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Al-Quds University

The Effect of Core stability and Kegel Exercises on Stress Urinary Incontinence and Quality of life among middle-aged Palestinian Women

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M.Sc. Thesis

Jerusalem- Palestine

1443\ 2022

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A thesis submitted in partial fulfillment of requirement for the degree of Master of Physiotherapy - Deanship of Graduate studies - Al-Quds University

1443\ 2022

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Thesis Approval

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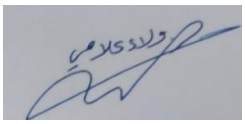
Declaration

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed: 

Wala Khalil Hassan Alami

Date: 11/12/2022

Dedication

First, I would like to thank God, for countless blessings, knowledge, and opportunity bestowed upon me, so that I have been finally able to accomplish the thesis.

To those stationed on the land of Isra and Miraj, Jerusalem

To every student of knowledge, I dedicate this scientific research to you.

To my dear father and mother, who instilled in me a love of knowledge, may God prolong their life and grant them health and wellness.

To the one who shared my hope and supported me in getting through this stage….my dear husband (Mohammad Al-Alami).

To my sons (Rahaf, Qais, Shams Al –Din, and Noor Al- Din)

To my brothers and sisters to my beloved family, and to everyone who supported me during this difficult period.

To all my doctors of the Physiotherapy Department at Al-Quds university. To my wonderful supervisor Dr. Hadeel Halaweh

To all physiotherapists in Palestine. I dedicate this humble work to you.

Acknowledgement

Praise and thanks be to God, who enabled me to complete this scientific research

I extend my sincere thanks and appreciation to my father and my mother, may God grant them long life, who gave me this opportunity and instilled in me a love of science and knowledge.

Thank you from the bottom of my heart to my dear husband for supporting me in getting through this stage of my life, and thanks to my children for bearing the burden of my studies and staying up late. I would like to express my thanks and appreciation to my wonderful supervisor, Dr. Hadeel Halaweh, for all the guidance and valuable information you provided me with, which contributed to enriching the subject of my study. I would like to thank the head and staff of the physiotherapy department at Al-Quds University, Dr. Israa Hamdan, Dr Abed Al – Hamid Al- Zeer, Dr Akram Amro for their efforts and excellence to advance the level of the physiotherapy profession in Palestine.

I would also like to thank the Health Work Committees Foundation (Ashraqah Center), for the assistance, facilities, and all requirements they provided for the implementation of a research program. I also thank all my colleagues in this institution for their cooperation.

Finally, I would like to thank all the participating women for their trust and all those who contributed to the achievement of this scientific research.

The Effect of Core stability and Kegel Exercises on Stress Urinary Incontinence and Quality of life among middle-aged Palestinian Women

Prepared by: Wala Khalil Hassan Alami

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Abstract

Background: Stress urinary incontinence is highly prevalent among middle- aged women, and it is highly associated with pregnancy, childbirth, aging, and after menopause.

There are no statistics about the prevalence of this problem in Palestine, in addition to lack of knowledge about the pelvic floor muscles and their function, and the importance of physiotherapy role to treat women with stress urinary incontinence. This problem has a negative impact on their daily activities and quality of life and limits their participation in social activities.

Many women do not seek medical help for stress urinary incontinence, and they consider it an embarrassing and sensitive condition for most of populations. Physiotherapy considered the first- line approach of conservative treatment for women with stress urinary incontinence, the intervention used to strengthen pelvic floor muscles, and to educate women on how lifestyle modification to improve quality of life and decrease the severity of incontinence. This study aimed to assess the effect of different conservative approaches of treatment on stress urinary incontinence and quality of life among middle-aged Palestinian women.

Methods: An experimental randomized controlled trial (RCT) design was used. This study was conducted during April -December 2021 at Physio one center in Beit Ommar at Hebron. A number of 58 middle-aged Palestinian women with stress urinary incontinence were recruited in this study, the participants were randomly distributed into the experimental and control groups. Study tools were included

the Incontinence Quality of Life Instrument (I-QOL), Ingelman-Sundberg scale, and the International Consultation of Incontinence (ICIQ) short form; these measures were used at baseline as preliminary tests and were compared with the post intervention test.

Results: The two groups showed significant improvements, however the intervention group achieved significant improvement in all outcome measures post-test ($p<0.05$). Higher BMI, number of children, and pregnancy number associated with stress urinary incontinence severity.

Conclusion: This study shows that a combination of Core Stability and Kegel exercise is an effective treatment for women with stress urinary incontinence, decreasing the number of urinary leakage episodes, and amount of leakage, so the severity of urinary incontinence decreased, and the quality of life was improved.

Keywords: Pelvic floor muscle, stress urinary incontinence, lifestyle modification, physiotherapy

تأثير تمارين الثبات المركزي لعضلات الجدع وتمارين كيجل على السلس البولي الإجهادي ونوعية الحياة لدى النساء في منتصف العمر

اعداد: ولاء خليل حسن العلامي

اشراف: الدكتوره هديل حلاوه

ملخص عن الدراسة باللغة العربية

هدف الدراسة: هدفت هذه الدراسة إلى مقارنة بين تمارين الثبات المركزي لعضلات الجدع وتمارين كيجل في علاج مشكلة السلس البولي الإجهادي، ودراسة تأثير هذه التمارين العلاجية على نوعية وجودة الحياة لدى النساء الفلسطينيات في منتصف العمر.

المقدمة: السلس البولي الإجهادي: هو تسريب البول بشكل لا إرادي عند العطس، أو السعال، أو الضحك، أو ممارسة الرياضة، أوعند القيام بنشاط يزيد الضغط على البطن، وبالتالي زيادة الضغط على المثانة. تقوم عضلات قاع الحوض بدعم العاصرة العضلية الموصلة بالإحليل، فعندما يختل هذا الدعم تفشل العاصرة في الإغلاق فتسمح للبول بالتسريب. يعتبر الحمل، والولادة، والسمنة وسن اليأس من عوامل الخطر الأساسية عند النساء التي تتسبب في إضعاف عضلات قاع الحوض.

لا يوجد أي إحصاءات في فلسطين عن عدد النساء المصابات بسلس البول الإجهادي ، كما أن النساء لا تبحث عن علاج طبي لحل مشكلة السلس البولي الإجهادي ، و تعتبر هذه المشكلة في معظم المجتمعات حساسة و محرجة، لذلك كان الهدف من هذه الدراسة بتسليط الضوء على دور العلاج الطبيعي كخط العلاج التحفظي الأول لعلاج السلس البولي الإجهادي عند النساء الفلسطينيات في منتصف العمر، حيث يقوم أخصائيون وأخصائيات العلاج الطبيعي على توضيح المعلومات عن عضلات قاع الحوض ،ووظيفتها ،وعوامل الخطر التي تضعف هذه العضلات، بالإضافة إلى تدريب النساء على تمارين العلاج الطبيعي ؛ لتقوية عضلات قاع الحوض وتقوية عضلات الجذع أو العضلات المركزية في الجسم .

المنهج المتبع للدراسة: عينة هذه الدراسة هي تجربة عشوائية ذات شواهد، حيث تمت الدراسة على (58) إمرأة تعاني من السلس البولي الإجهادي، تم توزيعهن بشكل عشوائي إلى مجموعتين: حيث كان عدد النساء في المجموعة التجريبية (29) إمرأة وقد خضعن لتمارين الثبات المركزي لعضلات الجذع، وتمارين كيجل بواقع 3 مرات في الإسبوع، وكان عدد النساء في المجموعة الضابطة (29) إمرأة خضعن لتمارين كيجل فقط وتم متابعتهن مرة واحدة بالإسبوع من قبل أخصائية العلاج الطبيعي، حيث استمرت هذه الدراسة لمدة ستة أسابيع لكلا المجموعتين.

خضعت النساء في كلا المجموعتين للاختبارات القبلية والبعدية المتعلقة بتسريب البول وكميته، وللاختبارات المتعلقة بجودة الحياة لدى النساء التي تعاني من السلس البولي الإجهادي.

نتائج الدراسة: بعد الانتهاء من الدراسة أظهرت النتائج تحسنا معنويا في كلا المجموعتين بين نتائج الاختبار القبلي والبعدي ($p<0.05$)، وكما أظهرت النتائج تحسنا معنويا أعلى لصالح المجموعة التجريبية في نتائج الاختبارات البعدية، بما في ذلك اختبار (I-QOL)&(ICIQ).

الاستنتاج: إن تأثير تمارين الثبات المركزي وتمارين كيجل كان لها دور فعال في علاج النساء اللواتي يعانين من السلس البولي الإجهادي، حيث أن هذه التمارين تقلل من كمية البول المتسرب، وتقلل من معدل حدوث التسرب خلال اليوم، وكما أن كان لها تأثيرا ايجابيا على نوعية وجودة حياة هؤلاء النساء.

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UI: Urinary incontinence

SUI: Stress urinary incontinence.

PFMT: Pelvic Floor Muscle Training

MUS: Mid- Uterus Sling

QOL: Quality of Life

ICIQ: The International Consultation of Incontinence

I-OQL: The Incontinence Quality of Life Instrument

BMI: Body Mass Index.

N: Number of samples.

SD: Standard Deviation.

Chapter one

1.1 Introduction

1.2 Problem statement

1.3 Study Justification

1.4 Objectives of study

1.5 Hypotheses

1.6 Terminology

1.1 Introduction

According to the data adopted during the 6th International Consultation on Incontinence (ICI), the problem of urinary incontinence (UI) in the whole population ranges from 4% to 8%. This problem is increasing continuously around the world. In 2018, the number of people with urinary incontinence around the world was~420 million – 300 million women and 120 million men (Radzimińska et al., 2018).

The International Continence Society (ICS) and the International Urogynecological Association defined Stress Urinary Incontinence (SUI) as "the complaint of involuntary urine loss on effort or physical exertion, or on sneezing or coughing (Oliveira et al., 2017) .

Two main types of urinary incontinence: Urgency urinary incontinence is uncommon, with 1%-7% prevalence, and Stress urinary incontinence are the most common types of urinary incontinence in women, reporting 10%- 39% prevalence (Milsom et al., 2014), and as a combination of symptoms is mixed incontinence is the next most common type (Milsom et al., 2014; Pandey et al., 2019). The type of urine leakage is classified according to what is reported by women (symptoms), and what is observed by clinicians (signs) (Haylen et al., 2010).

To differentiate between UI types, stress urinary incontinence if a woman reports involuntary urine leakage with physical exertion, but the leakage is not a combined by the contraction of the detrusor muscle (bladder smooth muscle) this is called urodynamic SUI. SUI is due to anatomical defects in the structures that support the bladder and urethra, resulting in suboptimal positioning of these structures at rest, or on exertion, or dysfunction of the neuromuscular component that controls urethral sphincter or urethral pressure (Dumoulin et al., 2018).

While urgency urinary incontinence the symptoms are present when involuntary leakage associated with or immediately preceded by a sudden (urgency). UUI results from an involuntary increase in bladder pressure due to the contraction of the detrusor muscle. While when women have either or both

symptoms and signs of SUI and UUI, this is called mixed urinary incontinence (Dumoulin et al., 2018)

The causes for SUI including a deficit on pelvic floor muscles, dysfunction of neural control, dysfunction of environment of bladder (Aoki et al., 2017).

Management of SUI involves both surgical and conservative treatment mainly physiotherapy. Intervention for treating SUT includes surgeries, which are done using Midurethral Tape. This involves place tape underneath the bladder, but there is disagreement from expert on how to treat women with SUI (Bakali et al., 2019).

Physiotherapy intervention is recommended for treatment of women with SUI. The pelvic floor muscle training (PFMT) is used to strengthen the pelvic floor muscles, providing maximum support to the pelvic organs (Ayeleke et al., 2013), and lifestyle modification. This intervention is inexpensive, with low risk of side effect, so the therapist counseling the participants for appropriate fluid intake, regular physical activity, reduction of caffeine, time urine voiding, smoking , and weight loss for obese (Hu & Pierre, 2019).

1.2 Problem statement

According to literature review, stress urinary incontinence is highly prevalent among middle age women (Kawaguchi et al., 2018), and it has significant effects on daily activities and quality of life, and leading to physical and social limitations, shame, and increased rates of depressive symptoms (Moroni et al., 2016).

Stress Urinary continence problem is arising during pregnancy, childbirth, post menopause, and aging. Although SUI is more common with the elderly, still is not considered as a sequence of aging, as it is highly associated with pregnancy and childbirth, many women silently suffer without seeking medical help(Pandey et al., 2019). The SUI is considered as an embarrassing, sensitive and stigmatizing condition in most populations (Aoki et al., 2017).

In Palestine, there are no statistics about the prevalence of stress urinary incontinence among Palestinian women, and there is lack of studies addressing SUI, and assessing different conservative approaches of treatment for SUI. In addition to the lack of knowledge among women, urologist, and gynecologist about the importance of physiotherapy role during pelvic floor muscle training and lifestyle modification.

1.3 Study Justification

This study is expected to add evidence to the literature in Palestine and will highlight the importance of physiotherapy's role for SUI management. Physiotherapy is described as the first line conservative treatment for treating women with stress urinary incontinence (Moroni et al., 2016). Results of this study are expected to help women to modify their lifestyle and improve their quality of life in terms of seeking treatment and dealing with this problem as any other medical condition.

1.4 Objectives of study

- To compare the effect of core stability and Kegel exercise with Kegel exercise alone on stress urinary incontinence among middle-aged women in Palestine.
- To analyze the development of stress urinary incontinence and quality of life according to the treatment applied and the changes produced after intervention.
- To explain correlation between (ICIQ score, leakage score, Quality of life score, and BMI) for the pre- post -test in the both groups.

1.5 Hypotheses

- A combined treatment program of core stability and Kegel exercise is more effective than Kegel exercise alone on stress urinary incontinence among middle-aged women in Palestine.
- A combined treatment program of core stability and Kegel exercise is more effective than Kegel exercise alone on the quality of life among middle-age Palestinian women.

- There is a positive correlation between (ICIQ score and the leakage score) for the pre- post -test in the both groups.
- There is a negative correlation between (ICIQ score and Quality of life score) for the pre- post -test in the both groups.

1.6 Terminology

UI: Urinary incontinence. International Continence Society (ICS) defined as claim or complaint from any involuntary loss of urine.

UUI: Urgency incontinence is the complaint of urine leakage associated with sudden urge avoid that con not postponed.

SUI: Stress urinary incontinence is the complaint of urine leakage in association with effort or coughing or sneezing.

MUI: mixed urinary incontinence : is a complaint of involuntary leakage associated with urgency or with effort ,sneezing or coughing (Aoki et al., 2017)

PFMT: Pelvic Floor Muscle Training

MUS: Mid- Uterus Sling

IAP: Intra-Abdominal Pressure

Chapter Two
Literature Review

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2.1.1 Pelvic Floor Muscle Anatomy

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Literature Review

2.1 Theoretical Framework

2.1.1 Pelvic Floor Muscle Anatomy

Pelvic floor muscles' component is a Dome-shaped muscular sheet that separated the pelvic cavity from the perianal region. This cavity surrounds the bowel of the pelvis, bladder, intestine and uterus in female (Bharucha, 2006).

The bony pelvis contains two innominate bones, or hip bones, which are fused to the sacrum posteriorly and to each other interiorly at the pubic symphysis. Each pelvic bone possessed of the ilium, ischium, and pubis, which are connected by cartilage in youth and fused in adult (Herschorn, 2004).

- **Ligaments of the pelvis**

The major four ligaments that stabilize the pelvic girdle consists of Iliolumbar ligament which strengthens the lumbo-sacral joint, lateral lumbosacral ligament, Sacrotuberous Ligament and the Sacrospinous ligament which extends from the Ischial spine to lateral margins of the sacrum.

- **Pelvic Floor Myology**

There are three layers of pelvic floor muscles consist of layer one- Urogenital Triangle, layer two- Urogenital Diaphragm, which called the triangular ligament, Layer three- pelvic diaphragm is a wide but thin muscular layer of tissue that forms the inferior border of the abdominopelvic cavity.

Levator Ani Muscle (pubococcygeus aka pubovisceral, pubovaginalis, puboanalis, puborectalis, iliococcygeus)(Bharucha, 2006).

2.1.2 Mechanism for stress urinary incontinence

Two common mechanism for stress urinary incontinence: The hammock hypothesis is widely accepted as the pathophysiological explanation of SUI associated with urethral hypermobility

resulting from loss of support of the bladder neck and urethral, they move during a peak of abdominal pressure. And weakness of urinary sphincter can result from trauma, neurological disease, aging or diseases leading to systemic muscular atrophy(Aoki et al., 2017).

2.1.3 Epidemiology for Stress Urinary Incontinence

Urinary incontinence is considered-stigmatizing condition in most population (Alshammari et al., 2020), which led to low rates of presentation for care, and create a high risk for respondent bias. In addition, most epidemiological studies did not differentiate between stress or urgency urinary incontinence (Aoki et al., 2017).

The prevalence rate for urinary incontinence varies between 25% to 45% in most studies (García-Sánchez et al., 2019; Milsom et al., 2014). UI is usually an under-reported, patients neglect it or are confused to report symptoms due to culturally embarrassing, and sensitive nature of the problem.

Health professionals should understand their patients in terms of cultural and religious identities, the misconception of UI patients should draw health professionals' attention in the Muslim community to clarify this medico-culture issue. These patients may benefit from the counseling of the Muslim Scholar who may explain the religious aspect of coping with permanent UI. According to Islamic teaching, A Muslim must perform prayers in all circumstances. Therefore, clothes should be immaculate and clean for praying (Alshammari et al., 2020).

Health professionals should be culturally sensitive to their patients' needs and correct their misconception about urinary incontinence, and physicians should work on improving help- seeking behavior to overcoming the embarrassment(Alshammari et al., 2020).

The association of urinary incontinence with age, the age specific incidence is < 2 per 1000 person-years in women < 40 years, but it increases with age. In addition, stress urinary incontinence is higher prevalence and more common in white women than in African –American or Asian –

American women. Other factors associated with urinary incontinence include obesity, previous hysterectomy or pelvic surgery, diabetes, pulmonary disease and dementia (Aoki et al., 2017).

2.1.4 Pelvic floor function

The pelvic floor muscles act to support the pelvic organs (bladder, vagina, and uterus) in female, anus and rectum with support from intra-abdominal contents, to maintain urinary and fecal continence, and sexual function of arousal and orgasm (Grimes & Stratton, 2020).

Pelvic floor muscles play role in breathing and posture, the core muscles including diaphragm, abdominal, pelvic floor muscles, and back muscles, these core muscles work as synergist to support trunk, pelvis, and spine to prevent injury or pain. Common problem for people, they hold breathing during lifting activity or bowel movement, which lead to pelvic floor muscle weakness or dysfunction, by adding excess stress on these muscles (Wallace et al., 2019).

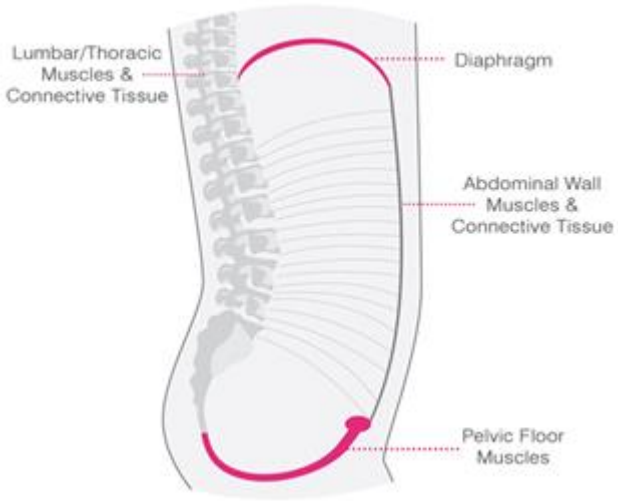

Figure 2-1 Core Activation: The Expansion and Compression cycle of the Core driven by the breath

https://images.app.goo.gl/KL3X4jHLbU9xswVz5

The diaphragm plays a significant role in the maintenance of breathing. When the diaphragm is contracted, it causes inspiration, and when it relaxes, it causes expiration. Diaphragmatic motion is affected by the contraction of the abdominal muscles. The downward movement of the diaphragm

decreases through the diaphragm is contracted because intra-abdominal pressure (IAP) increases, when the abdominal muscles are contracted during inspiration. In addition, expiratory flow can be increased because (IAP) make the diaphragm moves upward when the abdominal muscles are contracted during the relaxation of the diaphragm during expiration (Allison et al., 1998).

When both abdominal muscles and the diaphragm are contracted at the same time, the (IAP) increases (Cresswell et al., 1992). The stability of a trunk can be encouraged if there is an (IAP) by the simultaneous contraction both the abdominal and diaphragm muscles (Park & Han, 2015).

Among these muscles involved in IAP and breathing, the pelvic floor muscles are ignored. The diaphragm moves upward and the increased IAP induces a contraction of the PFM, when abdominal muscle are strongly contracted. The PFM are involved in changes of IAP and trunk stability, which is required in breathing, coughing, contracting simultaneously when both the diaphragm and anterolateral abdominal muscle are contracted (Park & Han, 2015).

So weakness or dysfunction of pelvic floor muscles may lead to tight or excessive load on Core muscles including the diaphragm, pelvic, trunk and abdominal muscles, these changes may lead to urinary incontinence(Wallace et al., 2019).

2.1.5 Etiology for Stress Urinary Incontinence

There are no specific factors that cause pelvic floor dysfunction, it might be habitual efforts to avoid urination or bowel movement, lifestyle factors, surgical or obstetric causes lead to muscular pain with hypertonicity of the pelvic floor, sexual abuse associated with pelvis pain, posture. In addition, gait, and skeletal asymmetry may lead to pelvic muscular pain, degenerative neuromuscular disease, lower back injury or surgery may contribute to pelvic dysfunction, irritable bowel syndrome, additional factors include advancing aging, obesity and childbearing (Grimes & Stratton, 2020).

2.1.6 Pelvic floor dysfunction

Incontinence in women is related to dysfunction of the bladder or pelvic floor muscle, dysfunction refers to wide range of signs and sympotms and anatomic changes related to abnormal function of the pelvic floor muscluatire. This dysfunction corresponds to increase activity, or reduced activity, or inappropriate coordination of pelvic floor muscle (Grimes & Stratton, 2020).

- Signs and symptoms of pelvic floor dysfunction for women

- Leaking urnie during activities, when coughing, laughing or sneezing, frequent need to urinate this is known as stress urinary incontience (Aoki et al., 2017).
- Difficulty emptying bladder (discountienous urination) stop many times, pelvic pain and lower back pain (Grimes & Stratton, 2020).
- Prolapse is a common sign that occurs due to weak pelvic floor, it may be felt as a bulge in the vagina, feeling discomfort, heaviness, drugging or stopping sensation (Grimes & Stratton, 2020).

- Risk factors pelvic floor dysfunction for women

- Age: women experiencing menopause which risks are dramatically increased due to hormonal fluctuation which change the functioning of female urogenital structure, it include weakening pelvic muscles, the muscle mass decrease during age (Frota et al., 2018).
- Direct injury to Levator ani (fall on groin), or loss of tone of pelvic muscles lead to changing position of Levator ani and widening of genital habitus. This alternation results on tearing or weakening that may cause pelvic organ prolapse (Iglesia & Smithling, 2017).
- Pregnancy and the nature of childbirth : overstretching damage the pudendal nerve due to vaginal birth, or surgical procedures to increase opening in vagina, weight and number of children, all these are factors that may lead to increased risk of pelvic dysfunction (Iglesia & Smithling, 2017).

2.1.7 Physical Examination for stress urinary incontinence

Examination of each patient should be individualized to be comfortable; a specialized team in women's health including gynecologists, nurses, and physiotherapists should do physical examination for each patient. Assessments of patients with SUI should include functional assessment including (pelvic &abdominal examination), to evaluate for any sub urethral masses, or pelvic floor muscle tenderness, and body mass index (BMI) (Winkelman WD, Elkadry E, 2021).

Cough stress test for diagnosis SUI, the patient is asked to cough during their pelvic examination to assess for SUI. This test is provoked by a serious of forceful cough in the supine or standing position. If a patient does not have a full bladder an empty supine stress test, may be done, if positive this indicated SUI of greater severity (Aoki et al., 2017; Winkelman & Elkadry, 2021).

2.1.8 Management for stress urinary incontinence

Before initiating treatment for SUI, it is important to identify the risk factors that may contribute to the severity of women problems. In addition, may relieve the potential benefits of the first –line SUI treatment (Winkelman &Elkadry, 2021)

The options for management of urinary incontinence include life style change (including fluid optimizing) and behavioral modification. The health belief model is commonly used in the field of health behavior and widely used in clinical practice. This model includes perceptions of risks, severity, benefits, barriers, and emphasize the individuals own perception and beliefs while ignoring the influence of external pressures, such as subjective norms (Hamzaee et al., 2019; Shariati et al., 2021).

Pharmacological treatment which is uncommon and subjective improvement of stress-specific symptoms is only modest (Winkelman & Elkadry, 2021).

There are a number of surgical procedures of the treatment SUI. The synthetic mid-urethral sling is the most common, and this procedure has an excellent long term success, low morbidity, and low continence rate around 90% with long term follow up (Winkelman & Elkadry, 2021). The

PFMT is a treatment option that lead to changes over women lifetime, and reflects her changing health priorities, so the goals and preferences change with time and should be considered (Aoki et al., 2017; Winkelman & Elkadry, 2021).

2.1.8.1 Pelvic floor muscle training (PFMT) & Pelvic floor muscle protocol

PFMT can be recommended at any time a concern of SUI has been identified. At first starting with physical examination, assess pelvic floor muscle contraction strength, and ability to isolate these muscles from the surrounding abdominal, lower extremity, and gluteal muscle. If the surrounding muscles are recruited more than pelvic floor muscles, indicating to pelvic floor dysfunction.

In addition, fluid intake and frequency of voiding to keep bladder volume below the leakage threshold are assessed. Instructed women who had weak PFM starting from supine position (Winkelman & Elkadry, 2021)

Routinely use (Knack maneuver) which consist squeezing the pelvic floor muscles at the time expected cough or sneeze. This maneuver is benefit for women with recent onset or long standing SUI. PFMT can help with the recruitment both the striated pelvic floor muscles, and striated urethral sphincter muscle, which proves urethral closure pressure and urethral stiffness, so decreasing leak volume (Winkelman WD, Elkadry E, 2021).

Women undergoing PFMT is likely to cure SUI in the long term, but may improve symptoms for prolonged period as a regular routine to obtain optimal muscle function. This routine can be performed or maintained at home or with physical therapist (Winkelman & Elkadry, 2021).

Pelvic floor muscle training (PFMT) protocol

Systematic review with Meta –analysis investigated the effects of PFMT through specific relaxation and tightening muscle exercises on women with SUI and to determine the main characteristics of PFMT protocol (García-Sánchez et al., 2019).

- Research studies have not determined which training load is the most effective for women with stress urinary incontinence(García-Sánchez et al., 2019)

- Regarding exercise characteristic, systematic review and meta-analysis confirm that PFM contraction and the moment in which it is performed are key factors for the maintenance of continence.
- Results suggest a training program of 6 weeks minimum for reaching an improvement.
- Contraction should carried out a combining slow contraction or holding 5, 6, to 10 s, with rapid contraction lasting 1, 2, and 3s.
- The recovery time between contractions may range from 1 to 12s, depending on the number of contraction performed (García-Sánchez et al., 2019).
- The series or set should not exceed nine per session; the recovery between them should be 1 to 3 minutes, with these variables to be used incrementally.
- To increase intensity, the number of contractions, duration of contraction or number of fast contraction should be increased.
- The use of vaginal cones of different weights and biofeedback could be added as a complement, and may assist the work performed by the pelvic floor musculature.
- The results suggest that PFMT using a short sessions (10-45 minutes), and with frequency of 3 to 7 days per week may evoke the greatest changes in women with UI (García-Sánchez et al., 2019).

2.1.8.2 Core Stabilizer

Core stability is defined as the ability to maintain equilibrium and control of spine and pelvis during movement without compensatory movement within physiological limits. The core muscles are: The Diaphragm, the Transverse abdomen muscles, Multifidus muscles, and pelvic floor muscles, act as one unit at the center of functional kinetic chain. The co-contraction of diaphragm and the abdomen muscles increase intra-abdominal pressure, reduce the load on the spine and fix the trunk(Alghadir et al., 2021).

Evidence support that Core muscles play an important role in trunk control and maintenance of continence, so the core muscles should be functioning optimally if the individual need to be free of incontinence. In addition to PFM, stability of the lumber spine is achieved through the coordinated effort with Core muscle the transverse abdominis muscle support spinal stability by increasing tension in the thoracolumbar fascia and assist the diaphragm in modulating intra-abdominal pressure. Continence is controlled through coordination of core muscles and abdominal cavity. PFM stabilize the neck of bladder, and increase intraurethral pressure to maintain the continence. So strong abdominal muscle contraction provide a strong PFM contraction, which is important for the control of incontinence (Alghadir et al., 2021).

2.1.8.3 Kegel exercise

Kegel exercises involve isometric contraction of the pelvic floor muscles. This can be described as a sensation of stopping urination mid –flow. These exercises help to produce sufficient strength, co-ordination and endurance of the pelvic floor muscles throughout the different stages of the women life(Huang & Chang, 2020)

Kegel exercises are one of the treatments to manage the pelvic floor muscle weakness and they are the most common therapies, because patients can implement them as daily routine.

There is no fixed protocol for Kegel exercises, but the basic rules include identifying the appropriate muscles, which stop, or slow the urination, to contract these muscles in the correct manner, to repeat the cycle for many times. Many patients may contract their hip adductors, abdomens, and gluteal muscles during pelvic floor muscle exercises (Huang & Chang, 2020)

Alternating fast and slow contraction as the key elements of the exercise. During the fast contractions, the patients tighten and relax the pelvic floor muscles quickly, and train the pelvic floor muscles to adapt to increases intra-abdominal pressure during coughing, or laughing.

The slow contraction, the patients hold the contracted muscles for a longer period then relax and help with muscle strengthening (Huang & Chang, 2020).

The steps for effective Kegel exercises to tighten the muscles around vaginal/anal area, contract the vaginal and rectal muscles, the patient should feel the muscles around the anus tighten slightly, then relaxed with no distraction, and hold contraction not more than 5-10 reps at time with a 3-5 sec hold (Huang & Chang, 2020)

Patients undergoes Kegel exercises showed better outcomes of pelvic floor function, including improvement of quality of life, decreasing urinary leakage, and higher satisfaction rate (Zanetti et al., 2007).

Performing Kegel exercise with an adequate intensity and frequency is an important factor for better outcome(Dumoulin et al., 2018).

Kegel exercise might be effective if the training program last more than three months(Dumoulin et al., 2018)

2.2 Similar studies

In the literature most of the studies have recommended that pelvic floor muscle training (PFMT) is an effective method and that PFMT is considered as a first –line conservative approach to treat stress urinary incontinence, and that it has a significant positive impact on the quality of life (Radzimińska et al., 2018). PFMT helps decreasing the number of urinary leakage episodes, and amount of leakage, so the severity of urinary incontinence decreased in the experimental groups compared with the control groups in most studies (Dumoulin et al., 2018; Oliveira et al., 2017).

A similar study has indicated that pelvic floor muscle rehabilitation contributed to improve the sexual function of women with stress urinary incontinence, it's part of the improvement of the quality of life, and decrease of urine leakage because it strengthens pelvic floor muscle (Preda & Moreira, 2019).

In a study by Pandey et al showed that the use of mid- uterus sling (MUS) surgery improves quality of life significantly in women with SUI, followed by PFMT. They found 100% symptomatic relief, high rate of improvement in the quality of life (QOL) with minimal easy to manage complications (Pandey et al., 2019).

The pelvic floor muscles play a great role to maintain posture and breathing, so weakness or dysfunction of pelvic floor muscles may lead to tight or excessive load on Core muscles include diaphragm, pelvic, trunk and abdominal muscles, these changes may lead to modification on posture to compensate dysfunction, and may lead to urinary incontinence (Wallace et al., 2019).

A previous study by Jan Krhut examined the impact of different type of incontinence on the quality of life; the results showed that there was no linear correlation between incontinence severity and quality of life. Stress urinary incontinence had lower impact on quality of life (QOL) than different type of urinary incontinence (Krhut et al., 2018).

In a study by Christiana Nygaard analyzed the prevalence of urinary incontinence in female patients and investigated the risk factors and how impact on the quality of life, results showed that the prevalence of urinary incontinence was high among obese patients and affected negatively on their quality of life. And vaginal deliveries and menopause associated with UI (Nygaard et al., 2018).

An Evidence –based approach to stress urinary incontinence confirm that Obesity is a known risk factor for SUI, weight loss is associated with improvement in SUI symptoms. A 10% loss of body weight is associated with a 70% reduction of urinary frequency (Winkelman & Elkadry, 2021).

A Randomized trail study demonstrated that women with BMI <30 kg/m^2 benefited from pelvic floor muscle training and m. transversus abdominis (PFMT and TrA) with consideration to physical limitation and embarrassment. SUI triggers emotion, severity measure and embarrassment. Results recommended participants with waist to hip ratio(WHR) <0.8 benefited more in terms quality of life than women with (WHR) >0.8 (Ptak et al., 2020).

A similar study results shown that's urinary incontinence is a common health problem and its prevalence and severity increased with age, and modifiable risk factors such as falls and depression may decrease the prevalence and incidence of urinary incontinence (Giraldo et al., 2019).

A randomized trial study demonstrated that combined conservative treatment (pelvic floor muscle training and m. transversus abdominis) was more effective and improved the quality of life of women with stress urinary incontinence such physical activity, travelling, social limitation, emotion, sleep problems, and embarrassment. And combined treatment gave better results in women who have birth fewer than three times than isolated pelvic floor muscle training (Ptak et al., 2019).

A multicenter randomized trial study was found no evidence of any difference in severity of urinary incontinence between PFMT alone and PFMT plus electromyographic biofeedback. And a routine use of biofeedback PFMT is not recommended (Hagen et al., 2020).

A similar study results showed that there was a significant association between the ICIQ scores severity of urinary incontinence and increasing in BMI. In addition, a high percentage of older adult participants did not seek help, consider UI common and distressing problem that is affect their quality of life. The participants had a limitation of social life and had negative impact on their physical activity, and self-esteem. The results recommended to increase awareness about UI, quality of life, and encourage them to overcome the stigma, embarrassment and to seek medical help (Alshammari et al., 2020).

Literature review identified the effect of PFMT with TrA training were the most effective approach when treating women with urinary incontinence, and reported positive outcomes after adding TrA recruitment to PFMT (Biljana Kennaway & Catherine Carus, 2020).

In addition, a similar study recommended abdominal and hip adductor exercise adjuncts of Kegel exercise, but the combination of abdominal, hip adductors and pelvic floor muscle contraction (combo) was the most effective in activating of pelvic floor muscles (Ojukwu et al., 2021).

A study by Swati Deshmane and K Memchoubi proved that pelvic floor exercise was highly effective in the management of urinary incontinence among women. Pelvic floor muscle is cost- effective, and should be the first line of treatment for urinary incontinence (Memchoubi, 2020).

In addition, a similar study recommended conservative management options for treating urinary incontinence, included pelvic floor retraining (Kegel) exercises for women with stress urinary incontinence. Additionally, behavioral modification, life style changing in combination with pelvic floor exercise were highly effective and recommended to treat women with urinary incontinence (Memchoubi, 2020).

(Alghadir et al., 2021) study showed the prevalence of stress urinary incontinence was higher with low back pain than healthy women. In addition, Core muscle endurance offer a stronger association with SUI than low back pain among women with low back pain compared to healthy women in Saudi Arabia.

A recent Cochrane systemic review compared the effect of PFMT to no treatment, placebo, or sham treatment for patients with UI. The review found that women with SUI undergoing PFMT were 8 times more likely to report symptomatic cure compared with women undergoing placebo, no treatment (Winkelman & Elkadry, 2021).

Our study expected to add evidence to the literature in Palestine and will highlight the importance of physiotherapy's role for SUI management, and expected to help women to modify their lifestyle and improve their quality of life in terms of seeking treatment and dealing with this problem as any other medical condition.

The scope of our study corresponded with similar studies, which recommended that pelvic floor muscles training (PFMT) is an effective method and that PFMT considered as a first –line conservative approach to treat stress urinary incontinence, and that it has a significant positive impact on the quality of life. PFMT helps decreasing the number of urinary leakage episodes, and amount of leakage.

2.3 Conceptual Framework

This study aimed to assess the effect of different conservative approaches of treatment on stress urinary incontinence and quality of life among middle- aged Palestinian women. In this study, there were two arms of intervention; one arm is a combination of Core Stability and Kegel exercise. This intervention program

affected on the frequency, severity, and amount of urine leakage, these variables decreased and improved their physical, functional, social, and ADL activities that is a part of improvement of quality of life among women with stress urinary incontinence.

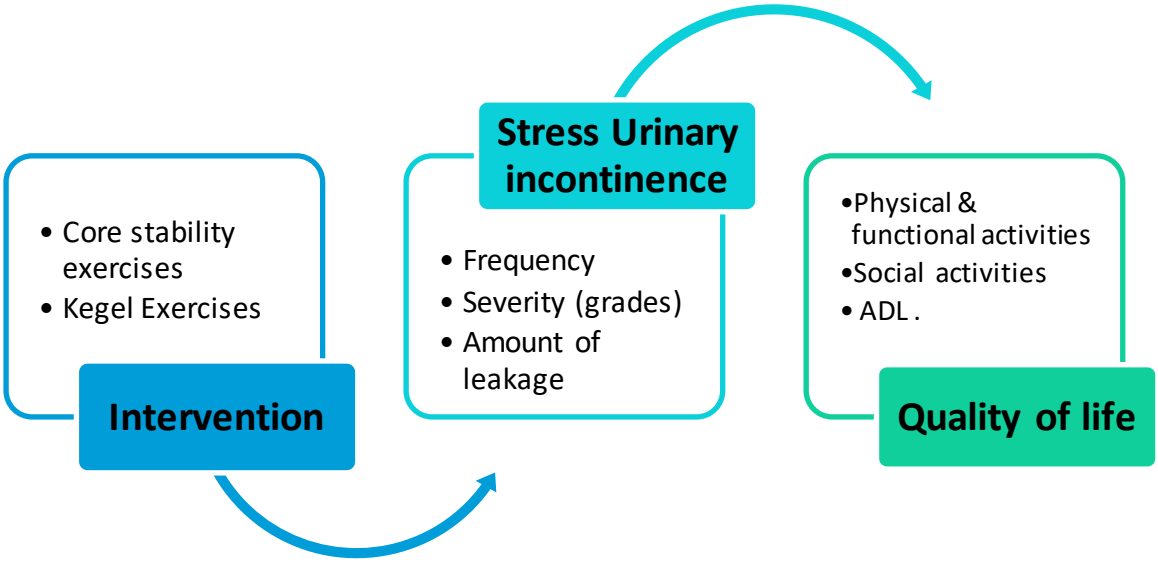

Figure 2-3 Conceptual Framework for study research

Chapter Three

Methods and Material

3.1 Study design

3.2 Study setting

3.3 Study Sample

3.3.1 Sampling methods

3.3.2 Sample Size

3.3.3 Inclusion criteria

3.3.4 Exclusion criteria

3.4 Data Collection

3.4.1 Data collection tools

3.4.2 Study Procedures

3.5 Suggested Program

3.6 Statistical analysis

3.7 Ethical Consideration

3.1 Study design

An experimental randomized controlled trial (RCT) design was used. This study was conducted during April – December 2021.

3.2 Study setting

The study took place at Physio One Center in Beit Omar town in Hebron. The clinic is prepared for the study implementation, all required tools were available prior the commencement of the intervention.

3.3 Study Sample

3.3.1 Sampling methods

At baseline, a convenient sample of 58 women with stress urinary incontinence recruited in this study. Then a systematic sample used for distributing the participants randomly into the experimental and control groups, participants with odd numbers assigned to the control group (n=29), and participants with even numbers allocated to the experiment group (n=29).

3.3.2 Sample Size

The participants were females, aged between 35-50 years old; participants were from Hebron city in the West Bank-Palestine, a number of 58 women with stress urinary incontinence were recruited in this study. Due to the absence of prevalence studies in Palestine on SUI and in accordance with similar studies, the number was expected to be adequate to achieve the objectives of this study.

3.3.3 Inclusion criteria

Middle aged Palestinian women 35- 50 years old, with stress urinary incontinence, and agreed to participate in this study and signed a consent form.

3.3.4 Exclusion criteria

- ✓ Pregnant women
- ✓ Chronic diseases such as diabetes, kidney, heart, cancer disease.
- ✓ Neurological disorder such as post- stroke, UI may affect a round half of stroke survivor in acute phase of stroke recovery (during the first months). It is unclear whether incontinence is a direct (site of brain lesion), or indirect (motor, visual, or speech problem) making the task of accessing toilet facilities is a challenge) consequence of stroke. (Thomas LH, Coupe J, Cross LD, Tan AL, Watkins CL. , 2019).
- ✓ People with neurological disorder often present with UI due to a failure of the bladder to adequately store or an adequately empty urine (Woodward, S. (2013).)
- ✓ Lung disease, Asthma.
- ✓ Cognitive impairment, depression.
- ✓ All types of surgeries in the last 6 months including Caesarian, hysterectomy, and others.
- ✓ Any other physical or psychological condition that makes investigations and intervention impossible.

3.4 Data Collection

3.4.1 Data collection tools

- ✓ **Demographic and clinical characteristics sheet:** Data related to (age, weight, height, body mass index (BMI), and marital status, and occupation, number of children, miscarriages, smoking habits, medical history, and previous surgeries) was recorded.
- ✓ **Outcome data was reported for each participant with the following measures:**

- **The Incontinence Quality of Life Instrument (I-QOL)** is a self-report quality of life measure specific to urinary incontinence. The I-QOL has 22 questions with three subscales (1) avoid and limiting behaviors (items), (2) psychosocial impacts (9 items), and (3) social embarrassment (5 items). The I-QOL is described as a valid and reliable measure

(García-Sánchez et al., 2019).The translated Arabic version was used (Schurch et al., 2007)The Cronbach ranged from .79 to .93, indicating that I-QOL is a reliable measure of QOL in neurogenic urinary incontinence patients. No item had more than 5.1% missing or out of range values. The I-QOL was responsive to improvements in symptoms. MID values ranged from 4 to 11 point. Results suggest that I-QOL is a reliable, valid, and responsive measure of incontinence-related QOL in neurogenic patients.

- **Ingelman-Sundberg scale** In this scale the incontinence severity is graded according to physical activities, provoking urinary leakage, grade I: urinary incontinence while coughing or sneezing, grade II: urinary incontinence while running or picking up heavy objects, and grade III: incontinence while walking or climbing stairs (Petros & Ulmsten, 1990).
- The International Consultation of Incontinence (ICIQ) self –reported questionnaire, it can be self-administered or during assessment by the therapist. Question items about frequency of urinary incontinence, amount of leakage. The ICIQ-UI Short form provides a score ranging from 0-21. With a higher score indicating greater severity of symptoms (García-Sánchez et al., 2019). The translated Arabic version was used of the ICIQ showed satisfactory test-retest reliability and internal consistency, with the Cronbach $\alpha = .75$. Confirmatory factor analysis confirmed the same two factors ("catheter function" and "lifestyle") structure as found in the English version of the tool supporting the construct validity of the translated questionnaire (Al-Shaikh et al., 2013).

3.4.2 Study Procedures

At baseline, the convenient sample of 58 women with stress urinary incontinence from Beit Ummer and Hebron city was recruited (29 women in the experimental group, mean (SD) age was 45(6.41) years, while 29 women in the control group, the mean (SD) was 43 (5.90) years.

Inclusion criteria consisted of middle-aged Palestinian women 35- 50 years old, with stress urinary incontinence. Exclusion criteria included pregnant, women exposed to any surgeries in the last six

months, and women diagnosed with chronic disease, neurological, cognitive disorder, and any other physical or psychological condition that makes investigations and intervention impossible.

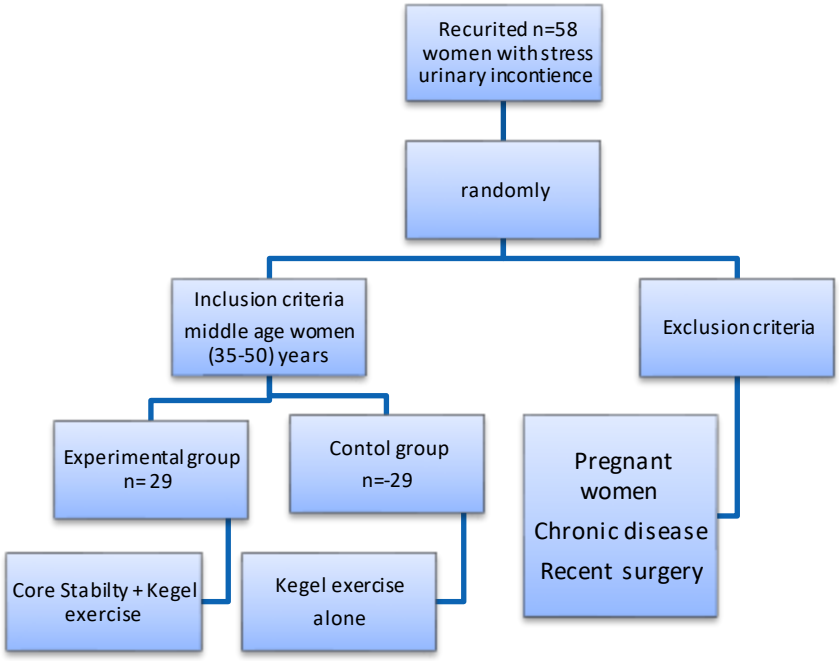

Figure 3-1 Flow chart for study procdures

The participants were randomly distributed in (Beit Ummer) to the control and experimental groups. The training setting for the experimental group was a hall in the Physio One Center for physiotherapy, which was equipped with mattresses and tools for training, in addition, used music therapy. The participants in the experimental group were trained on the suggested program (Core stability exercises +Kegel exercise). The training was applied as group therapy using a mat exercises design, (11) women were in a group .

After allocating the participants into the control or intervention group, the researcher has filled up the personal sheet for each participant on the first day.

Physiotherapist did physical examination, functional assessment (pelvis &abdominal) assessment, BMI and cough test to diagnose each participant, and to diagnose women with stress urinary incontinence from other types of incontinence.

Women with urinary stress incontinence were diagnosed from clinical history based on the presence of stress incontinence symptoms and severity, so each participant has filled out a self-report quality of life (I-QOL) measure, ICIQ questionnaire, and Ingelman-Sundberg scale on their own or with assistance during the assessment.

A treatment program was carried out (3 times per /week), duration of session 40-50 minutes under the supervision of the physiotherapist (Wala Alami) during 6 weeks of intervention.

Another experimental group was at Hebron city; the participants were (18) women with stress urinary incontinence. The training was at Health Work Committees Foundation at (Ishraqa Center) in the old town, the setting was equipped with mattresses and music therapy, the researcher has filled up the personal sheet and the outcome measures for each participant on the first day. The program was implemented by assistance of a physiotherapist (Rawan Qawasmeh), she was trained on the experimental program, and given a written program with illustrations for exercises and a number of repetitions +hold for each exercise considering progress every two weeks in the program. A treatment program was carried out (3 times per/ week) by Rawan Qawasmeh، and follow-up of the treatment program by the researcher once a week, in addition, follow up by social media (a Facebook group).

Control group in both regions. In the first week, the participants were instructed by the researcher on Kegel exercises how to contract pelvic floor muscles and provided information and advice regarding SUI, including an explanation about risk and prognostic factors for SUI in specific to each participant's lifestyle, try stopping urination in midstream or holding back gas.

Follow-up was done once a week, in addition through social media (Facebook group). The exercises were done two to three- times of 10 repetitions daily and hold the contraction for 10 seconds with progression every two weeks. The participants were instructed to perform these exercises daily at home, during the 6 weeks of intervention.

Control group (Kegel exercise)

- ✓ At the first week, Kegel exercises used to instruct the participants how to contract pelvic floor muscles and provided information and advised regarding SUI, including an explanation about

risk and prognostic factors for SUI in specific to each participant lifestyle, follow up done once /per week.

- ✓ In this group, the participants instructed by the physiotherapist on Kegel exercise, how to do active contraction of the pelvic floor muscles, try to stop urination in midstream or holding back gas.
- ✓ The exercises done two to three- times of 10 repetitions daily and hold the contraction for 10 second. Participants instructed to perform these exercises daily at home, during the 6 weeks of intervention (Huang & Chang, 2020).

Experimental group (Core stability +Kegel exercise)

- ✓ In addition to Kegel exercises, participants in the experimental group received a Core stability exercises program, improved posture, strengthened muscles around the hip and pelvis, lower back, and abdomen.
- ✓ The training applied as a group therapy using mat exercises design, 5-7 women included in each group.
- ✓ A treatment program carried out (3 times per /week), duration of session 40-50 minutes under supervision of the physiot3herapist during 6 weeks of intervention.

3.5 Suggested Program

Is illustrated in Tables 1 & 2 & 3

Table 3. 1 Intervention program for the experimental group (week 1&2)

Exercise	Intervention program	Duration	Description
Exercise 1	Warm up exercise	5 minutes	Jog exercise
Exercise 2	Bridge exercise	10 minutes	10-15 repetition+ hold for 3-5 seconds
Exercise 3	Wall Sit exercise	10 minutes	10-15 repetition+ hold for 3-5 seconds
Exercise 4	Cool down exercise	5 minutes	Stretching and relax exercise

Table 3. 2 Intervention program for the experimental group with progression at week 3&4

Exercise 1	Warm up exercise	5 minutes	
Exercise 2	Bridge exercise	5-7 minutes	10 repetitions +hold for 5-7 seconds
Exercise 3	Wall Sit	5-7 minutes	10 repetitions +hold for 5-7 second
Exercise 4	Bird Dog exercise	10 minutes	10-15 repetition +hold for 5-7 second
Exercise 5	Dead bug exercise	10 minutes	10-15 repetition +hold for 5-7 second

Table 3.3 Intervention program for the experimental group with progression at week 5&6

Exercise 1	**Warm up**	**5 minutes**	
Exercise 2	**Bridge exercise**	**5 minutes**	**10 repetition+ hold for 10 seconds**
Exercise 3	**Wall Sit**	**5 minutes**	**10 repetition+ hold for 10 seconds**
Exercise 4	**Dead Bug**	**5-7 minutes**	**10 repetition+ hold for 10 seconds**
Exercise 5	**Bird Dog exercise**	**5-7 minutes**	**10 repetition+ hold for 10 seconds**
Exercise 6	**Plank exercise**	**10 minutes**	**10-15 repetition+ hold for 10 seconds**
Exercise 7	**Plank with running**	**10 minutes**	**10-15 repetition+ hold for 10 seconds**

3.6 Statistical analysis

Statistical analysis performed via the Statistical Package for the Social Sciences (SPSS) package, version 24 (SPSS Inc.، Chicago، IL). Data were analyzed using descriptive statistics and inferential statistics using means, medians, and ranges. Descriptive statistics performed to characterize the sample according to age, sex …etc**.** Independent sample test performed to differentiate the means between groups. Paired sample t-tests were used to determine differences between the pre and post-tests,

Pearson's correlation coefficients were used to determine association between quality of life and ICIQ scores with the leakage scores. Statistical significance was set at $P < 0.05$.

3.7 Ethical Consideration

- The study approval was obtained from the MPT committee, and the Research Ethical Committee at Al Quds University (Appendix 4), which is in accordance with the Declaration of Helsinki.
- The participants were fully informed about the study objectives and procedures, participants had the right to refuse or to withdraw from the study at any time without any restrictions. A written consent form signed by the participants.
- Data processed confidentially.
- The researcher was responsible for protecting the rights, and safety of the participants.

3.8 Timetable

Table 3.4: Timetable for implementation the study research

Time point	Intervention treatment							Follow up (evaluation)
	Week 1	2	3	4	5	6	7	Week 8-9
Eligible before 2 weeks								
Informed consent	X							
Clinical evaluation (inclusion & exclusion criteria)	X							
Intervention		X	X	X	X	X	X	
Assessment pre –test (I-QOL)+ (ICIQ)	X							
Post – test (I-QO)+ ICIQ)								X

Chapter Four

Results and Discussion

4.1 Results and analysis

4.1.1 Descriptive Statistics

4.1.2 Results of Mean Differences T-Test

4.2 Discussion

4.3 Study Limitations

4.1 Results and analysis

4.1.1 Descriptive Statistics

We recruited women with stress urinary incontinence from Hebron city (n=58), divided into two groups: control (n=29), and experimental (n=29). Factors related to demographic and clinical characteristics including Age, Weight, Height, BMI, Occupation, Marital status, number of children, pregnancy number, number of miscarriages, health problems, previous surgeries, and smoking habits were recorded. Demographic and clinical characteristics of the participants are shown in Table 4.1.

Table 4.1. Demographic and clinical characteristics of the participants

Variable (N %)	All (n=58)	Controlled (29)	Experimental (29)
Occupation			
Housewife	54 (94.7)	26 (92.9)	28 (69.6)
Hairdresser	1 (1.8)	1 (3.6)	1 (3.4)
Nurse	1 (1.8)	1 (3.6)	0 (0.0)
Treasurer	1 (1.8)	0 (0.0)	0 (0.0)
Marital Status			
Married	58 (100.0)	29 (100.0)	29 (100.0)
Number of children			
1-2	2 (3.4)	2 (6.9)	0 (0)
3-5	23 (39.7)	12 (41.4)	11 (37.9)
5+	33 (56.9)	15 (51.7)	18 (62.1)
Pregnancy Number			
1-2	1 (1.7)	1 (3.4)	0 (0)
3-5	18 (31.0)	10 (34.5)	8 (27.6)
5+	39 (67.2)	18 (62.1)	21 (72.4)
Number of Miscarriages			
None	16 (28.1)	11 (37.9)	5 (17.9)
1	10 (17.5)	7 (24.1)	3 (10.7)
2	15 (26.3)	5 (17.2)	10 (35.7)

3+	16 (28.1)	6 (20.7)	10 (35.7)
Did you have health problem			
Yes	9 (15.1)	6 (20.7)	3 (10.3)
No	49 (84.5)	23 (79.3)	26 (89.7)
Have you had any previous surgeries in the past 6 months			
Yes	0 (0.0)	0 (0.0)	0 (0.0)
No	58 (100.0)	29 (100.0)	29 (100.0)
Do you suffer from psychological problems			
Yes	4 (6.9)	2 (6.9)	2 (6.9)
No	54 (93.1)	27 (93.1)	27 (93.1)
Smoking Habits			
Yes	4 (6.9)	4 (13.8)	0 (0.0)
No	54 (93.1)	25 (86.2)	29 (100.0)
BMI Score			
Under weight	7 (12.1)	7 (24.1)	0 (0.0)
Healthy weight	5 (8.6)	1 (3.4)	4 (13.8)
Overweight	19 (32.8)	11 (37.9)	8 (27.6)
Obese	20 (34.5)	6 (20.7)	14 (48.3)
Severely Obese	5 (8.6)	2 (6.9)	3 (10.3)
Morbidly Obese	2 (3.4)	2 (6.9)	0 (0.0)

The results showed that the mean (SD) age for the experimental group was 45(6.41) years, while the mean (SD) for the control group was 43 (5.90) years. About 55.9% of the participant have 5+ children, and 67.2% have 5+ pregnancy numbers as shown in Figure 4.1

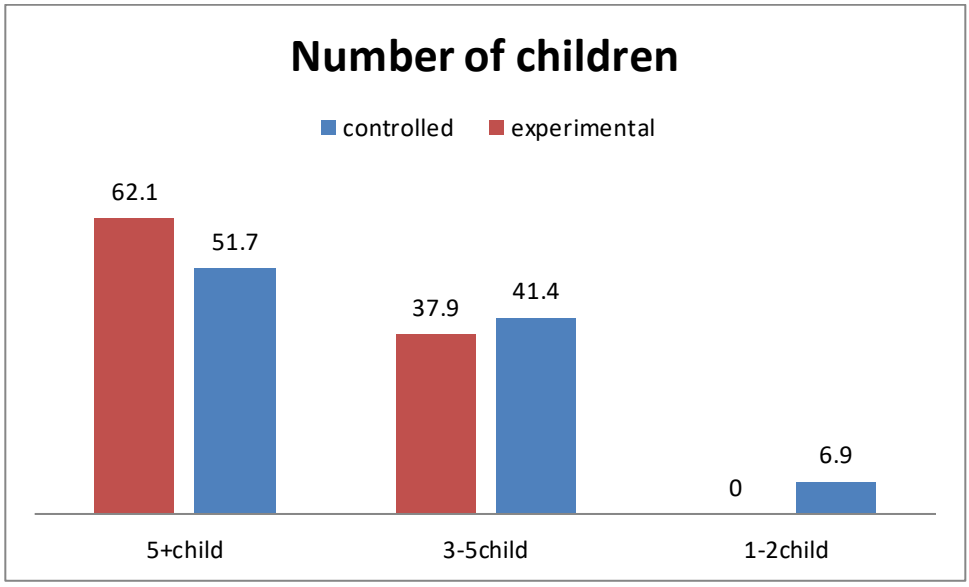

Figure 4.1 Number of children among (experimental/ control) groups

The mean (SD) of the BMI score for the experimental group was 30.84 (4.10), while the mean (SD) for the control group was 31.06 (5.50), and 86.2 % of the participants were Overweight as shown in Figure 4.2

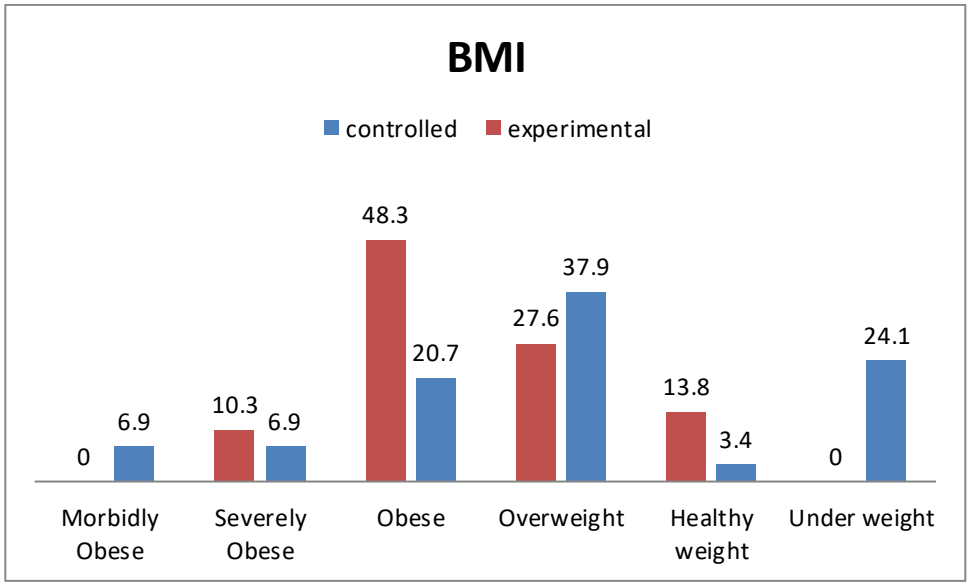

Figure 4.2 Distribution of BMI categories among (experimental/control) groups

As shown in Table 4.2, the results indicated that the majority of participants (58.6) % of the experimental group, and (67.9) % of the control group doesn't seek medical treatment for urinary incontinence.

Table 4. 2. Number of medical appointments to treat urinary incontinence.

Item	Responses	Exp.(n=29)	Con. (n=29)
How many medical appointments have you made in the past year to treat your urinary problems or incontinence	None	17 (58.6)	19 (67.9)
	1	3 (10.3)	3 (10.7)
	2	5 (17.2)	3 (10.7)
	3	2 (6.9)	2 (7.1)
	5	2 (6.8)	1 (3.6)

The severity of urinary incontinence among the respondents according to the group (controlled/ experimental) were described as (mild, moderate and severe). Descriptive statistics related to frequency distribution are illustrated in table 4.3.

Table 4.3 Frequency differences in the severity of urinary incontinence among the respondents according to the group (controlled/ experimental), n=58

Item	Responses	Exp. Pre (n=29)	Exp. Post (n=29)	Con. Pre (n=29)	Con. Post (n=29)
How would you describe the severity of your urinary problems or incontinence?	Mild	9 (31.0)	18(62.1)	8 (27.6)	19 (65.5)
	Moderate	11 (37.9)	10(34.5)	16(55.2)	10 (34.5)
	Severe	9 (31.0)	1 (3.4)	5 (17.2)	0 (0.0)

The results show that's (31.0%) of the participants in the experimental group, described mild severity of urinary incontinence pre -test, while (62.1%) became post -test. In addition, (31.0%) described severe urinary incontinence pre –test, while (3.4%) became post-test. A percentage of (27.6 %) described mild severity in the control group pre-test, while (56.5%) became in the post-test, and (17.2%) described severe urinary incontinence pre-test, while (0.0) became post-test as shown in figure 4.3

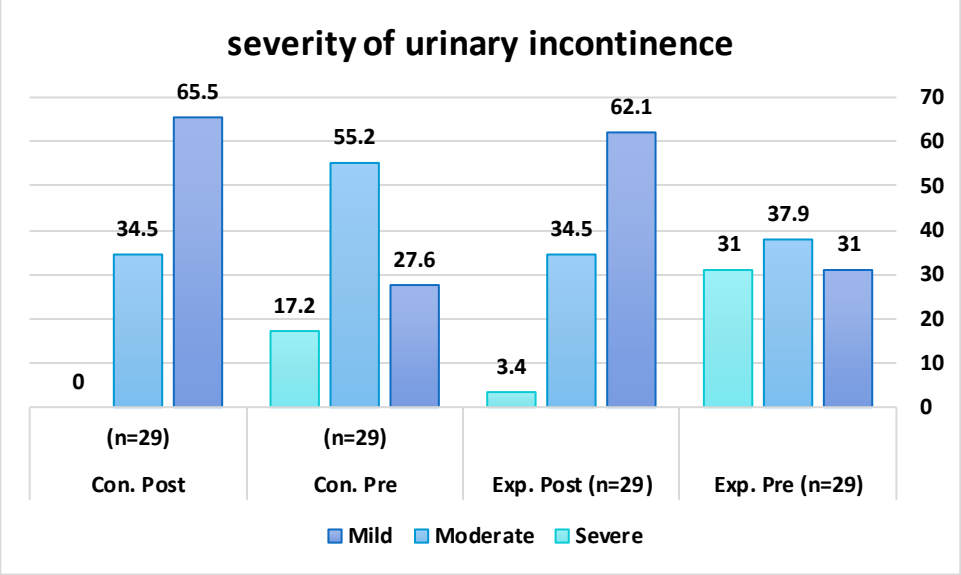

Figure 4.3 percentage of severity of urinary incontinence among (experimental /control) groups according to (pre-post) test

Table 4.4 shows the results of the pre and post – urinary incontinence Ingelman Sundberg Scale between the control and experimental groups, n=58

Table 4.4 Ingelman Sundberg Scale

Ingelman Sundberg Scale	Exp. -Pre (n=29)	Exp. -Post (n=29)	Cont. Pre (n=29)	Cont. Post (n=29)
0 No incontinence	2 (6.9)	12 (41.4)	1 (3.6)	6 (20.7)
1 Urinary incontinence while coughing، sneezing	18 (62.1)	15 (51.7)	15 (53.6)	17 (58.6)
2 Urinary incontinence whiles running، picking up object	8 (27.6)	2 (6.9)	11 (39.3)	6 (20.7)
3 Urinary incontinence while walking، climbing stairs	1 (3.4)	0 (0.0)	1 (3.6)	0 (0.0)

The results showed percentages' differences of pre and post -urinary scale among groups, the participants in the experimental group was pre-intervention (6.9%), while became (41.4%) post-intervention, this indicates that there were 10 women in the experimental group who had stress urinary incontinence disappeared, as in the control group the participants was pre-intervention (3.6%), while became (20.7%) post-intervention as shown in figure 4.4

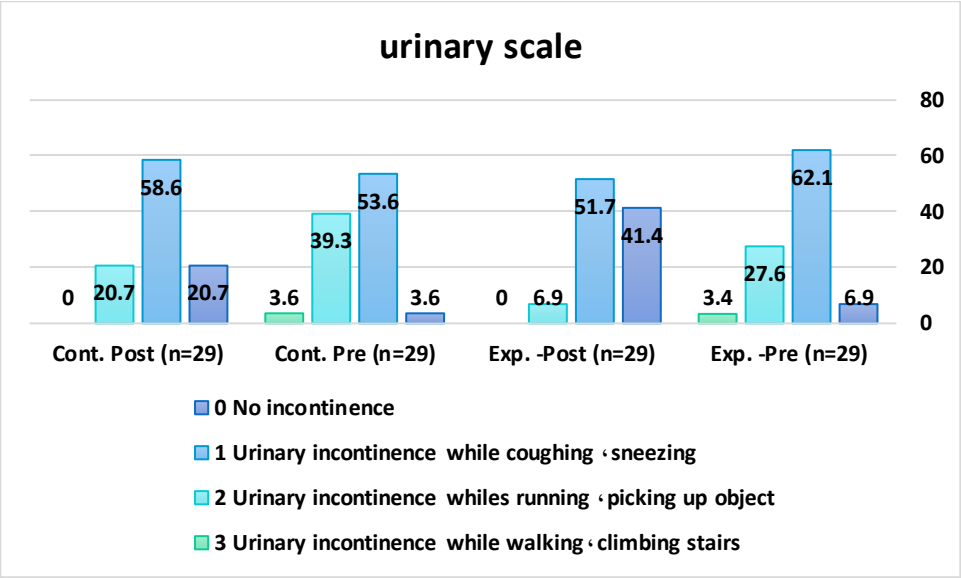

Figure 4.4 Percentage of urinary incontinence among (experimental/ control) groups according to (pre-post) test

The ICIQ-score indicating frequency of urinary incontinence, amount of leakage, and severity of symptoms, the difference in pre and post- frequencies between the two groups (controlled/ experimental) are shown in Table 4.5.

Table 4.5 A. Frequency differences in the International Consultation of Incontinence (ICIQ) score among the respondents according to the group (controlled/ experimental), n=58.

Items	Responses	Exp. Pre (n=29)	Exp. Post (n=29)	Cont. Pre (n=29)	Cont. Post (n=29)
How often do you leak urine?	Never	1 (3.4)	10 (34.5)	8 (27.6)	6 (20.7)
	About once a week or less often	7 (24.1)	11 (37.9)	6 (20.7)	9 (31.0)
	Two or three times a week	9 (31.0)	3 (10.3)	4 (13.8)	3 (10.3)
	Several times a day	12 (41.4)	5 (17.2)	9 (31.0)	1 (3.4)
	About once a day	--	--	0 (0.0)	9 (31.0)
	All the time	--	--	2 (6.9)	1 (3.4)
How much urine do you usually leak (whether you wear protection or not)?	None	1 (3.4)	9 (31.0)	1 (3.4)	7 (24.1)
	a small amount	12 (41.4)	13 (44.8)	16 (55.2)	17 (58.6)
	a moderate amount	13 (44.8)	6 (20.7)	8 (27.6)	2 (6.9)
	a large amount	3 (10.3)	1 (3.4)	4 (13.8)	3 (10.3)
Overall, how much does leaking urine interfere with your everyday life?	Never	0 (0.0)	7 (24.1)	0 (0.0)	4 (13.8)
	1	3 (10.3)	8 (27.6)	0 (0.0)	4 (13.8)
	2	4 (13.8)	3 (10.3)	2 (6.9)	4 (13.8)
	3	4 (13.8)	7 (24.1)	4 (13.8)	0 (0.0)
	4	2 (6.9)	1 (3.4)	6 (20.7)	6 (20.7)
	5	2 (2.9)	2 (6.9)	2 (6.9)	8 (27.6)
	6	1 (3.4)	0 (0.0)	4 (13.8)	1 (3.4)
	7	0 (0.0)	1 (3.4)	5 (17.2)	2 (6.9)
	8	4 (13.8)	0 (0.0)	1 (3.4)	0 (0.0)
	9	3 (10.3)	0 (0.0)	2 (6.9)	0 (0.0)
	10	6 (20.7)	0 (0.0)	3 (10.3)	0 (0.0)

Table 4.5 B. Frequency differences in the International Consultation of Incontinence (ICIQ) score among the respondents according to the group (controlled/ experimental), n=58.

Items	Responses	Exp. Pre (n=29)	Exp. Post (n=29)	Cont. Pre (n=29)	Cont. Post (n=29)
Urine does not leak	No	27 (93.1)	12 (42.9)	29 (100.0)	23 (79.3)
	Yes	2 (6.9)	16 (57.1)	0 (0.0)	6 (20.7)
leaks before you can get to the toilet	No	8 (27.6)	23 (79.3)	6 (20.7)	14 (48.3)
	Yes	21 (72.4)	6 (20.7)	23 (79.3)	15 (51.7)
leaks when you cough or sneeze	No	2 (6.9)	18 (62.1)	29(100.0)	10 (34.5)
	Yes	27 (93.1)	11 (37.9)	29 (100.0)	19 (65.5)
leaks when you are asleep	No	28 (96.6)	28 (96.6)	25 (86.2)	27 (93.1)
	Yes	1 (3.4)	1 (3.4)	4 (13.8)	2 (6.9)
leaks when you are physically active/exercising	No	13 (44.8)	23 (79.3)	14 (48.3)	21 (72.4)
	Yes	16 (55.2)	6 (20.7)	15 (51.7)	8 (27.6)
leaks when you have finished urinating and are dressed	No	17 (58.6)	26 (89.7)	22 (75.9)	27 (93.1)
	Yes	12 (41.4)	3 (10.3)	7 (24.1)	2 (6.9)
leaks for no obvious reason	No	24 (82.8)	29 (100.0)	23 (79.3)	28 (96.6)
	Yes	5 (17.2)	0 (0.0)	6 (20.7)	1 (3.4)
leaks all the time	No	28 (96.6)	29 (100.0)	28 (96.6)	29 (100.0)
	Yes	1 (3.4)	0 (0.0)	1 (3.4)	0 (0.0)

Results showed that the mean score of the ICIQ for the experimental group pre-test was 11.48(5.72), while it became 4.97(3.91) post- test. In addition, the mean score for the I-QOL score pre-test was 69.76(24.29), while it became 92.86(10.09) post- test. In the control group, the mean ICIQ score pre-

test was 11.48(4.24), while it became 7.17(4.61) post-test. In addition, the mean score for the I-QOL score pre-test was 27.79(17.34), while it became 89.17(17.71) post- test.

The I-QOL quality of life score specific for urinary incontinence, the results shows the difference in pre and post- frequencies between the two groups (controlled/ experimental) as shown in Table 4.6

Table 4.6 A. Frequency differences in the Quality of life score (I-QOL) among the respondents according to the group (controlled/ experimental), n=58.

Items	Responses	Exp. Pre (n=29)	Exp. Post (n=29)	Cont. Pre (n=29)	Cont. Post (n=29)
I worry about not being able to get to the toilet on time	Extremely	10 (34.5)	0 (0.0)	8 (27.6)	0 (0.0)
	Quite a bit	3 (10.3)	5 (17.2	3 (10.3)	4 (13.8)
	Moderately	5 (17.2)	5 (17.2)	7 (24.1)	9 (31.0)
	A little	8 (27.6)	7 (24.1)	5 (17.2)	5 (17.2)
	Not at all	3 (10.3)	12 (41.4)	6 (20.7)	11 (37.9)
I worry about coughing or sneezing because of my urinary problems or incontinence.	Extremely	10 (34.5)	1 (3.4)	13 (44.8)	1 (3.4)
	Quite a bit	4 (13.8)	4 (13.8)	1 (3.4)	1 (3.4)
	Moderately	3 (10.3)	2 (6.9)	9 (31.0)	12 (41.4)
	A little	10 (34.5)	12 (41.4)	4 (13.8)	8 (27.6)
	Not at all	2 (6.9)	10 (34.5)	2 (6.9)	7 (24.1)
I worry about wetting myself.	Extremely	11 (37.9)	3 (10.3)	6 (20.7)	0 (0.0)
	Quite a bit	2 (6.9)	2 (6.9)	2 (6.9)	7 (24.1)
	Moderately	2 (6.9)	1 (3.4)	7 (24.1)	5 (17.2)
	A little	7 (24.1)	7 (24.1)	11 (37.9)	7 (24.1)
	Not at all	7 (24.1)	16 (55.2)	3 (10.3)	10 (34.5)
I feel like I have no control over my bladder.	Extremely	7 (24.1)	0 (0.0)	6 (20.7)	0 (0.0)
	Quite a bit	5 (17.2)	4 (13.8)	3 (10.3)	6 (20.7)
	Moderately	5 (17.2)	1 (3.4)	5 (17.2)	6 (20.7)
	A little	5 (17.2)	12 (41.4)	10 (34.5)	7 (24.1)

	Not at all	7 (24.1)	12 (41.4)	5 (17.2)	10 (34.5)

Table 4.6 B. Frequency differences in the Quality of life score (I-QOL) among the respondents according to the group (controlled/ experimental), n=58.

Items	Responses	Exp. Pre (n=29)	Exp. Post (n=29)	Cont. Pre (n=29)	Cont. Post (n=29)
I feel depressed because of my urinary problems or incontinence.	Extremely	13 (44.8)	1 (3.4)	7 (24.1)	1 (3.4)
	Quite a bit	3 (10.3)	3 (10.3)	2 (6.9)	2 (6.9)
	Moderately	2 (6.9)	5 (17.2)	8 (27.6)	4 (13.8)
	A little	4 (13.8)	5 (17.2)	5 (17.2)	8 (27.6)
	Not at all	7 (24.1)	15 (51.7)	7 (24.1)	14 (48.3)
It is important for me to make frequent trips to the toilet.	Extremely	12 (41.4)	3 (10.3)	14 (48.3)	1 (3.4)
	Quite a bit	2 (6.9)	5 (17.2)	3 (10.3)	4 (13.8)
	Moderately	8 (27.6)	4 (13.8)	8 (27.6)	11 (37.9)
	A little	4 (13.8)	7 (24.1)	3 (10.3)	6 (20.7)
	Not at all	3 (10.3)	10 (34.5)	1 (3.4)	7 (24.1)
I worry about my urinary problems or incontinence getting worse as I grow older.	Extremely	16 (55.2)	5 (17.2)	19 (65.5)	4 (13.8)
	Quite a bit	2 (6.9)	4 (13.8)	0 (0.0)	5 (17.2)
	Moderately	3 (10.3)	3 (10.3)	7 (24.1)	9 (31.0)
	A little	6 (20.7)	7 (24.1)	3 (10.3)	5 (17.2)
	Not at all	2 (6.9)	10 (34.5)	0 (0.0)	6 (20.7)
I worry about being embarrassed or humiliated because of my urinary problems or incontinence.	Extremely	9 (31.0)	1 (3.4)	3 (10.3)	0 (0.0)
	Quite a bit	2 (6.9)	1 (3.4)	3 (10.3)	7 (24.1)
	Moderately	4 (13.8)	0 (0.0)	6 (20.7)	3 (10.3)
	A little	5 (17.2)	7 (24.1)	10 (34.5)	3 (10.3)
	Not at all	9 (31.0)	20 (69.0)	7 (24.1)	16 (55.2)

4.1.2 Results of Mean Differences T-Test

The results show that there were significant differences at ($\alpha \leq 0.01$) in the Leakage Score and Quality of life score among the participants due to the group (controlled/ experimental).

The differences among the experimental group were in favor of the post-test, in which the Leakage Score dropped up to mean equal (0.89%) compared to the controlled group (1.66%). Also, the differences for the Quality-of-life score were in favor of the post-test, in which the Quality of life score rises up to (93.89%) compared to (70.48%) for the pre-test as shown in Table 4.7.

Table 4.7 Mean differences in the Leakage Score and Quality of life score among the respondents according to the group (controlled/ experimental) ، n=58.

Group	Variable	Test	N	Mean (SD)	P-value
Experimental	Leakage Score	Pre	29	2.93 (1.19)	0.000
		Post	29	0.89 (1.08)	
	Quality of life score	Pre	29	70.48 (24.92)	0.000
		Post	29	93.89 (14.21)	
Controlled	Leakage Score	Pre	29	2.93 (1.31)	0.000
		Post	29	1.66 (1.17)	
	Quality of life score	Pre	29	72.79 (17.33)	0.000
		Post	29	90.21 (14.59)	

The results shows the mean differences in of the quality of life among groups(control/experimental)acording to pre-post test, in the experimental group the mean differences

was pre-test (70.48%),while increase to (93.89%)post-test. As in the contol group was pre-test (72.79%),while increased to (90.21%)pst-test as shown in figure 4.5

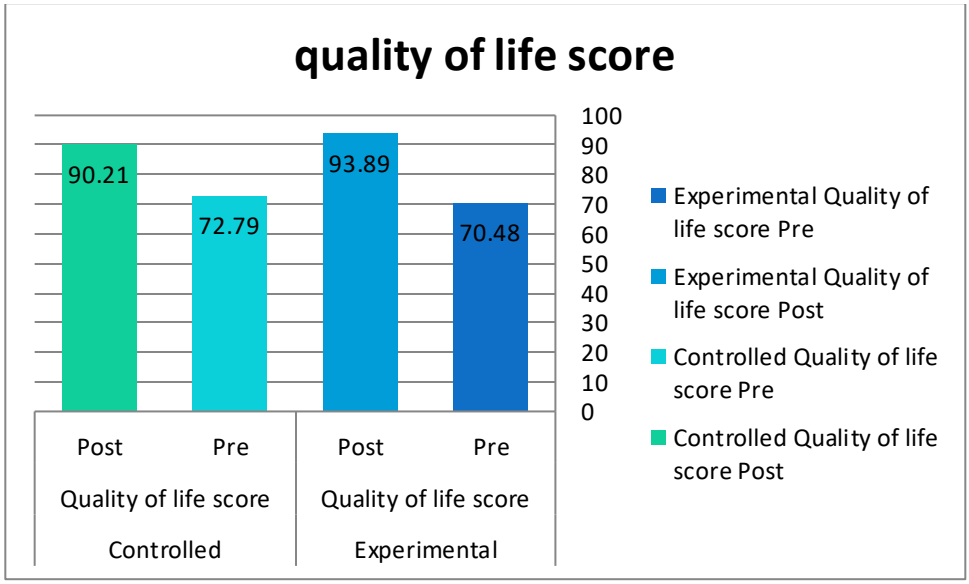

Figure 4.5 mean differences of the quality of life score among groups (controlled/experimental according to (pre-post) test

The results show mean differences of leakage score among groups (control/experimental) according to pre-post- test, in the experimental group was pre-test (2.93%), while dropped to (0.89%) post-test. As in the control group was pre-test (2.93%), while dropped to (1.66%) post-test as shown in figure 4.6

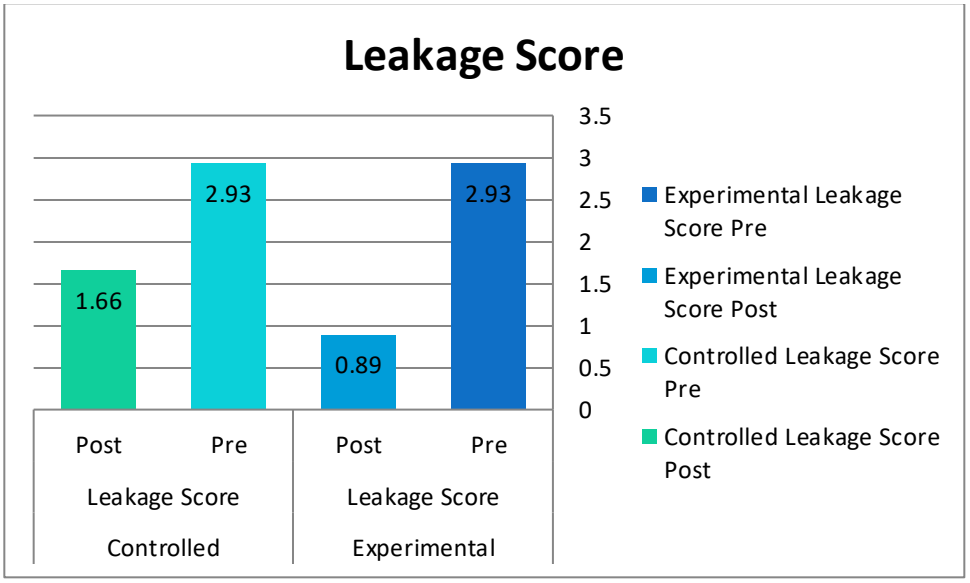

Figure 4.6 Mean differences of the leakage among groups (control/experimental) according to (pre-post) test.

Table 4.8 the results show that there were no significant differences at ($\alpha \leq 0.05$) Leakage Score and Quality of life score among the respondents in the post -test due to the group (controlled/ experimental).

Table 4.8 Paired sample T-test results for the differences in the Leakage Score and Quality of life score among the respondents in the post test among the groups (controlled/ experimental)

Variable	Group	N	Mean (SD)	P-value
Leakage Score	Experimental	29	1.48 (0.82)	0.168
	Controlled	29	1.83 (1.04)	
Quality of life score	Experimental	29	92.86 (14.09)	0.334
	Controlled	29	89.17 (17.71)	

Table 4.9 Correlation between (ICIQ score, leakage score, Quality of life score, and BMI) for the pre-test in the controlled group

		ICIQ score	leakage Score	Quality of life score	BMI
ICIQ score	Pearson Correlation	1	.630**	-.726-**	.041
	Sig. (2-tailed)		.000	.000	.832
leakage Score	Pearson Correlation	.630**	1	-.562-**	.103
	Sig. (2-tailed)	.000		.002	.593
**. Correlation is significant at the 0.01 level (2-tailed).					

The results show that there is a positive correlation between ICQI score and leakage Score (Pearson correlation= 0.630, P-value= 0.000). Also, the results show that there was a negative correlation between ICQI score and Quality of life (Pearson correlation= -0.726, P-value= 0.000)

In addition, the results show that there was a negative correlation between Quality of life score and leakage Score (Pearson correlation= -0.562, P-value= 0.002). While there was no significant correlation between the other variables

Table 4.10 Correlation between (ICIQ score, leakage score, Quality of life score, and BMI) for the post-test in the controlled group

		ICIQ score	leakage Score	Quality of life score	BMI
ICIQ score	Pearson Correlation	1	.686**	-.715-**	.133
	Sig. (2-tailed)		.000	.000	.493
leakage Score	Pearson Correlation	.686**	1	-.588-**	.043
	Sig. (2-tailed)	.000		.001	.825
**. Correlation is significant at the 0.01 level (2-tailed).					

The results show that there is a positive correlation between ICQI score and leakage Score (Pearson correlation= 0.686, P-value= 0.000). Also, the results show that there is a negative correlation between ICQI score and Quality of life (Pearson correlation= -0.715, P-value= 0.000)

In addition, the results show that there is a negative correlation between Quality-of-life score and leakage Score (Pearson correlation= -0.588, P-value= 0.002). While there was no significant correlation between the other variables.

Table 4.11 Correlation between (ICIQ score, leakage score, Quality of life score, and BMI) for the pre-test in the experimental group

		ICIQ score	leakage Score	Quality of life score	BMI
ICIQ score	Pearson Correlation	1	.638**	-.816-**	.139
	Sig. (2-tailed)		.000	.000	.471
leakage Score	Pearson Correlation	.638**	1	-.561-**	-.027-
	Sig. (2-tailed)	.000		.002	.891
**. Correlation is significant at the 0.01 level (2-tailed).					

The results show that there is a positive correlation between ICQI score and leakage Score (Pearson correlation= 0.638, P-value= 0.000). Also, the results show that there is a negative correlation between ICQI score and Quality of life (Pearson correlation= -0.816, P-value= 0.000)

In addition, the results show that there is a negative correlation between Quality-of-life score and leakage Score (Pearson correlation= -0.561, P-value= 0.002). While there was no significant correlation between the other variables.

Table 4.12 Correlation between (ICIQ score, leakage score, Quality of life score, and BMI) for the post-test in the experimental group

		ICIQ score	leakage Score	Quality of life score	BMI
ICIQ score	Pearson Correlation	1	.325	-.718-**	-.111-
	Sig. (2-tailed)		.086	.000	.565
leakage Score	Pearson Correlation	.325	1	-.361-	.169
	Sig. (2-tailed)	.086		.054	.380
**. Correlation is significant at the 0.01 level (2-tailed).					

The results show that there was a negative correlation between ICQI score and Quality of life score (Pearson correlation= -0.718, P-value= 0.000). While there was no significant correlation between the other variables.

4.2 Discussion

Our study aimed to compare the effectiveness of Core Stability and Kegel exercise or Kegel exercise alone in the treatment of stress urinary incontinence among middle-aged Palestinian women and analyzed the developments and resulting changes on the problem of stress urinary incontinence and their quality of life based on therapeutic intervention program.

Our study hypothesized that the combination of Core Stability and Kegel exercise treatment is more effective than Kegel exercise alone on middle-aged Palestinian women with stress urinary incontinence. Our study found (56.9%) of participants had more than five children, (62.1%) in the experimental group, while (51.7%) in the control group. In addition (67.2%) of the participants became pregnant more than five times, (72.4%) in the experimental group, while (62.1%) in the control group. A randomized trial study (Ptak et al., 2019) demonstrated that combined conservative treatment (pelvic floor muscle training and m. transversus abdominis) was more effective and improved the quality of life of women with stress urinary incontinence. In addition, combined treatment gave better results in women who have birth fewer than three time than isolated pelvic floor muscle training.

The result indicated that the majority of participants (86.2%) was overweight. An evidence –based approach for stress urinary incontinence confirmed obesity a known risk factor, and weight loss associated with reduction of urinary frequency(Winkelman & Elkadry, 2021). A similar study (Nygaard et al., 2018) showed that the prevalence of urinary incontinence was high among obsess patients and impacted negatively on their quality of life. And there was a significant association between the ICIQ scores severity of urinary incontinence and increasing in BMI (Alshammari et al., 2020). A similar study (Aoki et al., 2017) showed all types of urinary incontinence are more common with age and obesity. According to these results overweight may be the cause and risk factor for stress urinary incontinence.

Our study results indicated that the majority of participants (58.6%) of the experimental group, and (67.9%) of the control group doesn't seek medical treatment for urinary incontinence that's correspond

with similar studies (Alshammari et al., 2020; Pandey et al., 2019) that's a high percentage of participants did not seek help, and considering(UI) distressing problem that's affect their quality of life (Aoki et al., 2017) considered SUI as an embarrassing, sensitive and stigmatizing condition in most populations.

Findings showed frequency differences in the severity of urinary incontinence among the respondent in both groups, our participants in the experimental group pre- intervention was 9 (31.0)% of women had mild level, while 18 (62.1%) post- intervention, 11 (37.9%) had moderate level pre-intervention, while 10 (34.5%) post-intervention .9 (31.0%) had severe level , while 1 (3.4%) post- intervention .In the control group was 8 (27.6%) of the women had mild level pre-intervention, while 19 (65.5%) post-intervention , 16 (55.2%) had moderate level, while 10 (34.5%)post- intervention ,and 5 (17.2%) had severe level pre-intervention, while 0 (0.0%) post-intervention. These results correspond with a similar study (Oliveira et al., 2017) that PFMT helps decreasing the number of urinary leakage episodes, and amount of leakage, so the severity of urinary incontinence decreased. There was an improvement in both groups, but there was a higher improvement in the experimental group.

Results showed that frequency differences in the International Consultation of Incontinence (ICIQ) score among the respondent's groups, Differences about the rate of urinary leakage such as in the experimental, group pre-intervention: Never was 1 (3.4%), while 10 (43.5%) post-intervention. In addition, decreased the urinary leakage rate several times a day pre-intervention 12 (41.4%), while it became 5 (17.2%) post intervention. As for the control group, the urinary leakage rate never 8 (27.6%), while 6(20.7%) post intervention. In addition, decreased urinary leakage rate several times a day pre-intervention 9 (31.0%), while it became 1(3.4%) post-intervention. This results corresponded with similar studies (Alshammari et al., 2020; Oliveira et al., 2017).

Frequency differences about amount of urine leakage according to their estimation pre-intervention was 1(3.4%) None, while post- intervention became 9 (31.0%). As for the control group, the participants answer about the amount of urine leakage None 1(3.4%), while 7 (24.1%) post- intervention. These

results corresponded with a similar studied that PFMT helps decreasing the number of urinary leakage episodes, and amount of leakage, so the severity of urinary incontinence decreased(Dumoulin et al., 2018; Winkelman & Elkadry, 2021).

The participants worry about the occurrence of urinary leakage when coughing or sneezing, and worry about occurrence of urine leakage before reached the toilet in both groups , our results showed that's urine volume, amount of urine leakage, and severity of the problem decreased , these results corresponded with similar studies (Preda & Moreira, 2019; Radzimińska et al., 2018).

The results show the difference in pre and post- test frequency of the Quality of life score (I-QOL) between the respondents in both groups,

The participants in both groups were extremely depressed because of urinary incontinence, these results demonstrated with randomized study that combined conservative treatment (pelvic floor muscle training and m.transversus abdominis) was more effective and improved the quality of life of women with stress urinary incontinence such physical activity, travelling, social limitation, emotion, sleep problems, and embarrassment (Ptak et al., 2019; Radzimińska et al., 2018).

The participants were extremely concerned about the worsening of incontinence with aging , this results corresponded with a similar study that considered urinary incontinence is a common health problem, and its prevalence and severity increased with aging(Giraldo et al., 2019).

The participants were extremely worry about being embarrassed because of urinary incontinence.

Our study results correspond with similar studies (Radzimińska et al., 2018) that's (PFMT) is an effective method and it has a significant positive impact on the quality of life.

4.3 Study Limitations

There were several limitations to the present study by that the researcher recommends that they may be taken into consideration in the future research:

- The intervention duration (physiotherapy program) was 6 weeks, but this period may be longer, and the sample size was 58 participants, the number of women with stress urinary incontinence may be greater.
- Most of outcome measures were subjective measures, this is due to objectives of the study and the nature of this problem cannot be measured by objective measures, in addition, these measures such as biofeedback were not available.
- There were some restrictions during recruitment the samples, due to the coincidence of the sample recruitment with the presence of Corona virus, which lead to some women's fears to attend the intervention program implementation centers.

Chapter Five

5.1 Conclusion

5.2 Recommendation

5.1 Conclusion

- A combination of Core Stability and Kegel exercise is an effective treatment for women with SUI.
- Combination of Core Stability and Kegel exercise could be recommended as the first line conservative treatment for women with SUI.
- A suggested Physiotherapy program provided for women with stress urinary incontinence improve quality of life, which is an important determinant of their physical, mental, and social functioning.
- Suggested Physiotherapy program decreasing the number of urinary leakage episodes, and amount of leakage, so the severity of urinary incontinence decreased.
- A combination of Core Stability and Kegel significantly improve quality of life score, and decrease leakage score ($\alpha \leq 0.01$) of pre- post test
- The International Consultation of Incontinence (ICIQ) is useful for following up on leakage score of women with stress urinary incontinence in different clinical setting.
- The IOQL is useful for following up on QOL of women with stress urinary incontinence.
- There is an improvement in both groups in decreasing the amount of urine leakage, but there was a higher improvement in the experimental group.
- Higher BMI, number of children, and pregnancy number are associated with severity of stress urinary incontinence.

5.2 Recommendations

Recommendations for physiotherapists

- Women should be screened for urinary incontinence through screening questionnaire that can be used in the primary care setting to identify these patients with SUI.
- Women with complaints of SUI should undergo for basic components of assessment by specialists by review of general assessment, symptoms assessment ,past medical history (any previous conservative, medical or surgical treatment), coexisting disease that effect on incontinence ,such as patients with Asthma with SUI will suffer greatly during attack , any physical impairment that may need to be manage differently .And social history (any environmental ,cultural , or lifestyle issue), assessment of quality of life impact , assessment of desire for treatment, and physical examination (pelvic examination). and these women should refer to specialists
- Developing specialized clinics to treat problems related to women's health and encourage patients to work with specialized pelvic floor physical therapist.
- Suggested Physiotherapy program may be alone or combined with other modalities can include (electrical stimulation, muscle release technique) for treatment women with SUI.

Recommendations for ministry of health

- Recommendation for primary prevention, continence promotion, and education by educate women pelvic floor muscle training,
- Strategies to promote awareness about incontinence and its treatment.
- Increase awareness at all levels at policymaker, medical professionals, and public that incontinence is a disease, despites its International Classification of Disease.
- To use guidelines in clinical and primary health centers, and long- term follow up for women with SUI.

- To use pelvic floor muscle and Core muscle training as a protocol in institutions providing services related to women's health. And give women information sheet Up to date on pelvic floor strengthening, that may help women to get start on their own.
- Providing awareness programs for women in primary & maternity care centers about problems that has exposed women after pregnancy and childbirth, such as stress urinary incontinence. In addition, it is important that they be constructed about conservative options, and the benefit of different approaches.
- Consider the results of this study as primary evidence on the effectiveness of physiotherapy intervention with women with SUI.
- Encourage greater interaction between gynecologists, urologists and specialists in pelvic floor physical therapist.

Recommendations for women with SUI

- To adapt the Core Stability and pelvic floor muscle training as a part of lifestyle through different lifetimes (pregnancy, post- partum- and post- menopause)
- To encourage help seeking behavior to decrease the severity of incontinence.

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https://images.app.goo.gl/KL3X4jHLbU9xswVz5

Appendixes

Appendix 1: Data Collection demographic sheet

استمارة حول مشكلة السلس البولي لدى النساء الفلسطينيات

جميع المعلومات المذكورة في هذه الاستمارة ستستخدم لأغراض البحث العلمي فقط مع ضمان خصوصية وسرية المعلومات المذكورة فيها

المعلومات الشخصية

العمر	
العنوان	
رقم الهاتف	
الوزن	
الطول	
مؤشر كتلة الجسم	
الوظيفة	
الحالة الاجتماعية	

المعلومات الصحية

1. عدد الأطفال

☐ 1-2 ☐ 3-5 ☐ 5 فأكثر

2. عدد مرات الحمل

☐ 1-2 ☐ 3-5 ☐ 5 فأكثر

3. عدد مرات الإجهاض التي تعرضت لها

☐ 1 ☐ 2 ☐ 3 فأكثر

4. هل تعاني من مشاكل صحية

☐ نعم ☐ لا

5. هل لديك أي امراض مزمنة

☐ نعم ☐ لا

إذا كان الجواب نعم، ما هي الامراض؟ .....

Appendix 2: The International Consultation of Incontinence (ICIQ-UI Short form)

ICIQ-UI Short Form (Arabic)

سري

الرقم الأصلي

اليوم الشهر السنة

تاريخ اليوم

يعاني عديداً من الناس، في بعض الأحيان، من مشكلة التسرب البولي. نحاول هنا تحديد عدد الأشخاص الذين يعانون من مشكلة التسرب البولي ومعرفة إلى أي مدى تؤثر هذه المشكلة عليهم. سوف نكون ممتنين جداً لكم إجابتكم على الأسئلة التالية مع الأخذ في نظر الإعتبار حالتكم العامة في الأسابيع الأربع الماضية.

١. تاريخ الميلاد

اليوم الشهر السنة

٢. الجنس

أنثى ☐ ذكر ☐

٣. ما هو معدل حدوث التسرب البولي منك؟ (أشر (✓) على مربع واحد فقط)

0 ☐ لا يحدث أبدا

1 ☐ حوالي مرة في الأسبوع أو أقل

2 ☐ من مرتين إلى ثلاث مرات أسبوعياً

3 ☐ حوالي مرة يومياً

4 ☐ عدة مرات في اليوم

5 ☐ في كل الأوقات

٤. نود معرفة كمية البول المتسرب منك حسب تقديرك

ما هي كمية البول المتسربة منك عادة أثناء التسرب البولي (سواء استخدمت وسيلة للوقاية أم لا) ؟

0 ☐ لا يوجد

2 ☐ كمية صغيرة

4 ☐ كمية متوسطة

6 ☐ كمية كبيرة

٥. بشكل عام، إلى أي مدى تؤثر مشكلة التسرب البولي على حياتك اليومية؟

ضع دائرة حول الرقم المناسب مع ملاحظة أن (٠) تعني أنها لا تؤثر مطلقاً وأن (١٠) تعني أنها تؤثر إلى مدى كبير

0 1 2 3 4 5 6 7 8 9 10

لا تؤثر مطلقاً — تؤثر إلى مدى كبير

☐ ☐ نتيجة ICIQ : إجمع نقاط 3+4+5

٦. متى يحدث التسرب البولي؟ (رجاء أشر (✓) على جميع الحالات التي تنطبق عليك)

☐ لا أعاني أبدا من مشكلة التسرب البولي

☐ يحدث التسرب البولي قبل الوصول إلى دورة المياه

☐ يحدث التسرب البولي عند السعال أو العطس

☐ يحدث التسرب البولي أثناء النوم

☐ يحدث التسرب البولي مع الحركات الجسدية النشيطة و أثناء ممارسة الرياضة

☐ يحدث التسرب البولي بعد التبول وارتداء الملابس

☐ يحدث التسرب البولي بدون سبب واضح

☐ يحدث التسرب البولي في كل الأوقات

مع جزيل الشكر لإجابتكم على هذه الأسئلة

Appendix 3: Incontinence quality of life (1- QOL)

PLEASE WRITE IN TODAY'S DATE: ___ ___ ___
Day Month Year

PARTICIPANT ID:

PLEASE READ THIS CAREFULLY

ON THE FOLLOWING PAGES YOU WILL FIND SOME STATEMENTS THAT HAVE BEEN MADE BY PEOPLE WHO HAVE URINARY INCONTINENCE (LEAKING URINE WHEN YOU DON'T WANT TO).

PLEASE CHOOSE THE RESPONSE THAT APPLIES BEST TO YOU RIGHT NOW AND CIRCLE THE NUMBER OF YOUR ANSWER.

IF YOU ARE UNSURE ABOUT HOW TO ANSWER A QUESTION, PLEASE GIVE THE BEST ANSWER YOU CAN. **THERE ARE NO RIGHT OR WRONG ANSWERS.**

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT:

INCONTINENCE – QUALITY OF LIFE

Your Feelings

(Please circle the number of your answer)

1. I worry about not being able to get to the toilet on time

   1 EXTREMELY
   2 QUITE A BIT
   3 MODERATELY
   4 A LITTLE
   5 NOT AT ALL

2. I worry about coughing or sneezing because of my urinary problems or incontinence.

   1 EXTREMELY
   2 QUITE A BIT
   3 MODERATELY
   4 A LITTLE
   5 NOT AT ALL

3. I have to be careful standing up after I've been sitting down because of my urinary problems or incontinence.

   1 EXTREMELY
   2 QUITE A BIT
   3 MODERATELY
   4 A LITTLE
   5 NOT AT ALL

4. I worry about where toilets are in new places.

   1 EXTREMELY
   2 QUITE A BIT
   3 MODERATELY
   4 A LITTLE
   5 NOT AT ALL

5. I feel depressed because of my urinary problems or incontinence.

   1 EXTREMELY
   2 QUITE A BIT
   3 MODERATELY
   4 A LITTLE
   5 NOT AT ALL

INCONTINENCE – QUALITY OF LIFE

6. Because of my urinary problems or incontinence,‘ I don't feel free to leave my home for long periods of time.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

7. I feel frustrated because my urinary problems or incontinence prevents me from doing what I want.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

8. I worry about others smelling urine on me.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

9. My urinary problems or incontinence is always on my mind.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

10. It's important for me to make frequent trips to the toilet.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

11. Because of my urinary problems or incontinence, it's important to plan every detail in advance.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

12. I worry about my urinary problems or incontinence getting worse as I grow older.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

13. I have a hard time getting a good night of sleep because of my urinary problems or incontinence.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

14. I worry about being embarrassed or humiliated because of my urinary problems or incontinence.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

15. My urinary problems or incontinence makes me feel like I'm not a healthy person.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

16. My urinary problems or incontinence makes me feel helpless.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

17. I get less enjoyment out of life because of my urinary problems or incontinence.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

18. I worry about wetting myself.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

19. I feel like I have no control over my bladder.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

20. I have to watch what or how much I drink because of my urinary problems or incontinence.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

INCONTINENCE – QUALITY OF LIFE

21. My urinary problems or incontinence limit my choice of clothing.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

22. I worry about having sex because of my urinary problems or incontinence.

1 EXTREMELY
2 QUITE A BIT
3 MODERATELY
4 A LITTLE
5 NOT AT ALL

INCONTINENCE – QUALITY OF LIFE

About You

A-1 How long have you had urinary problems or incontinence? *(Please write the number below)*

YEARS MONTHS

_____

A-2 How many medical appointments have you made in the past year to treat your urinary problems or incontinence? *(Please write the number on the line provided)*

_____ NUMBER OF APPOINTMENTS IN THE LAST YEAR

A-3 How would you describe the severity of your urinary problems or incontinence? *(Please circle the number of your answer)*

1 **MILD**
2 **MODERATE**
3 **SEVERE**

A-4 Do you lose urine when you cough, sneeze, run, walk, jump or when you do some other specific activity?

0 **NO**

1 **YES**

A-5 Do you lose control of your bladder before you can get to the bathroom?

0 **NO**

1 **YES**

INCONTINENCE – QUALITY OF LIFE

A-6 Do you lose urine at times not associated with any specific activity or the need to go to the bathroom?

0 NO

1 YES

A-7 In the last month, how many times did you lose urine, even a small amount, when you didn't want to? *(Please write the number on the line provided)*

____ NUMBER OF TIMES IN THE LAST MONTH

A-8 In the last month, how many times did you lose urine, even a small amount, when you didn't want to?

0 NOT AT ALL IN THE LAST MONTH

1 1 TO 2 TIMES IN THE LAST MONTH

2 4 TIMES (ABOUT ONCE A WEEK)

3 2 TO 3 TIMES PER WEEK

4 ABOUT 1 TIME A DAY

5 ONE OR TWO TIMES A DAY

6 THREE OR FOUR TIMES A DAY

7 FIVE OR MORE TIMES A DAY

Appendix 4: Ethical Committee Approval

Al-Quds University
Jerusalem
Deanship of Scientific Research

بسم الله الرحمن الرحيم

جامعة القدس
القدس
عمادة البحث العلمي

Research Ethics Committee
Committee's Decision Letter

Date: March 16, 2021
Ref No: 177/REC/2021

Dear Dr. Hadeel Halaweh, Ms. Wala Khalil Al-Alami,

Thank you for submitting your application for research ethics approval. After reviewing your application entitled "The Effect of Core stability and Kegel Exercises on Stress Urinary Incontinence and Quality of life among middle aged Palestinians Women", the Research Ethics Committee confirms that your application is in accordance with the research ethics guidelines at Al-Quds University.
We would appreciate receiving a copy of your final research report/ publication.
Thank you again and wish you a productive research that serves the best interests of your subjects.

PS: This letter will be valid for two years.

Sincerely,

Suheir Ereqat, PhD
Associate Professor of Molecular Biology
Research Ethics Committee Chair

Cc. Prof. Imad Abu Kishek - President
Cc. Members of the committee
Cc. file

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Appendix 5: Consent Form

نموذج المشاركة في بحث علمي

عنوان الدراسة: تأثير تمارين الثبات المركزي لعضلات الجدع وكجيل على السلس البولي الإجهادي ونوعية الحياة لدى النساء الفلسطينيات في منتصف العمر

انا الموقعة ادناه ..... أوافق على مشاركتي في هذا البحث العلمي بطوعية مع احتفاظي بالحق في الانسحاب من البحث في أي وقت ودون أي سبب، مع العلم أني وقد أبلغت بأهداف البحث والبيانات/العينات التي سيتم جمعها وكيفية التعامل مع هذه البيانات/العينات بعد الانتهاء من البحث.

وأني أفهم أن جميع المعلومات التي أدلي بها أو يتم جمعها عني ستعامل بسرية تامة ولن تعلن بأي شكل قد يؤدي إلى التعريف بهويتي. كما أوافق على أنه يمكن نشر بيانات البحث. وان هذه الدراسة خاضعة للبحث العلمي فقط.

اسم الباحثة: ولاء العلامي

يمكن التواصل مع الباحثة على رقم الهاتف (0599987663) إذا كانت لديك بعض الأسئلة عن الدراسة.

اسم المشرف على البحث: د. هديل حلاوة

اسم وتوقيع المشاركة