Impact of Urinary Incontinence on Physical Performance and Quality of Life (QOL) among a Group of Elderly in Cairo

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ABSTRACT

Objectives: Urinary incontinence (UI) is a common disorder that particularly affects the elderly population worldwide. UI can be associated with poor quality of life (QOL) in this vulnerable population, as it leads to limitation in both their physical and social activities of daily life. Additionally, it has a psychological and economic burden on individuals, health care services and society. This study was performed to measure the frequency of UI among the elderly and to determine its impact on the overall QOL, physical performance and activities of daily living.
Participants and Methods: A cross-sectional study was performed in four Primary Health Care centres (PHCs) of El-Obour City. Data collection was done weekly on randomly chosen days. All elders aged 60 or above, who attended the PHCs on those days, were included.
Results: The overall frequency of UI was 38% among the studied elderly. UI ranged from mild (12.3%) to moderate (57.9%) and severe (29.8%). Among incontinent participants, the frequency in men was 47.4% and in women was 52.6%. The frequency of stress, urge, mixed and other UI were 7%, 33.3%, 40.4% and 19.3% respectively. Incontinent elderly had significantly lower QOL as regards mental and physical indices than their continent counterparts. UI severity was inversely related to physical performance.
Conclusion: UI has a high-frequency rate among the elderly population, and has a significant impact on all aspects of QOL especially their physical performance.

Keywords: Urinary Incontinence, ICIQ, Physical Performance, Quality of Life, elderly.

What is already known about this topic?

The prevalence of urinary incontinence (UI), affects approximately 30% of the elderly population of several countries such as United States, Spain, Norway and Brazil. (Menezes et al, 2015).

Population-based estimates of the prevalence of UI among elderly subjects (60 years and over) was 47.6% for women and 14.5% for men in Japan. UI is increasingly recognized as a health and economic problem that affects the physical, psychological, social, and economic well-being of individuals and their families and poses a substantial economic burden on health and social services (kikuchi et al, 2007).

Community-based studies in UK indicate that approximately 6% of the population, particularly women and older people, will have urinary incontinence of sufficient severity to interfere with their quality of life. This represents a significant demand for health care. (Cheater, F.M. and Castleden, C.M., 2000)

Altaweel, W. and Alharbi, M., 2012 performed a clinic-based cross-sectional survey and 6,600 Saudi women aged 20 years and older were selected. It showed that the overall plrevaence of urinary incontinence in their study was 29%. The prevalence of urinary incontinence according to its type was 50% stress urinary incontinence, 28% urgency urinary incontinence, and 22% mixed urinary incontinence. Older age, obesity, large baby birth weight, high parity, caesarean delivery, vaginal delivery, and diabetes were significant risk factors. Less than 10% of the women in this study reported a significant effect of urinary incontinence on their HRQL. In their study population, 9% sought medical care.

The exact magnitude of the problem of urinary incontinence (UI) in Egypt is not yet reported and there have been few researches that explored the relationship between UI and HRQOL in Egypt but El−Azab et al, 2007 carried out a cross−sectional, community−based study in Assiut, Upper Egypt which included 1,652 women aged 20 years and older selected randomly from the population

revealed that the prevalence of urge, stress and mixed incontinence, mutually exclusive of each other, was 15%, 14.8%, and 25%, respectively. The prevalence of severe incontinence is 8.4%. Regarding the quality of life, the most distressing issues for sufferers were their inability to pray (90%).

The prevalence of physical inactivity also increases with age, affecting 46.5% of the elderly population worldwide, being considered one of the major public health problems of modern society. It was observed that the level of scientific evidence on the influence of physical activity on urinary incontinence is still undefined and bidirectional where UI can cause physical inactivity and vice versa.. Furthermore, the increase in the frequency and severity of urinary incontinence can result in social isolation, contributing to the belief that UI is a barrier to the practice of physical activity. (Menezes et al, 2015).

A study carried out in Brazil by Menezes et al, 2015 revealed that older women with more frequent urinary incontinence had lower levels of physical activity, i.e., the frequency of urinary loss can be a factor that influences the low levels of physical activity in older women. Physical activity, influenced by several factors (determinants), can also be influenced by the frequency of urinary loss possibly due to the impact that UI has on the daily life of these individuals. A study in Japan which was carried out by H Lee, A. and Hirayama, F., 2012 on 700 men and 300 women (mean age 66.2, SD 7.7 years) who were recruited from the community in middle and southern Japan showed that the prevalence of UI was 7.2% (n = 49) among the 683 eligible male participants and 27.5% (n = 82) among the 298 female participants, who had experienced urine leakage for 2.6 (SD 1.9) years and 4.2 (SD 5.1) years, respectively. Habitual walking levels were lower among incontinent subjects than others without the condition.

What does this article add?

Except for a few epidemiological studies, there is a lack of data about impact of urinary incontinence on the level of physical performance and QOL in elderly population. Thus, this study was performed to compare the physical performance and daily activity between incontinent and continent elders of both sexes, determine the impact of urinary incontinence and describe the relationships between incontinence status (severity and frequency) and physical performance as well as daily activity level.

INTRODUCTION

The International Continence Society (ICS) applied a definition of urinary incontinence (UI), which is uncontrollable urinary leakage. Major types of UI include stress, urge, and mixed UI. Stress urinary incontinence (SUI) is the involuntary urine loss on effort, exertion, sneezing or coughing. Urge urinary incontinence (UUI) is the involuntary leakage accompanied or immediately preceded by an intense desire to void. Mixed urinary incontinence (MUI) is the combination of both stress and urge UI symptoms [(1)].

Urinary incontinence is a common condition in the general population particularly in the elderly. There is a recognized difference between the number of individuals who reported UI and the number of those who seek help. Reluctancy to seek clinical solutions might be due to the perception of incontinence as a taboo or because urinary leakage may not be significantly interfering with an individual's daily life. Studies to support either view are scarce [(2)]. Although older age was found to be one of the significant risk factors for UI [(1)], as shown by a few studies which have been carried out in Egypt to estimate the prevalence of UI particularly among the elderly population. However, many studies considered that UI is primarily affecting women and estimated its prevalence among them. ***El-Azab et al.*** [(3)] carried out a cross-sectional, community-based study in Assiut, Upper Egypt on women aged 20 years and older.

It revealed that the overall prevalence of UI was 54.8 %. The prevalence of urge, stress and mixed incontinence, mutually exclusive of each other, were 15%, 14.8%, and 25%, respectively. The prevalence of severe incontinence was 8.4%. The most bothering issue for sufferers was their inability to pray (90%). The prevalence of urinary incontinence in Saudi Arabia, according to its type, was 50% stress urinary incontinence, 28% urgency urinary incontinence, and 22% mixed urinary incontinence [(1)].

UI prevalence among the elderly population (60 years and above) was 47.6% among women and 14.5% among men in a population-based survey in Japan [(4)].

It is worth mentioning that the prevalence of physical inactivity also increases with age; (46.5%) of the elderly population worldwide, being considered one of the challenging public health problems of modern society. It was noticed that the scientific evidence of the influence of urinary incontinence on physical activity is still undefined and bidirectional. Whereas, the increase in frequency and severity of urinary incontinence might result in social isolation, contributing to the belief that UI is a barrier to the practice of physical activity [(5)]. A study carried out in Japan showed that habitual walking levels were lower among incontinent participants than their continent counterparts. The study found that the prevalence of UI also decreased with total and moderate activity levels [(6)].

Aforementioned, UI is a recognized health problem that affects the physical, psychological, social, and economic well-being of individuals and their families; leading to economic burden on health and social services. Moreover, there are a few community-based studies that estimate the prevalence of UI particularly among the Egyptian elderly population of both sexes and investigate the impact of urinary incontinence on the level of physical performance and QOL. Thus, this cross-sectional study was performed to compare the physical performance and QOL between incontinent and continent elders of both sexes, determine the impact of urinary incontinence and describe the relationships between incontinence status (severity and frequency) and physical performance together with QOL.

METHODS

A cross-sectional study was conducted in El-Obour city, one of the new urban areas in Greater Cairo. The study included elders of both sexes (aged 60 and above) attended the four PHCs of the city (El-Mostakbal, El-Shabab, El-Hay El Awal and El-Tarfehy Family Medicine centres) in the period from the end of November 2018 to until the end of July 2019. They were recruited in randomly chosen days every week. The sample size was calculated using PASS 11.0 based on an alpha error at 5 % and confidence interval width at 0.15, according to a previous study finding carried out by ***Kikuchi et al.*** [(4)] which showed the prevalence of UI was 25%.

This yields a sample of 126 elderly. The sample size was increased to 150 participants to cover missing data and non-response. Participants with the following criteria were excluded:

1- Demented patients by Mini-mental State Examination (MMSE).

2- Patients who are dependent on Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL).

3- Elders who are incapable of walking 50 meters independently.

4- Elders who had a history of stroke or depression.

<u>All study participants were subjected to:</u>

1- **An interview questionnaire** modified and adapted from Radwan et al., 2019, which included Socio-demographic data (age, gender, education, occupation, income, marital status, etc.), special habits of medical importance e.g. smoking, medical history, family history, previous surgical operations and regular medications.

2- **Full clinical examination including a** general physical examination (heart rate, respiratory rate, arterial blood pressure, etc.), cardiovascular examination (e.g., rales, pedal oedema), abdominal examination (bladder percussed for distention that would indicate overflow) and the extremities was examined for joint mobility and function (functional incontinence).

3- **Anthropometric Measurements:** Weight was measured by a digital scale. Standing height was measured in a stretch stature using a stadiometer or a measuring tape. Body mass index (weight/height "m^2") was calculated.

4- **Comprehensive geriatric assessment that included** a) General examination, as mentioned before, for fulfilling inclusion and exclusion criteria. b) Cognitive function *by the* Arabic version of the *Mini-Mental State Examination (MMSE)* [(7)]**.** The cutoff point established for normal cognitive function is usually set at 24. c) Arabic version of Geriatric Depression Scale (GDS 5)**,** which was recommended to be used in all Arabic speaking countries to detect depression and evaluate its severity in older adults.

5- **Daily activities assessment** using the valid Arabic version of ADL and IADL. They indicate how a person is performing at present**.** ADLs are self-care activities that a person performs daily (e.g., eating, dressing, bathing, etc.) and IADLs are activities needed to live independently (e.g., doing housework, preparing meals, taking medications properly, etc.). For ADL, the total score ranges from 0 to 6. For IADLs, score ranges from 0 to 8 in females and 0 to 5 in males to avoid gender bias [(8)].

6- **Assessment of urinary incontinence** using the valid Arabic version of ICIQ-UI SF [(9)] *to* determine the prevalence, severity and types of UI. ICIQ consists of 6 items. The first and second items are demographic and unscored. The final item is a self-diagnostic item which is also unscored. The total score ranges between 0-21 and is calculated as the sum of responses to 3 questions (Item 3, 4 and 5). The higher the score, the greater the degree of incontinence [(10)].

7- **Assessment of quality of life (QOL) using SF-12 questionnaire, which** contains 12 items adapted from the SF-36 and derives two summary scores - a physical component summary

(PCS) and a mental component summary (MCS). Translation of the original SF-12 questionnaire to Arabic was done by ***Al-Shehri et al.*** [11]. The scoring system used for scoring of the SF-12 questionnaire was based on the scoring of SF-36 from Ware and Colleagues [12].

8- **Physical performance** measured by Short Physical Performance Battery (SPPB), which is an objective assessment tool first described in 1994 [10] that provides specific information regarding lower extremity function in elderly [14]**.** The SPPB is calculated from three components: the ability to stand for up to 10 seconds with feet positioned in three ways (together side-by-side, semi-tandem and tandem); time to complete a 3-m or 4-m walk; and time to rise from a chair five times. Each of these components has a score ranging from 0 to 4 [15]**.** The scores range from 0 (worst performance) to 12 (best performance). The time taken to perform the test is reasonably quick, and in terms of equipment, it only requires the use of a chair and a stopwatch.

9- **Lab investigations**

Urine analysis to detect possible urinary tract infections, **Hb level** (gm/dl) to detect moderate to severe anaemia with a reduced haemoglobin level below 10 gm/dl that may lead to less oxygen-carrying capacity of the blood to skeletal muscle and impairment of physical performance by hemoglobinometer**, Random Capillary Blood Glucose (RBS)** by Glucometer, as an elevated blood glucose level may be associated with an increased risk of developing urinary incontinence.

Data management:

1- **ICIQ-SF:** The ICIQ-SF total score is calculated as the sum of responses to 3 questions related to frequency, amount of leakage together with the impact of UI on QOL (Item 3, 4 and 5). The included study participants were classified into 2 groups according to their continence status using the ICIQ-SF total score. The 2 groups included continent (Total ICIQ score=0) and incontinent group (Total ICIQ score=1 to 21). Concerning UI severity, the incontinent group was further classified into 3 categories; mild (total ICIQ score =1-7), moderate (total ICIQ score =8-14), severe UI (total ICIQ score =15-21). The frequency of each degree, among incontinent participants, was measured.

2- **SPPB tests:** The SPPB tests included 3 components; balance (0-4), gait (0-4) speed and chair test (0-4). SPPB total score was categorized into 3 groups; (0-6) group, (7-9) group and (10-12) group considering (0-6) the group with the least physical performance, while (10-12) group had the highest physical performance.

3- **SF-12 questionnaire**: Its answers were analyzed to give rise to two summary scores; Physical Composite Summary (PCS) and Mental Composite Summary (MCS). The scoring system used for scoring of the SF-12 questionnaire was based on the scoring of SF-36 from Ware and colleagues. A weighted number was given to each physical and mental item of the SF-12 questionnaire. Using specific calculations, the mean physical composite score (PCS) and the mental composite score (MCS) were then derived [11]. These means were used as measures of physical QOL and mental QOL and were subsequently used for comparing QOL between the continent and incontinent groups.

4- **ADL and IADL:** Individuals were classified, according to their scores, into a dependent or low function (score=0), independent or high function (maximum score) and assisted (score=1-5 for ADL, 1-4 for male IADL or 1-7 for female IADL) [8].

5- **BMI** was calculated using the measured weight and height (weight "kg" /height "m^2"), then it was classified into; below average (<18.5), average (>18.5-25), overweight (>25-30) and obese (>30).

6- **Capillary Hb level** was done by haemoglobin-meter, and its values were classified into mild (>10-10.9gm/dl), moderate (7-9.9 gm/dl) and severe anaemia (<7 gm/dl).

7- **Microscopic examination** was done for each urine sample to detect pus cells number, and then participants were classified into 2 groups; Normal/negative pyuria (0-5/HPF) and positive for pyuria (6-10/HPF or more).

Statistical analysis:

Data were coded, entered and analyzed using SPSS version 20 (Statistical Package for Social Science). Data were presented as qualitative (number, percentage) and quantitative (mean, standard deviation). Chi-square test was used to compare qualitative variables. A student t-test was used to compare quantitative variables between the two groups. ANOVA test was used for more than two quantitative groups. Pearson correlation was done to measure the correlation between quantitative variables. P-value was considered statistically significant when $P \leq 0.05$.

Ethical consideration:

Informed consent was obtained from all participants before taking part in the study. Informed consent ensured confidentiality, the anonymity of questionnaires and freedom to withdraw at any time from the study. The protocol of this study was approved by the Faculty of Medicine Ethical Committee Ain shams University

RESULTS:

The overall urinary incontinence frequency was 38% (95% CI: 30.62% - 45.98%). Among 57 participants who had UI, there were 30 women (52.6%) and 27 men (47.4%). There was no statistically significant difference between male and female participants in the frequency of UI **(Table 1).** The educational level was significantly lower in the incontinent group than in the continent group ($p<0.05$). However, chronic chest disease, chronic liver disease and abdominal surgery were significantly higher among incontinent participants. The urine analysis results revealed that the frequency of pyuria was significantly higher among the incontinent group (66.7%) than the continent group (48.4%) P-value=0.029***.** Otherwise, no significant difference was observed between the 2 groups **(Table 1).** Urinary Incontinence severity ranged from mild (12.3%) to moderate (57.9%) and severe (29.8%) **(Figure 1).** Regarding UI types, the frequency of stress UI, Urge UI, Mixed UI and other UI were 7%, 33.3 %, 40.4% and 19.3 % respectively (**Figure 2).**

There was a statistically significant difference between a continent and incontinent groups in the 3 different domains of SPPB tests (balance, gait and chair test scores), their total score and SF-12 scores with its 2 components (PCS and MCS)**.** In other words, the continent group scored higher in all domains of SPPB, which means they have better lower extremity function than the incontinent group. Additionally, the continent group has a better quality of life as regards its physical and mental components compared to the incontinent group **(Table 2)**. A significant negative correlation was found between the previously mentioned scores and the participants' ICIQ total score **(Table 3).**

Regarding IADL classification, independent participants were more frequent among the continent group (79.6%) than incontinent (61.4%)**.** Regarding ADL classification, independent participants were more frequent among the continent group (96.8%) **(Table 4)**.

Regarding RBS values of diabetic participants, there was no statistically significant difference between continent (Mean=195, SD=68) and incontinent participants (Mean=203, SD=58) **(Table 5)**.

There was a statistically significant difference between a continent and incontinent participants regarding QOL with its physical and mental components. Participants with good physical and mental QOL were more frequent in the continent group **(Table 6).**

DISCUSSION

In the studied sample 38% (95% CI: 30.62% - 45.98%) of elderly had UI. In other words, the problem of UI approximately affects two in five elderly individuals attending PHCs in El-Obour City, with greater occurrence in those with low educational level, chronic chest disease, chronic liver disease and urinary tract infection.

Studies in Egypt and Arab countries that estimated UI frequency particularly among elderly regardless their gender are limited. Most authors only investigated UI among women of different age groups. They justify this type of studies by the fact that UI is a health problem that primarily affects women because pregnancy, parity, menopause, previous gynecological surgery and the structure of the female urinary tract are among the major risk factors that account for developing UI [3,16,17, 18, 19]. ***Elserafy et al.*** [16] revealed the UI frequency was 67% among elderly women attending a rural family health centre in Gharbiya Governorate, Egypt. ***Fouad et al.*** [17] reported a very high frequency as the majority (84%) of the women recruited from two of elderly homes in Alexandria had UI.

Population studies from many countries revealed that the prevalence of UI ranged from approximately 5% to 70% [20] with most studies showing a prevalence of any UI ranging from 25% to 45% [21]. They reported that these enormous variations are found not only between different countries but also between studies within the same country. They explained that most studies did not consider age-standardized rates. Therefore, a meaningful comparison is largely precluded. They justify variation in true prevalence rates between countries by cultural differences in the perception of UI and willingness to report UI, as well as methodological differences, including the wording of questionnaire items, the method of administration of questionnaires, and most importantly, with differences in case of definitions applied.

Some studies reported approximate frequency to this study result as seen in a study conducted in Brazil by ***Borges et al.*** [22]. They showed that UI prevalence was 43% among institutionalized elderly. Another survey in Japan showed that the overall prevalence of UI among the elderly was 30.5% [4].

In the present study, the overall frequency of UI may be considered lower than some published studies such as some community-based studies in Alexandria. The prevalence of UI in Egypt was estimated to be 49.6% during the year 2006 [23].

The estimated frequency in our study, which was lower than others, maybe because urodynamic studies reveal that UI frequency is under-estimated when the assessment is only based on symptoms or self-reported questionnaires as used herein. Feeling of shame and the common belief among patients and some physicians that UI is a normal or inevitable consequence of the ageing process may make them ignore the problem. As a result, many patients don't look for clinical solutions to improve their quality of life, which can be significantly affected by this neglected disorder.

On the other hand, the frequency of UI in the current study was higher than in other studies. A population-based, cross-sectional survey (EPIC) conducted by ***Mourad et al.*** [24] with a random sample of adults aged ≥18 years in Egypt revealed that the overall UI frequency was 21%. This difference might be justified by the fact that UI increases with age, and the age group in ***Mourad et al.*** [24] study includes younger people. ***Sidik*** [25] found that the prevalence of UI among the elderly in a rural community in Malaysia was 9.9%.

As regards gender difference in UI frequency, the current study showed higher frequency in women than men, but it wasn't statistically significant as seen in ***Borges et al.*** [22] study. In contrast to some studies that reported a significant difference between males and females in UI frequency [4, 6, 26]. A study in Kuwait showed the prevalence of UI was approximately twice more in women (49.3%) than in men (22.2%).

Regarding educational level, UI was significantly higher among the less educated group (illiterate participants and those who can only read and write). This is similar to ***Ateskan et al.*** [27] who found that UI was more prevalent among illiterate elderly who could only read and write. In the same line, ***El-Azab et al.*** [3] showed that low educational level was significantly associated with UI.

This might be justified by a finding revealed by a study in Assuit carried out by ***Shaker et al.*** [28], who found that there was a statistically significant relationship between the educational status of elderly participants and their knowledge level ($P<0.001$), this may explain that well educated elderly had good awareness and health information regarding their disease including urinary incontinence. This also agrees with ***Kessler et al.*** [29] who reported that schooling years of elderly participants and their knowledge level are significantly related ($P=0.002$). Aforementioned, educated people are more aware and seek help as early as possible in contrast to illiterates.

The current study showed that UI was significantly more frequent in patients with chronic liver disease (CLD), including chronic hepatitis C (HCV) infection than those without the condition. This observation can be explained by a review by ***Frith and Newton*** [30] who stated that autonomic dysfunction (AD) in patients with CLD has prevalence as high as 67%, and AD may include UI. The review assumed that AD in CLD is impaired by many immunological and pathophysiological changes including electrolyte disturbance. The literature revealed that 14% of pre-transplant patients had to use incontinence pads. This AD can be also presented by urinary frequency, hesitation or retention, and the consequences of which include urinary tract infections that may contribute more to UI. Moreover, UI is exacerbated by commencing those patients on diuretics used in cirrhotic ascites due to portal hypertension.

Regarding urine analysis results, pyuria, a sign of UTI, was detected when there were 6-10 or more pus cells per HPF. The presence of pyuria was significantly associated with UI. This observation was in concordance with the study of ***Elserafy et al.*** [16]**,** which reported a significant association between UI among elderly women and urinary tract infection (odds ratio = 6.07). Another study by ***Hester et al.*** [31] explored the etiopathology of common causes of incontinence in elderly male patients and its analysis showed that UTI was one of the non-neurologic etiologies leading to UI.

UI was more common in studied participants suffering from chronic chest disease, including chronic obstructive(COPD) and bronchial asthma. This finding went in agreement with ***Cho et al.*** [32] study conducted in the UK, which stated that it might be because a cough leads to increased intra-abdominal pressure, thus a chronic cough may increase the incidence of stress urinary incontinence. Additionally, a study ***Reichman et al.*** [33] stated that although the abdominal and pelvic floor muscles are usually strong enough, sometimes they can't keep up with intense, prolonged coughing. ***Kuchel and DuBeau*** [34] stated that cough caused by pulmonary disease affects urethral closure, and this is considered one of the comorbid conditions that cause or worsens UI in older persons.

Regarding the subtypes of UI, this study revealed that the mixed UI was the most frequent type among incontinent elderly (40.4%) followed by urge UI (33.3%), while stress UI was the least frequent type (7.0%). These findings were consistent with a study conducted by ***El-Mowafy et al.***[35] in Port Said, which found that the prevalence of mixed, urge, and stress UI was 68.6%, 24.1% and 7.3%, respectively [35]. ***Mourad et al.*** [24] ***and El-Azab et al.*** [3] surveys showed that mixed UI was the most prevalent, but stress UI was the least frequent type. In contrast, a survey carried out by ***Altaweel and Alharbi*** [1] revealed that stress UI was the most prevalent type (50%), and mixed UI was the least frequent type (22%). This difference can be justified, as more than three-quarters of their study population were middle-aged women, and the mean age of the whole study subjects was 30 years. Also, the prevalence of stress UI peaks in the middle age and then starts to decline, but the prevalence of both mixed and urge UI continues to increase with age.

The mean SF-12 physical index was significantly higher (42.91) among continent than incontinent (38.80), while values of the mental index were 47.42 and 43.56 respectively. Also, the current study revealed that there was a significant negative correlation between the degree of severity of UI, according to ICIQ total scores, and QOL scores with its physical and mental components. These results provide an important perspective on the impairment of QOL in elderly with UI when compared to their counterparts without the condition.

Similar results were reported by a study carried out at the "Family health centre" at the sixth of October City by ***Mohammed et al.*** [36] who investigated QOL of women with UI. This goes in the same line with ***Ünsal et al.*** [37] who found that many aspects of a patient's life are impaired, including psychological well-being, social interactions, physical activities, sexual and interpersonal relationships. The researcher reported that UI affects social life, resulting in restrictions regarding going to public places, travelling and even visiting friends. Another study was performed in a research hospital in Turkey on admitted patients of both sexes above 40 years showed congruent results. Quality of life was assessed using the Incontinence Impact Questionnaire (IIQ-7). It revealed that patients who suffered from UI showed significant deteriorations in their QOL. Frequency and severity of UI were negatively associated with the QOL scores.

In contrast, ***Altaweel and Alharbi*** [1] survey revealed that less than 10% of the studied women reported a significant effect of urinary incontinence on their QOL. This might be because most women in this survey thought that UI is a part of normal life, whereas others thought their UI was not too severe or frequent enough to make them require treatment or even seek help.

When different types of UI were compared regarding physical and mental components of SF-12, it was found that patients experiencing mixed UI had the least SF-12 physical index (36.86±7.02), while stress UI was associated with lower SF-12 mental index (37.8 ±13.56). A similar result was revealed by ***Mohammed et al.*** [36] who found that individuals with mixed UI were more affected concerning their QOL than those with the other types of UI. This can be explained as individuals with mixed UI simultaneously suffer from symptoms of both stress and urge UI. Consequently, this doubles the burden of the problem on an individual's life.

The study results indicated that older adults with UI had significantly worse overall physical function as well as each SPPB component, including balance, gait speed and chair tests.

Reduced physical function measured by the SPPB is associated with increased risk of future disability and can affect mobility, activities of daily living, and quality of life in older adults [38]**.** This study did not involve a longitudinal follow-up. As a result, these findings can support the reverse hypothesis, which assumes that physical activity and high level of physical function, prevent the occurrence of UI because it is difficult to say that UI affects physical function. Therefore, the opposite can be stated [39, 40]. Additionally, a cross-sectional observational study in Spain concluded that sedentary life predisposes older people to develop UI [41]**.**

On the other hand, a study by ***Erekson et al.*** [42] justifies how UI patients are physically affected by stating that incontinent women reduce physical activity due to the fear of accidental urine loss and, consequently, there is an increase in functional limitations. Another study carried out by ***Menezes et al.*** [5] showed that older women with urinary incontinence had lower levels of physical activity. Physical activity may be affected by several determinants such as frequency of urinary loss possibly due to the impact of UI on daily life.

CONCLUSION

In light of these study findings, it can be concluded that urinary incontinence is a highly prevalent problem among the elderly population of both sexes. Physical and mental components of QOL are significantly affected by the presence of UI. This might be due to the impact that UI has on the daily life of those individuals. Moreover, the severity of the urinary loss is inversely related to QOL and physical performance scores. Low educational level, chest diseases, chronic liver disease and UTI are significant factors associated with urinary incontinence.

Limitations of the study:

In a cross-sectional study as seen herein, it is not possible to assess the temporal relationship of UI with poor physical performance, low level of daily activity and low QoL as well.

RECOMMENDATIONS

1- Continuous assessment of all QOL domains for elderly with urinary incontinence should be a part of the geriatric care.
2- Special considerations should be provided to the elderly with low educational level, chest diseases, chronic liver disease and UTI who are the most affected individuals.
3- Management plans and strategies must be set up by policymakers in geriatric health care facilities to treat UI and prevent its impact on the physical and mental health of this vulnerable population.
4- Carrying out longitudinal surveys to identify the causal relationship between UI and physical function, which was found to be significant yet undefined.

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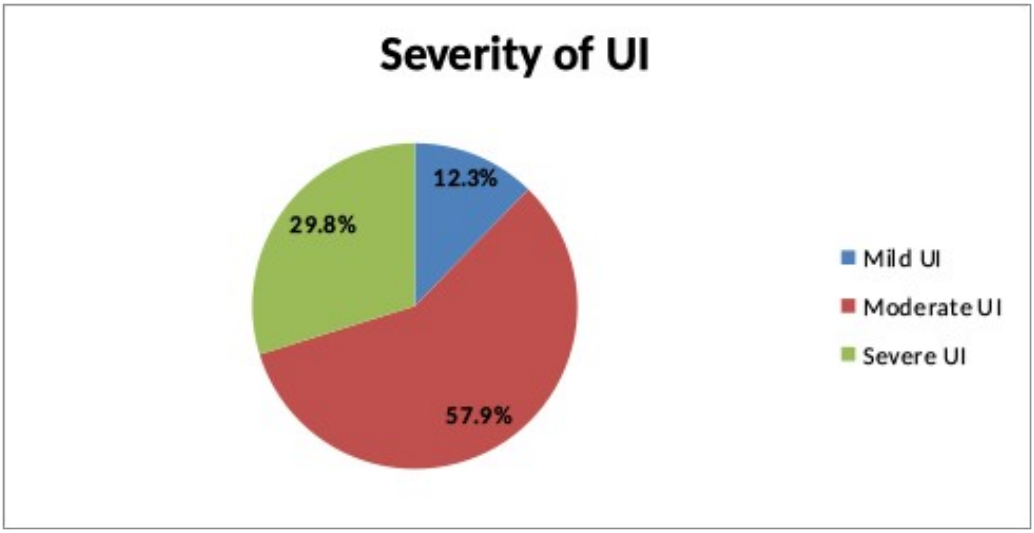
Table (1): Characteristics of study participants according to their urinary continence status:

		Continent participants (N=93)		Incontinent participants (N=57)		Student t-test	P-value
		Mean	**SD**	**Mean**	**SD**		
Age		64.17	3.77	64.77	4.375	0.889	.375
		N	**%**	**N**	**%**	**Chi-square**	**P-value**
Gender	Males	57	61.3%	27	47.4%	2.780	.095
	Females	36	38.3%	30	52.6%		
Marital status	Married	78	83.9%	38	66.7%	5.97	**0.015***
	Divorced/ Widow	15	16.2%	19	33.3%		
Education	Illiterate	24	25.8%	22	38.6%	9.801	**0.02***
	Read and write	13	14.0%	15	26.3%		
	Secondary education or less.	36	38.8%	15	26.3%		
	University or higher	20	21.5%	5	8.7%		
Current smoking	Non-smokers	67	72.0%	43	75.4%	0.208	0.648
	Smokers	26	28.0%	14	24.6%		
BMI categories (By examination)	Normal (18.5-25)	11	11.80 %	4	7.00%	1.707	0.426
	Overweight (>25-30)	42	45.20 %	23	40.40 %		
	Obese (>30)	40	43.00 %	30	52.60 %		
Chronic diseases	DM and its complications	37	39.80 %	27	47.40 %	0.831	0.362
	Cardiovascular diseases	40	43%	30	52.60 %	1.314	0.252
	Chest diseases	4	4.30%	9	15.80 %	5.893	**0.015***
	HCV / Chronic liver disease	6	6.50%	12	21.10 %	7.135	**0.008***
	BPH /Urinary tract stones	11	11.80 %	8	14%	0.156	0.693
	Bone and Joint diseases	11	11.80 %	11	19.4	1.576	0.209
Urine analysis (microscopic examination)	Pyuria	45	48.40 %	38	66.70 %	4.778	**.029***
Surgical operation	Female pelvic surgery	11	11.80 %	10	17.50 %	0.959	0.327

	Abdominal surgery	19	14.00 %	17	29.80 %	5.546	**0.019***
Regular medications	Antihypertensive	29	31.20 %	22	38.60 %	0.866	0.352
	Antidiabetic	33	35.50 %	24	42.10 %	0.658	0.417
	B2agonist inhaler	0	0.00%	3	5.30%	4.995	**0.025***

***Statistical significant at P (0.05)**

CVS diseases (hypertension, dyslipidemia and ISHD), Chest diseases (COPD and BA), Pyuria (6-10 or more pus cells/HPF), Bone and Joint diseases (osteoarthritis, osteoporosis, rheumatoid arthritis, etc), Female pelvic surgery (cesarean section, hysterectomy, ovarian cystectomy, etc), Abdominal surgery (appendectomy, cholecystectomy, exploration, hernia, etc)Anal surgery (hemorrhoidectomy, lateral sphincterotomy), Cardiac surgery (open heart surgery, PCA, PCI and valve replacement).



Mild UI: ICIQ score = (1-7), Moderate UI: ICIQ = (8-14) and Severe UI: ICIQ = (15-21)

Figure (1) Frequency of urinary incontinence, according to its degree of severity, among incontinent participants

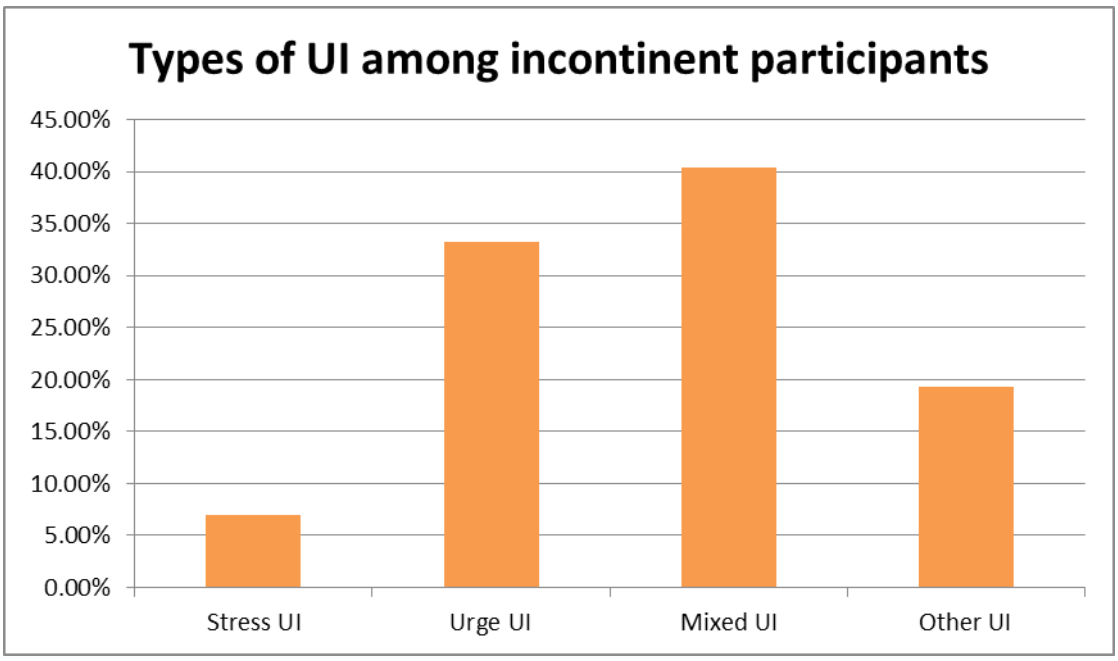


Figure (2) Frequency of urinary incontinence, according to its type, among incontinent participants

Table (2): Comparison between the continent and incontinent groups as regards their Short Physical Performance Battery Protocol (SPPBP), IADL /ADL scores and QOL components' score:

	Continent participants (N=93)		**Incontinent participants (N=57)**		**Student t-test**	**P-value**
	Mean	**SD**	**Mean**	**SD**		
1- SPPBP total score	9.00	2.36	7.47	2.25	3.91	<0.0001*
2- SPPBP balance score	3.65	0.87	3.30	0.94	2.25	0.026*
3- SPPBP gait score	2.87	0.96	2.42	0.823	2.94	0.004*
4- SPPBP chair score	2.46	1.05	1.77	1.12	3.82	<0.0001*
7-Physical health T-score-SF12	42.91	8.24	38.80	7.44	3.08	.002*
8-Mental health T-score - SF12	47.42	6.32	43.56	8.10	3.07	.003*

Table (3): Correlation of ICIQ score with SPPBP and SF-12 (PCS and MCS) scores among all participants:

Items	The correlation coefficient (Spearman)	P-value
1- SPPBP balance score	-0.186*	0.023*
2- SPPBP gait score	-0.225**	0.006*
3- SPPBP chair score	-0.321**	<0.0001*
4- SPPBP total score	-0.313**	<0.0001*
5-PCS of SF12	-0.251-**	0.002*
6-MCS of SF12	-0.265-**	0.001*

Table (4): Comparison between the continent and incontinent groups as regards their ADL/IADL classification

		Continent group (N=93)		Incontinent group (N=57)		Chi-square	P-value
		n	%	n	%		
IADL	Assisted	19	20.4%	22	38.6%	5.872	0.15*
	Independent	74	79.6%	35	61.4%		
ADL	Assisted	3	3.2%	57	100%	137.903	<0..0001 *
	Independent	90	96.8%	0	00.0%		

*Statistical significant at P (0.05)

Table (5): Comparison between the continent and incontinent <u>diabetic</u> participants regarding their Radom Blood Sugar (RBS)

	Continent <u>diabetic</u> participants (N=28)	Incontinent <u>diabetic</u> participants (N=18)	Student t-test	P value

	Mean	SD	Mean	SD		
RBS	195.21	68.29	203.17	58.33	-0.407	0.686

Table (6): Comparison between the 2 groups regarding QOL classification

SF-12		Continent group (N=93)		Incontinent group (N=57)		Chi-square	P-value
		n	%	n	%		
PCS	Poor	19	20.4%	18	31.6%	7.885	**0.019***
	Fair	49	52.7%	34	59.6%		
	Good	25	26.9%	5	8.8%		
MCS	Poor	17	18.3%	22	38.6%	8.192	**0. 017***
	Fair	46	49.5%	24	42.1%		
	Good	30	32.3%	11	19.3%		

*Statistical significant at P (0.05)