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Effect of hypopressive exercises versus pelvic floor muscle exercises on stress urinary incontinence among multiparous women

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Abstract:
Background: Stress urinary incontinence (SUI) is most prevalent gynecological urinary disease among multiparous women. It has negative impact on various areas of the woman's life, including physical, psychological, sexual, social and occupational aspects. Many non- pharmacological methods are accessible for the management of SUI, both hypopressive exercises and pelvic floor muscle exercises are viable options for non-invasive and cost-effective modalities of management that can be employed to prevent the occurrence of stress urinary incontinence and to decrease its severity. **Aim of the study:** to determine the effect of hypopressive exercises versus pelvic floor muscle exercises on stress urinary incontinence among multiparous women. **Design:** A quasi-experimental research design was employed. **Setting**: This study was carried out at Kafr El-Sheikh General Hospital, Kafr El-Sheikh Governorate, Egypt. **Subjects**: A Convenient sample of 100 multipara women were recruited based on certain criteria. **Tools:** Data was collected using two tools namely, structured interview questionnaire and Revised Urinary Incontinence Scale (RUIS). **Results:** The study results revealed a highly statistically significant difference between total severity of stress urinary incontinence in hypopressive and pelvic floor muscle groups after 4, 8 and 12 weeks follow up of intervention, where ($p<0.000$). **Conclusion:** The current study concluded that the hypopressive group generally demonstrated a lower degree of severity regards stress urinary incontinence as compared to the pelvic floor muscle group. **Recommendations:** It is suggested that developing an awareness program pertaining to the significance and advantages of engaging in hypopressive exercises.

Keywords: Hypopressive exercises, Pelvic floor muscle exercises, Stress urinary incontinence, Multiparous women.

Introduction

Stress urinary incontinence (SUI) pertains to the unintended release of urine from the exterior aperture of the urethra during intensified abdominal pressure (e.g., sneezing, coughing, laughing, or exercising), constituting a prevalent gynecological urinary disease **(Morton et al., 2021).**

Stress urinary incontinence manifests itself as a consequence of the weakening of the pelvic floor muscles and the pelvic connective tissues which responsible for supporting the bladder and urethra. This weakening allows for the downward descent of the bladder "neck," which occurs during episodes of intense physical activity. Consequently, this descent obstructs the proper functioning of the urethra in controlling the flow of urine. Another contributing factor to SUI is the weakening of the sphincter muscle that regulates the urethra. This weakened muscle fails to impede the flow of urine during normal circumstances or instances of increased abdominal pressure. The causes of this muscle weakness may be attributed to events such as pregnancy, childbirth, the natural process of aging, or previous pelvic surgeries. Additionally, chronic coughing or straining, obesity and smoking are recognized as risk factors for SUI **(U.S. Food & Drug Administration (FDA), 2019; Urology Care Foundation, 2023).**

Pregnancy and childbirth are recognized to be factors that contribute to damage in the pelvic floor due to neural and muscular injury as well as connective tissue injury. Throughout the course of pregnancy, the expanding fetus exerts substantial pressure on the bladder, thereby resulting in the occurrence of urinary leakage, commonly referred to as incontinence. Stress incontinence is a specific type of incontinence that pregnant women may experience **(Cheng & Caughey, 2017; American Congress of Obstetricians and Gynecologists [ACOG], 2023).**

Women who have undergone vaginal delivery or C-section are significantly more susceptible to stress incontinence compared to women who have never given birth. The process of childbirth can result in tissue or nerve damage, thereby weakening the pelvic floor muscles and the sphincter, rendering multipara women more prone to experiencing stress urinary incontinence. This condition may manifest shortly after delivery or even several years later. Multipara, in the context of pregnancies, refers to women who have had two or more viable pregnancies. For a pregnancy to be deemed viable, it must have endured for a minimum of 20 weeks. This term is employed to

describe deliveries irrespective of the outcome, whether the baby is alive or deceased. Bladder control issues can arise both during pregnancy and following childbirth, or may be caused by pelvic organ prolapse that occasionally occur postpartum **(Tähtinen et al., 2019; Arrue Gabilondo et al., 2021; American Congress of Obstetricians & Gynecologists [ACOG], 2023; Denomme & Lawson, 2023).**

The process of aging brings about physical alterations, including the gradual decline in muscle strength, which may render individuals more susceptible to the development of stress urinary incontinence. Nevertheless, stress incontinence can sporadically manifest itself at any stage of life. Individuals who are overweight or obese are facing an elevated likelihood of experiencing stress urinary incontinence. This heightened risk is attributable to the additional pressure exerted on the abdominal and pelvic organs as a result of excess body weight **(Tähtinen et al., 2019).**

Nurses can have a significant impact on the management of stress urinary incontinence through their involvement in continuous assessment and examination of women experiencing incontinence. They can also encourage these women to openly express their fears, concerns, and embarrassment related to their incontinence. Additionally, nurses should motivate patients to gain more knowledge about their specific condition in order to effectively manage and adapt to it. Furthermore, nurses should strive to enhance the quality of life for these women by identifying strategies to approach and provide education to incontinent individuals. This education should include information on non-pharmacological interventions such as lifestyle modifications, bladder training, using of bladder supports (such as pessaries), electrical stimulation, biofeedback, vaginal cones, pelvic floor muscle exercises more commonly referred to as Kegel exercises, and hypopressive exercises **(Tso & Lee, 2018; National Health Service [NHS], 2023).**

Kegel exercises, also known as pelvic floor muscles exercises, contribute to the maintenance of pelvic floor musculature fitness and the strengthening of other muscles in the body through resistance training. Engaging in Kegel exercises serves as a means to fortify the pelvic floor muscles. These exercises offer the potential to enhance control the urinary and fecal incontinence, while also preventing the weakening of pelvic muscles **(National Association for Continence [NAFC], 2022; American Academy of Family Physicians, 2023).**

Hypopressive exercises encompass a collection of exercises and breathing techniques involving the reduction of pressure within the abdominal, thoracic, and pelvic cavities. These exercises are often employed to achieve a more aesthetically appealing and toned abdomen, as well as to fortify the pelvic floor muscles. Following childbirth, these exercises have gained significant popularity due to their effectiveness in strengthening and tightening the abdominal muscles, alleviating stress and anxiety, expediting postpartum recovery, mitigating back pain, preventing urinary and fecal incontinence, enhancing body posture, rectifying genital prolapse, and improving bowel function **(Oliveira & Bruce, 2023).**

Significance of the study, urinary incontinence is a condition that impacts a notable percentage, specifically 25-45%, of women globally and approximately 26% of women in developing countries suffer from urinary incontinence, and SUI is accountable for 12.6% of the total number of instances **(Milsom & Gyhagen, 2019; Mostafaei et al., 2020).** 1 in 3 people who were assigned female at birth (AFAB) will experience stress urinary incontinence **(Office on Women's Health, 2021).** In Egypt, SUI represent 14.8%, many women fail to seek medical treatment due to their lack of awareness regarding the treatability of UI. The presence of inadequate reproductive health education and limited research efforts contribute to the increased prevalence of morbidity on a global scale **(El-Azab & Moeen, 2013).** Although stress urinary incontinence does not pose a threat to life, the impairment of bladder control can have an impact on various areas of a woman's life, including physical, psychological, sexual, social and occupational aspects. Stress urinary incontinence gives rise to physical issues such as dampness, unpleasant odor, discomfort, skin breakdown, pressure ulcers, and urinary tract infections. Additionally, it can be linked to a decrease in self-assurance and social isolation due to the feelings of shame and embarrassment it elicits. Furthermore, it can lead to negative consequences such as heightened levels of anxiety and depression, as well as a reduction in physical activity **(Pizzol et al., 2021).** Therefore, this study was conducted to determine effect of hypopressive exercises versus pelvic floor muscle exercises on stress urinary incontinence among multiparous women. The results of the current study can provide evidence that aid into reduce stress urinary incontinence.

Aim of the study:

The aim of the study was to determine the effect of hypopressive exercises versus pelvic floor muscle exercises on stress urinary incontinence among multiparous women.

Research hypothesis:

Multiparous women who practice hypopressive exercises exhibit less stress urinary incontinence than those who practice pelvic floor muscle exercises.

Materials and Method

Materials

Research design:

A quasi-experimental research design was employed to investigate the impact of two independent variables, namely Hypopressive Exercises and Pelvic Floor Muscle Exercises, on the dependent variable of stress urinary incontinence in this particular study.

Settings:

This investigation was carried out at the Obstetrics and Gynecological Outpatient Clinics situated in the Kafr El-Sheikh General Hospital, which is located in the Kafr El-Sheikh Governorate in Egypt. The selection of this particular setting was based on its status as the primary healthcare facility within the Kafr El-Sheikh Governorate, where obstetrics and gynecology services are provided. Moreover, the hospital experiences a significant influx of multipara women who have reported symptoms of stress urinary incontinence (SUI). This factor played a crucial role in facilitating the researcher's ability to recruit an adequate sample size.

Subjects:

A Convenient sample of 100 multipara women were recruited based on the specified inclusion criteria.

- Multipara woman older than 35years.
- Free from any medical and gynecological risk factors and /or conditions.
- Free from any neurological problems, urinary tract infection, diabetes mellitus, hepatitis and ascites.
- Having been diagnosed with stress urinary incontinence for a minimum of two months.
- Having reported a minimum of one instance of involuntary urine loss per week.
- Having not undergone any previous procedures for the treatment of incontinence.

Epi info 7 statistical program was used to estimate the sample size using the following parameters:

- Population size= 130
- Expected frequency=50%
- Acceptable error= 5%
- Confidence coefficient= 95%
- Minimal sample size= 97
  - The ultimate sample size consisted of a total of 100 individuals who were potentially capable of providing a normal response.
  - The chosen participants were evenly distributed between two separate study groups.

Tools:

Two tools were utilized for the process of data collection

Tool (I): Structured interview questionnaire:

The researcher employed and created this tool to gather the subsequent information, comprising of three parts:

- **First part,** Biosocio-demographic date including: age, marital status, level of education, occupation, residence, type of family, income , height , weight body mass index ,telephone number and whatapp.
- **Second part,** Reproductive History consist of:
  - Obstetric history including: gravidity & parity, number of abortions, presence of previous multiple pregnancy, mode of previous deliveries, complications accompanying previous pregnancies and deliveries.
- **Third part,** Stress Urinary Incontinence (SUI) history consist of :
  - Age at diagnosis of SUI.
  - Family history of SUI.
  - Risk factors of SUI
  - Duration of complain SUI.

Tool (II): Revised Urinary Incontinence Scale (RUIS):

The researcher adopted from **Sandvik et al. (2000)**.This scale encompassed a total of five inquiries, which were included; urine leakage related to feeling of urgency, urine leakage in relation to physical activity (laughing, coughing or sneezing, lift something heavy exercise and have sex) small amounts of urine drops, how often did they experience urine leakage?, and how much urine did they lose each time?, Individuals engage in responding to questions by choosing a specific response alternative from a predetermined collection of response alternatives for each inquiry. These response options were scored by using the numbers presented in brackets to the right of each response option. The RUIS total score is then calculated by adding up a person's score for each question. Adding the score for each of the five questions results in a possible score range of 0 - 16.

After that an ISI score calculated by multiplying the scores from questions 4 and 5, resulting in a score range from 0 to 12, where a 0 score represents no incontinence, scores from 1 to 12 are grouped into the following four severity levels:

1 - 2 = slight 3 - 6 = moderate 8 - 9 = severe 12 = very severe

This tool was employed both prior to and subsequent to an educational intervention and health guidance in order to assess its impact on diminishing episodes of stress urinary incontinence.

Method

The study was accomplished according to the following steps:

Training program:

The researcher participated in a three-day training program, lasting a total of 18 hours, centered on hypopressive exercises. This program was held at The Arab African Union, which serves as the Supreme

Body for Complementary Medicine and is affiliated with the Ministry of Culture and Investment in Alexandria governorate. As a result of her attendance, the researcher was able to acquire an accredited certificate.

Approvals:

Approval was obtained from the Scientific Research Ethics Committee at Kafr El-Shaikh University. The responsible authorities of the study settings were provided with an official letter from the vice-dean of the graduate studies and research at the Faculty of Nursing- Kafr El-Shaikh University, seeking their permission for data collection. The purpose of the study was explained to them as part of this process.

Tools development:

- **Tool (I):** Was created by the researcher subsequent to a comprehensive examination of contemporary and pertinent literature.
- **Tool (II):** Was adapted and subsequently translated into Arabic language to facilitate the process of data collection.
- **Validity:** The content validity of the tools was evaluated by jury of three experts in the field of women's health and midwifery nursing, resulting in the implementation of required modifications.
- **Reliability:** The reliability of tool (II) was assessed through the utilization of internal consistency, specifically the Cronbach's Alpha test, yielding a value of 0.810.

Pilot study:

A pilot study was conducted on a subset of the study population, comprising 10 multipara women, who were subsequently excluded from the final analysis. It aimed to assess the suitability and comprehensibility of the research tools, In addition, to determine the time required for data collection. Following the pilot study, the requisite adjustments were made.

Ethical consideration:

In accordance with ethical consideration, women were required to provide written informed consent prior to participating in the study. This consent was obtained after a thorough explanation of the study's objectives. Furthermore, it was ensured that the privacy of the study participants was safeguarded, and the confidentiality of the collected data was diligently maintained. Additionally, each woman was duly informed that her participation in the study was entirely voluntary, and she had the autonomy to withdraw at any given point in time.

Data collection:

Assessment:

- At the onset, the researchers encountered multipara women while they were waiting at the outpatient obstetrics and gynecological clinic. The researchers proceeded to introduce themself and elucidate the title and objective of the study.
- Then, the researchers conducted individual interviews with each woman in order to complete tool (I).
- After that, a group of 100 multiparous women was chosen to partake in the investigation in accordance with the specified inclusion criteria. These participants were subsequently assigned in a random and equitable manner, and subsequently divided into two distinct study groups:
  - **Group I:** comprised of (50) multipara women who were directed to engage in the practice of hypopressive exercises.
  - **Group II:** comprised of (50) multipara women who were provided with instructions to engage in pelvic floor muscle exercises.
- The researchers evaluated stress urinary incontinence for both groups prior to engaging in hypopressive exercises in group I and pelvic floor muscle exercises in group II, utilizing tool (II).

Implementation:

- The researchers ensured that the surroundings were maintained in a state of cleanliness, possessing proper ventilation, and devoid of any disruptive elements.
- The researchers individually engaged with each female participant, providing specific instructions to voluntarily empty their urinary bladder, shed any garments that were constricting, and allow their bodies to enter a state of relaxation.
- **In the group I:** The researchers commenced elucidating and illustrating the methodology of engaging in hypopressive exercises through the utilization of a PowerPoint presentation, video materials, and live demonstrations of these exercises, all while the researchers intently observes.

The steps of hypopressive exercises: **(Oliveira & Bruce, 2023)**

- Inquire the woman to gently shut her eyes and direct her attention towards a specific point situated ahead of her, purging her mind of any thoughts, and concentrating solely on her respiration for the duration of the exercise.
- When inhaling, one should do so in a regular manner and when exhaling, one should release all of the air until the abdomen autonomously begins to contract.
- Reduce the size of the abdomen by engaging the abdominal muscles in a contraction, which causes them to draw inward toward the spinal column.
- Maintain this contraction for an initial duration ranging from 5 to 10 seconds and, with the passage of time, progressively extend the period of contraction. Retain this position for as extensive a duration as feasible, refraining from inhaling.

- Take a deep inhalation, allowing lungs to be filled with the vitalizing air, and proceed to wholly unwind, thus resuming your customary respiration pattern.
- Initiate this sequence in a lying position and then progress to sitting and after that leaning forward and finally kneeling on the floor.
- In a lying position, reclining on the ventral side of the body, with lower limbs flexed and upper limbs aligned parallel to the torso, adhere to the aforementioned guidelines. Commence by executing three iterations of this physical exercise.
- In a sitting position, assume a seated position in a chair with the soles of the feet planted firmly on the floor, or alternatively, adopt a seated position on the floor with the knees flexed for novice individuals, and with the legs extended for those with greater expertise. Exhale all of the air from the lungs entirely and subsequently contract the abdominal area inward to its fullest extent, exhaling for as much time as one is capable of.
- In a standing position, incline the body anteriorly while mildly flexing the knees. Inhale deeply and subsequently, expel the exhalation while inwardly contracting the abdominal region, as well as the muscles encompassing the pelvic floor, sustaining the breath for the maximum duration achievable.
- Kneeling on the floor in the quadruped position, with the hands and knees positioned on the floor, one should exhale completely, retract the abdominal region as much as possible, and maintain this breath-holding maneuver for the maximum duration achievable.
  - After the completion of the explanation, every female participant was requested to exhibit the procedure once again, until the researchers ascertained that each individual was capable of independently demonstrating the technique.
  - One should engage in a sequence of hypopressive exercises in varying positions due to the fact that it is typical for an individual to possess the capability to sustain the contraction for an extended duration in one position as compared to another. The most effective approach to ascertain which position is able to sustain the contraction for a longer period of time is to assess each individual position.
  - Women performed hypopressive exercises for a duration ranging from 20 minutes to 1 hour, with a frequency of 3 to 5 times per week, over a period of 12 weeks.

weeks	Position	Number of sets	Frequency	Duration (in seconds)
1	Lying	3	3	5-10
2	Standing Setting	3	3	5-10 5-10
3	Standing Setting Kneeling	3	2	10-15 10-15 5-10
4	Standing Setting Kneeling	3	1	10-20 10-20 10-15
5	Standing Setting Kneeling	3	1	20-30 20-30 15-20
6-12	Standing Setting Kneeling	3	1	20-30 20-30 15-20

  - **In the group II:** The researchers instructed the woman to assume sitting or semi setting position, ensuring that their knees were slightly separated. They were further instructed to engage in deep breathing and to achieve a state of relaxation, consciously avoiding any tension in the abdominal, thigh, gluteal, or pectoral muscles throughout the duration of these exercises.
  - **The steps of Kegel Exercises (Patton & Bassaly, 2023)**
    - Hold back voiding urine or defecating.
    - Constrict pelvic floor muscles, specifically the muscles surrounding the vagina or the anal sphincter. Maintain this contraction and enumerate the passing of time for duration of 3 to 5 seconds.
    - Relax the muscles while simultaneously counting a duration ranging from three to five seconds.
  - Women performed kegal exercises 10 instances per day throughout a duration of 12 weeks.
- The researchers conducted subsequent investigations to monitor the female participants in both groups via telephone or the messaging application WhatsApp, in order to tackle any problem that emerged throughout the duration of the monitoring procedure.

Evaluation:

- The researchers reevaluated stress urinary incontinence for multiple groups on three separate occasions. The initial follow-up occurred after duration of four weeks, followed by a subsequent evaluation at the eight-week mark. Finally, a third follow-up was conducted after a span of twelve weeks from the initial assessment.

- These assessments were carried out utilizing a specific tool denoted as (II).
- Effect of hypopressive exercises versus pelvic floor muscle exercises on stress urinary incontinence was determined through a comparative analysis of the average stress urinary incontinence scale score prior to and following the implementation of the respective interventions within the two groups.
- The data collection spanned duration of four months, commencing from the midpoint of June and extending towards the midpoint of October in the year 2023.

Statistical analysis:

Analysis of data was conducted utilizing the Statistical Package for Social Sciences (SPSS) program, specifically version 26. The gathered data was classified, encoded, digitized, organized, and assessed. To depict and summarize categorical data, frequency and distribution were employed. Exploring the connections between variables involved cross tabulation with percentages. Pertinent assessments, such as the arithmetic mean and Chi-square test at a significance level of 0.05, were employed.

Results:

Table (1): Distribution of Bio-sociodemographic characteristics of the studied sample in hypopressive and pelvic floor muscle groups

	Hypopressive (50)		Pelvic floor muscle (50)		Chi-Square / Fisher's exact test	
	N	%	N	%	X^2	P
Age (years)						
< 45	18	36.0	19	38.0		
45 – 55	23	46.0	19	38.0		
> 55	9	18.0	12	24.0	0.837	0.658
Mean ±SD	50.72 ±4.31		51.36 ±3.81		0.787	0.433
Occupation						
Housewife	37	74.0	34	68.0		
Worker	5	10.0	7	14.0		
Employee	8	16.0	9	18.0	0.519	0.771
Educational level						
Preparatory	4	8.0	2	4.0		
Secondary	18	36.0	25	50.0		
University or Higher	28	56.0	23	46.0	2.296	0.317
Marital Status						
Married	42	84.0	37	74.0		
Divorced / Widowed	8	16.0	13	26.0	1.507	0.220
Type of family						
Nuclear	8	16.0	9	18.0		
Extended	42	84.0	41	82.0	0.071	0.790
Residence						
Rural	29	58.0	36	72.0		
Urban	21	42.0	14	28.0	2.154	0.142
Income						
Not Enough	7	14.0	11	22.0		
Enough	38	76.0	33	66.0		
More than enough	5	10.0	6	12.0	1.332	0.514
BMI						
Underweight	6	12.0	6	12.0		
Normal	34	68.0	27	54.0		
Overweight	10	20.0	17	34.0	2.618	0.270

Table (2): Distribution of obstetric history of the studied sample in hypopressive and pelvic floor muscle groups

	Hypopressive (50)		Pelvic floor muscle (50)		Chi-Square / Fisher's exact test	
	N	%	N	%	X^2	P
Gravidity						
Two	17	34.0	23	46.0		
Three	28	56.0	18	36.0		
Four or more	5	10.0	9	18.0	4.217	0.121
Parity	**(n=38)**		**(n=40)**			
Two	12	31.6	15	37.5		
Three	18	47.4	20	50.0		
Four or more	8	21.1	5	12.5	1.080	0.583
Number of abortions						
None	38	76.0	40	80.0		
Once	12	24.0	10	20.0	0.233	0.629
Presence of previous multiple pregnancy						
No	46	92.0	48	96.0		
Yes	4	8.0	2	4.0	0.709	0.399
Occurrence of previous pregnancies complications						
No	26	52.0	25	50.0		
Yes	24	48.0	25	50.0	0.040	0.841
Mode of previous deliveries						
Vaginal	35	70.0	31	62.0		
Cesarean Section	15	30.0	19	38.0	0.713	0.398
Occurrence of previous deliveries complications						
No	33	66.0	30	60.0		
Yes	17	34.0	20	40.0	0.386	0.534

Table (3): Distribution of the stress urinary incontinence history of the studied sample in hypopressive and pelvic floor muscle groups

	Hypopressive (50)		Pelvic floor muscle (50)		Chi-Square / Fisher's exact test	
	n	%	n	%	X^2	P
Age at diagnosis of stress urinary incontinence (Years)						
< 45	12	24.0	8	16.0		
45 – 55	29	58.0	34	68.0		
> 55	9	18.0	8	16.0	1.256	0.534
Mean ±SD	49.20 ±5.25		50.46 ±4.86		1.245	0.216
Family history of stress urinary incontinence						
No	20	40.0	15	30.0		
Yes	30	60.0	35	70.0	1.099	0.295
Duration of complain of stress urinary incontinence (Years)						
< 5	8	16.0	2	4.0		
5 – 10	36	72.0	42	84.0		
> 10	6	12.0	6	12.0	4.062	0.131
Mean ±SD	6.96 ±2.86		7.28 ±2.71		0.573	0.568

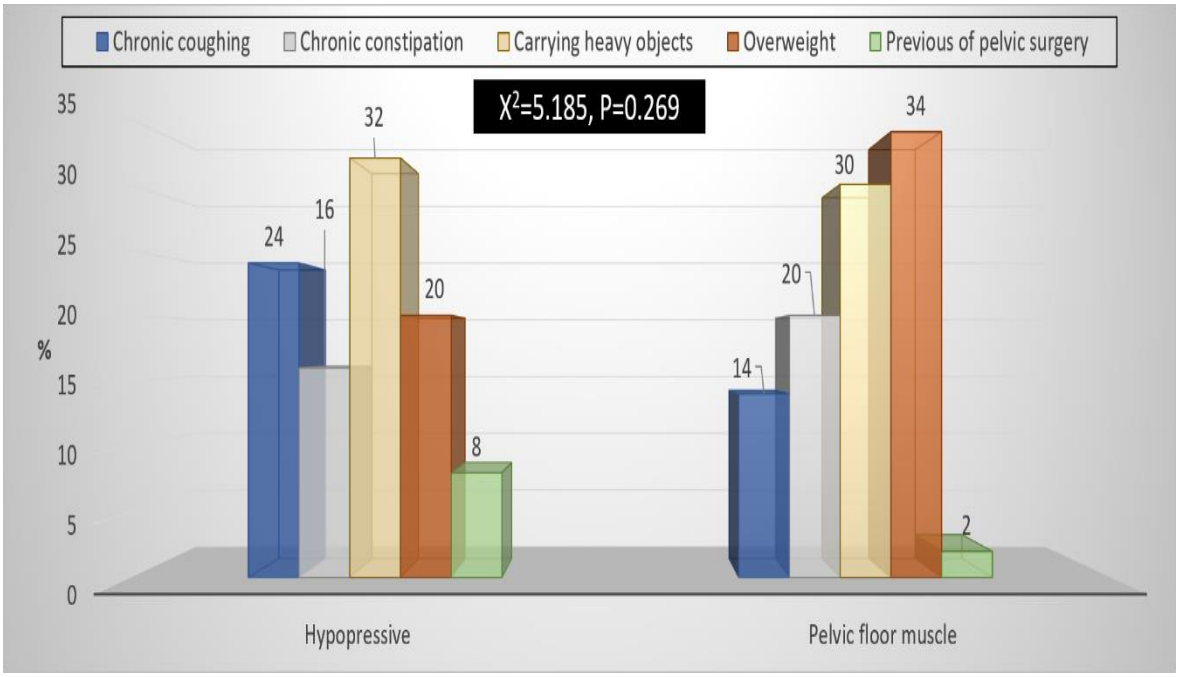

Figure (1): Distribution of risk factors of stress urinary incontinence of the studied sample in hypopressive and pelvic floor muscle groups

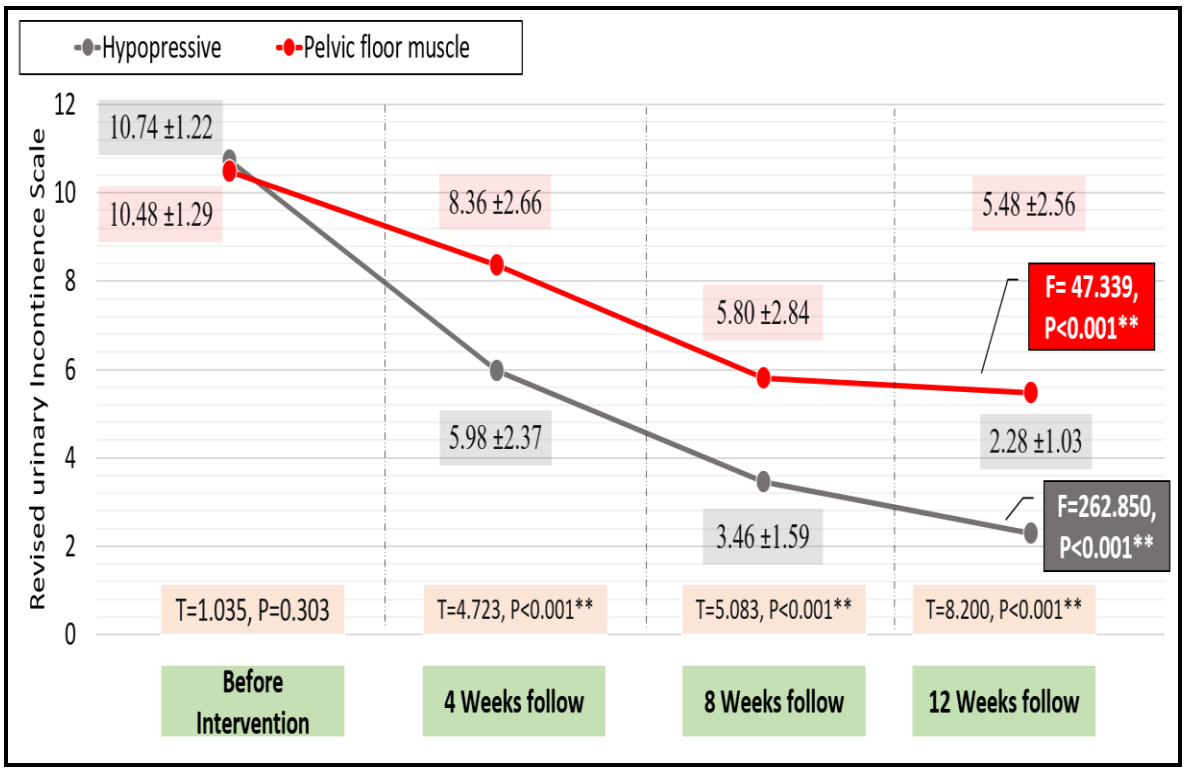

Figure (2): Distribution of total severity of stress urinary incontinence in hypopressive and pelvic floor muscle groups before, 4, 8 and 12 weeks after intervention

Table (4): Relationship between sociodemographic characteristic of the studied sample and total severity of stress urinary incontinence at 12 weeks follow in hypopressive and pelvic floor muscle groups

	Hypopressive	Significance test	Pelvic floor muscle	Significance test
	Mean ±SD		Mean ±SD	
Age (years)				
< 45	1.99 ±0.98	F=3.906, P=0.026*	4.48 ±2.13	F=3.430, P=0.041*
45 – 55	2.82 ±1.30		5.42 ±2.44	
> 55	3.10 ±0.92		6.79 ±2.70	
Occupation				
Housewife	2.61 ±1.06	F=1.848, P=0.168	5.46 ±2.69	F=0.070, P=0.932
Worker	3.68 ±1.68		5.34 ±2.02	
Employee	2.75 ±1.33		5.10 ±2.46	
Educational level				
Preparatory	2.95 ±1.39	F=0.159, P=0.853	6.34 ±1.15	F=0.192, P=0.825
Secondary	2.74 ±1.36		5.28 ±2.25	
University or Higher	2.63 ±1.22		5.41 ±2.48	
Marital Status				
Married	2.71 ±1.31	T=0.353, P=0.725	5.53 ±2.76	T=0.699, P=0.487
Divorced / Widowed	2.89 ±1.39		4.95 ±1.89	
Type of family				
Nuclear	2.15 ±1.01	T=2.424, P=0.019*	5.10 ±2.46	T=2.058, P=0.045*
Extended	3.33 ±1.30		5.44 ±2.56	
Residence				
Rural	2.55 ±1.28	T=1.215, P=0.230	5.11 ±2.40	T=1.274, P=0.208
Urban	2.99 ±1.24		6.08 ±2.89	
Income				
Not Enough	2.85 ±1.38	F=0.102, P=0.903	6.16 ±2.43	F=1.274, P=0.289
Enough	2.74 ±1.31		5.32 ±2.34	
More than enough	2.51 ±1.09		4.29 ±2.13	

As shown in **Table (1)**, Mean age of the hypopressive and pelvic floor muscle groups were (50.72 ±4.31&51.36 ±3.81) respectively. About three quarter of hypopressive group were housewife compared to more than two third of pelvic floor muscle group. More than one half of hypopressive group had university or higher level of education while half of pelvic floor muscle group had secondary school education. Majority of studied sample were married in both groups. Also, majority of he studied sample were lived in extended family. About (58.0%&72.0%) were lived in rural area for hypopressive and pelvic floor muscle groups respectively. More than two third of both groups had enough income. No statistically significant differences were found between the two groups' sociodemographic characteristics.

Table (2): Manifests that, 56.0% of the hypopressive group were pregnant 3 times while 46.0% of the pelvic floor muscle group were pregnant two times. The table illustrates that the majority of the two groups had no abortion and no previous multiple pregnancy. More than two third of the hypopressivre group had vaginal deliveries and no previous deliveries complications compared to more than three- fifths of the pelvic floor muscle group had vaginal deliveries and no previous deliveries complications. No statistically significant differences were found between the two groups' obstetric history

Table (3): Clarifies that the Mean ±SD of age at diagnosis of stress urinary incontinence (Years) for the hypopressive group and pelvic floor muscle group were (49.20 ±5.25 &50.46 ±4.86) respectively. About 60.0% of the hypopressive group had family history of stress urinary incontinence compared to 70.0% of the pelvic floor muscle group. No statistically significant differences were found between the two groups' stress urinary incontinence history.

Figure (1): Demonstrates that, 32.0% of the hypopresive group risk factors of stress urinary incontinence were chronic cough while, 34.0% of the pelvic floor muscle group were overweight.

Figure (2): Shows that , according to revised urinary incontinence scale (RUIS) there were a highly

statistically significant difference between total severity of stress urinary incontinence in hypopressive and pelvic floor muscle groups after 4, 8 and 12 weeks follow up of intervention.

Table (4): Presents that there were a statistically significant difference between total severity of stress urinary incontinence at 12 weeks follow in hypopressive and pelvic floor muscle groups related to age (years) P=0.041* and type of family P=0.045*.

Discussion

Stress urinary incontinence (SUI) is the prevailing form of urinary incontinence (UI). It typically occurs as a consequence of the debilitation or impairment of the musculature employed in the hindrance of micturition, specifically the pelvic floor muscles and the urethral sphincter. This ultimately leads to the involuntary release of urine during physical exertion or strenuous activities (e.g., sporting endeavors), as well as during instances of sneezing, coughing, or any conditions that increase the abdominal pressure (stress) exerted upon the bladder. It is important to note that stress incontinence is unrelated to psychological stress. Furthermore, SUI is most prevalent gynecological urinary disease among multiparous women **(Alghamdi et al., 2021; Office on Women's Health, 2021; Shenot, 2022; National Health Service [NHS], 2023).**

Both non-pharmacological and pharmacological modalities are accessible for the management of stress urinary incontinence. Non-pharmacological modalities primarily focus on enhancing the potency of the muscles of the pelvic floor. and modifying behaviors that impact bladder function, although not exclusively. On the other hand, pharmacological interventions predominantly target bladder innervation and sphincter function **(Balk et al., 2018)**. So, the aim of this study was to determine the effect of hypopressive exercises versus pelvic floor muscle exercises on stress urinary incontinence among multiparous women.

According to the results of the current study more than two third of the hypopressivre group had vaginal deliveries. This may be related that vaginal delivery is correlated with a nearly two-fold rise in the likelihood of developing leakage during physical exertion, in comparison to cesarean section **(Tähtinen et al., 2016)**. This finding is similar to the finding reported by **Molina-Torres et al. (2023)** who reported that more than half of studied sample had vaginal deliveries. More than three-fifths of the pelvic floor muscle group had vaginal deliveries. This finding is partially in line with the result of **Mohamed et al. (2018)** who showed that four-fifths of studied sample had vaginal deliveries.

In the present study, it was found that 60.0% of the hypopressive group had family history of stress urinary incontinence compared to 70.0% of the pelvic floor muscle group. This could be attributed to there could potentially exist a hereditary correlation with urinary incontinence, thereby increasing susceptibility in cases where there is a familial history of the condition **(National Health Service [NHS], 2023)**. This finding isn't in agreement with the finding of **Manoj & Kavitha (2022)** who found that only 10% of studied sample had family history of stress urinary incontinence.

In addition, about one-third of the hypopresive group risk factors of stress urinary incontinence were chronic cough. This may be due to coughing results in an elevation in intra-abdominal pressure; consequently, the presence of a persistent cough may augment the likelihood of developing stress urinary incontinence **(Cho et al., 2019)**. This result is supported by the study of **Yang et al. (2022)** who found that half of studied sample had chronic cough.

Moreover**,** it was found that about one-third of the pelvic floor muscle group risk factors of stress urinary incontinence were overweight. The reason for this occurrence can be attributed to the surplus amount of weight located in the abdominal region, which in turn exerts a substantial amount of force onto the bladder. Consequently, this exerted pressure has the potential to diminish or impair the strength and integrity of both the pelvic floor and urethral structures, thereby increasing the likelihood of experiencing stress urinary incontinence **(Swenson et al., 2017)**. This finding is resemblance to the finding reported by **Lamerton et al. (2018)** that one-third of studied sample were overweight.

The current study also showed that the hypopressive group generally exhibited low in severity of stress urinary incontinence compared to the pelvic floor muscle group, particularly at the later time points (8 Weeks and 12 Weeks Post-Test). This could be attributed to the fact that hypopressive exercises encompass a sequence of physical exercises and respiratory strategies aimed at diminishing the level of pressure within the abdominal, thoracic, and pelvic cavities. This subsequently results in a decrease in the strain experienced by the bladder. Conversely, pelvic floor muscle exercises involve only lifting and holding and then relaxing pelvic floor muscles (**American Academy of Family Physicians, 2023**).

Supporting the current results of **Oliveira and Bruce (2023) & Moreno-Muñoz et al. (2021)** reported that hyopressive exercises have the capacity to diminish the intra-abdominal pressure in the thoracic, abdominal, and perineal compartments. These exercises may have a significant impact on the activation of the striated muscle fibers of the pelvic

floor muscles and deep trunk muscles. Additionally, they offer various advantages such as improving posture and functionality, reducing stress and anxiety, aiding in postpartum recovery and alleviating back pain. Furthermore, they contribute to the prevention of urinary and fecal incontinence, improve body posture, treat genital prolapse, and enhance bowel function. Also, the results of this study are in line with the studies conducted by **Molina-Torres et al. (2023), Mitova et al. (2022) & de Araújo et al. (2020)** found that there was improvement in severity of stress urinary incontinence because of performing the hypopressive exercises in comparison with the control group.

The current study also uncovered a statistically significant relation between severity of stress urinary incontinence in hypopressive and pelvic floor muscle groups related to age. The findings of the present study may be associated with the notion that the severity of stress urinary incontinence escalates with advancing age due to alterations in the vesical muscle's structure, compromised neural regulation, and age-related modifications in the lower urinary tract **(Didyk, 2023)**. The finding of the current study consistent with the studies of **Gari et al. (2023) & Hakim et al. (2023)** who found that, there is a statically significant relation (p= 0.00)&(p=0.03) respectively between stress urinary incontinence and age. However, this result don't matches with **Opara and Czerwińska-Opara (2014)** who concluded that not statically significant relation (p = 0.3089) between stress urinary incontinence and age.

Furthermore, the present findings found that there was a statistically significant relation between severity of stress urinary incontinence in hypopressive and pelvic floor muscle groups and type of family. This may be due to there is an escalated level of diligence within the extended family when compared to the nuclear family, and this factor must be taken into account as a potential risk for the manifestation of stress urinary incontinence. The result of the current study is in contrast with the study of **Mohammed et al. (2021)** who found that no a statistically significant relation between severity of stress urinary incontinence and type of family.

Finally, the current study posited that hyopressive exercises serve as a non-pharmacological, uncomplicated, convenient, cost-free, non-invasive and efficacious approach to mitigating the intensity of stress urinary incontinence. It ought to be accessible and applicable as a component of nursing care for women afflicted with stress urinary incontinence.

Conclusion

Based on the findings of the present study, it can be deduced that the hypopressive group generally demonstrated a lower degree of severity with regards to stress urinary incontinence as compared to the pelvic floor muscle group, especially during later time points where hypopressive exercises entail a series of exercises and respiratory techniques that involve reducing pressure within the abdominal, thoracic, and pelvic cavities and this subsequent reduction in pressure on the bladder, in addition to fortifying the pelvic floor and abdominal musculature, and serves to prevent the occurrence of urinary and fecal incontinence.

Recommendations:

In the light of the current study findings, the following recommendations are suggested:

- Conducting additional research using larger sample sizes and a more diverse range of populations is necessary in order to enhance the generalizability of the results.
- Developing an awareness program pertaining to the significance and advantages of engaging in hypopressive exercises may potentially contribute to the mitigation of the intensity of stress urinary incontinence.
- Ensuring the provision of healthcare services such as counseling, therapy, or support groups that cater specifically to the field of gynecological urinary health is of utmost importance for women encountering severe levels of SUI.
- Further researches are required to continuously assess the effectiveness of interventions and support programs aimed at reducing the severity of stress urinary incontinence (SUI) among women.
- Replicate the current study in alternative situations (such as sampling, setting, measurement, and duration of management) is advised in order to authenticate its findings. This approach can facilitate the identification of areas requiring enhancement and offer valuable insights for evidence-based practice.

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