of quality of life between advanced cancer patients and their family caregivers. *Supportive Care in Cancer*, *28*(11), 5251-5262.

Liu, K. L., Chuang, C. K., Pang, S. T., Wu, C. T., Yu, K. J., Tsai, S. C., & Chien, C. H. (2022). Emotional state and cancer-related self-efficacy as affecting resilience and quality of life in kidney cancer patients: a cross-sectional study. *Supportive Care in Cancer*, *30*(3), 2263-2271.

Lopez, V., Copp, G., & Molassiotis, A. (2012). Male Caregivers of Patients With Breast and Gynecologic Cancer: Experiences From Caring for Their Spouses and Partners. *Cancer Nursing*, *35*(6), 402-410.

Lu, K. H., & Burke, T. W. (2000). Early cervical cancer. *Current Treatment Options in Oncology*, *1*(2), 147-155.

Luo, Zhou, L. H., Wang, W. L., Qian-Qian, N. I., Zhang, S. S., Nursing, S. O., University, A. M., & Hospital, A. P. (2017). Relationship between dyadic coping and intimacy in gynecological cancer patients and partners. *Chinese Mental Health Journal*(12), 964-970.

Luszczynska, A., Gutiérrez-Doña, B., & Schwarzer, R. (2005). General self-efficacy in various domains of human functioning: Evidence from five countries. *International Journal of Psychology*, *40*(2), 80-89.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: a critical evaluation and guidelines for future work. *Child Dev*, *71*(3), 543-562.

Lyons, K., Sadowski, T., & Lee, C. S. (2020). The role of concealment and relationship quality on patient hospitalizations, care strain and depressive symptoms in heart failure dyads. *European journal of cardiovascular nursing : journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *19*(2), 118-124.

Lyons, K. S., Flatley, C., Gorman, J. R., Hanan, D. M., & Hayes-Lattin, B. (2022). Challenges experienced and resources identified by young to midlife couples 1–3 years post-cancer diagnosis. *Psycho-Oncology*, *31*(1), 116-121.

Lyons, K. S., & Lee, C. S. (2018). The Theory of Dyadic Illness Management. *Journal of Family Nursing*, *24*(1), 8-28.

Lyons, K. S., & Lee, C. S. (2020). The Association of Dyadic Symptom Appraisal With Physical and Mental Health Over Time in Care Dyads Living With Lung Cancer. *Journal of Family Nursing*, *26*(1), 15-25.

Lyons, K. S., Miller, L. M., & McCarthy, M. J. (2016). The Roles of Dyadic Appraisal and Coping in Couples With Lung Cancer. *Journal of Family Nursing*, *22*(4), 493.

Lyons, K. S., Vellone, E., Lee, C. S., Cocchieri, A., Bidwell, J. T., D'Agostino, F., Hiatt, S. O., Alvaro, R., Vela, R. J., & Riegel, B. (2015). A Dyadic Approach to Managing Heart Failure With Confidence. *Journal of Cardiovascular Nursing*, *30*(4S), S64.

Lyons, R. F., Mickelson, K. D., Sullivan, M. J. L., & Coyne, J. C. (1998). Coping as a Communal Process. *Journal of Social and Personal Relationships*, *15*(5), 579-605.

MacCosham, A. (2021). *Human Papillomavirus Transmission and Vaccination in Couple-Based Studies. McGill University (Canada)*.

Magsamen-Conrad, K., Checton, M. G., Venetis, M. K., & Greene, K. (2015). Communication Efficacy and Couples' Cancer Management: Applying a Dyadic Appraisal Model. *Communication Monographs*, *82*(2), 179-200.

Mamguem, K., Ariane, Dumas, A., Joly, F., Billa, O., Simon, J., Poillot, M. L., Darut-Jouve, A., Coutant, C., Fumoleau, P., Arveux, P., & Dabakuyo-Yonli, T. S. (2019). Long-Term Gynecological Cancer Survivors in Côte d'Or: Health-Related Quality of Life and Living Conditions. *The Oncologist*, *24*(7), e490-e500.

Mandelbaum, J., Myers, K. G., Brightharp, C. L., & Hicks, S. P. (2023). Assessment of Chronic Disease Management Strategies Among Health Care Practices in Medically Underserved South Carolina Counties. *Health Education & Behavior*, *50*(3), 406-415.

Manne, & Sharon. (1998). Psychosocial Issues:Cancer in the Marital Context: A Review of the Literature. *Cancer Investigation*, *16*(3), 188-202.

Manning, M. M., & Wright, T. L. (1983). Self-efficacy expectancies, outcome expectancies, and the persistence of pain control in childbirth. *Journal of Personality & Social Psychology*, *45*(2), 421-431

Marks, R., & Allegrante, J. P. (2005). A Review and Synthesis of Research Evidence for Self-Efficacy-Enhancing Interventions for Reducing Chronic Disability:

Implications for Health Education Practice (Part I). *Health Promot Pract*, *6*(2), 148-156.

Marshall, T. C. (2008). Cultural differences in intimacy: The influence of gender-role ideology and individualism—collectivism. *Journal of Social and Personal Relationships*, *25*(1), 143-168.

Martin, M., Hanna, M., Sabine, K. H., Christina, M. P., Catherine, D., Patrick, J., Sonja, S., Manuela, E., & Kumar, M. P. (2016). Relationship between Resilience, Psychological Distress and Physical Activity in Cancer Patients: A Cross-Sectional Observation Study. *PLoS ONE*, *11*(4), e0154496.

Maruish, M. E. (2012). *User's manual for the SF-12v2 health survey (3rd ed.).* Lincoln: Quality Metric Incorporated.

Matzka, M., Mayer, H., Köck-Hódi, S., Moses-Passini, C., Dubey, C., Jahn, P., Schneeweiss, S., & Eicher, M. (2016). Relationship between Resilience, Psychological Distress and Physical Activity in Cancer Patients: A Cross-Sectional Observation Study. *PLOS ONE*, *11*(4), e0154496.

McAninch, K. G., Basinger, E. D., Delaney, A. L., & Wehrman, E. C. (2023). Integrating relational turbulence theory and the theory of resilience and relational load to investigate the relationships of couples with chronic illness. *Communication Quarterly*, *71*(1), 1-21.

McCarthy, M. J., Bakas, T., Schellinger, J., Stapleton, K., & Kissela, B. M. (2018). Association between incongruence about survivor function and outcomes among stroke survivors and family caregivers. *Topics in Stroke Rehabilitation*, *25*(8), 569-575.

McCarthy, M. J., & Lyons, K. S. (2015). Incongruence between stroke survivor and spouse perceptions of survivor functioning and effects on spouse mental health: a mixed-methods pilot study. *Aging & Mental Health*, *19*(1), 46-54.

McPherson, C. J., Wilson, K. G., Lobchuk, M. M., & Brajtman, S. (2008). Family Caregivers' Assessment of Symptoms in Patients with Advanced Cancer: Concordance with Patients and Factors Affecting Accuracy. *Journal of Pain and Symptom Management*, *35*(1), 70-82.

Meernik, C., Kirchhoff, A. C., Anderson, C., Edwards, T. P., Deal, A. M., Baggett, C. D., Kushi, L. H., Chao, C. R., & Nichols, H. B. (2021). Material and psychological financial hardship related to employment disruption among female adolescent and young adult cancer survivors. *Cancer*, *127*(1), 137-148.

Meier, C., Bodenmann, Moergeli, & Jenewein. (2011). Dyadic coping, quality of life, and psychological distress among chronic obstructive pulmonary disease patients and their partners. *International Journal of Chronic Obstructive Pulmonary Disease*, *6*, 583.

Messelt, A., Thomaier, L., Jewett, P. I., Lee, H., Teoh, D., Everson-Rose, S. A., Blaes, A. H., & Vogel, R. I. (2021). Comparisons of emotional health by diagnosis among women with early stage gynecological cancers. *Gynecologic Oncology*, *160*(3), 805-810.

Min, L., Jiali, W., Jinhua, L., & Xuying, L. (2020). Research status of the influencing factors and interventions of the couples communication in breast cancer patients. *Chinese Nursing Management*, *20*(6), 938-941.

Mirabeau-Beale, K. L., & Viswanathan, A. N. (2014). Quality of life (QOL) in women treated for gynecologic malignancies with radiation therapy: A literature

review of patient - reported outcomes. *Gynecologic Oncology*, *134*(2), 403-409.

Molassiotis, A., Chan, C. W. H., Yam, B. M. C., & Chan, S. J. (2000). Quality of life in Chinese women with gynaecological cancers. *Supportive Care in Cancer*, *8*(5), 414-422.

Molloy, G. J., Johnston, M., Johnston, D. W., Pollard, B., Morrison, V., Bonetti, D., Joice, S., & MacWalter, R. (2008). Spousal caregiver confidence and recovery from ambulatory activity limitations in stroke survivors. *Health Psychol*, *27*(2), 286-290.

Northouse, L. L., & McCorkle, R. (2015). Spouse caregivers of cancer patients. In *Psycho-oncology, 3rd ed* (pp. 567-573). Oxford University Press.

Northouse, L. L., Walker, J., Schafenacker, A., Mood, D., Mellon, S., Galvin, E., Harden, J., & Freeman-Gibb, L. (2002). A Family-Based Program of Care for Women With Recurrent Breast Cancer and Their Family Members. *Oncology Nursing Forum*, *29*(10), 1411-1419.

O'Leary, A. (1992). Self-efficacy and health: Behavioral and stress-physiological mediation. *Cognitive Therapy and Research*, *16*(2), 229-245.

O'Neill, A. (2019). *Perceived Partner Responsiveness, Sleep and Pain: A Dyadic Study of Military-Connected Couples*.Portland State University.

Ochoa, C. Y., Lunsford, N. B., & Smith, J. L. (2020). Impact of informal cancer caregiving across the cancer experience: A systematic literature review of quality of life. *Palliative & Supportive Care*, *18*(2), 220-240.

Oldertrøen Solli, K., Boer, M., Nyheim Solbrække, K., & Thoresen, L. (2019). Male partners' experiences of caregiving for women with cervical cancer—a qualitative study. *Journal of Clinical Nursing*, *28*(5-6), 987-996.

Oldertroen Solli, K., de Boer, M., Nyheim Solbraekke, K., & Thoresen, L. (2019). Male partners' experiences of caregiving for women with cervical cancer-a qualitative study. *J Clin Nurs*, *28*(5-6), 987-996.

Osei Appiah, E., Amertil, N. P., Oti-Boadi Ezekiel, E., Lavoe, H., & Siedu, D. J. (2021). Impact of cervical cancer on the sexual and physical health of women diagnosed with cervical cancer in Ghana: A qualitative phenomenological study. *Women's Health*, *17*, 17455065211066075.

Ovaska-Stafford, N., Maltby, J., & Dale, M. (2021). Literature Review: Psychological Resilience Factors in People with Neurodegenerative Diseases. *Archives of Clinical Neuropsychology*, *36*(2), 283-306.

Padilla-Ruiz, M., Ruiz-Román, C., Pérez-Ruiz, E., Rueda, A., Redondo, M., & Rivas-Ruiz, F. (2019). Clinical and sociodemographic factors that may influence the resilience of women surviving breast cancer: cross-sectional study. *Support Care Cancer*, *27*(4), 1279-1286.

Parthipan, M., Feng, G., Toledano, N., Donison, V., Breunis, H., Sudharshan, A., Emmenegger, U., Finelli, A., Warde, P., Soto-Perez-de-Celis, E., Krzyzanowska, M., Matthew, A., Clarke, H., Mina, D. S., Alibhai, S. M. H., & Puts, M. (2023). Symptom experiences of older adults during treatment for metastatic prostate cancer: A qualitative investigation. *Journal of Geriatric Oncology*, *14*(1), 101397.

Patterson, J., Wilson, J. A., Carding, P. N., & McColl, E. (2013). Head and neck cancer and dysphagia; caring for the carers. *Psycho-Oncology*, *22*(8), 1815-1820.

Peerawong, T., Suphasynth, Y., Kongkamol, C., Rordlamool, P., & Chicharoen, S. (2020). Validation of the Functional Assessment of Cancer Therapy with Cervical Cancer Subscale (FACT-CX) for Quality of Life in Thai Patients Prior to Chemoradiotherapy. *Asian Pacific Journal of Cancer Prevention*, *21*(7), 1891-1897.

Petrocchi, S., Filipponi, C., & Schulz, P. J. (2021). A longitudinal application of the Actor Partner Interdependence Model extended Mediations to the health effects of dyadic support. *PLOS ONE*, *16*(7), e0254716.

Petrocchi, S., Iannello, P., Lecciso, F., Levante, A., Antonietti, A., & Schulz, P. J. (2019). Interpersonal trust in doctor-patient relation: Evidence from dyadic analysis and association with quality of dyadic communication. *Social Science & Medicine*, *235*, 112391.

Pfaendler, K. S., Wenzel, L., Mechanic, M. B., & Penner, K. R. (2015). Cervical cancer survivorship: long-term quality of life and social support. *Clin Ther*, *37*(1), 39-48.

Popa-Velea, O., Diaconescu, L., Jidveian Popescu, M., & Truțescu, C. (2017). Resilience and active coping style: Effects on the self-reported quality of life in cancer patients. *The International Journal of Psychiatry in Medicine*, *52*(2), 124-136.

Porter, L. S., Keefe, F. J., Garst, J., McBride, C. M., & Baucom, D. (2008). Self-efficacy for managing pain, symptoms, and function in patients with lung cancer and their informal caregivers: Associations with symptoms and distress. *Pain*, *137*(2), 306-315.

Rajandram, R. K., Ho, S. M. Y., Samman, N., Chan, N., McGrath, C., & Zwahlen, R. A. (2011). Interaction of hope and optimism with anxiety and depression in a specific group of cancer survivors: a preliminary study. *BMC Research Notes*, *4*(1), 519.

Ramos, K., Leo, K., Porter, L. S., Romano, J. M., Baucom, B. R. W., & Langer, S. L. (2023). Attachment in Couples Coping with Cancer: Associations with Observed Communication and Long-Term Health. *International Journal of Environmental Research and Public Health*, *20*(7), 5249.

Randall, A. K., & Bodenmann, G. (2009). The role of stress on close relationships and marital satisfaction. *Clinical Psychology Review*, *29*(2), 105-115.

Rapelli, G., Donato, S., Parise, M., Pagani, A. F., Castelnuovo, G., Pietrabissa, G., Giusti, E., & Bertoni, A. (2022). Yes, I can (with you)! Dyadic coping and self-management outcomes in cardiovascular disease: The mediating role of health self-efficacy. *Health & Social Care in the Community*, e2604-e2617.

Reblin, M., Sutton, S. K., Vadaparampil, S. T., Heyman, R. E., & Ellington, L. (2019). Behind closed doors: How advanced cancer couples communicate at home. *Journal of Psychosocial Oncology*, *37*(2), 228-241.

Regan, Lambert, S. D., Kelly, B., McElduff, P., Girgis, A., Kayser, K., & Turner, J. (2014). Cross-sectional relationships between dyadic coping and anxiety, depression, and relationship satisfaction for patients with prostate cancer and their spouses. *Patient Education and Counseling*, *96*(1), 120-127.

Regan, T. W., Lambert, S. D., Kelly, B., McElduff, P., Girgis, A., Kayser, K., & Turner, J. (2014). Cross-sectional relationships between dyadic coping and anxiety, depression, and relationship satisfaction for patients with prostate cancer and their spouses. *Patient Educ Couns*, *96*(1), 120-127.

Revenson, T. A., & Lepore, S. J. X. (2012). Coping in social context. *Handbook of health psychology*, 193-217.

Robin, T. P., Amini, A., Schefter, T. E., Behbakht, K., & Fisher, C. M. (2016). Disparities in standard of care treatment and associated survival decrement in patients with locally advanced cervical cancer. *Gynecologic Oncology*, *143*(2), 319-325.

Roche, V., & Palmer, B. F. (2009). The Hidden Patient: Addressing the Caregiver. *The American Journal of the Medical Sciences*, *337*(3), 199-204.

Rottmann, N., Dalton, S. O., Christensen, J., Frederiksen, K., & Johansen, C. (2010). Self-efficacy, adjustment style and well-being in breast cancer patients: a longitudinal study. *Quality of Life Research*, *19*(6), 827-836.

Rusu, P. P., Hilpert, P., Falconier, M., & Bodenmann, G. (2018). Economic strain and support in couple: The mediating role of positive emotions. *Stress Health*, *34*(2), 320-330.

Sadler, P., Ethier, N., & Woody, E. (2011). Tracing the Interpersonal Web of Psychopathology: Dyadic Data Analysis Methods for Clinical Researchers. *Journal of Experimental Psychopathology*, *2*(2), 95-138.

Saimaldaher, Z. a. H., & Wazqar, D. Y. (2020). Relationships between caregiving stress, mental health and physical health in family caregivers of adult patients with cancer: implications for nursing practice. *Scandinavian Journal of Caring Sciences*, *34*(4), 889-898.

Saita, E., Acquati, C., & Kayser, K. (2015). Coping with early stage breast cancer: examining the influence of personality traits and interpersonal closeness. *Frontiers in Psychology*, *6*, 88.

Schumacher, A., Sauerland, C., Silling, G., Berdel, W. E., & Stelljes, M. (2014). Resilience in patients after allogeneic stem cell transplantation. *Supportive Care in Cancer*, *22*(2), 487-493.

Schwarzer, R., & Born, A. (1997). Optimistic self-beliefs: Assessment of general perceived self-efficacy in thirteen cultures. *World Psychology*, *3*(1-2), 177-190.

Schwarzer, R., & Jerusalem, M. (1995). *Generalized Self-Efficacy scale*. In J. Weinman, S. Wright, & M. Johnston, Measures in health psychology: A user's portfolio. Causal and control beliefs (pp. 35-37). Windsor, UK: NFER-NELSON.

Schwarzer, R., Luszczynska, A., Ziegelmann, J. P., Scholz, U., & Lippke, S. (2008). Social-cognitive predictors of physical exercise adherence: Three longitudinal studies in rehabilitation. *Health Psychology*, *27*(1), S54-S63.

Schwarzer, R., & SchrÖder, K. (1997). Effects of self-efficacy and social support on postsurgical recovery of heart patients. *Irish Journal of Psychology*, *18*(1), 88-103.

Secinti, E., Fischer, I. C., Brennan, E. A., Christon, L., & Balliet, W. (2023). The efficacy of psychosocial interventions for cancer caregiver burden: A

systematic review and meta-analysis of randomized controlled trials. *Clinical Psychology Review*, *99*, 102237.

Segrin, C., Badger, T. A., Sikorskii, A., Crane, T. E., & Pace, T. W. W. (2018). A dyadic analysis of stress processes in Latinas with breast cancer and their family caregivers. *Psycho-Oncology*, *27*(3), 838-846.

Segrin, C., Badger, T. A., Sikorskii, A., Pasvogel, A., Weihs, K., Lopez, A. M., & Chalasani, P. (2020). Longitudinal dyadic interdependence in psychological distress among Latinas with breast cancer and their caregivers. *Supportive Care in Cancer*, *28*(6), 2735-2743.

Seiler, A., & Jenewein, J. (2019). Resilience in Cancer Patients. *Frontiers in Psychiatry*, *10*, 208.

Shaffer, S. M., Dunagin, M. C., Torborg, S. R., Torre, E. A., Emert, B., Krepler, C., Beqiri, M., Sproesser, K., Brafford, P. A., Xiao, M., Eggan, E., Anastopoulos, I. N., Vargas-Garcia, C. A., Singh, A., Nathanson, K. L., Herlyn, M., & Raj, A. (2017). Rare cell variability and drug-induced reprogramming as a mode of cancer drug resistance. *Nature*, *546*(7658), 431-435.

Shah, R., Nwankwo, C., Kwon, Y., & Corman, S. L. (2020). Economic and Humanistic Burden of Cervical Cancer in the United States: Results from a Nationally Representative Survey. *J Womens Health (Larchmt)*, *29*(6), 799-805.

Shajahan Ahamed, M., & Degu, A. (2023). Health-related quality of life among cervical cancer patients at Kenyatta National Hospital. *Journal of Oncology Pharmacy Practice*, *29*(2), 393-400.

Shneor, R., Munim, Z. H., Zhu, H., & Alon, I. (2021). Individualism, collectivism and reward crowdfunding contribution intention and behavior. *Electronic Commerce Research and Applications*, *47*, 101045.

Shylasree, T., Ranade, R., Kattepur, A., Kaur, S., Dusane, R., Maheshwari, A., Mahantshetty, U., Chopra, S., Engineer, R., & Kerkar, R. (2021). Quality of life in long term survivors of cervical cancer: A cross sectional study. *Indian Journal of Cancer*, *58*(2), 171.

Sihvola, S., Kuosmanen, L., & Kvist, T. (2021). Resilience and related factors in colorectal cancer patients: A systematic review. *European journal of oncology nursing : the official journal of European Oncology Nursing Society*, *56*, 102079.

Simeon, B. W., & Jones, M. (2015). Burden on informal caregivers of elderly cancer survivors: risk versus resilience. *Journal of Psychosocial Oncology*, *33*(2), 178-198.

Sinclair, R. R., & Britt, T. W. (2013). *Building psychological resilience in military personnel : theory and practice*. Washington,DC: American Psychological Association.

Smith, J. L., & Hollinger-Smith, L. (2015). Savoring, resilience, and psychological well-being in older adults. *Aging & Mental Health*, *19*(3), 192-200.

Song, Y.-Y., Liu, H., Wang, S., & Jiang, X.-L. (2021). Correlates of posttraumatic growth among spouses of newly diagnosed gynecological cancer survivors: A cross-sectional study. *European Journal of Oncology Nursing*, *54*, 102039.

Soriano, E. C., Pasipanodya, E. C., LoSavio, S. T., Otto, A. K., Perndorfer, C., Siegel, S. D., & Laurenceau, J. P. (2018). Social constraints and fear of recurrence in couples coping with early stage breast cancer. *Health psychology*, *37*(9), 874.

Ştefănuţ, A. M., Vintilă, M., Bădău, L. M., Grujic, D., Oprean, C. M., Goian, C., & Sârbescu, P. (2023). Perception of disease, dyadic coping, and the quality of life of oncology patients in the active treatment phase and their life partners: an approach based on the actor-partner interdependence model. *Frontiers in Psychology*, *14*, 1069767.

Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, *42*(5), 893-898.

Steinhardt, M. A., Brown, S. A., Dubois, S. K., Harrison, J. L., Lehrer, H. M., & Jaggars, S. S. (2015). A Resilience Intervention in African-American Adults with Type 2 Diabetes. *American Journal of Health Behavior*, *39*(4), 507-518.

Strauss, B., Brix, C., Fischer, S., Leppert, K., Füller, J., Roehrig, B., Schleussner, C., & Wendt, T. G. (2007). The influence of resilience on fatigue in cancer patients undergoing radiation therapy (RT). *Journal of Cancer Research and Clinical Oncology*, *133*(8), 511-518.

Sun, H., Qin, Y., & Hengudomsub, P. (2021). Factors associated with resilience in spousal caregivers of patients with cancer: An integrative review. *Nursing Open*, *8*(5), 2131-2141.

Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA: A Cancer Journal for Clinicians*, *71*(3), 209-249.

Suo, R., Zhang, L., Tao, H., Ye, F., Zhang, Y., & Yan, J. (2021). The effects of dyadic coping and marital satisfaction on posttraumatic growth among breast cancer couples. *Supportive Care in Cancer*, *29*(9), 5425-5433.

Tabachnick, B. G., Fidell, L. S., & Pearson. (2013). Using Multivariate Statistics: Pearson New International Edition. *Pearson Schweiz Ag*, *26*(6), 495-496.

Tang, Y. (2015). *Confucianism, Buddhism, Daoism, Christianity and Chinese Culture*. Springer Group.

Tennstedt, S. L. (2000). Empowering older patients to communicate more effectively in the medical encounter. *Clinics in Geriatric Medicine*, *16*(1), 61-70.

Teo, I., Cheung, Y. B., Lim, T. Y. K., Namuduri, R. P., Long, V., & Tewani, K. (2018). The relationship between symptom prevalence, body image, and quality of life in Asian gynecologic cancer patients. *Psycho-Oncology*, *27*(1), 69-74.

Teskereci, G., & Kulakaç, O. (2018). Life experiences of caregivers of women with gynaecological cancer: a mixed-methods systematic review. *European Journal of Cancer Care*, *27*(1), e12456.

Thapa, N., Maharjan, M., Xiong, Y., Jiang, D., Nguyen, T.-P., Petrini, M. A., & Cai, H. (2018). Impact of cervical cancer on quality of life of women in Hubei, China. *Scientific Reports*, *8*(1), 11993.

The Whoqol, G. (1998). The World Health Organization quality of life assessment (WHOQOL): Development and general psychometric properties. *Social Science & Medicine*, *46*(12), 1569-1585.

Thewes, B., Lebel, S., Leclair, C. S., & Butow, P. (2016). A qualitative exploration of fear of cancer recurrence (FCR) amongst Australian and Canadian breast cancer survivors. *Supportive Care in Cancer Official Journal of the Multinational Association of Supportive Care in Cancer*, *24*(5), 2269-2276

Thoits, P. A. (2011). Mechanisms Linking Social Ties and Support to Physical and Mental Health. *Journal of Health and Social Behavior*, *52*(2), 145-161.

Thornton, C. P., Li, M., Yeh, C. H., & Ruble, K. (2021). Self-efficacy in symptom management for adolescents and young adults with cancer: a systematic review. *Supportive Care in Cancer*, *29*(6), 2851-2862.

Tiwari, P., Coriddi, M., Salani, R., & Povoski, S. P. (2013). Breast and gynecologic cancer-related extremity lymphedema: a review of diagnostic modalities and management options. *World Journal of Surgical Oncology*, *11*(1), 237.

Tong, L., He, M., Zou, Y., & Li, Z. (2021). Effects of bundled nursing combined with peer support on psychological state and self-efficacy of patients with cervical cancer undergoing chemotherapy. *American Journal of Translational Research*, *13*(9), 10649-10655.

Traa, M. J., De Vries, J., Bodenmann, G., & Den Oudsten, B. L. (2015). Dyadic coping and relationship functioning in couples coping with cancer: A systematic review. *British Journal of Health Psychology*, *20*(1), 85-114.

Tu, J., Liu, Y., Wu, X., Xu, D., & Liao, J. (2021). Dyadic appraisal and coping with illness among older Chinese adults with type 2 diabetes mellitus: a qualitative study. *Age and Ageing*, *50*(3), 928-935.

Uchino, B. N. (2009). Understanding the Links Between Social Support and Physical Health: A Life-Span Perspective With Emphasis on the Separability of Perceived and Received Support. *Perspectives on Psychological Science*, *4*(3), 236-255.

Ustaalioglu, B. O., Acar, E., & Caliskan, M. (2018). The predictive factors for perceived social support among cancer patients and caregiver burden of their family caregivers in Turkish population. *International Journal of Psychiatry in Clinical Practice*, *22*(1), 1-7.

Valente, M., Chirico, I., Ottoboni, G., & Chattat, R. (2021). Relationship Dynamics among Couples Dealing with Breast Cancer: A Systematic Review. *International Journal of Environmental Research and Public Health*, *18*(14), 7288.

Van Houtven, C. H., Miller, K. E. M., James, H. J., Blunt, R., Zhang, W., Mariani, A. C., Rose, S., Alolod, G. P., Wilson-Genderson, M., Smith, V. A., Thomson, M. D., & Siminoff, L. A. (2023). Economic costs of family caregiving for persons with advanced stage cancer: a longitudinal cohort study. *Journal of Cancer Survivorship,*1-15.

Vellone, E., Chung, M. L., Cocchieri, A., Rocco, G., Alvaro, R., & Riegel, B. (2014). Effects of self-care on quality of life in adults with heart failure and their spousal caregivers: testing dyadic dynamics using the actor-partner interdependence model. *J Fam Nurs*, *20*(1), 120-141.

Venetis, M. K., Magsamen-Conrad, K., Checton, M. G., & Greene, K. (2014). Cancer Communication and Partner Burden: An Exploratory Study: Cancer Communication and Partner Burden. *Journal of Communication*, *64*(1), 82-102.

Vistad, I., Fosså, S. D., & Dahl, A. A. (2006). A critical review of patient-rated quality of life studies of long-term survivors of cervical cancer. *Gynecologic Oncology*, *102*(3), 563-572.

Vordermark, D. (2016). Radiotherapy of Cervical Cancer. *Oncology Research and Treatment*, *39*(9), 516-520.

Wagner, C. D., Tanmoy Das, L., Bigatti, S. M., & Storniolo, A. M. (2011). Characterizing Burden, Caregiving Benefits, and Psychological Distress of Husbands of Breast Cancer Patients During Treatment and Beyond. *Cancer Nursing*, *34*(4), E21-E30.

Wagnild, G. M. (2009). *The resilience scale user's guide: for the US English version of the resilience scale TM and the 14-Item resilience scale TM (RS-14 TM)*. Resilience center.

Wagnild, G. M., & Yong, H. M. (1993). Development and psychometric. *J Nurs Meas*, *1*(2), 165-17847

Wan, X., Huang, H., Peng, Q., Yu, N. X., Zhang, Y., Ding, Y., Wu, H., Hao, J., Lu, G., & Chen, C. (2023). A meta-analysis on the relationship between posttraumatic growth and resilience in people with breast cancer. *Nursing Open*, *10*(5), 2734-2745.

Wang, C.-k., Hu, Z.-f., & Liu, Y. (2001). A Study on the Reliability and Validity of General Self-efficacy Scale. *Chinese Journal of Applied Psychology*, *7*(1), 4.

Wang, C., Wacharasin, C., & Hengudomsub, P. (2023). Self-efficacy as Mediator of the Association Between Dyadic Coping and Quality of Life among Spousal Caregiver of Patients with Cervical Cancer. *Asia-Pacific Journal of Oncology Nursing*, 100354.

Wang, L., Luo, J., Li, Y., Zhou, Y., & Wang, W. (2022). Social support, anxiety, and depression in patients with prostate cancer: complete mediation of self-efficacy. *Supportive Care in Cancer*, *30*(8), 6851-6856.

Wang, X., Wang, S., Yang, D., Chu, Y., Hao, Y., & Dai, H. (2022). Associations among resilience, hope, social support, stress, and anxiety severity in Chinese women with abnormal cervical cancer screening results. *Heliyon*, *8*(12), e12539.

Ware, J., Snow, K. K., Kosinski, M. A., & Gandek, B. G. (1993). SF-36 health survey. Manual and interpretation guide. Boston: The Health Institute, New England Medical Center, 10-16.

Ware, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of Scales and Preliminary Tests of Reliability and Validity. *Medical Care*, *34*(3), 220-233.

Ware, J. E., Kosinski, M. A., & Keller, S. D. (2002). SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales.

Wenzel, L. B., Donnelly, J. P., Fowler, J. M., Habbal, R., Taylor, T. H., Aziz, N., & Cella, D. (2002). Resilience, reflection, and residual stress in ovarian cancer survivorship: A gynecologic oncology group study. *Psycho-Oncology*, *11*(2), 142-153.

Whitton, S. W., Sarno, E. L., Josza, K., Garcia, C. P., & Newcomb, M. E. (2023). Recruiting and retaining sexual and gender minority couples in intervention research: Lessons learned from trials of tailored relationship education programs. *Family Process*, *62*(3), 932-946.

Wiltink, L. M., King, M., Müller, F., Sousa, M. S., Tang, M., Pendlebury, A., Pittman, J., Roberts, N., Mileshkin, L., Mercieca-Bebber, R., Tait, M. A., Campbell, R., & Rutherford, C. (2020). A systematic review of the impact of contemporary treatment modalities for cervical cancer on women's self-reported health-related quality of life. *Supportive Care in Cancer*, *28*(10), 4627-4644.

Wit, E. M. K., & Horenblas, S. (2014). Urological complications after treatment of cervical cancer. *Nature Reviews Urology*, *11*(2), 110-117.

Woods, P. R., & Lamond, D. A. (2011). What Would Confucius Do? – Confucian Ethics and Self-Regulation in Management. *Journal of Business Ethics*, *102*(4), 669-683.

Wooldridge, J. S., Gray, C., Pukhraj, A., Geller, J., & Trivedi, R. B. (2019). Understanding communal coping among patients and informal caregivers with heart failure: A mixed methods secondary analysis of patient-caregiver dyads. *Heart & Lung*, *48*(6), 486-495.

Wu, T., & Zheng, Y. (2021). Effect of Sexual Esteem and Sexual Communication on the Relationship Between Body Image and Sexual Function in Chinese Heterosexual Women. *The Journal of Sexual Medicine*, *18*(3), 474-486.

Wu, X., Wu, L., Han, J., Wu, Y., Cao, T., Gao, Y., Wang, S., Wang, S., Liu, Q., Li, H., Yu, N., Wang, H., Li, Y., Wang, Z., Sun, X., & Wang, J. (2021). Evaluation of the sexual quality of life and sexual function of cervical cancer survivors after cancer treatment: a retrospective trial. *Archives of Gynecology and Obstetrics*, *304*(4), 999-1006.

Xie, Y., Zhao, F. H., Lu, S. H., Huang, H., Pan, X. F., Yang, C. X., & Qiao, Y. L. (2013). Assessment of quality of life for the patients with cervical cancer at different clinical stages. *Chinese Journal of Cancer*, *32*(5), 275-282.

Xu, F., Hilpert, P., Randall, A. K., Li, Q., & Bodenmann, G. (2016). Validation of the Dyadic Coping Inventory with Chinese couples: Factorial structure, measurement invariance, and construct validity. *Psychological Assessment*, *28*(8), e127-e140.

Yaman, Ş., & Ayaz, S. (2016). Psychological Problems Experienced by Women with Gynecological Cancer and How They Cope with It: A Phenomenological Study in Turkey. *Health & Social Work*, *41*(3), 173-181.

Yang, Y. L., Liu, L., Wang, X. X., Wang, Y., & Wang, L. (2014). Prevalence and Associated Positive Psychological Variables of Depression and Anxiety among Chinese Cervical Cancer Patients: A Cross-Sectional Study. *PLOS ONE*, *9*(4), e94804.

Yates, M. E., Tennstedt, S., & Chang, B. H. (1999). Contributors to and Mediators of Psychological Well-Being for Informal Caregivers. *The Journals of Gerontology: Series B*, *54B*(1), P12-P22.

Ye, Z. J., Qiu, H. Z., Li, P. F., Liang, M. Z., & Quan, X. M. (2017). Predicting changes in quality of life and emotional distress in Chinese patients with lung, gastric, and colon-rectal cancer diagnoses: the role of psychological resilience. *Psycho-oncology*, *26*(6), 829-835.

Yeh, Y. C., Lu, C. H., Chen, I. H., Kuo, S. F., & Huang, Y. P. (2021). Quality of life and its predictors among women with gynecological cancers. *Collegian*, *28*(1), 81-88.

Yiu, H. C., Zang, Y., Chew, J. H. S., & Chau, J. P. C. (2021). The Influence of Confucianism on the Perceptions and Process of Caring Among Family Caregivers of Persons With Dementia: A Qualitative Study. *Journal of Transcultural Nursing*, *32*(2), 153-160.

Zautra, A. J. (2009). Resilience: One Part Recovery, Two Parts Sustainability. *Journal of Personality*, *77*(6), 1935-1943.

Zetin, Y., & Dursun, S. L. (2020). Quality of life, caregiver burden, and resilience among the family caregivers of cancer survivors. *European Journal of Oncology Nursing*, *48*, 101832.

Zhang, J. X., & Schwarzer, R. (1995). Measuring optimistic self-beliefs: A Chinese adaptation of the General Self-Efficacy Scale. *Psychologia: An International Journal of Psychology in the Orient*, *38*(3), 174-181.

Zhang, L., Zhang, Z., Mei, Y., & Liu, Q. (2020). Dyadic appraisals, dyadic coping, and mental health among couples coping with stroke: A longitudinal study protocol. *Journal of Advanced Nursing*, *76*(11), 3164-3170.

Zhang, M., Chan, S. W. C., You, L., Wen, Y., Peng, L., Liu, W., & Zheng, M. (2014). The effectiveness of a self-efficacy-enhancing intervention for Chinese patients with colorectal cancer: a randomized controlled trial with 6-month follow up. *International journal of nursing studies*, 51(8), 1083-1092.

Zhang, M., Foley, S., & Yang, B. (2013). Work–family conflict among Chinese married couples: testing spillover and crossover effects. *The International Journal of Human Resource Management*, *24*(17), 3213-3231.

Zhao, M., Luo, L., Zhang, C. H., Zhang, J. P., Yuan, J. Y., Gu, R. Y., & Ding, S. R. (2021). Health-related quality of life in patients with cervical cancer in Southwest China: a cross-sectional study. *BMC Health Services Research*, *21*(1), 841.

Zhi, S., Gu, W., Miao, R., Zhang, L., Jing, X., Ramachandran, H. J., & Wang, W. (2024). Associations between dyadic communication and dyadic coping of patients with cervical cancer and their spouses: a study utilizing the actor-partner interdependence model. *Supportive Care in Cancer*, *32*(2), 90.

Zhou, J., Chen, X., Wang, Z., & Li, Q. (2023). Couple-Based Communication Interventions for Cancer Patient–Spousal Caregiver Dyads' Psychosocial Adaptation to Cancer: A Systematic Review. *Healthcare*, *11*(2), 236.

Zhou, K. N., Wang, Y., Xie, Y., Yang, S. H., Liu, S. Y., Fang, Y. H., & Zhang, Y. (2023). Symptom burden survey and symptom clusters in patients with cervical cancer: a cross-sectional survey. *Supportive Care in Cancer*, 31(6), 1-13.

Zou, G., Li, Y., Xu, R., & Li, P. (2018). Resilience and positive affect contribute to lower cancer-related fatigue among Chinese patients with gastric cancer. *Journal of Clinical Nursing*, *27*(7-8), e1412-e1418.

APPENDICES

Appendix A

The institutional review board and permission letter for data collection

Permission of IRB from Burapha University

สำเนา

ที่ IRB3-067/2565

เอกสารรับรองผลการพิจารณาจริยธรรมการวิจัยในมนุษย์
มหาวิทยาลัยบูรพา

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาโครงการวิจัย

รหัสโครงการวิจัย : G-HS031/2565

โครงการวิจัยเรื่อง : Interactive Model Assessing Mediating Role Of Resilience And Self-efficacy On Dyadic Coping And Quality Of Life Among Couples With Cervical Cancer

หัวหน้าโครงการวิจัย : MRS.CHUNTAO WANG

หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์

BUU Ethics Committee for Human Research has considered the following research protocol according to the ethical principles of human research in which the researchers respect human's right and honor, do not violate right and safety, and do no harms to the research participants.

Therefore, the research protocol is approved (See attached)

1. Form of Human Research Protocol Submission Version 2 : 8 July 2022
2. Research Protocol Version 1 : 19 May 2022
3. Participant Information Sheet Version 2 : 8 July 2022
4. Informed Consent Form Version 2 : 8 July 2022
5. Research Instruments Version 2 : 8 July 2022
6. Others (if any) Version - : -

วันที่รับรอง : วันที่ 9 เดือน สิงหาคม พ.ศ. 2565
วันที่หมดอายุ : วันที่ 9 เดือน สิงหาคม พ.ศ. 2566

ลงนาม *นางสาวรมร แย้มประทุม*
(นางสาวรมร แย้มประทุม)
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา
ชุดที่ 3 (กลุ่มคลินิก/ วิทยาศาสตร์สุขภาพ/ วิทยาศาสตร์และเทคโนโลยี)

Permission of IRB from Yancheng No.1 People's Hospital

盐城市第一人民医院伦理委员会

科研项目伦理审查批准件

伦审号【2021】-（K-131）

项目名称	心理弹性和自我效能在宫颈癌夫妻二元应对和生活质量模型中的中介作用测试			
申请人	王春桃		申请专业	护理
审查人所在单位	盐城市第一人民医院			
审查材料	试验方案	有■ 无□	审查途径	会议审查□ 快速审查■
	知情同意书	有■ 无□		
	申报书	有□ 无■		
伦理委员会审评意见				
经审查，该临床研究项目符合伦理要求。 主任委员签名： 日期：2021.12.28				

Permission of IRB from Yancheng No.3 People's Hospital

盐城市第三人民医院

伦理审查批件

批件号：LS20211205

项目名称	心理弹性和自我效能在宫颈癌夫妻二元应对和生活质量模型中的中介作用测试		
申请者	王春桃	单位/科室	江苏医药职业学院
审查文件	1.初始审查申请表； 2.临床科研项目可行性与安全性论证报告； 3.研究方案； 4.主要研究者履历； 5.免知情同意的申请。		
审查类别	☑初始审查 ☐跟踪审查： ☐年度/定期跟踪审查 ☐修正案审查 ☐严重不良事件和非预期事件报告审查 ☐不依从/违背方案事件审查 ☐暂停或终止已批准研究审查 ☐结题审查 ☐受试者抱怨 ☐实地访查 ☐复审		
审查方式	☐会议审查 ☑简易审查 ☐紧急会议审查		
审查意见	审查决定：批准 根据《涉及人的生物医学研究伦理审查办法》（2016 年）、《药物临床试验质量管理规范》（2020 年）、《药物临床试验伦理审查工作指导原则》（2010 年）、WMA《赫尔辛基宣言》的伦理原则。经		
	本伦理委员会审查同意按所同意的临床研究方案、知情同意书开展本项研究。 注： 1、请遵循 GCP 原则、遵循伦理委员会同意的方案开展临床研究保护受试者的健康和权利。 2、对研究方案、知情同意书、招募材料等的任何修改请提交修正案审查申请。 3、发生 SAE 请及时提交严重不良事件报告。 4、如有不依从/违背方案的情况请及时提交违背方案报告。 5、请根据年度/定期跟踪审查频率及时提交研究进展报告。 6、暂停或终止临床研究请及时提交暂停/终止研究报告。 7、完成临床研究请提交结题报告。		
年度定期/跟踪审查频率	12 个月		
主任委员（被授权者）签名	盐城市第三人民医院伦理委员会（盖章） [illegible]年 [illegible]月 [illegible]日		

Permission of IRB from Jianhu People's Hospital

医学伦理审查报告

我院 妇科 科室拟开展"心理弹性和自我效能在宫颈癌夫妻二元应对和生活质量模型中的中介作用的研究"项目，伦理项目编号：JY-LL-202112-K054，我院伦理委员会对该项目相关医学伦理问题进行了审查。

项目信息			
项目名称：	心理弹性和自我效能在宫颈癌夫妻二元应对和生活质量模型中的中介作用的研究		
承担单位：	建湖县人民医院	项目负责人：	王春桃
研究起止时间：	2021.12-2023.12	科室：	妇科
主要研究者：	王春桃	职称：	副教授

伦理审查评议意见：

经我院伦理委员会审议，该项目的设计和执行方案充分考虑了安全性和公平性原则，其研究内容对受试者造成伤害和风险与获益相比在伦理接受范围以内，对不良后果有相关预案及补偿措施。受试者基于了自愿和知情同意的原则，并将尽最大限度保护受试者的权益及隐私，研究内容和研究结果不存在利益冲突。

结论：

该项目的受试者权益得到充分保护，对受试者造成伤害和风险与获益相比在伦理接受范围以内，同意该项目的开展。

建湖县人民医院伦理委员会

2021年12月7日

Permission of IRB from Dongtai People's Hospital

东台市人民医院伦理委员会批件

批件号： 2021-dtry-K-025

项目名称	心理弹性和自我效能在宫颈癌夫妻二元应对和生活质量模型中的中介作用测试				
申办者	江苏医药职业学院 王春桃				
承担单位	东台市人民医院		研究机构	东台市人民医院	
临床研究科室	肿瘤科、妇科	项目负责人	王春桃	职称	副教授
参与伦理审查成员	杨小进、花萍、姚成俊、林永德、王桂宏、朱月华 练云、纪冬霞、方芳、窦宝平、沈玉婷、蔡霞				
审议时间	2022.01.13	审议地点	行政楼九楼二会议室	审查类别	会议审查
送审资料	1.伦理审查申请表：2.研究方案				
表决结果	批准 12 票	作必要修正后批准 0 票	不批准 0 票	终止或暂停临床试验 0 票	
	委员人数 13 人	出席人数 12 人	作必要修正后再审 0 票	回避 0 人	
审查意见	批 准				
伦理委员会联系人	万鹏	联系电话	0515-85253955		
联系地址	江苏省东台市康复西路 2 号	邮编	224200		

伦理委员会审批意见：

意见如下：

伦理委员会同意批准临床科学研究的实施。

如试验开展一年以上，需向伦理委员会提交试验年度报告。暂停或提前终止临床试验，请及时通知伦理委员会。如发生严重不良事件以及影响研究风险受益比的非预期不良事件，24小时内报告伦理委员会（电话、传真：0515-85253955）。如临床方案、知情同意书的任何修改、研究者的更换，应及时通知伦理委员会，重新审查，获得批准后执行。发现影响受试者参加研究意愿的违反方案情况应及时报告。

主任委员签字：

东台市人民医院医学伦理委员会（盖章）

2022 年 01 月 14 日

声明：本伦理委员会组成及操作符合伦理规范及相关法律法规，所有出席的委员均有效任期期间。特此声明。

Permission of IRB from The First Affiliated Hospital of Suzhou University

V2.0，2021.07.01

苏州大学附属第一医院医学伦理委员会
非干预性研究快速审核表

审核编号：（2022）伦研批第 275 号

研究项目名称	心理弹性和自我效能在宫颈癌夫妻二元应对和生活质量模型中的中介作用测试		
研究类别	非干预性研究		
项目来源	无		
承担科室	妇科	主要研究者	耿莉，王春桃
主要研究内容	本研究共纳入患者 320 例。计划在本院收集 100 例数据。我们将采用分组随机抽样技术，在苏州大学附属第一医院等三甲医院选择宫颈癌患者及其配偶。符合标准的夫妇将被招募，直到参与者人数达到。在每家医院，宫颈癌患者及其配偶将通过便利抽样技术被招募。 我们将向研究对象解释本研究。经医院的机构审查委员会（IRB）批准的中文知情同意书，我们将把调查问卷包输入网上问卷。参与者在回答问卷之前将被要求签署同意书。参与将是自愿的，并将保持保密性。 主要研究者签名：耿莉 2022 年 1 月 7 日		
科研管理部门立项审查意见	同意立项。 签名：[illegible] 2022年 7月 12 日		
审查意见	经伦理委员会审核，该研究项目为非干预性研究，依据我国相关法律、法规和国际伦理准则，该研究方案设计科学，符合伦理原则，同意开展本项研究。		
伦理委员会审核委员签字	委员 [illegible] 苏州大学附属第一医院医学伦理委员会（盖章） 2022 年 7 月 20 日		

备注：审查文件清单见附件：附件 1：科研诚信承诺书
附件 2：研究方案
附件 3：知情同意书模板

Appendix B

Participant’s information sheet and consent form

Participant information sheet

AF 06-02

เอกสารชี้แจงผู้เข้าร่วมโครงการวิจัย
(Participant Information Sheet)

รหัสโครงการวิจัย : ..... G-HS 031/2565 .....
(สำนักงานคณะกรรมการพิจารณาจริยธรรมในมนุษย์ มหาวิทยาลัยบูรพา เป็นผู้ออกรหัสโครงการวิจัย)
โครงการวิจัยเรื่อง : Interactive Model Assessing Mediating Role Of Resilience And Self-efficacy On Dyadic Coping And Quality Of Life Among Couples With Cervical Cancer

Dear participants

I am Ms. Wang Chuntao, a doctoral nursing student at Faculty of Nursing, Burapha University Thailand. My study is "Interactive Model Assessing Mediating Role of Resilience and Self-efficacy on Dyadic Coping and Quality of Life among Couples with Cervical Cancer". The main objectives of this study are to describe the quality of life, dyadic appraisal, and dyadic coping status among patients with cervical cancer and their spouses; and to examine the mediating effect of resilience and self-efficacy between dyadic appraisal, dyadic coping and quality of life among patients with cervical cancer and their spouses. This study will be a survey study. Participating in this study is voluntary. If you agree to participate in this study, you will be asked to answer the following questionnaires, which will take approximately 30-40 minutes. The questionnaires will be done in two methods, paper or online questionnaires.

During the data collection period, the research assistant will clarify any questions posed by the participants for clarity regarding the language or content. You will not get any direct benefits by participating in this study. However, the information collected from this study may help patients with cancer and their spouses use the principles of positive psychology to better cope with their illness together, thereby improving quality of life and being valuable in developing future dyadic coping interventions. There will be no identified physical and psychological risk to the person participating in the study and no risk to the society.

You have the right to end your participation in this study at any time, and no necessary to inform the research assistant, and it will not affect the quality of services you receive from the organization. Any information collected from this study, including your identity, will be kept confidential. A coding number will be assigned to you and your name will not be used. Findings from the study will be presented as a group of participants and no specific information from any individual participant will be disclosed. All data will be accessible only to the researcher which will be destroyed one year after publishing the findings. You will receive a further explanation of the nature of the study upon its completion if you wish.

You will not receive any remuneration for participating in this study. To compensate you for any inconvenience for time and inconvenience that may be caused by your participation in this study, you will be given RMB 10 as a gift after you complete the questionnaire.

During the interview before you discharge from the hospital, this study will follow guidelines to prevent COVID-19: 1) You and the researcher need to wear masks; 2) You and the researcher need to disinfect hands with quick hand disinfectant or wash hands with soap solution before and after the interview; 3) You and the researcher need to maintain a safe distance of at least 1 meter; 4) The pens and other objects will be cleaned and disinfected before being handed over to you; 5) The completed questionnaires and unfilled questionnaires will be stored separately by the researcher; 6) The place for questionnaire storage will be disinfected daily by ultraviolet light .

The research will be conducted by Ms. Wang Chuntao under the supervision of my major-advisor, Associate Professor Dr.Chintana Wacharasin. If you have any questions, please contact me at mobile number: +8613485283336 or by email yammy_taotao@163.com and/or my advisor's e-mail address chintana@buu.ac.th. Or you may contact Burapha University Institutional Review Board (BUU-IRB) telephone number +66-3810-2620 or by email buuethics@buu.ac.th. Your cooperation is greatly appreciated. You will be given a copy of this consent form to keep.

Ms. Wang Chuntao

Participant's consent form

AF 06-03.1

เอกสารแสดงความยินยอม
ของผู้เข้าร่วมโครงการวิจัย (Consent Form for Patients with cervical cancer)

รหัสโครงการวิจัย : ..... G-HS 031/2565 .....
(สำนักงานคณะกรรมการพิจารณาจริยธรรมในมนุษย์ มหาวิทยาลัยบูรพา เป็นผู้ออกรหัสโครงการวิจัย)
โครงการวิจัยเรื่อง Interactive Model Assessing Mediating Role Of Resilience And Self-efficacy On Dyadic Coping And Quality Of Life Among Couples With Cervical Cancer

Date of data collection .....Month.....Year .....

Before giving my signature below, I have been informed by researcher Ms. Wang Chuntao about the purposes, method, procedures, benefits, and possible risks associated with participation in this study thoroughly, and I understood all the explanations. I consent voluntarily to participate in this study. I understand that I have the right to withdraw from the study any time, without any affects regarding the quality of services that I will receive from the hospitals.

The researcher Ms. Wang Chuntao has explained to me that all data and information of the participants will be kept confidential and only be used for this study. I have read and understood the information related to participation in this study clearly and I am signing this consent form.

Signature ..... Participant
(.....)

Signature ....Witness
(.....)

BUU-IRB Approved
9 Aug 2022

Appendix C

Instruments English version

Instruments English version

Patient General Questionnaire

Dear Madam, In order to better understand your physical and mental health, we are going to assess you with a questionnaire in order to provide you with more helpful health guidance. **Your personal information will be treated with the utmost confidentiality** and we thank you for your cooperation!

F **Code: A-1 - _____**

1. Age:……years

2. Marriage: □1 Single/divorced/widowed □2 Married for 10 years or less

□3 Married for 10-20 years □4 Married for 20-30 years □5 Married ≥ 30 years

•

•

•

11. Did you know about "the screening for cervical and breast cancer screening services" for women?

□1 don't know at all □2 know some □3 know

Spouse General Questionnaire

M **Code: A-1 - _____**

Dear Sir, We have designed this questionnaire in order to provide our patients' families with more helpful guidance on their physical and mental health, so please answer the questions. **Your personal information will be treated with the utmost confidentiality**; thank you for your cooperation!

1. Age: ……Year

2. Marriage: □1 Married for less than 10 years □2 Married for 10-20 years

□3 Married 20-30 years □4 Married ≥ 30 years

•

•

•

10. Did you know about "the screening for cervical and breast cancer screening services" for women?

□1 Don't know at all □2 Know some □3 Know

D **Code: A-_____**

1. Code number:

2. Pathological diagnosis:

-
-
-

9. Treatment methods (Multiple Choice):

☐1 Surgery ☐2 Radiotherapy ☐3Chemotherapy ☐4 Other

Investigator's signature: _____ Research date: _____ _____ ____

The Brief Illness Perception Questionnaire

For the following questions, please circle the number that best corresponds to your views:

How much does your illness affect your life?

0	1	2	3	4	5	6	7	8	9	10
no affect at all										severely affects my life

How long do you think your illness will continue?

0	1	2	3	4	5	6	7	8	9	10
a very short time										forever

.....

0	1	2	3	4	5	6	7	8	9	10
absolutely no control										extreme amount of control

.....

0	1	2	3	4	5	6	7	8	9	10
not at all										extremely

.....

0	1	2	3	4	5	6	7	8	9	10
no symptoms at all										many severe symptoms

How concerned are you about your illness?

0	1	2	3	4	5	6	7	8	9	10
not at all concerned										extremely concerned

.....

0	1	2	3	4	5	6	7	8	9	10
don't understand at all										understand very clearly

How much does your illness affect you emotionally? (e.g. does it make you angry, scared, upset or depressed?)

0	1	2	3	4	5	6	7	8	9	10
not at all affected emotionally										extremely affected emotionally

.....

The General Self-Efficacy Scale (GSES)

Guidance: Please answer each of the following items by placing a checkmark in the box that corresponds to your actual situation.

1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true

		Not at all true	**Hardly true**	**Moderately true**	**Exactly true**
1.	I can always manage to solve difficult problems if I try hard enough.	☐1	☐2	☐3	☐4
2.	If someone opposes me, I can find the means and ways to get what I want.	☐1	☑2	☐3	☐4
3.	.....	☐1	☐2	☐3	☐4
4.	.....	☐1	☐2	☐3	☐4
5.	.....	☐1	☐2	☐3	☐4
6.	.....	☐1	☐2	☐3	☐4
7.	.....	☐1	☐2	☐3	☐4
8.	.....	☐1	☐2	☐3	☐4
9.	.....	☐1	☐2	☐3	☐4
10.	I can usually handle whatever comes my way.	☐1	☐2	☐3	☐4

Dyadic Coping Inventory (DCI)

This scale is designed to measure how you and your partner cope with stress. Please indicate the first response that you feel is appropriate. Please be as honest as possible.
Please response to any item by marking the appropriate case, which is fitting to your personal situation. There are no false answers.

	How you communicate your stress to your partner?	**never/ very rarely**	**rarely**	**some times**	**often**	**very often**
1.	I let my partner know that I appreciate his/her practical support, advice, or help.	☐1	☐2	☐3	☐4	☐5
2.	I ask my partner to do things for me when I have too much to do.	☐1	☐2	☐3	☐4	☐5
3.	……	☐1	☐2	☐3	☐4	☐5
4.	……	☐1	☐2	☐3	☐4	☐5
	What your partner does when you are feeling stressed?					
5.	……	☐1	☐2	☐3	☐4	☐5
6.	……	☐1	☐2	☐3	☐4	☐5
7.	……	☐1	☐2	☐3	☐4	☐5
8.	……	☐1	☐2	☐3	☐4	☐5
9.	……	☐1	☐2	☐3	☐4	☐5
10.	……	☐1	☐2	☐3	☐4	☐5
11.	……	☐1	☐2	☐3	☐4	☐5
12.	……	☐1	☐2	☐3	☐4	☐5
13.	……	☐1	☐2	☐3	☐4	☐5
14.	……	☐1	☐2	☐3	☐4	☐5
15.	……	☐1	☐2	☐3	☐4	☐5
	How your partner communicates when he/she is feeling stressed?					
16.	……	☐1	☐2	☐3	☐4	☐5
17.	……	☐1	☐2	☐3	☐4	☐5
	How your partner communicates when he/she is feeling stressed?					
18.	……	☐1	☐2	☐3	☐4	☐5
19.	……	☐1	☐2	☐3	☐4	☐5
	What you do when your partner makes know his/her stress?	**never/ very rarely**	**rarely**	**some times**	**often**	**very often**
20.	……	☐1	☐2	☐3	☐4	☐5
21.	……	☐1	☐2	☐3	☐4	☐5
22.	……	☐1	☐2	☐3	☐4	☐5
23.	……	☐1	☐2	☐3	☐4	☐5
24.	……	☐1	☐2	☐3	☐4	☐5

25.	.....	☐1	☐2	☐3	☐4	☐5
26.	.....	☐1	☐2	☐3	☐4	☐5
27.	.....	☐1	☐2	☐3	☐4	☐5
28.	.....	☐1	☐2	☐3	☐4	☐5
29.	.....	☐1	☐2	☐3	☐4	☐5
30.	.....	☐1	☐2	☐3	☐4	☐5
	What you and your partner do when you are both feeling stressed?					
31.	.....	☐1	☐2	☐3	☐4	☐5
32.	.....	☐1	☐2	☐3	☐4	☐5
33.	.....	☐1	☐2	☐3	☐4	☐5
34.	.....	☐1	☐2	☐3	☐4	☐5
35.	.....	☐1	☐2	☐3	☐4	☐5

For #35: Even if you have restrictions now, answer this question regarding how you generally cope.

	How you evaluate your coping as a couple?					
36.	.....	☐1	☐2	☐3	☐4	☐5
37.	I am satisfied with the support I receive from my partner and I find as a couple, the way we deal with stress together is effective.	☐1	☐2	☐3	☐4	☐5

the Resilience Scale- 14

	Items	Strongly disagree	Basically disagree	A little disagree	Indeter minacy	Kind of agree	Basically agree	In full agree ment
1.	I usually manage one way or another	☐1	☐2	☐3	☐4	☐5	☐6	☐7
2.	I feel proud that I have accomplished t hings in life	☐1	☐2	☐3	☐4	☐5	☐6	☐7
3.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
4.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
5.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
6.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
7.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
8.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
9.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
10.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
11.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
12.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
13.	……	☐1	☐2	☐3	☐4	☐5	☐6	☐7
14.	My life has meaning	☐1	☐2	☐3	☐4	☐5	☐6	☐7

The 12-item Short-Form health survey (SF-12)

This information will help your doctors keep track of how you feel and how well you are able to do your usual activities. Answer every question by placing a check mark on the line in front of the appropriate answer. If you are unsure about how to answer a question, please give the best answer you can and make a written comment beside your answer.

1.In general,would you say your health is:

Excellent	Very good	Good	Fair	Poor
☐1	☐2	☐3	☐4	☐5

2.The following two questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

		Yes,limited a lot	Yes, limited a little	No,not limited at all
a.	Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:	☐1	☐2	☐3
b.	Climbing several flights of stairs:	☐1	☐2	☐3

3. .....

4. .....

5. .....

6. .....

7.During the PAST 4 WEEKS, how much of the time has your PHYSICAL HEALTH OR EMOTIONAL PROBLEMS interfered with your social activities (like visiting with friends, relatives,etc.)?

All of the time	Most of the time	A good bit of the time	Some of the time	None of the time
☐1	☐2	☐3	☐4	☐5

Appendix D

Instruments Chinese version

患者调查表

F **编码：A-1-_____**

尊敬的女士，您好！为切实了解您的身心健康，本院将对您进行问卷评估，以期为您提供更有帮助的健康指导，我们将对您的**个人信息绝对保密**，感谢您的配合！

1.年龄：_____岁

2.婚姻：□1 单身/离异/丧偶 □2 已婚 10 年以内 □3 已婚 10-20 年 □4 已婚 20-30 年 □5 已婚≥30 年

-
-
-

11. 您是否知道什么是女性“两癌”和“两癌”筛查？

□1 完全不知道 □2 知道一些 □3 知道

配偶调查表

M **编码：A-1-_____**

尊敬的先生，您好！为切实了解患者的身心健康，我们设计了这项问卷，以期为患者家庭提供更有帮助的健康指导，我们将对您的**个人信息绝对保密**；感谢您的配合！

一、一般情况调查表

1.年龄：_____岁

2.婚姻：□1 已婚 10 年以内 □2 已婚 10-20 年

□3 已婚 20-30 年 □4 已婚≥30 年

- ……
- ……
- ……

10. 您是否知道什么是女性“两癌”和“两癌”筛查？

□1 完全不知道 □2 知道一些 □3 知道

患者一般信息调查表（由研究人员填写）

D **编码：A-_____**

1.编码:

2.病理诊断:

.

.

.

9. 治疗方法（多选）: □1 手术 □2 放疗 □3 化疗 □4 其他

调查员签字: _____ 调研时间: _____年_____月 ____日

简要疾病认知问卷

以下问题，请选出最符合您的生活有多大影响

1 您的疾病对您的生活有多大的影响?

0 1 2 3 4 5 6 7 8 9 10

完全没影响 严重影响我的生活

2 您认为疾病会持续多久?

0 1 2 3 4 5 6 7 8 9 10

短时间 永远

3.....

0 1 2 3 4 5 6 7 8 9 10

几乎没有控制力 强控制力

4.....

0 1 2 3 4 5 6 7 8 9 10

一点也没有 极有帮助

5.....

0 1 2 3 4 5 6 7 8 9 10

没有任何症状 许多严重的症状

6 您对您的疾病有多担心?

0 1 2 3 4 5 6 7 8 9 10

一点也不担心 非常担心

7.....

0 1 2 3 4 5 6 7 8 9 10

一点也不了解 了解非常清楚

8 您的疾病对您的情绪有多大影响? (例如，这会让您生气、害怕、难过或者沮丧吗?)

0 1 2 3 4 5 6 7 8 9 10

一点也不影响 非常影响情绪

.....

一般自我效能感量表

指导语：以下 10 个句子关于你平时对你自己的一般看法，请你根据你的实际情况（实际感受），在合适的选项上打“√”。答案没有对错之分，对每一个句子无须多考虑。				
条目	**完全不正确**	**有点正确**	**多数正确**	**完全正确**
1. 如果我尽力去做的话，我总是能够解决问题的	1	2	3	4
2. 即使别人反对我，我仍有办法取得我所要的	1	2	3	4
3. ……	1	2	3	4
4. ……	1	2	3	4
5. ……	1	2	3	4
6. ……	1	2	3	4
7. ……	1	2	3	4
8.……	1	2	3	4
9.……	1	2	3	4
10. 无论什么事在我身上发生，我都能应付自如	1	2	3	4

夫妻支持应对量表

指导语：下列是测评您和您的伴侣是**如何应对压力（如患病）**。请根据您个人的情况圈选（〇）出最佳选择。					
您如何与您伴侣沟通您的压力?	**极少**	**很少**	**有时**	**经常**	**频繁**
1.我让他知道，我很感谢他实际的支持、建议和帮助。	1	2	3	4	5
2.当我比较忙的时候，我会请他帮忙。	1	2	3	4	5
3. ……	1	2	3	4	5
4. ……	1	2	3	4	5
当您有压力时，您的伴侣如何做?	**极少**	**很少**	**有时**	**经常**	**频繁**
5. ……	1	2	3	4	5
6.他会告诉我他在我身边。	1	2	3	4	5
7. ……	1	2	3	4	5
8.他帮助我从不同角度看待压力情境。	1	2	3	4	5
9. ……	1	2	3	4	5
10. ……	1	2	3	4	5
11. ……	1	2	3	4	5
12. ……	1	2	3	4	5
13. ……	1	2	3	4	5
14. ……	1	2	3	4	5
15. ……	1	2	3	4	5
当您的伴侣有压力时，他如何与您沟通?	**极少**	**很少**	**有时**	**经常**	**频繁**
16. ……	1	2	3	4	5
17. ……	1	2	3	4	5
18. ……	1	2	3	4	5
19. ……	1	2	3	4	5
当您的伴侣有压力时，您如何做?	**极少**	**很少**	**有时**	**经常**	**频繁**
20.我对他的压力表示同情和理解。	1	2	3	4	5
21. ……	1	2	3	4	5
22.我责备他没有很好应付压力。	1	2	3	4	5

23. ……	1	2	3	4	5
24.我注意倾听他诉说，让他有机会沟通困扰他的原因。	1	2	3	4	5
当您的伴侣有压力时，您如何做?	**极少**	**很少**	**有时**	**经常**	**频繁**
25. ……	1	2	3	4	5
26.当他有压力时，我倾向于回避。	1	2	3	4	5
27. ……	1	2	3	4	5
28. ……	1	2	3	4	5
29. ……	1	2	3	4	5
30.当他感到有太多事情要做时，我会帮助他。	1	2	3	4	5
当您与您的伴侣都有压力时，你们如何做?	**极少**	**很少**	**有时**	**经常**	**频繁**
31.我们试着共同面对问题并寻找明确的解决方案。	1	2	3	4	5
32. ……	1	2	3	4	5
33. ……	1	2	3	4	5
34.我们一起从事一些活动来放松身心,比如按摩、一起沐浴、或听音乐。	1	2	3	4	5
35.我们彼此深爱对方,可以用爱的方式来应对压力。	1	2	3	4	5
作为一对伴侣，您如何评价你们的应对方式?	**极少**	**很少**	**有时**	**经常**	**频繁**
36.我对我的伴侣提供的支持，以及我们一起应对压力的方式感到满意。	1	2	3	4	5
37. ……	1	2	3	4	5

心理韧性量表

指导语：请指出**从上个月以来**，您对以下陈述的同意程度。如果有些特殊情境并未发生，则回答如果真的发生了您的感受会是怎样。请在最能描述你的感觉的数字上打“〇”。							
内容	**完全不同意**	**基本不同意**	**有点不同意**	**不确定**	**有点同意**	**基本同意**	**完全同意**
1.我通常有多种处理事情的方法	1	2	3	4	5	6	7
2.我为我目前取得的成就感到骄傲	1	2	3	4	5	6	7
3.....	1	2	3	4	5	6	7
4.....	1	2	3	4	5	6	7
5.....	1	2	3	4	5	6	7
6.....	1	2	3	4	5	6	7
7.....	1	2	3	4	5	6	7
8.....	1	2	3	4	5	6	7
9.....	1	2	3	4	5	6	7
10.....	1	2	3	4	5	6	7
11.....	1	2	3	4	5	6	7
12.....	1	2	3	4	5	6	7
13.....	1	2	3	4	5	6	7
14.当我遇到困难时，我通常能够找到摆脱困难的方法	1	2	3	4	5	6	7

健康状况调查简表

指导语：本表用于调查您对自己健康状况的评估，您所提供的信息有助于了解您的自我感觉和从事日常生活的能力。请在最符合您实际情况的方框内打“√”。

1. 总体来说，您认为您现在的健康状况是

（1）非常好　（2）很好　（3）好　（4）一般（不好不坏）　（5）差

2. 以下各项是您日常生活中可能进行的活动，您**目前的健康状况**是否会限制您从事这些活动？如果有，限制到什么程度？

	有很大限制	有一点限制	没有任何限制
a.中等强度的活动，例如搬桌子、打扫或清洁地板，打保龄球，或打太极拳？			
b.是否影响你步行上楼梯？			

3. .....

4. .....

5. .....

6. .....

7. 在过去四个星期里，有多少时间由于您身体健康或情绪问题而妨碍您的社交活动（比如探亲、访友等）？

（1）常常都有　（2）大部分时间有（3）有时有（4）偶尔有一次半次　（5）完全没有

Appendix E

Permission instruments

Permission of using “The Brief Illness Perception Questionnaire”

Letter asking permission to use your instruments named "The Brief Illness Perception Questionnaire"

发件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>
收件人：e.broadbent<e.broadbent@auckland.ac.nz>
时 间：2022年06月10日 20:05 (星期五)

发送状态：发送成功 查看详情

翻译成中文

Dear Dr. Elizabeth Broadbent:

My name is Chuntao Wang. I am a doctoral nursing candidate at Burapha University, Thailand. My advisor is Dr. Chintana Wacharasin and co-advisor is Dr. Pornpat Hengudomsub.

I read many articles about measuring the cognitive and emotional representations of illness. Most articles used your questionnaire. I'm interested in your instruments named " The Brief Illness Perception Questionnaire ". I trust that your instruments will be greatly benefited to measure the cancer patients'cognitive and emotional representations of illness in my research. Therefore, I would like to ask your permission to use this instrument. Thank you very much!

If you have any questions, please kindly contact me at yammy_taotao@163.com. I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Chuntao Wang
Ph.D. candidate

Re: Letter asking permission to use your instruments named "The Brief Illness Perception Questionnaire"

发件人：Elizabeth Broadbent<e.broadbent@auckland.ac.nz>
收件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>
时 间：2022年06月11日 06:07 (星期六)

邮件已被回复 查看详情

翻译成中文

Daer Chuntao

You have my permission to use the questionnaire for your research

Kind regards

Elizabeth Broadbent
Professor of Health Psychology
Department of Psychological Medicine
Faculty of Medical and Health Sciences
The University of Auckland
New Zealand
e.broadbent@auckland.ac.nz
google scholar

Permission of using “The Resilience Scale - 14(Chinese Version)”

请求允许使用名为“中文版心理弹性问卷（RS-14）”的工具的信函

发件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>
收件人：tianjunfjmu<tianjunfjmu@126.com>
时 间：2022年06月10日 22:33 (星期五)

发送状态：发送成功 查看详情

尊敬的田俊教授：

您好！我叫王春桃。目前在攻读护理博士学位，我的博士论文中的一部分是关于宫颈癌病人的心理弹性对生活质量的影响的研究。我读了很多文章，您和您的学生倪倩钰汉化的中文版心理弹性问卷（RS-14）已经在许多研究中使用，信效度非常高。所以，关于本研究的心理弹性的测量，我想使用您翻译的中文版心理弹性问卷（RS-14）来测量病人的心理弹性水平。希望能得到您的允许。如果您同意，能给我回复一下邮件吗？非常感谢你！

如果您有任何问题，请通过yammy_taotao@163.com 邮箱与我联系。再次感谢您！期待您百忙之中的回复！

此致

敬礼

答复: 请求允许使用名为“中文版心理弹性问卷（RS-14)”的工具的信函

发件人：Tian Jun<tianjunfjmu@126.com>

收件人：'Wang Chuntao(Penny)王春桃'<yammy_taotao@163.com>

时　间：2022年06月11日 07:57 (星期六)

附　件：2个 (RS-14.pdf 等) 查看附件

王春桃同学:

你好!

很高兴中文版RS-14能够应用于你的课题。附件中是量表及相关的论文。如果你的课题有发表相关论文，希望在论文中标注中文版RS-14的引用。

祝工作顺利!

田俊

流行病与卫生统计系

福建医科大学

Permission of using “The Dyadic Coping Inventory”

Letter asking permission to use your instruments named " Dyadic Coping Inventory "

发件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>

收件人：guy.bodenmann<guy.bodenmann@psychologie.uzh.ch>

时　间：2022年06月10日 20:52 (星期五)

发送状态：发送成功　查看详情

翻译成中文

Dear Dr. Guy Bodenmann:

My name is Chuntao Wang. I am a doctoral nursing candidate at Burapha University, Thailand. My advisor is Dr. Chintana Wacharasin and co-advisor is Dr. Pornpat Hengudomsub.

I read many articles about measuring dyadic coping. Most articles used your questionnaire. I'm interested in your instruments named " Dyadic Coping Inventory". I trust that your instruments will be greatly benefited to measure cancer patients'and their spouses'dyadic coping in my research. Therefore, I would like to ask your permission to use this instrument. If you kindly allow me to utilize it, could you please provide the questionnaire for me? Thank you very much!

If you have any questions, please kindly contact me at yammy_taotao@163.com. I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Chuntao Wang
Ph.D. candidate
Faculty of Nursing, Burapha University
169 Longhaad Bangsaen Road,

AW: Letter asking permission to use your instruments named " Dyadic Coping Inventory " 安全浏览

发件人：Guy Bodenmann<guy.bodenmann@psychologie.uzh.ch>

收件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>

时　间：2022年06月11日 16:09 (星期六)

附　件：2个 (Dyadic Coping Inventory (Description).pdf 等)　查看附件

Good morning

Thanks for your mail and interest in using the DCI. Please find attached the scale and information on psychometrics. Good luck with your study!

Best regard,

Guy Bodenmann

Prof. Dr. Guy Bodenmann

Universität Zürich

Permission of using “The General Self-Efficacy Scale (GSES)(Chinese Version)”

请求允许使用名为“一般自我效能量表(中文版)”的工具的信函 安全浏览模式　优化阅读　精简信息

发件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>

收件人：zhangjx<zhangjx@psych.ac.cn>

时　间：2022年07月11日 13:34 (星期一)

发送状态：发送成功　查看详情

尊敬的张教授：

您好！我叫王春桃。目前在泰国东方大学攻读护理博士学位。我的博士论文中的一部分是关于宫颈癌病人的自我效能对生活质量的影响。我读了很多文章，您翻译的中文版一般自我效能量表（GSES）已经在许多研究中使用，信效度非常高。所以，关于本研究的自我效能的测量，我想使用您翻译的一般自我效能量表（GSES）来测量病人的自我效能水平。如果您能允许，我将在而且只在自己的研究中使用GSES，绝不违反知识产权转给任何其他人使用。希望能得到您的允许。如果您同意，能给我回复一下邮件吗？非常感谢你！

如果您有任何问题，请通过 yammy_taotao@163.com 邮箱与我联系.再次感谢您！期待您百忙之中的回复！再次感谢！

此致

敬礼

研究人员：王春桃

回复: 请求允许使用名为“一般自我效能量表(中文版)”的工具的信函 安全浏览模式

发件人：Psych<zhangjx@psych.ac.cn>

收件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>

时　间：2022年06月23日 10:06 (星期四)

邮件已被回复　查看详情

王博士，你好，

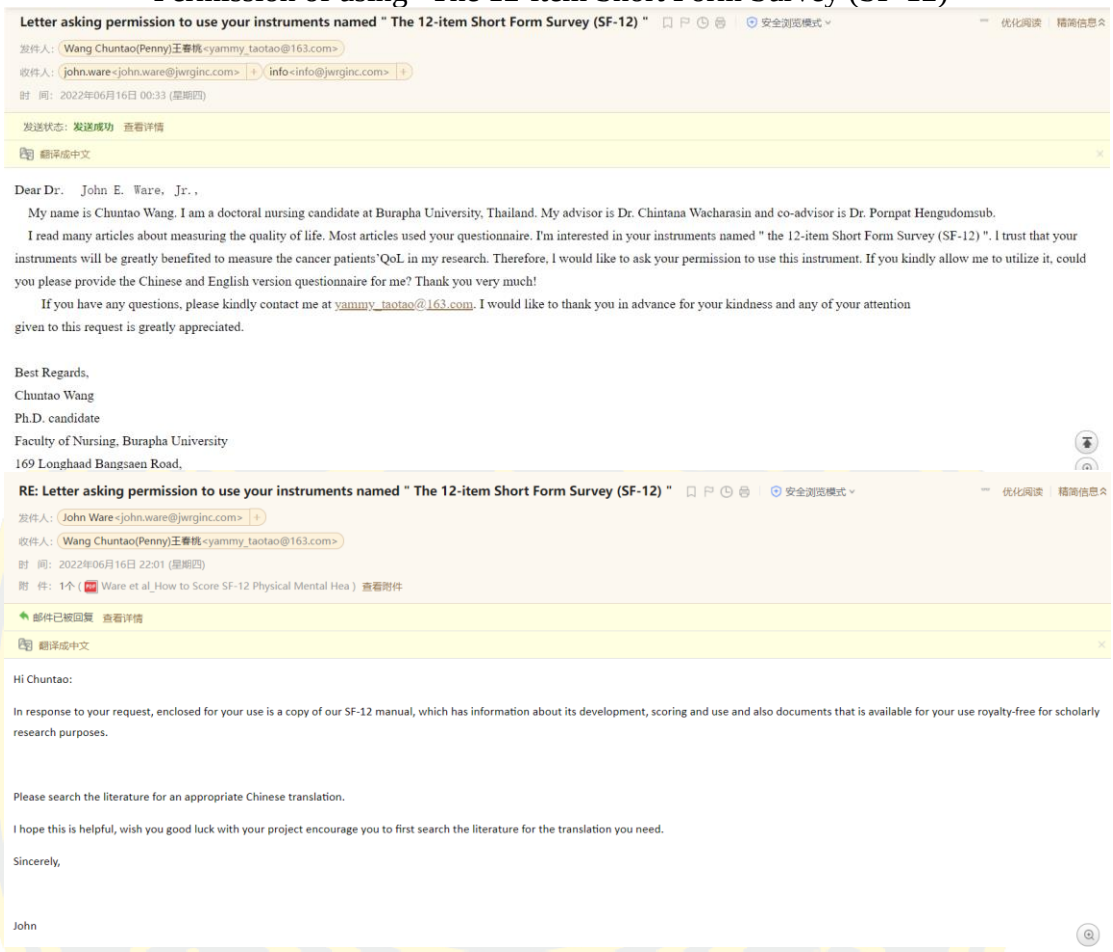
收到你的邮件。谢谢你感兴趣在研究中使用GSES。

不知道能否告知你现在哪所高校读博呀？另外，还需要你在邮件中明确表达，只在自己研究中使用GSES，绝不违反知识产权转给任何其他人使用。

谢谢！

张建新

Permission of using “The 12-item Short Form Survey (SF-12)”



Letter asking permission to use your instruments named " The 12-item Short Form Survey (SF-12) "

发件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>

收件人：john.ware<john.ware@jwrginc.com> info<info@jwrginc.com>

时 间：2022年06月16日 00:33 (星期四)

发送状态：发送成功 查看详情

翻译成中文

Dear Dr. John E. Ware, Jr.,

My name is Chuntao Wang. I am a doctoral nursing candidate at Burapha University, Thailand. My advisor is Dr. Chintana Wacharasin and co-advisor is Dr. Pornpat Hengudomsub.

I read many articles about measuring the quality of life. Most articles used your questionnaire. I'm interested in your instruments named " the 12-item Short Form Survey (SF-12) ". I trust that your instruments will be greatly benefited to measure the cancer patients'QoL in my research. Therefore, I would like to ask your permission to use this instrument. If you kindly allow me to utilize it, could you please provide the Chinese and English version questionnaire for me? Thank you very much!

If you have any questions, please kindly contact me at yammy_taotao@163.com. I would like to thank you in advance for your kindness and any of your attention given to this request is greatly appreciated.

Best Regards,
Chuntao Wang
Ph.D. candidate
Faculty of Nursing, Burapha University
169 Longhaad Bangsaen Road,

RE: Letter asking permission to use your instruments named " The 12-item Short Form Survey (SF-12) "

发件人：John Ware<john.ware@jwrginc.com>

收件人：Wang Chuntao(Penny)王春桃<yammy_taotao@163.com>

时 间：2022年06月16日 22:01 (星期四)

附 件：1个 (Ware et al_How to Score SF-12 Physical Mental Hea) 查看附件

邮件已被回复 查看详情

翻译成中文

Hi Chuntao:

In response to your request, enclosed for your use is a copy of our SF-12 manual, which has information about its development, scoring and use and also documents that is available for your use royalty-free for scholarly research purposes.

Please search the literature for an appropriate Chinese translation.

I hope this is helpful, wish you good luck with your project encourage you to first search the literature for the translation you need.

Sincerely,

John

BIOGRAPHY

NAME	Chuntao WANG
DATE OF BIRTH	March 11, 1982
PLACE OF BIRTH	Yancheng City, Jiangsu Province, China
PRESENT ADDRESS	School of nursing, Jiangsu Vocational College of Medicine, Jiangsu, China
POSITION HELD	2004-2019 Associate Professor /Lecturer School of Nursing, Jiangsu Vocational College of Medicine, China 2019- present Associate Professor Science and Technology Division,School of Nursing Jiangsu Vocational College of Medicine, China
EDUCATION	2000-2004 Bachelor of Nursing, School of Nursing, Jiangnan University, Jiangsu Province, China 2011-2013 Master of Public Health, School of Public Health, Southeast University, Jiangsu Province, China 2019-present Doctor of Philosophy in Nursing Science (International Program), Faculty of Nursing, Burapha University, Thailand