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Research Article

PREVALENCE OF URINARY INCONTINENCE IN TYPE 2 DIABETIC FEMALES AGED 20-45 YEARS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Urinary incontinence, complaint of any involuntary leakage of urine, is a hidden medical problem present in nearly 50% population. Patients perceive urinary incontinence as a significant health problem that negatively affects their quality of life. It is a sign of various conditions, including stress and urge urinary incontinence. Although female gender, parity, advancing age are recognized risk factors for incontinence, other factors like myofascial dysfunction in and around pelvic floor, diabetes mellitus may put women at risk at any age.

Method: Longitudinal cross-sectional study was conducted amongst 100 type 2 diabetic and 100 nondiabetic females to examining prevalence of urinary incontinence. 30 Incontinent diabetic females with tight piriformis and adductors were given piriformis auto stretching, adductor reinforcement technique with pelvic floor co-contraction to assess effect of these exercises on frequency of urinary incontinence on 7th, 14th & 21st day of intervention.

Results: 78% type 2 diabetic females were incontinent whereas only 35% females were incontinent in non diabetic category. Frequency of incontinence decreased from 4.4/day to 2.7/day. **Conclusion:** urinary incontinence is more prevalent in diabetic females. Piriformis autostretching and adductor reinforcement technique with pelvic floor recruitment are effective in reducing frequency of urinary incontinence in diabetic females.

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INTRODUCTION

Prevention has always been much better than cure - assuming that cure is possible once a health problem has started. Continence is a priceless and unappreciated gift until it is lost. Urinary incontinence (UI), the complaint of any involuntary leakage of urine, is a hidden medical problem present in nearly 50% of middle aged and older women. This symptom is 2.5 to 4 times more common in women than in men, yet less than half report the problem to a physician. Recent evidences show that as women gets older 69% of them will have more problem controlling their bladder⁽¹³⁾. Many of them considered it as aging problem. Despite of its high prevalence, health care professionals and public are uncomfortable with and know little about urinary incontinence. It tends receive less attention than other complication and progress of condition is often not monitored. This could be because it is not life threatening but it can be distressing.

Patients perceive urinary incontinence as a significant health problem that negatively affects their quality of life, social

relations, and occupational activities. According to estimates of the National Institutes of Health (2000), economic consequences of urinary incontinence are at a level similar to the costs associated with HIV/AIDS or breast cancer. The prevalence of at least 1 daily episode of urinary incontinence in women is about 20%. Depending on the age group, it varies from about 5–6% for women aged 18–30 years to about 40% in women over 80 years.⁽²⁾ Impairment like incontinence can devastate the lives of female and impend upon their daily functional activities and general mobility.⁽¹⁾

Urinary incontinence is a sign of various conditions, including stress urinary incontinence (SUI) (involuntary leakage on effort or exertion) and overactive bladder syndrome (OAB) (involuntary leakage accompanied by or immediately preceded by urgency).⁽²⁾

Stress urinary incontinence can result when there is loss of the anatomical integrity or neurophysiological function of the pelvic floor (muscles and fascia) secondary to a single major trauma or repetitive minor trauma. Inefficient load transfer

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strategies through low back and pelvis, particularly those which excessively increase the intra-abdominal pressure and result in the bladder and pelvic organs being repetitively compressed inferiorly, can lead to incontinence via repetitive microtrauma to the fascial supports or via altering optimal recruitment of pelvic floor muscles⁽³⁾. This type of incontinence is characterized by involuntary backing of urine on effort or incretion such as during coughing, laughing, sneezing, and lifting. Urge Urinary Incontinence is defined as backing of urine associated with a strong urge to urinate. Mixed Urinary Incontinence is a combination of stress and urge continence symptoms.⁽⁴⁾ Stress urinary incontinence represents approximately 50% of urinary incontinence cases in women. Urge urinary incontinence constitutes approximately 10–20% of cases and mixed urinary incontinence approximately 30–35%⁽⁵⁾. The prevalence of all types of urinary incontinence increases with age.

There are various causes of urinary incontinence, but exact cause is not understood. Pelvic diaphragm is the largest muscle group in the pelvic floor and is responsible for the most of the function or dysfunction of this area.⁽⁶⁾ The pelvic floor plays a significant role in effective force closure of the urethra. Optimally, pelvic floor muscles function constantly at low levels of tone and increase their activation in anticipation of load. They should co-activate with core muscles of lumbo-pelvic-hip complex for lumbo - pelvic stabilization and play a role in increasing the intra-urethral pressure.⁽³⁾

The muscle performance refers to the capacity of muscle to do work despite the simplicity of definition. Muscle performance are strength, power, endurance. If one or more of these areas of muscle performance is impaired, functional limitations and disability or increase risk of dysfunction may ensue. Many factors such as disease, inactivity and disuse may result in impaired muscle performance which is influenced by integrity of surrounding structures also.^(7,8,9) The pelvic floor must allow relaxation of myofascial support at the urogenital hiatus during voiding and parturition while maintaining the anatomic position of pelvic structures. The complex mechanics of its bimodal function and frequent insults to the integrity of the pelvic diaphragm from gravity, daily activities, and vaginal birth contribute to the pelvic musculature's vulnerability to weakness and dysfunction.⁽¹⁰⁾

Lying within the pelvic cavity are the piriformis, and obturator muscles, which are not elements of the pelvic diaphragm but may contribute to pelvic floor dysfunction when imbalanced.⁽¹⁰⁾ Identification of a myofascial dysfunction and pain in and around pelvic floor as a cause or contributing factor is a critical step in management of patients with urinary incontinence.

The most common scenario is that impairment, limitation and disabilities that result from the development and progression of chronic complication that are associated with systemic disorder like diabetes mellitus.⁽¹¹⁾ Statistics reveal that Indian will be the diabetic capital of the world with the estimated population of 57 million diabetics!⁽¹²⁾ It is a multisystem involvement which can cause various muscular complication also. Persons with diabetes are 2 to 3 times more likely to report disabilities/complications than are people with normal glucose level. Despite the escalating prevalence of these complications amongst the diabetic population, this area is frequently

neglected in the clinician settings. Although female gender, parity and advancing age are recognized risk factors for urinary incontinence other factors like myofascial dysfunction, diabetes mellitus may put women at risk at nearly all age.

Objectives

1. To examine prevalence of urinary incontinence in diabetic females.
2. To know the effect of myofascial impairment around lumbo-pelvic-hip complex in stress urinary incontinence.

MATERIALS AND METHOD

100 Type 2 Diabetic and 100 non diabetic female subjects ranging between 20-45 years were selected for finding the prevalence of urinary incontinence. Females giving positive history of lumbar PID, piriformis syndrome, post-menopausal, pelvic inflammatory conditions, urinary tract infection were excluded from the study. Also patients with diabetes induced peripheral neuropathy, pregnant females and PNC females were excluded.

All diabetic females were thoroughly assessed according to the proforma. They were questioned about type of incontinence. Urinary incontinence was defined by an affirmative response to one of the two questions: during that past month, have you ever experienced urine loss when coughing, laughing or doing any physical activity and during passed months have you ever had to pee & then wet yourself before getting to toilet? Mixed incontinence was defined as an affirmative answer to both question, stress incontinence as 'yes' to only first and urge incontinence as 'yes' to only second question

Anthropometric measures were noted to calculate BMI & they were categorized according to given classification.

Less than 18.5 - Underweight
Between 18.5-24.9- Normal
Between 25-29.9 - Overweight
Above 29.9 - Obese

Females giving positive history of urinary incontinence mainly stress and mixed urinary incontinence were thoroughly assessed for muscular impairments like piriformis and adductor tightness. Those exhibiting reduced flexibility were taught autostretching for piriformis and adductor reinforcement technique incorporated with voluntary pelvic floor muscle contraction.

Piriformis autostretching: Patient maintaining flexion, adduction and internal rotation of hip joint to stretch piriformis and obturator internus of that side.

Adductor reinforcement technique: In supine hook lying position patient is asked to press both the knees on a soft pad. Five repetition of adductor reinforcement technique with a hold period of 10 second each and rest period of 5 seconds in between were advised after every 2 hours. These females were trained to coordinate pelvic floor muscle contraction with activities of daily living. Frequency of urinary incontinence per day was noted and the comparison was done between frequency of incontinence before and after intervention 7th, 14th & 21st day.

DATA ANALYSIS AND RESULT

Data analysis was done using
 -percentage
 -chi square (χ^2)test.

RESULTS

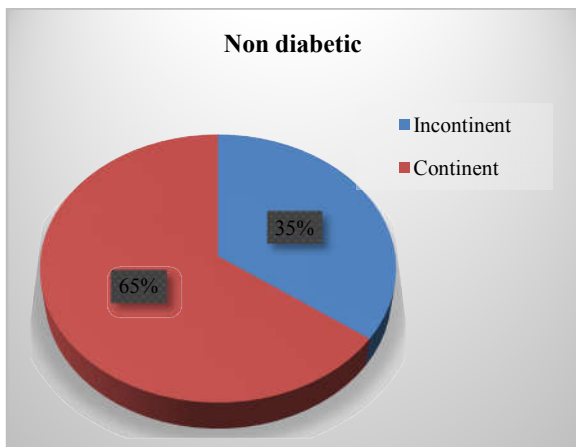
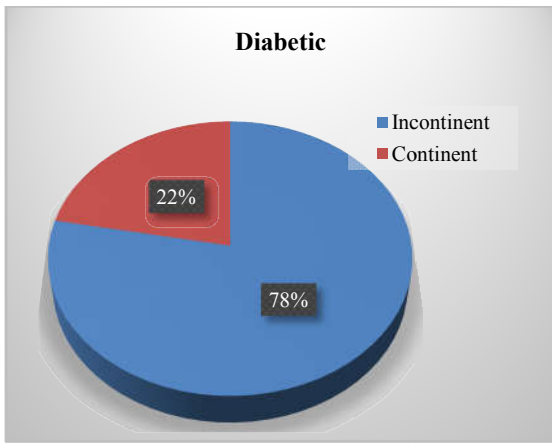
A longitudinal and cross sectional study was carried out in females in the age group of 20-45 years. Mean age of diabetic females was 38.35 and Mean age of non diabetic females: 36.69

Prevalence of Urinary Incontinence in diabetic and non diabetic patients (Refer Table 1)

Table 1 Prevalence of Urinary Incontinence in diabetic and non diabetic patients

Study group	Incontinent	Continent
DIABETICS	78	22
NON DIABETICS	35	65

$\chi^2 = 11.69$, p value < 0.0006



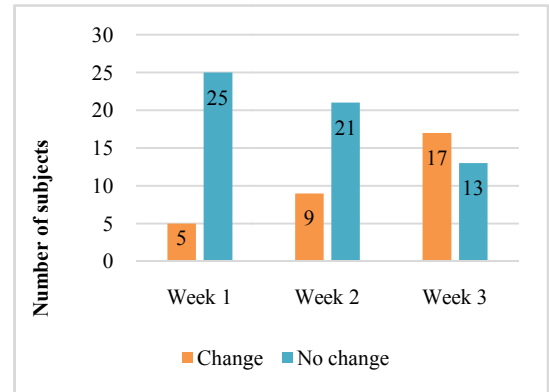
78% diabetic females showed affirmative response to urinary incontinence whereas it was only 35% non diabetic population which showed positive response to urinary incontinence.

Out of 78 incontinent diabetic females, Stress urinary incontinence was present in 23 females, urge urinary incontinence in 12 patients and mixed urinary incontinence was present in 43 diabetic females.

Incontinent Diabetic females with myofascial imbalance showing change/ no change in symptoms of incontinence with intervention. (Refer Table 2)

Table 2 Incontinent Diabetic females with myofascial imbalance showing change/ no change in symptoms of incontinence with intervention

	Duration of intervention		
	Week 1	Week 2	Week 3
Change	5	9	17
No change	25	21	13

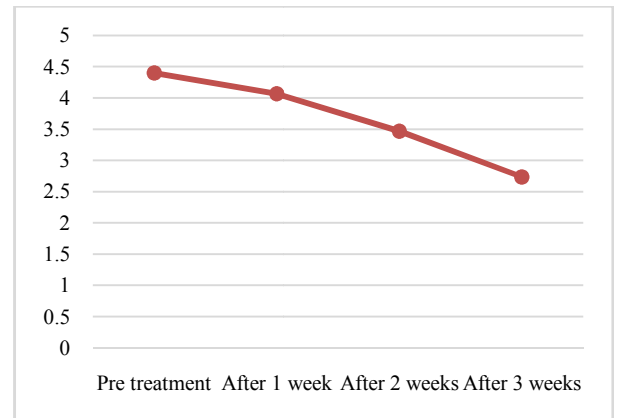


Number of diabetic females with urinary incontinence showing improvement in the symptom of urinary incontinence increased with piriformis stretching & adductor reinforcement techniques.

Frequency of stress urinary incontinence (Refer Table 3)

Table 3 Frequency of stress urinary incontinence

	Frequency of incontinence
Pre treatment	4.4
After 1 week	4.066
After 2 weeks	3.466
After 3 weeks	2.799



Frequency of urinary incontinence decreased from 4.4/day to 2.7/day.

Out of 35 incontinent non-diabetic females, 18 females were having BMI more than 24.9

44 out of 78 incontinent diabetic females were in the category of overweight and obesity according to BMI classification.

DISCUSSION

Cross sectional study was conducted to know prevalence of urinary incontinence in diabetic females. It was evident from the results that urinary incontinence was much more prevalent

in diabetic females as compared to non diabetics (78% Vs 35%) stressing the fact that diabetics are more prone to developed complications. All the exercises i.e. piriformis autostretching in supine and sitting, adductor reinforcement incorporated with pelvic floor muscle contraction advised in the present study appeared to be effective in reducing the frequency of incontinence and the improvement in frequency of incontinence was very much pronounced by the end of third week of intervention.

Diabetes mellitus is a syndrome having heterogeneous manifestation and is associated with risk of number of comorbidities like urinary incontinence. It is more common among females with diabetes; exact mechanism being unclear, but it would appear to be multifactorial in origin. Likely etiological factors are deposition of abnormal collagen in connective tissues, formation of AGEs (Advanced glycation end products) which promote cross linking, reducing elasticity and predispose tissues to shear stress and weakness, microangiopathy.^(14,15) Such diabetic microangiopathy may predispose connective tissues to become ischaemic, with resultant fibrosis and alterations in the connective tissues/collagen structures. Recent data indicate that the loss of muscle mass is not only a cause but can also be a consequence of type 2 diabetes. The loss of muscle mass, and specific type II muscle fiber atrophy leads to the loss of muscle strength. These findings imply that age-related loss of muscle mass and strength is accelerated in a type 2 diabetes state. It could be speculated that greater type II muscle fiber atrophy in the diabetic elderly could predispose to a greater loss of strength and endurance leading to various dysfunctions⁽¹⁶⁾

The pathogenesis of these complication is considered as a process that occurs in stage over years and decades. Early in the course of diabetes mellitus, functional alterations occur in these tissues that are targets of late complications. These alterations are reversible and are detectable long before the appearance of characteristics structural alterations.

Hip muscles such as piriformis, obturator internus, and adductor play an important role in enhancing supportive function of pelvic floor muscle because of their close proximity.⁽¹⁷⁾ Piriformis and obturator internus contribute in forming lateral and posterior wall of pelvic wall respectively. Inferior border of piriformis is very close to the superior border of coccygeus muscle. Also iliococcygeus, a part of levator anis closely linked with obturator internus as it originates from ascus tendinus which is the fascia covering obturator internus^(8,18). Normally pelvic floor muscles and urethral sphincter contract reflexly during various strenuous activities, as a part of preprogrammed sequence of events involving contraction of lumbo –pelvic- hip musculature also. This orchestration of events may be compromised if there is any impairment in length, strength, endurance associated with inappropriate timing of contraction. This in turn affects the quality of reinforcement provided by these muscles to the pelvic diaphragm resulting in functional weakness and impaired muscle performance. Consequently pelvic floor muscles provide less guarding / support against increased intrabdominal pressure suggesting the important role of these muscles in maintaining bladder health.

Thus, it is essential to correct these altered motion control strategies by well planned exercise programme. Piriformis autostretching, adductor reinforcement technique with pelvic floor recruitment are mild form of exercises to start the training of force closure by pelvic floor muscles.

These neuromuscular techniques help to restore optimal force closure and control of neutral zone through training of local system partially.

Overweight and obesity are becoming a worldwide health problem associated. With numerous co-morbidities. Epidemiological studies document overweight and obesity as important risk factors for urinary incontinence. While to our knowledge the mechanism of the obesity-urinary incontinence association is unknown, it is theorized that excess body weight increases abdominal pressure, which in turn increases bladder pressure and urethral mobility, leading to stress urinary incontinence and also exacerbating detrusor instability and overactive bladder. Like pregnancy, obesity may cause chronic strain, stretching and weakening the muscles, nerves and other pelvic floor structures.⁽¹⁹⁾

CONCLUSION AND CLINICAL IMPLICATION

Symptom of urinary incontinence is more prevalent in diabetic females when compared to non-diabetic females. Simple exercises like piriformis autostretching and adductor reinforcement technique with pelvic floor recruitment are effective in reducing the frequency of urinary incontinence in diabetic female patients.

Urinary incontinence remains largely a neglected problem despite the fact that it is highly treatable. Contemporary physical therapy practice includes a role of physical therapist in primary prevention i.e. interacting with clients to promote health and improve wellness before they become patients. First step towards prevention is education which provides these females with the knowledge that urinary incontinence is not merely associated with usual ageing but is the dysfunction occurring from muscular impairments. Second step would be to encourage the establishment of routing exercises protocol addressing flexibility, endurance, strength and co-ordination of the pelvic floor and hip musculature.

Thus urinary incontinence is a condition with quite amazing clinical responses to physical interventions the impact of bladder health education can be life changing.

As practitioners, our role is to enhance the lives of individuals. It is very much comforting to know that we have tools to succeed

Further studies should be done to see the long term effect of these exercises along with stabilization exercises.

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