Female Urinary Incontinence: Prevalence, Severity and Healthcare Provider Consultation Rate among Outpatients at Kenyatta National Hospital

Research Dissertation in part fulfillment of Master of Medicine Degree in Obstetrics and Gynaecology, University of Nairobi

Principal researcher

Dr. Charlotte S. Kaliti, MBChB

H58/7033/06

Supervisors

Professor J.B Oyieke

Dr. Z. Qureshi

DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

Charlotte Salame Mwanzia Kaliti

MMED student

Department of Obstetrics and Gynaecology

University of Nairobi.

Signed.................................Date..........15/5/2012............

This thesis has been submitted for examination with our approval as university supervisors.

Professor J B Oyieke.

Professor of Obstetrics and Gynaecology

Department of Obstetrics and Gynaecology

University of Nairobi.

Signed.................................Date............16.05.12

DR. Z Qureshi

Senior lecturer,

Department of Obstetrics and Gynaecology

University of Nairobi.

Signed...........................Date.........15/5/12....

DEDICATION

This work is dedicated to my dear husband Dr. Stephen Kaliti without whose encouragement and unwavering support this thesis would not have been successful, and our lovely sons Alex, Jesse and Owen who brightened my busy days by being there for me.

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ABBREVIATIONS AND DEFINITIONS

FUI - female urinary incontinence

FWC - family welfare clinic

GOPC - gynecology outpatient clinic

IIQ - Incontinence impact questionnaire

KNH - Kenyatta National Hospital

MOPC - medical outpatient clinic

SI   - Stress incontinence

UDI - Urinary distress inventory diary

UI   - Urinary incontinence

Urinary Incontinence - The complaint of involuntary loss of urine

Urge incontinence - A sudden and strong desire to void accompanied by an involuntary loss of urine.

Stress incontinence - An involuntary loss of urine that occurs due to increased intra-abdominal pressure for example during physical activity, coughing, sneezing, laughing, or exercise.

Overflow incontinence -Involuntary loss of urine associated with over distension of the bladder, with or without a detrusor contraction

Mixed incontinence - A combination of the symptoms of both urge and stress urinary incontinence

ABSTRACT

BACKGROUND: According to WHO, female urinary incontinence is a silent global epidemic and one of the last medical taboos. It is associated with high economic costs, psychological morbidity and adverse effects on the quality of life. The prevalence of urinary incontinence is reported to range between 25 % and 69 % among women aged 18 years or more and affects about a quarter billion women worldwide. Despite this, it is associated with low physician consultation rates which have been attributed to shame, embarrassment, fear of surgery and a misconception that being incontinent is an inevitable consequence of age and/or child birth.

MAIN OBJECTIVE: To establish the prevalence, severity and healthcare provider consultation rate of female urinary incontinence among outpatients at Kenyatta National Hospital.

MAIN OUTCOME MEASURES: Presence of urinary incontinence symptoms, severity of the urinary incontinence symptoms as determined by interpretation of the severity index and rate of healthcare provider consultation among those suffering from urinary incontinence.

DESIGN SETTING AND POPULATION: A hospital based cross sectional survey carried out at Kenyatta National Hospital. One hundred and fifty consenting women aged 18 years or more and attending the family welfare, medical and gynecology clinics were recruited using convenience sampling and a provider administered questionnaire used to collect data.

RESULTS: The prevalence of female urinary incontinence at Kenyatta national hospital was found to be 64% of which 18.7 %, 39.6% and 41.7% had stress, urge and mixed incontinence respectively. There was a slight increase in odds of urinary incontinence with increase in age although this was not statistically significant in the adjusted logistic regression (OR 1.03 95% CI 1.00, 1.06) p value 0.814) There was a statistically significant increase in odds of UI with more than 10years duration since last delivery (OR 1.06 p value 0.007). Majority of the respondents had mild incontinence (53%) in terms of severity with 29% and 18% of them reporting symptoms of moderate and severe incontinence respectively. Only 11% of the respondents ever consulted healthcare personnel for their incontinence symptoms.

CONCLUSION AND RECOMMENDATION: Female urinary incontinence is quite prevalent in the local setting with most of the women experiencing mild incontinence. However, the healthcare consultation rate for patients with UI symptoms is very low. Healthcare providers should be enlightened on the high prevalence and encouraged to proactively diagnose and manage the condition.

INTRODUCTION

Urinary incontinence, the complaint of involuntary leakage of urine[1] often remains undetected and undertreated by health care personnel worldwide, despite its substantial impact on affected individuals and health care systems [2,3] . In a US survey of a multi-ethnic population, only 45 percent of women and 22 percent of men who reported urinary incontinence occurring at least once a week, ever sought medical care for their incontinence symptoms[4]. This leaves the majority of incontinent individuals with diminished quality of life, both at home and at work[5,6]due to unresolved physical, functional and psychological morbidity.

 Symptoms of incontinence may herald a serious underlying condition for example, neurologic disease such as multiple sclerosis or malignancy and should thus never be dismissed casually. More often than not, primary care clinicians are in a position to identify the cause of incontinence in majority of patients[7]and as such, are able to initiate appropriate treatment.

Urinary incontinence in women has been the subject of many epidemiologic studies. Since 1968, this field has accumulated a large body of information which until recently has mainly been based on western populations. A comprehensive study in the U.S.[8] was carried out among community-dwelling women aged 60 years or older and found the prevalence to be 38% in this age group. Another study in the same age group and similar population was able to elicit various predictors of urinary incontinence[9]. In 2000, a large epidemiological survey of urinary incontinence in Norway, the EPINCONT study [10] showed that there existed great differences in sub-populations by type and prevalence. Another study showed great

variations by race with UI being most prevalent among Hispanic women (36%) followed by White (30%), Black (25%) and Asian-American women (19%)[11]

Establishing the true prevalence and incidence of UI remains a challenge as different societies define and approach UI differently. Studies have however concluded that urinary incontinence is a devastating worldwide problem with most stigmatizing women with the condition[12]. In addition, most studies are in agreement that different populations need to establish the epidemiology of urinary incontinence within their communities[11] as a necessary pre-requisite to improving management of this distressing global silent epidemic.

As a result of vast research, a range of well-validated, condition-specific study tools have been developed that can be used in studying the symptoms as well as the adverse effects related to or as a result of female urinary incontinence[13]. Recommendations have been provided regarding which tools to use in different situations[14].

The high prevalence, low consultation rates, stigmatization and high success rates of treatment as well as the great variation in the epidemiology of urinary incontinence among different ethnic and racial sub populations, and paucity of studies on FUI in the African setting is the foundation of this study. It is hoped that this study will shed light on the prevalence and pattern of female urinary incontinence as well as the healthcare provider consultation rates among women suffering from urinary incontinence in our setting.

LITERATURE REVIEW

Continence is the end product of an elaborate reflex pathway involving both physiological and anatomical components responsible for the control of micturition[15]. Its central coordination occurs in the pontine micturition center. The parietal lobes and thalamus receive and coordinate detrusor afferent stimuli while the frontal lobes and basal ganglia provide modulation with inhibitory signals. Peripheral coordination occurs in the sacral micturition center at spinal cord level S2-S4. Sympathetic efferents from spinal level T11-L2 via the hypogastric nerve mediate alpha-adrenergic contractions of the urethral smooth muscle and relaxation of bladder smooth muscle (detrusor) to allow urine storage during bladder filling. Sphincter closure is augmented by striated sphincter muscle contraction with cholinergic somatic stimulation from spinal level S2-S4 via the pudendal nerve. A fascial and muscular urethral support "hammock" compresses the urethra when there is increased abdominal pressure or when the pelvic muscles are contracted [16]

When detrusor afferent stimuli indicate the need to void, coordination through the pontine center results in parasympathetic activation via the pelvic nerve from the sacral micturition center. This in turn causes muscarinic contraction of the detrusor muscle and preganglionic inhibition of sympathetics leading to urethral relaxation. The primary muscarinic subtypes in the human bladder are M2 and M3. Although M2 receptors are more, M3 receptors predominate in the mediation of detrusor contraction[17].In addition, a variety of neurotransmitter systems in the urothelial lining of the bladder and its interstitial cells play a role in mediating bladder contraction and relaxation via afferent signalling [18]

The complex coordinated series of central, peripheral, and autonomic neuronal signals results in socially appropriate and effective voiding. Any physiological or anatomical alteration of any part of this elaborate system may predispose to incontinence. For example, while incontinence is not part of normal aging, age leads to detrusor overactivity, decreased bladder capacity, decreased flow rate, increased post void residual volume and change in diurnal fluid excretion;factors which may predispose to incontinence.Similarly anatomical defects,eg,obstetric fistula,may lead to incontinence.Below is a schematic presentation of normal micturition
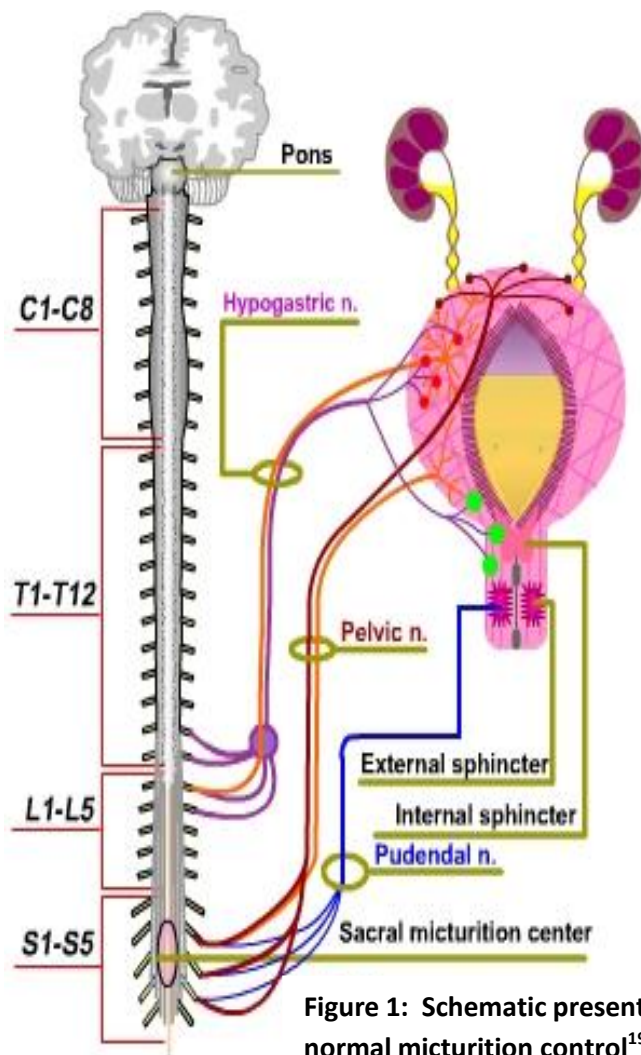
Urine storage reflexes: During the storage of urine, distention of the bladder produces low level vesical afferent firing, which in turn stimulates the sympathetic outflow to the bladder outlet and pudendal outflow to the external urethral sphincter. These responses occur by spinal reflex pathways and represent the "**guarding reflexes**," which promote continence. Sympathetic firing also inhibits detrusor muscle and modulates transmission in bladder ganglia. A region in the rostral pons increases external urethral sphincter activity.

Voiding reflexes: During elimination of urine, intense bladder afferent firing activates spinobulbospinal reflex pathways passing through the pontine micturition center, which stimulate the parasympathetic outflow to the bladder and internal sphincter smooth muscle and inhibit the sympathetic and pudendal outflow to the urethral outlet. Ascending afferent input from the spinal cord may pass through relay neurons in the periaqueductal gray area before reaching the pontine micturition center.

Figure 1: Schematic presentation of normal micturition control[19]

From the above illustration, urinary incontinence represents a multi-factorial syndrome involving an interplay between neuro-urinary pathophysiology, age-related factors, and co-morbid conditions.

The prevalence of urinary incontinence in women, using the inclusive definition of any leakage at least once in the past year, is variable, ranging from 25 to 69 percent [4, 12, 20, 21, 22,23] .At least one half of people with incontinence do not report the problem to health care personnel [7,24, 25] and as such, providers may underestimate the prevalence of incontinence in their patients.

Incontinence has been shown to increase with age as seen in a systematic literature review presented at a National Institutes of Health State-of-the-Science Conference [26] where moderate or severe urinary incontinence (at least weekly leakage or monthly leakage of more than just drops) was reported to affect 7 percent of non- pregnant women aged 20 to 39, 17 percent in those aged 40 to 59, 23 percent in those aged 60 to 79, and 32 percent in those ≥ 80 years. The prevalence of urinary incontinence by race or ethnicity in women has been variably reported. It was noted to be higher in non-Hispanic white women compared to African American women in some studies [9] , higher in white and Mexican American women compared to black women in another [10] and did not differ between racial/ethnic groups in yet another study [11] .In a multi-racial multi ethnic cohort of over 2000 women, Thom et al [11] concluded that Significant differences in the adjusted risk of incontinence among Hispanic, white, black and Asian-American women existed suggesting the presence of additional, but as yet unrecognized, risk or protective factors for incontinence. Ascertaining the prevalence of FUI by frequency, severity and type among different

racial/ethnic groups is therefore necessary in order to fully understand the scope of incontinence in different populations[11].

Urinary incontinence is universally divided into three main types with the commonest being stress incontinence (50%) followed by mixed incontinence (32%) and finally urge incontinence (14%) [2]. A discussion of urinary incontinence however, cannot be complete without an exhaustive categorization and definition of the different types of incontinence that one comes across in literature.

Stress incontinence involves the leakage of urine during exercise, coughing, sneezing, laughing, lifting heavy objects, or other body movements that exert pressure on the bladder. It is the most common type of incontinence particularly in women but can also occur In men e.g. after surgery on the prostate.

Urge incontinence, the inability to hold urine long enough to reach a restroom, is associated with a sudden, intense desire to void that cannot be resisted. It can be caused by neurological conditions such as stroke, dementia, Parkinson's disease, and multiple sclerosis, but can also develop in patients without neurological diseases. Problems with bowel movements can also cause urge incontinence.

Overflow incontinence is leakage that occurs when the quantity of urine produced exceeds the bladder's capacity to hold it. This type of incontinence generally develops when a person is unable to completely empty the bladder on a regular basis. Patients often complain of persistent dribbling, or passing small amounts of urine but not feeling empty.

Mixed incontinence usually refers to both stress and urge incontinence, but can refer to any

combination of types of incontinence.

Functional incontinence is usually as a result of a medical condition that prevents a person from making it to the bathroom in time to void thus leading to urine leakage.

Common causes include physical impairments such as arthritis, which make it difficult to move quickly enough to reach a restroom, or mental impairments such as dementia, which prevent a person from realizing when they need to void.

Total incontinence is persistent, continuous leakage that can occur as a result of anatomic defects that may be due to congenital abnormalities or fistulae that develop during surgery, child birth, radiotherapy or other pelvic procedures or instrumentation.

Despite the high prevalence rates reported in the majority of studies, Urinary Incontinence remains a taboo, with only a minority of incontinent women consulting a doctor about their problem[2, 10] .Reasons for these low consultation rates include shame and embarrassment, lack of information about available treatment options, fear of surgery and the misconception that becoming incontinent is an inevitable consequence of age and/or child birth [23, 24] .Most FUI patients suffer in silence and employ coping mechanisms e.g. by using pads, restricting fluid intake, avoiding social activities and limiting physical exercise. In fact, according to WHO "urinary incontinence is a widespread global disease and one of the last medical taboos that is associated with high economic costs, psychological morbidity and adverse effects on the quality of life" [12] .This is despite the existence of effective non pharmacological, pharmacological and surgical treatment modalities[27].

In 2000, Urinary incontinence-related costs in the United States were in the tune of nearly $20 billion[28]. Studies in patients with incontinence of any type have found costs higher for

urge compared with stress incontinence and higher for African American compared with white women with annualized expenditures for patients with severe incontinence being almost $900[29]. The economic costs of female urinary incontinence are projected to increase significantly in coming years as awareness increases and efforts are made to de-stigmatize female urinary incontinence [28].

Apart from the economic costs to the society mentioned above, female urinary incontinence has been associated with significant medical morbidity which includes perineal candida infection; cellulitis and ulcers from constant skin moisture, irritation and secondary bacterial infection, urinary tract infections and urosepsis from urinary retention and indwelling catheters, falls and fractures from slipping on urine, bladder stones from fluid restriction and sleep interruption and deprivation from nocturia[30]. Psychological morbidity includes poor self-esteem, social withdrawal, depression and sexual dysfunction secondary to the associated embarrassment [6]. Among the elderly, incontinence increases caregiver burden and contributes to decisions to place individuals in nursing homes [29, 31] Urinary incontinence may greatly influence a number of aspects that are important to quality of life including physical, social, and role functions; mental health and general health perceptions [5,6].

Many individuals find urinary incontinence personally and socially devastating[32], while others report a limited effect upon their lifestyle or emotional well-being. This variability in impact is only partially explained by differences in the frequency and severity of urinary incontinence episodes and likely reflects other individual factors [33] Urinary incontinence has been demonstrated to adversely impact quality of life even in frail nursing home residents, suggesting a need to improve continence care among the sufferers[30]. Raising awareness in

patients and physicians on the high prevalence, bothersomeness and treatment options of female urinary incontinence is therefore key to managing this silent epidemic.

In an effort to standardize the impact of urinary incontinence across different populations, several simple tools have been developed that can assess severity, bothersomeness and quantity of urinary incontinence without the need for costly laboratory tests [13, 34, 35]. The Urogenital Distress Inventory (**UDI**) and the Incontinence Impact Questionnaire **IIQ** are the most widely used validated instruments[13]. The severity index developed by Sandvik et al[33]. is used to characterize the degree and thus severity of incontinence. This index is calculated by multiplying the reported frequency (four levels) by the amount of leakage (dichotomized to two levels). The resulting index value (1-8) is further categorized into slight (1-2), moderate (3-4) and severe (6-8).This was validated using a 48 hr pad test and found to correlate strongly[36]

Suffice it to say that urinary incontinence is a debilitating problem that has in the past received minimal attention from clinicians and researchers, more so in the developing countries and yet it continues to be a burden both economically, physically and psychologically. It is on this basis that this study seeks to establish the situation as it is in Kenya

RATIONALE/ JUSTIFICATION

As cited in the literature review above, FUI is a silent global epidemic and places an enormous burden on both the individual and the healthcare system. As referenced earlier, annualized expenditures related to FUI are projected to rise steeply in coming years as awareness increases and myths are dispelled about FUI. This will lead to women stepping out of their silent suffering and seeking medical attention for their urinary problems. This however can only be achieved through research, results of which can be used to sensitize and create awareness in both healthcare providers and patients.

The underlying causes of FUI are treatable. However, many clinicians are not sensitized to proactively diagnose and treat FUI despite availability of simple inexpensive tools of assessing its presence and severity, a situation that hopefully the results of this study will help address.

The prevalence and impact of FUI has been shown to vary significantly by race and ethnicity. In fact, earlier research has concluded that differences in the adjusted risk of incontinence among different racial and ethnographic populations may suggest the existence of unknown race/ethnic specific risk or protective factors for incontinence, hence the need for local statistics.

 Research in this field is scanty in Africa and lacking in our country. No similar study has been done in our setting to the best of the author's knowledge. There is thus urgent need to define the epidemiology of female urinary incontinence in our setting to aid in planning for management and creating awareness among patients and healthcare providers.it is hoped that the research findings can and will be utilized in lobbying for creation of programs that

will increase awareness of both healthcare providers and patients about FUI and also empower healthcare providers in management of the same.

RESEARCH QUESTION

What is the prevalence, severity and healthcare provider consultation rate of women with female urinary incontinence in selected out-patient clinics at Kenyatta National Hospital?

BROAD OBJECTIVE

To establish the prevalence, severity and healthcare provider consultation rate of women with female urinary incontinence in selected out-patient clinics at Kenyatta National Hospital

SPECIFIC OBJECTIVES

To establish, among female outpatients at the family welfare, gynecology and medical out-patient clinics in Kenyatta National Hospital the following:

1. The prevalence of women with urinary incontinence

2. The severity of incontinence as reported by the sufferers

3. The healthcare provider consultation rate among women with urinary incontinence

CONCEPTUAL FRAMEWORK DEPICTING FACTORS RELATED TO AND ASSOCIATED WITH FEMALE URINARY INCONTINENCE

LOW CONSULTATION RATES

-Shame
-Embarrassment
-stigmatization
-Fear of surgery
-Lack of information about available treatment options
-Misconception about being an inevitable consequence of age and child birth

Physical
-Perineal candidiasis
-ulcers
-Irritation
-Bladder stones
-Urinary tract infection
-sleep interruption/nocturia

Quality of life
-physical and social role functions
-poor mental health & Psychological morbidity
-Diminished health perceptions
-Personally and socially devastating

Economic
-High individual costs
-high healthcare costs

COPING MECHANISMS

-use of pads
-Restricting fluid intake
-Avoiding social activities
-Limiting physical exercise

FEMALE URINARY INCONTINENCE

(UNDER DETECTED AND UNDER TREATED)

Research

-Prevalence-varied by subpopulations
-severity
-Bothersomeness of symptoms

Sensitization of patients & healthcare providers

-Proactive diagnosis and optimal management of FUI
-Alleviation of patients suffering
-reduction in individual and general economic costs associated with FUI

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CONCEPTUAL FRAMEWORK DEPICTING FACTORS RELATED TO AND ASSOCIATED WITH FEMALE URINARY INCONTINENCE

As depicted in the diagrammatic representation of the conceptual framework above, this study is based on the fact that female urinary incontinence is still considered a taboo in many societies and thus deserves the term a silent epidemic. According to WHO, urinary incontinence is a widespread global disease and one of the last medical taboos that is associated with high economic costs, psychological morbidity and adverse effects on quality of life [12].

Indeed in many societies, female urinary incontinence is under detected and undertreated[2,3] .As depicted in the framework above, a major contributing factor is the universal low healthcare provider consultation rates by women suffering from female urinary incontinence. This has been attributed to various reasons including shame, embarrassment, lack of information about available treatment options, fear of surgery, stigmatization, and the misconception that female urinary incontinence is an inevitable consequence of age and child birth. In addition, health care providers, who are in many instances not aware of the high prevalence of FUI, do not proactively seek history and examine for symptoms of female urinary incontinence from female patients and thus miss out on patients who would have otherwise benefitted from treatment. This has inadvertently led to under detection and under treatment.

Many female urinary incontinence patients employ coping mechanisms to enable them deal with their incontinence symptoms. Some of the mechanisms employed include use of perineal pads, restricting fluid intake, avoiding social activities and limiting physical activities

and exercise. In a bid to cope with the symptoms incontinence sufferers are thus forced to drastically alter their lifestyles which in many cases include heavy expenses, borne silently and bravely[7]. These costs are also borne by the healthcare system in the long run[28]. Another effect of female urinary incontinence is the low quality of life which many women especially in our setting would not disclose or talk about. In this the women suffer psychological morbidity with diminished health perception. They also experience altered physical and social role functions which can be personally and socially devastating. In addition, women develop other physical and medical conditions secondary to the incontinence symptoms such bladder stones and urinary tract infections which are due to restriction of fluid intake in a bid to minimize the symptoms. These women may also experience irritation and even ulceration and cellulitis due to constant perineal wetness

It is with all these factors related to and associated to female urinary incontinence in mind that this study seeks to establish the prevalence, severity and healthcare provider consultation rate of women suffering from female urinary incontinence in our local setting. In addition, prior studies have shown great differences in subpopulations by type and prevalence of female urinary incontinence[10] as well as variations by race. Conclusions have been made that there is a need for different populations to establish the epidemiology of female urinary incontinence in their local settings as a prerequisite to improving management of this distressing global epidemic [11].

Results of research studies, as is the aim of this study, can be utilized in sensitizing patients on available treatment options for their incontinence symptoms. These results can also be used to sensitize healthcare providers on the prevalence, severity and healthcare provider consultation rate of women with urinary incontinence in the local setting and encourage

them to proactively diagnose and manage female urinary incontinence. This will eventually

lead to optimal management of the condition, alleviation of patients suffering and reduction

of individual and general medical costs associated with female urinary incontinence.

METHODOLOGY

This study was based on an assumption that there exist a significant proportion of women in Kenya living with urinary incontinence and suffering in silence. Based on this assumption a research question was developed to highlight this problem by seeking to find out the prevalence of female urinary incontinence and thus try to establish the actual magnitude of this problem among out patients at Kenyatta National Hospital.

The second objective was as the severity of incontinence. This was established through a severity index[33] which was used to interpret the patient's responses and thus determine the women's perception of severity of symptoms. The severity index is calculated by multiplying the reported frequency (four levels) by the amount of leakage (dichotomized to two levels). The resulting index value (1-8) is further categorized into slight (1-2), moderate (3-4) and severe (6-8). Establishing the severity of the symptoms was necessary in order to help find out why the patients did not seek medical help if at all that was the case. Finally, this study hoped to establish the health care provider consultation rate among those suffering from female urinary incontinence at Kenyatta National Hospital.

Study site

The study was conducted at the Kenyatta National Hospital family welfare, medical and gynecology out-patient clinics. The study site selected i.e. Kenyatta national hospital, was for feasibility as well as convenience. This is because it was possible to get the sample size of the particular study population at minimal costs considering that the study is not funded. In addition, Kenyatta National Hospital being a national referral hospital draws its population from all over Kenya and the sample interviewed can be projected to represent more than

just Nairobi. It is in fact hoped that the results drawn from the sample at Kenyatta National Hospital reflects the picture of Kenyan women at large.

The clinics selected were not uro-gynecology clinics and thus the women presenting to these clinics were not likely to be presenting with incontinence as the chief complaint. As such, they were similar to the women in the general population who were not in hospital presenting with incontinence thus minimizing selection bias.

Study design

This was a hospital based cross sectional survey. The rationale behind using this study design was that a survey best captures the prevalence of a given disease/condition, in this case female urinary incontinence in a population. Being a descriptive study, it is suitable for establishing the prevalence as well as the proportions of women with difference levels of severity of the condition and the healthcare provider consultation rate of incontinence sufferers.

Study duration

The study was carried out over a period of three months during the months of May to July 2011 during which time data was collected. This was followed by data entry, data analysis and report writing.

Study population

The study population comprised of women aged 18 years and above. From this population, a study sample was drawn comprising of consenting females who were attending the family welfare, gynecology and medical outpatient clinics during the study period. Age 18 was used

in order to ensure that the study participants were legally able to give consent to participate in the study. This study population was also appropriate in answering the research question which is concerned with female urinary incontinence.

Sampling and sample size determination

This being a descriptive study, binomial Gaussian distribution of responses is expected. Based on the central limit theorem for Gausian polytopes [37, 38], the formula $n = Z^2pq/d^2$ was used to determine the desired sample size. The theorem states that "as the size of a sample of independent observations approaches infinity, provided data come from a distribution with infinite variance that the sampling distribution of the sample mean approaches a normal distribution and the sample mean approaches the population mean [36]".

Based on this formula:

- n = minimum desired sample size

- z = 1.96 (corresponding z score for a p value of 0.05) in a two tailed test

- P = the probability of an outpatient clinic attendant at KNH being incontinent of urine. No prior study of this nature has been done in our country but a similar study in Taiwan, Yueh-Chi Tsai et al 2008 showed a female urinary incontinence prevalence of 69 % among outpatient clinic attendants [23]. The 'p' value from the Taiwan study was selected because the study was similar to this one in that it was a hospital based cross-sectional study with only women as study participants as opposed to other studies e.g. the BACH survey [20] which was a community survey and in addition, included men in the study.

- q = 1-p = 0.5

- d = the maximum error with which p was estimated = 7.5% = 0.075 aka the width of the confidence interval of estimating p[37])

Using this formula, a sample size of 146 was arrived at. This was rounded upwards to 150 patients. This equated to an equal number of 50 study participants per clinic. These patients were recruited using convenience sampling technique from the three clinics by trained study assistants who were nurses in the selected clinics.

Data collection

Once the patients were recruited, a provider administered questionnaire was used to collect data from the participants. The study assistants who administered the questionnaire were nurses in the selected clinics. A participant who fulfilled the inclusion criteria signed an informed consent form after detailed information had been presented to her about the study. A study number was then assigned to the participant depending on the clinic attended. For example, GYN001 for women who were attending the gynecology clinic, MOP001 for women attending the medical clinic and FPC001 for women attending the family welfare clinic. Thereafter, the provider administered questionnaire was administered to the participant and appropriate referrals made if the patient was noted to suffer from urinary incontinence.

Eligibility

The three clinics selected were adult clinics and thus excluded participants below 18 years of age. As discussed in study population above.

There being several and varied etiological factors contributing to female urinary incontinence, none of these were excluded through the introduction of restrictions. The purpose of this was to enable equal distribution of the occurrence of these factors by chance and thus minimize bias. Patients with vesico- vaginal fistulae however were excluded. This is because Kenyatta National Hospital receives referrals from all over the country to the fistula clinic. This may introduce selection bias and falsely increase the prevalence of FUI whereas in actual fact the numbers would be high because of patient concentration at KNH due to referrals to the fistula clinic.

Inclusion criteria

- All women attending family welfare, gynecology and medical out-patient clinics at Kenyatta National Hospital

Exclusion criteria

- Patients known to have vesico-vaginal fistula currently or in the past
- Women unable or unwilling to give consent to participate in the study.

DATA MANAGEMENT AND STATISTICAL ANALYSIS

Data was collected professionally by trained study assistants who in this case are nurses stationed in the respective clinics.

Data collected was coded, tabulated and analyzed using the Stata/IC 11. After data entry, variables were created and analysis carried out. The test statistic used to test differences in proportions e.g. by age category across the three clinics was Pearson's chi-squared test. The students T test was used to test differences in means of variables e.g. duration since last pregnancy across the three study clinics

The main outcome variable i.e. Incontinence, was coded as a binary variable and as such, logistic regression was the used to analyze associations between the main outcome variable and various covariates e.g. age and duration from last pregnancy. Bivariate analysis was undertaken in order to establish the unadjusted point estimates. This was followed by adjusted regression analysis which catered for possible confounders.

A key epidemiological assumption employed was that the data conformed to a normal distribution curve and thus a power of 80% and a p value of 0.05 for detection of statistical significance were used in data analysis and interpretation in this study. The Pearson's goodness of fit test was carried out in order to check how well the model fits the data

Results of the data analysis were presented using tables and figures such as box plots, pie charts and histograms.

Raw data was retained for future reference and validity scrutiny.

SOURCES OF BIAS AND COUNTERS TO VALIDITY THREATS

One of the major challenges that needed address was recall bias. This was based on the fact that the tool of data collection was a questionnaire which attempted to elicit symptoms that would point towards the diagnosis of female urinary incontinence and its severity, through recall. An attempt was made to counter this through a questionnaire design that avoided direct questions that would have evoked a preponderance to misreport event occurrence. The section on severity was based on a validated tool [34, 36] .

Study participants were also clearly informed that participation in the study would not alter their intended management in any way and that they would be referred to the appropriate facility if noted to require treatment. This hopefully helped to minimize information bias through what would have been perceived as appropriate responses.

The research assistants who administered the questionnaires were trained and familiarized with the instrument of data collection to reduce on data entry errors or misreporting/ misclassification of events.

Another challenge was that being a hospital based survey the study may have captured a skewed population comprising only of those who report to hospital and thus the results may not reflect the true picture in the general population. On the contrary, it is the researcher's conviction that the patients presenting to the selected outpatient clinics represented the general population. This is based on the fact that none of the study clinics was a specialized uro-gynecology clinic and thus the prevalence of FUI would not be falsely increased compared to that of the general population. In addition, it was assumed that most of the study participants did not have symptoms of urinary incontinence as their main presenting

complaint to the clinic, but instead were attending the clinics for the regular family welfare, gynecology or medical consultation. These women would thus represent the women in the community who were not in hospital reporting their symptoms of incontinence.

That said, we acknowledge that KNH being a referral hospital attracts women of a particular economic background as they are able to afford the hospital fees which are likely to be higher than those in dispensaries, health centers and district hospitals. This may thus have introduced an element of selection bias.

It is however hoped that the findings of this study can be generalized to the country as a whole although it is humbly admitted that a community based survey would have produced more generalizable results but could not be carried out in this case due to logistical constraints.

ETHICAL CONSIDERATIONS

Ethical approval was sought from the Kenyatta National Hospital Ethical Review Committee and evidence of the same is attached to the final submission of this thesis.

After a detailed explanation of what the study entails, only patients who willingly signed the informed consent form were recruited into the study.

Study participants noted to have urinary incontinence were advised on how to best access appropriate medical attention for their problem and linked or referred appropriately.

Refusal to participate in the study did not in any way adversely affect their care.

STUDY LIMITATIONS

The main limitation as stated in the preceding section above is that this being a hospital based survey, generalizability of the results may be in question. In as much as a community survey would have produced more generalizable results but could not be done for reasons mentioned above, it is the conviction of the researcher that results from this study can be used to represent Kenya. This is because care was taken in the selection of participant out-patient clinics in order to get study participants who in characteristics resemble the women in the community. This was achieved by selecting clinics which do not primarily deal with incontinence as a specialty. Family-welfare clinic which primarily deals with essentially healthy women was also included to balance the medical and gynaecology clinics which mainly deal with sick women. In addition, as mentioned in the study site section above, KNH gets its patients from all over the country thus crudely gives a picture of the whole nation's condition of health.

The other limitation as brought out in the literature review in that FUI is a taboo to many and thus many women may actually downplay their symptoms and not give true responses during the interview. To deal with that the research assistants will be trained on how to ask the open ended questions in the questionnaire and also put the participants at ease even before administering the questionnaire so that the woman knows that she can be assisted if she suffers from the condition. This will hopefully help the women discuss their symptoms as they are.

RESULTS

Socio-demographic characteristics

One hundred and fifty study participants were recruited using convenience sampling from the family welfare, gynecology and medical outpatient clinics. Table 1 presents the frequency and distribution of socio-demographic characteristics of the study participants. The participants had a mean age of 39.7 years (Table 1) with a range of 18 to 89 years. Most of the women were in the 31-40yrs age bracket (34%) with only 14 (9.3%) being over 61 years of age.

Table 1: socio-demographic characteristics of study participants

Characteristic	N (%) [a]
Total participants	150 (100)
Age of respondents	
Aggregate [b]	39.7 (12.9, 18 81)
18-30yrs	39 (26)
31-40yrs	51 (34)
41-50yrs	30 (20)
51-60yrs	16 (10.7)
>61yrs	14 (9.3)
Parity	
Aggregate [b]	2.7 (2.4, 0 12)
Nulliparous	24 (16)
Para 1	27(18)
Para 2-3	55 (36.7)
Para=>4	44(29.3)
Duration since last delivery	
Aggregate [b]	12.4 (10.5, 0.2 49)
< 1yr	10 (7.9)
1-5yrs	39 (31)
5-10yrs	13 (10.3)
>10yrs	64 (50.8)
Marital status	
Single	23 (15.3)
Married	112 (74.7)
Divorced/separated	9 (6)
Widowed	6 (4)
Level of education	
Non	8 (5.3)
Primary	48 (32)
Secondary	43 (28.7)
Tertiary	51 (34)
Occupation	
Student	7 (4.7)
unemployed	26 (17.3)
Formal employment	43 (28.7)
Casual laborer	4 (2.7)
Peasant farmer	27 (18)
Self employed	43 (28.7)

[a] Except where otherwise noted
[b] Aggregate Age, parity and duration since last delivery are reported as mean (standard deviation, minimum maximum)

The participants had a mean parity of about 3 births. Parity ranged from nulliparous to 12 births with most women (36.7%) in the two to three prior births category. Majority, 64 (50.8%) of the parous women had more than 10 years duration since the last delivery with an aggregate mean duration of 10.5yrs and a range of 0.2 to 49 years since the last delivery.

74.7% of the women were married with 62% of the study participants having attained secondary education and above. About 58% of the study participants were either in formal employment or self employed

Socio-demographic characteristics by clinic

Analysis of socio-demographic characteristics by clinic was carried out in order to establish the diversity of the women in the different clinics and rule out selection bias.

The socio-demographic characteristics varied significantly by clinic attended. The mean age was highest in the medical clinic (47.9yrs) and lowest in the family welfare clinic (34.6). As depicted in figure 2 below, 50% of participants in the medical clinic were in the age range 36-61 years whereas 50% of participants in the family welfare and gynecology clinics were in the age range 35-40 and 34-42 years respectively. These age differences between clinics is however not statistically significant (p value 0.404).

Figure 2: box plot of participants' age distribution by study clinic
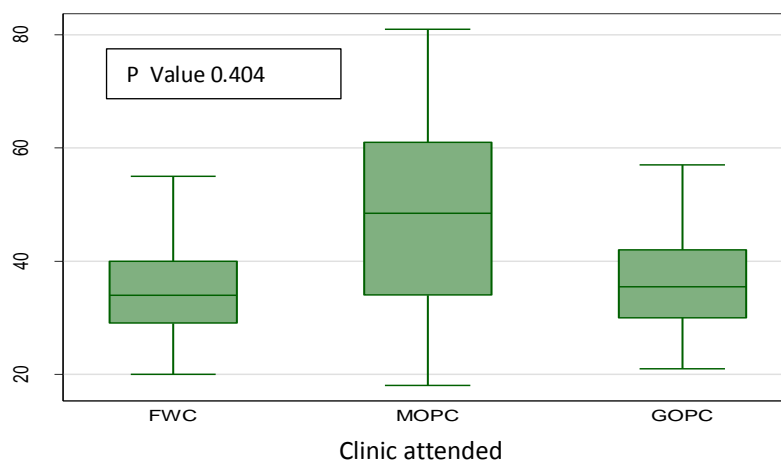
By age category, the medical clinic had 28% of the study participants being over 61 years of age whereas the family welfare and gynecology clinic had none in that age category. Majority of participants in the family welfare and medical clinics were in the 31-40 years age bracket whereas the populous age category in the medical clinic was over 61 years. Figure 3 below demonstrates the difference in mean ages by categories across the various socio-demographic characteristics.

Figure 3: Participants mean age across various categories of socio-demographic characteristics
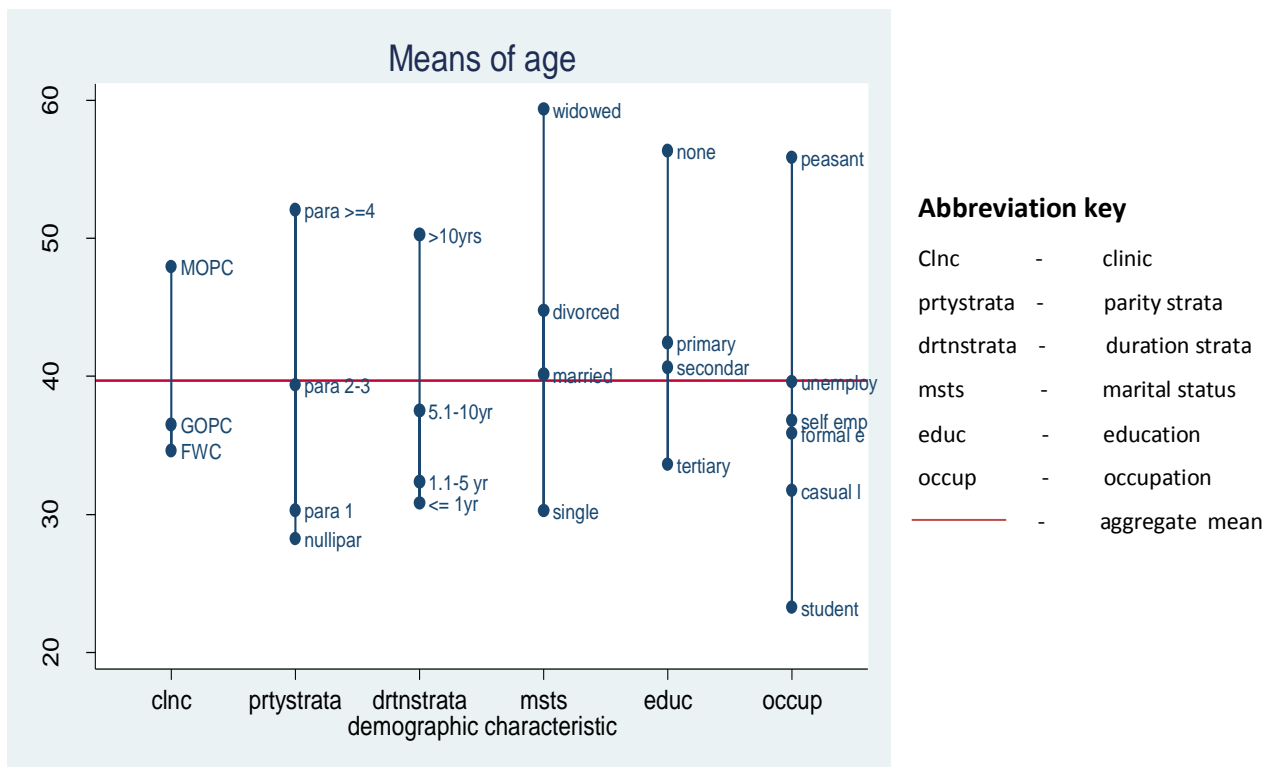
As demonstrated in table 2 below, distribution of study participants varied significantly by clinic across the various socio-demographic characteristics.

By parity, most study participants in the family welfare clinic and gynecology clinics were in the two to three prior births category (50% and 30% respectively) whereas in the medical clinic, most study participants (50%) had four or more prior viable births.

Participants in the medical clinic had the longest duration since the last delivery with a mean

duration of 19.8 years followed by the gynecology clinic study participants whose mean

duration since the last delivery was 12.3 years and lastly the family welfare clinic

participants who had a mean duration of 5.6 years. This is also demonstrated in figure 4.

Table 2: socio-demographic characteristics by clinic

| Characteristic	N (%) [a]			P value [c]
	FWC	MOPC	GOPC	
Total participants	50 (33.33)	50 (33.33)	50 (33.33)	
Age of respondents				
Aggregate [b]	34.6 (7.9,20 55)	47.9 (15.9,18 89)	36.5 (9.3,21 57)	
18-30 yrs	16 (32)	8 (16)	15 (30)	
31-40yrs	24 (48)	8 (16)	19 (38)	<0.001
41-50yrs	8 (16)	10 (20)	12 (24)	
51-60yrs	2 (4)	10 (20)	4 (8)	
>61yrs	0	14 (28)	0	
Parity				
Aggregate [b]	2.3 (1.3,0 6)	3.9 (2.9,0 12)	2.0 (2.3,0 10)	
Nulliparous	3 (6)	7 (14)	14 (28)	
Para 1	12 (24)	3 (6)	12 (24)	<0.001
Para 2-3	25 (50)	15 (30)	15 (30)	
Para=>4	10 (20)	25 (50)	9 (18)	
Duration since last delivery				
Aggregate [b]	5.6 (5.3,0.2 20)	19.8 (0.3 49)	12.3 (7.6,0.2 25)	
< 1yr	7 (14.9)	1 (2.3)	2 (5.6)	
1-5 yrs	24 (51.1)	7 (16.3)	8 (22.1)	<0.001
5-10yrs	5 (10.6)	2 (4.7)	6 (16.7)	
>10	11 (11.4)	33 (76.7)	20 (55.6)	
Marital status				
Single	4 (8)	9 (18)	10 (20)	
Married	45 (90)	30 (60)	37 (74)	0.008
Divorced/separated	1 (2)	6 (12)	2 (4)	
Widowed	0	5 (10)	1 (2)	
Level of education				
Non	0	6 (12)	2 (4)	
Primary	13 (26)	15 (30)	20 (40)	0.032
Secondary	17 (34)	17 (34)	9 (18)	
Tertiary	20 (40)	12 (24)	19 (38)	
Occupation				
Student	0	3 (6)	4 (8)	
unemployed	8 (16)	14 (28)	4 (8)	
Formal employment	18 (36)	11 (22)	14 (28)	0.001
Casual laborer	1 (2)	1 (2)	2 (4)	
Peasant farmer	2 (4)	15 (30)	10 (20)	
Self employed	21 (42)	6 (12)	16 (32)	

[a] Except where otherwise noted
[b] Aggregate Age, parity and duration since last delivery are reported as mean(standard deviation, minimum maximum
[c] Test statistic – Pearson's chi-squared test

Most participants in the three clinics were married (90% in FWC, 60% in MOPC and 74% in GOPC) although the proportions varied significantly (p value0.008). Family welfare and gynecology clinic participants were mostly in self or formal employment (78% and 60% respectively) whereas most participants (58%) in the medical clinic were either peasant farmers or unemployed.

In terms of education attained, most participants in the family welfare clinic had attained tertiary education (40%) whereas most participants in the medical clinic attained secondary education (34%) and primary education in the gynecology clinic (40%) (P value 0.032).

Figure 4: box plot of distribution of participant's duration since last delivery by clinic
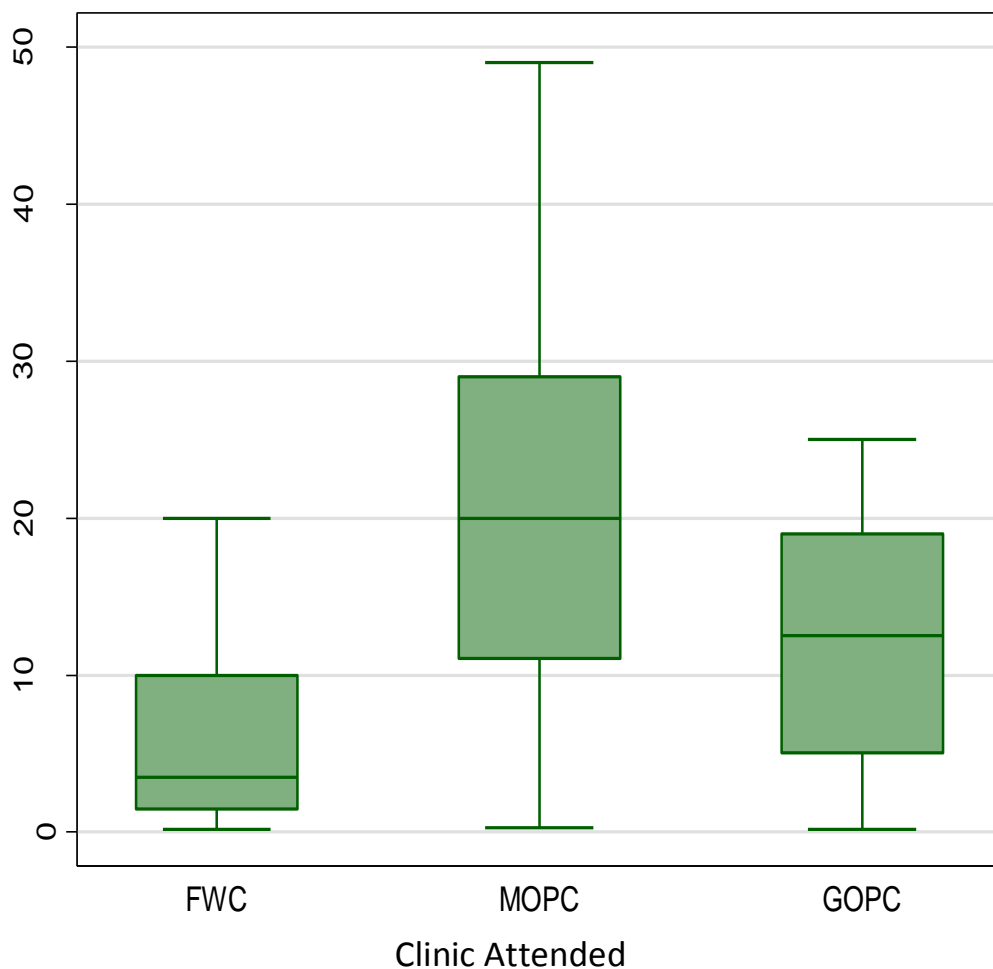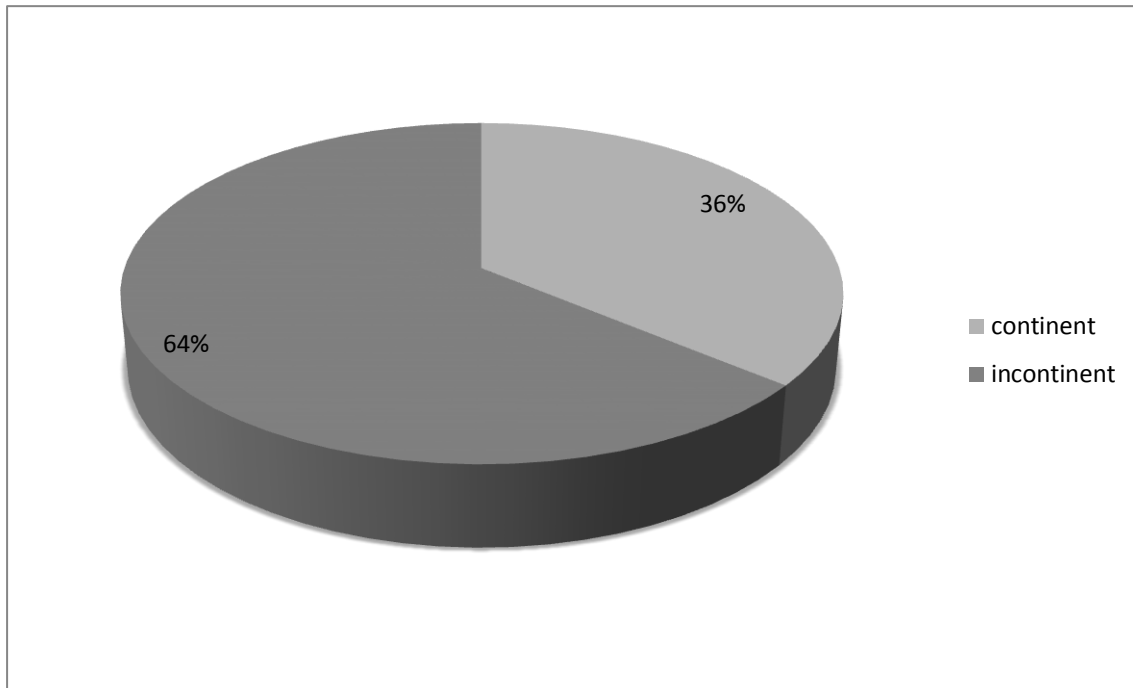
Prevalence of Female urinary incontinence

The overall prevalence of female urinary incontinence as demonstrated in figure 5 below was found to be 64% among the study participants.

Figure 5: Pie chart of prevalence of female urinary incontinence

Incontinence by age

Further analysis revealed that mean age for the incontinent participants was 41.4 years with 50% of the participants being in the age range 31.5 to 50 years. On the other hand, the mean age for the continent participants was slightly lower at 36.7years with 50% of the patients being in the age range of 29 to 41 years. This age distribution by continence status is depicted in the box plot in figure 6 below. These differences are statistically significant with a p value of 0.0323.

Figure 6: box plot of participants' age distribution by continence status
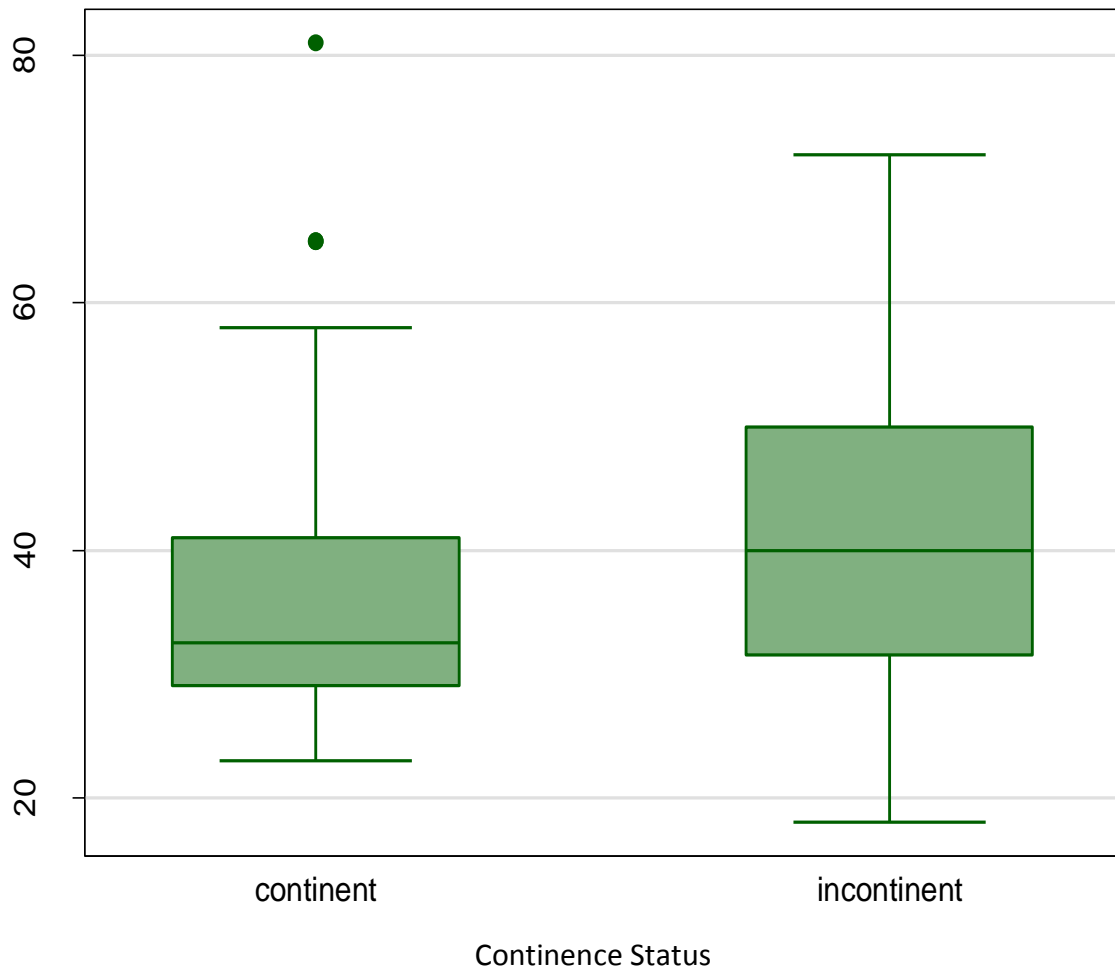
Continence Status

Analysis of continence status across the age categories reveals that the older age strata have higher proportions of incontinence compared to the younger age groups. However, there seems to be a dramatic increase in the proportion of participants with incontinence from the 31-40 age strata (54.9%) to the 41-50 age strata (76.7%). This sharp rise is preceded and followed by an almost constant level of incontinence (56.4% and 54.9% before the sharp increase in incontinence and 76.7%, 75% and 78.6% after the increase. This trend is demonstrated in figure 7 below. The differences in proportions are not statistically significant as evidence by the Pearson's chi square test with a p value of 0.134.

Figure 7: bar graph of proportions by continence status across age strata
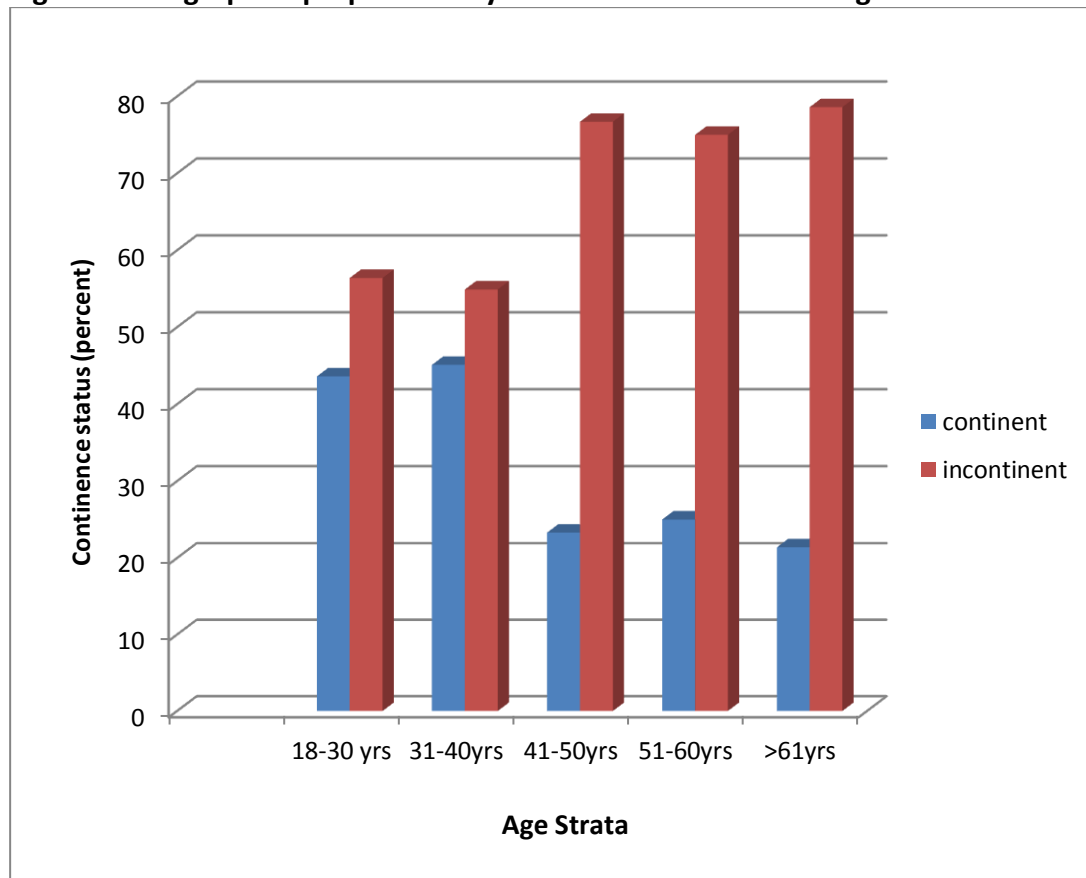
Incontinence by duration since last delivery

Participants who had their last delivery less than a year ago had the lowest prevalence of incontinence (20%) whereas those who had the longest duration since their last delivery (> 10 years) had the highest prevalence of incontinence (78.1%). Of note is that other than in the less than one year duration strata, participants in all the other duration strata were more incontinent than continent in terms of proportions as demonstrated in figure 8 below. The differences in mean duration since last delivery as well as the proportions by strata of duration since last delivery between the continent and incontinent groups are statistically significant (p value 0.011 and 0.002 respectively).

Figure 8: Histogram of prevalence of incontinence across strata of duration since last delivery
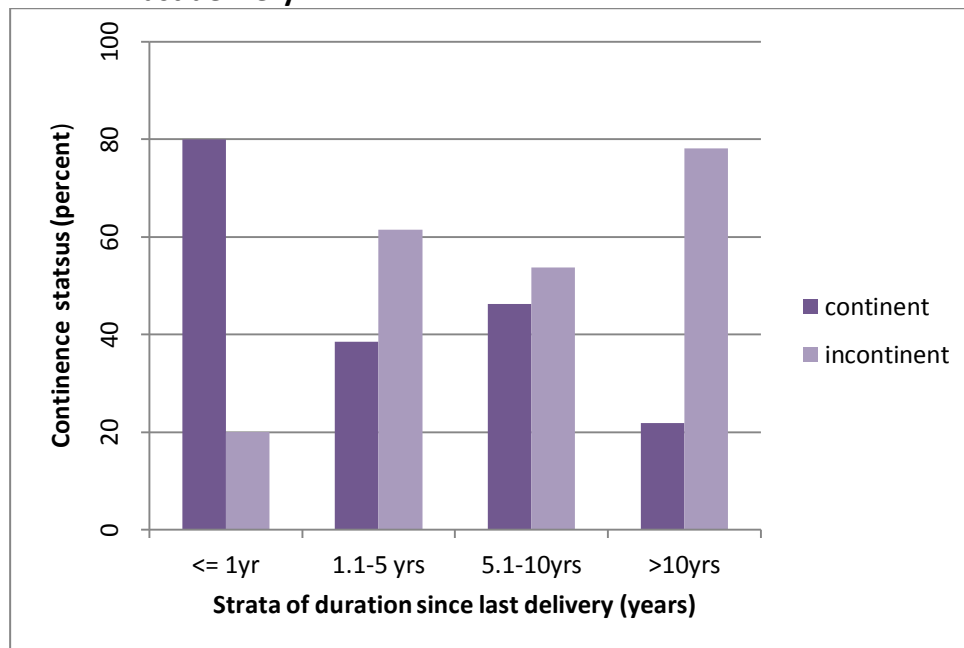
Incontinence by parity, marital status, education and occupation

Table 3 presents the results of cross tabulation of incontinence and various covariates. It is evident from this table that there is no statistically significant difference between mean parity and proportions of participants per parity strata between the continent and incontinent groups (p value 0.349 and 0.296 respectively).

There is also no statistically significant difference between the continent and incontinent groups in terms of marital status and level of education (p value of 0.716 and 0.360 respectively). There is however a statistically significant difference in occupation between the two continence groups (p value 0.006). From table 3, it is evident that participants in formal employment were more likely to be continent than incontinent (58.1% vs. 41.9%) whereas a higher proportion of participants in all the other occupation categories were incontinent.

Table 3: Cross-tabulation of the outcome variable and Covariates

Characteristic	Continence		P value [c]
	No N (%) [a]	**Yes** N (%) [a]	
Age of respondents			
Aggregate [b]	36.7 (11.9,23 81)	41.4 (13.2,18 72)	0.032
18-30 yrs	17 (43.6)	22 (56.4)	
31-40yrs	23 (45.1)	28 (54.9)	
41-50yrs	7 (23.3)	23 (76.7)	0.134
51-60yrs	4 (25)	12 (75)	
>61yrs	3(21.4)	11 (78.6)	
Parity			
Aggregate [b]	2.5(2.5,0 10)	2.9 (2.4,0 12)	0.349
Nulliparous	11 (45.8)	13 (54.2)	
Para 1	11 (40.7)	16 (59.3)	0.296
Para 2-3	21 (38.2)	34 (61.8)	
Para=>4	11 (25)	33 (75)	
Duration since last delivery			
Aggregate [b]	9.10 (10.3,0.2 41)	14.12 (10.3,0.4 49)	0.011
< 1yr	8 (80)	2 (20)	
1-5 yrs	15 (38.5)	24 (61.5)	0.002
5-10yrs	6 (46.2)	7 (53.6)	
>10	14 (21.9)	50 (78.2)	
Marital status			
Single	9 (39.1)	14 (60.9)	
Married	40 (35.7)	72 (64.3)	0.716
Divorced/separated	4 (44.4)	5 (55.6)	
Widowed	1(16.7)	5 (83.3)	
Level of education			
Non	3(37.5)	5 (62.5)	
Primary	16 (33.3)	32 (66.7)	0.360
Secondary	12 (27.9)	31 (72.1)	
Tertiary	23 (44.1)	28 (54.9)	
Occupation			
Student	2(28.6)	5 (71.4)	
unemployed	10 (38.5)	16 (61.5)	
Formal employment	25 58.1)	18 (41.9)	0.006
Casual labourer	0	4 (100)	
Peasant farmer	5 (18.5)	22 (81.5)	
Self employed	12 (27.9)	31 (72.1)	

[a] Except where otherwise noted
[b] Aggregate Age, parity and duration since last delivery are reported as mean(standard deviation, minimum maximum
[c] Test statistic – Pearson's chi-squared test

Prevalence of Incontinence by type of incontinence

As depicted in the pie chart below, majority of the participants who experienced urinary incontinence had mixed type incontinence (42%) whereas the minority had stress incontinence (19%).

Figure 9: pie chart of proportions of incontinent participants by type of incontinence
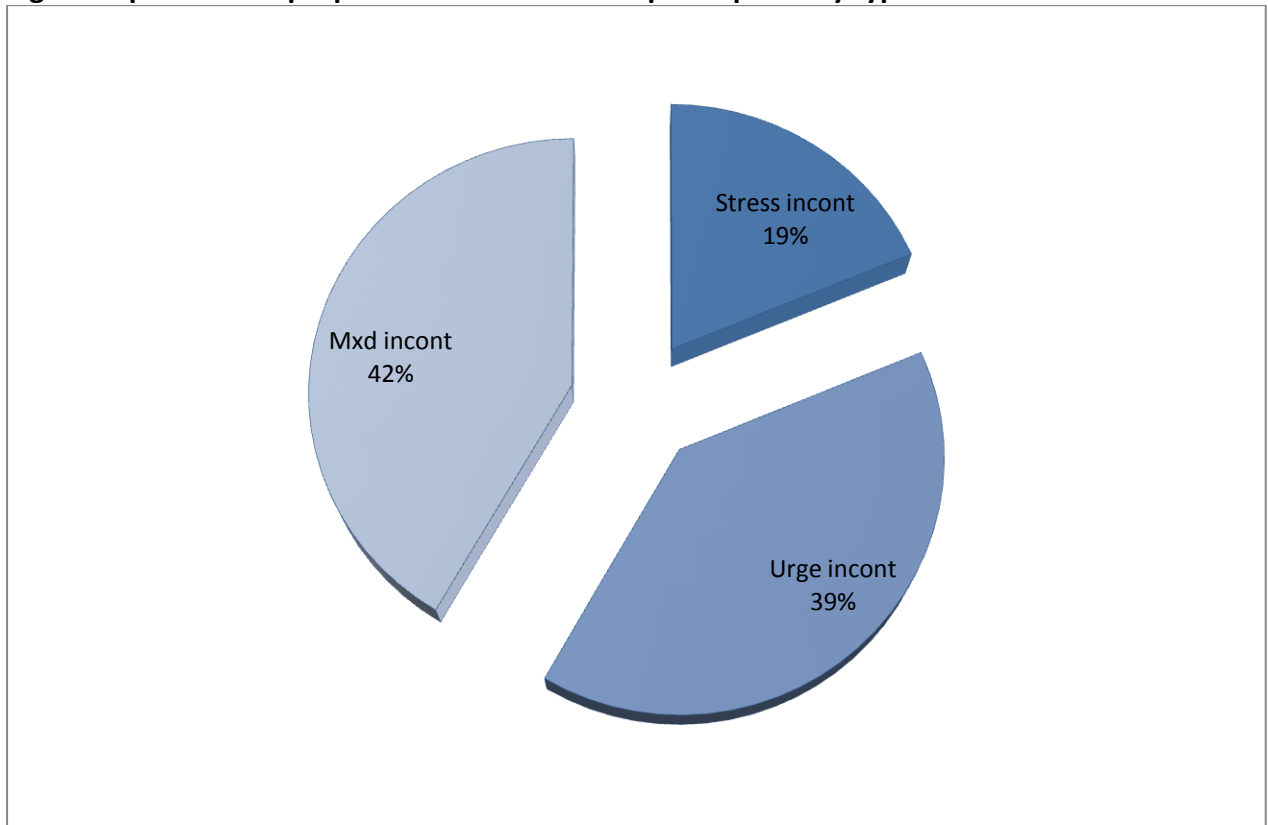
Participants age distribution by type of incontinence

Analysis of age distribution by type of incontinence reveals that the participants' age distribution is similar between the three incontinence subtypes. The stress incontinence sub group had a mean age of 40.9 years whereas the urge and mixed incontinence subgroups had mean ages of 42.4 and 40.6 years respectively with a p value of 0.603. The middle 50% of participants who experience stress incontinence are in the age range 29 to 50 years whereas 50% of those in the urge incontinence and mixed incontinence subgroups are in the age ranges 32 to 51years and 33 to 46.5 years respectively as shown in figure 10 below.

Figure 10: box plot of participants' age distribution by type of incontinence

P value 0.603

Abbreviation key

Incont - incontinence

Mxd - mixed

Type of incontinence
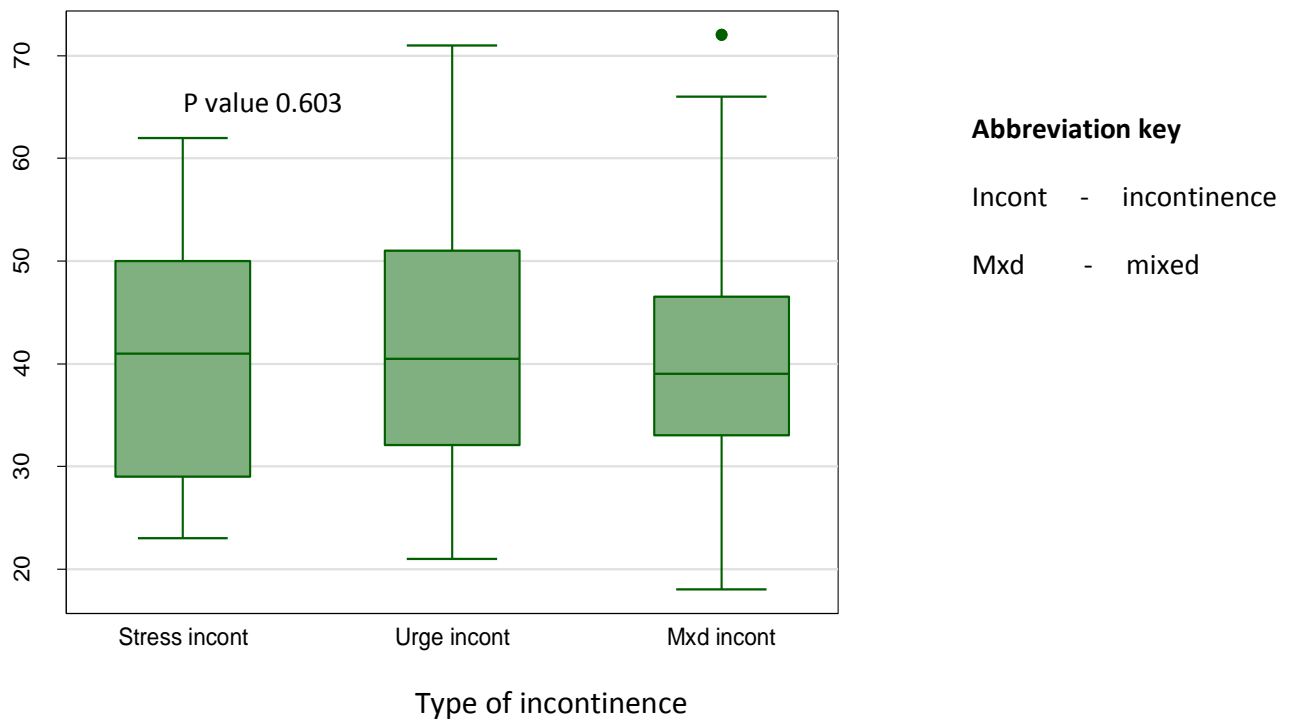
Incontinence type by parity

Figure 11: bar graph of distribution of types of incontinence by parity
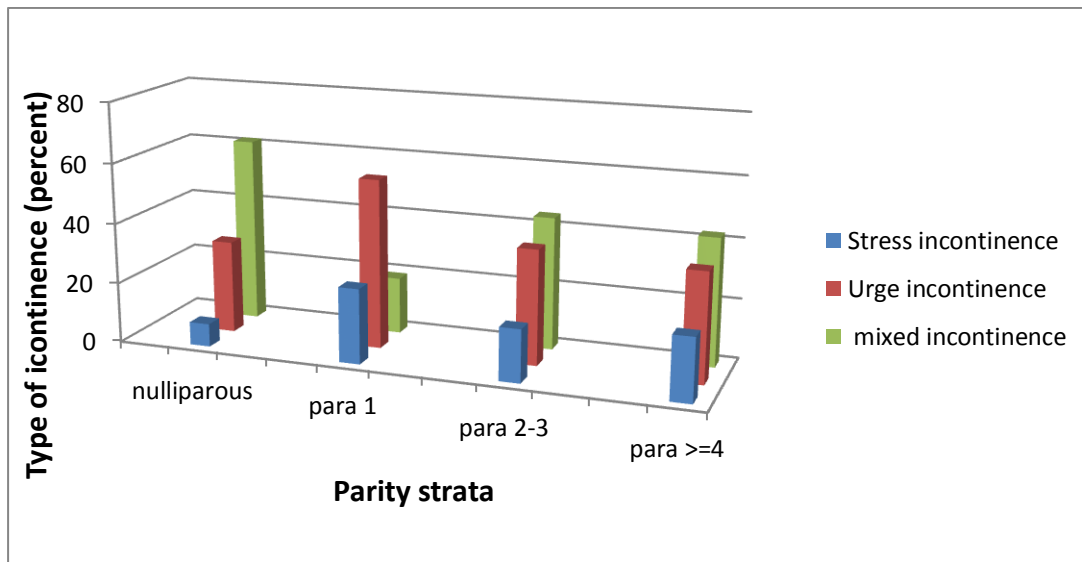
As demonstrated in figure 11 above, 61.5% of the nulliparous participants who experienced

urinary incontinence had mixed incontinence. This is followed in proportion by urge

incontinence at 30.8 % and stress incontinence (7.7%). This trend is replicated among participants in the para 2-3 and para >=4 parity categories although with varying proportions. However among the participants who have had only one prior delivery, most participants reported symptoms of urge incontinence (56.2%) followed by stress incontinence at 25% and mixed incontinence at 18.8%.

Crude and adjusted multiple logistic regression analysis

To test the relationship between the main outcome variable i.e. incontinence and other covariates, a logistic regression analysis was carried out, the results of which are presented in table 4.

Table 4: Unadjusted and adjusted multiple Logistic regression results

Characteristic	Logistic regression [θ]					
	Unadjusted			Adjusted *		
	OR(SE)	95%CI	P value	OR(SE)	95%CI	P value
Age of respondent	1.03(0.01)	1.00 1.06	0.035	1.01(0.04)	0.93 1.09	0.814
Age strata						
18-30yrs	Ref	Ref	Ref	Ref	Ref	Ref
31-40yrs	0.94 (0.40)	0.41 2.18	0.887	1.11 (0.74)	0.31 4.76	0.876
41-50yrs	2.54 (1.37)	0.88 7.30	0.084	1.48 (1.34)	0.25 8.73	0.668
51-60yrs	2.32 (1.53)	0.63 8.48	0.204	086 (0.99)	0.09 8.25	0.897
>61yrs	2.83 (2.06)	0.68 11.78	0.152	1.00 (1.22)	0.09 10.86	0.997
Parity	1.07 (0.08)	0.93 1.24	0.347	0.89 (0.12)	0.69 1.15	0.389
parity strata						
Nulliparous	Ref	Ref	Ref	Ref	Ref	Ref
Para 1	1.23 (0.70)	0.41 3.74	0.714	0.82 (0.51)	0.24 2.80	0.749
Para 2-3	1.37 (0.68)	0.52 3.61	0.525	0.82 (0.51)	0.24 2.80	0.749
Para=>4	2.54 (1.36)	0.88 7.28	0.083	1.2 (0.96)	0.27 5.68	0.782
Duration since last delivery	1.05 (0.02)	1.01 1.10	0.013	1.06 (0.04)	0.97 1.15	0.186
Duration since last delivery strata						
< 1yr	Ref	Ref	Ref	Ref	Ref	Ref
1-5yrs	6.4 (5.48)	1.19 34.29	0.030	6.68 (5.78)	1.23 36.34	0.028
5-10yrs	4.7 (4.51)	0.70 31.04	0.111	4.65 (4.58)	0.67 32.02	0.119
>10yrs	14.3 (12.09)	2.72 75.05	0.002	13.47(12.95)	2.05 88.66	0.007

*adjusted for age, parity and duration since last delivery
[θ]Pearson's goodness of fit test statistic – p value 0.7599

From the unadjusted regression analysis, there is a 3 % increase in odds of experiencing urinary incontinence with every year increase in age. This is statistically significant with a

p value of 0.035. This association however weakens when we control for parity and duration since last delivery and becomes non-significant statistically (OR 1.01, p value 0.814. By age strata, women in the >61 years age category had a 2.83 increased odds of experiencing incontinence when compared to those in the 18-30 years age strata in the bivariate analysis. This is however not statistically significant (p value 0.152). in the multivariate analysis, the odds of incontinence reduce to 1.00, still non-significant statistically (p value 0.997).

Increase in parity seems to increase the odds of experiencing urinary incontinence although this association lacks statistical significance (OR 1.07 p value 0.389). The situation is the same when the analysis is carried out using parity strata.

Bivariate regression analysis of duration since last delivery and incontinence reveals an odds ratio of 1.05 which is statistically significant with a p value of 0.013. This association is maintained when the analysis is adjusted for age and parity (OR 1.06) but loses statistical significance (p value 0.186). However when the analysis of duration since last delivery is carried out using duration strata, there is a statistically significant six and fourteen times increase in odds of experiencing urine incontinence in the 1-5 years and >10 years duration strata compared to the < 1year duration strata(OR 6.4 p value 0.03 and OR 14.3 p value 0.002 respectively. This association is maintained when adjusted for parity and age and remains statistically significant (OR 6.68 p value 0.028 and OR 13.47 p value 0.007.

Severity of female urinary incontinence

On further analysis of the women who experienced urine incontinence symptoms, majority (53%) experienced mild urinary incontinence whereas 29% experienced moderate and 18% experienced severe incontinence. This is depicted in the pie chart below.

**Figure 12: Pie chart of severity of female urinary incontinence**
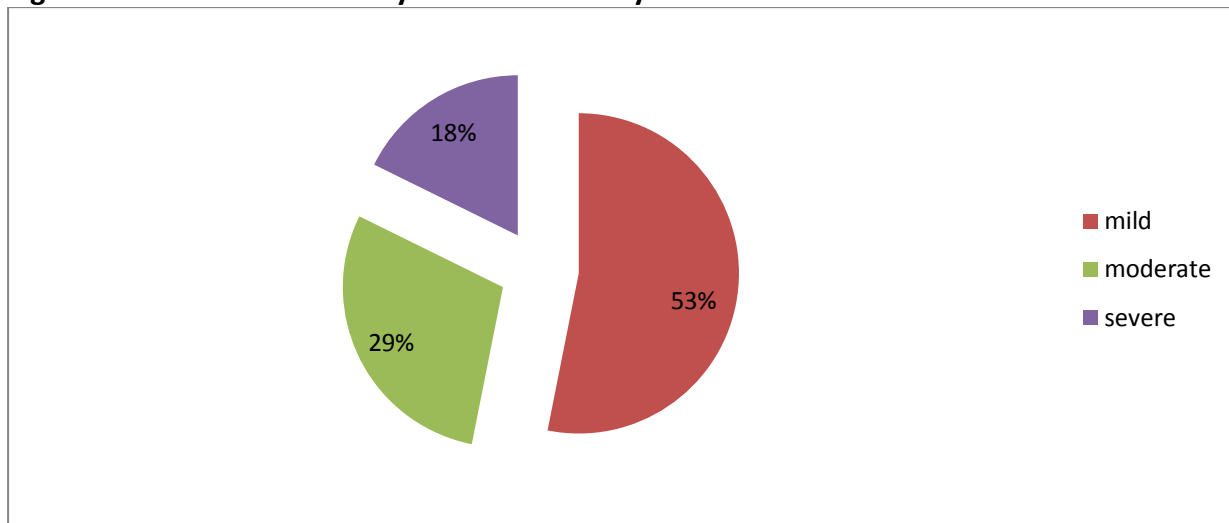
Severity by age

As depicted in the box plot below, there is no difference in distribution of the severity of incontinence categories by age (p value 0.299). The means of ages for the mild, moderate and severe incontinence categories was 39.8 years, 42.9 years and 43.7 years respectively.

Figure 13: box plot of Severity of incontinence by age
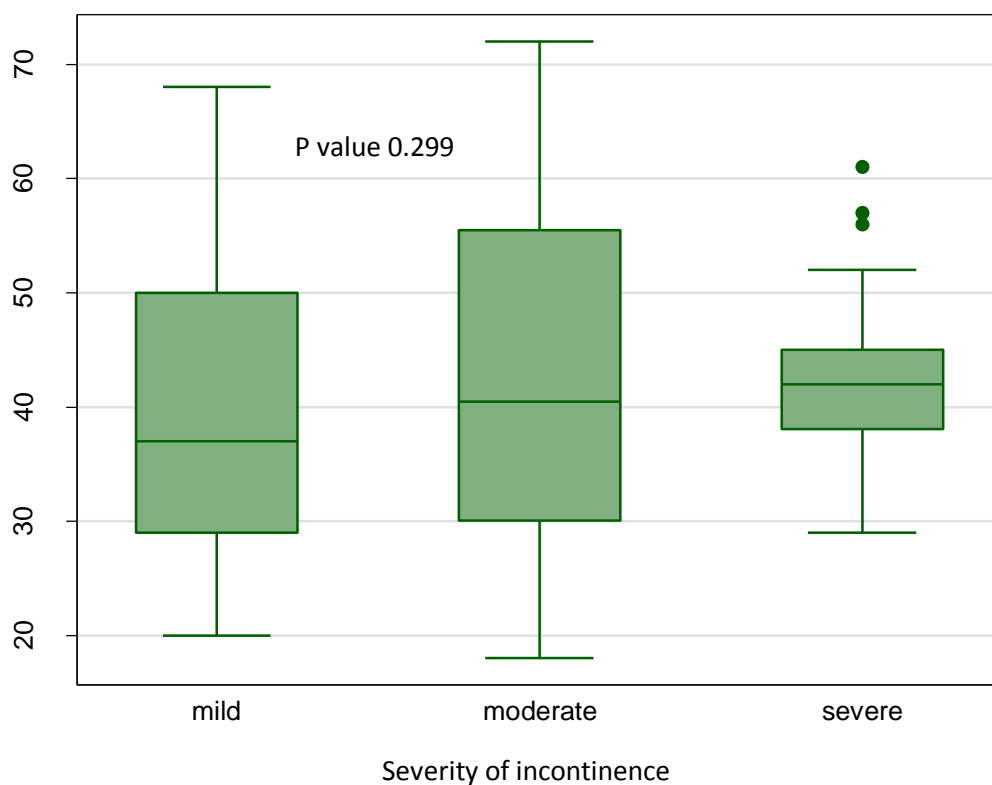
Severity by amount of urine leakage

In terms of amount leakage, majority (72%) of women who experienced urinary incontinence leaked just drops of urine in amount whereas 28% leakage more than just drops of urine. This trend cuts across all age strata with over 50% of women with leakage in all age strata having less than drops as is demonstrated in the stacked bar graph below.

Figure 14: Stacked histogram of proportion of women experiencing urine leakage by amount of leakage according to age strata
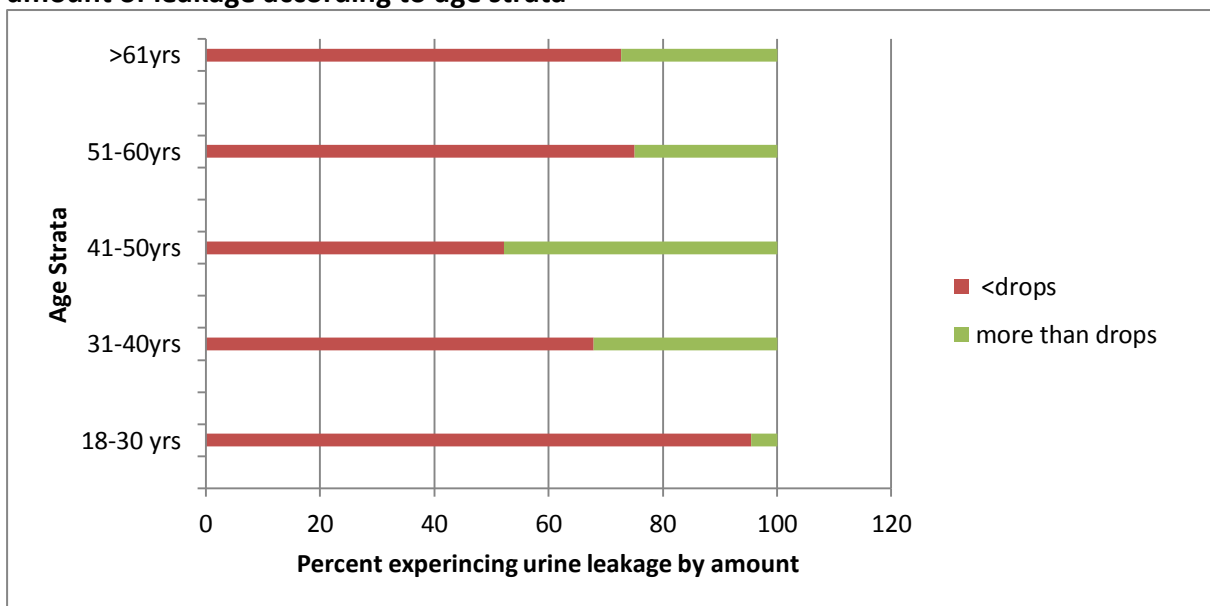
Severity by frequency of urine leakage

As depicted in figure 15 below, majority of women experiencing urine incontinence in the > 61 years age category reported having leakage every day or a few times a month(36.4% and 36.4% respectively) whereas the minority (27.2%) reported leakage less than once a month. In the18-30 and 31-40 years age categories however, majority of women reported leakage less than once a month (45.5% and 50% respectively) followed by leakage a few times a week (31.3% and 21.3% respectively). In overall the most reported frequency of leakage

was less than once a month (39%) whereas the least reported frequency of urine leakage was every day and/or night (12%).

Figure 15: histogram of frequency of urine leakage by age strata
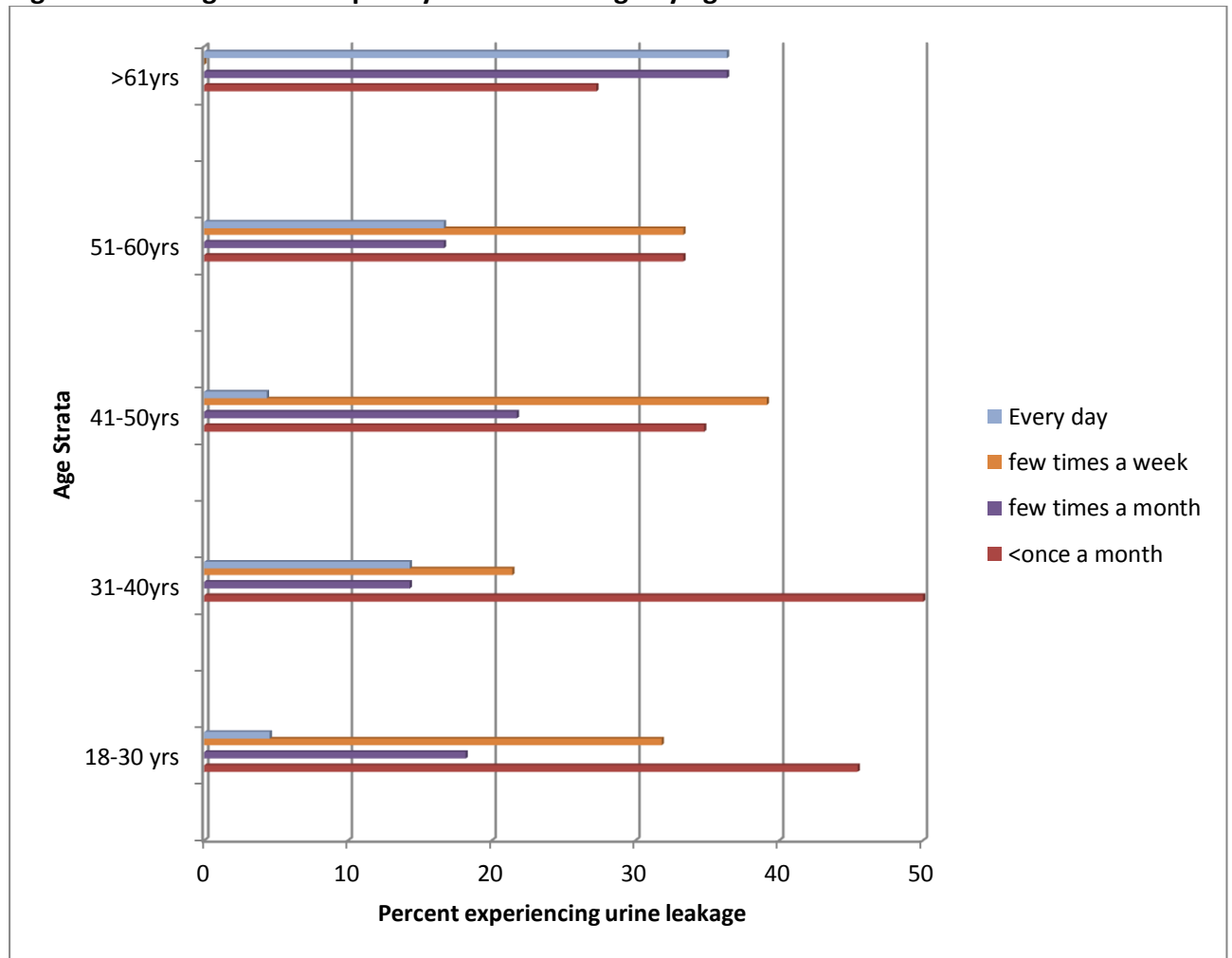
Severity by type of incontinence

Analysis of severity by type of urinary incontinence reveals that majority of women who had severe incontinence had mixed urinary incontinence (64.7%) whereas the least type of urinary incontinence in this severity category was stress incontinence (11.8%).On the other hand, majority of women in the mild and moderate severity categories reported symptoms of urge incontinence (39.2% and 50% respectively). In these severity categories, symptoms

of stress incontinence were least reported (25.5% and 10.7% respectively). This is

demonstrated in figure 16 below.

Figure 16: Severity of incontinence by type of incontinence
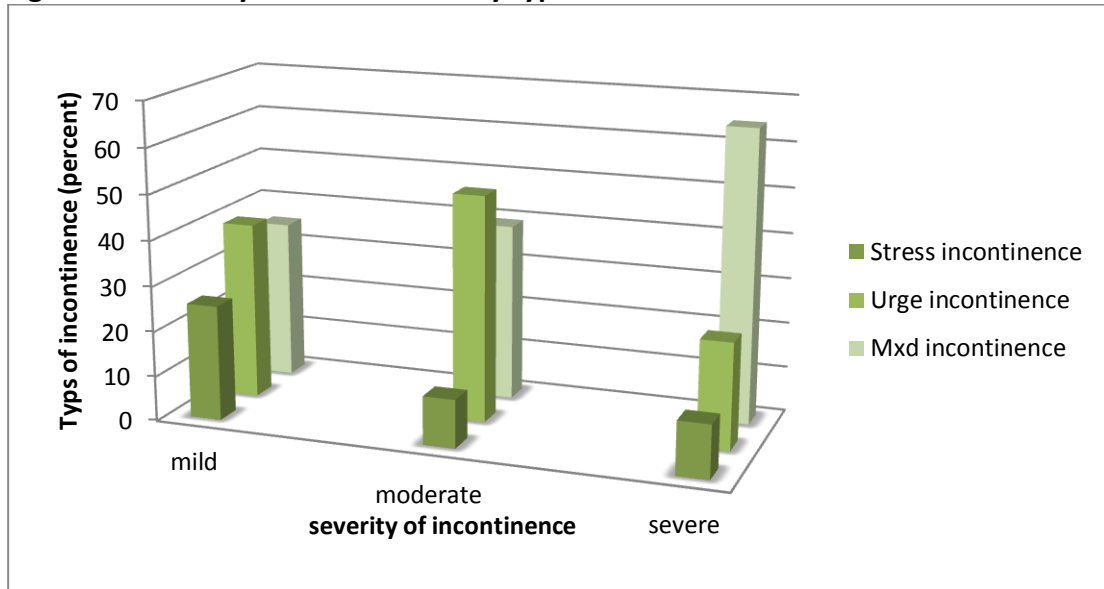
Healthcare provider consultation

As demonstrated in the pie chart below, only 11% of women who experienced urinary

incontinence sought medical attention.

Figure 17: Pie chart of healthcare consultation rate
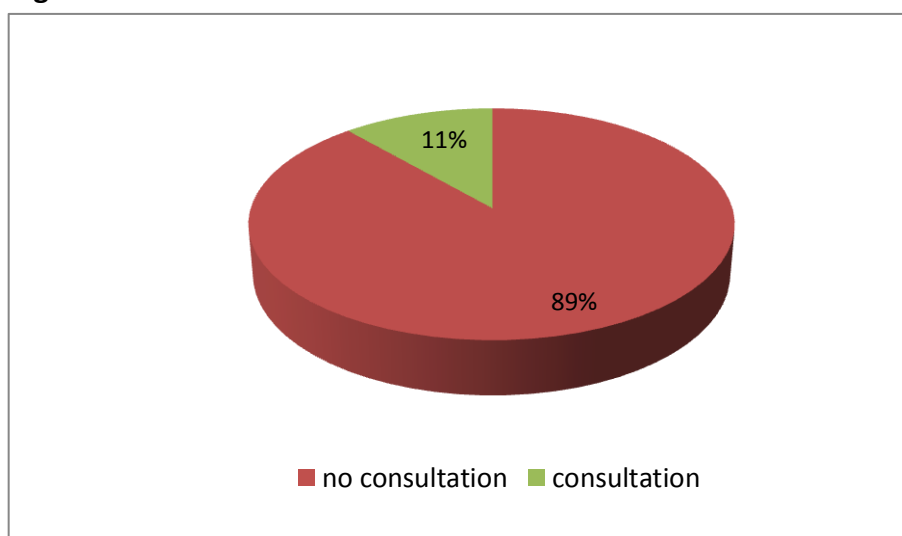
Of those who consulted healthcare personnel for their symptoms, majority (45.5%) experienced moderate incontinence whereas 36.4% experienced severe incontinence and 18.9% experienced mild incontinence. This is shown in the bar graph below.

Figure 18: Bar graph of healthcare consultation rate by severity of incontinence
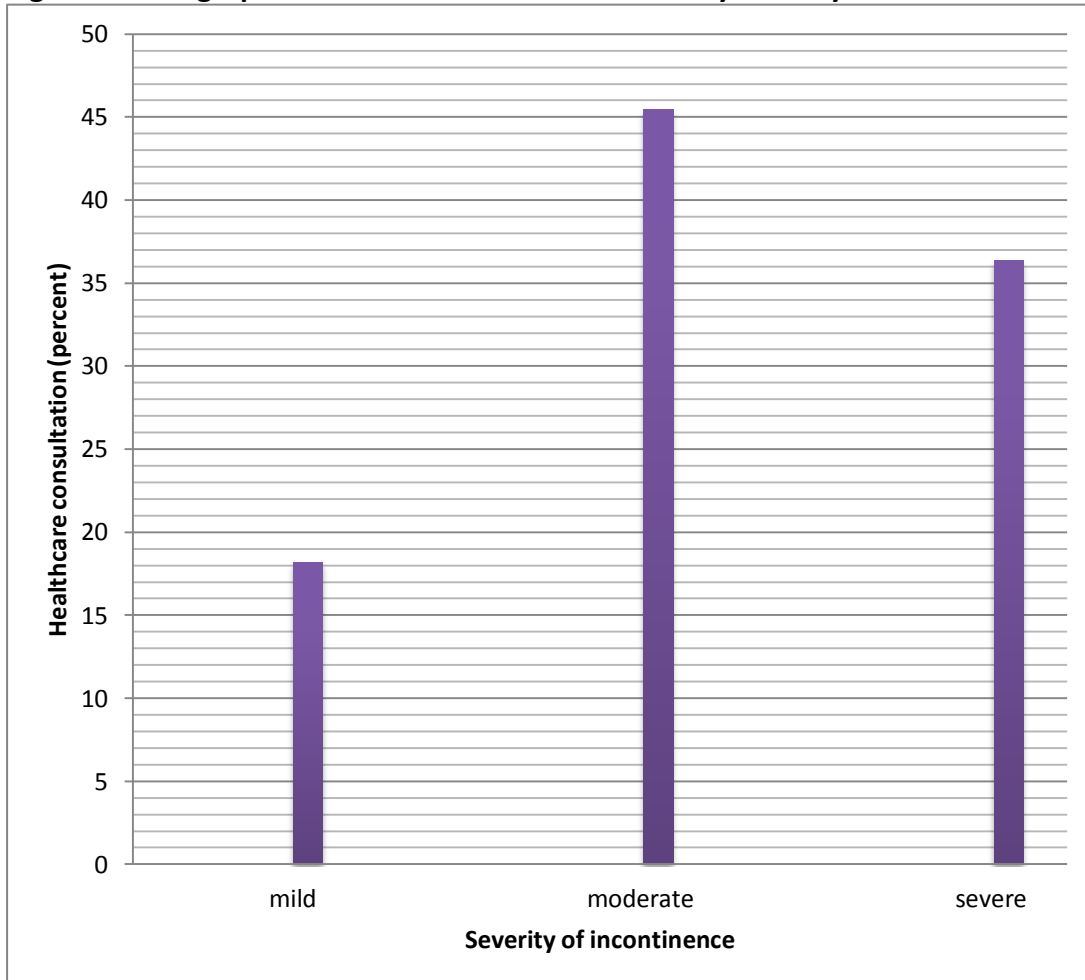
DISCUSSION

This research was set to establish the prevalence of female urinary incontinence, its severity and health care provider consultation rate of women with female urinary incontinence in selected out-patient clinics at Kenyatta National Hospital. This was mainly inspired by the fact that globally, female urinary incontinence is a silent epidemic that places an enormous burden on the individual as well as the healthcare system. In addition, local studies on female urinary incontinence are lacking. Without information, on the local situation with regards to the epidemiology of female urinary incontinence, this condition will remain largely undetected as well as undertreated and optimal management of the same will be difficult to achieve.

This study revealed that the prevalence of female urinary incontinence in Kenyatta national hospitals outpatient clinics is 64%. This was similar to that found by Yueh-Chi Tsai et al in Taiwan who found a female urinary incontinence prevalence of 69.3 % among outpatient clinic attendants [23]. Analysis of incontinence by age revealed that women age 60 years and more had a high urinary incontinence prevalence of 78.6 percent. This was unlike the prevalence of 38% In the same age group in the United States found by Herzog et al[8].However Herzog's study was a community based study unlike this one which was hospital based and specifically among outpatients. This study also revealed a prevalence by type of incontinence of 12% for stress incontinence, 25.3% for urge incontinence and 26.7% for mixed incontinence which made up 18.7 % 39.6% and 41.7% respectively for those with FUI. This is unlike what is found by most authors[2,39] where stress incontinence is the most frequent followed by mixed incontinence and finally urge incontinence. One possible reason for this would be that most of the other studies are community based studies which may

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bring about the differences. Keeping in mind that most authors seem to agree that there exist variations in prevalence as well as types of female urinary incontinence by subpopulations, this may be a pointer to the true situation in our local setting. A possible reason would be also be that this was a small magnitude study in terms of sample size which may affect results of the data analysis.

Incontinence has been shown to increase with age. This was replicated in this study although the increase, which was statistically significant in the unadjusted analysis, lost its statistical significance when adjusted for possible confounders.

The logistic regression results showed a statistically significant increase in odds of incontinence with increased duration since the last delivery. The researcher has not come across studies addressing this association to the best of her knowledge but this may point to the effects of aging of tissues especially after the effect of child birth. The positive association of incontinence with parity was not statistically significant.

In terms of severity, most patients experienced mild incontinence with the minority (18%) of respondents reporting symptoms of severe incontinence (at least once a week or monthly leakage of more than just drops). Other than stigma, mild symptoms may contribute to the low healthcare consultation rate among the respondents. Only 11% of the respondents had ever sought health advice or treatment for their incontinence symptoms. This is unlike what was found in an American survey[4] where 45% of women sought medical attention for urinary incontinence symptoms. Although the reasons behind a low healthcare consultation rate are beyond the scope of this study, it is speculated that in addition to the possible reasons given in the preceding discussion, lack of knowledge on availability of treatment

and the misconception that urinary incontinence is a natural aftermath of pregnancy and childbirth may contribute to this low rate.

CONCLUSION

As is the situation with numerous studies that have been carried out globally, female urinary incontinence is more common in our setting than we anticipated with a prevalence of 64%. This, coupled with the low healthcare consultation rate of just 11%, has probably been the source of great suffering and reduced quality of life as women suffer in silence. A possible reason for the low healthcare provider consultation rate is the fact that most women,(53%) experience mild incontinence with only 18% reporting severe incontinence symptoms.

Establishing the prevalence in the local setting is a step in the right direction as it gives healthcare providers a basis for proactive diagnosis and management of female urinary incontinence. This hopefully will eventually lead to improved quality of life and reduced costs of living with urinary incontinence. The study also established increased odds of urinary incontinence with increase in years after delivery. It would important to follow this up with further research to check reproducibility of the same and further determine its significance.

RECOMMENDATIONS

Results of this study should be made available to healthcare providers in the local setting in order to enhance proactive management by good history taking, diagnosis and treatment of

women attending healthcare facilities in order to pick unreported urinary incontinence. Further research of larger magnitude is needed as this will assess reproducibility of the results from this study as well as confirm or dispute the association between duration since last delivery and likelihood of developing female urinary incontinence. In addition, uro-gynecology and pelvic floor medicine should be given the attention it deserves especially during training of healthcare personnel i.e. Medical students, nurses, clinical officers and obstetrician/gynecologists as this will go a long way in improving the life of Kenyan women.

References

1   Abrams P, Cardozo L, Fall M et al. The standardization of terminology of lower urinary tract function: report from the Standardization Sub-committee of the International Continence Society. Neurourol Urodyn 2002; 21:167

2   Minassian VA, Drutz HP, Al-Badr A. Urinary incontinence as a worldwide problem. *Int J Gyn & Ob* 2003;82(3):327-338

3   Lose G. The Burden of Stress Urinary Incontinence. *Europ Urol Supplements*.2005; 4(1): 5-10.

4   Anger JT, Saigal C, Litwin MS. The prevalence of urinary incontinence among community dwelling adult women: results from the National Health and Nutrition Examination Survey. J Urol. 2006 Feb; 175(2):601-4.

5   DuBeau CE, Levy B; Mangione CM, Resnick NM. The impact of urge urinary incontinence on quality of life: importance of patients' perspective and explanatory style. J Am Geriatr Soc 1998 Jun;46(6):683-92

6   Wyman JF, Harkins SW, Choi SC, Taylor JR, Fantl JA. Psychosocial impact of urinary incontinence in women. J Obstet Gynecol 1987 Sep;70(1):378-81.

7   Thom DH, Nygaard IE, Calhoun EA. Urologic diseases in America project: urinary incontinence in women-national trends in hospitalizations, office visits, treatment and economic impact. J Urol 2005 Apr; 173(4):1295-301.

8   Herzog AR, Diokno AC, Brown MB et al. Two-Year Incidence, Remission, and Change Patterns of Urinary Incontinence in Non-institutionalized Older Adults. J Gerontology 1990;45(2):67-74

9   Goode P, Burgio K, Redden D et al. Population Based Study of Incidence and Predictors of Urinary Incontinence in Black and White Older Adults. The Journal of Urology; 179(4): 1449-1454.

10   Hannestad Y, Rortveit G, Sandvik H, Hunskaar S. A community-based epidemiological survey of female urinary incontinence. The Norwegian EPINCONT study. J Clin Epidemiol 2000; 53:1150-7.

11   Thom D, Van Den Eeden S, Ragins A et al. Differences in prevalence of urinary incontinence by race/ethnicity. J urol. 2006 Jan; 175(1):259-264

12   Voelker R. International group seeks to dispel incontinence "taboo" JAMA 1998, sep.16; 280(11):951-953.

13   Shumaker SA, Wyman JF, Uebersax JS. Health-Related Quality of Life Measures for Women with Urinary Incontinence: The Incontinence Impact Questionnaire and the Urogenital Distress Inventory. Continence Program in Women (CPW) Research Group. Qual Life Res 1994 Oct; 3(5): 291-306

14   Matza LS, Zyczynski TM, Bavendam T . A review of quality-of-life questionnaires for urinary incontinence and overactive bladder: Which ones to use and why? Current Urology reports 2004; 5(5)

15   Van Arsdalen K, Wein A. Physiology of micturition and continence in: Krane, RJ, Siroky, MB (Eds).Clinical Neuro-Urology.2nd edn.). Little Brown and company: New York,1991:25-82.

16   DeLancey JO. Structural aspects of the extrinsic continence mechanism. Obstet Gynecol journ 1988;72(3):296-301.

17   Ouslander JG. Management of overactive bladder. N Engl J Med 2004; 350:786.

18   Andersson KE. Bladder activation: afferent mechanisms. Urology 2002 May; 59(5 Suppl 1):43-50.

19   http://www.rnceus.com/course_frame.asp?exam_id=56&directory=uro. Date accessed 17th April 2008

20   Hunskaar S, Burgio K, Clark A, et al. Epidemiology of urinary and fecal incontinence and pelvic organ prolapse, 3rd International Consultation on Incontinence, Volume 1: Basic Evaluation. 2005;1:255.

21   Tennstedt SL, Link CL, Steers WD, McKinlay JB. Prevalence of and risk factors for urine leakage in a racially and ethnically diverse population of adults: the Boston Area Community Health (BACH) Survey. Am J Epidemiol. 2008 Feb 15;167(4):390-9.

22   Dooley Y, Kenton K, Cao G. Urinary incontinence prevalence: results from the National Health and Nutrition Examination Survey. J Urol. 2008 Feb; 179(2):656-61.

23   Tsai YC, Liu CH Urinary incontinence among Taiwanese women: an outpatient study of prevalence, comorbidity, risk factors and quality of life. Int Urol and Nephrol J 2009; 41(4): 795-803

24   Hannestad Y, Rortveit G, Hunskaar S. Help seeking and associated factors in female urinary incontinence. The Norwegian EPINCONT study. Scand J Prim Health Care 2002;20:102-7

25   Cetinel B, Demirkesen O, Tarcan T. The prevalence of female urinary incontinence and risk factors of bothersomeness and help-seeking behavior of hidden female UI in urology and obstetrics and gynecology outpatient clinics. Int Urogyn J 2007;18(6):659-654.

26   Landefeld CS, Bowers BJ, Feld AD. National Institutes of Health state of the science conference statement: prevention of fecal and urinary incontinence in adults. Ann Intern Med. 2008 Mar 18; 148(6):449-58.

27   Abdool Z, SA Fam Prac,2007:49(6): 34-39

28   Hu TW, Wagner TH, Bentkover JD, Leblanc K. Costs of urinary incontinence and overactive bladder in the United States: a comparative study. J Urol 2004 Mar;63(3):461-5.

29   Cortes E, Kellehe C. Costs of female urinary incontinence. Women's Health Medicine, Vol 2(6): 3

30   Ouslander JG; Zarit SH; Orr NK; Muira SA Incontinence among elderly community-dwelling dementia patients. Characteristics, management, and impact on care givers. J Am Geriatr Soc 1990 Apr; 38(4):440-5.29.

31 Dubeau CE, Simon SE, Morris JN. Effect of urinary incontinence on quality of life in older nursing home residents. J Am Geriatr Soc. 2006 Sep;54(9):1325-33.

32 Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life .A conceptual model of patient outcomes. JAMA 1995 Jan 4; 273(1):59-65

33 Jeter KF, Wagner DB. Incontinence in the American home, A survey of 36,500 people. J Am Geriatr Soc 1990 Mar;38 (3):379-83.

34 Sandvik H, Hunskaar S, Seim A. Validation of a severity index in female urinary incontinence and its implementation in an epidemiological survey .J Epidem & Com Hlth 1993;**47**:497-499.

35 Blaivas J, Panagopoulos G, Weiss J. The Urgency Perception Score: Validation and Test-*Retest. J Urol 2007 ; 177(1): 199-202*

36 Sandvik H, Seim A, Vanvik A, Hunskaar S. A severity index for epidemiological surveys of female urinary incontinence: comparison with 48-hour pad-weighing tests. Neurourol Urodyn. 2000;19(2):137-45.

37 Billingsley, Patric (1995), Probability and measure(3rd ed.), chapter 5: 357-370. John Wiley & sons, ISBN 0-471-00710-2, New York USA

38 Barany, Imre; Vu,Van(2007).Central limit theorems for Gaussian polytopes. The annals of probability. Institute of Mathematical Statistics.35 (4):1593-1621.

39 Peyrat L, Haillot O, Bruyere F. Prevalence and risk factors of urinary incontinence in young and middle-aged women. BJU Int. 2002 Jan; 89(1):61-6.

Appendix (i) consent form

Information given to the participant

This research forms part of my thesis for a master's degree in obstetrics and gynaecology. The main objective of the study is to determine the magnitude of female urinary incontinence (inability to voluntarily control urine) at Kenyatta national hospital among outpatients. This is mainly based on the fact that urinary incontinence has been shown to be a widespread problem but those affected rarely report their problem or seek help for the same .This is despite negative physical, psychological, financial and social consequences due to the condition. This lack of reporting is mainly due to embarrassment, lack of information on where to get help and a false belief that incontinence is an inevitable consequence of aging and childbirth.

By participating in this study, you will enable us to find out the magnitude of the problem, its severity and how bothersome it is.

You are therefore requested to voluntarily participate in this research in order to generate information that will be utilised in improving care to those afflicted. This study will inflict no harm to you and will not alter your proposed treatment plan. The information you give will be treated with utmost confidentiality.

By being part of this research, you will have given crucial information to the scientists of this country on how to plan for better management of women suffering from urinary incontinence. This information may be published and appear in scientific journals. You have a right to refuse to participate in this research and this will in no way affect your current or future treatment in this or any other hospital

Your faithfully,

Dr. Charlotte Salame Kaliti

Postgraduate student

Department of obstetrics and gynaecology

University of Nairobi

Telephone : 0722449220

I ....do consent to participate in this research. I understand that this research is for educational purposes only and i do not stand to gain financially from it. i do understand that it is my right to decline to participate in this study and this will not in any way affect my current or future treatment in this hospital.

Signature of participant/ left thumb print

………………………………………   date…………………………………

Signature of witness

………………………………………   date ……………………………

Mimi ………………………………………………………………………. nina kubali kushiriki katika utafiti huu.ninaelewa ya kwamba utafiti huu ni kwa sababu ya masomo na sitarajii pesa au fidia zozote kutokana na utafiti huu. Ninaelewa ya kwamba ni haki yangu kukataa kujihusisha na utafiti huu na uamuzi wangu hautadhuru matibabu yangu ya sasa au baadaye katika hospitali hii.

Sahihi ya muhusika/ alama ya kidole gumba cha kushoto

……………………………………………   tahere …………………………….

Sahihi ya shahidi

……………………………………………. tarehe …………………………….

Appendix (ii) Questionnaire

<u>Female urinary incontinence: prevalence, severity and healthcare provider consultation rate among outpatients at Kenyatta National Hospital</u>

Outpatient no.   ....

Section A : Eligibility   yes   no

    1. Have you ever been diagnosed to have a vesicovaginal fistula?   ☐   ☐

    2. Do you experience continuous uncontrollable leakage of urine?   ☐   ☐

    If yes to any of the above, participant is not eligible.

    Please refer to appropriate clinic eg VVF clinic . If no, obtain

    informed consent from the participant

    3. Has patient consented to participate in the study?   ☐   ☐

    If yes, please assign a study now eg MOP001

Study no.   ....

SECTION B : Patient demographics

I. Age in Yrs   ☐☐

2. Parity   ☐ + ☐

3. If parous ,duration after last delivery   ☐☐ years

4. Marital status

    a.   Single ☐

    b.   Married ☐

    c.   Divorced/separated ☐

    d.   Widowed ☐

5. Level of education

    a.   Non ☐

    b.   Primary ☐

    c.   Secondary ☐

    d.   Tertiary ☐

6. Occupation

    a.   Student ☐

    b.   unemployed ☐

    c.   Formal employment ☐

    d.   Casual labourer/Wage earner ☐

    e.   Peasant farmer ☐

    f.   Self-employed/Business person ☐

SECTION C : Incontinence symptoms

7. Do you experience involuntary loss of urine? ☐ ■

8. Do you leak urine when coughing, sneezing, laughing &/or lifting heavy items? ☐ ■

9. Is leakage preceded by sudden and strong urge to void? ☐ ■

SECTION D : Severity

10. how often do you experience urinary leakage?

   1. Less than once a month ☐

   2. A few times a month ☐

   3. A few times a week ☐

   4. Every day and/or night ☐

11. How much urine do you lose each time?

   1. Drops ☐

   2. More than drops ☐

      - Interpretation of severity   (please do not fill in this question)

         o Slight (1 – 2) ☐

         o Moderate (3 – 4) ☐

         o severe (6 – 8) ☐

12. Have you consulted a healthcare provider about your symptoms?

      Yes ☐   no ☐

   If yes, what level of facility was it?

   1. dispensary ☐

   2. health centre ☐

   3. hospital ☐

   4. private clinic ☐

Name/Sign. of interviewer: _____   Date of interview _____

┌─────────────────────────┐
│   THE END THANK YOU   │
└─────────────────────────┘

Ref: KNH-ERC/ A/535

Dr. Charlotte S. Kaliti
Dept.of Obs/Gynae
School of Medicine
University of Nairobi

Dear Dr. Kaliti

RESEARCH PROPOSAL: "FEMALE URINARY INCONTINENCNE: PREVALENCE, SEVERITY AND HEALTHCARE PROVIDER CONSULTATION RATE AMONG OUTPATIENTS AT KENYATTA N. HOSPITAL" (P291/10/2009)

This is to inform you that the KNH/UON-Ethics & Research Committee has reviewed and **approved** your above revised research proposal for the period 19th July 2010 to 18th July 2011.

You will be required to request for a renewal of the approval if you intend to continue with the study beyond the deadline given. Clearance for export of biological specimens must also be obtained from KNH/UON-Ethics & Research Committee for each batch.

On behalf of the Committee, I wish you a fruitful research and look forward to receiving a summary of the research findings upon completion of the study.

This information will form part of the data base that will be consulted in future when processing related research study so as to minimize chances of study duplication.

Yours sincerely

PROF A N GUANTAI
SECRETARY, KNH/UON-ERC
c.c.   Prof. K. M. Bhatt, Chairperson, KNH/UON-ERC
        The Deputy Director CS, KNH
        The Dean, School of Medicine, UON
        The Chairman, Dept of Obs/Gynae, UON
        The HOD, Records, KNH
        Supervisors: Prof. J. B. Oyieke, Dept.of Obs/Gynae, UON
                    Dr. Z. Qureshi, Dept.of Obs/Gynae, UON