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FACTORS INFLUENCING SELF-MANAGEMENT OF END-STAGE RENAL DISEASE (ESRD) PEOPLE UNDERGOING HEMODIALYSIS IN BHUTAN

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BURAPHA UNIVERSITY
2018

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DIPSIKA RAI

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The Thesis of Dipsika Rai has been approved by the examining committee to be partial fulfillment of the requirements for the Master of Nursing Science in - of Burapha University

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End stage renal disease [ESRD] is the last stage of chronic kidney disease [CKD] which is irreversible and permanent. ESRD has become a public health challenge worldwide due to increasing prevalence and burden on health sectors.This predictive study aimed to explore self-management and examine the predictive relationships of self-efficacy, social support, and health literacy towards self-management of Bhutanese ESRD patients undergoing hemodialysis. A sample of 81 ESRD patients undergoing hemodialysis at dialysis center of Jigme Dorji Wangchuk National Referral Hospital, Bhutan was recruited for this study using convenience sampling technique. Data were collected in March 2018 using a set of questionnaires and medical records. The set of questionnaires consisted of DDQ, IPAQ - SF,ESRD - AQ, SEMCD - 6 item scale, MSPSS, BHLS, and SLUMS questionnaire. Descriptive statistics, Pearson's product correlations, and Standard multiple regressions were used to analyze data.

Findings of the study revealed that self-management of ESRD patients undergoing hemodialysis in Bhutan was at moderate level (2.17, $SD = 0.61$), and was positively associated with self-efficacy ($r = .496$, $p < .01$) and social support ($r = .447$, $p < .01$), but was not associated with health literacy ($r = .116$, $p > .05$). Regression analysis revealed that self-management was predicted by self-efficacy ($\beta = .367$, $p < .01$) and social support ($\beta = .300$, $p < .05$). Health literacy was not a significant predictor. The total variance explained was 32 % ($R^2 = .32$, $p < .001$). Self-efficacy and social support play important role in self-management of ESRD patients undergoing hemodialysis. The findings of the study can be used to develop future self-management interventions for ESRD patients undergoing hemodialysis in Bhutan.

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CHAPTER 1
INTRODUCTION

Statements and significance of the problems

End-stage renal disease [ESRD] is the last stage of chronic kidney disease [CKD] which is irreversible and permanent. Therefore, patients with ESRD must either receive a kidney transplant or undergo dialysis treatments regularly. ESRD has become a public health challenge worldwide due to increasing prevalence and burden on health sectors (White, Chadban, Jan, Chapman, & Cass, 2008). An estimate of more than 1.4 million ESRD patients receive renal replacement therapy [RRT] with an annual growth rate of 8 % globally (Abraham et al., 2016). It was observed that the number of kidney failure cases increased dramatically in developing countries (Jha et al., 2013; Hill et al., 2016; Wetmore & Collins, 2016). In neighboring countries of India and Bangladesh, the approximate incidence of ESRD is 150-200 per million population [PMP] and 150-200 patients PMP respectively. Sri Lanka, which is also one of the South Asian developing country noted simultaneous increased incidences of diabetes and hypertension whereby these patients finally landed up in dialysis and renal transplant centers (Abraham et al., 2016).

Similarly, Bhutan experienced constant rising rate of ESRD, with records indicating a steady rising from 8 cases in 1998 to more than 140 cases in 2015 requiring hemodialysis (Abraham et al., 2016). According to the records from Bhutan kidney foundation [BKF], the number of ESRD patients registered to avail their service gradually increased from 137 to 170 patients between 2014 to 2017. The rise could be speculated due to increasing prevalence of non-communicable diseases such as hypertension and diabetes (Ministry of Health [MoH], 2017) Data from dialysis unit of Jigme Dorji National Referral Hospital [JDWNRH] projected 610 ESRD patients requiring RRT from 1998 to 2015 (Tsukamoto, 2017). The demography shows prevalence of 35 % in southern, 35 % in eastern, 23 % in western, and 7 % in central region of Bhutan (Tsukamoto, 2017). Royal Government of Bhutan spends about Nu Ngultrum [Nu.] 546,000 for hemodialysis per case and spends around $12100 to $13600 for renal transplant per case (Abraham et al., 2016). It was found that 80 % global financial burden is due to treatment of ESRD in low to middle income countries (Couser, Remuzzi, Mendis, & Tonelli, 2011).

Evidences suggested that incorporating self-management in the care of ESRD patients helps in reducing financial burden by minimizing negative effects of the disease, and by delaying the progression of disease. Thus, reducing the need for health care services (Curtin, Mapes, Schatell, & Burrows-Hudson, 2005). Self-

management refers to day by day tasks that an individual must perform in order to control or reduce the impacts of disease (Clark et al., 1991). Self-management such as physical activity, fluid restriction adherence, diet restriction adherence, and medication adherence in patients with ESRD undergoing hemodialysis is critical and challenging because they encounter several problems once they start on hemodialysis. The problems include dependence on technology, complications, complex treatment regimen, developing new routine for physical activity, diet restrictions, fluid restrictions, and uncertainty about life (Reid, Hall, Boys, Lewis, & Chang, 2011). All these problems directly impact on their physical functioning, and autonomy which ultimately reduces their quality of life. Self-management helps patients to monitor these activities, because these activities can be intervened by health professionals to bring about improvement in their condition. Self-management for ESRD patients changes over time and varies according to the experience and culture of the patients (Li, Jiang, & Lin, 2014).

Evidences indicated that self-management was low in ESRD patients on hemodialysis. The low level of self-management results due to long duration of disease which require patients to taking care of their conditions over time leading to noncompliance to the recommended treatment plan (Curtin et al., 2008; Parmar, 2002). Furthermore, low level of self-management in ESRD patients resulted in increasing risk of morbidity and association with several comorbidity, increased complications, and premature death (Grey, Knafl, & McCorkle, 2006; Lin et al., 2012; Robinson-Cohen et al., 2014). While adequate self-management improved individual's physiological functioning, improved wellbeing, improved glomerular filtration rate [GFR], decreased serum creatinine level, and improved quality of life (Parmar, 2002; Zhang, Terry, & McHorney, 2014). Thus, making self-management very appropriate for ESRD (Curtin et al., 2008). The level of self-management varied in activities such as physical activity, medication adherence, diet restriction, fluid restriction and hemodialysis attendance (Curtin et al., 2008; Herselman, 2008; Johnson et al., 2016; Li et al., 2014; Smart et al., 2013).

Physical activity is highly recommended as one part of self-management in patients undergoing hemodialysis (Painter & Marcus, 2012; Smart et al., 2013). ESRD patients usually had poor exercise capacity and performed low level of physical activity (Barcellos, Santos, Umpierre, Bohlke, & Hallal, 2015; Broers et al.,2017; Howden, Fassett, Isbel, & Coombes, 2012). Araújo Filho et al. (2016) found that 77.8 % of their patients were having low physical activity, and 9.6 % of decline in eGFR (estimated glomerular filtration rate) per year among inactive participants as compared to 6.2 % decline per year among physically active participants was noted by Robinson-Cohen et al., (2014). Studies found that physical activities improve the renal function, immune function, and overall health outcomes in ESRD (Stump, 2011). The

possible reason for low level of physical activity could be attributed to concomitant comorbidities to ESRD which leads to fatigue and activity intolerance. ESRD is associated with multiple comorbidities such as hypertension, diabetes mellitus, protein-energy malnutrition and cardiovascular diseases which accounts for about 40 % of the deaths in ESRD (Parmar, 2002). National Health and Nutrition Examination Survey III [NHANES III] observed low physical activity in people with multiple comorbid conditions, along with increased risk for mortality (Beddhu, Baird, Zitterkoph, Neilson, & Greene, 2009).

Furthermore, fluid restrictions and diet restrictions were another challenge for self-management of patients undergoing hemodialysis (Griva et.al., 2009; Herselman, 2008; Rambod, Peyravi, Shokrpour & Sareban, 2010). Non-adherence to fluid restrictions and diet restrictions along with intradialytic weight gains were noted in previous studies (Denhaerynck et al., 2007; Herselman, 2008; Rambod et al., 2010). Denhaerynck et al. (2007) reported that 30 to 70 % of dialysis patients were non-adherent to fluid restrictions, and 10 to 60 % had inappropriate interdialytic weight gain. A reason for not being able to self-manage fluid restrictions and diet restrictions could possibly be due to requirement of greater psychological involvement. Hemodialysis patients reported difficulty in reducing the intake of foods high in phosphorus, such as chocolate, cola drinks, meat, fish, eggs, and milk and other dairy products (Rambod et al., 2010). The patient's adherence to restrictions in fluid, and diet restrictions is influenced by their beliefs, social and cultural morale, and the patient's ability to ignore their powerful physiological drive (Rambod et al., 2010).

Additionally, medication adherence was reported as one part of poor self-management. Due to high pill burden, non-adherence to prescribed medication was noted among patients undergoing hemodialysis (Burnier, Pruijm, Wuerzner, & Santschi, 2015; Raymond, Wazny, & Sood, 2011). Rifkin et al. (2010) found that multiple medicine and complex medication choices in ESRD patients resulted in adherence problems as every patient had 5-14 prescribed medications, and multiple comorbid conditions which resulted in less adherent behavior as most of the patients' regularly skipped medications they considered less important. A systematic review found that the prevalence of medication non-adherence varied from 12.5 % to 98.6 % in hemodialysis patients (Ghimire, Castelino, Lioufas, Peterson, & Zaidi, 2015). Non -adherence to medication acts as a significant barrier in the treatment of any chronic diseases, and studies found that the long term survival, risk of complications, and treatment success depended on a patient's adherence to self-management in regard to therapeutic regimen (Kugler,Vlaminck, Haverich, & Maes, 2005).

ESRD patients perceived that hemodialysis adherence is more important than other treatment modalities (Naalweh et al., 2017) because skipping at least 1

dialysis session per month was associated with 25 % to 30 % of increased risk for death and shortening dialysis three or more times a month for more than 10 minutes was associated to increased mortality (Denhaerynck et al., 2007). Naalweh et al. (2017) found that 7.9 % of patients' in the United States skipped dialysis one or more sessions per month, and 19.6 % shortened the session by ten or more minutes which was quite high as compared to 0.6 % in Japan,where 5.7 % shortening of session was observed (Denhaerynck et al., 2007). Adhering to hemodialysis include both "no skipping of sessions/ regular attendance" and "no shortening of a session/ full completion of hemodialysis session" (Denhaerynck et al., 2007). Previous study found that patients perceived hemodialysis adherence more important than other treatment modalities (Naalweh et al., 2017). Denhaerynck et al. (2007) pointed out that skipping at least 1 dialysis session per month is associated with 25 % to 30 % of higher risk for death and shortening dialysis three or more times a month for more than 10 minutes as associated to increased mortality.

Self-management activities were influenced by several factors such as health status, individual factors, self-efficacy, communication, psychological factors, social network, community, health care system, family factors, health literacy, resources, etc. (Curtin et al., 2008; Galura & Pai, 2017; Li et al., 2014; Sritarapipat, Pothiban, Panuthai, Lumlertgul, & Nanasilp, 2012; Washington, Zimmerman, & Browne, 2016) However self-efficacy, social support, and health literacy were specifically focuses on because these three variables were found to be important in many studies. These factors had direct impact on self-management and could be improved by intervention from health care providers. Self-efficacy was positively associated with various self-management activities (Curtin et al., 2008) and contributed in initiating and adhering to self-management behavior (Curtin et al., 2005). Individuals require self-confidence to achieve a task successfully; unless a person is prepared enough for a change they do not try to pursue the activity. Self-efficacy is a cognitive phenomenon based on self-confidence of an individual which aids in developing new pattern of cognitive and emotional behavior and enables oneself to monitor the developed self-management behavior. Feeling self-efficacious results from patient's self-confidence and their ability to achieve their goals of self-management and, patient's ability to self-manage their disease may improve their self-efficacy subsequently (Clark & Dodge, 1999; Bandura, 1977). Incorporating self-efficacy in self-management showed significant improvement in self-management. Previous studies found that self-efficacy was positively associated with self-management (Curtin et al., 2008) activities such as physical activity, diet restriction adherence, fluid restriction adherence, and medication adherence (Curtin et al., 2008; Denhaerynck et al., 2007; Li et al., 2014; Naalweh et al., 2017; Sritarapipat

et al., 2012; Washington et al., 2016)

Higher self-efficacy was associated positively with improved control of intradialytic weight gain, better fluid restrictions, better diet restrictions, better adherence to hemodialysis, adequate physical activity decreased hospitalization and complications, and improved overall quality of life. (Curtin et al., 2008; Denhaerynck et al., 2007; Li et al., 2014; Naalweh et al., 2017; Sritarapipat et al., 2012; Washington et al., 2016). Washington et al. (2016) reported that ESRD participants had high self-efficacy for managing ESRD ($\bar{x}$ = 8.49 ± 1.11), with 36 % of the participants (n = 107) having high self-efficacy, 34 % with moderate and 30 % with low self-efficacy. They found that greater self-efficacy was associated with group that spent more time in physical activity and better fluid restrictions, and participants with low self-efficacy were non-adherent to their diet restrictions. Sritarapipat et al. (2012) stated that self-efficacy was one of the significant predictors of self-management in elderly pre-dialysis people. Previous study suggested that improvement in self-efficacy was one of the desired outcomes of self-management (Udlis, 2011).

Social support is a complementary factor that was significantly associated and had great impact on self-management of patients on hemodialysis (Kannan, 2016). Social support is an intricate network in which a person may give and receive information and aid to have their emotional and functional needs met (Cohen et al., 2007). Social support can impact on the compliance of treatment regimens (John, 2012), while Patel, Peterson, & Kimmel (2005) found that social support improved ESRD health outcomes. When a person is socially accepted they feel more confident in learning and performing self-management activities. According to the norms of illness and family, sick person is supposed to receive support from the significant support group to overcome the adversaries of the disease condition (Schaffer, 2004). Previous studies acknowledged that social support can impact on the compliance of treatment regimens as social support improved ESRD health outcomes. Family members, friends, and health care team were the main source of social support for ESRD patients. Cohen et al. (2007) found that patients with a lower level of social support had 4.5 times of noncompliance to treatment than those with greater levels of social support, and patients with support for self-management had higher GFR than the patients with no support (29.11 ± 20.61 versus 15.72 ± 10.67 mL/ min; $p < 0.05$) (Chen et al., 2011).

Previous studies noted that 9 % to 32 % of people on hemodialysis had limited health literacy, and those with low health literacy were observed to have low level of self-management (Cavanaugh et al., 2014; Galura & Pai 2017; Fraser et al., 2012). Health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make informed health decision" (Jain & Green, 2016). Health literacy helps in obtaining and

processing information for making informed health decisions which is very important for practicing self-management in the daily life of the patients.

Low health literacy in people leads to difficulty in understanding the basic health information needed to make decisions for daily activities of self-management. Studies found that higher level of health literacy was associated with better self-management and vice versa (Fraser et al., 2012; Kim, Love, Quistberg, & Shea, 2004). Patients with limited health literacy had poor compliance to physical activity and treatment regimen as compared to those with adequate health literacy. Ibelo (2016) found that health literacy could improve self-management in ESRD patients.

Participants with limited health literacy had poor compliance to physical activity as compared to participants with adequate health literacy (32.4 % vs. 21.7 %). Zhang et al. (2014) acknowledged that several studies on health literacy and medication adherence offered contradicting results where some studies found lower health literacy to be associated with poorer medication adherence, while others found it to be related to better medication adherence, and still few found no statistically significant relationships. However, higher health literacy levels were positively associated with better medication adherence in their study. Rapid progression of ESRD to advanced stage was noted in people from low socioeconomic and low health literacy group (Fraser et al., 2012). Which indicates that when the support level is low, people's ability to acquire information and knowledge decreases, resulting in poor decision making. Inability to make decisions pertaining to health and treatment directly impacts the activities of self-management. Therefore, from the above discussed studies it can be concluded that self-management is critical among ESRD patients, and best outcomes are observed when patients assume active role in their self-management.

In Bhutan, information was limited on self-management of ESRD patients undergoing hemodialysis. A survey on general population of Bhutan revealed that the Bhutanese (57.7 %) had low level of physical activity (defined as < 600 metabolic equivalent minutes/ week), where women mostly had low physical activity as compared to men (Ministry of Health, 2009), and another survey revealed 58.8 % low physical activity in Bhutanese (Ministry of Health, 2017). Salt restriction is a great challenge for Bhutanese patients with ESRD on hemodialysis because Bhutanese cuisines are mostly salty and spicy in nature, which contributes to high salt intake in general. It was reported that Bhutanese people consume around 9 grams of salt per day, in their daily meals which exceeds World Health Organization's [WHO] recommendation of daily intake of < 5 g/ day (Ministry of Health, 2009). It can be speculated that consuming high salt diet leads to high fluid intake, and these evidences provide some speculations of poor self-management in ESRD patients in Bhutan. Records from Health ministry shows that the number of patients with diabetes

increased from 4,097 cases in 2012 to 12,120 cases in 2016. While the incidence of hypertension has increased from 27,023 cases in 2012 to 30,260 in 2016 (Ministry of Health, 2017). The rise in non-communicable disease like diabetes and hypertension shows that the incidence of ESRD in Bhutan is on rise, and the patients might have chances of complications as well if they do not manage their health-related behavior. Since, there was little evidence about self-management of ESRD patients in Bhutan, this study aims to explore self-managements and examine the predictive relationships of self-efficacy, social support, health literacy, and self-management of Bhutanese ESRD patients undergoing hemodialysis.

Research objectives

The objectives of the study were as follows:

1. To explore self-management of the ESRD patients undergoing hemodialysis
2. To examine the predictive relationships of self-efficacy, social support, and health literacy towards self-management of ESRD patients undergoing hemodialysis in Bhutan

Research hypothesis

Self-efficacy, social support, and health literacy would predict self-managements of Bhutanese ESRD patients undergoing hemodialysis

Scope of the study

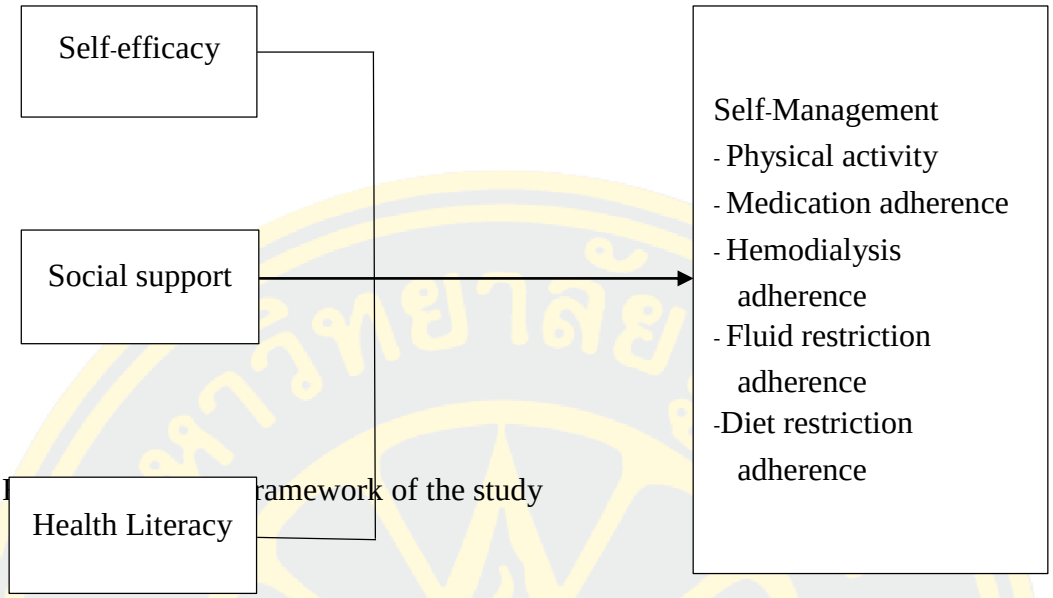
This predictive study was aimed to study the factors influencing self-management of ESRD patients undergoing hemodialysis in Bhutan. It was carried out at the dialysis center of the Jigme Dorji Wangchuk National Referral Hospital [JDWNRH] Thimphu. The data for the study was collected from March to April 2018.

Conceptual framework

This study is guided by evidences from literature review and self-management theory (Lorig & Holman, 2003). Lorig and Holman (2003) pointed out that patients should be involve in managing their disease conditions as self-management, while health care providers assist patients to make informed decisions. Further, Lorig and Holman (2003) considered self-management in three tasks/components; 1) medical or behavioral management, 2) role management, and 3) emotional management. The first task of medical or behavioral management involves taking medications as per prescription and adhering to the prescribed diet

and any other recommended activities by the health care provider such as physical activity. Medical or behavioral management is generally considered the self-management tasks that helps patients to control the risk of complications and improve health outcomes. The second task, role management involves set of tasks that helps in maintaining, changing, and creating new meaningful behaviors of life roles that is necessary for managing the disease condition. The final task, emotional management involves tasks dealing with emotional sequelae of having a chronic condition which affects one's decision in performing self-management (Lorig & Holman, 2003). However, medical or behavioral management has been considered as important task because it involves activities of daily living which respond to disease conditions. Focusing on and accomplishing this first task of medical or behavioral management helps patient to have direct control over the negative effect of the disease condition and improves their quality of life. Which ultimately improves their emotional status and role management. In patients with ESRD undergoing hemodialysis, self-management will focus on physical activity, hemodialysis adherence, fluid restriction, diet restriction, and medication adherence.

Empirical evidences suggested significant association of self-efficacy, social support, and health literacy with all the constructs of self-management. Hence, they were selected as independent variables for this study. These three variables are considered measurable and modifiable, which is an essential characteristic of variables to be used as basis for structuring self-management. Self-management level can be directly influenced with a change in these variables because these variables individually can be improved by interventions from health care providers. There are several evidences that support the association of all tasks of self-management with self-efficacy, social support, and health literacy. Self-efficacy is the fundamental of various behavioral change required for self-management (Curtin et al., 2005; Freund, Gensichen, Goetz, Szecsenyi, & Mahler, 2013). Evidences suggested that when a person feels the presence of social support they feel more confident in performing their self-management tasks as social support acts as source of encouragement and resource for performing social support. (Cohen et al., 2007; Patel et al., 2005; Spinale et al., 2008). Health literacy is considered as the core factor of people's knowledge and health information, as it keeps the patient informed about their health status which in turn helps them in making health related decisions and enhances self-management simultaneously (Cavanaugh et al., 2010; Ricardo et al., 2014). Hence, self-efficacy, social support and health literacy significantly enhances self-management of ESRD patients undergoing hemodialysis (Cohen et al., 2007; Lin et al., 2012). These three factors function in close collaboration with self-management, where the change in one of these factors directly influences the daily self-management practice of the ESRD patients on hemodialysis. Research framework of this study was as follows:



I ramework of the study

Definition of Terms

ESRD [ESRD] patients refers to people diagnosed with advanced stage of chronic kidney disease undergoing hemodialysis at dialysis center of Jigme Dorji Wangchuk National Referral Hospital [JDWNRH], Bhutan.

Self-Management refers to task of medical or behavioral management which includes daily activities of ESRD patients undergoing hemodialysis focusing on physical activity, fluid restriction, diet restriction, hemodialysis attendance, and medical adherence. The combination of international physical activity questionnaire short form (IPAQ-SF) (Booth, 2000), and end-stage renal disease adherence questionnaire (ESRD- AQ) (Kim, Evangelista, Phillips, Pavlish, & Kopple, 2010) were used to measure self-management.

Physical Activity refers to any bodily movement of ESRD patients undergoing hemodialysis in Bhutan. It can be three specific types mild, moderate and vigorous. It was measured in average number of physically active days per week. IPAQ-SF developed by Booth (2000), was used to measure physical activity.

Fluid restriction refers to reduction of fluid intake by ESRD patients undergoing hemodialysis as per the recommendation of health professionals. It was measured by a section of ESRD-AQ developed by Kim et al. (2010).

Diet restriction refers to selecting healthy renal diet and managing their dietary challenges by adhering to the recommended diet by health professionals. It was measured by a section of ESRD-AQ developed by Kim et al. (2010).

Medical adherence - refers to taking medications according to the prescription from physician (correct dose, time and frequency). It was measured by a section of ESRD-AQ developed by Kim et al. (2010).

Hemodialysis Adherence - refers to no skipping/missing of hemodialysis sessions, and full completion of hemodialysis session. It was measured by a section of ESRD- AQ developed by Kim et al. (2010).

Self-efficacy refers to the confidence of the participants in their abilities to control their self-management activities and the overall disease process. Self-efficacy was measured by self-efficacy for managing chronic disease 6-item scale [SEMCD-6] (Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001).

Social support refers to perception of support from significant others, family members, and friends from where the ESRD patients undergoing HD may receive information, resources and aid, and have their functional and emotional needs met. It can be both formal support groups and informal helping relationships. It was measured using multidimensional scale of perceived social support [MSPSS] developed by Zimet, Dahlem, Zimet, & Farley (1988).

Health literacy refers to ability of the ESRD patients undergoing hemodialysis to seek information and take care of health-related actions and decision making, with or without help from others. It was measured by brief health literacy screen [BHLS] (Haun et al., 2009).

CHAPTER 2
LITERATURE REVIEWS

This chapter discusses the theoretical and empirical findings related to the field of end stage renal disease [ESRD] and self-management. A comprehensive search of Burapha University Library database (cumulative index to nursing and allied health literature, science direct, clinical key, and medical literature analysis and retrieval system online), and internet search engines like goggle scholar and yahoo search were performed. The literatures reviewed basically focused on end stage renal disease, concept of self-management amongst the patients with ESRD undergoing hemodialysis, and factors associated with self-management in context of people with ESRD undergoing hemodialysis. The literature reviews were presented as follows:

1. End Stage Renal Disease [ESRD]
   1.1. Significance of ESRD
   1.2. Definition
   1.3. Diagnosis and Staging
   1.4. Pathophysiology
   1.5. Signs and Symptoms
   1.6. Complications
   1.7. Management
2. Self-Management
   2.1. Definition
   2.2. Self-Management Theory
   2.3. Self-management of ESRD patients undergoing hemodialysis
   2.4. Self-management of Bhutanese ESRD patients undergoing hemodialysis
3. Factors influencing self-management of ESRD patients undergoing hemodialysis
   3.1. Self-efficacy
   3.2. Social support
   3.3. Health literacy

End-stage renal disease [ESRD]

1. Significance of ESRD

The increasing global old age population and incidences of non-communicable diseases has led to increase in prevalence of chronic kidney disease. The estimated global prevalence of chronic kidney disease is 11 to 13 % of the

population (Hill et al., 2016), and an estimate of > 1.4 million ESRD patients receive renal replacement therapy [RRT] with an annual growth rate of 8 % (Abraham et al., 2016). According to the 2010 global burden of disease study, chronic kidney disease rose its rank from 27th in 1990 to 18th in 2010 in the list of causes of total number of deaths worldwide (Jha et al., 2013). Incidences of chronic kidney disease and ESRD are becoming a topic of concern in South Asian developing countries. According to record from Bhutan kidney foundation, Bhutan is experiencing rampant rise in chronic kidney disease cases with 137 cases registered with Bhutan kidney foundation in the year 2014, to 149 in 2016 and 170 in 2017, with many more unreported cases.

2. Definition

End- stage renal disease is the advanced stage of chronic kidney disease [CKD] which is progressive, irreversible loss of kidney function leading to the need for a regular course of long-term dialysis or a kidney transplant to maintain life. CKD is a medical condition in which the kidneys are damaged and is unable to remove uremic wastes from the body, therefore disturbing the homeostasis of the body.

Chronic kidney disease is defined as "kidney damage or decreased kidney function (decreased GFR) for □ 3 months or GFR < 60 mL/ min/ 1.73m^2 for □ 3 months, with or without kidney damage" (National Kidney Foundation, [NKF], 2002). ESRD can be defined as advanced stage of chronic kidney disease where the GFR is < 15 mL/ min/ 1.73 m^2 or the patient requires renal replacement therapy in the form of dialysis or kidney transplantation (NKF, 2002). There is a spectrum of disease related to decrements in renal function, thereby leading to difference in clinical presentation and therapeutics depending on the glomerular filtration rate [GFR] reduction.

3. Diagnosis and staging

Staging of chronic kidney disease is an assessment of the extent to which the disease has advanced, and it is a major tool in the diagnosis, and management of the disease process. Stages of chronic kidney disease range from kidney damage with normal renal function (Stage 1), through to stage 5 chronic kidney disease also known as ESRD. According to the National Kidney Foundation [NKF], (2002). CKD can be classified based on cause, GFR category, and albuminuria category [CGA]. The cause can either be the presence of structural abnormality or the presence of systemic disease affecting the anatomy and functioning of the kidney. The most popular and recommended classification system is the GFR category.

Of many prediction equations of estimating GFR to monitor the progress of the disease, Cockcroft and Gault equation was one of the first such formulae to be developed to estimate the creatinine clearance based on serum creatinine concentration, age, sex and weight (Sandilands, Dhaun, Dear, & Webb, 2013).

Creatinine clearance = (140 - age in years) x (wt. in kg)) x 1.23) /

(Serum creatinine in micromole/ l)
(For women multiply the result of calculation by 0.85)

According to the National Kidney Foundation, (2002). guidelines, chronic kidney disease is classified into five stages as per the GFR.

Table 1 Chronic kidney disease staging base on GFR (NKF, 2002).

Stage	GFR category	GFR (ml/ min/ 1.73 m^2)	Terms
I	G 1	□ 90	Normal or high
II	G 2	60 - 89	Mildly decreased*
III	G 3 a**	45 - 59	Mildly to moderately decreased
	G 3 b**	30 - 44	Moderately to severely decreased
IV	G 4	15 - 29	Severely decreased
V	G 5	< 15	Kidney failure/ ESRD

*Relative to young adult level
**In the absence of evidence of kidney damage, neither GFR category G1 nor G2 fulfill the criteria for chronic kidney disease.

Albuminuria is a condition characterized by the presence of albumin in urine, typically indicating kidney disease. The American Diabetes Association and NKF recommend assessment of proteinuria to detect chronic kidney disease (Levey et al., 2003). The ratio of protein or albumin to creatinine in an untimed urine specimen has replaced protein excretion in a 24 - hour collection as the preferred method for measuring proteinuria (Levey et al., 2003).

Table 2 Albuminuria grading (NKF, 2002).

Category	AER (mg/ 24hr)	ACR (approximate equivalent)		Terms
		(mg/ mmol)	(mg/ g)	
A 1	< 30	< 3	< 30	Normal to mildly increased
A 2	30 - 300	3 - 30	30 - 300	Moderately increased*

A 3	> 300	> 30	> 300	Severely increased**

Abbreviations: AER, albumin excretion rate; ACR, albumin-to-creatinine ratio; CKD, chronic kidney disease. *Relative to young adult level. **Including nephrotic syndrome (albumin excretion usually 42200 mg/ 4 hours [ACR 42220 mg/ g; 4220 mg/ mmol])

4. Pathophysiology

A normal kidney contains approximately 1 million nephrons, which aids in waste filtration (Arora, 2017). ESRD develops when chronic kidney disease progresses to advanced stage. Chronic kidney disease can either develop due to structural damage to kidneys (renal injury) or as a consequence of some other comorbid conditions. Various factors affect our kidneys, such as deposition of immune complexes, hypoxia, nephrotoxic substances, vesicoureteral reflux and glomerular hypertension which leads to glomerular injury and loss of nephrons (Casey, 2012). Thus, wastes are not removed effectively from the body leading to other comorbid conditions such as cardiovascular diseases [CVD], hypertension, anemia, malnourishment, endocrinological disorders, mineral and bone diseases, cancer, mental disorder, and cognitive impairments (Bragazzi & Puente, 2013; Levey et al., 2003). Chronic kidney disease is generally associated with old age, diabetes, hypertension, obesity, and cardiovascular disease, diabetic glomerulosclerosis and hypertensive nephrosclerosis as the presumed pathological entities (Levey et al., 2003).

Some of the potential risk factors for susceptibility to and initiation of chronic kidney disease are a) clinical factors : diabetes, hypertension, auto immune diseases, systemic infections, urinary tract infections, urinary stones, urinary tract obstruction, neoplasia, family history of chronic kidney disease, recovery from acute kidney injury, reduction in kidney mass, exposure to certain drugs and low birth weight, and b) sociodemographic factors: old age, ethnicity (most prevalent in African American, American Indian, Hispanic, Asian or Pacific islanders), Exposure to nephrotoxic agents and environments and low income and education (Vassalotti, Fox, & Becker, 2010). Renal disease is often progressive once GFR falls by 25 % of normal (Parmar, 2002), and the plasma creatinine value will approximately double with a 50 % reduction in GFR (Arora, 2017).

5. Sign and symptoms

Chronic kidney disease is a long standing progressive disease, however the symptoms are often not apparent until the disease is at advanced stage, where the GFR reduces to < 30 ml/ min/ 1.73 m^2). It is at this stage that the clinical features become apparent. Anemia is observed in almost all the chronic kidney disease patients as a result of reduced erythropoietin secretion. Metabolic acidosis and uremic syndromes are manifested in ESRD (Arora, 2017).

Anemia in chronic kidney disease is associated with fatigue, reduced exercise capacity, impaired cognitive and immune function, reduced quality of life, development of cardiovascular disease, and increased cardiovascular mortality. Metabolic acidosis in ESRD include protein-energy malnutrition, loss of lean body mass, and muscle weakness. Uremic syndrome includes complications such as pericarditis, encephalopathy, peripheral neuropathy, restless leg syndrome, gastrointestinal symptoms (anorexia, nausea, vomiting, and diarrhoea), skin manifestations (dry skin, pruritus, ecchymosis), fatigue, increased somnolence, failure to thrive, malnutrition, erectile dysfunction, decreased libido, amenorrhea and platelet dysfunction. Peripheral edema, pulmonary edema and hypertension is also observed as a consequence of altered fluid and electrolyte balance.

6. Complications

Chronic kidney disease is closely associated with various organ systems; thus, its damage can have an impact on the other systems of the body. Similarly, chronic kidney disease can present due to long term damage and failure of various organ system or as a result of treatment for the other comorbid conditions. Diabetes and hypertension are the most common associates of chronic kidney disease. Nevertheless, cardiovascular diseases accounts for about 40 % of the deaths in end stage renal disease, raising the mortality rate 10-20 times higher than the general population (Parmar, 2002). Some of the modifiable risk factors for ESRD progression include control of blood pressure, proteinuria/albuminuria, and glycated hemoglobin (HbA1c). Some of the complications arising from non-adherence to dietary prescriptions, fluid restrictions and medications includes development of renal osteodystrophy, metastatic calcifications and premature death, cardiac arrhythmia, fluid overload with pulmonary edema, left ventricular hypertrophy and heart failure, protein-energy malnutrition, and increased morbidity and mortality in ESRD (Herselman, 2008).

7. Management

The management of ESRD patients involves many challenges, including timely diagnosis and establishment of a comprehensive disease management program (Chen et al., 2011). As ESRD is a progressive condition associated with several other complex conditions, treatment plan varies according to the comorbid conditions they are diagnosed with. Albeit, making an early diagnosis is important, providing proper medications to the ESRD patients, along with behavioral modification instructions and thorough background information regarding treatment is necessary, while the patients also need to be receptive to the care provided and the treatments planned (Evans, Wagner, & Welch, 2004). Treatment of the people with chronic kidney disease varies widely according to their staging of GFR. The main treatment includes:

7.1. Life style changes can reduce risk of developing chronic kidney disease and the risk of progression to ESRD. Lifestyle changes such as cessation of

smoking, eating healthy balanced diet, exercising appropriate for their physical ability and medical history, maintaining normal body weight, limiting alcohol intake to no more than 50 gm/ day and avoiding over the counter non-steroidal anti-inflammatory drugs [NSAIDs] (Ritz & Schwenger, 2005).

7.2. Pharmacological managements include medications to control associated problems, such as high blood pressure with Angiotensin converting enzymes [ACE] inhibitors and Angiotensin- II receptor blockers [ARBs], diabetes mellitus (antiglycemic drugs) and hyperlipidemia (statins), anemia (Iron supplements), bone disorders (Calcium) and Water retention (diuretics) (Arora, 2017).

7.3. Renal Replacement Therapy [RRT] includes kidney/ renal transplantation, continuous renal replacement therapies [CRRT], hemodialysis, and peritoneal dialysis as the standard treatment for ESRD (Pannu & Gibney, 2005; Ibelo, 2016). Several studies have shown that dialysis improves cognitive functioning in hemodialysis patients and such improvements in cognitive performance may lead to better levels of self-care and adherence with the treatment (Evans et al., 2004). Indications for dialysis include diuretic resistant pulmonary edema, hyperkalemia (refractory to medical therapy), metabolic acidosis (refractory to medical therapy), dialyzable intoxications (lithium, toxic alcohols, and salicylates) and uremic complications such as pericarditis, encephalopathy and bleeding.

In kidney transplantation, a healthy kidney from a donor is surgically grafted into the body of the transplant recipient. The donor can be living or deceased donor. A cadaver kidney can be stored as long as 48 hours on ice outside the body (Harris, 2016). CRRT is renal replacement therapy that is intended to be applied for 24 h per day, especially in an intensive care unit. CRRT involves waste removal either by convection (hemofiltration), diffusion (hemodialysis), or a combination of both (hemodiafiltration). Small molecular weight substances such as urea, creatinine, and potassium are removed by hemodialysis, while middle and larger molecular weight substances are more efficiently removed by hemofiltration in the process (Pannu & Gibney, 2005). This process requires the use of replacement fluid to prevent iatrogenic acidosis and electrolyte depletion as well as excessive fluid removal. With this method, blood urea nitrogen [BUN] clearances is achieved at the range of 23-30 mL/ min (Pannu & Gibney, 2005).

In peritoneal dialysis, the peritoneum acts as the dialyzer membrane for filtering the waste products from the body. The dialysate is filled into the peritoneum through a surgically inserted catheter and left there for some time, during which the waste products from blood gets collected in the peritoneum and is drained along with the dialysate. The patient outcomes are at least equivalent to those treated with hemodialysis (Ibelo, 2016).

Hemodialysis is a process of removing waste products based on diffusion across the membrane driven by concentration gradient between the blood and dialysate. It is carried out by a machine called dialyzer. The blood flows out from artery to the machine, gets purified and is returned via vein. The access point is known as vascular access which is a surgically created arterio - venous anastomosis. Hemodialysis is prescribed for 3 - 6 h per session. Chronic hemodialysis patients are treated three times per week but can vary according to the condition of the patient. In order to observe improved patient outcome in early stages of kidney failure, the target BUN should be under 80 - 100 mg/ dL (29 - 36 mmol/ L) in hemodialysis patients (Pannu & Gibney, 2005).

Hemodialysis is a long-term life sustaining treatment which affects several outcomes like mortality, morbidity, quality of life, and has impact on daily living of ESRD patients. Although hemodialysis is expected to improve the health condition of the individual, patients might as well encounter some complications such as dialysis disequilibrium syndrome while undergoing hemodialysis. Patients will have symptoms such as headache, nausea with or without vomiting, dizziness, muscle cramp, blurred vision, tremors, restlessness, agitation, alteration of consciousness, seizure, coma or sudden cardiac arrest which might develop during dialysis, immediately post-dialysis or within 24 hours after completion of dialysis (Susantitaphong & Jaber, 2017). Some of the risk factors that could potentiate complications include high blood urea nitrogen level, aggressive urea removal during the first hemodialysis session (removed more than 30 %), in young patients (children), individuals with pre-existing neurological impairment, and metabolic acidosis (Susantitaphong & Jaber, 2017)

Self-management

1. Definition

As per the records of the National Center for Health Statistics, globally the elderly population is expected to rise from 35 million in 1999 to 70 million by 2030 (Kuczmarski, 2002). The rise in elderly population will result in increase in chronic diseases, requiring significant medical attention, thus placing huge burden on the health care system (National Center for Health Statistics, 2015). Therefore, it is imperative to encourage and include patients in their own care, to take some responsibilities for maintaining their health to control their chronic disease, and to reduce the associated healthcare cost (Simmons, 2009). Therefore, self-management has significant role in the lives of chronic ill people.

Gruman and Von Korff (1996) defined Self-management as "engaging in activities that promote health, build physiologic reserves and prevent adverse sequelae, interacting with health care providers and adhering to treatment protocols,

monitoring physical and emotional status and making appropriate management decisions on the basis of self-monitoring, and managing the effects of illness on the person's ability to function in important roles, emotions, self-esteem, and relationships with others" (Swerissen et.al., 2006). In this study self-management refers to those daily activities performed by ESRD patients undergoing hemodialysis, focusing on physical activity, fluid and diet adherence, and medical adherence, to control their symptoms and maintain their health. Self-management in ESRD involves long term behavioral adjustments (Lorig & Holman, 2003). However, there is no gold standard of self-management till date (Curtin et al., 2005).

Barlow, Wright, Sheasby, Turner, and Hainsworth (2002) stated that successful self-management requires sufficient knowledge of the disease condition and its treatment, performance of the condition management activities and application of the necessary skills to maintain adequate psychological functioning. Self-management can be categorized into three broad domains of medical management, adopting new behaviors or life roles, and dealing with associated emotions (Lorig & Holman, 2003).

Allowing patients to define their problems can be the fundamentals of self-management, and support can be extended to improve their confidence and practices of self-management. Albeit researches are being performed on self-management of chronic illnesses, there are little evidence that support self-management in individuals with chronic kidney disease (Curtin et al., 2008). A study by Kaptein, Klok, Moss-Morris, and Brand (2010) acknowledged that self-management was mainly determined by behavioral factor and not sociodemographic factors. Therefore, this study proposes to study the relation between various self-management activities and factors affecting self-management in patients undergoing hemodialysis. In this study, self-management can be described as the daily practice of health management behaviors such as physical activity, medication adherence, and fluid and diet restriction adherence by ESRD patients undergoing hemodialysis.

2. Self-management theory

The concept of self-management was first introduced by Thomas Creer and his colleagues since mid-1960s work on pediatric Asthma program (Ryan & Sawin, 2009). In 2003, Lorig and Holman developed self-management theory which is based on the concept that health professionals need to address the problems of people living with the chronic condition as perceived important by the patient themselves and not by what the care provider thinks is required. Therefore, self-management is a shared decision-making process where patients have vital role in controlling their disease condition (Lorig & Holman, 2003; Thomas-Hawkins & Zazworsky, 2005;). The joint venture of shared responsibility between health care providers and patients has slowed

down the disease progression and reduced hospitalizations in patients with chronic kidney disease (Chen et al., 2011).

According to self-management theory, self-management is mainly composed of three tasks/ components: medical or behavioral management, role management and emotional management. The first task of medical or behavioral management involves taking medications as per prescription, and adhering to the prescribed diet and any other recommended activities by the health care provider. Performing the tasks of medical or behavioral management is considered the fundamental of self-management because these medical tasks are such that it needs to be inculcated in our daily activities in order to reduce negative effect of disease condition. The second task, role management involves set of tasks that helps in maintaining, changing, and creating new meaningful behaviors of life roles. In second task of role management, the sick individual tries to adapt themselves in their new role which they acquire after being diagnosed with a chronic disease. They assume sick role, and develop and practice habits consistent with their disease condition. The final task, emotional management involves tasks dealing with emotional sequelae of having a chronic disease (Grady, 2014; Lorig, & Holman, 2003;). Emotional sequelae usually presents as unawareness about how to deal with their disease condition. It involves higher cognitive functioning which impacts the psychological aspect of the individual. Therefore, self-management in people living with ESRD is an important element in controlling disease progression (Lin et al., 2012) as it involves physiological, environmental and cognitive factors. Several studies on chronic illness (Grey et al., 2006; Grey, Schulman-Green, Knafl & Reynolds, 2015; Lorig & Holman, 2003; Ryan & Sawin, 2009) have stated that individuals incorporating self-management in their daily activities have better health outcomes and better quality of life by preventing complications as compared to those who do not. Self-management is a life time process which needs continuous monitoring and regulation by individual themselves (Curtin et al., 2008; Lorig & Holman, 2003).

3. Self-management of ESRD patients undergoing hemodialysis

There are various self-management activities of ESRD patients undergoing hemodialysis. However, in this study, self-management comprises of physical activity, fluid and diet restriction adherence, and medication adherence.

3.1. Physical activity is a self-management activity which the patients on hemodialysis should inculcate in their daily living in order to prevent complications and improve health outcomes. It is one of the significant aspects of self-management in the care of chronic illnesses (American Heart Association, [AHA], 2015). If physical activity is good in an individual, self-management is assumed to be high. Physical activity is proven to improve and maintain both mental and physical health (AHA, 2015) which are vital for daily functioning. Researchers found that each month of

dialysis reduces the physical activity level by 3.4 % in end-stage renal patient (Adams & Vaziri, 2006). Physical activity in self-management involves patients' bodily movement produced by the contraction of skeletal muscle that considerably increases energy expenditure and can be either daily activities or purposeful effort to improve metabolic and physical function, or other routine calorie expending behaviors such as occupational tasks, or recreational activities. These activities can vary in type, intensity, and duration (Stump, 2011). A patient undergoing hemodialysis can include any physical activity that a person with normal kidney function does, except the intensity and duration of the activity needs to be modified.

Exercise is a form of physical activity that is structured with the intent of developing physical fitness such as to improve cardiovascular function, build strength, and develop flexibility (Stump, 2011). ESRD patients undergoing hemodialysis can perform exercise such as aerobic exercise, anaerobic exercise and flexibility exercise (Smart et al., 2013). Aerobic exercise also known as endurance training aims at increasing the cardiovascular endurance. Anaerobic exercise consists of two components, the strength and resistance training and mainly aims at firming, strengthening and toning muscles, improving bone strength, balance and coordination. Flexibility exercise are aimed at stretching and lengthening the muscles and improving the range of motion (American Heart Association, 2016) For patients on hemodialysis there are different intensities of exercise recommendations based on frequency, intensity, time, type [FITT] principle (Koufaki, Greenwood, Painter, & Mercer, 2015) which the patients should be aware of while perusing self-management physical activity. Patients on hemodialysis are recommended of light to moderate intensities of exercise ranging between 10-13 RPE (rate of perceived exertion) (Smart et al., 2013). Exercise can be performed on all days, including during the hemodialysis sessions (intradialytic), and a total of 30-45 minutes of exercise is considered safe for ESRD patients (Smart et al., 2013). Five days or more physical activity per week indicated adequate physical activity (Milam, 2016).

Poor exercise capacity has been noted as a common consequence of physical inactivity in people with ESRD (Barcellos et al, 2015; Howden et al., 2012), and it may be attributed to concomitant comorbidities to ESRD. It is often noted that ESRD patients even if they initiate a physical activity, are unable to keep it up for longer duration due to fatigue and weakness leading to activity intolerance (Johansen & Painter, 2012). National Health and Nutrition Examination Survey III [NHANES III], observed that physical activity decreased as the ageing progressed, and people with multiple comorbid conditions were low on physical activity along with increased risk for mortality (Beddhu et al., 2009).

Araújo Filho et al. (2016) found that 77.8 % of their sample were identified as sedentary and 70.4 % did not receive any guidance for performing physical activity (p =

0.013) and concluded that individuals with ESRD undergoing hemodialysis have low level of physical activity. O'Hare, Tawney, Bacchetti, and Johansen (2003) noted, that sedentary patients under dialysis treatment had approximately 62 % higher risk of death compared to the non-sedentary patients. Changes in self-image, lifestyle and chronicity of the disease, depression, uremic state and fatigue were some of the identified causes that impact the physical activity (Araújo Filho et al., 2016; Broers et al., 2017). According to Delgado and Johansen, even after the guidance for physical activity, it cannot be guaranteed that the patients will comply with the activity (Araújo Filho et al., 2016). Robinson-Cohen et al. (2014) found that kidney function declined with relative 9.6 % of decline in eGFR per year among inactive participants as compared to 6.2 % per year among physically active participants. Broers et al. (2017) found that physical activity was significantly lower in ESRD patients on dialysis as compared to healthy controls and non-dialysis patients.

A general population survey in Bhutan revealed that 57.7 % of the studied population had low level of physical activity, with an average of 20 minutes physical activity per day, and 82.2 % were not engaged in any vigorous physical activity (Ministry of Health, 2009), thus increasing the risk for ESRD along with other non-communicable diseases. These finding sheds light on low level physical activity of Bhutanese and higher risk of non-communicable diseases in Bhutanese. The literature review suggests that all chronic kidney disease, including ESRD patients have low level of physical activity.

3.2. Fluid restriction adherence: Adapting to fluid and diet restriction in ESRD patient has always been a challenge because it requires greater psychological involvement. The patient's adherence to restrictions is influenced by their beliefs, social and cultural morale, and the patient's ability to ignore a powerful physiological drive to control their thirst (Rambod et al., 2010). Therefore, for the patients undergoing hemodialysis, developing a new pattern of drinking and eating habit, and adhering to the developed behavior requires great effort, greater level of self-efficacy, social support and literacy about self-management they have to pursue in order to have better health outcomes. Herselman (2008), and Rambod et al. (2010), reported that patient's reported non-adherence to fluid restrictions between 30 to 74 % and noticed 10 to 60 % inappropriate interdialytic weight gain in dialysis patients. Studies have reported that 33-50 % of haemodialysis patients were non-compliant with fluid restriction (Tsay, 2003). This suggest that the ESRD patients have less control over fluid restriction as self- management.

3.3. Diet restriction adherence: Dietary salt restriction is considered a cornerstone of the management of patients with all stages of chronic kidney disease, including those on dialysis therapy and those who have received a kidney transplant (Wright & Cavanaugh, 2010). Salt restriction aims at lowering blood pressure and

blockade of the renin angiotensin system [RAS] and dietary protein restriction is believed to reduce progression of ESRD (Ritz & Schwenger, 2005). As recommended by WHO a low-sodium diet is defined as salt intake less than 5 g/ day (2g/ day sodium. The national health and nutrition examination survey [NHANES], reported higher salt consumption in the American citizens with approximately 95 % of male adults and 75 % of female adults consuming more than recommended (Wright & Cavanaugh, 2010). Therefore, it can be concluded that they are at greater risk of developing ESRD and have low self-management in dietary restriction.

The recommended amount of protein for ESRD is 0.6 to 0.75 grams of protein per kilogram body weight, and a low-potassium diet includes potassium intake of less than 2000 mg/ day (Chen, et al., 2011). Rambod et al. (2010), found that out of 200 hemodialysis patients most of the patients (56 %) did not adhere to fluid restrictions but adhered to dietary restrictions. The adherence rate for potassium was 94.5 %, which is within the range reported by other researchers, which was 60 % to 98 % and the adherence rate for phosphate intake was 74.5 %, which is within the range demonstrated by other authors, being 43 % to 81 %. Patients report difficulty in reducing the intake of foods high in phosphorus, such as chocolate, cola drinks, meat, fish, eggs, and milk and other dairy products (Rambod et al., 2010),). Griva et al. (2014) stated that a substantial proportion of chronic kidney disease patients were found to deviate from prescribed dialytic, medication, dietary and fluid recommendations causing ongoing challenges in the health.

There is no data on the self-management of Bhutanese ESRD patients. From a survey it was noted that general Bhutanese people have faulty eating habit. Since Bhutanese cuisines are mostly salty and spicy, salt intake in general Bhutanese population is quite high. An average Bhutanese consumes around 9 grams of salt per day, which puts them at greater risk for chronic kidney disease (Ministry of Health, 2009). Moreover, Bhutanese tradition of drinking suja (salt tea with churned butter), and traditional meal consisting mostly rice, meat and cheese are one of the risk factors for associated diseases like hypertension and diabetes mellitus. More than 67 % of the sample (n = 2822) did not consume adequate fruits and vegetables, 7.8 % added extra salt to their meal, and 11.1 % mostly consumed processed food (Ministry of Health, 2009). These faulty eating habits depicts that self-management of general Bhutanese population is low, and along with low physical activity in long run can have serious implications on kidney functions. The need for change in eating habits of the population can be seen as a real challenge, especially the fight for salt reduction has been a real challenge with still high consumption of salt.

3.4. Medication adherence: Therapeutic goals can hardly be achieved without substantial treatments with medications (Burnier et al., 2015). In most cases, medications constitute a vital part of care, and health workers rely on patients to take

medication as prescribed (Curtin et al., 2008). Patients on dialysis belong to the group of chronic patients with the highest daily pill burden as they are generally prescribed an average of 10 different medications that needs to be taken several times daily (Raymond et al., 2011), such high pill burden is inevitably associated with major problems of medication adherence. Higher the number of pills lesser will be the adherence capacity (Burnier et al., 2015). The long-term survival, the risk of complications, and treatment success depend on a patient's adherence to self-management in regard to the therapeutic regimen (Kugler et al., 2005).

Burnier et al. (2015). defines medication adherence as the extent to which a patient's behaviour, with respect to taking medication, corresponds with agreed recommendations from healthcare providers. A survey on medication adherence in patients with chronic kidney disease, revealed that cost has implication in non-adherence in several studies of dialysis patients, and those with inadequate medication coverage and lack of transportation were more likely to be non-adherent in a survey of hemodialysis patients (Raymond et al., 2011). A study stated that polypharmacy in chronic kidney disease patients leads to complex medication choices and adherence problems, each participant had 5-14 prescribed medications, had 2-9 physicians and 5-11 comorbid conditions. All these resulted in less adherent behavior because most of the participant expressed the intention to be adherent but regularly skipped medications they considered less important (Rifkin et al., 2010). In the same study participants with more prominent symptoms showed better than those who were asymptomatic, and the adherence also varied with the beliefs and priorities of the patients (Rifkin et al., 2010). Non adherence to medication acts as a significant barrier in the treatment of any chronic diseases. Similarly, non-adherence to diet and fluid restrictions, and medications has serious life-threatening consequences in people with ESRD undergoing hemodialysis.

3.5. Hemodialysis adherence: Missing and shortening a hemodialysis session is a common practice in hemodialysis patients universally, but the rate varies across countries. Studies in the United States show that 7.9 % of patients skipped dialysis one or more sessions per month and 19.6 % shortened the session by ten or more minutes which was quite high as compared to 0.6 % in Japan with 5.7 % shortening of session in Japan (Naalweh et al., 2017). Along with other treatment modalities, adhering to hemodialysis attendance is one of the important part of successful treatment regimen of ESRD patients. Adhering to hemodialysis include both "no skipping of sessions/ regular attendance" and "no shortening of a session/ full completion of hemodialysis session" (Denhaerynck et al., 2007). Previous study found that patients perceived hemodialysis adherence more important than other treatment modalities like adhering to diet and fluid, and adhering to medication (Naalweh et al., 2017). Assessing hemodialysis adherence allows health professionals to obtain some

information on patient's self-management. It is an interventional method to improve self-management in hemodialysis patients. Assessing hemodialysis adherence minimizes health and economic consequences of non-adherence (Naalweh et al., 2017). Denhaerynck et al. (2007) pointed out that skipping at least 1 dialysis session per month is associated with 25 % to 30 % of higher risk for death and shortening dialysis three or more times a month for more than 10 minutes as associated to increased mortality. Missing hemodialysis session was associated with increased mortality (Denhaerynck et al., 2007). Therefore, adhering to recommended self-management of physical activity, diet restrictions, fluid restrictions, hemodialysis adherence, and medication adherence are part of the complex and rigorous treatment of ESRD patients.

Self-management of Bhutanese ESRD patients undergoing hemodialysis

In Bhutan, number of people living with chronic kidney disease is increasing annually, and the ambiguity of its causes is one of the challenges arising in the health sector of our country. Records from the hemodialysis unit of Jigme Dorji Wangchuk National Referral Hospital reported an approximate of 610 ESRD patients requiring hemodialysis in 2015 (Tsukamoto, 2017), from 8 cases diagnosed in 1998 (Abraham et al., 2016). The concept of self-management is still budding, where the patients are not aware of the need for self-management and those practicing self-management are not aware of their behavior and ways to acquire resources for self-management. Increasing trend of high density and high calorie processed foods consumptions amongst the younger generation in the country could be one reason for increase in non-communicable diseases like hypertension, diabetes and obesity which ultimately leads ESRD. Due to lack of manpower (i.e. very less number of specialist and nurses in renal field), self-management programs do not exist and thus, self-management activities are hampered immensely. It has been projected that by 2020, more than 50 % of the population in Bhutan will migrate to urban areas with most of the urban dwellers lacking physical exercise and adopting faulty health habits (Yangchen, Tobgay, & Melgaard, 2017). Therefore, in my opinion, in a country where early diagnosis of chronic kidney disease itself is a great challenge, the concept of self-management would play huge role in improving the well-being of the patients, and also reduce burden on the health sector.

Factors influencing self-management of ESRD patients undergoing hemodialysis

From the review of previous studies on self-management, various risks, and protective factors associated with self-management of a chronic condition were observed (Grey et al., 2006). Self-management behaviors could be studied in various aspects, such as by grouping them into domains of communication with the care giver; partnership in care; self-advocacy, and medication adherence, or could be studied as individual behavior, such as dietary behavior, fluid management; physical activity, cognitive symptoms management, comorbid conditions, social support, monitoring symptoms, self-management knowledge, and identifying the social networks available, (Toukhsati, Driscoll, & Hare, 2015), including all those activities of daily living having impact on the various aspects of life and well-being of the individual. Thus, physical activity, fluid and diet restriction adherence and medication adherence are few crucial factors that will be studied in this study in relation to self-efficacy, social support and health literacy of ESRD patients undergoing hemodialysis. These self-management components were chosen because these have significant impact on the overall health and wellbeing of patient with ESRD (Lorig et al., 2001; Washington et al., 2016;), and can be intervened by health care professionals. Self-efficacy was taken as an influencing factor to these self-management because, previous research states that patient's medication adherence is not associated with any demographic or easily identifiable characteristics (Clark & Dodge, 1999). Social support in the form of social network is yet another factor from where people often draw on the health literacy information and skills of others in their social networks to self-manage the disease condition. Low health literacy is an important predictor of poor health outcomes (Curtin et al., 2008) and it may lead to poorer self-management in ESRD patients. Evidence suggests that self-efficacy is enhanced by adequate health literacy and availability of adequate social support and vice versa in people with chronic diseases (Geboers, Winter, Luten, Jansen, & Reijneveld, 2014).

1. Self-efficacy

Evidences suggest that being self-efficacious resulted in better self-management behaviors (Lin et al., 2012; Washington et al., 2016). According to the social cognitive theory, while practicing self-management, more self-efficacious one feels, more likely are they to persist on their self-management behaviors. Self-efficacy has vital role in maintaining adherence of self-management behaviors, as self-efficacy has been identified as an important and consistent determinant of a number of health behaviors including physical activity (McAuley, Szabo, Gothe, & Olson, 2011). Previous studies suggest that self-efficacy is one of the potential

mediators of the effects of physical activity on the psychological outcomes such as anxiety, affect, depression, and quality of life (McAuley et al., 2011). According to self-efficacy theory, self-efficacy can be described as one's belief and confidence in one's ability to accomplish a tasks/ events and to have control over the way these events are experienced. Since self-management involves adopting new behaviors to control the disease condition, it is supported by social cognitive theory which states that human behavior is extensively motivated and regulated by the continuous process of self-influence, thereby rendering it essential for an individual to have self-efficacy in order to reach their goal. Many ESRD patients have difficulty complying with prescribed self-management activities like physical activity, fluid and diet restrictions and medication adherence. These patients require major behavioral change and self-efficacy to comply with the treatment regimen of their chronic illness. A person with an increased self-efficacy is more likely to participate in self-management activities and thus increase their adherence to the treatment regimen (Tsay, 2003).

Self-efficacy is usually accompanied by perceived behavioral control (PBC- extent to which individuals perceive that their behavior is under their control) and can be achieved by three methods: first - personal mastery; second - role modeling i.e. observing others succeeded the task, and third - persuasive method to develop habit. Therefore, self-efficacy plays vital role in self-management of people with ESRD for adhering to the self-management activities. Praphasil (2011) found that at 12 weeks of intervention with self-efficacy and self-management concept, had significantly higher score on self-management behaviors on experimental group than the control group who were provided with regular nursing care only. Past studies state that increased self-efficacy was associated with improved control of intradialytic weight gain among hemodialysis patients (Curtin et al., 2008) which suggests about effective fluid restriction by the patient by achieving their goals by performance mastery. Tsay (2003) states that those who have confidence in their ability to manage self-care had better fluid intake compliance. Curtin et al. (2008) reported decreased hospitalization, decrease amputation in diabetic dialysis patients, and improved overall quality of life with higher level of self-efficacy. In following studies (Curtin et al., 2008; Sritarapipat et al., 2012; Washington et al., 2016) self-efficacy has been significantly associated with one or more of self-management behavior. Sritarapipat et al. (2012) stated that self-efficacy was one of the significant predictors of self-management and a mediator between self-management and other predictors in elderly pre-dialysis people. A study suggested that the exercise related self-efficacy gradually declined with time till the end of the study. However, the feeling good from exercise resulted in higher self-efficacy (McAuley et al., 2011) which shows that the self-efficacy is also influenced by perception of individual. Evidences showed

relationship between medication adherence and self -efficacy (Kalichman, 2005) indirectly measuring the component of self-management. Patients with increased dietary self-efficacy demonstrated favorable attitude towards compliance to prescribed regimens because when an individual feels self-efficacious, they are able effectively perform self-management activities (Zrinyi et al., 2003). Therefore, we conclude that self-efficacy has significant role in the self-management behaviors of ESRD patients.

2. Social support

Past studies have observed that social support greatly impacts the outcome of the chronic conditions. Social support refers to the intricate network in which a person may give and receive information and assistance, and have emotional needs met (Cohen et al., 2007). The social resources that individual perceive to be available or that are actually provided to them by their social network in context of both formal support groups and informal helping relationships is termed as social support (Gottlieb & Bergen, 2010). Higher level of social support has also been positively associated with better health and lower depression prevalence (Cohen et al., 2007), which may simultaneously result in better self-management. Chronic kidney disease and renal replacement therapy [RRT] have tremendous medical, social, and financial consequences, both for the individual patient with renal failure and for the health system of the country as a whole (Patel et al., 2005). Social support can be obtained from family, friends, coworkers, spiritual advisors, health care personnel, or members of one's community or neighborhood acquaintances in the workplace, and medical personnel. It is well recognized as an important factor in the patient's adjustment to chronic illnesses like ESRD, as it presents a heavy burden on a patient's psychological and social life (Patel et al., 2005). Spinale et al. (2008) found that the patients with higher social support scores had improved survival in patients with ESRD. Cohen et al. (2007) found that patients with a lower level of social support had a 4.5 times greater likelihood of noncompliance than those with greater levels of social, thus labeling lower level of social support as a significant indicator for low self-management. McAuley et al., (2011) in their study reported that those participants who were frequently physically active enjoyed greater social support within the exercise program, and demonstrated positive experiences, and robust sense of self efficacy. A possible reason could be that the participants must have developed a sense of support from the program organizer and a sense of connectedness with the other participants there by leading to feeling of self-efficacious. Yet another reason could be that the participants received information and emotional support from the group while performing physical activity. Zrinyi et al. (2003) stated that increasing number of family member was inversely associated to the dietary self-efficacy of the patient suggesting that the increase in the number of family members resulted in lower dietary efficacy beliefs and expectations of patients. A Survey conducted in UK,

Europe and the US, revealed that the nephrologist and Renal Multidisciplinary care team [RMDT] recognized exercise as an important component in the wellbeing of the people with ESRD but less than 50 % of them prescribed or facilitated to such programmes (Koufaki et.al., 2015), this indicates that these group of patients receive relatively less support from the health professionals than expected.

3. Health literacy

The concept of health literacy is dynamic as it includes the ability of an individual to interact with the broad health care system from where they gather and process health related information. It requires various skills for managing their health condition, such as reading and writing, listening and speaking, numerical ability, and cultural and conceptual knowledge (Dageforde & Cavanaugh, 2013). According to integrated conceptual model of health literacy for kidney patients, there are mainly two factors: internal factors and, external factors that impact on patient health literacy. Then there is a process where the patient interacts with the health system to acquire knowledge and make health related decisions. The outcome observed is either clinical or patient reported outcomes. Evidences report of limited health literacy among ESRD patients as most healthcare providers are unaware of their patient's health literacy (Cavanaugh et al., 2010; Wallston et al., 2014), which may lead to low dissemination of health information subsequently affecting the practice of self-management of the patients. Health literacy can be defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make informed health decision." (Galura & Pai, 2017; Jain, & Green, 2016). Inadequate health literacy has been a major problem in the United States (Haun et al., 2009). Limited health literacy is associated with difficulty understanding one's health condition, less adherence to self-management practices, poorer health status, increased mortality, and higher health care costs (Wallston et al., 2014). Studies identified that medication self-management is a great challenge, especially in patients with low literacy (Galura & Pai, 2017; Kalichman, et al., 2005) because low health literacy is associated with poor health outcomes, increased complications, hospitalization and increased mortality (Galura & Pai, 2017).

Low health literacy means that the patients will have less knowledge on the self-management activities they need to perform, and this might give rise to doubts on the information they receive and hamper their decision making in the practice of self-management. According to the World Health Organization [WHO], health literacy is the core of people's understanding of their health and engagement in health behavior, treatment and prevention of disease (WHO, 2014). People living in low and middle-income countries, particularly those with little education, have very poor access to quality health information and services (WHO, 2014). Therefore, the researcher assumes that Bhutan being one of the low-income countries in the South

Asian region could possibly be having low health literacy, as there is no recorded information till date on the health literacy of ESRD patients in Bhutan. Wright & Cavanaugh, (2010) found 18 % prevalence of limited health literacy in 401 ESRD patients (Jain & Green, 2016). Cavanaugh et al. (2010) reported a prevalence of 32 % limited health literacy in their study of 480 patients undergoing hemodialysis.
In another study it was reported that the outcome indicators of ESRD was directly proportional to the percentage of health literacy, where patients with limited health literacy, had lower eGFR as compared to patients with adequate health literacy (34 ml/ min vs 42L/ min per L.73 m^2); higher urine protein/ 24 hour (0.13 g vs .15 g), a higher self-reported cardiovascular disease (61 % vs 37 %), and were less likely to have BP < 130/ 80 mmHg (51 % vs. 58%); p □ 0.01 for each comparison (Ricardo et al., 2014). Prevalence of limited health literacy was 28 % and 5 % among Black and White, participants respectively (Ricardo et al., 2014), and limited health literacy was more likely associated with higher mortality in chronic hemodialysis patients (Cavanaugh et al., 2010). Therefore, considering all the literature reviews, self-efficacy, social support and health literacy are selected for study in Bhutanese patients with ESRD undergoing hemodialysis.

Summary of literature review

Self-management of people with chronic kidney disease greatly varies along different stages, and studies have observed that better the self-management, slower will be the progression of chronic kidney disease to end-stage of renal failure. ESRD patients assume proactive role in planning treatment, communicating with physician, self-advocacy, self-efficacy, seeking information, and partnership in health care related to physical activity, fluid restriction, diet restriction, hemodialysis attendance, and medication adherence which they practice as their daily self-management due to disease condition.

Previous studies on self-management of ESRD patients suggests activities of self-management tasks included physical activity, adherence to medication, adherence to diet restriction, fluid restriction, and adherence to treatment regimen are being studied due to difference patient. Being long term disease in nature, ESRD would progress and cause great burden to the patients, their family and the health sector. Incorporating self-management helps reduce the burden on the care provider and improve the health outcome of the patients with ESRD. Self-efficacy, social support, and health literacy were found to influence self-management. Self-management level can be directly influenced with a change in these variables as these variables individually can be either increased or decreased by interventions from health care providers. The empirical evidence obtained from this study would provide better understanding of the self-management of patients undergoing hemodialysis in Bhutan.

It would help shed light on self-management of the patients and pave a path for making the decision for developing a self-management program for these population.

CHAPTER 3
RESEARCH METHODOLOGY

Research design

A predictive correlational design was selected. The objectives of study were self-efficacy, social support and health literacy predicted self-management of ESRD patients undergoing hemodialysis in Bhutan.

Population and sample

Population

Population for this study was ESRD patients undergoing hemodialysis in Jigme Dorji Wangchuk National Referral Hospital [JDWNRH], Thimphu.

Sample

Sample was patients with ESRD undergoing hemodialysis at JDWNRH, Thimphu. The sample was selected based on following inclusion criteria:

1. □ 20 years of age
2. Diagnosed with ESRD
3. Currently receiving hemodialysis for at least one month
4. Having normal to mild cognitive impairment (Screened by SLUMS questionnaire).
5. No physical limitation

Sample size

Sample size for this study was calculated by using G*Power 3.1.9.2 version (Faul, Erdfelder, Lang, & Buchner, 2007), based on effect size (f^2) of .10, alpha (α) level .05, and power of .80. Considering limited prevailing information on the self-management of ESRD patients undergoing hemodialysis in Bhutan, a small effect size was considered (Kadam & Bhalerao, 2010). Therefore, the sample size required for this study was at least 81 participants. However, there was no consistent definition of amount of missing data ranging from 5 % to 20 % or less of values (Saunders et al., 2006). Therefore, a total of 90 patients were taken in order to compensate for the missing data.

Sampling technique

Participants were recruited by using convenience sampling. The total estimated ESRD patients undergoing hemodialysis in JDWNRH were 123 cases. Following were the steps of recruitment:

1. Every day an estimated number of patients undergoing hemodialysis at dialysis center of JDWNRH was 30 patients per day.

2. On reaching the dialysis unit, the researcher checked the medical record of the patients for inclusion criteria of 20 years of age, diagnosed with ESRD, currently receiving hemodialysis for at least one month, and made a list (A) of all participants fulfilling the above stated criteria.

3. Participants in list (A), fulfilling the above stated inclusion criteria were screened for dementia by using Saint Louis University mental status [SLUMS] examination questionnaire, where the patients with higher education should score between 20-30, and patients with less than high school education should score between 14-30.

4. Then another list (B) of patients without dementia and fulfilling the inclusion criteria were obtained, and serial number was assigned to all the eligible patients.

5. Everyday 2-6 new participants were recruited and the remaining patients those who fulfilled the criteria were taken as sample during another session/ week of hemodialysis.

6. The time for data collection was every working day, from 8 am to 5 pm.

7. If the patient were not able to complete the questionnaire in the allotted time due to some issues, they were approached later in their convenient time.

8. If the patient in the list (B) stayed nearby (especially the hospital guest house), the researcher asked permission/ appointment to collect data at their residence.

Setting of the study

The study was conducted at the dialysis unit of Jigme Dorji Wangchuk National Referral Hospital [JDWNRH], which is located at the heart of Thimphu town, the capital city of Bhutan. JDWNRH is one of the three hospitals in Bhutan providing dialysis facility in the country. The dialysis unit at JDWNRH is a 10 bedded center and functions throughout the week including government holidays in three shifts, from 8:00 am till 11:00 pm, and caters for emergency dialysis services. Since there is only one nephrologist, the patients in the unit is being attended by different medical specialists in rotation and the renal clinic is run by a nephrologist and 2 nurses for two days a week.

Research instruments

The data for this study was collected using six questionnaires and a questionnaire to screen dementia in hemodialysis patients. The instruments used were all in English version. Following are the details of the questionnaires:

1. Demographic data questionnaire [DDQ]

Demographic data questionnaire [DDQ] was used to collect participant's demographic data. DDQ was developed by the researcher, specific to this study. Sources of data included self-report and medical records. DDQ consists of two sections. Section I- provides the general patient characteristics (item 1-8), including age, gender, marital status, education level, occupation, monthly family income, living situation. Section - II provides health information (item 9-15), including the duration of diagnosis, frequency of hemodialysis per week, duration of hemodialysis (hours and minutes), comorbid condition(s), laboratory records for latest serum creatinine in mg/ dl, and estimated GFR [eGFR] in mL/ min/ 1.7 m^2 calculated by using Cockcroft and Gault equation.

2. Questionnaires for measuring self-management

Self-management was measured by using two questionnaires, the international physical activity questionnaire short form [IPAQ - SF] to measure physical activity and the end-stage renal disease adherence questionnaire [ESRD-AQ] to measure adherence to medication, hemodialysis, fluid restriction, and diet restriction. The average scores of IPAQ - SF and ESRD-AQ were summed for the self-management. The mean of self-management was scored in a scale of 1 to 5, where 1-1.7 was low self-management, 1.8 - 3.3 was moderate self-management, and 3.4 - 5 was high self-management

2.1. International physical activity questionnaire short form [IPAQ- SF]

IPAQ - SF developed by Booth (2000) was used to measure physical activity. The IPAQ - SF consists of 7 questions which collects information about three specific types of physical activities as well as sedentary behavior in the last 7 days. Three types of physical activities include time spent in vigorous intensity activity (P1-P2), moderate intensity activity (P3-P4), and time spent walking (P5-P6). The correlations were 0.80 for reliability and 0.30 for validity. It is one of the most recommended and widely used physical activity assessment tool. Results on concurrent validity between IPAQ and GPAQ (global physical activity questionnaire) also showed a moderate to strong positive relationship (0.45 to 0.65) (Bull, Maslin & Armstrong, 2009). The researcher modified the scoring by using only days of physical activity per week (P1, P3 and P5). The average of P1, P3 and P5 was scored in the range of 0 to 7 days per week where higher number of days indicated higher physical activity. However, for multiple regression analysis, the average physical activity was scored in a range of 1 to 5 where □ 1.9 days/ week was scored as 1, 2 to 2.9 days/ week was scored as 2, 3 to 3.9 days/ week was scored as 3, 4 to 4.9 days/ week was scored as 4, and □ 5 days/ week was scored as 5.

2.2. End stage renal disease adherence questionnaire [ESRD-AQ]

ESRD-AQ was used to measure treatment adherence behaviors in ESRD patients. It consists of five parts; General information on RRT history, HD attendance, medication use, fluid restrictions, and diet recommendations in the ESRD patients undergoing hemodialysis. It was developed by Kim et al. (2010).

However, the instrument was modified to be fitted in this study by sorting only directly related questions. Total of thirteen items were chosen to be scored from four parts of the questionnaire. Three questions each from hemodialysis attendance (11, 13, 14), medication use (22, 25, 26), and diet recommendations (41, 44, 46), and four questions from fluid restriction (31, 32, 35, 37). The responses were on a 5-point rating scale (1 to 5). All the questions were summed, and an average of adherence was obtained. Higher scores indicated better adherence.

Self-management was obtained by summing the average scores of numbers of days of physical activity per week from questionnaire 2.1 (IPAQ - SF) and the average of adherence questionnaire 2.2 (ESRD - AQ) in a scale of 1 to 5, where score of 1 - 1.7 was low self-management, 1.8 - 3.3 was moderate self-management, and 3.4 - 5 was high self-management

3. Self-efficacy for managing chronic disease 6 item scale [SEMCD-6]

SEMCD - 6 developed and validated by the Stanford patient education resource center (Lorig, et al., 2001) was used to measure the self-efficacy of the participants in the study. It is a 6 - item scale which assesses the confidence of the patient in performing various activities and tasks of daily living and preventing complications. In a scale of 1 to 10, patients' choses the score that best described their confidence level in performing their daily tasks and activities. Where 1 is not at all confident and 10 is totally confident. The score ranged from 6 to 60, where score of 6 - 24 was low self-efficacy, 25 - 43 was moderate, and 44 - 60 indicated high self-efficacy.

This instrument was tested on 605 subjects with chronic diseases, and the internal consistency reliability was 0.91 (Freund et al., 2013; Lorig et al., 2001).

4. Multidimensional scale of perceived social support [MSPSS]

MSPSS developed by Zimet et al. (1988) was used to measure perception of support by individuals from mainly 3 sources: family (fam), friends (fri), and significant other (SO). The scale is comprised of 12 items (Zimet et al., 1988). The sample responds on 7-point Likert-type response format (1 = very strongly disagree; 7 = very strongly agree). A total score will be obtained by totaling the responses. The lowest possible score will be 12 and the highest will be 84. A score of 12 - 36 was low social support, 37 - 60 was moderate, and 61 - 84 was perceived as high social support. The Cronbach's coefficient alpha for MSPSS was .93. The family, friends, and

significant other subscales demonstrated α's of .91, .89, and .91 respectively (Dahlem, Zimet & Walker, 1991; Zimet et al., 1988).

5. Brief health literacy screen [BHLS]

BHLS developed by Haun et al. (2009) consists of four questions about reading ability and understanding capacity of the participants. The responses are offered in the following five-point Likert scale: 1 = always, 2 = often, 3 = sometimes, 4 = occasionally, and 5 = never. The sum of the response will indicate the level of health literacy. A score of 4 to 9 was low level, 10 to 15 was moderate, and 16 to 20 indicate high level of health literacy. Cronbach's alpha for the BHLS was 0.80 among hospital patients (n = 498) and 0.76 among clinic patients (n = 295) (Wallston et al., 2014). In this study Cronbach's alpha for BHLS was .71.

6. Saint Louis university mental status [SLUMS] examination questionnaire

SLUMS examination questionnaire was used to rule out dementia in ESRD patients. SLUMS was developed by Tariq, Tumosa, Chibnall, Perry, & Morley (2006). It is an 11-item questionnaire with scores ranging from 0 to 30. It is designed to identify individuals with mild or early dementia by measuring orientation, memory, attention, and executive functions. It has been shown to be superior to the mini-mental state exam [MMSE] in the detection of early dementia. In patients with high school education score of 1-19 will be considered as dementia, 20 to 27 is mild cognitive impairment and 28 to 30 is considered normal cognitive function, and in patients with less than high school education score of 1 to 14 is considered dementia, 15 to 19 is mild cognitive impairment and 20 to 30 is considered normal cognitive function. For this study, the names of the people and few items were replaced with similar item's name which were familiar to the participants. For example, pen was replaced with pencil, Jill replaced with Deki, and Jack replaced with Dorji.

Quality of instruments

The researcher used the original version of instruments, which were validated and verified by the experts, therefore, content validity was skipped. However, a pilot study was carried out with 20 participants who met the inclusion criteria to determine reliability prior to data collection. The internal consistency was determined by using test-retest reliability for IPAQ - SF and ESRD-AQ, and Cronbach's alpha for SEMCD-6, MSPSS and BHLS. The reliability results revealed acceptable interclass correlation coefficients of .93 for IPAQ - SF and .99 for ESRD-AQ. The internal consistency of Cronbach's alpha was .92 for SEMCD-6, .78 for MSPSS and .71 for BHLS. The reliability test of all questionnaires was conducted at dialysis center of JDWNRH.

Protection of human subjects

The research proposal was approved by the Institutional Review Board [IRB], Faculty of Nursing, Burapha University and the Research Ethical Board of Ministry of Health [MoH], Bhutan. The research procedure was then conducted adhering to the research proposal. The participants were informed about the aim of the study and the involvement procedure. Informed consent was obtained prior to data collection. Participants were informed that the participation was completely voluntary, and they have the right to withdraw from the study as they want, without any penalty. No names or any form of participant's identity was disclosed. Confidentiality and anonymity requirements were strictly observed by the researcher. Every form and data were kept under lock and key. The data would be destroyed after one year of publication of the study.

Data collection

The data collection procedures were carried out by the researcher from March to April 2018. The procedures were as follows:

1. The researcher submitted the research proposal to the Institutional Review Board [IRB] of the Faculty of Nursing, and then to the Research Ethical Board of Ministry of Health [MoH], Bhutan.

2. Permission for data collection was sought from the concerned authorities of the hospital [JDWNRH] and the chief nurses of the dialysis center. The objectives and the purpose of the study was explained to obtain permission for data collection.

3. The data was collected using an interview questionnaire, which was implemented by the researcher herself, before dialysis and during the first 2 hours of the whole 4 hours of the dialysis procedure, as the last 2 hours is mostly associated with negative symptoms of hemodialysis and mostly the patients are tired. Interview method was adopted due to limitation of movement in patients during dialysis.

4. The researcher reviewed the case file with permission from the staff on duty to approximate the inclusion criteria and do the sampling.

5. When participants met the inclusion criteria, he/she was approached for informed consent. The researcher then explained the purpose of the study, also their rights for human protection and confidentiality of the data.

7. The researcher provided direction on how to respond to the questionnaire. Each participant was provided with approximately 25 to 30 minutes to complete a set of questionnaires. Patient's medical record was assessed to complete data collection to avoid repetition in patients.

8. Minimum of 2 and maximum of 6 patients were interviewed a day, from 8am till 5 pm until the required sample size was met.

Data analysis

Data was analyzed using statistical software. An alpha (α) level of 0.05 was set for significance. Following are the process of data analysis:

1. Descriptive statistics including frequency, percentage, mean, and standard deviation (*SD*) was used to describe the demographic characteristics of the sample, the dependent variable (self-management such as physical activity, fluid restriction, diet restriction adherence, and medication adherence), and independent variables (self-efficacy, social support and health literacy).

2. Before analysis of the data, assumptions of multiple regression were tested for normality of variables, linearity, homoscedastic, no auto correlation and no multicollinearity

3. Pearson correlations was performed to examine the relation between self-efficacy, social support, health literacy, and self-management of ESRD patients undergoing hemodialysis.

4. Standard multiple regression was performed to examine predicting factors of self-management.

CHAPTER 4
RESULTS

This chapter presents the findings of the study. The purpose of this study was to examine the predictive relationship of self-efficacy, social support, and health literacy towards self-management of ESRD patients undergoing hemodialysis in Bhutan. The findings of the study are presented as follows:

1. Description of participants characteristic
2. Description of the studied variables
3. Predictors of Self-management of ESRD patients undergoing hemodialysis in Bhutan
4. Factors predicting self-management

Description of participants characteristic

The total number of participants were 81 ESRD patients receiving hemodialysis at JDWNRH, Thimphu, Bhutan. It consisted of 33 males (40.7 %) and 48 females (59.3%). Majority of the participants presented with normal cognitive function (67.9 %). The age ranged from 20 years to 77 years old. Majority of the participants were in the age group of 20-39 years with a mean age of 47.96 years (SD = 15.03). Most of them were married (81.5%) and lived with families (61.7 %). Almost half of the participants had education level less than primary level (63 %) and unemployed (85.2 %) which included retired government and corporate officers. The average monthly family income was Nu. 15553.09 (SD = 14942, Min = 2000, Max = 120000) (Approximately $228.31). Table 3 illustrates details of the demographic characteristics of general participants.

Table 3 Demographic characteristics of participants (n = 81)

Characteristics		**Number** (n)	**Percentage** (%)
Gender			
Male		33	40.7
Female		48	59.3
Age	$\bar{x}$ = 47.96, SD = 15.03, Min = 20, Max = 77		
20 - 39		31	38.2
40 - 59		28	34.6
□ 60		22	27.2
Marital status			

Single	8	9.9
Married	66	81.5
Divorced	4	4.9
Widowed	3	3.7
Occupation		
Unemployed	69	85.2
Government employee	9	11.1
Private sector employee	2	2.5
Business	1	1.2
Education		
Non/ Informal education	51	63.0
Primary	14	17.3
Higher secondary	13	16.1
College or above	3	3.6

Table 3 (Continued)

Characteristics	**Number (*n*)**	**Percentage (%)**
Monthly family income (Ngultrum, where Nu.68.3 = 1 USD)	$\bar{x}$ = 15553. 09, *SD* = 14942.04, Min = 2000 Max = 120000	
< Nu.5000	22	27.2
Nu. 5000 - 10000	16	19.8
Nu. 10001 - 20000	18	22.2
> Nu. 20000	25	30.8
Living situation		
Lives with family	62	76.54
Lives alone	19	23.46
Cognitive function		
Normal cognitive function	55	67.9
Mild cognitive impairment	26	32.1

Health information of the participants

The length of time being on hemodialysis ranged from 1 month to 240 months ($\bar{x}$ = 38.95, *SD* = 47.44). 66.7 % of the participants had hemodialysis 2 times per week ($\bar{x}$ = 1.72, *SD* = 0.5) with 77.8 % participants having time duration of 4 hours per hemodialysis session ($\bar{x}$ = 3.8, *SD* = 0.37). 75.3 % of the sample has associated comorbid

conditions in which hypertension (n = 54) and diabetes mellitus (n = 15) were the most significant. The average serum creatinine was 9.2 mg/dl with a range of 2.4 to 21.3 mg/dl (SD = 3.63). The mean of estimated glomerular filtration rate (eGFR) by Cockcroft Gault formula was 8.35 ml/min per 1.73 m^2 (SD = 4.09) with almost all participants having eGFR □ 15 ml/min per 1.73 m^2 (93.8 %).

Table 4 Health information of the participants (n = 81)

Health information	**Number (n)**	**Percentage (%)**
Duration of diagnosis(months) $\bar{x}$ =38.95, SD = 47.44, Min = 1, Max = 240		
< 1 year (12 months)	30	37.0
1 - 5 Years (12 - 60 months)	36	44.5
6 - 10 Years (72 - 120 months)	9	11.1
> 10 years (> 120 months)	6	7.4
Frequency of dialysis (per week) $\bar{x}$ = 1.72, SD = .5, Min = 1, Max = 3		
1 time	25	30.8
2 times	54	66.7
3 times	2	2.5
Duration of hemodialysis $\bar{x}$ = 3.8, SD = .37, Min = 3, Max = 4		
3 hrs	13	16.0
3.5 hrs	5	6.2
4 hrs	63	77.8
Comorbid conditions		
Without comorbid condition	20	24.7
With comorbid condition	61	75.3
Hypertension	44	54.3
Diabetes mellitus	5	6.2
Diabetes mellitus + Hypertension	10	12.3
Other	2	2.5

Table 4 (continued)

Health information	**Number (n)**	**Percentage (%)**

Serum Creatinine	$\bar{x}$ = 9.2, *SD* = 3.63, Min = 2.4, Max= 21.3		
eGFR (Cockcroft and Gault in mL/ min mL/ min per 1.73 m^2)	$\bar{x}$ = 8.35, *SD* = 4.09, Min = 3, Max =27		
□ 15 mL/ min		76	93.8
> 15 mL/ min		5	6.2

Description of the studied variables

The variables that are being studied in this study are Self-management (physical activity, medication adherence, hemodialysis adherence, fluid restriction adherence, and diet restriction adherence), self-efficacy, social support and health literacy. Table 5 presented the description of the variables.

Table 5 Mean and standard deviation (*SD*) of the variables (*n* = 81)

Variables	**Possible score**	**Actual score**	$\overline{X}$	***SD***
Self-Management	1 - 5	1 - 3	2.17	0.61
Physical activity	1 - 5	1 - 5	1.64	1.17
Medication adherence	1 - 5	2 - 3	2.39	0.26
Fluid restriction adherence	1 - 5	1 - 3	2.16	0.58
Diet restriction adherence	1 - 5	2 - 3	2.77	0.43
HD adherence	1 - 5	1 - 3	2.96	0.19
Self-efficacy	6 - 60	6 - 57	30.00	13.48
Social support	12 - 84	12 - 80	56.02	16.95
Health literacy	4 - 20	4 - 20	9.28	4.12

From table 5 the mean score of self-management was 2.17 (*SD* = 0.61), which was considered as moderate level. Mean score of: Medication adherence was 2.39 (*SD* = 0.26), fluid restriction adherence was 2.16 (*SD* = 0.58), diet restriction adherence was 2.77, (*SD* = 0.43), and hemodialysis adherence was 2.96, (*SD* = 0.19). For physical activity the participants had a mean of 1.1.64 (*SD* = 1.17). Mean score of self-efficacy was 30 (*SD* = 13.48), mean score of social support was 56.02 (*SD* = 16.95), and mean score of health literacy was 9.28 (*SD* = 4.12).

Predictors of self-management of ESRD patients undergoing hemodialysis in Bhutan

Initial analyses were conducted to test the assumptions of regression analysis including normality of dependent and independent variables, autocorrelation, multi-collinearity, homoscedasticity and linearity. The results showed normal distribution of self-management, self-efficacy, social support, and health literacy. Kolmogorov-Smirnov with significance value > .05 indicated normal distribution. Autocorrelation means the scores can be repeating patterns or scores of samples are not independent. In the model summary table, Durbin-Watson test value of 1.91 indicted no autocorrelation as Durbin - Watson test value between 1.5 - 2.5 denotes no autocorrelation (Tabachnick and Fidell, 2007). The tolerance values were all greater than .1 and Variance Inflation Factor [VIF] values were all less than 2 indicating no multicollinearity among the predictors. Standardized residual value was between + 3.00 and - 3.00 indicating no multivariate outlier. Linearity was tested using both statistics and scatterplot. The values for linearity and deviation from linearity were all significant, indicating linearity. Scatterplot showed that the residual means were on the same straight line, therefore linearity and homoscedasticity assumption was met.

Pearson's correlation test was performed to determine the relationships between self-management of ESRD patients undergoing hemodialysis, self-efficacy, social support, and health literacy. Standard multiple regression was used to test the influences of the self-efficacy, social support, and health literacy on self-management of ESRD patients undergoing hemodialysis in Bhutan. Table 6 provides the details of the correlation.

Table 6 Correlation between predictors and self-management (n = 81)

	Health literacy	**Social support**	**Self-efficacy**	**Self-management**
Health literacy	1			
Social support	-.006	1		
Self-efficacy	.229*	.403**	1	
Self-management	.116	.447**	.496**	1

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

From the correlation matrix, self-management significantly associated with self-efficacy (r = .496, p < .001) and social support (r = .447, p < .001), but there was no association with health literacy (r = .116, p > .05).

Factors predicting self-management

Standard multiple regression analysis illustrated that self-management in patients with ESRD undergoing hemodialysis was significantly predicted by self-efficacy ($\beta = .367$, $p = .001$) and social support ($\beta = .300$, $p = .005$). Health literacy was not showed as significant predictor of self-management ($\beta = .034$, $p = .729$). The final regression model indicated that self-efficacy, social support, and health literacy explained 32 % of the variance in self-management of ESRD patients undergoing hemodialysis ($R^2 = .320$, $F_{[3, 77]} = 12.081$, $p < .001$). The results were presented in table 7

Table 7 Summary of regression analysis for variables predicting self-management of ESRD patients undergoing hemodialysis ($n = 81$)

Predicting variables	***B***	**SE**	**β**	***t***	***p*-value**
Self-efficacy	.182	.053	.367	3.459	.001
Social support	.118	.041	.300	2.900	.005
Health literacy	.054	.154	.034	.348	.729
Constant = 41.284, $R^2 = .32$, $F_{[3, 77]} = 12.081$, $p < .001$					

Thus, predicting equations was as follows:

Self-management = 41.28 + .182 (self.efficacy) + .118(social support) + .054(health literacy)

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter presents the summary and discussion of the study findings. In addition, implications of the study findings are discussed in relation to nursing practices, education, and research as well as recommendations.

Summary of the findings

This predictive study aimed to explore self-management and examine the predictive relationships of self-efficacy, social support, and health literacy towards self-management of the ESRD patients undergoing hemodialysis in Bhutan. Self-management theory by Lorig and Holman (2003) provided a conceptual framework for this study. Convenience sampling was adopted to recruit 81 participants of a dialysis center in Bhutan. Data were collected using structured interview questionnaires. The package of questionnaires consisted of demographic data questionnaire, IPAQ-SF (Booth, 2000), ESRD - AQ (Kim et al., 2010), SEMCD - 6 (Lorig et al., 2001), MSPSS (Zimet et al., 1988), and BHLS (Haun et al., 2009).

Findings revealed that 59.3 % of the participants were female (n = 48) and 40.7 % were male (n = 33) with a mean age of 47.96 years (SD = 15.03), ranging from 20 to 77 years old. 38.3 % of the participants were young adults (20 - 39 Years), 34.6% were middle aged adults, and 27.2 % were older adults. Majority of the participants presented with normal cognitive function (67.9 %) and had education lower than primary level (63 %). Most of the participants were married (81.5 %), lived with family (76.54 %), and were unemployed (85.2 %). The average monthly family income was Ngultrum 15,553.09 (SD = 14942) (approximately USD 230).

The duration of being prescribed of hemodialysis ranged from 1 month to 240 months (20 years), with a mean of 38.95 months (SD = 47.44). Majority of the participants had hemodialysis □ 2 times per week (97.6 %) with time duration of attendance for 4 hours per hemodialysis session (77.8 %), 6.2 % doing for 3.5 hours and 16 % doing for 3 hours. 75.3 % of the sample had associated comorbid conditions in which hypertension was leading (n = 54), diabetes mellitus (n = 15), and some having other comorbidities. The average serum creatinine was 9.2 mg/ dl (SD = 3.63) with a range of 2.4 to 21.3 mg/ dl. The mean of estimated glomerular filtration rate (eGFR) by Cockcroft Gault equation was 8.35 ml/ min per 1.73 m^2 (SD = 4.09) with almost all participants having eGFR □ 15 ml/ min per 1.73 m^2 (93.8 %). The mean score of self-management was ($\bar{x}$ = 2.17, SD = 0.61), which was considered as moderate level. Mean

score of Medication adherence ($\bar{x}$ = 2.39, *SD* = .26), fluid restriction adherence ($\bar{x}$ = 2.16, *SD* = 0.58), diet restriction adherence ($\bar{x}$ = 2.77, *SD* = 0.43) and hemodialysis adherence ($\bar{x}$ = 2.96, *SD* = 0.19). For physical activity the participants had a mean score of 1.64 (*SD* = 1.17). Mean score of self-efficacy was 30 (*SD* = 13.48), mean score of social support was 56.02 (*SD* = 16.95), and mean score of health literacy was 9.28 (*SD* = 4.12).

Pearson's correlation test revealed that self-management was significantly correlated to self-efficacy (*r* = .496, *p* < .001) and social support (*r* = .447, *p* < .001), while it was not statistically significant to health literacy (*r* = .116, *p* > .05). Standard multiple regression analysis indicated that self-management of ESRD patients undergoing hemodialysis was predicted by self- efficacy (β = .367, *p* = .001) and, social support (β = .300, *p* = .005). Health literacy was not significant predictor of self-management (β = .034, *p* = .729). The regression model of self-efficacy, social support, and health literacy explained 32 % of the variance in self-management of ESRD patients undergoing hemodialysis (R^2 = .32, $F_{[3, 77]}$ = 12.081, *p* < .001).

Discussion

1. Level of self-management

The findings of the study revealed that self-management of ESRD patients undergoing hemodialysis in Bhutan, was at a moderate level ($\bar{x}$ = 2.17, *SD* = 0.61). The results showed moderate level of medication adherence ($\bar{x}$ = 2.39, *SD* = 0.26); fluid adherence ($\bar{x}$ = 2.16, *SD* = 0.58); diet adherence ($\bar{x}$ = 2.77, *SD* = 0.43); and hemodialysis adherence ($\bar{x}$ = 2.96, *SD* = 0.19), while physical activity level was low ($\bar{x}$ = 1.64 *SD* = 1.17). The findings of this study were consistent to that of previous studies (Broers et al., 2017; Efe & Kocaöz, 2015; Khan, Shah & Hameed, 2014; Naalweh et al., 2017; Rifkin et al., 2010) which found low level of physical activity, moderate medication and hemodialysis adherence and, low to moderate fluid and diet adherence.

The possible reasons for moderate level of self-management in this sample could be due to more female participants in the sample (59.3 %). Previous studies suggest that relative to men, women were less adherent to medication (Chen, Lee, Liang, & Liao, 2014). Especially in Bhutan this may be due to the fact that the traditional role of women in Bhutan is the primary caregiver of the household. This may leave them too busy and preoccupied resulting in forgetting to take their medicines (Khan, et al., 2014). Contradicting the findings of the study, Tamie Nakao, Gorayeb and Cardeal, (2016) found women to be more adherent to diet and medication when compared to men. Low level of physical activity in Bhutanese end-stage renal

patients could possibly be due to fatigue. A study by Delgado, and Johansen (2012) found that fatigue is a barrier to physical activity in dialysis patients. In this study it was evident that fatigue due to deranged kidney function with 93. 8% participants having GFR □ 15ml/ min per 1.73 m^2 ($\bar{x}$ = 8.35, *SD* = 4.09) (Wang et.al., 2016). A survey in general Bhutanese population revealed that Bhutanese women (69%) significantly had low physical activity as compared to men (Ministry of Health, 2009). This could be attributed to their way of life as they were not using walking and cycling for transportation, and their recreation time included sedentary activities (Ministry of Health, 2009). Participants' were skeptical about fear of damaging or rupturing the arteriovenous fistula if they perform vigorous physical activity, so this could also be another contributing factor to low level physical activity in Bhutanese ESRD people. Since, physical activity leads to fluctuation in blood pressure, people with ESRD might be at risk as both higher and lower blood pressure has been found to be detrimental to their health (Mazzuchi, Carbonell, & Fernández-Cean, 2000: Stern, Sachdeva, Kapoor, Singh, & Sachdeva, 2014). High level of serum creatinine also depicted moderate self-management in the field of diet restrictions. Findings of the study revealed 100 % participants having extremely high serum creatinine ($\bar{x}$ = 9.2, *SD* = 3.63). Study conducted by Rosman et al. (1984) reported that restricting protein diet lowered the level of serum creatinine. Non-adherence to diet restriction could be due to the dietary culture which includes mainly rice, cheese, and meat with salt used as seasoning follower by butter used in cooking. A survey by Ministry of Health (2009) revealed that 66 % of the participants consumed very less amount of fruits and vegetables, and this could be attributed to less choice of healthy food due to inadequate supply of healthy and fresh food during monsoon and winter seasons (Om, 2013)

Moderate level of self-management in this study could also be explained by the fact that the participants had low education level, and low financial status. Since, 63 % of the participants in this study were uneducated, and 85.2 % were unemployed with 47 % of the population having monthly family income of less than Ngultrum (Nu.)10, 000 ($\bar{x}$ = 15553, *SD* = 14942), which could be considered as minimum for a family of 4 to 5 members. An acceptable level of education is necessary to ensure that the people are able to access information and resources important for self-management, which will further guide them in seeking, understanding, and processing information while making informed health decisions for improving self-management. Likewise, adequate income is important for obtaining resources necessary for maintaining good health status, as it is believed that income is the main reason behind striking health disparities. People with lower income report of poorer health (Bueno, 2011; Fraser et al., 2012; Woolf et.al. 2015).

Furthermore, moderate level of self-management in Bhutanese end-stage renal patients on hemodialysis could be justified by examining the concomitant presence of comorbid conditions. Results of this study revealed that 75.3 % of the participants had associated comorbid conditions, with some participants reporting of multiple disease conditions. As the number of comorbid conditions increases, physical functioning decreases and individuals will be burdened by the responsibility of taking care of different conditions individually. For example, a patient with ESRD having both diabetes mellitus and hypertension will have to involve self-management activities addressing all three conditions, while patient with only one disease condition has to focus on controlling only one. A study by Patrick, Kinne, Engelberg, and Pearlman (2000) found that number of comorbidities resulted in increased disability leading to decreased level of physical functioning causing burden on patients. Effectively managing these disease condition could be an important step towards improving the self-management. Congruently, Wasse, Zhang, Johansen, and Kutner (2013) found that dialysis patients with comorbid conditions associated significantly with low level of daily tasks of self-management. Moderate adherence to hemodialysis could be explained by the findings of the study which revealed that 97.6 % of the sample received hemodialysis 2 times per week, which is lesser than the recommended 3 days per week by National Kidney Foundation (2017). Less than recommended number of hemodialysis sessions may result in low GFR which may ultimately lead to impaired cognition and poor physical functioning of the individual (Kurella, Chertow, Luan, & Yaffe, 2004). Findings of moderate adherence to hemodialysis attendance was consistent to Naalweh et al. (2017).

Cognitive impairment has been recognized as a complication of ESRD which may even be present in patients having adequate dialysis. Previous studies have reported of 16 % - 38 % of ESRD patients being affected by cognitive impairment including dementia (Tamura & Yaffe, 2011). Presence of mild cognitive impairment in 32.1 % of the sample could yet be another reason for moderate self-management of ESRD patients in Bhutan, as substantiated by the presence of vascular diseases like hypertension, and diabetes in 72.83 % of the sample in this study. Records from Ministry of Health [MOH], Bhutan shows that the number of patients with diabetes has increased from 4,097 cases in 2012 to 12,120 cases in 2016. While the incidence of hypertension has increased from 27, 023 cases in 2012 to 30, 260 in 2016 (MoH, 2017). Patel, Dasgupta, Tadros, and Baharani, (2015) in their study discussed that vascular disease along with acute events of stroke were the main cause of cognitive impairment in hemodialysis patients. Mild cognitive impairment can be described as decline in cognitive function associated with normal ageing but not having the characteristics of dementia (where there is impairment of mental process such as attention, concentration, learning and memory , thus affecting activities of

daily living) (Tamura & Yaffe, 2011). Evidences have reported of cognitive impairment leading to increased need for assistance in daily task of self-management and hampering quality of life, and changes in cognitive function was reported to have negative impact on self-management tasks such as treatment adherence and activities of daily living (Schneider, Kielstein, Braverman, & Novak, 2015).

Finally, age could possibly explain the moderate level of self-management in Bhutanese end-stage renal patients on hemodialysis. Majority of the participants were young to middle aged adults (72.9 %) with age range of 20 to 59 years. A study by Khan et al. (2014) revealed similar result where younger and middle-aged adults were non-adherent and older adults showed 100 % adherence. Forgetfulness, and inconvenience of controlling diet and fluid were the main reasons of non-adherence in the participants of this study. The possible reason for forgetfulness and inconvenience could be supported by the fact that young adults were more engaged in taking care of their daily schedule (especially women have to take care of their children and family) which might have led them to forget taking medicine on time, along with that young people have larger social circle than the older adults, thus to fit in the social circle, they may divert from their recommended dietary and fluid intake. Young people have the natural disposition to travel more than older people which might have caused them inconvenience to adhere to their medication, dietary, fluid, and hemodialysis attendance adherence, while people with older age have physical limitation and do not travel much and, elderly family members receive more care and support from the family which might lead to better adherence (Wasse, Zhang, Johansen, & Kutner, 2013).

2. Factors influencing self-management of ESRD patients undergoing hemodialysis in Bhutan

The findings of this study indicated that 32 % of the variability in self- management of ESRD patients undergoing hemodialysis in Bhutan could be explained by self-efficacy ($\beta = .367$, $p = .001$) and social support ($\beta = .300$, $p = .005$). but could not be explained by health literacy ($\beta = .034$, $p = .729$). However, the regression model revealed that the variables had important role in predicting self-management in end-stage dialysis patients ($R^2 = .32$, $F_{[3, 77]} = 12.08$, $p < .001$).

The findings of this study showed positive correlation of self-management to self-efficacy ($r = .496$, $p < .001$) and social support ($r = .447$, $p < .001$). This associations can be explained by self-efficacy theory (Bandura, 1977) which describes self-efficacy as vital component of behavior cognition. Self-efficacy acts as fundamental in developing and maintaining new behaviors for self-management. It provides a person with confidence which aids them to develop and engage in self-management tasks, and the presence of social support boosts their confidence thus encouraging them to be more self-efficacious to participate more in self-management.

Simultaneously supporting the objective of the study, self-efficacy was a significant predictor of self-management, and this result could be explained by the fact that people generally do not do something which they think they cannot perform. Individual require self-confidence in order to achieve a task successfully unless a person is prepared enough for a change they do not try to pursue the activity. The self-efficacy theory (Bandura, 1977), states that self-efficacy is a cognitive phenomenon based on self-confidence of an individual which aids in developing new pattern of cognitive and emotional behavior and enables oneself to monitor the developed behavior. Hence, it can be concluded that ESRD patients should inculcate high self-efficacy for better self-management. Thus, self-efficacy was seen as an influential factor in all three components of self-management theory: medical or behavioral management, role management, and task management. Self-efficacy was showed to be an influencing factor in self- management of people undergoing hemodialysis (Li et al., 2014). Therefore, some previous studies examined the association and influence of self-efficacy on self-management.

The findings of this study were consistent with results of previous studies by Curtin et al. (2008) and Li et al. (2014), where self-efficacy significantly associated with self-management, and predicted various components of self-management. A study by Nelson, McFarland, and Reiber (2007) was in tune with findings of this study where most of the participants had low self-efficacy with low level of physical activity and were non-adherent to medication. In a review by Greenberger, Dror, Lev, and Hazoref (2014), self-efficacy explained 31.5 % and 34.5 % variance in the self-management of diet and exercise routine respectively. Consistently, Meyer et al. (2016) found that self-efficacy significantly influenced physical activity in ESRD patients ($R^2 = 0.51$, $p = .001$) where participants with higher self-efficacy of physical activity were more likely to adhere to physical activity/ exercise. Higher fluid restriction associated positively with self-efficacy (Lindberg & Fernandes, 2010). Therefore, self-efficacy play important role in self-management of ESRD patients.

Social support presented as important predictor of self-management in this study and was positively associated with self-management ($r = .447$, $p < .001$). Participants in this study received moderate level of social support ($\bar{x} = 56.02$, $SD = 16.95$), from their significant others, family members and friends. Therefore, it can be seen that availability of social support directly influences the level of self-management. A possible explanation could be that when a person feels the availability of social support, they feel accepted and more confident in performing and monitoring their self-management activities (Schaffer, 2004). It is believed that having strong social support enhances psychological wellbeing as social support is seen as a source of encouragement and resources in performing self-management

tasks (Dolan, 2017). According to social cognitive theory (Bandura, 1977) learning occurs in social environment, where individuals learn and acquire behavioral roles by observing the environment, and by replicating the action of others in their social network. It believes in learning from the social networks such as friends and family. Hence, a better social support enhances learning by providing favorable environment.

Living with family and having a spouse indicated a good source of social support amongst the participants. 81.5 % of the participants were married and 76.54 % of them stayed with family and had mean of 56.02 (SD = 16.95) for social support. Self-efficacy however ranged from low to moderate with a mean of 30 (SD = 13.48). Past studies have shown that availability of social support enhances self-efficacy ultimately improving self-management by developing confidence in self-care (Cheng & Weng, 2018). Higher level of social support and self-efficacy are associated with better self-management activities such as medication adherence, diet and fluid recommendation adherence (Cohen et al., 2007; Patel et al., 2005; Spinale et al., 2008).

According to Bhutanese culture people mostly live with family where it is the responsibility of the members to take care of the sick, especially when the sick person is dependent and unemployed. The findings of this study were consistent to Cheng and Weng (2018) which found social support to be a strong predictor of self-management and, majority of their participant depended on family for their care. Likewise, Cohen et al. (2007) found that patients with lower level of social support had greater likelihood of noncompliance and low level of self-management. There are several previous studies on chronic illness that are consistent with the findings of this study (Almdal, Jensen, & Willaing, 2012; Cheng & Weng, 2018; Li, Jiang, & Lin, 2014; Schiøtz, Bøgelund, Spinale et al., 2008) where social support influenced different aspects of self-management. Consistent to the results of this study social support was significantly associated with self-management of adherence to recommended regimen (r = .64, p < .001), and was also the strongest predictor of self-management (Cheng & Weng, 2018). Social support explained 32.4 % variance of self-management in chronic kidney patients (Cheng & Weng, 2018). A supportive environment encourages, promotes and, facilitates participation in physical activity, where family and friends were seen as a major source of social support (Dolan, 2017; Schiøtz et al., 2012). A study by Gu et al. (2017) found that social support significantly influenced medication adherence (β = 0.08, p = 0.003) and explained 2 % of the variance independently in T2DM patients. Another study by Theodoritsi et al., (2016) found significant association of social support from family, friends and, significant others with dietary adherence of hemodialysis patients. Similarly, Hemodialysis adherence, medication and diet adherence was reported to be significantly associated with social support (Tamie Nakao, Gorayeb &

Cardeal, 2016).

Health literacy though perceived to have significant association with self-management in previous studies (Curtin, et al., 2008; Cheng & Weng, 2018; Geboers et al., 2014), has no significance in this study ($r = .116$, $p > .05$). Contradicting the findings of previous studies, in this study health literacy did not predict self-management ($\beta = .034$, $p = .729$). The findings of the study were not consistent with other studies (Browne & Merighi, 2010; Cheng & Weng, 2018; Schinckus, Dangoisse, Van den Broucke, & Mikolajczak, 2017) which found health literacy to be associated with and predicting self-management. In previous studies, health literacy was found to be significantly associated with poor physical activity (Wolf, Gazmararian, & Baker, 2007), increased incidence of missed dialysis attendance (Green et al., 2013), less adherence to medications (Browne & Merighi, 2010), and low adherence to dietary and fluid restrictions (Fincham, Kagee, & Moosa, 2008). However, findings of this study were congruent with that of Londono and Schulz (2015) who reported that overall health literacy did not influence self-management even when they thought it was vital in obtaining and processing information. The possible reason for no association and prediction could be the relationship between the level of health literacy and the support they receive. It is believed that low health literacy decreases self-management abilities, as patients with low health literacy usually would be shy to asking questions, and have difficulty in reading and gaining health related information, thus needing more assistance for gaining information (Cheng & Weng, 2018). However, in this study, participants despite having low health literacy did not have difficulty in gathering and understanding information due to presence of support/ assistance. They were always accompanied by a literate family member to the hospital or were helped by the health staffs in gathering information, which was consistent with Cheng and Weng (2018), that most patients relied on health care providers and family to manage their care. Hence, self-management of the participants did not differ from those with adequate health literacy. Another reason could be, that the patient may not be able to comprehend the medical terminologies found on prescriptions even if they were able to read, thus making no significant change in self-management whether adequately literate or not. Therefore, self-management was moderate even when 61.7 % of the participant had low health literacy with a mean of 9.28 ($SD = 4.12$). Another possible reason for no significant association and prediction of self-management by health literacy could be due to instrument used for measurement. Though BHLS has been used in previous studies of chronic kidney disease, it mainly focuses on reading and understanding the health information, and does not include the concept of gathering health information, taking health related action, and decision making which the research intends to study. Therefore, these reasons could make

health literacy non-significant predictor of self-management in ESRD patients undergoing hemodialysis in Bhutan.

Implications of the findings

Nursing practice

This study provides evidence for nurses to enhance self-management in ESRD patients undergoing hemodialysis and provides information to develop new interventions for self-management. It also provides insight on reinforcing self-efficacy, social support, and health literacy for self-management in the clinics, and might include family members in self-management enhancing interventions. Based on the findings of the study, nurses in collaboration with health care team could encourage ESRD patients on hemodialysis to perform moderate intensity physical activity/ exercise during their dialysis session because physical activity was relatively low in ESRD patients undergoing hemodialysis as compared to other self-management activities.

Nursing education

The findings of this study might be used by nurse educators to educate new nurses and nursing students to improve self-management of ESRD patients undergoing hemodialysis. The findings of the study can be used as a resource for continuing nursing education such as short-term training courses and on the job training for nurses and other health professionals/care providers to improve self-management of ESRD patients.

Future research

Findings showed that self-efficacy and social support predicted self-management while health literacy did not predict self-management of ESRD patients undergoing hemodialysis. Based on the findings of this study, in future interventional/experimental studies should be performed. Experimental study should be performed by incorporating self-efficacy enhancing interventions in self-management of ESRD patients. Future studies should consider use of more appropriate instrument to measure intended components of health literacy.

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APPENDICES

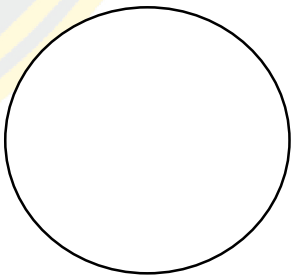
APPENDIX A

Questionnaires

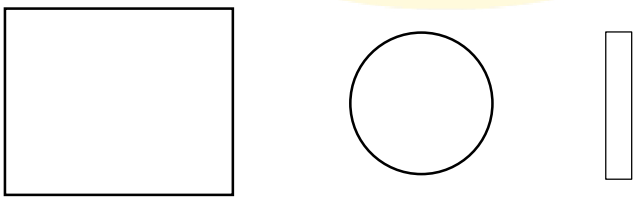
Part I: Saint Louis University Mental Status [SLUMS] examination questionnaire

Patient Serial Number ..... Age..... Is patient alert? .....Level of education.....

1. What day of the week is it? [1]
2. What is the year? [1]
3. What dzongkhag are we in? [1]
4. Please remember these five objects. I will ask you what they are later.
   Apple Pencil Tree House Car
5. You have Nu.100 and you go to the store and buy a dozen apples for Nu. 3 and a tricycle for Nu.20.
   How much did you spend? [1]
   How much do you have left? [2]
6. Please name as many animals as you can in one minute.
   0-5 animals [0] 5-10 animals [1] 10-15 animals [2] 15+ animals [3]
7. What were the 5 objects I asked you to remember? 1 point for each one correct. [5]
8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24.
   87 [0] 649 [1] 8537 [1]
9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock.
   Hour markers okay [2] Time correct [2]



10. Please place an X in the triangle. [1]



11. Which of the above figures is largest? [1]
12. I am going to tell you a story. Please listen carefully because afterwards, I'm going to ask you some questions about it.
    Deki was a very successful business woman. She made a lot of money. She then met Dorji, a very handsome man. She married him and had three children. They

lived in Thimphu. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Dorji lived happily ever after.

What was the female's name? [2] What work did she do? [2]

When did she go back to work? [2] What state did she live in? [2]

Scoring		
High school education		Less than high school
27-30	Normal	20-30
20-27	Mild cognitive impairment	14-19
1-19	Dementia	1-14

*names are changed according to the place of study.

Part II: Demographic data questionnaire

Direction: Please read question 1-10 carefully and give the most honest of your response. There is no right or wrong answers for these questions. Questions 11- 17 will be collected by the researcher from the medical records. Please answer all the questions in the space provided.

1. Age: .....years
2. Gender:
   □ Male □ Female
3. Marital Status
   □ Single □ Married □ Divorced □ Widowed
4. Education level
   □Less than Primary □ Primary School □ Lower Secondary
   □ Higher Secondary □ College or above
5. .....
6. .....
7. .....
8. Duration of diagnosis (years and months) .....
9. Frequency of hemodialysis per week.....
10. Duration on hemodialysis (hours and minutes) .....
11. .....
12. .....
13. .....

14. .....

15. Latest serum creatinine: .....

16. eGFR (Cockcroft and Gault):.....

PART III: QUESTIONNAIRES FOR MEASURING SELF-MANAGEMENT

2.1. The international physical activity questionnaire short form [IPAQ – SF]

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport. Think about all the **vigorous activities** that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.		
During the last 7 days, on how many days did you do vigorous physical activities	Yes Specify how many days per week ____ Days No (**Skip to question 3**)	P1
How much time did you usually spend doing vigorous physical activities on one of those days?	_____ Hours per day _____ minutes per day	P2
Physical Activity continued		
Think about all the **moderate activities** that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.		
During the last 7 days, on how many days did you do moderate physical activities	Yes _____ days per week No (**Skip to question 5**)	P3
How much time did you usually spend doing moderate physical activities	_____ Hours per day _____ minutes per day	P4
Think about the **time you spent walking** in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.		

During the last 7 days, on how many days did you walk	____ days per week No (**Skip to question 7**)	P5
Physical Activity continued		
How much time did you usually spend walking on one of those days?	_____ hours per day _____ minutes per day Don't know/Not sure [3]	P6
The last question is about the **time you spent sitting** on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.		
During the last 7 days, how much time did you spend sitting on a week	____ hours per day _____ minutes per day Don't know/Not sure	P7

PART B: The end-stage renal disease adherence questionnaire [ESRD-AQ]

This survey asks for your opinion about how well you follow your dialysis treatment schedule and about medical recommendations related to medication, diet, and fluid intake. This information will help us to understand if you have difficulty following your dialysis treatment, medication regimen, fluid restriction, and recommended diet. Please answer every question by marking the appropriate box. If you are unsure about how to answer, please choose one best answer that applies to you. Note: Numbers in parentheses are the response codes.

I. General Information	
1. When did you begin or restart your hemodialysis treatment?	Beginning Date: MM/YYYY
2. Have you ever had chronic peritoneal dialysis treatment?	No (1) Yes(2) (Please answer below) I had peritoneal dialysis from.....to.....
3.	.....
4.	.....
5. Who accompanies you to the dialysis center?	□ Myself (1) □ Parent (2) .....
II. Hemodialysis Treatment	
6. How many days a week do you receive hemodialysis treatment?	□ 2 days or less (1) □ 3 days (2)

	□ 4 days (3) □ More than 4 days (4) .....
7. **How many hours are you treated for each hemodialysis?**	□ Less than 3 hours (1) □ 3 hours (2) .....
8. **Is your dialysis schedule convenient for you? (Please choose one best answer that applies to you.)**	□ Yes (1) □ No, because I have to come to the dialysis center .....
9.....	.....
10.	.....
11. **How important do you think it is to follow your dialysis schedule?**	□ Highly important (1) □ Very important (2) □ Moderately important (3) □ A little important (4) □ Not important (5)
12.	.....
13. **How much difficulty have you had staying for your entire dialysis treatment as ordered by your doctor**	□ No difficulty (1) □ A little difficulty (2) □ Moderate difficulty (3) □ A lot of difficulty (4) □ Extreme difficulty (5)
14. **During the last month, how many dialysis treatments did you miss completely?**	□ None (I did not miss any treatments) (1) □ Missed one dialysis treatment (2) □ Missed two dialysis treatments (3) □ Missed three dialysis treatments (4) .....
15	.....
16	.....
17	.....
18	.....
19	.....
20	.....
21	.....
III. Medication	
22. **How important do you think it is to take your medicines as scheduled?**	□ Highly important (1) □ Very important (2) □ Moderately important (3) □ A little important (4) □ Not important (5)
23. **Why do you think it is important to**	□ Because I fully understand that my kidney condition requires to take

take your medicines as scheduled? (Please choose one best answer that applies to you.)	medicines as scheduled (1) .....
24	.....
25. How much difficulty have you had with taking your prescribed medicines?	□ No difficulty (1) □ A little difficulty (2) □ Moderate difficulty (3) □ A lot of difficulty (4) .....
26. During the past week, how often have you missed your prescribed medicines?	□ None of the time: I did not miss my medicines (1) □ Very seldom (2) .....
27. What was the main reason for not taking your prescribed medicines this past week?	□ Not applicable: I did not miss medicines (1) .....
28.	.....
29.	.....
30.	.....
IV. Fluid	
31. During the past week, how often have you followed the.....	□ All of the time (1) .....
32. How important do you think it is to limit your fluid intake?	□ Highly important (1) □ Very important (2) .....
33.	.....
34.	.....
35. How much difficulty have you had following your fluid restriction recommendations?	□ No difficulty (1) □ A little difficulty(2) □ Moderate difficulty (3) .....
36.	
37.	.....
38. How important do you think it is to weigh yourself daily?	□ Highly important (1) □ Very important (2) .....
39	.....
40	.....
V. Diet	
41. How important do you think it is to watch the types of food you eat each day?	□ Highly important (1) □ Very important (2) .....
42	.....
43	.....
44. How much difficulty have you had	□ No difficulty(1)

following your dietary recommendations?	□ A little difficulty(2) □ Moderate difficulty (3) .....
45. What type of difficulty have you had keeping your dietary recommendations?	□ Not applicable: No difficulty (1) □ I was not willing to control what I want to eat (2) .....
46. During the past week, how many times have you followed the diet recommendations?	□ All of the time (1) □ Most of the time (2) .....

PART IV: QUESTIONNAIRES FOR MEASURING FACTORS RELATED TO SELF-MANAGEMENT

Part A: self-efficacy for managing chronic disease 6-item scale [SEMCD-6]

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number from the scale provided below that best corresponds to your confidence that you can do the tasks regularly at the present time.

Not at all confident 1 2 3 4 5 6 7 8 9 10 Totally confident

		1	2	3	4	5	6	7	8	9	10
1	How confident do you feel that you can keep the fatigue caused by your disease from interfering with the activities you want to do?										
2	.....										
3	How confident do you feel that you can keep the emotional distress caused by your disease from interfering with the activities you want to do?										
4	.....										
5	.....										
6	How confident do you feel that you can do activities other than just taking medication to reduce how much your illness affects your everyday life?										

PART B: Multidimensional scale of perceived social support [MSPSS]

Instructions: We are interested in how you feel about the following statements. Read each statement. Carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
Circle the "2" if you **Strongly Disagree**
Circle the "3" if you **Mildly Disagree**
Circle the "4" if you are **Neutral**
Circle the "5" if you **Mildly Agree**
Circle the "6" if you **Strongly Agree**
Circle the "7" if you **Very Strongly Agree**

		1	2	3	4	5	6	7	
1	There is a special person who is around when I am in need.								SO
2	There is a special person with whom I can share my joys and sorrows.								SO
3	My family really tries to help me.								Fam
4	.....								Fam
5	.....								SO
6	My friends really try to help me.								Fri
7	I can count on my friends when things go wrong.								Fri
8	I can talk about my problems with my family.								Fam
9	I have friends with whom I can share my joys and sorrows.								Fri
10	There is a special person in my life who cares about my feelings								SO
11	My family is willing to help me make decisions.								Fam
12	I can talk about my problems with my friends.								Fri

The items tended to divide into factor groups relating to the source of the social support, namely family (Fam), friends (Fri) or significant other (SO)

PART C: BRIEF Health Literacy Screen (BHLS)

Please circle the answer that best represents your response.

	Questions	**1**	**2**	**3**	**4**	**5**
		Always	**Often**	**Sometimes**	**Occasionally**	**Never**
1	How often do you have someone help you read hospital materials?					
2	.....					
3	.....					
		Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Extremely**
4	How confident are you filling out medical forms by yourself?					

APPENDIX B

Information sheet and consent forms

PARTICIPANT'S INFORMATION SHEET

Dear .....

I am Dipsika Rai, a graduate student at the Faculty of Nursing, Burapha University Thailand. My study entitled, "Factors influencing self-management of End –Stage Renal Disease people undergoing hemodialysis in Bhutan". The objective of the study are to explore self-management of the end-stage renal disease patients undergoing hemodialysis and to examine the predictive relationships of self-efficacy, social support and health literacy towards self-management of end-stage renal disease patients undergoing hemodialysis in Bhutan.

Participation in this study is voluntary. You have the right to end your participation at any time without affecting your normal health care and is not necessary to inform the researcher. If you agree to participate in this study, you will be asked to answer some questions which may take about 1 hour. There are no identified risks with participating in this study. Any information collected in this study, including the identity will be kept confidential. A coding number will be assigned to your record 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. You will receive a further and deeper explanation of the nature of the study upon its completion, if you wish.

The research will be conducted by Ms. Dipsika Rai under supervision of my major- advisor Associate Professor Dr. Aporn Deenan. If you have any questions or for further information please contact me at telephone: 17769077 or by email: dipbuttang@yahoo.com and /or my advisor's email address: apornd@buu.ac.th. REBH Secretary: at Tel: +975-2-322602 or email at msgurung@health.gov.bt or tashidema@health.gov.bt. Your cooperation is greatly appreciated.

Dipsika Rai

APPENDIX C

Permission letter to use instrument

APPENDIX D

Approval and permission letters

THE INSTITUTIONAL REVIEW BOARD (IRB) FOR GRADUATE STUDIES
FACULTY OF NURSING, BURAPHA UNIVERSITY, THAILAND

Thesis Title Factors Influencing Self-management of End-stage Renal Disease (ESRD) People undergoing Hemodialysis in Bhutan

Name Ms. Dipsika Rai
ID: 59910039
Master of Nursing Science Program, Pathway of Adult Nursing (International Program)

Number of the IRB approval **12 – 01 – 2561**

The Institutional Review Board (IRB) for graduate studies of Faculty of Nursing, Burapha University reviewed your submitted proposal. The contingencies have been addressed and the IRB **approves** the protocol. Work on this project may begin. This approval is for a period of one year from the date of this letter and will require continuation approval if the research project extends beyond **February 9th, 2019**.

If you make any changes to the protocol during the period of this approval, you must submit a revised protocol to the IRB committee for approval before implementing the changes.

Date of Approval February 9th, 2018

Chintana Wacharasin

Chintana Wacharasin, R.N., Ph.D.

Chairperson of the IRB
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ROYAL GOVERNMENT OF BHUTAN
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RESEARCH ETHICS BOARD OF HEALTH
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Ref. No. REBH/Approval/2018/005 19th March, 2018

REBH APPROVAL LETTER (valid through 18/03/2019)

PI: Ms. Dipsika Rai **Institute:** Jigme Dorji Wangchuck National Referral Hospital, Thimphu	**Study Title**: Factors Influencing Self-management of End-Stage Renal Disease (ESRD) people undergoing Hemodialysis in Bhutan
Co-Investigator(s): 1. Assoc. Professor. Dr. Aporn Deenan and 2. Assistant Professor Dr. Nisakorn Krungkraipetch, Faculty of Nursing, Burapha University, Chonburi Thailand **Proponent of the study:** Individuals	
Mode of Review: Initial Review : ✔ *Expedited Review* Resubmission Review : ✔ *Expedited Review*	
Date of continuing review: *18/01/*2019 Note: Please submit continuing review report along with application form AF/01/015/05 at least seven days before the date of continuing review. If the study is completed then please submit final report of the study.	
List of document(s) approved: Protocol : Version No. 3 Dated: 09th March, 2018 Informed Consent Form : Version No. 3 Dated: 09th March, 2018 Tools (Questionnaire/forms/guides/etc): Version No. 3 Dated: 09th March, 2018	
Conditions for Approval: 1. *This approval is granted for the scientific and ethical soundness of the study. The PI shall be responsible to seek all other clearances/approvals required by law/policy including permission from the study sites before conducting the study.* 2. *Report serious adverse events to REBH within 10 working days after the incident and unexpected events should be included in the continuing review report or the final report.* 3. *No biological material shall be used for other research purpose beyond which is specified in this protocol.* 4. *Any new research study with stored biological material from this study will need a new approval from the REBH before study begins.* 5. *Any changes to the proposal or to the attachments (informed consent and research tools such as forms) shall be approved by REBH before implementation.* 6. *Final report of the study shall be submitted to REBH at the end of the study for review and protocol file closure.*	

(Mr. Cheku Dorji)
Interim Chairperson

For further information please contact: *REBH Secretary:* at *Tel: +975-2-322602* or email at msgurung@health.gov.bt or tashidema@health.gov.bt

Office of Graduate Studies
Faculty of Nursing, Burapha University
169 Longhad Bangsaen Rd., Chon Buri, THAILAND 20131
Tel : +66 38 102 836 Fax: +66 38 393 476

MOE 6206/ 0458

February 14th, 2018

Ministry of Health
Thimphu, Bhutan

Subject: Asking permission for data collection to test the reliability of research instruments

Dear Ministry of Health :

Ms. Dipsika Rai is a master degree student of Faculty of Nursing, Burapha University, Thailand. Presently, she is in the process of conducting her master thesis entitled "*Factors influencing self-management of End-Stage Renal Disease (ESRD) people undergoing hemodialysis in Bhutan*" under supervision of Associate Professor Dr. Aporn Deenan.

In this regard, I am writing to ask your permission to allow Ms. Dipsika Rai to collect data in order to test the reliability of research instruments from 30 participants from Dialysis Center at Jigme Dorji Wangchuk National Referral Hospital and Central Regional Referral Hospital, Bhutan during the period of February 15th – March 15th , 2018. Participants will be asked to complete questionnaires on their own.

Should you need further information of this research project, please contact Ms. Dipsika Rai at dipbuttang@yahoo.com.

Your kind cooperation for this matter will be highly appreciated.

Yours sincerely,

Nujjaree Chaimongkol, RN, PhD, Associate Professor
Dean, Faculty of Nursing, Burapha University
Chon Buri, 20131, THAILAND
E-mail: nujjaree@buu.ac.th
Tel: 66 38 102 809
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Office of Graduate Studies
Faculty of Nursing, Burapha University
169 Longhad Bangsaen Rd., Chon Buri, THAILAND 20131
Tel : +66 38 102 836 Fax: +66 38 393 476

MOE 6206/ 0456

February 14th, 2018

Medical Superintendent
Jigme Dorji Wangchuk National Referral Hospital
Thimphu, Bhutan

Subject: Asking permission for data collection to test the reliability of research instruments

Dear Medical Superintendent:

Ms. Dipsika Rai is a master degree student of Faculty of Nursing, Burapha University, Thailand. Presently, she is in the process of conducting her master thesis entitled "*Factors influencing self-management of End-Stage Renal Disease (ESRD) people undergoing hemodialysis in Bhutan*" under supervision of Associate Professor Dr. Aporn Deenan.

In this regard, I am writing to ask your permission to allow Ms. Dipsika Rai to collect data in order to test the reliability of research instruments from 30 participants from Dialysis Center at Jigme Dorji Wangchuk National Referral Hospital, Bhutan during the period of February 15th – March 15th, 2018. Participants will be asked to complete questionnaires on their own.

Should you need further information of this research project, please contact Ms. Dipsika Rai at dipbuttang@yahoo.com.

Your kind cooperation for this matter will be highly appreciated.

Yours sincerely,

Nujjaree Chaimongkol, RN, PhD, Associate Professor
Dean, Faculty of Nursing, Burapha University
Chon Buri, 20131, THAILAND
E-mail: nujjaree@buu.ac.th
Tel: 66 38 102 809
Fax: 66 38 393 476

To,

The Medical Superintendent

Jigme Dorji Wangchuk National Referral Hospital

Thimphu

Subject: Asking permission for data collection for my thesis titled, "Factors influencing self-management of End-Stage Renal Disease (ESRD) people undergoing hemodialysis in Bhutan".

Respected Sir,

With due respect I would like to lay down following few lines under your kind considerations please. I am Dipsika Rai, a master degree student of Faculty of Nursing, Burapha University, Thailand. Currently I am in the process of conducting my master thesis titled,"Factors influencing self-management of End-Stage Renal Disease (ESRD) people undergoing hemodialysis in Bhutan".

Therefore, I would like to request for your permission for data collection from the dialysis center and renal unit of Jigme Dorji Wangchuk National Referral Hospital.

A copy of following letters has been attached for your reference:

1. Letters asking permission, from Office of Graduate studies, Faculty of Nursing, Burapha University
2. A Copy of Institutional Review Board (IRB) certificate from Faculty of Nursing, Burapha University

Thanking You

Yours Sincerely,

Dipsika Rai

Contact no – 17769077 (email- dipbuttang@yahoo.com)

Approved for data collection. However there should be no disturbance to delivery of service + consent from pt. should be obtained

REFERENCES

มหาวิทยาลัยบูรพา
BURAPHA UNIVERSITY

BIOGRAPHY

NAME	Dipsika Rai
DATE OF BIRTH	08 September 1988
PLACE OF BIRTH	Bhutan
POSITION HELD	Clinical Nurse (2012 – Present) Jigme Dorji Wangchuk National Referral Hospital
HOME ADDRESS	Thimphu, Bhutan
INSTITUTIONS ATTENDED	2006-2010 Sikkim Manipal Institute of Medical Sciences Sikkim, India 2016-2018 Faculty of Nursing Burapha University, Chonburi Thailand