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URINARY INCONTINENCE AND WOMEN'S QUALITY OF LIFE IN OMAN

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URINARY INCONTINENCE AND WOMEN'S QUALITY OF LIFE IN OMAN

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the

Doctorate of Philosophy in the Field of Health Education

Department of Public Health and Recreation Professions

in the Graduate School

Southern Illinois University Carbondale

December 2017

DISSERTATION APPROVAL

URINARY INCONTINENCE AND WOMEN'S QUALITY OF LIFE IN OMAN

By

Alya Ali AL Hasni

A Dissertation Submitted in Partial

Fulfillment of the Requirements

for the Degree of

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in the field of Health Education

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AN ABSTRACT OF THE DISSERTATION OF

ALYA ALI AL-HASNI, for the DOCTOR OF PHILOSOPHY degree in HEALTH EDUCATION AND RECREATION, presented on *October 30, 2017 * at Southern Illinois University Carbondale.

TITLE: URINARY INCONTINENCE AND WOMEN'S QUALITY OF LIFE IN OMAN

MAJOR PROFESSOR: Dr Juliane Wallace

Urinary incontinence (UI) is a common public health concern among women worldwide, with adverse effects on their quality of life (QoL). This study aims to explore the prevalence of UI among Omani women aged 18-49 years old, and to explore the impact of UI on women's daily prayers, physical activities, social life, mental health, and general QoL. The study is of quantitative comparative design, and the researcher used the World Health Organization's (WHO's) International Classification of Functioning, Disability and Health (ICF), as a conceptual framework. The researcher randomly chose four-hundred and one participants from ten primary health care centres in Muscat. The researcher assessed their UI status and impact on different domains of their life using UDI-6 and IIQ-7 respectively, which are validated self-reported questionnaires. From the results, the researcher highlighted the high prevalence (85%) of UI among young Omani women. Additionally, UI did have a statistically significant impact on Omani women's ability to perform their daily prayers, physical activities, social life, mental health, as well as, their general QoL. The use of ICF framework allows policymakers and public health officials to see the big picture of UI as public health concern in Oman. It forms the basis for implementing cost-effective health education programs at the Primary Health Care (PHC) institutions in Oman, for the goal of improving women's health and community health.

DEDICATION

I would like to dedicate this work to my beloved parents, who passed away a long time ago, but they are, and have always been, in my heart and thoughts. I would like to express my gratitude to my beloved mother “Raya”, and my beloved father “Ali” for everything I got in this life. I dedicate the success in my long education journey to both of you, as my first memorable teachers. Both of you did not attend school, yet, you taught me the importance of learning and how powerful one can be with education. Mom, I still remember when I was watching you trying to learn how to read and write by watching others, till you mastered it in a few months. I still remember how good you were in math, without even attending any classes. Those early valuable childhood experiences shaped my learning style, and helped me achieve what I achieved today. Thank you, and God bless you both in your graves.

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CHAPTER 1

INTRODUCTION

Background Information

Urinary incontinence (UI) is a common health condition that can affect women of all ages, with a wide range of severity and symptoms. The International Continence Society (ICS) defines UI as any involuntary loss of urine (Abrams et al., 2010). The ICS considers incontinence under the paradigm of the Lower Urinary Tract Symptoms (LUTS). While this classification includes disorders of either storage or voiding functions of the urinary tract system, researchers consider UI a multi-factorial storage disorder (Abrams et al., 2010; Sandvik, 1996). There are five main types of UI currently known to exist. The three most common types of UI known to occur in women are stress, urge, and mixed incontinence (Hersh & Salzman, 2013; Wood & Anger, 2014).

Stress incontinence occurs when the muscles and tissues around the urethra do not stay closed properly when there is an increase in abdominal pressure, like coughing or sneezing, leading to urine leakage. This type is more common in obese women, as well as, after either normal or assisted vaginal deliveries (Hersh & Salzman, 2013; Wood & Anger, 2014). Urge incontinence, also referred to as overactive bladder, happens when there is a sudden urge to urinate, with the possibility of leaking urine on the way to the toilet. Common triggers of this type include unlocking the door when returning home, turning on the water faucet, or even washing hands (Hersh & Salzman, 2013; Wood & Anger, 2014). Mixed incontinence occurs when women experience symptoms of both stress and urge incontinence (Hersh & Salzman, 2013; Wood & Anger, 2014).

Regardless the type, UI is a social and hygienic problem (Haylen et al., 2010), which can have adverse effects on a woman's quality of life (QoL). Although UI may not have serious physical consequences, it poses tremendous negative consequences on the social, mental and psychological facets of health (Coyne et al., 2012; Golmakani et al., 2014; Virkud, 2011). It represents a degree of disability that may limit a woman's daily functioning.

People often consider UI a taboo topic, and do not prefer to discuss it in society (Sims, Browning, Lundgren-Lindquist & Kendig, 2011). In addition, UI is a costly condition, with the cost attributed mainly to the absorbent pads and laundry (Milsom et al., 2014; Subak et al., 2007). Many studies demonstrated the negative impact of UI on public health, and highlighted the needs for educational programs to address the issue (Seshan, AlKhasawneh, Hashmi & Hamed, 2016; Seshan & Muliira, 2013).

UI is very prevalent among multiparous women who have undergone vaginal delivery, due to recurrent physical trauma to their pelvic floor muscles (Hersh & Salzman, 2013; Peyrat et al., 2002; Wood & Anger, 2014). Despite the high prevalence among women, UI is still an underdiagnosed and undertreated condition (Norton & Brubaker, 2006). Healthcare professionals at the primary healthcare level can manage UI initially with non-conservative measures like lifestyle modifications and Kegel exercises (Wood & Anger, 2014).

According to Peyrat et al. (2002), even in well-developed countries, UI is highly prevalent among young and middle-aged female hospital workers, who already have access to the medical resources, however, they still do not seek treatment. Women do not routinely seek medical advice for UI, especially in developing countries like Oman, because they think it is part of the physiological changes following normal vaginal deliveries (Al-Busaidi, 2011; Al-Sayegh, Leri, Al-Qallaf, Al-Fadhli & Al-Sharrah 2014; El-Azab & Shaaban, 2010; Elbiss, Osman, &

Hammad, 2013). However, there are many different causes of UI other than vaginal deliveries including advanced age, weight gain, and diabetes (Norton & Brubaker, 2006).

Most of the Omani women are Muslims (Al Sadi & Basit, 2013), and issues like UI can negatively impact their personal life, especially when it comes to praying. In Islam, ablution (Wudu) needs purity, and to be able to perform the prayer, a person must be clean and have no biological waste (urine, stool, or blood) in their body or on their clothes (Al-Misri, 1994). If leakage of urine occurs, women should change their clothes, repeat their ablution, or even repeat their prayers sometimes if they leak urine while praying. Therefore, the impact of UI on Muslim women is more pronounced than women from other religions (Sange & Hill, 2008).

Statement of the Problem

UI is a currently unrecognized public health issue among Omani women, especially at the Primary Health Care (PHC) level, where they usually go to receive plenty of other free healthcare services. UI by itself, may have negative consequences on all facets of health, and hence on QoL. Omani women have distinct cultural beliefs that shape their values even when it comes to seeking medical attention. Arabic women in general, do not usually seek care merely for UI, unless they have developed complications such as lower uro-genital tract infections (Al-Sayegh et al., 2014; Elbiss et al., 2013).

UI management varies from simple exercise to medications and surgery in advanced cases, where it becomes very costly and creates a burden on the public healthcare system. Hence, public health administrators consider primary prevention and early detection programs of UI cost effective. However, currently, there are no programs available for Omani women at the PHC level, to help screen or manage this common condition that may impact their health and QoL (Busaidi, 2011). In addition, there is a gap in the Omani medical literature regarding

impact of UI on women's QOL and their general health. There is a need for more studies that highlight the negative burden of this devastating condition on Omani women's QoL.

Need for the Study

Many studies have focused on UI in well-developed countries (Khandelwal & Kistler, 2013; McKertich, 2008; Milsom et al., 2014; Wu et al., 2010); however, there is only one conducted recently in Oman (Al Busaidi, 2011). Al Busaidi (2011) focused mainly on designing an instrument to screen for UI, risk factors, and its subtypes. Hence, there is a need for more studies in Oman, to further explore the burden of UI on women's QoL, and bring the issue of UI to the surface. Such information will guide the design of effective health education and promotion programs at the PHC level in Oman, where women get easy access to free healthcare.

Purpose of the Study

The main goal of this study is to highlight the effects of UI on women's QoL in Oman, at the PHC level. The study will explore the impact of UI on specific aspects of QoL including women's physical daily prayers, daily physical activities, social life and relationships, as well as, on their mental health. Furthermore, the researcher hopes to estimate and highlight the prevalence of UI among Omani women, who are already seeking advice at the PHC services for other clinical issues than UI.

Research Questions

The researcher used a quantitative comparative cross-sectional design for this study. The investigator randomly selected Omani women, from ten PHC centres located in Muscat; the capital city of Oman. The researcher used the Urogenital Distress Inventory (UDI-6) and the Incontinence Impact Questionnaire (IIQ-7) questionnaires to assess women's UI status and its

effects on their QoL respectively. Both instruments are reliable and valid self-reported questionnaires. This study aims to address the following research questions:

Q #1. What is the prevalence of UI among Omani women, already attending PHC centres in Muscat, for reasons other than UI?

Q#2. What is the difference between Omani women with UI and those without UI in their ability to perform their daily prayers?

Q#3. What is the difference between Omani women with UI and those without UI in their ability to perform their daily physical activities like performing some exercises and daily housework tasks?

Q4. What is the difference between Omani women with UI and those without UI in their social life and relationships?

Q#5. What is the difference between Omani women with UI and those without UI in their mental health?

Q#6. What is the difference between Omani women with UI and those without UI in their general QoL?

Significance of the Study

There is a lack of information within the medical literature pertaining to the effects of UI on women's QoL in Oman. The researcher believes that having a better understanding of UI among Omani women will enable family physicians and general practitioners to utilize the best available practice to help those women improve their general health and QoL. Moreover, the results of this study will form the foundational basis for planning the needed health education and intervention programs implemented at the PHC level. Such programs will enhance the role of PHC services that are already available to Omani women. This intervention will have a great

impact on the health of these women by improving their general well-being, as well as improving their QoL.

Instruments

The researcher used two instruments in this study called UDI-6 and IIQ-7 questionnaires. These are condition-specific instruments designed to assess the health-related QoL in women with UI. Used in conjunction with one another, these two instruments provide detailed information on effects of UI on the lives of women (Shumaker, Wyman, Uebersax, McClish, & Fantl, 1994). Both the UD-6 and IIQ-7 are the short versions of their original long forms of nineteen and thirty questions respectively (Uebersax, Wyman, Shumaker, McClish, & Fantl, 1995).

The UDI-6 is a questionnaire composed of six items addressing all possible symptoms of UI in a Likert scale of not at all, slightly, moderately and greatly. The constructs of the questionnaire aim to measure any type of UI whether stress, urgent, or mixed type. Since the development of UDI, researchers conducted studies to validate it against the gold standard urodynamic studies, and proved it was valid with good predictive information about UI in women (Lemack & Zimmern, 1999).

The IIQ-7 is also a short questionnaire of seven items answered on a four-point Likert scale like the UDI-6. The first question in the Arabic version of this questionnaire assesses the impact of UI on women's daily prayers. The next two items intend to assess the impact of UI on physical health by assessing the impact on ability to perform their daily household chores and physical recreation activities. The fourth and fifth questions assess the impact of UI on social life by assessing the impact on social commitments and ability to travel. The last two items in IIQ-7 assess the impact of UI on emotional health by assessing feelings of anxiety and

depression due to UI symptoms. The overall questionnaire items (sum of all the seven items), assess the impact of UI on general QoL. The researcher provided both English and Arabic versions of the UDI-6 and IIQ-7 questionnaires (Appendix B).

Sample and Participant Selection

The researcher conducted the study among Omani women, aged 18 years or older, who attend PHC centres in Muscat. The researcher chose women living in Muscat as representative of all the Omani women for two reasons. First, as per the National Centre of Statistics and Information (NCSI) (2016), the total Omani females of all ages were around 1,160,516 with about one-fifth of them (237,615) living in Muscat. Second, all the ministries and governmental institutions are in Muscat, in addition to all other large private companies and institutions, creating more job opportunities there (Central Intelligence Agency, 2016). Hence, most of Omanis living in Muscat are originally coming from different Oman regions due to more job opportunities for their families in Muscat. However, they still go to their regions of origin during national holidays and weekends.

The inclusion criteria for participants' recruitment were:

- Being a woman with Omani citizenship and residing in Muscat Governorate
- Age is between 18 and 49 years
- Ability to read and write
- Not being pregnant, or within the six weeks' post-partum period during the time of the study

Theoretical Framework

There are many models for human functioning and disability depending on how one views disability. Like the broad definition of health, health professionals along with health

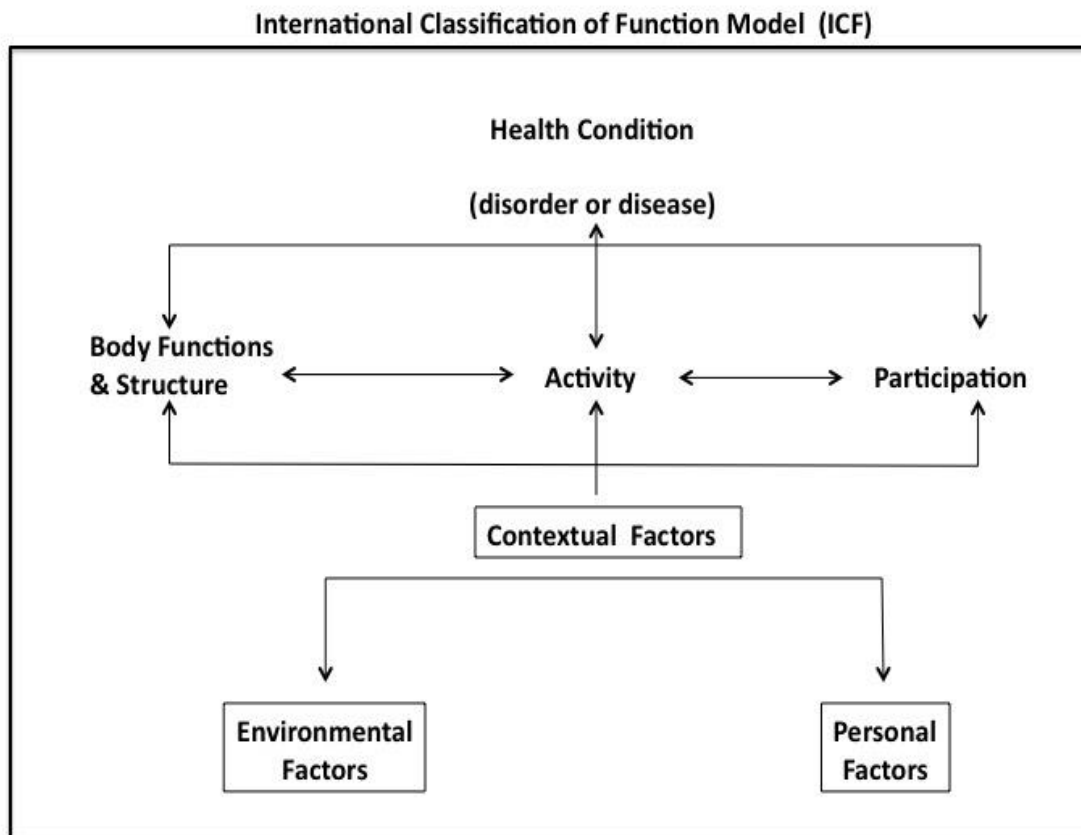
educators should consider a broader view of disability. Disability does not merely encompass a presence of defect, but it extends to include the socio-ecological aspects of persons with a disability that may limit any aspect of their human functioning. Researchers may define disability as the expression of limitations in individual functioning within a social context that represent a substantial disadvantage to the individual (Buntinx & Schalock, 2010).

Since this study focuses on the effect of UI on women's QoL, the researcher used the World Health Organization's (WHO's) International Classification of Functioning, Disability and Health (ICF), as a conceptual framework. Researchers worldwide agreed that UI represents a degree of disability that has the potential to limit some of the women's daily functioning (Abrams et al., 2014; Bedretdinova et al., 2016; Bogner et al., 2002; Coyne et al., 2012; Güvenç et al., 2016; Mallah et al., 2014; Saadoun et al., 2006; Senra & Pereira, 2014; Trantafylidis, 2009; Van der Vaart et al., 2002; Wan et al., 2014). This alteration in their daily functioning affects their general QoL. The biopsychosocial model embedded in the ICF broadens the perspective of disability, allowing assessment of medical, individual, social, and environmental influences on functioning and disability (WHO, 2013).

Taking the broad view of health, any existing health condition can become a disability, if it significantly affects any aspect of human functioning. Hence, both healthcare providers, as well as patients, may view UI as a disability. In case of UI, the ICF framework describes the relationships between the women's impairment of body functions and structures and their restricted participation. For example, weak pelvic floor muscles in stress UI, may cause one to avoid laughing due to fear of leakage, hence, restricting women's participation, as women may decide not to attend a social gathering in fear of leakage.

The ICF model has two parts, with two components within each part. The below diagram (Fig 1), with permission to use the diagram from WHO, displays the ICF components (WHO permissions team, personal communication, September 7, 2017). A copy of the personal communication regarding the permission request is available in (Appendix H). Researchers and health professionals can use both negative and positive terms to express each of the four components of this model (WHO, 2013). For example, in participation, they can express it as “avoids some social gathering” or “can attend all social gatherings”.

The first construct of ICF is the functioning and disability, and it has two main components: Body functions and structures, as well as, activities and participation. The second construct of the model is the contextual factors, and it also has two components: Environmental factors and personal factors. According to the ICF framework, disability and functioning are outcomes of interactions between health conditions and contextual factors (WHO, 2013). The below Figure (Fig 1) also illustrates these interactions.



Adapted From: Model of Disability – ICF Model

Figure 1. The International Classification of Function (ICF) Model of Disability. This figure illustrates the four components of the ICF model and the interactions between them. Reprinted with permission from *The International Classification of Functioning, Disability, and Health*, WHO, Introduction, Page 18, Copyright (2001)

In this study, the researcher used the UDI-6 questionnaire to assess the degree to which symptoms of any-type UI are troubling. It covers all the symptoms related to weak pelvic floor muscles, detrusor muscle over-activity and bladder outlet obstruction. Hence, the researcher relates this assessment to the first component of the ICF model; the body functions and structures.

Based on the ICF framework, UI -related impairments, such as unexpected or expected leaking of urine, can cause limitation in “activity”. As mentioned earlier, the IIQ-7 assesses the impact of UI at four domains including physical activity, social relationships, travel and emotional health. Those domains fit well within the second (activity and participation) and third (environmental factors) components of the ICF model. The researcher assessed the fourth component of the model, the personal factors, by asking questions concerning the participants’ socio-demographic variables, along with their parity and presence of any other chronic illness (Section #1 in Appendix A). All those factors covered in this section of the questionnaire match the personal factors highlighted by the ICF model.

Assumptions

There are no available statistics on the patient-base numbers seen at each PHC center in Oman. However, the Ministry of Health (MoH) in Oman provided statistical reports on the total numbers of patients seen at all PHC centers throughout the Muscat governorate, during weekdays and weekends (moh.gov, 2016). In addition, the MoH distributes the locations of PHC centres based on the population of the clients served. So, there is more than one PHC centre serving the most populated areas in Muscat. Hence, the researcher assumed that each health center served an equal number of patients

Moreover, the researcher assumed that the randomly chosen women from each health centre will come on their scheduled appointment and would consent to participate. In case some participants cancel their appointment, the researcher randomly selected other eligible women, meeting all the inclusion criteria, coming for “walk-in” appointments, and asked them to participate. Moreover, the researcher assumed that the participants have the needed literacy level to read the questionnaire, comprehend it and answer it all by themselves. However, we cannot take this assumption for granted, as some illiteracy might still exist among older women in Oman. The researcher excluded all illiterate women from the study, as the survey is self-reported. The main reason for meeting this important criterion is that UI is an embarrassing issue, and Omani women are not used to talking about it in front of others.

Another related important assumption is that the participants understood all the items in the survey as intended by the instrument developers, and answered all the survey questions honestly. This assumption is valid because UI is a sensitive topic in the Omani culture. In addition, the survey is self-reported and totally anonymous, and the participants understood that the data are confidential and the researcher will not link their identity to their responses in any way.

Finally, the researcher assumed that the environment in the waiting room was somewhat similar in all the ten randomly selected health centres. This assumption is valid because the Ministry of Health in Oman planned all the PHC centres buildings with the same physical structure. However, this assumption may not be true if there is any medical emergency occurring in any of the health centre. In case of cardiovascular resuscitation, death, delivery, or any other emergency medical situation, there could be a great deal of tension among both staff and patients. The tension may happen because each health centre has a small emergency room

located in the centre of the building, and anything happening there could cause a distraction even to clients in the waiting room. Furthermore, the Omani culture is distinct, in that if any family member is seriously sick, the rest of the family members accompany the patient. In most of these situations, there is accompanying screaming, crying, and tension. If that scenario happens, then the researcher will not distribute the surveys on that day, and will randomly select other participants for the next day.

Limitations

In this study, some degree of selection bias may result by selecting only women living in Muscat; as it is an urban city. There are some women, whose caregivers live in Muscat but the women still live by themselves in other regions. The researcher discussed reasons behind choosing Muscat residents as representatives of Omanis earlier in this chapter under the “Sample and Participants Selection” section.

Moreover, some researchers may view exclusion of women who are coming for UI as a limitation, as dropping those women who already have UI, may possibly affect (under-estimate) the prevalence. However, this is not a major concern in this study for two reasons. First, researchers found that women with UI do not seek medical attention for their problem (Al-Busaidi, 2011; Al-Sayegh et al. 2014; Elbiss et al., 2013). Additionally, in Oman, UI is mainly managed at the tertiary care level, not at the PHC level (World Health Organization, 2006).

Another limitation is that there is a small chance of data contamination. Those participants who already completed the survey, may talk about the survey questions with other potential participants in the clinic’s waiting room or even in their community. The researcher will remind them, while submitting the survey, to not discuss it with other women for at least four weeks when the researcher anticipates that data collection period be complete. Finally, the

hawthorn effect may also threaten the results as participants may alter their responses due to their awareness of being observed. To eliminate or reduce the impact of this limitation, the researcher will emphasize to the participants the anonymity and confidential nature of the study.

Delimitations

The researcher considered positive responses to presence of any kind of urinary leakage as positive for having UI, and used these responses to calculate its prevalence. The different types of UI (stress, urge, or mixed) were not in the scope of this study. Hence, the causes of UI were also out of the scope of the study. Moreover, the researcher did not assess either frequency of leakage, nor if leakage occurred nocturnally.

Another delimitation of this study, was not reaching out for women who were unable to attend the health centre during the allocated study time. Hence, this delimitation could threaten the study's external validity by limiting the study population to those attending PHC services. The researcher overcame this threat by taking random samples from ten different health centres to be able to catch a representative population.

Moreover, dropping the illiterate women because they could not answer the surveys themselves, may affect the study results. This is because in Oman some illiteracy level may still exist among old women who might already have UI as part of their aging. Hence, dropping them may underestimate the prevalence of UI. The researcher statistically controlled for the education level and the rest of the extraneous variables to reach equivalence of participants on their characteristics, so they were approximately similar in all other characteristics except their UI status. However, as explained earlier, UI is a sensitive issue and some literacy level is expected from the participants to be able to answer the survey by themselves.

Another delimitation was the exclusion of pregnant women and women who were six-weeks post-partum during the study period. Those women may all have UI even before their current pregnancy; hence, also underestimating its prevalence. On the other hand, this criterion is enhancing the study's internal validity, as pregnancy and recent delivery itself can induce UI, and not excluding them may lead to overestimation of its prevalence. Likewise, exclusion of women at age fifty or more is also enhancing the study's internal validity. Around this age, perimenopausal changes, mainly lack of estrogen, may induce UI through effects on the collagen tissues that may lead to weakened pelvic floor muscles and ligaments supporting the urethra (AlKhasawneh et al., 2016; Goode et al., 2008; Seshan et al., 2016; Viktrup & Bump, 2003).

It was not the scope of this study to examine all the validated QoL questionnaires pertaining to UI. In addition, the researcher did not explore the women's beliefs and attitudes about UI, or their perceived challenges to seeking medical advice for UI in this study. Those beliefs, attitudes and perceptions are of paramount importance, and the researcher intends to explore them in a future study.

Definitions of Terms

Activity Limitations: Difficulties an individual may have in executing activities (WHO, 2001).

Body Functions: The physiological functions of body systems (WHO, 2001).

Daily physical activity: In the proposed study, this variable is used to reflect the women's ability to perform certain daily physical activities like prayers at the regular allocated times, as well as their ability to perform daily housework activities. The ability to perform daily housework activities includes doing laundry, vacuuming, cooking, etc.

Disability: An umbrella term for impairments, activity limitations and participation restrictions.

It denotes the negative aspects of the interaction between an individual with a health condition, and that individual's contextual factors (environmental and personal factors) (WHO, 2001).

Dribbling: To fall in drops, as the urine from a distended bladder (Farlex Partner Medical Dictionary, 2012).

Effects of UI on ability to do shopping or some travel: It can be defined in the context of this study as any limitation due to UI causing avoidance of shopping or travel, any feeling of discomfort, or embarrassment during shopping or travel.

Effects of UI on social life and relationships: In this study, this variable will be defined as any limitation due to UI, preventing them from attending or participating in any family, friendly, or any social gathering.

Environmental Factors: The physical, social, and attitudinal environment in which people live and conduct their lives. These are either barriers to or facilitators of the person's functioning (WHO, 2001).

Functioning: An umbrella term for body functions, body structures, activities and participation. It denotes the positive aspects of the interaction between an individual with a health condition, and that individual's contextual factors (environmental and personal factors) (WHO, 2001).

Incontinence Impact Questionnaire (IIQ-7) : It is a validated short-form version of the questionnaire used to assess the impact of accidental urinary loss on people's routine activities, relationships, and feelings (Uebersax et al, 1995).

Nocturia: Urination at night, especially when excessive in amount (Merriam-Webster).

Participation Restrictions: Problems an individual may experience in involvement in life situations (WHO, 2001).

Quality of Life (QoL): It is a broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life (The WHOQOL Group, 1998). In this study, it will be concluded from the sum of the above physical activity, emotional health, social life, and relationships. So, the total sum of the seven responses to the questions in IIQ-7 represents the total effect of UI on QoL.

Sacral Neuromodulation: Neuromodulation is the alteration of nerve activity through targeted delivery of a stimulus to specific neurological sites in the body. In sacral neuromodulation, health providers place a small electrode tip near the sacral nerve, which is the nerve that controls voiding function in the lower spine. This implanted device stimulates the nerve to act as a sort of pacemaker for the bladder, improving urinary function and reducing or eliminating pain (The International Neuromodulation Society).

The women's emotional health: For the context of this study, the researcher defines this variable as any emotional disturbance like anxiety, depression, or any mood changes caused by the leakage of urine.

Transvaginal pessaries: Are removable intravaginal support devices, that may be controlled by the patient, reduce prolapse or incontinence, and are an alternative treatment option for women with these conditions (Clemons, 2017).

Urgency: A strong sensation of needing to go to the bathroom to urinate.

Urinary Incontinence (UI): As per the International Continence Society, UI is considered a bladder storage issue, and can be defined as any involuntary loss of urine. For this study, the presence of any kind of urinary leakage will be considered positive for UI.

Urogenital Distress Inventory short form (UDI-6): It is a validated short-form version of the Urogenital Distress Inventory used to assess the presence of any symptoms of urinary distress. (Uebersax et al., 1995).

Wudu: Ritual washing to be performed in preparation for prayers and worship. (Oxford Dictionary, 2017).

Summary

UI is a common public health concern among women of all ages worldwide. Regardless its type and causes, UI is an embarrassing condition that may prevent women from seeking medical attention, especially in countries with unique cultures like Oman. UI may not have serious physical consequences, but may negatively alter individual's social and mental health. It may have an adverse impact on women's general health and QoL. Hence, patients along with health professionals, can view UI as a disability. The theoretical model framing this study is the WHO model of International Classification of Functioning, Disability and Health (ICF).

The main aim of this study is to explore UI among Omani women aged 18 to less than 50 years, and explore the difference UI makes on their QoL. For this study, the researcher will adopt the standardized, translated, and validated UDI-6 and IIQ-7 questionnaires. The researcher will assess different QoL in domains including daily prayers, physical activities, mental health, social life and relationships.

Having a better understanding of UI among Omani women enables family practitioners to utilize the best available practices to help them improve their QoL and eventually improve their general health. In addition, there is a need for health education and promotion programs to tackle UI issues. Therefore, the study results form the baseline for designing and implementing the needed health education programs at the PHC level.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides a review of the literature about the topic under study including the development of the healthcare system in Oman, urinary incontinence (UI) definitions, risk factors, management options, and the impact of UI on general health and quality of life (QoL). In addition, the study will also include a review of studies done in some of the Arabic and Islamic countries that share similar culture as Oman. Finally, the chapter will conclude with a review of the theoretical model and the instruments used in this study.

The Health Care System in Oman

The Sultanate of Oman is one of the six Gulf countries, located on the southeastern coast of the Arabic peninsula. The political leaders and administrators of Oman divided the Sultanate into four governorates and five regions with 61 Wilayats (provinces) throughout the country. Muscat is one of the four governorates, and it is the capital city of the country (Darke, 2013). According to the Oman National Centre for Statistics and Information (NCSI) (2016), the total Omani population was 2,344,946 in 2015, with 487,592 of this population (20.8%) living in Muscat. There are several reasons behind the fact that more than one-fifth of the population resides in Muscat. These includes that Muscat is the most developed city in the country with good schools, health facilities, roads, parks, availability of great shopping malls and other entertainment facilities, and no power or water-cuts in the city. In addition, all the ministries are located there, which give citizens more variety in job opportunities (Central Intelligence Agency, 2016).

The health care system in Oman underwent tremendous development since 1970 when His Majesty, the Sultan Qaboos, took over the reins of government in the country. In four decades, the Omani Renaissance has brought economic and social prosperity to all the people of Oman, with health being a primary concern (Hill, Muyeed, & al-Lawati, 2000). His Majesty issued a royal decree on August 22, 1970 establishing the Ministry of Health (MoH) in Oman, to be responsible for the organization and development of the national health services (Alshishtawy, 2010).

Since the declaration of Alma-Ata in 1979, Oman has considered the comprehensive primary care as the first portal of entry to all levels of health care (Alshishtawy, 2010). The MoH invested in developing well-structured, wide spread Primary Health Care (PHC) centres throughout the country to provide a free, equitable, and easy access to health for all the population (Alshishtawy, 2010). Additionally, the MoH adopted the Five-Year Health Development Plans since 1976 (Alshishtawy, 2010). The seventh Five-Year Health Development Plan (2006-2010) started to focus on strengthening the PHC services, to provide the most up-to-date, recommended preventive care services to keep the Omani population healthy (Al-Riyami, 2012).

Muscat Governorate has excellent PHC services with acceptable system for public health care provision in both in-patient and out-patient management (Albalushi, Sohrabi, & Kolahi, 2012). Over the past ten years, there was a shift in the focus of those services from communicable diseases like polio and malaria, to non-communicable ones like diabetes mellitus and hypertension. However, there are still some public health issues like UI, that public health administrators and healthcare professionals did not bring to the attention of the Omani healthcare system, either due to some cultural beliefs or other systemic challenges (AL Busaidi, 2011).

Urinary Incontinence

UI is basically a bladder storage disorder. It occurs when there is a failure of the storage function, due to inappropriate activity of the detrusor muscle of the bladder or, incompetence of the continence maintaining mechanisms (Patel & Chapple, 2008). The neural pathway, along with the mechanical factors throughout the urinary tract system, including the pelvic floor, striated sphincter muscles, and smooth muscles of the bladder and the urethra, play a major role in maintaining normal continence functioning (Nambiar & Lucas, 2014).

Urinary Incontinence Definitions

The International Continence Society (ICS) defined UI in 1979, as “the involuntary loss of urine, that is a social or hygienic problem, and is objectively demonstrable” (Bates et al., 1979, p.551). That definition confined UI to only leakage of urine that causes a hygienic problem or affects people’s social life. Hence, the ICS changed the old definition in 2002, to a broader one. The ICS considered the new broad definition of UI as having “the complaint of any involuntary leakage of urine” (Abrams et al., 2002, p.116).

Despite UI being a common problem and the new broader definition by the ICS, still there was no consensus on the definition of UI among epidemiologists and researchers (Hampel, Wienhold, Benken, Eggersmann, & Thuroff, 1997). The inconsistency in UI definitions among researchers and epidemiologists were mainly either in the quantity, duration, or the frequency of the symptoms depending on their research instrument. Some researchers focused on the frequency of the leaking in their studies. For example, Thomas, Plymat, Blannin, and Meade (1980), defined UI as " involuntary excretion or leakage of urine in inappropriate places or at inappropriate times twice or more a month, regardless of the quantity of urine lost” (p.1243). On the other hand, other researchers considered duration of leaking as the criteria of defining UI. As

an example, in one study, researchers defined UI as “any uncontrolled urine loss in the prior twelve months without regard to severity” (Diokno, Brock, Brown, & Herzog, 1986, p.1022).

As mentioned above, the new ICS definition does not specify the severity or duration of the symptom.

Types

In general, there are five main types discussed in the below reviewed literature. Stress incontinence is the most common type of UI among younger women (Hersh & Salzman, 2013; Wood & Anger, 2014), and the second most common type among older women (Gibbs, Johnson, & Ouslander, 2007). In this type of incontinence, urine leaks with physical exertion or any activity that increases the abdominal pressure such as laughing, coughing, straining, or sneezing (Hersh & Salzman, 2013; Lukacz, 2015; Wood & Anger, 2014). In stress incontinence, there is either an increase in the urethral mobility, weakness of the pelvic floor muscles, or a dysfunction of the intrinsic sphincter muscle (Gibbs et al., 2007; Norton & Brubaker, 2006; Wood & Anger, 2014).

Urge incontinence is another type of UI, where leakage of urine is usually a strong desire to empty the bladder preceding or accompanying the leakage. Some patients with urge incontinence may complain of nocturia and increased frequency of urination (Hersh & Salzman, 2013; Lukacz, 2015; Wood & Anger, 2014). Health professionals encounter this type of UI more in older women, and they associate it strongly with stroke, because the underlying pathology here is usually over-activity of the detrusor muscle, neurologic disorders, or spinal cord injury (Brubaker, 2006; Gibbs et al., 2007; Gorina, Schappert, Bercovitz, Elgaddal, & Kramarow, 2014; Hersh & Salzman, 2013).

Mixed-type incontinence is by far the most common type among all patients with UI (Gibbs et al., 2007; Hersh & Salzman, 2013). In this type, the etiology is a mix of both weakness or dysfunction of the bladder and urethral muscles, along with some neurological disorders (Gorina et al., 2014; Lukacz, 2015; Wood & Anger, 2014). Hence, individuals with mixed incontinence, will have a combination of both urge symptoms (due to pathology in bladder innervation) and stress symptoms (due to pathology in pelvic floor muscles) (Lukacz, 2015). Among women of all ages, the three most common types of UI are stress, urge, and mixed-type incontinence (Hersh & Salzman, 2013; Wood & Anger, 2014).

Overflow incontinence is another type of UI, that occurs when the bladder does not empty completely, leading to leakage of urine when it becomes full. Patients with overflow incontinence have a sensation of incomplete bladder emptying, and they usually complain of dribbling of urine (Gorina et al., 2014; Hersh & Salzman, 2013; Lukacz, 2015). This type is not very common among women. Health professionals commonly encounter this type of UI in patients with diabetes with neuropathy. The neuropathy causes impaired detrusor contractions, resulting in overflow incontinence (Hersh & Salzman, 2013; Wood & Anger, 2014). Other causes of this type of incontinence may include any pathology causing a bladder outlet obstruction, which is rare among women (Gibbs et al., 2007; Hersh & Salzman, 2013; Wood & Anger, 2014).

Functional UI is the last type of incontinence, where the structure and the function of the urinary system is intact. This type of incontinence is not due to any underlying pathology of the urinary tract system. Individuals with functional UI have the incontinence due to inability to toilet, either because of a physical impairment like severe arthritis, or a cognitive impairment like dementia (Brubaker, 2006; Gorina et al., 2014; Hersh & Salzman, 2013).

Prevalence

UI is a prevalent condition among people of all ages, especially in older females (Hersh & Salzman, 2013; Seshan et al., 2016; Wood & Anger, 2014). There were some discrepancies regarding the prevalence among the reviewed literature, mainly due to inconsistencies in their definition of UI in terms of duration, frequency or severity of symptoms. However, researchers in most of the reviewed literature concluded a high prevalence of UI among women worldwide, of around 50% or more (Seshan et al., 2016; Wood & Anger, 2014; Wu et al., 2010). The prevalence of UI highly depends on the age of the population surveyed (Hersh & Salzman, 2013; Seshan et al., 2016; Wood & Anger, 2014).

In the United States, a recent CDC report documented that more than half of the noninstitutionalized women aged 65 years or over, reported urinary leakage of some type (Gorina et al., 2014). Around 24% to 45% of women aged over 30 years, reported stress UI (Khandelwal & Kistler, 2013; McKertich, 2008). The prevalence of urge incontinence increased from nine percent in women aged 40 to 44 years, to 31% in women older than 75 years (Khandelwal & Kistler, 2013; McKertich, 2008).

Researchers conducted a systematic review of the global prevalence of urge incontinence, and determined that it ranges between 1.8% to 30.5% in European populations, between 1.7% to 36.4% in US populations and between 1.5% to 15.2% in Asian populations (Milsom et al, 2014). Another group of researchers did a secondary analysis of the Study of Pelvic Problems, Hysterectomy and Intervention Alternatives (SOPHIA), and they concluded that the overall prevalence of any UI among those women was 51.1% (Wu et al., 2010). In the same analysis, stress UI at baseline was the most common at 39.4%, followed by urge UI at 23.7%, and mixed-type UI at 18.9% (Wu et al., 2010).

Risk Factors

UI, like many other health conditions, is multifactorial. The risk factors associated with UI play an important role in determining its type (Troko, Bach, & Tooze-Hobson, 2016; Wood & Anger, 2014). In the below review, the investigator will list UI risk factors as per their level of evidence in literature, starting with the highest level of evidence.

Age. UI is not a normal result of aging, as many people may think. Some scholars did not consider it in their review of the risk factors, although they did report family history and genetics as level 1 risk factors for UI (Wood & Anger, 2014). However, researchers established that aging increases the prevalence of both urge and stress incontinence, leading to a mixed-type UI (Danforth et al., 2006; Khandelwal & Kistler, 2013; McKertich, 2008; Sampsel, Harlow, Skurnick, Brubaker, & Bondarenko, 2002; Seshan et al., 2016; Wu, Liu, Xie, Wang, Wu & Liu, 2011).

Pregnancy and childbirth. This is a well-established risk factor for stress UI, with level 1 evidence (Chapple & Milsom, 2012; Daltveit, Hannestad, & Hunskaar, 2003; Parazzini, Chiaffarino, Lavezzari, & Giambanco, 2003; Peyrat et al., 2002; Rortveit, Daltveit, Hannestad, & Hunskaar, 2003, Seshan et al., 2016; Thom et al., 2010; Wood & Anger, 2014). Pregnancy, in addition to vaginal delivery may cause trauma to the pelvic floor muscles, thereby leading to stress incontinence. With increased numbers of vaginal deliveries, the odds of developing UI increases (Parazzini et al., 2003; Rortveit et al., 2003). Women who did not have children had a lower prevalence than those who have had one or more babies. Researchers found that within the parity range of one to three, there were no differences in the prevalence of UI (Thomas et al., 1980). However, the prevalence increased in women who had four or more deliveries (Thomas et al., 1980). Moreover, having a history of operative vaginal deliveries or caesarian sections

increased the odds of developing UI, due to possible trauma to the pelvic floor muscles and adjacent tissues (Parazzini et al., 2003; Rortveit et al., 2003).

Increased Body Mass Index (BMI). Obesity, as well as being overweight, has level 1 evidence as being a risk factor for developing UI (Danforth et al., 2006; Mishra, Hardy, Cardozo & Kuh, 2008; Parazzini et al., 2003; Pinto et al., 2011; Sampsel et al., 2002; Seshan et al., 2016; Subak et al., 2007; Wu et al., 2011). Researchers did a population-based cohort study of 2109 women, aged 40 to 69 years, and showed that new-onset UI was more common in women with a higher BMI at baseline, than those who experienced increase in their BMI later (Thom, Brown, Schembri, Ragins, Subak & Van Den Eeden, 2010). However, as discussed above, age is an important risk factor for UI by itself. Hence, the investigator could attribute the association of UI with increased BMI in the above study to increased age. On the other hand, researchers found that increase in the BMI have accumulation effects on symptoms of severe stress UI. Women who have been obese or overweight since the age of 20, were more likely to report severe UI than women who maintained their weight (Fuganti, Gowdy, & Santiago, 2011; Mishra et al., 2008).

Diabetes mellitus (DM). Most of the reviewed literature considered DM as an independent risk factor, with level 2 evidence for developing UI (Danforth et al., 2006; Lifford, Curhan, Hu, Barbieri & Grodstein, 2005; Moul & McVary, 2010; Sampsel et al., 2002; Seshan et al., 2016; Wood & Anger, 2014). Since the risk of UI was more associated with longer duration of DM, then preventing or delaying the onset of DM could have important public health implications (Lifford et al., 2005; Moul & McVary, 2010).

Hysterectomy. Having a hysterectomy, which is the surgical removal of the uterus, may damage the pelvic floor muscles leading to UI. Researchers proved that hysterectomy predispose

women to stress UI with level 2 evidence (Danforth *et al.*, 2006; Parazzini *et al.*, 2003; Peyrat *et al.*, 2002; Seshan *et al.*, 2016; Wood & Anger, 2014; Wu *et al.*, 2011)

Urinary Tract Infections (UTIs). Recurrent UTIs are a documented risk factor for developing UI, with level 3 evidence (Parazzini *et al.*, 2003; Seshan *et al.*, 2016; Wood & Anger, 2014; Wu *et al.*, 2011). Researchers usually associated those infections with urge type UI (Seshan *et al.*, 2016; Wood & Anger, 2014). Despite low evidence of UTIs as a risk factor for UI, those infections are worth looking for because they are easily treatable with proper antibiotics.

Menopause. Some researchers considered oral estrogen in post-menopausal women as an important risk factor for developing UI with level 1 evidence (Sampselle *et al.*, 2002; Wood & Anger, 2014). Hormonal changes may affect the collagen tissue that supports the bladder neck and the urethra, leading to development of stress UI (AlKhasawneh *et al.*, 2016; Goode *et al.*, 2008; Seshan *et al.*, 2016; Viktrup & Bump, 2003). Therefore, complete history of menopause or any hormonal replacement therapy is important to note during assessment of UI in women (Wood & Anger, 2014).

Other factors. The presence of other chronic illnesses, apart from DM, can also predispose a person to UI (Gorina *et al.*, 2014). In a study conducted by Thom *et al.* (2010), participants with chronic obstructive pulmonary disorder (COPD) were more likely to progress to UI (OR 2.64, 95% CI 1.22–5.70). Healthcare professionals can anticipate progression to UI in patients with COPD due to their chronic cough. Similarly, researchers reported smoking to be a risk factor for stress UI for the same reason (Fuganti *et al.*, 2011). Moreover, they linked smoking to urge-type incontinence due to its irritative effect on the bladder (Sampselle *et al.*, 2002; Wood & Anger, 2014).

In addition to smoking, researchers identified other modifiable behavioral as risk factors for UI. Researchers linked caffeine intake with urge UI, due to its diuretic effect (Riesenhuber, Boehm, Posch, & Aufricht, 2006; Troko et al., 2016; Wood & Anger, 2014), especially with daily intake of more than 204mg (Gleason et al., 2013). Moreover, researchers associated alcohol intake with persistence, but not the incidence of UI symptoms (Maserejian et al., 2013; Troko et al., 2016). Those are modifiable risk factors for UI, where health education can play a major role in primary prevention, as well as alleviation of existing UI symptoms (Bezerra et al., 2015).

Additionally, they linked some non-modifiable risk factors, like sociodemographic characteristics to developing UI. For example, race may contribute to the development of UI (Danforth et al., 2006). African American women are at higher risks of developing UI than women from other races (Ruff, 2005; Sampsel et al., 2002; Thom et al., 2010). Additionally, researchers found an association of poor socioeconomic status with development of UI (Gorina et al., 2014; Wu et al., 2011). Researchers in some studies, highlighted the association of having higher education levels with lower risk of developing UI (Gorina et al., 2014; Parazzini et al., 2003; Ruff, 2005). In conclusion, health educators can use the knowledge about risk factors effectively in health education and health promotion of such a devastating condition like UI.

Management

Management of UI starts with extensive evaluation through history-taking and physical examination to identify reversible causes like constipation, UTIs, atrophic vaginitis due to menopause, depression, or medications (Frank & Szlanta, 2010; Khandelwal, & Kistler, 2013; Wood & Anger, 2014). Care providers may need some laboratory investigations along with urodynamic testing in most cases (Khandelwal, & Kistler, 2013; Wood & Anger, 2014). The

complete history-taking and physical examination is the first and important step in the management of UI in women, and healthcare providers do this effectively at the PHC level (Wood & Anger, 2014). For example, care providers can advise women who are obese or overweight to reduce their weight and maintain a normal BMI, to help improve their UI symptoms (Wood & Anger, 2014).

In addition, determining the type of UI is essential for its management. The initial management plan in all three of the most common types, are the same, and there are four main management options for them. The first management modality is lifestyle and behavioral interventions. Women with any type of UI can benefit from some lifestyle modifications like reduction in their intake of total fluids, caffeine, and carbonated drinks (Gormley et al., 2012; Khan & Tariq 2004; Wood & Anger, 2014). Behavioral modifications like timed-voiding, also called bladder training, is beneficial for women with urge and mixed type UI (Gormley et al., 2012; Hersh & Salzman, 2013; Khan & Tariq, 2004; Wood & Anger, 2014). Researchers proved these behavioral modifications to be equivalent or even superior to pharmacotherapy in reducing the frequency of incontinence episodes along with improving the women's QoL (Gormley et al., 2012).

For stress incontinence, evidence showed that cognitive and behavioral modifications were beneficial for prevention and treatment (Bezerra et al., 2015; Hersh & Salzman, 2013; Khan & Tariq 2004; Wood & Anger, 2014). Tools for cognitive modifications may include educational materials like manuals, videos, pamphlets, and educational programs. Such educational materials were effective in expanding women's information and treatment seeking behavior for patients with UI due to dysfunction of pelvic floor muscles (Bezerra et al., 2015).

Another first line of therapy in managing women with UI is physical therapy, commonly known as Kegel exercises. The aim is to strengthen the pelvic floor muscles, thereby helping to improve stress UI. The National Institute for Health and Care Excellence (NICE) guidelines (2013), recommend performing Kegel exercises consistently. The recommended frequency is to do the exercises three times daily, with eight contractions each, for a minimum of three months (NICE, 2013). Researchers have determined that performing these exercises consistently, for several times a day, were beneficial even in urge and mixed type UI (Dumoulin, Hay-Smith & Mac Habée-Séguin, 2014; Hersh & Salzman, 2013; Wood & Anger, 2014).

Physicians reserve pharmacotherapy for patients with urge UI, if behavioral modifications along with physical therapy do not help improve their symptoms (NICE, 2013; Wood & Anger, 2014). The main medications used for managing UI are anticholinergic agents, which are available orally, trans-dermally, or as a gel formula. Many guidelines recommend at least four weeks of use for the patients to experience their benefit (Gormley et al., 2012; NICE, 2013; Wood & Anger, 2014). Practitioners should always combine these medications with lifestyle and behavioral modifications for better relief of UI symptoms (Dumoulin et al., 2014; Gormley et al., 2012; NICE, 2013; Wood & Anger, 2014). They sometimes need to use combinations of drugs, and if still not effective, other minimally-invasive techniques like sacral neuromodulation that may benefit patients with urge UI (Gormley et al., 2012; NICE, 2013; Wood & Anger, 2014). In the United States, FDA approve no drug for stress UI, but in the United Kingdom, practitioners use duloxetine and showed it to reduce symptoms for women with stress UI (Hersh & Salzman, 2013; Li et al., 2013; Wood & Anger, 2014).

Surgical intervention is also an option for women with stress UI in cases where the first and second treatment options are not beneficial for reducing their symptoms (Hersh & Salzman,

2013; Wood & Anger, 2014). The American Urological Association (AUA) approved five surgical procedures including injectable bulking agents at the bladder neck, laparoscopic suspensions, mid-urethral slings, pubo-vaginal slings, and open retro-pubic suspensions (Dmochowski et al., 2010). The injectable bulking agents are suitable for women with intrinsic sphincter deficiency, as they act as a central filler volume, increasing the length of the muscle fibers (Cameron & Haraway, 2011).

The laparoscopic suspension procedure involves using a needle to tie sutures between the vagina and the abdominal wall (Glazener & Cooper, 2014). In the sling procedures, surgeons use strips of synthetic mesh to create a sling under the urethra or the bladder neck, to support the urethra and help keep it closed (Mayo clinic, 2017). Open retropubic suspension is an operation that involves lifting the tissues around the junction between the bladder and the urethra to support the muscles that are holding up the bladder (Lapitan, 2016). If the woman is a poor candidate for surgery, her care providers may offer transvaginal incontinence pessaries to help support her anterior vaginal wall (Hersh & Salzman, 2013; Wood & Anger, 2014). The pessary compresses the urethra against the upper posterior portion of the symphysis pubis and elevates the bladder neck, leading to increased outflow resistance and hence, correction of the angle between the bladder and the urethra (Viera & Larkins-Pettigrew, 2000).

In conclusion, behavioral and lifestyle modifications along with physical training are effective treatment options among all types of UI. The American College of Physicians also recommends first-line treatment with pelvic floor muscle training in women with stress UI, bladder training in women with urgency UI, and pelvic floor muscle training with bladder training in women with mixed UI (Qaseem et al., 2014). This highlights further the role of

primary care physicians in the initial management of UI, as they can perform those two options at the PHC level.

Urinary Incontinence and Quality of Life

UI is a chronic disease that may affect people's QoL at every moment of their lives (Abrams, Smith & Cotterill, 2014; Bedretdinova, Fritel, Zins, & Ringa 2016). According to the World Health Organization Quality of Life Group (WHOQL), QoL depends on the subjective perception of UI and its treatment at social, physical, and mental levels (WHOQL, 1995). The type of UI, as well as the age of women, plays a role in determining the aspects of impact on QoL (Coyne et al., 2012).

Researchers found negative association of UI with QoL, mainly in the dimensions of energy, social isolation, and physical mobility (Bedretdinova et al., 2016). The more severe the UI, the more harmful the effect on QoL (Saadoun et al., 2006). Based on most of studies, researchers believe that the negative impact of urge UI on QoL was greater than the impact of stress UI (Coyne et al., 2012; Van der Vaart, De Leeuw, Roovers & Heintz, 2002). In addition, they also found high association of urge incontinence with embarrassment among younger women (Van der Vaart et al., 2002). Researchers, on the other hand, found that mixed UI is more bothersome than either stress or urgency UI alone (Minassian, Devore, Hagan & Grodstein, 2013).

Impact of UI on Daily Activities

UI may result in some degree of limitation of physical mobility, due to the frequent needs to go to the bathroom (Bedretdinova et al., 2016). In women, the impact of UI on physical mobility was more pronounced than its psychological impact (Bedretdinova et al., 2016). Moreover,

researchers found significant association between the severity of the UI symptoms and higher impairment on women's daily activities (Abrams et al., 2014).

In a large population survey of women from France, Germany, the United Kingdom, and the United States, researchers surveyed 300 women with UI from each of the four countries regarding the effect of UI on their QoL (Abrams et al., 2014). They further categorized them based on their response to the question 'How much urine do you usually leak?' as light UI (having a small amount of urine loss), medium UI (having a moderate amount of urine loss) and severe UI (having a large amount of urine loss). The researchers reported that 95% of women with light UI indicated that their household tasks were either 'slightly' or 'not at all' affected by UI, while 50% of respondents in the medium UI group classified the degree of effect of UI on their household tasks as 'moderately' or 'a lot'. In women with severe UI, 50% classified the degree of effect of UI on their household tasks as 'a lot' (Abrams et al., 2014).

Impact of UI on Social Life and Relationships

Having UI may result in social isolation due to problems like odor or frequent need to change the underwear or pads, hence, sufferers are more likely to limit their social contacts with others (Bedretdinova et al., 2016). Trantafylidis (2009) argued that individuals with UI may avoid social gatherings and lose self-confidence, which has a proportional impact on their social interactions. Researchers found that the impact of UI on the social life is more prominent at older ages, as older women described the social consequences of their disease in the framework of feelings of shame and humiliation, resulting in their isolation from family and friends (Bogner et al., 2002; Mallah et al., 2014).

Moreover, researchers associated the severity of UI with limitations on social life, ability to visit friends, and impact on family life (Abrams et al., 2014). In the above mentioned four-

country population survey, researchers reported that social life and ability to travel was more affected among those with severe or medium UI than women in the light UI group (Abrams et al., 2014). Travel may also be a challenge facing women with UI. Women may choose to stay home and avoid travel because of fear of losing urine in public, feeling wet and malodorous, or not finding a bathroom when they need to change clothes or their protective pad (Senra & Pereira, 2014).

Impact of UI on Feelings and Mental Health

UI may also negatively impact women's mental health (Abrams et al., 2014; Coyne et al., 2012; Mallah et al., 2014). Sufferers of UI were more depressed, psychologically stressed, and report more anxiety (Bedretdinova et al., 2016; Pinto et al., 2011; Saadoun et al., 2006). In the previous large population study of women from France, Germany, the United Kingdom, and the United States, about half of the respondents in the light and medium UI groups reported being anxious (Abrams et al., 2014). In addition, around 75% of respondents in the severe UI group reported anxiety (Abrams et al., 2014).

Women may conceive UI as a lack of health, which may yield feelings of anger and sadness, as well as embarrassment and depression in them (Trantafylidis, 2009). People may perceive UI as a disease that can cause huge stigma to the individuals, and make many of them feel humiliated because of their condition (Wan et al., 2014). Researchers in a Chinese study concluded that women with severe stress UI, perceived higher levels of stigma, and hence, experienced lower QoL, than women with less severe or other type UI (Wan et al., 2014). This study was particularly unique, because it highlighted the importance of addressing strategies to reduce the sense of disease stigma in managing individuals with UI to improve their QoL (Wan et al., 2014).

Impact of UI on Sexual Life

Several researchers have shown that UI may have an impact on the sexual life of its sufferers (Bedretdinova et al., 2016; Saleh, Bener, Khenyab, Al-Mansori & Al Muraikhi, 2005; Senra & Pereira, 2014; Sims et al., 2011). In women with UI, leakage of urine may occur during intercourse, especially in women with stress UI (Xu, Song & Huang, 2011). This coital incontinence may lead to disharmony, avoidance of sexual activity, embarrassment and shame (Senra & Pereira, 2014; Vella & Cardozo, 2005; Xu et al., 2011).

Females with stress UI are more affected in this aspect of life than women with other types of UI, because the weakened pelvic floor muscles in this type, along with fear of coital incontinence, may result in increased apprehension about sexual contact (Fatton, De Tayrac & Costa, 2014). Researchers found that women with stress UI have significantly lower overall sexual function, lower frequency of sexual intercourse, and less satisfaction (Lim, Liong, Leong, Khan & Yuen, 2016). In addition, those women had higher avoidance behavior than women without stress UI. Interestingly, the same researchers reported negative association of stress UI in females with their partner's sexual function (Lim et al., 2016). Researchers recommended that while managing women with UI, especially stress UI, clinicians should screen both partners for sexual problems (Fatton et al., 2014).

In conclusion, women with UI may have at least mild or moderate negative impacts on their general QoL (Güvenç, Kocaöz, & Kök, 2016). The lifestyle changes made to accommodate women's UI symptoms and restriction in their activities, may estimate the impact of UI symptoms on the women's QoL (McKertich, 2008). The negative impact of UI on people's general health and QoL highlights the need for more effective management plans and the importance of taking into consideration the women's own perception of UI when designing the

targeted promotional programs (Sims et al., 2011). The first and essential element of this management plan is increasing women's awareness of UI and the use of protective measures, to help improve their QoL (Güvenç et al., 2016).

Urinary Incontinence among Arabic Women

UI is a very common health issue among women worldwide, and researchers discussed its effects in the literature for many decades (Abrams et al., 2014; Bedretdinova et al., 2016; Güvenç et al., 2016; Hersh & Salzman, 2013; Lim et al., 2016; McKertich, 2008; Sims et al., 2011; Wood & Anger, 2014; Xu et al., 2011). However, researchers did not conduct much research studies in the Arab world especially the Gulf Area. Most of existing studies have only been within the last decade. In all the conducted studies in this region, there was a surprisingly high prevalence of UI among women in the Arabian Gulf area (Al-Busaid, 2011; Al-Sayegh et al., 2014; Altaweel & Alharbi, 2012; Bakarman & Al-Ghamdi, 2016; Elbiss et al., 2013; Saleh et al., 2005). Additionally, there was agreement among researchers regarding the adverse effects of UI on different aspects of QoL, depending on the women's own perspectives (Al-Busaid, 2011; Altaweel & Alharbi, 2012; Al-Sayegh et al., 2014; Bakarman & Al-Ghamdi, 2016; Elbiss et al., 2013; Ghafouri Alnaimi, Alhothi, Alroubi, Alrayashi, Molhim, N. & Shokeir, 2014; Saleh et al., 2005).

Researchers found that the prevalence of UI was around 54.5% among women in Kuwait (Al-Sayegh et al., 2014), 42.2% among women in the United Arab Emirates (Elbiss et al., 2013) and 43% among Omani women (Al-Busaid, 2011). Among Qatari women, the prevalence of UI was 20.6%, which is lower than nearby countries (Saleh et al., 2005). According to Altaweel and Alharbi (2012), in Riyadh, a town in the Kingdom of Saudi Arabia (KSA), researchers found the prevalence of any type UI to be 29%; with 50 % having stress UI, 28% urge UI, and 22%

mixed UI. In Jeddah, another city of KSA, the prevalence of UI among women of child-bearing age was (34.3%) (Bakarman & Al-Ghamdi, 2016). Additionally, in Egypt, a neighboring country to the Arabian Gulf, the prevalence of UI among Egyptian women was 54.8% (El-Azab, Mohamed, & Sabra, 2007). This trend of the high prevalence of UI among the Arabian Gulf women is very apparent recently, and implies that UI is a real public health issue in this area (Altaweel & Alharbi, 2012).

Along with the high prevalence of UI, there were many risk factors found to predispose a woman to UI. These risk factors included aging, high parity, menopause, vaginal delivery, and lower education levels (Altaweel & Alharbi, 2012; El-Azab et al., 2007; Kılıç, 2016). Diabetes was the most common risk factor for UI among Arabic women (Altaweel & Alharbi, 2012; Kılıç, 2016).

The unique culture and beliefs of Arabic women may shape the impact of UI on aspects of QoL. Al-Sayegh et al. (2014), highlighted the impact of UI on physical effects like nocturia and activities of daily living. They found that 76.7% of women reported waking up at least once at night to urinate. In addition, the reported effect of UI on daily living was variable.

About 58.2% of women reported no effects to their activities of daily livings, while 31.5% reported affected activities to a moderate degree, and 10.3% reported affected activities to a large degree (Al-Sayegh et al., 2014). Almost half of the Saudi women with UI, found it disturbing and had negatively affected their daily functioning (Bakarman & Al-Ghamdi, 2016). Limitations on physical activities included having trouble in doing housework in 14%, and suffering from inconvenience during shopping in about 13 % of women with UI (Saleh et al., 2005).

Saleh et al. (2005), also reported there was around 20% limitation in women's social activities due to UI. Elbiss et al. (2013), showed there was a huge negative effect of UI, as high as 64% limiting women from attending some of their social gathering and events, and caused some degree of physical activity limitation in 61.5% of them. Moreover, UI negatively affected some of those women emotionally and psychologically (Bakarman & Al-Ghamdi, 2016). Those affected aspects of life were mainly due to the impact of UI on their ability to perform prayers, along with the negative effects of UI on their sexual life.

Troubled by their inability to pray was apparent in 67% among Emirati women (Elbiss et al., 2013) and 64% among Qatari women (Saleh et al., 2005). Inability to pray was the most distressing issue 90% affecting QoL of the Egyptian women (El-Azab et al., 2007). UI negatively affected women's sexual relationships and marital life in 47% and 57.1% of the women in Qatar (Saleh et al., 2005) and the United Arab Emirates respectively (Elbiss et al., 2013). Almost half of Saudi women with UI reported negative impact on their marital life due to UI (Bakarman & Al-Ghamdi, 2016).

Researchers who studied populations different than Arabic women showed a relation between the impact of UI on QoL and the severity of the symptoms experienced by those women (Abrams et al., 2014; Saadoun et al., 2006). However, the evidence on severity of UI among the reviewed studies on Arabic women was conflicting. Al-Busaidi (2011), found that symptoms were severe in 25% of the women and bothersome in 65%, while Elbiss et al. (2013) found the effect on QoL was severe in 8.8% only.

Despite the high prevalence and negative effects on women's health, most of the affected women did not seek medical attention for UI (El-Azab & Shaaban, 2010; Altaweel & Alharbi, 2012; Kılıç, 2016). Al-Sayegh et al. (2014), showed that only 10.3% of women sought medical

attention, while Al-Busaidi (2011) found that only 20% of the affected women sought care. However, Elbiss et al. (2013) showed around 50.5% of women did not consult for advice about the condition. The only study that reported more than 90% of medical seeking behaviour among Arabic women was in Qatar (Ghafouri et al., 2014).

El-Azab and Shaaban (2010), Al-Busaidi (2011), Al-Sayegh et al. (2014) and Elbiss et al. (2013), reported some of the main reasons for not seeking medical attention. These reasons included the belief that UI was a natural condition and is common after menopause, feelings of guilt or embarrassment, preference of a female doctor, and lack of awareness regarding the existence of medical treatment. Health professionals need to carefully address all those beliefs and perceptions to help women with UI feel comfortable seeking medical advice.

Theoretical Framework

The history of developing the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF) model dates to 1980, when WHO presented a model of human functioning called the "International Classification of Impairment, Disability and Handicap—ICIDH" (WHO, 1980). The WHO designed the model to provide a description of health status, with unified and standard language, that everyone can use across disciplines and cultures (Bakas et al., 2012; WHO, 1980, 2001, 2007). The model has evolved over time from focusing only on the consequences of diseases in 1980, to look at comprehensive components of health in 2001 (Bakas et al., 2012; WHO, 1980, 2001). Later, in 2007, WHO revised the model to include a version for infants, children and youth, called the ICF-CY (Bakas et al., 2012; Buntinx & Schalock, 2010; WHO, 2007).

The core of the ICF concept of health and disability is that disability is a multi-dimensional universal phenomenon, placed on a continuum with health (Kostanjsek, 2011). The

functioning of human-being is as a continuum of health states, exhibiting one or another degree of functioning in each domain, at the body, person and society levels (Kostanjsek, 2011).

Interestingly, this model introduced three planes of experience necessary for human functioning including body structures and functions, activities within an individual context like their skills and abilities, and activities in the social context (Buntinx & Schalock, 2010).

In a recent Cochrane review, the authors considered the ICF framework when choosing the primary outcomes for their review on management options for women with UI (Dumoulin et al., 2010). Their choice of condition specific QoL as primary outcome measures reflects the importance they placed on the effects of UI on women's activities and participation (Dumoulin et al., 2010). Therefore, when planning health educational programs for UI, it is important to assess the primary and secondary outcomes of interest, and ICF can guide this phase smoothly.

The interactions in the ICF framework explain how a health condition may impact functioning at three levels in relation of the body structure and function, activities and participation (WHO, 2013). Researchers and healthcare professionals should consider the way health condition impacts functioning within the context of environmental and personal factors (Kostanjsek, 2011).

To understand the connection between some UI questionnaires and the ICF framework, there were one study that tried to connect between the King's Health Questionnaire and the ICF in assessing patients with UI (Castaneda& Plácido, 2010). For the first component in the framework, the authors obtained twelve categories for body functions and none for body structure. For the second and fourth components, they obtained twenty-two for physical activities and four for environmental factors respectively. However, the authors could not link

seven concepts of the questionnaire to the ICF components (Castaneda& Plácido, 2010). There were no studies found in literature that connected between the ICF model and UDI-6 or IIQ-7.

In summary, the ICF framework is an appropriate tool to classify and measure UI indicators as it allows evaluation of the patient through a single document covering daily life activities, social participation and environmental factors (de Moura Quintana et al., 2014). The ICF model is primarily a classification and mapping system model. Hence, it is practical in situations for needs assessments, matching treatments with conditions, and evaluating outcomes (Bakas et al., 2012).

Instruments

In the reviewed studies, researchers usually measured the health-related quality of life (HRQoL) with generic QoL questionnaires, and not disease-specific ones. Although these questionnaires are useful to compare HRQoL among different diseases, they are less sensitive for measuring specific aspects of a particular illness (Shumaker et al., 1994; Van der Vaart et al., 2002). The specific questionnaires like the Urogenital Distress Inventory (UDI-6) and the Incontinence Impact Questionnaire (IIQ-7) can provide specific assessment of the of impact of UI on women's QoL (McKertich, 2008; Wood & Anger, 2014)

Shumaker et al (1994) designed the Incontinence Impact Questionnaire to assess the impact of UI on activities and emotions in women. The original long version has thirty self-administered questions covering four domains: Physical activity, social relationships, travel and emotional health. Each question has a four-point response scale by which patients rate the extent to which their UI affects their daily functioning in the above domains (zero for not at all, one for slightly, two for moderately, and three for greatly) (Harvey, Kristjansson, Griffith, & Versi, 2001). The same group of scientists developed the Urogenital Distress Inventory at the same

time, which complements the IIQ, to assess the degree to which symptoms associated with incontinence are troubling (Harvey et al., 2001). It consists of 19 questions covering three types of UI, with a similar response scale to the IIQ (zero for not at all, one for slightly, two for moderately, and three for greatly).

Researchers developed short forms of the IIQ and UDI with the original data on the full-length questionnaire. Results from regression analyses suggested that a seven- to eight-item questionnaire would accurately predict the IIQ long forms, and a six-item form would predict the UDI long form. The approach succeeded in reducing the 30-item IIQ and the 19-item UDI to seven- and six-item short forms, respectively.

The IIQ-7 and UDI-6 are both strongly correlated with their original long versions, 0.97 and 0.93 respectively (Uebersax et al., 1995). They both showed significant convergent validity when compared to the pad test and the number of incontinent episodes (Uebersax et al., 1995). The instruments' developers argued that the short form versions may be more useful than the long versions in many clinical and research applications (Uebersax et al., 1995).

Both instruments have been validated recently by Utomo et al., (2015), when they analyzed the questionnaire data of 160 patients. They found that the internal consistency was good in the IIQ-7 with Cronbach's alphas of 0.86 to 0.92, and moderate in the UDI-6 where Cronbach's alphas was 0.44 to 0.66 (Utomo et al., 2015). Both instruments showed good reproducibility at the test-retest, within one week between the administrations, with good Intra-class Correlation Coefficients of 0.75-0.85 (Utomo et al., 2015). Construct validity was adequate, with 75% confirmed hypotheses of urodynamic data, as the gold standard for diagnosing UI, with the measure's scores (Utomo, et al., 2015).

Moreover, Altaweel, Seyam, Mokhtar, Kumar, and Hanash in 2009, had validated the UDI-6 in an Arabic speaking population composed of 68 Saudi patients aged 22 years or over, who had been complaining of lower urinary tract symptoms for at least three months. The type of reliability evidence provided was the internal consistency, with total score Cronbach's alpha of 0.71 (Altaweel et al., 2009). The correlation co-efficient between ratings was more than 0.75, and confirmed the discriminate power between cases and controls (Altaweel et al., 2009). However, Altaweel et al (2009) used only the UDI-6 instrument alone, and did not use the IIQ-7 along with it.

Luckily, in the same year, El-Azab and Mascha (2009), validated both instruments in the Arabic language among Egyptian women. They added an item inquiring about prayer, which is item #1 of IIQ-7 in the Arabic version, (Appendix B). Additionally, they deleted the item inquiring about entertainment activities as it was culturally inappropriate, which was item #3 in the original English version of IIQ-7 (Appendix B). Moreover, they modified the item inquiring about some social activities, which is item #4 in both versions of IIQ-7 (Appendix B).

The test-retest reliability within two weeks was excellent for both instruments, with Lin's concordance correlation coefficient for the UDI-6 being 0.89 and for the IIQ-7 was 0.90 (El-Azab and Mascha, 2009). However, in their study, the internal consistency assessed by Cronbach's alpha was relatively low for both instruments; 0.32 and 0.31 for the UDI-6 and IIQ-7 respectively (El-Azab and Mascha, 2009). Researchers may attribute the low internal consistency to low number of items in each questionnaire.

In summary, both short forms of UDI-6 and IIQ-7 have good reliability and validity for use in the populations like the proposed one in this study. They have the advantage of being short and self-administered, and hence, researchers and healthcare providers can easily use them in

busy clinical settings. Moreover, they are free from sources of construct irrelevant variance, such as verbal ability or intelligence, and free from obvious response biases, such as social desirability.

Summary

In this chapter, the investigator provided a summary of the reviewed literature on UI. From the review, the investigator affirmed UI as a public health concern worldwide due to its high prevalence and cost, as well as its negative consequences on women's general health and QoL. The last part of the chapter, uncovered the research done among Arabic women with UI, and ended with a review of the ICF model, and UDI-6 and IIQ-7 questionnaires.

CHAPTER THREE

METHODS

Introduction

This chapter covers in detail the design of the current study, which is a cross-sectional, non-experimental comparative design. It details the methodology, the target population including details of sample selection, along with sample size calculations. Then, it outlines in detail data collection and data analysis methods. At the end of the chapter, there is a discussion of the study's internal and external validity.

Methodology

Design

The categorical independent variable in this cross-sectional study (presence of any type UI) is attribute, hence, it adopts a non-experimental design, with both of its descriptive and the comparative approaches. The descriptive approach details the socio-demographic variables of the studied population, and identifies the prevalence of urinary incontinence (UI) among them. The comparative approach answers the questions about the impact of UI on quality of life (QoL) and its subset domains.

Research Questions and Hypotheses

Q #1. What is the prevalence of UI among Omani women, already attending Primary Health Care (PHC) centres in Muscat, for reasons other than UI?

Q#2. What is the difference between Omani women with UI and those without UI in their ability to perform daily prayers?

Hypothesis #2: UI among Omani women negatively impacts their ability to perform daily prayers, compared to women without UI.

Q#3. What is the difference between Omani women with UI and those without UI in their ability to perform their daily physical activities like performing some recreational activities and daily housework tasks?

Hypothesis #3: UI among Omani women negatively impacts their ability to perform their daily physical activities like performing some recreational activities and daily housework tasks, compared to women without UI.

Q4. What is the difference between Omani women with UI and those without UI in their social life and relationships?

Hypothesis # 4: UI among Omani women negatively impacts their relationships and social life, compared to women without UI.

Q#5. What is the difference between Omani women with UI and those without UI in their mental health?

Hypothesis # 5: UI among Omani women negatively impacts their mental health, compared to women without UI.

Q#6. What is the difference between Omani women with UI and those without UI in their general QoL?

Hypothesis # 6: Omani women with UI may have lower QoL compared to women without UI.

Study Variables

The attributable categorical independent variable was the presence of any-type of UI at the time of the study. The researcher computed this variable from the average of the total scores in all the six items in the Urogenital Distress Inventory (UDI-6) questionnaire. The investigator considered women who responded by slightly, moderately or greatly to any of the six items as

positive for having any-type UI. On the other hand, the investigator computed women who answered not at all for all the six items as having no UI.

There were five dependent variables in this study. They are the participants' ability to perform their daily prayers, physical health, their social life and relationships, their mental health, and their general QoL. Since this is a between-groups design, there is a comparison between the groups of women with UI (slightly, moderately and greatly) and women without UI (not at all) in each of the above dependent variables. The table below (Table 1) summarizes the variables with their levels of measurement by each research question. The researcher converted the original ordinal levels of the dependent variables (not at all, slightly, moderately and greatly) to continuous level of measurement with scores ranging from zero to one hundred, by multiplying the average score of each of the dependent variable by $33 \frac{1}{3}$. This conversion to continuous scale allows for use of Analysis of Co-Variance (ANCOVA) test.

Table 1

Study Variables and their Level of Measurement

Research Question	Dependent Variable (DV)	Level of DV	Independent Variable (IV)	Level of IV
RQ # 2	Daily Prayers	Continuous (the four scales of not at all, repeat Wudu, repeat prayers & stopped prayers converted to scale of 0-100)	Presence of UI	Ordinal (not at all, slightly, moderately & greatly)
RQ # 3	Physical Health	Continuous (the four scales of not at all, slightly, moderately & greatly converted to scale of 0-100)	Presence of UI	Ordinal (not at all, slightly, moderately & greatly)
RQ # 4	Social Life	Continuous (the four scales of not at all, slightly, moderately & greatly converted to scale of 0-100)	Presence of UI	Ordinal (not at all, slightly, moderately & greatly)
RQ # 5	Mental Health	Continuous (the four scales of not at all, slightly, moderately & greatly converted to scale of 0-100)	Presence of UI	Ordinal (not at all, slightly, moderately & greatly)
RQ # 6	General QoL	Continuous (the four scales of not at all, slightly, moderately & greatly converted to scale of 0-100)	Presence of UI	Ordinal (not at all, slightly, moderately & greatly)

Note: RQ = research question; UI = urinary incontinence; QoL = Quality of Life.

Study Population

The total population of Omani females of all ages, was around 1,160,516 in 2015, with approximately one-fifth of them (237,615) living in Muscat Governorate, the capital city of Oman (NCSI, 2016). This study targeted only Omani women, living in Muscat Governorate with ages of at least 18 years and less than 50 years (Table 2). The investigator extracted the numbers in (Table 2) from the section demonstrating the total Omani citizens living in Muscat by age group and gender, in the Oman Census 2015 raw data (NCSI, 2016). The table below (Table 2) illustrates only the number of females residing in Muscat within the study's eligible age group criteria. There is no age group category that starts from 18 years in the original census raw data (NCSI, 2016). Hence, the researcher included the category of women with ages 15-19 years, to capture those women aged 18 years and older.

From data in (Table 2), the researcher calculated the total target population size, and it was 126,377 women. For a confidence level of 95%, a confidence interval of 0.05 and a standard error of 0.02551, the needed calculated sample size was 383 women. In anticipation of incomplete responses, that the researcher might need to discard from the analysis, the researcher aimed for 400 women. The researcher obtained those four-hundred participants as 40 women from each of the ten PHC centres in Muscat Governorate.

Table 2

Number of Omani Females Residing in Muscat by Age Group

Age Group	Number of females
15 - 19 years	21,852
20-24 years	25,092
25 - 29 years	24,491
30 - 34 years	21,172
35 - 39 years	16,185
40 - 44 years	10,184
45 - 49 years	7,401
Total number of target population	126,377

Note: The above numbers are extracted from Table#6 of the Oman Census 2015.

Participants' Inclusion and Exclusion Criteria

The inclusion criteria for participants' recruitment included:

1. Being a woman with Omani citizenship
2. Age is between 18 years and over, and less than 50 years
3. Can read and write
4. Attending the PHC centre in Muscat Governorate for reasons other than UI

Alternatively, the exclusion criteria included:

1. Non-Omani women, or not a resident of Muscat Governorate
2. Age less than 18 years, or 50 years and older
3. Cannot read or write independently
4. Being pregnant at the time of the study
5. Within the six weeks' post-partum period during the time of the study
6. Seeking medical advice for UI at the PHC centre

Selection of the PHC centres

At the time of this study, there were 23 PHC centres scattered all around Muscat Governorate. These centres are: AL Shadi Health Centre, AL Hail Health Centre, AL Khoudh Health Centre, AL Mawaleh Health Centre, North AL Mawaleh Health Centre, South Maabila Health Centre, AL Azaibah Health Centre, AL Ansab Health Centre, AL Khuwair Health Centre, AL Gubrah Health Centre, Wadi Kabir Health Centre, Ruwi Health Centre, AL Nahdah Health Centre, Muscat Health Centre, Mattrah Health Centre, AL Amerat Health Centre, AL Hajer Health Centre, Yeti Health Centre, Hai ALMina Health Centre, Bamah Health Centre, Mazara Health Centre, Siya Health Centre, and Seefa Health Centre (Ministry of Health [MOH], 2017). The researcher randomly assigned numbers from one-to-23, to all the above PHC centres in plain

white cards, and placed all the 23 numbered-cards in a box. From that box, the researcher randomly selected ten cards. The randomly-selected ten PHC centres were:

1. Mattrah Health Centre
2. AL Hail Health Centre
3. AL Gubrah Health Centre
4. South Maabila Health Centre
5. AL Khuwair Health Centre
6. AL Ansab Health Centre
7. North AL Mawaleh Health Centre
8. AL Khoudh Health Centre
9. AL Azaibah Health Centre
10. AL Amerat Health Centre

The researcher substituted the names of the chosen ten health centres with letters from A to J, to assure anonymity. Some of the chosen health centres are in the most remote areas of Muscat Governorate like Mattrah and Al Amerat Health Centres, while others are in the most prestigious areas like Al Ansab and Al Azaibah Health centres (Fig 2). Some health centres, like Mattrah Health Centre, serves citizens with low socio-economic status. On the other hand, there are some health centres that serve citizens with middle socio-economic status like in Al Hail and AL Khoudh Health Centres.



Figure 2. Map of cities in Muscat Governorate. This figure illustrates the cities in Muscat. The name of PHC centres in each city is the same as the name of the city. Reprinted from <http://omancoast.blogspot.com/2014/03/housing-for-expats-in-oman.html>

Instrumentation

Shumaker et al., (1994) refined a urinary incontinence symptom inventory called the Incontinence Impact Questionnaire (IIQ) and a life impact assessment instrument called the Urogenital Distress Inventory (UDI), which quantifies the impact of urinary incontinence on QoL. Uebersax et al. (1995) condensed these scales to seven- and six-item short-forms respectively, and both are self-administered surveys. Using these two measures, the researcher obtained detailed information on how UI impact QoL of the affected women.

El-Azab & Mascha (2009) had translated and validated both questionnaires in Arabic language. The researcher obtained permission to use the existing Arabic version of these questionnaires in this proposed study from its developers (A. EL-Azab, personal communication, October 16, 2016). Please refer to Appendix G for the communication details. The researcher administered the self-reported surveys in the Arabic language, which contained two sections:

Section #1. This section included fill-in-the-blanks and multiple-choice questions (Appendix A). It covered the extraneous factors that might affect the study's dependent variables, apart from the presence of the independent variable. Those factors included age, marital status, educational status, family income, presence of other chronic illness, and number of children the women had (parity). Those factors represent the personal factors in the ICF model.

Section # 2. This section consisted of 13 questions, covering the combined six items of UDI-6 and seven items of the IIQ-7 questionnaires (Appendix B). All the thirteen questions were answered by choosing the proper level of both of UI symptoms, and impact of UI on their QoL aspects; from four levels of (not at all, slightly, moderately, and greatly).

The investigator handled missing data in this section, as described by the original developer of UDI-6 and IIQ-7 instruments. If one or two items were left blank in the variable, the average of the participant's observed values can be used, while if more than two items were left blank, scores can not be calculated (Uebersax et al., 1995). There was no single case of double answers to any of the items in this section, otherwise the researcher could calculate the average and record it as the final answer.

Pilot Study

The researcher conducted a pilot study on 41 women from the target population (ten percent of the proposed sample size). This pilot study was in AL Mawaleh Health Centre, which was not included in the ten PHC centres of the actual study. The researcher conducted the pilot study only after getting the ethical approval from the Centre of Studies and Research in Oman (Appendix F). Results from this pilot, were used for psychometric analysis of the Arabic version of the UDI-6 and IIQ-7 in the study target population. The researcher intended to determine the reliability and validity of both instruments. For reliability of UDI-6 and IIQ-7, the researcher calculated the Cronbach's coefficient alpha. The researcher examined validity of both instruments by using component factor analysis, with factor loading of more than 0.4 as an acceptable level.

Data Collection

The researcher recruited 401 participants from the chosen ten health centres. The researcher chose the potential participants randomly from the registration list, by taking every third name on the list, if they met the above-mentioned inclusion criteria. Each participant came to their appointment for their proposed clinical visit to see their family physician or general practitioner. At the registration desk, the researcher assigned numerical values for each eligible

participant starting from one to 40. After reaching number 40, the principal investigator moved forward to the next assigned health centre.

As outlined above, the researcher identified each health centre by the alphabetical letters from A- J. This data identification system ensured anonymous nature of the collected information. Therefore, each participant was identified by a number and a letter. For example, participant # 4C represented the fourth woman who participated in the study from AL Gubrah Health Centre. The researcher stopped recruiting when reached number 40 in all the ten health centres.

The researcher obtained consent verbally while the potential participants were checking-in for their clinical visit at the registration desk. A copy of the consent letter in both English and Arabic languages is available in (Appendix C). Even though the researcher received consent verbally from the participants prior to recruiting them, the participants still received a cover letter (Appendix D), along with the survey questionnaire, that helped enhance their comprehension and facilitated a well-informed voluntary consent. The researcher asked the participants to sign the consent letter, as an indication of their agreement to participate in the study. If the participant could not read or write, then they were excluded from the study, even when they offered the help of their accompanying relatives.

The waiting time to see the doctor after registering is around 15-30 minutes, and the study survey took less than ten minutes to complete. The participants completed the surveys while waiting for their appointment. The researcher provided a box with a lid, to drop the completed surveys before the participants go to see their physician. The researcher took the box at the end of the day, to enter the collected data. The researcher anticipated that by the end of the

fourth week after starting the study, data collection will be complete yielding the required sample size of 401 participants.

The principal investigator entered data into the Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armonk, New York) software. The investigator stored the completed survey questionnaires in a locked file cabinet in her personal office. To ensure confidentiality, the researcher locked the computer containing the SPSS file by a password known to principal the investigator only. Following the completion of data entry, the investigator cleaned data and checked it for errors using descriptive analysis for all the entered variables.

Data Analysis

The researcher adopted the instrument developers' scoring system, that Uebersax et al., (1995) explained. The participants answered all the combined thirteen questions of the UDI-6 and IIQ-7 in a scale of not at all, slightly, moderately, and greatly scale. The four Likert scale responses corresponded to values from zero-to-three, in the order of the scale. Hence, for each question, the response not at all scored as zero, slightly scored as one, moderately scored as two, and greatly scored as four (Uebersax et al., 1995). Then, the researcher calculated the average of each question, yielding a range from zero to three. Finally, for IIQ-7, the researcher multiplied the average by $33 \frac{1}{3}$ to put the scores on a scale of zero-to-100, as per the original developers' instructions (Uebersax et al., 1995).

To answer the first research question, the researcher used descriptive statistics to report the prevalence of UI among the participants. The researcher extracted the prevalence from the average score of the responses to all the six items in UDI-6 questionnaire. The researcher considered women who chose the response "not at all" to all the six items as having no UI. The

researcher calculated the total number of women who answered positively to any of the six items in UDI-6, and divided it by the total number of women who participated in the study, to yield the prevalence of UI among the participants.

Furthermore, the researcher used descriptive analysis to describe the frequency and distribution of each of the six UI symptoms in UDI-6 questionnaire. In addition, the researcher used descriptive statistics like the mean, frequencies and percentages to describe the participants' socio-demographic variables like age, marital status, education, and income level. The researcher also used similar descriptive statistics to report the other two extraneous variables of parity and presence of any chronic illnesses.

To answer the second research question, the researcher compared women with UI (levels from slightly to greatly) to women without UI, in their ability to perform their daily prayers. The dependent variable here was the ability of those women to perform their daily prayers. The researcher calculated this variable from scores on the responses to item#1 in the IIQ-7 questionnaire (Appendix B). Then the researcher multiplied the average score by $33 \frac{1}{3}$ to convert it to continuous scale ranging from zero-to-100. The independent variable was the presence of any-type UI (slightly, moderately or greatly), calculated from the average scores on the six items of UDI-6 questionnaire.

Then, the researcher tested for assumptions to use ANCOVA test (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017). However, in this case there was a violation in the assumption of homogeneity of variances, hence the researcher chose not to use ANCOVA and shifted to non-parametric tests (Gliner, Morgan & Leech, 2011). The researcher used Kruskal Wallis test to report the difference in performing daily prayers among the women with no UI, women with slightly-UI, women with moderately-UI and women with greatly-UI. If the test was statistically

significant, then the researcher ran Mann Whitney tests for pairwise comparisons to test which pairs among “not at all and slightly”, “not at all and moderately”, “not at all and greatly”, “slightly and moderately”, “slightly and greatly” and between “moderately and greatly” differs the most (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017).

To answer the third research question, the researcher compared women with UI (slightly, moderately or greatly) to women without UI in their abilities to perform daily physical activities like daily housework tasks and some recreational activities. Here, the researcher calculated the score of the dependent variable by calculating the average score on item#2 and item #3 in the IIQ-7 questionnaire (Appendix B). Then the researcher multiplied the average score by $33 \frac{1}{3}$ to convert it to continuous scale ranging from zero-to-100.

Before running the analysis, the researcher tested for assumptions to use ANCOVA test to check that they were all met (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017). There was no violation of the assumptions in this case, hence the researcher used ANCOVA to report the difference in physical health among the groups of women with no UI, women with slightly-UI, women with moderately-UI and women with greatly-UI. When the test result was statistically significant between the groups, the researcher ran post-hoc analysis to determine which pairs differ significantly from each other out of “not at all and slightly”, “not at all and moderately”, “not at all and greatly”, “slightly and moderately”, “slightly and greatly” and finally between “moderately and greatly” (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017).

The fourth research question was regarding the difference in social life and relationships between women with UI and women with no UI. The dependent variable here is the social life and relationship dimension of QoL. The researcher calculated this variable from the average

scores on item #4 and item #5 in IIQ-7 (Appendix B). Then the researcher multiplied the average score by $33 \frac{1}{3}$ to convert it to a continuous scale ranging from zero-to-100. The independent variable is still the presence of any-type UI calculated, as mentioned above, from the average scores on the six items of UDI-6 questionnaire.

Again, before running any analysis, the researcher tested for assumptions to use ANCOVA test (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017). However, there was a violation to the assumptions of normality, as well as, homogeneity of variances. Therefore, the researcher chose to shift to non-parametric tests in this case (Gliner, Morgan & Leech, 2011). The researcher used Kruskal Wallis test to report the difference in social life between women with no UI, women with slightly-UI, women with moderately-UI and women with greatly-UI. When the test was statistically significant, then the researcher ran Mann Whitney tests for pairwise comparisons to test which pairs showed more difference among “not at all and slightly”, “not at all and moderately”, “not at all and greatly”, “slightly and moderately”, “slightly and greatly” and between “moderately and greatly” (Gliner, Morgan & Leech, 2011).

Similarly, for the fifth research question, the researcher compared the difference among participants with UI and those without UI on their mental health. The researcher calculated the dependent variable, which is mental health, from the average score on last two items (item #6 and item#7) in the IIQ-7 questionnaire (Appendix B). Then, again, the researcher multiplied the average score by $33 \frac{1}{3}$ to convert it to a continuous scale ranging from zero-to-100. The independent variable is still the presence of any-type UI calculated.

After that, the researcher tested for meeting all the assumptions to use ANCOVA test (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017). Like prayers and social life cases, there was a violation to the assumptions of, homogeneity of variances in this case. Therefore,

the researcher chose to shift to non-parametric tests here as well (Gliner, Morgan & Leech, 2011). The researcher used Kruskal Wallis test to report the difference in social life between women with no UI, women with slightly-UI, women with moderately-UI and women with greatly-UI. When the test was statistically significant, then the researcher ran Mann Whitney tests for pairwise comparisons to test which pairs showed more difference among “not at all and slightly”, “not at all and moderately”, “not at all and greatly”, “slightly and moderately”, “slightly and greatly” and between “moderately and greatly” (Gliner, Morgan & Leech, 2011).

Finally, the last research question was about any difference in general QoL due to presence of UI in women. The dependent variable here is general QoL, and the researcher calculated this score from the sum of all the seven items in the IIQ-7 questionnaire (Appendix B). After that, the researcher multiplied the calculated average score by $33 \frac{1}{3}$ to convert it to continuous scale ranging from zero-to-100.

Similarly, the researcher tested for assumptions to use ANCOVA test before running the analysis (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017). Luckily, there were no violations to the assumptions in this case, hence the researcher used ANCOVA to report the difference in general QoL among the groups of women with no UI, women with slightly-UI, women with moderately-UI and women with greatly-UI. When the test result was statistically significant between the groups, the researcher ran post-hoc analysis to determine which pairs differ significantly from each other out of “not at all and slightly”, “not at all and moderately”, “not at all and greatly”, “slightly and moderately”, “slightly and greatly” and finally between “moderately and greatly” (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017).

The researcher conducted all data analysis using the Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armon. New York) software. For the above-mentioned tests, the

researcher controlled statistically for the extraneous variables that may affect responses to the items in the IIQ-7 questionnaire. These variables were age, marital status, income, education, parity, and the presence of other illnesses or co-morbidities. For the ANCOVA tests, the researcher recoded the marital status variable (categorical) to binary variable of married and not-married. The researcher allocated all married responses a numerical value of one, and all other responses of single, divorced or widowed a numerical value of two, in order to enter the variable in the regression model. In all of these analyses, the researcher adjusted for significance intervals using Bonferroni adjustment for multiple comparisons to avoid the possibility of increasing Type I error. Table 3 provides a summary of the analysis used in this study, in correspondence to each research question.

Table 3

Summary of Data-Analysis Methods by Research Questions, Variables, and Instrument Items

Research Question	Variables	Instrument Items	Analysis Method
Q#1: What is the prevalence of UI among Omani women?	Age, marital, education, income, parity, presence of any chronic illnesses	Items 1-6 in UDI-6 total score of 0=NO, score of 1 or more= yes	Descriptive statistics for prevalence of UI The mean, frequencies and percentages to describe participants' socio-demographic variables
Q#2. Is there any difference between women with UI and women with no UI in performing their daily prayers?	IV= presence of UI DV= Ability to perform daily prayers	Item #1 in IIQ-7	Kruskal Wallis followed by Man Whitney tests
Q#3. Is there any difference between women with UI and women with no UI in performing their daily physical activities?	IV= presence of UI DV= physical health	Items #2 and item #3 in IIQ-7	ANCOVA followed by post-hoc analysis
Q#4. Is there any difference between women with UI and women with no UI in their social life?	IV= presence of UI DV= Social life	Item #4 and item #5 in IIQ-7	Kruskal Wallis followed by Man Whitney tests
Q#5. Is there any difference between women with UI and women with no UI in their mental health?	IV= presence of UI DV= Mental health	Item #6 and item #7 in IIQ-7	Kruskal Wallis followed by Man Whitney tests
Q#6. Is there any difference between women with UI and women with no UI in their mental health?	IV= presence of UI DV=general QoL	Items 1-7 in IIQ-7	ANCOVA followed by post-hoc analysis

Note: UI = urinary incontinence; IV = independent variable; DV = dependent variable; QoL= quality of life; UDI-6 = the Urogenital Distress Inventory questionnaire; IIQ-7 = Incontinence Impact Questionnaire.

Evaluation of the Research's External and Internal Validity

Researchers can assess external validity of a research study through evaluation of the selected population as a representative of the target population, and through evaluation of the study's ecological validity (Gliner, Morgan & Leech, 2011). In terms of the target population, the investigator attempted to obtain a representative sample from Muscat Governorate to represent the Omani women. Regarding the ecological validity, the researcher conducted the study at the same environment, the PHC centres, as the intended health promotional programs for UI. Hence the study had good ecological validity.

The researcher assessed the internal validity of this study by the psychometric analysis of the instruments, from the pilot study, along with measures taken to avoid some threats to internal validity. The investigator took measures to ensure well-informed consent, anonymity and confidentiality, along with the survey being self-reported. However, there was still a possibility that participants might not answer very honestly, because they were at the health centre, and they might want to please the investigator. The researcher tried to ensure equivalence of participant's characteristics, like socio-demographic variables, parity, and presence of other illnesses using statistical control through use of ANCOVA instead of ANOVA. Threats like use of extreme groups was not applicable in this study. However, the threat of dropping the illiterate women might have affected this aspect, as discussed earlier in chapter one.

In conclusion, this study did not aim to infer causality, as researchers cannot assume that UI happened before the negative effects on QoL. However, the researcher could infer the relationship between UI and QoL by demonstrating the statistical difference between groups with

UI and the group without UI. This relationship was valid based on the medium-level of the external and internal validity of the study.

Summary

This chapter provided a detailed review of the methods in this cross-sectional study. The review included the methodology, participants and sampling methods and data collection methods. In addition, it outlined details of both parametric and non-parametric tests used in the analysis as outlined in (Table 3). The chapter concluded with an evaluation of the study's external and internal validity.

CHAPTER 4

RESULTS

Introduction

This chapter outlines the results of both the pilot study along with the actual study in detail. The first section presents the results of the pilot study including both demographics of its participants, along with the psychometric analysis of both instruments UDI-6 and IIQ-7. In addition, it includes the prevalence of UI among the piloted participants, as well as its impact on their quality of life (QoL). The second section details the demographics of the participants from all the ten health centres in Muscat Governorate in the full study. The third section outlines the full study results according to the research questions and hypotheses. From the results, the researcher highlighted the prevalence of urinary incontinence (UI) among Omani women, along with the impact of UI on different domains of QoL among those women.

Pilot Study

In order to perform the pilot study on similar participants as the actual study, the researcher conducted the pilot study only after getting the approval from the Centre of Studies and Research in Oman (Appendix F). Unfortunately, their approval was much later than the Institutional Review Board (IRB) approval from Sothern Illinois University- Carbondale (Appendix E). Hence, the researcher delayed the pilot study until the two institutions approved the research proposal.

Forty-one Omani women from the AL Mawaleh Health Centre met the study's inclusion criteria. The researcher chose them by random sampling method, by selecting every third woman coming to see their general practitioner. All of them voluntarily consented to participate in the pilot study.

Participants' Demographic Description

Out of the 41 participants, 32 women (78%) documented their age, which was between 18 and 48 years ($M= 32.03$, $SD = 9.36$). Almost a third of the participants (34%) had a high school diploma, and slightly more than half of them (56%) had either been enrolled in or completed their undergraduate degree. There were thirty-seven women (90%); who completed the income question, with 78.4% of them reported having a monthly income of 500 Omani Rials (O.R.) or more, which is equivalent to \$ 1,400 USD a month. There were only around 15% of participants who reported an income of less than 300 O.R. (around \$779) a month.

One quarter of the surveyed women (25%) were single, and 5% were divorced. Among the married and divorced women, 80% had three or more children, and around 30% had more than five children. Since the surveyed population were relatively young, most them 85% did not have chronic illnesses at the time of the survey.

Instruments' Psychometric Analyses

In addition to the sociodemographic section, the survey included questions from two existing instruments. The Urogenital Distress Inventory short form (UDI-6) comprised of six questions assessing the presence of any symptoms of urinary distress. The Incontinence Impact Questionnaire (IIQ-7), which consists of seven questions, specifically assessing the impact of incontinence on peoples' QoL in different dimensions. The answers to all the questions in both instruments were on a four-point Likert scale of not at all, slightly, moderately and greatly.

Instruments' Reliability

The researcher assessed the internal consistency for the six items in UDI-6 questionnaire by Cronbach's alpha. In the returned thirty-eight surveys (93%), in which women answered more than four out of six items in the UDI-6 questionnaire, Cronbach's alpha was acceptable

(0.66). For the IIQ-7 questionnaire with seven items, there were thirty-nine surveys (95%), in which women did not miss more than two items. Cronbach's alpha yielded excellent internal consistency between the seven items with alpha of 0.81. Table (4) illustrates Cronbach's Alpha for both instruments.

Instruments' Validity

The researcher ran principal components analysis (PCA) with Varimax rotation using Kaiser normalization, to check for factor loadings on both UDI-6 and IIQ-7 questionnaires. For the six items in UDI-6 questionnaire, this method extracted two components. The first component contained item #1 (frequent urination), item #5 (incomplete bladder emptying) and item #6 (discomfort or pain), which loaded together representing symptoms of unspecified UI, mainly mixed type. The second component of UDI-6 consists of item #2 (leaking with urgency feeling) and item #3 (leaking with increased intra-abdominal pressure), which represent specific UI symptoms, urge, and stress UI respectively. The question about symptom of dribbling in item #4 did not load with either component.

Regarding the seven items on IIQ-7 questionnaire, the PCA method extracted four components. In disagreement with the findings of the instruments' original authors (Uebersax et al., 1995) and the Arabic version authors (El-Azab & Mascha, 2009), item #4 (social gatherings) loaded well (0.74) with item #2 (household chores) and item #3 (physical activity), with loadings of 0.84 and 0.95 respectively. The second component in IIQ-7 questionnaire is mental health which consisted of item #6 (anxiety) and item #7 (depression) with factor loadings of 0.92 and 0.94, respectively. In agreement with the findings of the instrument's original developers, this mental health component represents the mental health dimension of QoL.

The third component in the Arabic version of IIQ-7 was item #1 (effects of UI on daily prayers) with factor loading of (0.95), as an important component of QoL among the Arabic women. Finally, the fourth component in this questionnaire composed of item #5 (effects of UI on travel), with factor loading of (0.95). This is a unique finding that does not lie in agreement with the developer of the Arabic version. For detailed results of this analysis, please refer to (Table 5) for the PCA tests on both the UDI-6 and IIQ-7 questionnaires.

Table 4

Cronbach's Alpha for Piloted Instruments

Instrument	N of Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted	
UDI-6	6	0.658	Item #1	0.537
			Item #2	0.594
			Item #3	0.666
			Item #4	0.689
			Item #5	0.588
			Item #6	0.571
IIQ-7	7	0.811	Item #1	0.804
			Item #2	0.804
			Item #3	0.769
			Item #4	0.741
			Item #5	0.818
			Item #6	0.796
			Item #7	0.759

Note: UDI-6 = the Urogenital Distress Inventory questionnaire; IIQ-7 = Incontinence Impact Questionnaire; Significant alpha levels are in boldface.

Table 5

Factor Loadings for Principal Component Analysis with Varimax Rotation for Piloted Instruments

	Component	
	1	2
Item#1_UDI6	.665	.443
Item#2_UDI6	.161	.859
Item#3_UDI6	-.023	.832
Item#4_UDI6	.177	-.166
Item#5_UDI6	.898	-.063
Item#6_UDI6	.854	.065

	Component			
	1	2	3	4
Item#1 IIQ-7	.326	.151	.928	-.025
Item#2 IIQ-7	.844	-.174	.360	.186
Item#3 IIQ-7	.951	.194	.115	.112
Item#4 IIQ-7	.714*	.602	.238	-.063
Item#5 IIQ-7	.148	.228	-.013	.954
Item#6 IIQ-7	.011	.921	-.064	.282
Item #7 IIQ-7	.124	.939	.218	.083

Note: Significant factor loadings are in boldface; asterisk (*) denotes disagreement in loading per original authors.

The Study Results

A total of 401 women, from the ten-allocated primary health care (PHC) centres in Muscat Governorate, voluntarily consented to participate in the study and returned the completed surveys to the principal investigator. The expressed results for all the confounding variables show the valid percentages only, without calculating the missing values for each of them. For both the dependent variable (QoL measured by seven items in IIQ-7) and the independent variable (presence of UI measured by six items in UDI-6), the researcher did not analyze the variable if it is missing more than two items in each questionnaire, as per the inventors' instructions (Uebersax et al., 1995).

Participants' Demographic Description

The majority of the participants (91%) documented their age, which ranged between 18 and 49 years old ($M = 31.65$, $SD = 8.03$). The surveyed population was relatively young, with almost half of them (52.6%) aged 30 years or younger, and only 17.8% were between the age of 40 and 49 years. At the time of the survey, most of those women (44.4%) either completed or were doing their undergraduate degree. More than a third of the participants (36.4%) had completed or were in their last year of secondary school at the at the time of the survey.

Since the chosen PHC centres were from different areas in Muscat Governorate, the monthly income varied among the surveyed women. The majority (35.2%) had an income ranging from 500 to 1000 O.R each month (one O.R. is equivalent to \$2.6). Only 2.7% had a monthly income of over 2000 O.R., and 15.2% reported having less than 300 O.R a month.

Most of the surveyed women (74.4%) were married. Around 18.8% were single, 3.8% were divorced and 2.8% were widowed. Regarding parity, 26% had no children, 62.6% had one to three children, and 11.4% had five or more children. The majority (77.5%) did not complain

of any chronic illness when surveyed. The most common reported chronic illnesses were hypertension, diabetes, asthma and thyroid disorders, with only sixteen women (4.1%) reporting having more than one illness at the time of the survey. A summary of those confounding variables is available in Table 6, with Table 7 detailing different types of chronic illnesses among the surveyed population.

Prevalence of UI Among Omani Women (Research Question #1)

The researcher excluded only four surveys (1%) from this analysis, because they were missing more than two items in the UDI-6 questionnaire. Any-type UI was surprisingly very prevalent (85.4%) among the 397 women who completed all the six items in the questionnaire. Among women with UI, the majority (76.7%) of them considered their symptoms' bothering level as slightly, moderately (20.1%) and only (3.2%) referred to their UI as greatly bothersome. Women did not report the level greatly at all in four PHC centres; Mattrah, AL Khuwair, AL Ansab and AL Khoudh Health Centres (Figure 3).

Since there is a high prevalence of UI among the surveyed women, the researcher ran a descriptive analysis of all six UI symptoms in UDI-6 questionnaire. The most commonly reported symptoms of UI were frequent urination (67.1%), leaking urine with increased intra-abdominal pressure like coughing and sneezing (62.7%), lower abdominal pain and discomfort (58.3%) and feelings of urgency in (56.4%). The least reported complaints were incomplete emptying of the bladder (40.8%) and dribbling of urine (20.1%). Figure (4) illustrates the distribution of different UI symptoms among the study participants.

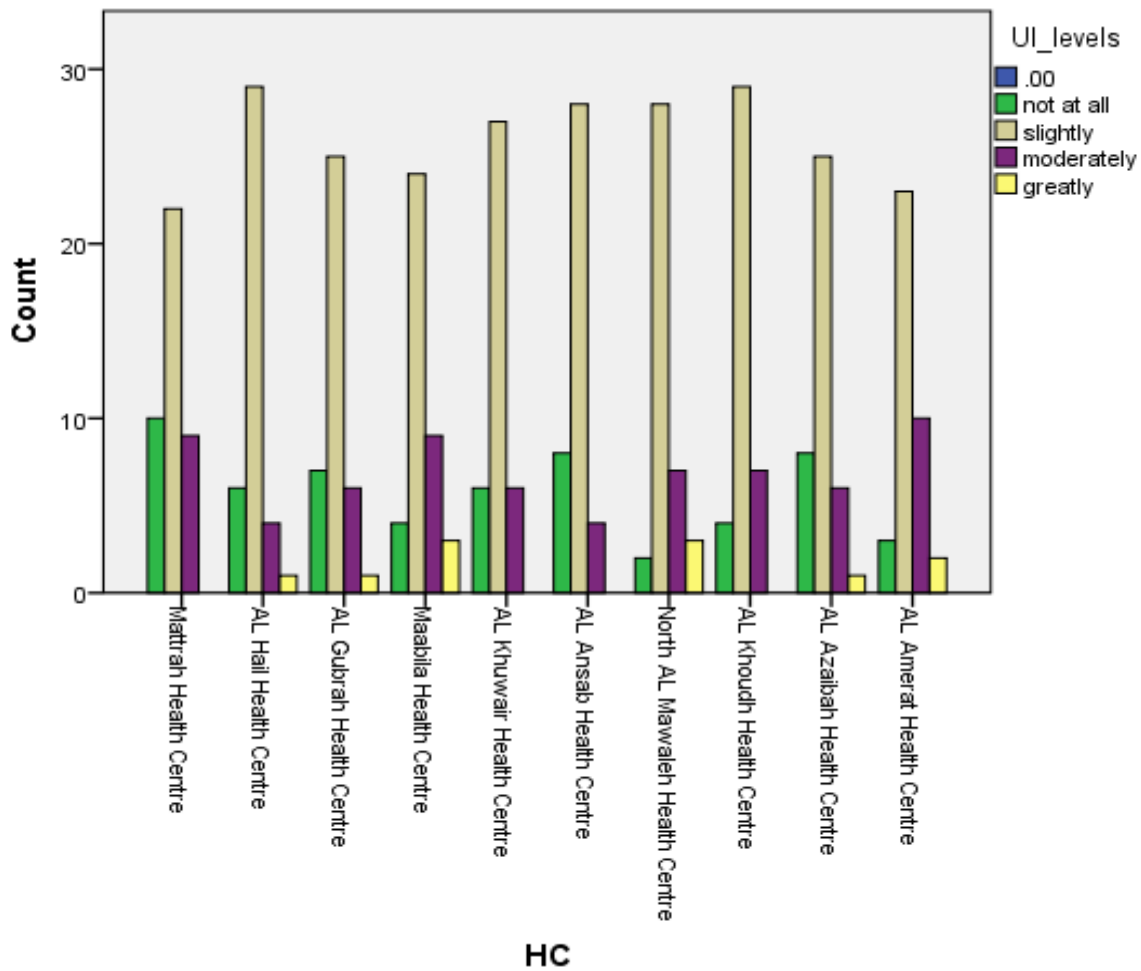


Figure 3. Prevalence of UI among PHC centres in Muscat. This figure illustrates the distribution of UI by its four levels of not at all, slightly, moderately and greatly among the chosen ten PHC centres in Muscat.

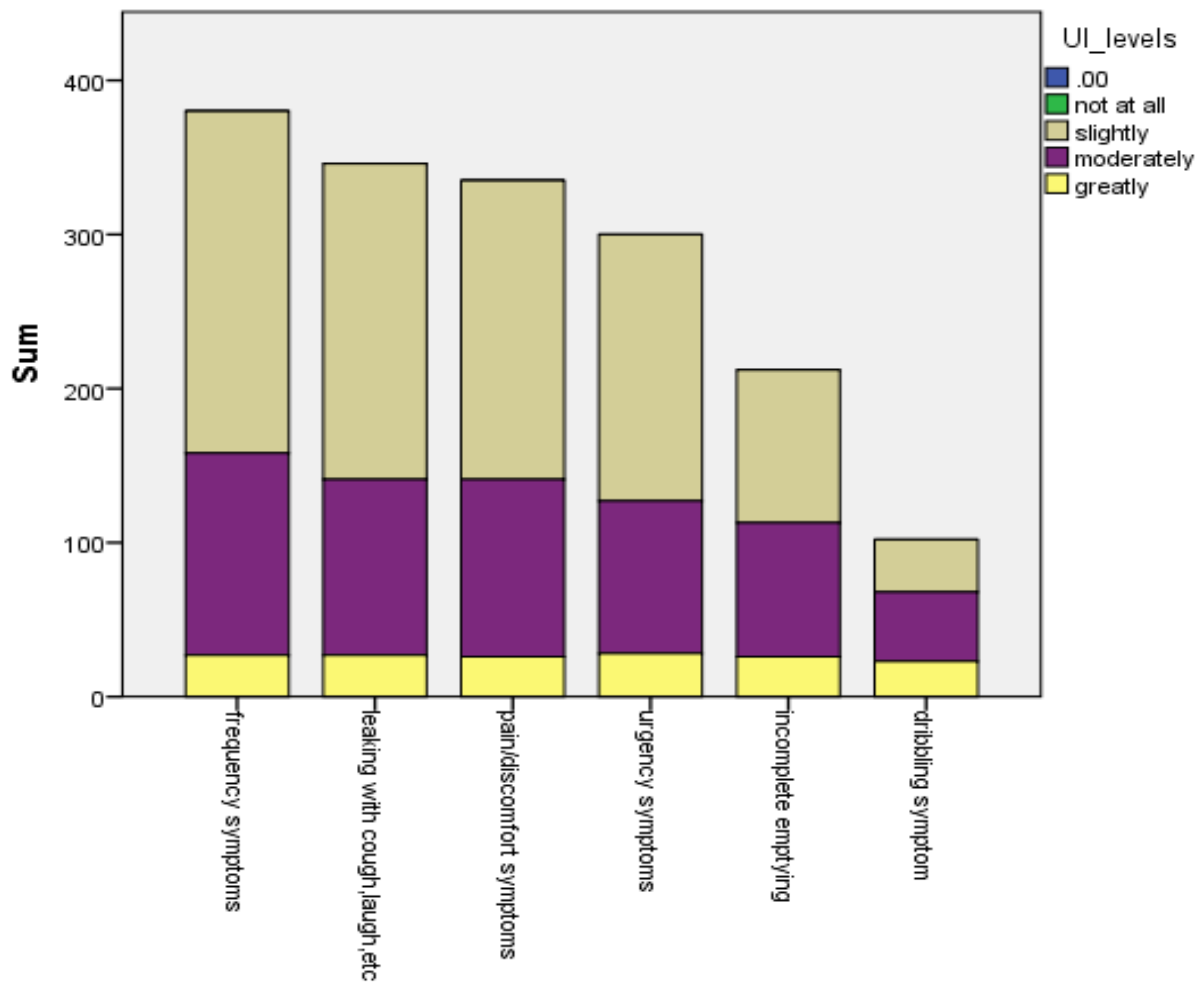


Figure 4. Distribution of UI different symptoms. This figure illustrates the distribution of the six UI symptoms among the study participants, with four levels of severity (not at all, slightly, moderately, greatly).

Table 6

Sociodemographic Characteristics of the Participants

Variable	Number (%)
^a Age	
18-19	11 (3.01%)
20-29	161 (44.11%)
30-39	118 (32.33%)
40-49	75 (20.55%)
Education	
primary (grades 1-6)	23 (5.8%)
preparatory (grades 7-9)	34 (8.6%)
secondary (grades 10-12)	144 (36.4%)
under-graduate degree	176 (44.4%)
post-graduate degree	19 (4.8%)
Monthly Income	
<300 O.R.	56 (15.2%)
300-<500 O.R.	79 (21.4%)
500-<1000 O.R.	130 (35.2%)
1000-2000 O.R.	94 (25.5%)
>2000 O.R.	10 (2.7%)
Marital Status	
Single	75 (18.8%)
Married	298 (74.7%)
Divorced	15 (3.8%)
Widowed	11 (2.8%)
Parity	
No children	102 (26.0%)
1 or 2 children	148 (37.7%)
3 or 4 children	98 (24.9%)
5 or 6 children	32 (8.1%)
> 6 children	13 (3.3)
Chronic Illnesses	
No chronic illness	306 (77.5%)
Had chronic illness	89 (22.5%)

Note: Edu is the last education degree attained or currently enrolled-in.

^aMean age was 31.85 years (SD = 8.03).

Table 7

Distribution of Different Chronic Illnesses Among the Participants

		Frequency	Valid Percent
Types of Chronic illnesses	No illness	306	77.5
	More than one illness	16	4.1
	Hypertension	15	3.8
	Asthma	9	2.3
	Diabetes	9	2.3
	Thyroid disorders	8	2.0
	Arthritis/osteoprosis/tmj/msk	7	1.8
	IDA/SCD/anemia	6	1.5
	Derma (eczemz, psoraisis, etc)	4	1.0
	PCOD/dysmenorrhea/menorrhagia	3	.8
	Dyslipidemia	2	.5
	Allergic rhinitis	2	.5
	Migraine	2	.5
	Hepatitis	2	.5
	Mood disorder	2	.5
	Gastrointestinal	1	.3
	Epilepsy/neuro	1	.3
	Missing	6	0
Total	401	100.0	

Note: tmj = temporomandibular joint disorders; msk = musculoskeletal disorders; IDA=iron-deficiency anemia; SCD= sickle cell disease; derma+ skin conditions; PCOD=polycystic ovarian disease.

Impact of UI on QoL Among Omani Women

The researcher examined the impact of the independent variable (presence of any type-UI) on the dependent variable (QoL) using One-Way Analysis of Covariance (ANCOVA) test, to statistically control for the factors that may affect the dependent variables apart from the independent variable when there were no violations of its assumptions (Gliner, Morgan & Leech, 2011; Statistics.laerd.com, 2017). The below results are for the impact of UI and its four levels of (not at all, slightly, moderately and greatly) on different domains of QoL after controlling for the covariates including age, education, income, marital status, parity and presence of any chronic illness.

Additionally, the researcher tested for the assumption of linear relationship between the dependent variables and the covariates for the two questions analyzed using ANCOVA test (Table 8). There was no linear relationship between the dependent variables (physical life and general QoL) and the two covariates of age and income. Nevertheless, the researcher still overcontrolled for those two factors, as previous research showed they affect QoL (Danforth et al., 2006; Gorina et al., 2014; Khandelwal & Kistler, 2013; McKertich, 2008; Sampelle, Harlow, Skurnick, Brubaker, & Bondarenko, 2002; Seshan et al., 2016; Wu, Liu, Xie, Wang, Wu & Liu, 2011). In case of violations to ANCOVA assumptions, the researcher shifted non-parametric test of Kruskal Wallis and Mann Whitney tests (Gliner, Morgan & Leech, 2011).

Table 8

Correlations Demonstrating Linear Relationship between Covariates and Dependent Variables

		Age	Education	Income	Marital status	Parity	Chronic Illness
Impact on physical life	Pearson Correlation	.048	-.148*	-.082	.203*	.161*	.103*
	Sig. (2-tailed)	.369	.003	.120	.000	.002	.044
Impact on general QoL	Pearson Correlation	.095	-.180*	-.069	.169*	.145*	.145*
	Sig. (2-tailed)	.072	.000	.191	.001	.004	.004

Note: The dependent variables are impact on physical life and impact on general QoL. The covariates are age, education, income, marital status, parity and presence of any chronic illnesses. Asterisks denotes significant correlations at the 0.05 level

Impact on Daily Prayers (Research Question #2). The majority of the women who had UI, (70.4%) reported no effects at all of UI on their prayers, 21.6% reported that they had to repeat their Wudu rituals and 7.2% reported that they had to repeat their prayers. There were three participants (0.9%), from the group of the women with UI, who reported that they had stopped praying completely (Table 9). Kruskal-Wallis H test pointed out a statistically significant difference in daily prayers score between the four different UI levels, $\chi^2(3) = 82.05$, $p < 0.001$, with a mean rank score of 145.50 for no UI at all, 184.29 for slightly UI, 258.85 for moderate UI and 316.64 for greatly-level of UI (Table 10).

Mann-Whitney test for pairwise comparisons of effects on daily prayers among the four groups of UI revealed statistically significant differences between groups of not at all ($Mdn = 0.00$) and slightly ($Mdn = 0.00$) with $U = 5785.00$ ($Z = -3.72$), $p < 0.001$ ($r = -0.21$), not at all ($Mdn = 0.00$) and moderately ($Mdn = 1.00$) with $U = 798.00$ ($Z = -6.76$), $p < 0.001$ ($r = -0.61$), not at all ($Mdn = 0.00$) and greatly ($Mdn = 1.00$), $U = 57.00$ ($Z = -7.26$), $p < 0.001$ ($r = -0.88$), slightly ($Mdn = 0.00$) and moderately ($Mdn = 1.00$), $U = 5154.00$ ($Z = -6.18$), $p < 0.001$ ($r = -0.35$) and between slightly ($Mdn = 0.00$) and greatly ($Mdn = 1.00$), $U = 451.00$ ($Z = -5.20$), $p < 0.001$ ($r = -0.32$). However, after Bonferroni adjustment for $P < 0.008$, the difference between moderately ($Mdn = 1.00$), and greatly ($Mdn = 1.00$), was not statistically significant, $U = 233.00$ ($Z = -2.02$), $p = 0.043$. Details of these tests are available in (Table 10).

Impact on Physical Activities (Research Question #3). Almost half of the women with UI (52.7%) reported no effects at all on their performance of household chores and recreational activities. There were 38.4% of women with UI who described the impact as slight on this aspect of their life. 7.8% of the participants with UI reported moderate impact, and only 1.2% of them had a great impact on their physical life domain (Table 11).

There was a statistically significant effect of presence of any-type UI on the physical life domain of QoL of those affected women with $F(3, 315) = 50.53, p < 0.001$, as outlined in (Table 12). Pairwise multiple comparisons between the four levels of UI yielded significant differences across all the levels (Table 10). These differences are between not at all and slightly ($p = 0.005$), not at all and moderately ($p < 0.001$), not at all and greatly ($p < 0.001$), slightly and moderately ($p < 0.001$), slightly and greatly ($p < 0.001$), and between moderately and greatly ($p = 0.016$).

Table 9

Crosstabulation of Distribution of impact of UI on Women's Daily Prayers

		UI levels				
		No	Slightly	Moderately	Greatly	Total
Impact on daily prayers	not at all	57	203	28	2	290
		100.0%	79.6%	42.4%	18.2%	74.6%
	repeat wudu	0	42	26	4	72
		0.0%	16.5%	39.4%	36.4%	18.5%
	repeat prayers	0	10	10	4	24
		0.0%	3.9%	15.2%	36.4%	6.2%
	stopped praying	0	0	2	1	3
		0.0%	0.0%	3.0%	9.1%	0.8%
Total		57	255	66	11	389
		100.0%	100.0%	100.0%	100.0%	100.0%

Note: Table demonstrates the distribution of severity of the UI effect on women's daily prayers (calculated from scores on item #1 in IIQ-7). The count is the total number of women within the UI level at each level of impairment. The % is from those within that level of UI who had that specific level of impact.

Table 10

Kruskal Wallis Test with Post Hoc Multiple Comparisons Using Mann Whitney Tests on UI Levels and Effects on Women's Daily Prayers

	UI-levels	N	Mean Rank	Chi-Square	df	Asymp. Sig.
	Not at all	57	145.50	82.050*	3	0.000
Daily Prayers	Slightly	255	184.29			
	moderately	66	258.85			
	Greatly	11	316.64			
	Total	389				

Pairwise comparisons	Mann-Whitney <i>U</i>	<i>Z</i>	^a Asymp. Sig. (2-tailed)
Daily prayers by UI levels (0 1)	5785.00	-3.719	0.000
Daily prayers by UI levels (0 2)	798.00	-6.761	0.000
Daily prayers by UI levels (0 3)	57.00	-7.257	0.000
Daily prayers by UI levels (1 2)	5154.00	-6.175	0.000
Daily prayers by UI levels (1 3)	451.00	-5.198	0.000
Daily prayers by UI levels (2 3)	233.00	-2.022	0.043

Note: The dependent variable (daily prayers) is calculated from scores on item #1 in IIQ-7 Questionnaire; Asterisks denotes a significant Chi-Square test. Significant Mann-Whitney tests are in boldface.

^aAdjustment for level of significance using Bonferroni ($p < 0.008$).

Table 11

Crosstabulation of Distribution of Impact of UI on Women's Physical Life

		UI levels				Total
		No	Slightly	Moderately	Greatly	
Impact on physical life	Not at all	56 98.2%	162 63.5%	12 18.2%	0 0.0%	230 59.1%
	Slightly	1 1.8%	88 34.5%	36 54.5%	4 36.4%	129 33.2%
	Moderately	0 0.0%	4 1.6%	17 25.8%	5 45.5%	26 6.7%
	Greatly	0 0.0%	1 0.4%	1 1.5%	2 18.2%	4 1.0%
Total		57 100.0%	255 100.0%	66 100.0%	11 100.0%	389 100.0%

Note: Table demonstrates the distribution of severity of the UI effect on women's physical life (calculated from average scores on item #2 and item #3 in IIQ-7). The count is the total number of women within the UI level with that level of impairment. The % is from those within that level of UI who had that specific level of impact.

Table 12

Univariate Tests with Post Hoc Comparisons for UI Levels and Effects on Women's Physical Health

Sum of Squares	df	Mean Square	F	Sig.
30.381	3	10.127	50.529*	.000
63.132	315	.200		

Pairwise Comparisons		Mean Difference	Sig. ^a
not at all	Slightly	-.249	.005
	Moderately	-.838	.000
	Greatly	-1.326	.000
Slightly	not at all	.249	.005
	Moderately	-.588	.000
	Greatly	-1.076	.000
Moderately	not at all	.838	.000
	Slightly	.588	.000
	Greatly	-.488	.016
Greatly	not at all	1.326	.000
	Slightly	1.076	.000
	Moderately	.488	.016

Note: The dependent variable (physical health) is calculated from the average of answers on item #2 (household chores) and item #3 (recreational activities) in IIQ-7 Questionnaire; Asterisks denotes a significant F test; Significant mean differences at the 0.05 level are in boldface.

^aAdjustment for multiple comparisons done using Bonferroni.

Impact on Social Life and Relationships (Research Question #4). Majority of the women with UI (62.5%) reported having no effect of UI on their social life and relationships, with 30% reporting having a slight-bothersome effect, 6.9% reported having moderate effect and only 0.6% reported having great effect on this aspect (Table 13). However, a Kruskal-Wallis H test showed that there was a statistically significant difference in social life and relationships between women with UI and without UI, $\chi^2(3) = 96.331, p < 0.001$, with a mean rank score of 132.50 for no UI at all, 184.17 for slightly bothersome UI, 265.81 for moderately bothersome UI and 345.09 for greatly bothersome UI (Table 14).

Mann-Whitney test for pairwise comparisons of social life among the four groups of UI revealed statistically significant differences between all groups (Table 14). The largest difference was between not at all ($Mdn = 0.0000$) and greatly ($Mdn = 1.500$) with $U = 28.50$ ($Z = -7.71$), $p < 0.001$ ($r = -0.93$), followed by not at all ($Mdn = 0.0000$) and moderately ($Mdn = 0.5000$) with $U = 627.00$ ($Z = -7.44$), $p < 0.001$ ($r = -0.67$). Differences between the rest of pairwise comparisons were smaller but still statistically significant even with Bonferroni adjustment for level of significance ($p < 0.008$) as follows: Between not at all ($Mdn = 0.0000$) and slightly ($Mdn = 0.0000$), $U = 5244.00$ ($Z = -4.49$), $p < 0.001$ ($r = -0.25$), between slightly ($Mdn = 0.0000$) and moderately ($Mdn = 0.5000$), $U = 4783.00$ ($Z = -6.34$), $p < 0.001$ ($r = -0.35$), between slightly ($Mdn = 0.0000$) and greatly ($Mdn = 1.500$), $U = 249.00$ ($Z = -5.69$), $p < 0.001$ ($r = -0.35$) and finally between moderately ($Mdn = 0.5000$) and greatly ($Mdn = 1.500$), $U = 150.50$ ($Z = -3.18$), $p = 0.001$ ($r = -0.36$).

Table 13

Crosstabulation of Distribution of Impact of UI on Women's Social Life

		UI levels				Total
		No	Slightly	Moderately	Greatly	
Impact on social life	not at all	57 100.0%	184 72.2%	22 33.3%	1 9.1%	264 67.9%
	Slightly	0 0.0%	64 25.1%	32 48.5%	4 36.4%	100 25.7%
	Moderately	0 0.0%	6 2.4%	12 18.2%	5 45.5%	23 5.9%
	Greatly	0 0.0%	1 0.4%	0 0.0%	1 9.1%	2 0.5%
Total		57 100.0%	255 100.0%	66 100.0%	11 100.0%	389 100.0%

Note: Table demonstrates the distribution of severity of the UI effect on women's Social life (calculated from average scores on item #4 and item #5 in IIQ-7). The count is the total number of women within the UI level with that level of impairment. The % is from those within that level of UI who had that specific level of impact.

Table 14

Kruskal Wallis Test with Post Hoc Multiple Comparisons Using Mann Whitney Tests on UI Levels and Effects on Social Life

	UI-levels	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Social-life	not at all	57	132.50	96.331*	3	0.000
	Slightly	255	184.17			
	moderately	66	265.81			
	Greatly	11	345.09			
	Total	389				

Pairwise comparisons	Mann-Whitney <i>U</i>	<i>Z</i>	^a Asymp. Sig. (2-tailed)
Social life by UI levels (0 1)	5244.00	-4.487	0.000
Social life by UI levels (0 2)	627.00	-7.444	0.000
Social life by UI levels (0 3)	28.50	-7.708	0.000
Social life by UI levels (1 2)	4783.00	-6.336	0.000
Social life by UI levels (1 3)	249.00	-5.689	0.000
Social life by UI levels (2 3)	150.50	-3.183	0.001

Note: The dependent variable (social life) is calculated from average scores on item #4 and item #5 in IIQ-7 Questionnaire; Asterisks denotes a significant Chi-Square test. Significant Mann-Whitney tests are in boldface.

^aAdjustment for level of significance using Bonferroni ($p < 0.008$).

Impact on Mental Health (Research Question #5). For impact of UI on mental health, almost half of the women with UI (52.4%) reported having no effect at all, 35.7% reported having slight impact, 7.5% reported having a moderate impact and 4.5% reported having greatly effect on their mental health elements (Table 15). The researcher ran Kruskal Wallis to test the differences in mental health among women with no-UI, slightly-UI, moderately-UI and greatly-UI, due to violation of homogeneity of variance assumption, which made ANCOVA not applicable in this situation. As demonstrated in (Table 16), there was a significant difference in mental health among women in the above UI levels, $\chi^2(3) = 107.919, p < 0.001$, with a mean rank score of 116.00 for no UI at all, 186.09 for slightly bothersome UI, 273.47 for moderately bothersome UI and 358.55 for greatly bothersome UI.

Mann-Whitney test for pairwise comparisons of effects on mental health among the four groups of UIs revealed statistically significant differences between groups of not at all (*Mdn* =0.00), and slightly (*Mdn* =0.00), with $U = 4503.00 (Z = -5.52), p < 0.001 (r = -0.31)$, slightly (*Mdn* =0.00) and moderately (*Mdn* =1.00), $U = 4510.00 (Z = -6.41), p < 0.001 (r = -0.36)$, slightly (*Mdn* =0.00) and greatly (*Mdn* =2.00), $U = 145.00 (Z = -5.69), p < 0.001 (r = -0.35)$ and between moderately(*Mdn* =1.00) and greatly (*Mdn* =2.00), $U = 146.00 (Z = -3.21), p < 0.001 (r = -0.37)$. The greatest difference found was between levels of not at all (*Mdn* =0.00) and greatly (*Mdn* =2.00), $U = 0.00 (Z = -8.15), p < 0.001 (r = -0.99)$, followed by differences between not at all (*Mdn* =0.00) and moderately (*Mdn* =1.00), $U = 456.00 (Z = -8.15), p < 0.001 (r = -0.73)$. Details of these tests are available in (Table 16).

Table 15

Crosstabulation of Distribution of Impact of UI on Women's Mental Health

		UI levels				Total
		No	Slightly	Moderately	Greatly	
Impact on mental health	Not at all	57 100.0%	158 61.7%	16 24.2%	0 0.0%	231 59.2%
	Slightly	0 0.0%	87 34.0%	30 45.5%	2 18.2%	119 30.5%
	Moderately	0 0.0%	8 3.1%	13 19.7%	4 36.4%	25 6.4%
	Greatly	0 0.0%	3 1.2%	7 10.6%	5 45.5%	15 3.8%
Total		57 100.0%	256 100.0%	66 100.0%	11 100.0%	390 100.0%

Note: Table demonstrates the distribution of severity of the UI effect on women's physical life (calculated from average scores on item #6 and item #7 in IIQ-7). The count is the total number of women within the UI level with that level of impairment. The % is from those within that level of UI who had that specific level of impact

Table 16

Kruskal Wallis Test with Post Hoc Multiple Comparisons Using Mann Whitney Tests on UI Levels and Effects on Mental Health

	UI-levels	N	Mean Rank	Chi-Square	df	Asymp. Sig.
	not at all	57	116.00	107.919*	3	0.000
Mental Health	Slightly	256	186.09			
	moderately	66	273.47			
	Greatly	11	358.55			
	Total	390				

Pairwise comparisons	Mann-Whitney <i>U</i>	<i>Z</i>	^a Asymp. Sig. (2-tailed)
Social life by UI levels (0 1)	4503.00	-5.520	0.000
Social life by UI levels (0 2)	456.00	-8.147	0.000
Social life by UI levels (0 3)	0.00	-8.146	0.000
Social life by UI levels (1 2)	4510.00	-6.409	0.000
Social life by UI levels (1 3)	145.00	-5.690	0.000
Social life by UI levels (2 3)	146.50	-3.209	0.000

Note: The dependent variable (mental health) is calculated from average scores on item #6 and item #7 in IIQ-7 Questionnaire; Asterisks denotes a significant Chi-Square test. Significant Mann-Whitney tests are in boldface.

^aAdjustment for level of significance using Bonferroni ($p < 0.008$).

Impact on General QoL (Research Question #6). The researcher found that more than a third (35.7%) of women with UI had no effect at all on their general QoL. The researcher also found that there were slightly more than half (51.4%) of the women who reported experiencing a slight impact on their QoL. There were 12% and 0.9% of women with UI who reported having a moderate and great impact on their general QoL respectively (Table 17).

There was a significant impact of UI on general QoL at the four reported levels of UI, $F(3, 315) = 66.67, p < 0.001$. Post hoc multiple comparisons indicated a statistically significant difference between all the compared six levels. These comparisons were as follows: Not at all and slightly ($p < 0.001$), not at all and moderately ($p < 0.001$), not at all and greatly ($p < 0.001$), slightly and moderately ($p < 0.001$), slightly and greatly ($p < 0.001$), and between moderately and greatly ($p < 0.001$). Table 18 illustrates the details of this analysis. Figure 5 illustrate the distributions of UI impact on aspects of prayers, physical life, social life and mental health. The most reported impact due to UI was on women's general QoL, followed by impact on their mental health and their physical life. The least reported impact due to UI was on performing daily prayers and on women's social life. The majority of the participants described the severity of the impact on all the above aspects of QoL as slight.

Table 17

Crosstabulation of Distribution of Impact of UI on Women's General QoL

		UI levels				Total
		No	Slightly	Moderately	Greatly	
Impact on general QoL	Not at all	56 98.2%	114 44.7%	4 6.1%	0 0.0%	174 44.7%
	Slightly	1 1.8%	131 51.4%	38 57.6%	2 18.2%	172 44.2%
	Moderately	0 0.0%	10 3.9%	23 34.8%	7 63.6%	40 10.3%
	Greatly	0 0.0%	0 0.0%	1 1.5%	2 18.2%	3 0.8%
Total		57 100.0%	255 100.0%	66 100.0%	11 100.0%	389 100.0%

Note: Table demonstrates the distribution of severity of the UI effect on women's general QoL (calculated from average scores on all seven items in IIQ-7). The count is the total number of women within the UI level with that level of impairment. The % is from those within that level of UI who had that specific level of impact

Table 18

Univariate Test with Post Hoc Multiple Comparisons for UI and Effects on Women's General QoL

Sum of Squares	df	Mean Square	F	Sig.
35171.431	3	11723.810	66.665*	.000
55396.354	315	175.861		

Pairwise Comparisons	Mean Difference	Sig. ^a
not at all	Slightly	-9.063
	moderately	-26.946
	Greatly	-50.916
Slightly	not at all	9.063
	moderately	-17.883
	Greatly	-41.854
Moderately	not at all	26.946
	Slightly	17.883
	Greatly	-23.971
Greatly	not at all	50.916
	Slightly	41.854
	moderately	23.971

Note: The Dependent variable is the sum of scores in all the seven items in IIQ-7; Asterisks denotes a significant F test; Significant mean differences at the 0.05 level are in boldface.

^aAdjustment for multiple comparisons done using Bonferroni.

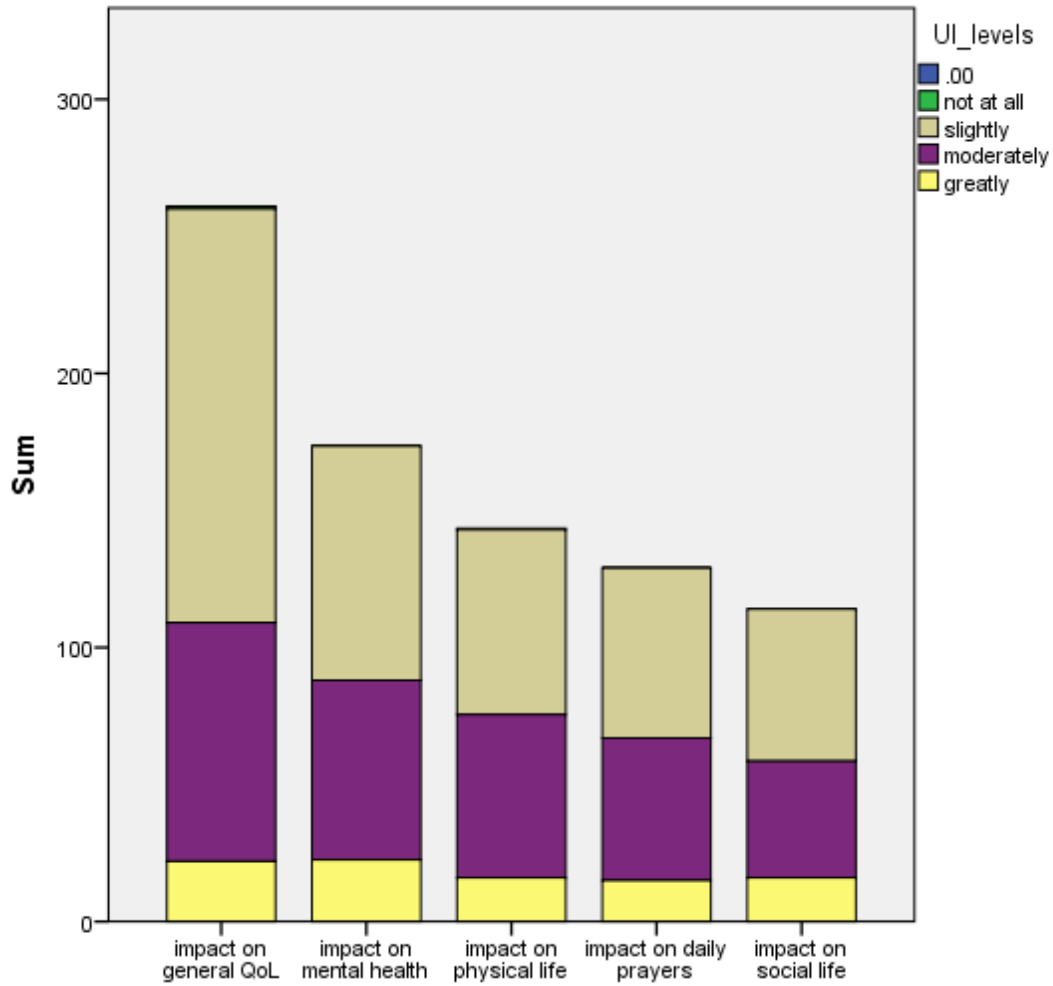


Figure 5. Distribution of UI impact on different life domains. This figure illustrates the distribution of Impact of UI on different QoL domains among the study participants, according to levels of UI severity (not at all, slightly, moderately, greatly).

Summary

This chapter outlined the results of the pilot study (41 Omani women), as well as, the actual study (401 Omani women). Although the participants were young, UI was highly prevalent among them, and hence, supporting the first research hypothesis. Moreover, there was a significant difference between groups of women with UI and those without UI on their daily prayers (confirming the second research hypothesis), on their physical life (confirming the third research hypothesis), on their social life (confirming the fourth research hypothesis) and on their mental health (confirming the fifth research hypothesis) dimensions of QoL. Finally, the researcher confirmed the sixth research hypothesis by extracting a statistical significance differences between groups of women with UI and those without UI on their general QoL.

CHAPTER 5

DISCUSSION

Introduction

This chapter provides an overview of the current study, along with discussion of its results on urinary incontinence (UI) and quality of life (QoL) among Omani women. The research questions and hypotheses will lead the first part of this discussion, and the researcher tied the findings to the literature presented in chapter two. Then, the discussion highlights the four components in the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF) framework, as it pertains to the current study results. Finally, the researcher presented a discussion of the study limitations, that emerged during the data collection and analysis phases, along with some implications and recommendations for clinical practice and future research.

Discussion of Study Findings

The current study aimed to uncover the topic of UI among the young Omani women. A sensitive topic like UI, may negatively impact women's lives, and prevents them from seeking medical attention (Norton & Brubaker, 2006; Peyrat et al., 2002; Sims et al., 2011). Like many other health issues, UI is multifaceted and needs exploration from different aspects, in order to properly address the health of the Omani population. The current study results highlighted how common UI is among the surveyed young Omani women, and how it negatively impacted their daily functioning tasks and their QoL, yet they did not complain about it to their healthcare providers. Healthcare providers at PHC centers can manage UI initially effectively with conservative primary prevention measures like Kegel exercises (Dumoulin, Hay-Smith & Mac Habée-Séguin, 2014; Hersh & Salzman, 2013; Wood & Anger, 2014).

Prevalence of UI

The first research question in this study was about the prevalence of UI among Omani women, who are already attending PHC centres for reasons other than UI. The current study results supported high prevalence of UI, in accordance with the previous studies done in the Arab world (Al-Busaid, 2011; Al-Sayegh et al., 2014; Altaweel & Alharbi, 2012; Bakarman & Al-Ghamdi, 2016; Elbiss et al., 2013; Saleh et al., 2005), which all showed a high prevalence of nearly close to 50%. However, the prevalence of UI from this study of 85% was shockingly high, especially given that the study population here was relatively young, as all the participants were less than 50 years old.

There are some factors that may help explain the high prevalence of UI found in this study. An important factor is that in this study the researcher, based on the recent recommendations of the International Continence Society (ICS), did not specify any time frame or for the participants' complaints (Abrams et al., 2010). The discrepancies in the prevalence of UI in the previous reviewed literature were mainly due to inconsistency in their definitions of UI in terms of duration, frequency or severity. Not limiting UI definition to any duration or quantity of leakage yields more recognition of it as a public health concern.

Another important factor that explains the high prevalence in this study is that the researcher surveyed those women at the PHC settings, which made it easier and safer for them to disclose their concerns about any urine leakage symptoms. In addition, the instruments used here were self-reported, and the researcher included only women who could read and write by themselves in the study, hence, providing the safe environment needed to disclose their symptoms freely. Anonymity, as well as assuring confidentiality of the results enhanced the safe environment circumstances. In the previous study conducted in Oman (Al-Busaidi, 2011), the

setting was community indwelling and the researcher used structured interviews, which may have contributed to the lower prevalence rate (43%).

Furthermore, the surveyed population was young ($M = 31.65$, $SD = 8.03$), more educated and financially secure (Table 6). Hence, they could talk about such issue more candidly if asked in appropriate settings. Most of the surveyed women in this study (77.5%) did not have any chronic illnesses. They were either coming for a birth-spacing clinic, a common cold or other acute illness, or for a well-check visit for their babies. Therefore, no one should expect those women to consult their PHC providers about their UI symptoms, unless their providers clearly ask them about it.

Additionally, using the short form of Urinary Distress Inventory (UDI-6) questionnaire in the current study, gave women more flexibility in stretching their responses to fit their symptoms accurately. The four Likert scale responses to all the six questions in UDI-6 about any UI symptoms made choices about women's UI level much easier and more accurate. In this study, most of the women with UI (76.7%) reported the slightly-level UI. In contrast, only 20.1% of them reported moderately-UI, and 3.2% reported greatly-UI. Questions restricting women to answer either with yes or no to UI-symptoms restrict that flexibility, and may lead to under-reporting of their symptoms.

Although many studies validated the use of UDI-6, along with other UI questionnaires, at the PHC settings, the gold standard test for diagnosing UI is still to perform the urodynamic studies. Hence, the reported prevalence from such questionnaires does not reflect the actual diagnosis of UI. However, since urodynamic studies are costly and not available at PHC settings in Oman, PHC providers can use these instruments as a screening tool for UI. The UDI-6 questionnaire has grade A rating for symptoms of UI in women (Avery et al., 2005).

Out of the six questions in UDI-6, PHC providers may pay more attention to responses to UI-specific symptoms questions, when screening for UI. As principal component analysis (PCA) results yielded loading of the urgency-UI question with the stress-UI question resulting in the component of specific-UI symptoms (Table 5). The researcher suggests that positive responses to those two items in UDI-6 are of paramount importance, while screening women for UI. The two symptoms of leaking urine with any increase in intra-abdominal pressure or leaking urine with urge feelings, specifically relate to pathologies in either muscular or innervation components of the urinary tract system respectively. These two specific symptoms indicate more of bladder storage dysfunction, rather than voiding one. Although the ICS considers UI under the paradigm of the Lower Urinary Tract Symptoms (LUTS), which includes disorders of either storage or voiding functions of the urinary tract system, some scientists in urology consider UI more of a storage pathology (Abrams et al., 2010; Sandvik, 1996).

In this study, 56.4% of women reported urgency-specific UI symptom and 62.7% reported stress-specific UI symptom. The other four symptoms of frequency (item #1), dribbling (item #4), incomplete emptying of the bladder (item #5) and lower abdominal pain or discomfort (item #6) are non-specific ones, yet important in assessing any UI, and may point to pathologies outside the urinary tract system like pelvic obstruction or uro-genital infections. They may point to either bladder storage or voiding pathology. In fact, there was a study conducted in 1999 to validate some questionnaires including UDI-6 with the gold standard urodynamic studies, and its results support this finding (Lemack & Zimmern, 1999). The researchers in that study found that the predictive information provided by those items in the questionnaire are highly correlated with positive findings in the gold standard tests (Lemack & Zimmern, 1999).

UI represents a real under-recognized public health concern in many under-developed, as well as, well-developed countries. In Oman, the healthcare system emphasizes women's health as an important aspect of community health. Omani women, like other Arabic women, may not seek medical attention for UI voluntarily, unless it forms a greater disability. The healthcare system in Oman considers PHC institutions as gatekeepers, and hence, it is important that healthcare providers in these institutions screen women for UI with a quick, easy, reliable and valid questionnaire like UDI-6. Then they can interpret the results of it paying more attention to specific symptoms of urge and stress UI, to justify referrals for secondary and tertiary care for further evaluation and management. This secondary prevention measure will help improve the general health and wellbeing of young Omani women.

Impact of UI on Women's Daily Prayers

The second research question was about the the difference between Omani women with UI and those without UI, in their ability to perform their daily prayers. The research hypothesis stated that Omani women with UI may have altered ability in performing their daily prayers due to presence of UI. The researcher based this hypothesis on the fact that the leaked-urine is a biological waste that prohibits women from performing their prayers, and must clean it from their body or clothes before praying (Al-Misri, 1994).

The current study results supported rejection of the null hypothesis and showed that women with UI had a statistically significant difference from those with no UI, when it comes to performing daily prayers, $\chi^2(3) = 82.05, p < 0.001$ (Table 10). This finding is like the studies conducted in nearby Muslim countries like United Arab Emirates (Elbiss et al., 2013), Qatar (Saleh et al., 2005), and Egypt (El-Azab et al., 2007). Basically, there are three scenarios of how UI can impact performing daily prayers. First, leaking may happen after finishing the ablution

(Wudu), a cleaning ritual needed before performing prayers, and in that case the women should change her clothes and repeat her Wudu, so she can start praying. Second, leaking may occur after completing Wudu and starting the actual prayer. In this case, the women must stop her prayer, change her clothes, repeat Wudu and repeat her prayer. Third scenario is when leaking occurs only after completing the prayer, in which case, the women's prayer remains unaffected. Hence, UI affects Muslim women more than women from other religions (Sange & Hill, 2008), due to its possible impact on their daily prayers.

The Arabic version of IIQ-7 has the addition of the item#1 about effects on prayers (Appendix B). The developers of the Arabic version of IIQ-7 showed this item to stand as a separate important component in QoL among Arabic women (El-Azab & Mascha, 2009). The results of this research pilot study supported similar findings, where prayer item loaded strongly by itself with factor loading of 0.95 (Table 5). Since Oman is primarily a Muslim country (Al Sadi & Basit, 2013), being able to perform prayers is an important component in Omani women's QoL, especially in conditions like UI that may alter this ability.

In the current study, 70.4% of women with UI reported having no effect at all on their daily prayers, which is conflicting with other studies that showed much higher rates of impact on this aspect of life (Al- Busaidi, 2011; El-Azab et al., 2007; Elbiss et al., 2013; Saleh et al., 2005). The researcher may explain this difference due to the timing of this study, as data collection phase was during the second two weeks of Holy month of Ramadan and the following two weeks after it. This period of fasting and spiritual rituals may have led some UI sufferers to be in the denial phase and underestimate or underreport its impact on this area. Although one may argue that the opposite scenario is true, but social desirability supports the first scenario, which

explains the lower (probably under-estimated) rate of impact of UI on daily prayers among the surveyed Omani women.

An important finding to document is that there were three women who reported that they almost had stopped praying completely. Two of them had moderate-level UI and the other one reported great-level UI. Again, the nature of the methodology of this study gave the women the freedom to honestly report such impact. Performing prayers five times a day is an important aspect of Muslims' QoL. When UI interferes, or prevents women from performing their daily prayers, then one can anticipate some impairment in their QoL.

Pairwise multiple comparisons showed significant differences between most groups of UI of not at all and slightly, not at all and moderately, not at all and greatly, slightly and moderately and slightly and greatly as demonstrated in (Table 10). On the other hand, the difference between moderately and greatly UI, after Bonferroni adjustment, was not statistically significant in impacting their daily prayers. This point is in accordance with the previous reviewed studies, as most women with moderate or severe UI report negative impact on their daily prayers (Al- Busaidi, 2011, El-Azab et al., 2007; Elbiss et al., 2013; Ghafouri et al; 2014; Saleh et al., 2005).

This finding is interesting for health educators and health professionals who aim to make a difference in peoples' QoL. Primary prevention is the key concept when a woman has a "not at all" level of UI, where health education plays a major role in preventing women from getting to higher-levels of UI, where the difference in this aspect of their lives is still significant. Similarly, secondary prevention measures are important at "slightly"-level UI to prevent deterioration to higher levels, where the difference in this aspect is not significant anymore. When women's conditions deteriorate to higher levels of UI, "moderately" and greatly", there are no easy

options, apart from surgery, to help them improve their ability to pray five-times daily, and hence improve their QoL. Surgical options are more costly than non-surgical ones, aside from their possible risks.

Impact of UI on Women's Physical Life

The third research question in this study focused on the difference between Omani women with UI and those without UI, on their physical life. The research hypothesis stated that any type of UI may negatively impact the women's physical life. The results of the current study guided the researcher in rejecting the null hypothesis, and accepting the above-stated alternative research hypothesis.

Around 47.3% of Omani women with UI reported some degree of physical life impairment in ranging from slightly to greatly, due to their UI symptoms (Table 11). Al-Sayegh et al. in 2014 reported that a similar percentage (42%) of women had varying degrees of impact on their physical life by UI. Interestingly, in this study, women with UI reported slightly more impact on their physical recreational activities (38.6%) than on their daily housework chores (30%). The researcher can attribute this finding to the fact that the surveyed population were young educated women, who consider recreational activities as important aspects of their QoL. Another factor that can explain this finding is the fact that the study population were from Muscat, and many women in Muscat participate in physical recreation activities like walking, swimming or going to the gym (Al- Busaidi, 2011).

Physical recreation is an important aspect in Omani women's physical health and general QoL. Healthcare providers need to address any limitations in this aspect when dealing with UI in women. Even in the developed countries like the United States, women perceive UI as a

barrier to exercise and physical activity (Nygaard, Girts, Fultz, Kinchen, Pohl & Sternfeld; 2005).

This study demonstrated similar findings to some studies in the Gulf region, which reported some impairment on daily physical activities like household chores due to UI (Bakarman & Al-Ghamdi, 2016; Saleh et al., 2005). This study demonstrated a similar impairment rate (30%) in household chores due to UI as the previous study in Oman (27%) (Al-Busaidi, 2011). AL Busaidi (2011) documented that 10% of the impairment in daily house works was extreme. On the other hand, in the current study, only five women (1.2%) reported severe impairment in performing their household work due to UI. The difference in this study setting and population may provide an explanation for the difference in perception of the severity among the participants of the two studies.

In the current study, the performed statistical analysis showed significant differences in the presence of any-type UI on the physical life domain of QoL among the surveyed young Omani women (Table 12). The difference between groups was significant among all groups of UIs. Hence, health care professionals can intervene at any level of their UI symptoms, to improve their physical health domain of their QoL.

Impact of UI on Women's Social Life

The fourth research question in this study was about any difference in social life and relationships between Omani women with UI and those women without UI. The research alternative hypothesis stated that any type of UI may negatively impact the social life and relationships of the Omani women. In this study, 37.5% of women with UI reported impairment in their social life with statistical difference between the UI groups, and hence, the researcher accepted the research hypothesis and rejected the null one.

It is worth mentioning here that the original English version of IIQ-7 assesses social life and relationships from scores on item #5 only, while the modified Arabic version gets this assessment from average scores on item #4 (about impact on social activities) and item #5 (about impact on travel) as demonstrated (Appendix B). The Arabic culture, with extended families, is unique in terms of considering travel as an important factor in maintaining connected relationships with relatives and friends, as demonstrated in a factor analysis conducted by the instrument's Arabic developers (El-Azab et al., 2007; El-Azab & Mascha, 2009). Additionally, women may choose to stay home instead of being socially involved because they try to avoid travel in fear of losing urine in front of others, feeling wet, malodorous and associated embarrassments (Senra & Pereira, 2014). In the current study, the researcher used the validated modified-Arabic version (El-Azab & Mascha, 2009), hence, the researcher included scores of the travel item in the assessment of social life and relationship domain of QoL.

However, in disagreement with the instruments' original authors (Uebersax et al., 1995) and the Arabic version authors (El-Azab & Mascha, 2009), in this pilot study, social life (0.74) loaded well with items of household chores and physical recreation activity (0.84 and 0.95) respectively (Table 5). The context of the unique Omani culture, can provide a good explanation for this interesting finding. Omani women need to be able to maintain their daily household activities to be able to keep their social life active. In Oman, women gather mainly at their homes or get together at the shopping malls (Al Busaidi, 2011), which requires good physical health. In addition, the extended family is still a trend in Oman, and being able to maintain household chores is the key to stay connected with their social networks.

Travel loaded strongly by its own in this pilot study with factor loading of (0.95). This is a unique finding that also does not lie in agreement with the developer of the Arabic version.

Again, the researcher may explain this finding in the context of unique values of the Omani women. Those women value driving and consider it a necessity for daily living activities, and hence, it is an important component in their QoL by itself.

Researchers in the study of women from the four well-developed countries: Germany, France, the United Kingdom, and the United States, used similar methods of analyzing social life as a combination of social relationships and travel, and found a similar negative impact of UI on those women's social life (Abrams et al., 2014). The researcher in the current study found similar negative impact of UI on women's social life in Oman, $\chi^2(3) = 96.331, p < 0.001$ (Table 14). Indeed, the results of this study showed that 62.5% of the women in the UI group reported no effect on their social life (Table 13), which is slightly lower (67%) than that reported by the women from the developed-countries (Abrams et al., 2014). The women in that study were older in age (45-60 years) than the women in this study, yet they all reported an increased negative impact on social life by increase in severity of UI symptoms.

In the nearby Gulf countries, the evidence about the impact of UI on social life was inconsistent. Qatari women reported around 20% limitation in their social life due to UI (Saleh et al., 2005) and Saudi women reported (17.5%) social limitation due to UI (Bakarman & Al-Ghamdi, 2016). On the other hand, in the United Arab Emirates, the impact on social life was as high as 64% among women with UI (Elbiss et al., 2013). In the current study, Omani women with UI reported 37.5% limitation in their social life (Table 13). The use of different health-related QoL questionnaires in those studies, where participants shared similar cultures and almost similar age groups, may explain the differences found in the impact of UI on their social life.

Assessment of the impact of UI in this important domain in QoL among Omani women makes the current study unique, as researchers never explored it before in this population. Al Busaidi's study in 2011 assessed the impact of UI on women's sexual life particularly (aspect of relationships), and not their general social life. The author found a negative impact in 13% of Omani women with UI on their sexual relationships (Al- Busaidi, 2011). This result was lower than those found in nearby countries such as 47% impact on sexual relationships among Qatari women (Saleh et al., 2005), around 57% in United Arab Emirates (Elbiss et al., 2013) and around 53% in Saudi Arabia (Bakarman & Al-Ghamdi, 2016). Both the English and Arabic versions of the IIQ-7 questionnaires do not explore the sexual or marital relationship in specific, yet researchers can still consider them under the main domain of social activities and relationships covered in item # 4 and item #5 in the Arabic and the English versions respectively (Appendix B).

Impact of UI on Women's Mental Health

The fifth research question in this study was about the difference in mental health between Omani women with UI and those women without UI. The research alternative hypothesis stated that any type of UI may negatively impact the Omani women's mental health. The basis for this hypothesis is that researchers found that UI impacts mental health by feelings of stigma, embarrassment, humiliation, anger, sadness and worry about leaking (Abrams et al., 2014; Coyne et al., 2012; Mallah et al., 2014; Trantafylidis, 2009; Wan et al., 2014).

The researcher assessed mental health aspect of QoL by the average of scores on item #6 (anxiety) and item #7 (depression) in the IIQ-7. In agreement with the original instrument developers (English version) and the instrument modifiers (Arabic version), this pilot study demonstrated nicely how anxiety and depression (item #6 and item #7) loaded strongly together

(0.92 and 0.94) respectively, representing the mental health dimension in QoL (Table 5). All the women in the group of no UI reported no effects on anxiety or depression symptoms.

Results of this study supported the research alternative hypothesis and rejection of the null, due to statistically significant difference found between the group of women with no UI and the groups with UI in mental health, $\chi^2(3) = 107.919, p < 0.001$ (Table 16). Around 48% of the Omani women with UI reported a negative impact on their mental health ranging from slightly to greatly (Table 15). The fact that the statistically significant differences between groups of not at all and all levels of UI in pairwise comparisons highlights the importance of primary prevention of UI in Omani women to improve maintain good mental health status among them. Most of the reviewed studies on UI among Arabic women, did not specifically examine the impact of UI on mental health, but instead examined generally the impact on general QoL.

Two of the reviewed studies conducted in the same country, that specifically examined the impact on mental health, showed different limitation rates in this aspect of life. In the first one, Saudi women reported less than 10% limitation on their mental health due to UI (Altaweel & Alharbi, 2012). In the second study, however, Saudi women reported higher rates of 20.6% limitations in their emotions due to UI (Bakarman & Al-Ghamdi, 2016). Altaweel and Alharbi (2012) used the translated English version of IIQ-7, and not the modified validated version used in our study, and this can explain the lower rates found at all aspects of their cohort's QoL. On the other hand, Bakarman and Al-Ghamdi (2016) assessed aspects of QoL by using the King's Health Questionnaire. Therefore, the use of different questionnaires may also explain the differences in the limitation of mental health due to UI between those two studies and the current study.

Impact of UI on Women's General QoL

The final research question in this study was about the difference in general QoL between Omani women with UI and those women without UI. The research alternative hypothesis stated that any type of UI may negatively impact the Omani women's general QoL. There were around 64% of women with UI who reported impairment in their general QoL in this study (Table 17). The ANCOVA test showed statistically significant difference on QoL among Omani women with UI and those without UI (Table 18), hence, the researcher rejected the null hypothesis, and accepted the above-stated alternative research hypothesis.

Studies from different countries worldwide supported similar finding of negative impact of UI on people's QoL (Abrams et al., 2014; Bedretdinova et al., 2016; Bogner et al., 2002; Coyne et al., 2012; Güvenç et al., 2016; Mallah et al., 2014; Saadoun et al., 2006; Senra & Pereira, 2014; Trantafylidis, 2009; Van der Vaart et al., 2002; Wan et al., 2014). In addition, researchers in some Arabic countries confirmed similar findings (Al-Busaid, 2011; Altaweel & Alharbi, 2012; Al-Sayegh et al., 2014; Bakarman & Al-Ghamdi, 2016; El-Azab et al., 2007; Elbiss et al., 2013; Ghafouri et al; 2014; Saleh et al., 2005). However, there was no consistency on the instrument used to assess QoL domains between the above studies.

Using a disease-specific health-related QoL instrument, and not merely a generic QoL questionnaire, is crucial to properly assess the impact of that disease on people's QoL. Such instruments help improve the sensitivity for measuring specific aspects of a health condition (Shumaker et al., 1994; Van der Vaart et al., 2002). In a Chinese study (Wong et al., 2006), the researchers used the same instruments as in the current study among women in Hong Kong. However, along with difference in religion and culture, the setting of the Hong Kong study was different, as the administration of the surveys was through phone interview, which could explain the lower rate of impairment (16%) in their QoL compared to higher rate in this study.

Saudi women, who share similar religion and culture as Omani women, also reported less than 10% of impact on their QoL due to UI, where the researchers used IIQ-7 (Altaweel & Alharbi, 2012). As mentioned earlier, the difference could be due to use of the un-modified un-validated Arabic version of IIQ-7. In addition, Omani women have distinct cultural believes that may shape their own believes and perception of QoL from women in nearby countries. In Qatar, for example, women with UI reported a higher rate (79%) of moderate to severe degree of negative impact on their QoL, as evaluated by the ICIQ-SF questionnaire (Ghafouri et al; 2014).

In AL Busaidi 's study, Omani women reported varying degrees of UI impact on different aspects of life. The majority of them (72%) reported impact on daily prayers, 27.6% reported impact on housework activities, 14.5% reported impact on sporting activities and 13% reported impact on their sexual life (AL Busaidi, 2011). The researcher cannot compare the results of this study to AL Busaidi's study for a few reasons. AL Busaidi (2011) did not compute an overall impact of UI on QoL, as her developed questionnaire contained questions on those four aspects of life, but did not sum them together in the analysis. Additionally, AL Busaidi (2011) related the impact on QoL due to being wet and changing clothings. However, there are many other reasons than changing of clothes for UI to impact women's QoL, for example the well-reported negative impact on feelings and emotions, which Al Busaidi (2011) did not explore.

The results of this study are in accordance with previous studies, where researchers showed that the severity of the symptoms perceived by women with UI determines its impact on QoL (Abrams et al., 2014; Saadoun et al., 2006). For example, among women who reported a moderate impact on their QoL due to UI, only 3.9% had slightly-UI, while 34.8% had moderately-UI and 63.3 % had greatly-UI (Table 17). The researcher demonstrated similar

patterns of worsening severity of impact on previous different domains of QoL with worsening severity of UI. Post hoc pairwise comparisons also pointed to similar findings as there were significant differences in a stepwise manner among all the groups and the highest difference was between not at all and greatly (Table 18).

Limitations

There were some limitations identified before the conduction phase of the study, as discussed in chapter one of this document. Those limitations include some degree of selection bias by confining the sample to women living in Muscat. Another limitation was a chance of data contamination while women are filling out their questionnaires in the waiting room. Finally, the Hawthorn Effect may have occurred and made the participants alter their responses due to their awareness of someone being observing them.

The fact that the instrument was self-reported may buffer this effect, as women felt safe to report their symptoms and impact on their lives. On the other hand, one may argue that there should be some objective assessment in the study, not merely depend on subjective perceptions of the participants. However, researchers, public health officials and all other healthcare professionals need to believe their clients and manage them according to their own perception of severity, because everyone is unique and different.

Another limitation that emerged after starting the data collection phase is the timing of data collection. The researcher started data collection during the second week of the Holy month of Ramadan. There were still a good number of patients attending the PHC centres with a good response rate for participation in the study. However, due to amplified spiritual feelings and religious rituals during that time, it may have affected the participants responses, and hence threatened the study's internal validity.

The main limitation of the current study lies in the inability to analyze the pilot study data before starting the actual data collection. This unfortunate limitation happened due to technical issues in using the Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armonk, New York) software overseas. However, the researcher benefited from conducting the pilot in three ways.

First it gave the researcher a starting reassurance about the high prevalence of UI, and how Omani women were responsive and open to this issue. Second, while explaining the merit of the study and taking consent from the piloted participants, most of them were asking similar questions to clarify if there is any time limit or frequency for their symptoms. Hence, the researcher explained this from the beginning in the actual study, which saved time in actual data collection phase. Third, the pilot study helped in smoothing the logistic process of the actual study. The researcher learned that she should approach the Medical Officers In-Charge (MOIC) in each PHC centre before starting in that centre, and leave with them a copy of the approval letter from the Centre of Studies and Research in Oman (Appendix F).

The final limitation in this study emerged during the data analysis phase. The researcher planned to run parametric analysis (ANCOVA) for all the research questions. However, before running the test, the researcher tested for the assumptions to run ANCOVA, and found that the assumption of homogeneity of variance was not met in the first, third and fourth research questions. Since this is an important violation in either ANOVA or ANCOVA, the researcher switched to non-parametric tests to answer the above three research questions, in order to obtain statistically sound results.

Theoretical Framework and Implications for Practice

As UI is a very prevalent condition among women, with demonstrated negative impact on their QoL, the researcher adopted the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF) framework. Buntinx and Schallock (2010) defined disability as any expression of limitation, as perceived by people with the condition themselves, in their functioning within a social context that represent a substantial disadvantage to them. Results of this study, as perceived by the participants' themselves, support previous work done worldwide showing that UI has negative impacts on different domains of women's lives (Abrams et al., 2014; Bedretdinova et al., 2016; Bogner et al., 2002; Coyne et al., 2012; Güvenç et al., 2016; Mallah et al., 2014; Saadoun et al., 2006; Senra & Pereira, 2014; Trantafylidis, 2009; Van der Vaart et al., 2002; Wan et al., 2014). Hence, healthcare professionals may view UI as a form of disability while trying to address it, so they have a holistic approach in their management.

For a proper assessment of UI as a public health concern in Oman, healthcare professionals including public health officials and program planners, health educators, general and family practitioner's, along with urologists and gynecologists, should assess in detail the two parts in this framework with two components in each (Figure 1). The use of ICF framework help to, holistically, understand UI and its consequences on health. The first part of the framework that healthcare professionals in Oman need to assess is the functioning and disability of the urinary tract system. This part has two components, which are important to assess in any health condition including UI.

Assessment of the component of body functioning and structures in UI constitute a thorough evaluation of UI symptoms and their level of bothersness. The UDI-6 questionnaire provided detailed evaluation of this component. The six questions assessed both the structure

and the function of the urinary tract system, through inquiring about specific (urge and stress) and non-specific (frequency, dribbling, incomplete emptying of bladder and lower abdominal pain and discomfort) UI symptoms. While planning the needed educational programs, planners need to know the most common complaints regarding UI symptoms among UI sufferers, as well as their severity as perceived by themselves, also assessed by UDI-6 questionnaire. Knowing that majority of the women (76.7%) perceive the bothersomeness of their symptoms as slightly, highlights the need for implementation of both primary and secondary prevention educational programs at the PHC level in Oman.

The other component in the part of functioning and disability is the activity and participation (Figure 1). Any limitation, due to presence of UI, that may limit women's normal daily activities and restrict their participation in the social context, define the degree of disability caused by UI. Program planners need to evaluate this component carefully to know which area to target, so they can improve the client's QoL.

The use of IIQ-7 as UI-specific health-related QoL questionnaire provides a holistic assessment as it evaluates limitations in activity (prayers, housework chores, physical recreations), as well as, limitations in participation (social commitments and travel). The results of this study highlighted the limitations that Omani women with UI suffer in those areas (Tables 9 to 18). In addition to the benefit of ICF to program planners, healthcare professionals may use this tool too while managing women with UI. It will help them inquire about any limitations in their daily activities and participation, and then follow up any improvement in functioning or deterioration in limitations appropriately.

The second part of the ICF model is the contextual factors, composed of personal factors and environmental factors (Fig 1). A holistic assessment of any health condition or disability

should take in consideration personal factors, as well as, the environment around individuals. In the case of UI among women, planners need to assess for personal factors like age, education, income, and marital status, as they increase the women's risk of either developing UI or worsening an existing one, in addition to influence of those factors on their QoL. Other personal factors that influence both UI and QoL include parity and presence of other chronic illness. Assessment of these factors allows program planners to design and implement their educational programs using segmentation and targeting strategies. The first section in the current study survey covered well the personal factors component of the ICF framework, which is crucial in assessment of UI as a public health concern.

Assessment of the environmental factors is the last component in the ICF framework. This component constitutes either facilitating factors or barriers that may affect women with UI. For example, the cultural values, beliefs, as well as social norms regarding UI in Oman may be a barrier for seeking medical attention for the condition (AL Busaidi, 2011). The researcher did not explore this aspect in the current study. There are many other environmental factors that enable or disable women with UI in their daily functioning.

In this study, the researcher assessed the impact of UI on travel by item #5, about impact of UI on travel, in the IIQ-7 questionnaire (Appendix B). The ability to travel is an important aspect of the environmental factors for women with UI. Availability of bathrooms along the way, as well as, availability of private places where a woman may need to change her clothing if needed, are either an enabling or disabling environmental factor in this case. However, the phrasing of the travel item in IIQ-7 questionnaire does not detail it that way, instead this item fit more within the activity and participation component of the ICF framework. Using the current survey questionnaires, did not fully cover the environmental factors of the framework.

There is a need for modification of the IIQ-7 questionnaire to fit more with the second part of the ICF framework. UDI-6 questionnaire, on the other hand, fits well within the first part of the framework. Investigators can express the four component of the model in either positive terms (functionality), as in “not at all”, or negative terms (disability), as in “slightly”, “moderately” or “greatly” in the current questionnaire responses. The beauty of the ICF framework is that it focuses on people’s capacity, comprising biological, as well as, psychosocial factors, and not only on disability issues (de Moura Quintana et al., 2014). Additionally, it provides a scientific basis for understanding and studying health-related conditions with a common language among researchers to allow comparison of data across health care disciplines worldwide, as it provides a coding scheme for health information systems (de Moura Quintana et al., 2014).

In this study, the researcher highlighted the high prevalence of UI among young population of Omani women, and how this condition impacted their functionality. The use of ICF framework in clinical practice promotes patient-centered approaches. The researcher hopes that the use of ICF framework will guide public health policies in developing strategies based on the framework components of body structures, activities and participation, and environmental factors. Those strategies should focus on bringing about Omani women’s potential personal factors and tailor it to the appropriate intervention of UI for them. Furthermore, the use of ICF framework in clinical practice helps the healthcare professionals to track any improvement or deterioration in the functioning abilities of the affected women over time. Hence, this tracking tool may also help the program planners in the phase of impact evaluation of the implemented intervention programs at the PHC centres.

Recommendation for Healthcare Professional

From the results of this study, the researcher recommends that family physicians and general practitioners at the PHC centres, should screen all Omani women about any of the six UI symptoms during their well-check visits. Alternatively, nurse practitioners may screen women, who do not come for annual check-ups but are coming for other non-urgent reason, for any UI symptoms while taking their vital signs in the triage room before seeing the physician. If the screening is positive, they may schedule them an appointment with a physician for another visit to fully assess their UI status. This assessment should include the impact of UI on their QoL at all the different domains.

In addition, nurse practitioners who assess patients in chronic-illness clinics like hypertension, diabetes and asthma, need to screen women for UI while assessing their signs and symptoms for the other chronic condition. This practice is important because many women with concurrent chronic illnesses may develop or worsen their preexisting UI symptoms due to the nature of the illness itself or as a side effect of its treatment. Healthcare providers should not assume that a young single nulliparous woman is not suffering from UI, instead they should use every opportunity to screen for UI among women.

Furthermore, the researcher recommends that healthcare providers serving women in the antenatal and birth-spacing clinics, should distribute educational pamphlets about UI and its primary prevention measures like exercises to strengthen the pelvic floor muscles. Such educational materials will help in preventing weakness of the pelvic floor muscles due to pregnancy and childbirth. Therefore, it is a simple, yet cost effective, primary prevention strategy.

Another recommendation is that health educators in every PHC centre may plan an educational campaign to disseminate proper knowledge about UI for women attending the PHC

centres. They may plan this educational activity once a month in the waiting room, while women are waiting for their turns to see the physician. In addition to the benefit of dissemination of knowledge, such initiative can be a cue to action and may trigger women with UI to seek medical help for their condition. Moreover, it will increase the screening yield done by the physicians or nurse practitioners.

Finally, the researcher recommends referral of women with moderately- or greatly-UI to secondary care institutions for further evaluation with urodynamic studies. Furthermore, the researcher recommends referral to tertiary care services if women reports moderate to great impact on their QoL due to their UI symptoms, to discuss with them further management options. Healthcare providers should still follow up those women frequently at the PHC level for continuity of their care.

Recommendations for Future Research

Based on the experience of the whole process of the current study, the researcher may suggest a few recommendations for future research of UI in Oman. First, there is a need to explore the beliefs and attitudes of Omani women towards UI and explore how to modify the behavior of seeking medical attention for such an issue in early stages. The researcher intends to conduct a qualitative study using the Health Belief Model to explore Omani women's perceived susceptibility and severity of UI, their perceived benefits and barriers towards seeking medical attention for UI, as well as their perceived level of confidence in seeking medical advice for UI. This proposed study will help increase the efficacy and efficiency of proposed health education programs at the PHC centres in Oman.

The second recommendation for future research in the field of UI in Oman should expand to involve both men and women as this area is still lacking in the Omani literature. In addition,

there should be an expansion in the age group of the studied population to cover those over fifty years of age. Furthermore, there might be a need to expand the setting to involve community indwelling not just those attending healthcare institutions. Examples for such setting include surveying members at the Oman Women Association or Parents' Associations in public schools.

The third recommendation for future research is to modify the current survey questionnaire composed of the socio-demographic and health variables and the Arabic version of UDI-6 and IIQ-7 questionnaires. The researcher should use the ICF taxonomy while modifying the instrument. In addition, the modifications need to include adding some items about environmental factors that may affect UI. The researcher will extract those factors from the above-mentioned proposed qualitative research. The new instrument should go through all the steps for improving instrument's rigor in terms of both reliability and validity. Then, the researcher needs to perform psychometric analysis for the new questionnaire to validate it among the Omani population. Such research is important and needed because the current available level-A recommended questionnaires in UI, cover only small spectrums of the burden of the condition (Köhler, Brand, Isler, Passweg & Radlinger, 2014).

The fourth recommendation is the use of ICF framework in conducting clinical research in the field of UI in Oman. In doing so, researchers in Oman should use the ICF coding system for each domain of functioning (as an example social life). Then they should add qualifiers in each category to measure the extent of the functioning or disability in that category (for example slightly, moderately, or greatly), or the extent to which an environmental factor is a facilitator or a barrier (WHO, 2013). An example of ICF-code and generic qualifiers is available in (Appendix D).

There is a need for more research in clinical practice using the ICF framework. Researchers in a systematic review showed that there is lack of quantitative epidemiological studies involving the use of ICF in clinical practice (Castaneda, Bergmann & Bahia, 2014). The use of the ICF in clinical practice and research makes it possible to analyze all components involved in the functioning and human disability process. Hence, the proposed research will build on the scientific knowledge in this area.

Conclusion

UI is still an unrecognized public health concern in both developed and under-developed countries, with negative impact on people's QoL, and hence, on their general health and well-being. UI is a health concern not limited to a specific stratum of people. It can affect both men and women, both young and old, as well as nulliparous and multiparous women. This study highlighted the high prevalence of UI among young Omani women aged eighteen to less than fifty years old.

The WHO defined health very broadly as "a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity" (WHO, 1948, no. 2, p100). Hence when assessing women with UI, one should look for its impact, either directly or indirectly, on all facets of health, not just the physical complaints. The researcher in this study concluded that UI did make a negative difference on all different domains of women's life. It negatively impacted their daily prayers, their physical life, their social life, and their mental health. Therefore, from these results, the researcher concluded that UI did impact Omani women's QoL and their general health and wellbeing.

In this study, the researcher did not consider UI solely as a health condition, but viewed it as a disability instead. People should not view disability as a problem residing in the individual,

but as a health experience that occurs in a context, and as a multi-dimensional phenomenon placed on a continuum with health. In this study, the researcher used the ICF framework, which has a core principle of universality, meaning that functioning and disability are applicable to all people irrespective of their health condition (WHO, 2013). If UI can cause a decrease in the functioning at one or more levels of women's life, then it fits in the disability and functioning continuum, the same way it fits in health and illness continuum.

The researcher concluded this project with some recommendations at different levels of the Omani healthcare system. For clinical research, the researcher recommended more studies in this field including both quantitative and qualitative ones, with integration of the ICF framework. Researchers need to be innovative in their research ideas and designs for exploring UI among Omani women, who have unique culture and beliefs.

At the level of public health policy, the researcher recommended using this study and other exploratory studies as a foundational basis to plan and implement the needed health educational programs at the PHC level. Those programs should include both primary and secondary prevention measures. Such programs will enhance the role of PHC services that are already available to Omani women.

At the PHC level, the researcher recommended routine screening for all women aged over eighteen for any UI symptoms with the quick, validated, easy to use UDI-6 and IIQ-7 questionnaires. Additionally, the researcher recommended health educators to launch regular educational campaigns at PHC centres to disseminate proper needed knowledge about UI among Omani women. Having a better understanding of UI among Omani women, will enable family physicians and general practitioners to utilize the best available practice to help those women improve their general health and QoL.

Finally, this study helps in breaking the iceberg of UI condition among Omani women. It allows policymakers and public health officials to see the big picture of UI as public health concern in Oman. It forms the basis for implementing cost-effective health education programs at the PHC institutions in Oman. Furthermore, it opens the door widely to innovative ideas for improving women's health, an important area in community and public health in Oman.

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APPENDICES

APPENDIX A

SECTION #1 OF QUESTIONNAIRE (ENGLISH AND ARABIC VERSIONS)

Please answer the following questions honestly and to the best of your ability:

- 1- **How old are you today?** ----- years
- 2- **What is the last educational degree you accomplished?**
 - a) Elementary school
 - b) Secondary school
 - c) High school
 - d) College diploma/ bachelor
 - e) Post graduate degree
- 3- **What is your family monthly income (approximately)?**
 - a) Less than 300 O.R.
 - b) More than 300- and less than 500 O.R.
 - c) More than 500 and less than 1000 O.R.
 - d) Between 1000- 2000 O.R.
 - e) More than 2000 O.R.
- 4- **What is your marital status?**
 - a) Single
 - b) Married
 - c) Divorced

d) Widowed

5- If you are married, divorced or widowed, how many children do you have?

a) I have no children

b) I have 1 or 2 children

c) I have 3 or 4 children

d) I have 5 or 6 children

e) I have more than 6 children

6- Do you have any chronic illness that requires regular follow up with the doctor?

a) No

b) Yes what is it? -----

القسم 1:

الرجاء الإجابة على الأسئلة التالية بصدق وبكل ما أوتيت من قدرة:

1- كم عمرك اليوم؟ ----- سنوات

2- ما هي درجة التعليمية الأخيرة التي أنجزتها؟

(أ) المدرسة الابتدائية

(ب) المدرسة الإعدادية

(ج) المدرسة الثانوية

(د) الدبلوم / البكالوريوس

(هـ) الماجستير / الدكتوراة

3- ما هو دخلك الشهري للأسرة (تقريباً)؟

(أ) أقل من 300 ريال عماني.

(ب) أكثر من 300 ريال عماني - وأقل من 500 ريال عماني.

(ج) أكثر من 500 ريال عماني وأقل من 1000 ريال عماني.

(د) بين 1000 ريال عماني - 2000 ريال عماني.

(هـ) أكثر من 2000 ريال عماني.

4- الحالة الاجتماعية؟

(أ) عزباء

(ب) متزوجه

(ج) مطلقه

(د) أرملة

5- إذا كنت متزوجه أو مطلقة أو أرملة، وكم من الأطفال لديك؟

(أ) ليس لدي أطفال

(ب) لدي 1 أو 2 أطفال

(ج) لدي 3 أو 4 أطفال

(د) لدي 5 أو 6 أطفال

(هـ) لدي أكثر من 6 أطفال

6- هل لديك أي مرض مزمن يتطلب المتابعة الدورية مع الطبيب؟

(أ) لا

(ب) نعم ما هو؟ -----

APPENDIX B

QUESTIONNAIRE SECTION #2 (ENGLISH AND ARABIC VERSIONS)

UROGENITAL DISTRESS INVENTORY SHORT FORM (UDI-6)

Please answer each question by checking the best response. While answering these questions, please consider your symptoms over the last 3 months. We realize that you may not be having problems in some of these areas, but please fill out this form as completely as possible.

Do you experience, and if so, how much are you bothered by...	Not at all	Slightly	Moderately	Greatly
Frequent urination	0	1	2	3
Leakage related to feeling of urgency	0	1	2	3
Leakage related to physical activity, coughing, or sneezing	0	1	2	3
Small amounts of leakage (drops)	0	1	2	3
Difficulty emptying bladder	0	1	2	3
Pain or discomfort in lower abdominal or genital area	0	1	2	3

INCONTINENCE IMPACT QUESTIONNAIRE-SHORT FORM (IIQ-7)

Some people find that accidental urine loss may affect their activities, relationships, and feelings. The questions below refer to areas in your life that may have been influenced or changed by your problem. For each question, circle the response that best describes how much your activities, relationships, and feelings are being affected by urine leakage.

Has urine leakage affected your...	Not at all	Slightly	Moderately	Greatly
1. Ability to do household chores (cooking, housecleaning, laundry)?	0	1	2	3
2. Physical recreation such as walking, swimming, or other exercise?	0	1	2	3
3. Entertainment activities (movies, concerts, etc.)?	0	1	2	3
4. Ability to travel by car or bus more than 30 minutes from home?	0	1	2	3
5. Participation in social activities outside your home?	0	1	2	3
6. Emotional health (nervousness, depression, etc.)?	0	1	2	3
7. Feeling frustrated?	0	1	2	3

Items 1 and 2 = physical activity; Items 3 and 4 = travel
Item 5 = social/relationships; Items 6 and 7 = emotional health

Scoring: Item responses are assigned values of 0 for "not at all," 1 for "slightly," 2 for "moderately," and 3 for "greatly." The average score of items responded to is calculated. The average, which ranges from 0 to 3, is multiplied by 33 1/3 to put scores on a scale of 0 to 100.

Reference: Uebersax, J.S., Wyman, J.F., Shumaker, S.A., McClish, D.K., Fantl, J.A., & the Continence Program for Women Research Group. (1995). Short forms to assess life quality and symptom distress for urinary incontinence in women: the Incontinence Impact Questionnaire and the Urogenital Distress Inventory. *Neurology and Urodynamics*, 14(2), 131-139.

1UDI-6 and IIQ-7

الرقم المسلسل:

التاريخ:

السن (تاريخ الميلاد):

تعانى بعض السيدات من مشكلة السلس البولى (انفلات أو تسرب البول بصورة لا إرادية). نرجو منكم الأجابة بدقة عن الأسئلة الموجودة فى هذا الأستبيان وسوف نكون ممتنين جدا لإجاباتكم مع الأخذ فى الاعتبار أن كل المعلومات الموجودة فى هذا الأستبيان سرية للغاية ولن يطلع عليها أحد. مع الأخذ فى عين الاعتبار حالتكم العامة فى الاسابيع الأربعة الماضية.

1- هل تشعرين بزيادة عدد مرات التبول؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

2- هل حدث من قبل أو يحدث الآن أنك فجأة تشعرين برغبة شديدة فى التبول مع عدم قدرتك على مقاومة

هذه الرغبة فتجربين للبحث عن دورة مياة وقد يحدث إنفلات أو تسرب للبول قبل الوصول إلى دورة المياة؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

3- هل تشعرين بإنفلات للبول عن القيام بحركة مفاجئة مثل العطس أو الكحة؟ إذا كانت الإجابة بنعم فإلى

أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

4- هل يحدث إنفلات أو تسرب للبول بدون القيام بأى مجهود وبدون أن تشعرى بذلك مسبقاً؟ إذا كانت

الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

أ. لا يحدث ذلك على الإطلاق

ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة

ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة

د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

5- هل هل يكون البول مدفوعاً للأمام أثناء التبول أما أنه ينزل نقطة بنقطة أو هل تشعرين بصعوبة فى

التبول (البول بحاجة إلى التنغية أو الحرق)؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

أ. لا يحدث ذلك على الإطلاق

ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة

ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة

د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

6- هل تعانين من ألم فى أسفل البطن أو فى المهبل؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

أ. لا يحدث ذلك على الإطلاق

ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة

ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة

د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

1- هل أثر السلس البولوى على الصلاة ؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة تجلبنى قد أعيد الوضوء للصلاة فأحياناً أتوضأ عدة مرات فى اليوم وأحياناً
أغتسل عدة مرات فى اليوم
- ج. يحدث ذلك بدرجة تجلبنى أعيد الصلاة
- د. يحدث ذلك بدرجة كبيرة جعلتنى أتوقف تماماً عن الصلاة

2- هل أثر السلس البولوى على قدرتك على أداء الأعمال المنزلية مثل تنظيف المنزل وغسل الملابس والطبخ؟ إذا كانت الإجابة بنعم فالى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

3- هل أثر السلس البولوى على أنشطتك الأستجمامية مثل المشى او السباحة او القيام بأية تمرينات رياضية أخرى مثل التنس أو السفر للنتزه؟ إذا كانت الإجابة بنعم فالى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

4- هل أدى السلس البولوى الى عدم قدرتك على أداء واجباتك الأجتماعية اليومية مثل زيارة الجيران او الأقراب؟ إذا كانت الإجابة بنعم فالى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

5- هل تستطيعين ركوب سيارة لمدة اكثر من نصف ساعة أم أن إنفلات البول قد يحدث فى أثناء المدة ويمنعك من ركوب سيارة لمدة نصف ساعة متصلة فأكثر؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

6- هل أدى السلس البولى لاصابتك بالتوتر والعصية الزائدة؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

7- هل أدى السلس البولى الى اصابتك بالأحباط و الحزن وخيبة الأمل والأكتئاب؟ إذا كانت الإجابة بنعم فإلى أى مدى يضايقك ذلك؟

- أ. لا يحدث ذلك على الإطلاق
- ب. يحدث ذلك بدرجة بسيطة يضايقنى بدرجة بسيطة
- ج. يحدث ذلك بدرجة متوسطة يضايقنى بدرجة متوسطة
- د. يحدث ذلك بدرجة كبيرة يضايقنى بدرجة كبيرة

APPENDIX C

CONSENT FORM (ENGLISH, ARABIC)

Dear potential participants,

My name is Alya Al Hasni. I am a graduate student at the Department of Health Education and Recreation, Southern Illinois University-Carbondale.

I am asking you kindly to participate in my research study. The purpose of my study is to evaluate the prevalence of urinary incontinence among Omani women and explore its effects in their quality of life.

Participation is totally voluntary. You have the right to choose not to participate in this study. If you choose to participate in the study, it will take approximately 10-25 minutes of your time to fill in the questionnaire. If you choose to participate, you are free to withdraw at any time with no consequences.

Participants of this study will not be identified by names, addresses, phone numbers, or medical records numbers. Instead each participant will be assigned a chronological number and letter according to their health centre. The collected data will be stored in a locked file cabinet in the principal investigator home. Data entered in the computer will be protected by a password known to the principal investigator only. After completion of the study, all the data will be deleted permanently and the files will be shredded safely.

If you have any questions about the study, please contact me. (or contact my advisor: Dr. Wendi Middleton)

(My name: Alya AL Hasni (+1-618-303-7688) (+968-909-92615))

(My Advisor: Dr. Wendi Middleton (+1-618- 453-2121))

Thank you for taking the time to assist me in this research.

By signing here, you give consent to participate in this study.

Participant Signature and Date

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

نموذج الموافقة

المشاركين المحتملين الاعزاء،

اسمي علياء الحسني. أنا طالبة دراسات عليا في جامعة جنوب الينوي (كاربونديل) الولايات المتحدة الامريكية.

أطلب منكم التكرم بالمشاركة في دراسة بحثي. والغرض من البحث هو تقييم مدى انتشار سلس البول بين النساء العمانيات واكتشاف آثاره في نوعية حياتهم.

المشاركة طوعية تماما. لديك الحق في اختيار عدم المشاركة في هذه الدراسة. إذا اخترت المشاركة في الدراسة، وسوف يستغرق حوالي فقط 10-25 دقيقة من وقتك لملء الاستبيان. إذا اخترت المشاركة، أنت حرة في الانسحاب في أي وقت دون عواقب.

لن يتم تحديد شخصيه المشاركين في هذه الدراسة لانه لن نطلب الأسماء او العناوين او أرقام الهاتف، أو أرقام السجلات الطبية. وبدلا من ذلك سيتم تعيين كل مشارك بعدد ورمز وفقا لمركزك الصحي. سيتم تخزين البيانات التي تم جمعها والتي تم إدخالها في الكمبيوتر في ملف سري. محمي بواسطة كلمة مرور معروفة لدى الباحث الرئيسي فقط. وبعد الانتهاء من الدراسة سيتم حذف كل البيانات بشكل دائم وسيتم تمزيق الملفات بأمان.

إذا كان لديك أي أسئلة حول الدراسة، يرجى الاتصال بي. (أو اتصل بالمشرف الدكتور: ويندي ميدلتون)

(علياء الحسني (+ 1-618-303-7688) (+ 968-909-92615)

(المشرف الدكتور ويندي ميدلتون +1-618- 453-2121)

أشكركم جدا على أخذ الوقت لمساعدتي في هذا البحث.

من خلال التوقيع هنا، فإنك تعطي الموافقة على المشاركة في هذه الدراسة.

توقيع المشارك والتاريخ:

قد تم مراجعة هذا المشروع والموافقة عليه من قبل لجنة الموضوعات الإنسان. ويمكن مراجعة المسائل المتعلقة بحقوقك كمشارك في هذا البحث إلى اللجنة الرئيسية مكتب الإدارة ، كاربونديل،

الهاتف: +1 (618)- 4534533

البريد الإلكتروني: siuhsc@siu.edu

APPENDIX D

COVER LETTER (ENGLISH, ARABIC)

Dear participant,

I am a graduate student seeking my PhD degree in the Department of Health Education and Recreation at Southern Illinois University Carbondale.

The purpose of the enclosed survey is to gather some information about the prevalence of urinary incontinence among Omani women and study its effects on their quality of life. You were selected to participate in this study because you belong to the study target population. Your cooperation in completing this survey is highly appreciated.

The survey will take only 10 to 25 minutes at the maximum to complete. All your responses will be kept confidential.

Completion and return of this survey indicate voluntary consent to participate in this study.

Please use the return envelope provided.

Questions about this study can be directed to me or to my supervising professor, Dr.

Wendi Middleton, Department of Health Education and Recreation,

Office address: 475 Clocktower DR, SIUC, Carbondale, IL 62901

Phone +1 -(618) 453-2121.

Thank you for taking the time to assist me in this research.

Alya Al Hasni

Phone number +1-6183037688 or +968-92615-909-968

E-mail: alhasni@siu.edu

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone +1 (618) 453-4533. E-mail: siuhsc@siu.edu

عزيزي المشارك،

اسمي علياء الحسني. أنا طالبة دراسات عليا في جامعة جنوب الينوي (كاربونديل) الولايات المتحدة الامريكية. والغرض من هذه الدراسة المغلقة هو جمع بعض المعلومات عن انتشار سلس البول بين المرأة العمانية ودراسة تأثيرها على نوعية حياتهم. تم اختيارك للمشاركة في هذه الدراسة لأنك تنتمي إلى الفئة المستهدفة من الدراسة. تعاونكم في الانتهاء من هذا المسح هو محل تقدير كبير.

إلى 25 دقيقة في الحد الأقصى لإكمال. وستبقى كل ما تبذلونه من الردود سرية.10سوف تأخذ الدراسة اكتمال وعودة هذه الدراسة تشير إلى الموافقة الطوعية للمشاركة في هذه الدراسة. الرجاء استخدام الغلاف لاعادة الاستبيان.

إذا كان لديك أي أسئلة حول هذه الدراسة يمكن أن توجه لي أو للمشرف الأستاذ الدكتور ويندي ميدلتون

IL 62901، كاربونديل، SIUC، DR عنوان المكتب: 475 برج الساعة

الهاتف : 21211-453 - (618) +1

أشكركم على أخذ الوقت لمساعدتي في هذا البحث.

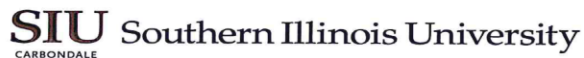
علياء الحسني

رقم الهاتف + 1-618-303-7688 أو + 1-909-968-92615

البريد الإلكتروني: alhasni@siu.edu


وقد تم مراجعة هذا المشروع والموافقة عليها من قبل اللجنة الموضوعات الإنسان. ويمكن معالجة المسائل المتعلقة حقوقك كمشارك في هذا البحث إلى اللجنة رئيسة مكتب الإدارة برعاية مشاريع، . الهاتف: 4534533-(618) +1-62901-4709، IL، كاربونديل، SIUC
البريد الإلكتروني: siuhsc@siu.edu

APPENDIX E
RESEARCH ETHICAL APPROVAL-SIUC



HUMAN SUBJECTS COMMITTEE
OFFICE OF SPONSORED PROJECTS
ADMINISTRATION
WOODY HALL - MAIL CODE 4709
900 SOUTH NORMAL AVENUE
CARBONDALE, ILLINOIS 62901
siuhsc@siu.edu
618/453-4533
618/453-8038 FAX
ospa.siu.edu/compliance/human-subjects

HSC Approval letter (exempt)

To: Alya AL Hasni
From: Wayne R. Glass, CRA 
Interim Chair, Human Subjects Committee
Date: October 25, 2016
Subject: *Urinary Incontinence and Women's Quality of Life in Oman*
Protocol Number: 16335

The above referenced study has been approved by the SIUC Human Subjects Committee. The study is determined to be exempt according to 45 CFR 46.101(b)2. This approval does not have an expiration date; however, any future modifications to your protocol must be submitted to the Committee for review and approval prior to their implementation.

Your Form A approval is enclosed.

This institution has an Assurance on file with the USDHHS Office of Human Research Protection. The Assurance number is FWA00005334.

WG:kr

cc: Dr. Wendi Middleton

APPENDIX F

RESEARCH ETHICAL APPROVAL- OMAN

Sultanate of Oman
Ministry of Health
Directorate General of Planning and Studies



سلطنة عمان
 وزارة الصحة
 المديرية العامة للتخطيط والدراسات

Ref. : MoH/DGPS/CSR/PROPOSAL_APPROVED /14/2017

Date : 20.4.2017

الرقم :
 التاريخ :
 الموقع :

Alya AL Hasni
 Principal Investigator

Study Title : "Urinary Incontinence and Women's Quality of Life in Oman"

After compliments

We are pleased to inform you that your research proposal "**Urinary Incontinence and Women's Quality of Life in Oman**" has been approved by Research and Ethical Review & Approve Committee, Ministry of Health.

Regards,





Dr. Ahmed Mohamed Al Qasmi
 Director General of Planning and Studies
 Chairman, Research and Ethical Review and Approve Committee
 Ministry of Health, Sultanate of Oman.







Cc
 Day file

APPENDIX G


PERMISSION FOR USING THE INSTRUMENTS





UDI-6-and IIQ7  Inbox x   


 **famco medicine** <famco2006@gmail.com> 10/14/16 ☆  

to elazab, alhasni 

Dear Dr Elzab,
 I am Dr Alya AL Hasni, a family physician from Sultanate of Oman. I am currently doing my PhD program at Sothern Illinois University of Carbondale, and would like to use UDI-6 and IIQ-7 for my dissertation topic. I read your article about validation of the instrument translated to Arabic. I was hoping you can send me the translated forms if possible.
 Your cooperation is highly appreciated.




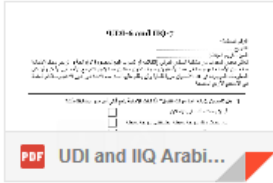
 **Ahmed Elzab** <elazab@hotmail.com>  10/15/16 ☆  




to me 


good luck

Ahmed S. El-Azab, MD
 Fellow, Metro Urology
 Cornerstone Medical Centre
 6025 Lake Road Suite 200
 Woodbury, MN 55125
 USA




 UDI and IIQ Arabi...

 **Alya** <famco2006@gmail.com> 10/15/16 ☆  

to Ahmed 

Thank you

Sent from my iPhone



APPENDIX H
PERMISSION TO REPRINT ICF MODEL

From: permissions@who.int <permissions@who.int>
Sent: Thursday, September 7, 2017 11:25 AM
To: Alya Al Hasni
Cc: permissions@who.int
Subject: ID: 236823 Permission authorization for WHO copyrighted material

alhasni@siu.edu

alhasni@siu.edu



[Show details](#)

Dear Dr AL Hasni

Thank you for your request for permission to reproduce, reprint or translate certain WHO copyrighted material.

On behalf of the World Health Organization, we are pleased to authorize your request to reproduce the WHO materials as detailed in the form below, subject to the terms and conditions of the non-exclusive licence below.

If you have questions regarding this authorization, please contact permissions@who.int.

We thank you for your interest in WHO published materials.

Kind regards,
WHO Permissions team

APPENDIX I

EXAMPLE OF ICF CODES AND QUALIFIERS

Box 6: The generic qualifier and an example of an ICF-code

ICF codes require the use of one or more qualifiers which denote the magnitude or severity of the problem in question. The problem refers to an impairment, limitation, restriction, or barrier when used in combination with b, s, d or e codes, respectively. Qualifiers are coded as one or more numbers after a decimal point.

xxx.0	NO problem	(none, absent, negligible, ...)	0-4%
xxx.1	MILD problem	(slight, low, ...)	5-24%
xxx.2	MODERATE problem	(medium, fair, ...)	25-49%
xxx.3	SEVERE problem	(high, extreme, ...)	50-95%
xxx.4	COMPLETE problem	(total, ...)	96-100%
xxx.8	not specified		
xxx.9	not applicable		

The letters b, s, d, and e represent the different components and are followed by a numeric code that starts with the chapter number (one digit), followed by the second level (two digits), as well as third and fourth levels (one extra digit each). For example, the following codes indicate a 'mild' problem in each case.

b2.1	Sensory functions and pain	(first-level item)
b210.1	Seeing functions	(second-level item)
b2102.1	Quality of vision	(third-level item)
b21022.1	Contrast sensitivity	(fourth-level item)

WHO 2001

VITA

Graduate School
Southern Illinois University

Alya AL Hasni

famco2006@gmail.com

Sultan Qaboos University
Bachelor of Health Sciences, 1998

Sultan Qaboos University
MD, 2001

Oman Medical Specialty Board
MRCGP[INT], 2010

University of Toronto
Academic Fellowship in Family Medicine, 2012

University of Toronto
Clinical Fellowship in Women's Health, 2014

Southern Illinois University of Carbondale, 2017
Master of Public Health

Special Honors and Awards:

Merit in MRCGP[INT], 2010

Donald N. Boydston Graduate Scholarship Award, SIUC, 2017

Dissertation Title:

Urinary Incontinence and Women's Quality of Life in Oman

Major Professor: Juliane Wallace

Publications:

Al-Mandhari, A., Al-Zakwani, I., Al-Hasni, A., & Al-Sumri, N. (2011). Assessment of perceived health status in hypertensive and diabetes mellitus patients at primary health centers in Oman. *International journal of preventive medicine*, 2(4), 256