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Effectiveness of an Interventional Package on Pelvic Floor Muscle Strength among Women with Pelvic Floor Dysfunction

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ABSTRACT

Aim and Objective: Assess the effectiveness of an interventional package on pelvic floor muscle strength among women with pelvic floor dysfunction at selected rural community - India.

Methodology: A Quantitative research approach with true experimental design was used for the study, Women between 3 months to 1 year post-delivery status either with urinary incontinence, bowel incontinence, pelvic organ prolapses, pelvic pain or dyspareunia in the 26 selected villages which comprised a total of 424 women. Pelvic floor dysfunction was assessed using pelvic floor distress inventory scale. Muscle strength was assessed by per vaginal examination by the investigator and graded using modified Oxford grading scale. Pelvic floor muscle strength was assessed under 5 categories such as Power, Endurance, Repetitions, fast contraction and every timed contraction. Video assisted teaching, demonstration and return demonstration techniques provided by the investigator to strengthen the pelvic floor muscle

Result: Women in the experimental group reported good pelvic floor muscle strength in the post test with mean score of 15.81 while women in control group had mean score of 9.52. There was significant improvement noted in all the components of pelvic floor muscle strength such as power, endurance, repetitions, fast contractions and timed contraction scores among women in the experimental group.

Conclusion: Pelvic floor dysfunction causes a lot of burden among the women and studies have showed a trend of increasing prevalence. Community based nursing interventions are very much needed to prevent women from encountering pelvic floor dysfunction which will significantly improve their quality of life.

KEY WORDS: pelvic floor dysfunction, pelvic floor muscle strength

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INTRODUCTION

Nation's health is dependent on the Women's health. Women are the key role players in the family. The family's holistic health is based on the health of the women. Healthy women are determined to deliver a healthy baby who grow as healthy children to become a productive citizen to the healthy nation.

Women's health have become the prime focus of many countries, Although men and women share common health challenges in the current scenario. Women's health requires more attention because of their biological changes. As gender based discrimination prevails in most part of the globe, women's longer lives are not healthy lives, an India is not an exception.[1]

There are health issues which women experience because of their reproductive anatomy. Conception and Childbirth are a natural phenomena which occurs in women's life, which are now seen in health care as a disease because of the social processes and lack of quality healthcare services

which has put women's health at risk.[1] The current healthcare system in the developing countries is not tailor made for women and are reactionary to the problems existing.[2]

Among the health problems of women which affect their quality of life 'Pelvic floor dysfunction' is considered as a prime problem. Pelvic Floor Dysfunction (PFD) means the presence of any one of the symptoms such as 'Urinary Incontinence (UI)', 'Faecal Incontinence (FI)', 'Pelvic Organ Prolapse (POP)', 'sensory or emptying abnormalities of the lower urinary tract', 'defecation dysfunction', 'sexual dysfunction' and 'chronic pain syndromes', which can individually occur or mutually be prevalent. Vaginal delivery has been repeatedly mentioned as one of the main contributing factor. Any factor which weakens the pelvic floor muscle causes dysfunction of these major functions in women. These problems affect the women's health very badly and disrupt the quality of life of women as they get older.[5]

The vaginal birth poses the risk of laxicity of the muscles of the pelvic floor which are stretched during delivery and undergo intense pressure which causes damage and which impacts the functions of the pelvic floor. The women are required to rebuild their pelvic floor muscle strength adopting various strengthening exercises. Reviews have showed that women who have vaginal delivery are having more risk for 'pelvic floor dysfunction' than women who have cesarean birth and also they say that it increases with 'multiple child births'.[6]

National Institute of Health reported that the a scientific team from 'Kaiser Permanente Southern California' and the 'University of California, San Diego Medical Center' strongly affirmed that women undergoing vaginal delivery are at double the risk of acquiring pelvic floor disorders than their counterparts who undergo cesarean delivery and also nulliparous women .[7]

The major contributing factors to pelvic floor dysfunction among women are overweight and obesity, frequent pregnancy and childbirth, frequent lifting of heavy objects, having surgery or trauma to pelvic floor and difficult bowel patterns. Child birth is considered as a major known risk factor for many years. The strain which caused during child birth process brings about damage to the nerves of the pelvic floor and also causes trauma to the muscle and connective tissue. The muscles traumatized during childbirth affects the core functions of the pelvic floor leading to prolapse, incontinence of urine and feaces etc. [8]

There is a assumption that older aged women will get pelvic floor disorders but the truth is pelvic floor disorders are more prevalent and extremely debilitating among the women in younger ages also. Most often women report them during their older ages as young women feel reporting them would lead to isolation and discrimination in their family.[7]

Pelvic Floor disorders are very common and mostly treatable; since women avoid and delay treatment it affects their quality of life greatly. A survey report higlighted that almost forty percent of the women in the U.S manage their pelvic floor disorders with over the counter treatments such as using pads or they wait until the issue becomes very serious for seeking treatment. Although there are many minimally invasive procedures available to treat the issue women often don't seek healthcare in the early stages.[9] Many women around the world are hesitant to report the symptoms and they believe it to be untreatable and also are not aware of the treatment options available. In a country like India women are 'accustomed to enduring pain and discomfort'.[10]

Women are open to the elements for lot of health risks due to various physiological changes happening in reproductive process. One of the important aspects of women's health post-delivery is pelvic floor strength. Pelvic floor forms the core foundation of the lower body supporting the abdominal parts and acts to maintain the continence of bowel and bladder in females. [12]

PFD is considered as one of the major unaddressed issues in the health of women. It is common factor which affects the quality of life (QOL) of 1/3 rd of the adult women population. Women often are reported with symptoms of urinary of anal incontinence, pelvic organ prolapse or dysfunctional bowel. Pelvic floor dysfunction was known to have affected nearly about twenty five percent of the women across 30-70 years of age around the world. Many times they go undiagnosed and untreated leading to poor QOL.[13]

The prevalence rate of women experiencing any one of the pelvic floor dysfunctions in United States was estimated to be 25%. The prevalence included 17.1% of women with moderate-to severe urinary incontinence, 9.4% with fecal incontinence, and 2.9% with prolapse. It was reported that in the United States more than '15 Million' women were found to have 'stress urinary incontinence (SUI)' and about '16 million' women were found to have 'an overactive bladder'. One in 10 women was found to have suffered with Anal Incontinence (AI).[14]

Worldwide statistics regarding urinary incontinence showed that around '200 million people' are affected with some form of 'PFD'. It was observed that 'One in four women over the age of 18' years have experienced episodes of urinary incontinence. It was also found that women wait for '6.5 years' to have a proper diagnosis for such symptoms involuntarily.[14]

Prevalence of pelvic floor dysfunction was reported to be high among the women in the rural areas. Rural areas

reported prevalence of 44.2% . The reason being most of the women do lot of heavy lifting activities and give birth to more number of children. An epidemiological study conducted among 552 women in rural India showed that about 53 (10%) reported episodes of Urinary Incontinence (UI). 57% of the women had symptoms of stress incontinence, 23% of urge, and 20% mixed symptoms.

Pregnancy has increased the stress on the pelvic floor throughout the pregnancy and childbirth which causes injury to the muscles making them weak and leading to urinary incontinence. In a survey done by Nygaard et a1 showed that about 12.8% of women who had never given birth experienced pelvic floor dysfunction, while 18.4% of those who have had one child, '24.6% of those who have had two children' and '32.4% of women who have had three or more children' reported pelvic floor dysfunction respectively.[9]

The other factors important during child birth are the prolonged second stage of labor and higher birth weights. Prolonged second stage causes increased pressure through 'maternal pushing' which weakens the pelvic floor and also babies with high birth weight also causes more damage to the pelvic floor during vaginal delivery process. The second stage of labor is characterized by 'progressive descent of the fetal head through the completely dilated cervix'. This is achieved by the expulsive forces generated by uterine contractions. During these contractions,' intrauterine pressure can be as high and thus a prolonged second stage may increase soft tissue injury and neuromuscular damage to the pelvic floor. Both of these mechanisms may be central to the pathophysiology of PFDs. [6]

Systematic reviews showed that women who had vaginal delivery and operative vaginal delivery i.e., using instruments, assistive devices, episiotomy had more odds for developing stress incontinence and pelvic organ prolapse. Several studies supported that the incidence of PFDs varies with the mode of delivery. MacLennan *et al*., reported pelvic floor dysfunction in 58% of women who had spontaneous vaginal delivery, compared with 43% of those who underwent cesarean section. In a recent study of parous women, history of a vaginal childbirth was associated with twice the risk of developing bothersome symptoms of stress incontinence compared with women delivered exclusively via caesarean section. [24]

Several studies have shown that 'PFDs' are more common in parous women compared with nulliparous women of the same age, irrespective of the mode of delivery. Hansen *et al*. reported that urinary incontinence was three-times more common in primiparous women compared with their aged-matched nulliparous counterparts. The effect of parity is most notable in young women between the ages of 20 and 34 years and disappears in women older than 65 years.[25] Similarly, in a study of 4000 Turkish women, the prevalence of various PFDs was significantly higher in parous women compared with nulliparous women.[26]

Among parous women, an increasing number of childbirths further increases the risk of PFDs. Kepenekci *et al.*, reported that Increasing parity also leads to a linear increase in the probability of developing prolapse.[26] In a British study, women with one child were four-times more likely, and those with two children were 8.4-times more likely, to develop 'pelvic organ prolapse' when compared with nulliparous women. Similarly, prevalence of fecal incontinence increases with an increase in the number of childbirths. [27]

Kearney *et al.* reported the increased probability of levator ani muscle defects with longer duration of the second stage of labor in primiparous women; these levator defects may be a risk factor for later development of PFDs.[29] Prolonged second stage of labor has been identified as a risk factor for postpartum urinary incontinence in primiparous women. A Japanese study identified duration of the second stage of labor of 'more than 30 min as a risk factor for pelvic organ descent in primiparous women'. This increase in severe perineal lacerations is most likely a result of obstetric interventions, such as operative vaginal delivery, to manage the prolonged second stage of labor. [30]

Ageing was also associated with urinary incontinence as women age the 'pelvic supporting structures' weaken leading to incontinence. Women with advanced maternal age also were found associated with stress incontinence. Kuh *et al*. found a strong association between the symptoms of 'stress urinary incontinence' and maternal age of 30 years or older at first vaginal delivery among British women. [31] Foldspang *et al.* found increased risks of urinary incontinence with increasing age at the time of the last childbirth for women aged 30–44 years.[32] Pregazzi *et al.* reported an association between urinary frequency and advanced maternal age 14% of women aged 30 years are at high risk for surgery for pelvic organ prolapse compared with 6% of women younger than 30 years.[33] Rortveit and Hunskaar also noted an association between increased prevalence and severity of urinary incontinence in women with delayed childbearing. [34]

Increased body mass index has contributed to 'pelvic floor dysfunction'. The most probable mechanism of 'pelvic floor dysfunction' development among obese women was due to the increase of intra-abdominal pressure that causes weakening of pelvic floor muscles and fascia. The degree of obesity was correlated with a higher prevalence of stress and urge incontinence. [35]

Obesity is considered a strong independent risk factor for both 'pre-existent and new-onset urinary incontinence'. The odds ratio attributable to obesity in urinary incontinence varies between 4 and 5. Each five-unit increase in BMI increases the risk of urinary incontinence by 70% as reported in a systematic review by Subak et al.[36] The mechanism of stress incontinence is more quickly precipitated by obesity due to the increased intra-abdominal pressure associated with the condition. The increased intra-abdominal pressure leads to an increase in vesical pressure and urethral mobility. Overactive bladder symptoms' are also reported to be higher in patients with obesity, particularly in the premenopausal age group.[37]

Women with mild to moderate pelvic floor dysfunction avoid seeking treatment in India. In a study conducted among 220 women in Northern India with urinary incontinence, 72 % of women never had any treatment and the reason stated were that women felt it was normal and had not taken it seriously and were shy to come out for treatment. The study also reported that urinary incontinence has affected their daily living and quality of life.[38]

In a study conducted among 215 women from rural regions diagnosed with Pelvic Organ Prolapse (POP) showed that most of them had urinary incontinence (159; 73.95%). Women with POP and symptoms of urinary incontinence had poor quality of life scores and women had very low sexual function QoL (median - 61.00) when compared to those not suffering from urinary incontinence (median- 78.00).[39]

Pelvic floor dysfunction' can be easily prevented by women with improved awareness and by performing regular 'pelvic floor muscle strengthening exercises (PFME). The major problem in India and other developing countries was the lack of awareness about the preventing measures and contributing factors of pelvic floor dysfunction. Studies conducted among Asian populations have shown low awareness rate and poor health seeking behavior regarding the various pelvic floor dysfunctions.[40]

Pelvic Floor Muscle Strengthening Exercises (PFME)' commonly known as 'Kegel Exercises' was first introduced by an 'American Gynecologist Dr. Arnold Kegel'. PFME involves 'selective voluntary contraction and relaxation of specific pelvic floor muscles' which supports the pelvic floor. Kegel exercises was first introduced to treat 'postpartum urinary incontinence' and also for improving the tone of the pelvic floor muscles after child birth process. 'PFME' was considered as a successful intervention for the postpartum women, with regular practice of those exercises it was reported that the cure rates fir urinary incontinence was as high as 84%. [41]

'PFME' include teaching the patient to contract the pelvic muscles such as 'levator ani and pubococcygeal muscles' for the 'count of 10 for 5 – 10 times' and also to perform them several times in a day. The patient's are instructed on how to contract the pelvic muscles and also instructed to 'stop the urine stream while voiding urine'. Patients are instructed to identify the right pelvic muscles which prevent urinary and anal incontinence. Women are asked to squeeze the muscles of the anus so as to prevent passing of the gas where they will find the 'pulling' sensation at the anus which will help them in identifying the pelvic floor muscles.[42]

One out of every three women has experienced Stress Urinary Incontinence (SUI) at some point in their life. Most of the women live with it and think it is as normal part of aging and feel embarrassed to seek help. Women won't openly discuss about 'SUI' and not even with the healthcare providers. Initial treatment provided for SUI includes reducing weight and modification in diet. 'Pelvic Floor Muscle Training (PFMT)' conducted under supervision have proved to be a recommended measure for preventing and treating 'SUI'. [43]

Many interventions such as weight management, pelvic strengthening exercises, pelvic floor muscle training and behavioral therapy approaches are found to be useful in managing women with pelvic floor dysfunction. Engagement of women to perform the exercises was considered important for improving the quality of life of the women. Community based nursing interventions are the need of the hour in managing the problem of pelvic floor dysfunction among the women. Strong commitment, dedication, endurance and effort are required from women to perform the 'PFME'. Community based interventions will aid in engaging the women regularly to improve her pelvic floor muscle strength. 'PFME' is a specific exercise for the pelvic floor muscles and is different from exercise of other muscles in the body.

Pelvic Floor Muscle Training (PFMT) was found in several studies to be very much effective in reducing the symptoms of pelvic floor muscle dysfunction. In a study conducted among 140 women visiting Talkha MCH Centre, the effect of PFMT was studied for its effect on urinary incontinence and quality of life. Study results showed a statistically significant positive effect of PFMT on UI and the women's quality of life. The study recommended clinical teaching and in-service education programs for all maternity nurses and nursing educators regarding the UI and PFMT as a preventive as well as treatment modality for UI. Furthermore, community awareness about the positive effect of practicing PFME among incontinent women was recommended. [44]

Statement of the problem:

Study to assess the effectiveness of an interventional package on pelvic floor muscle strength among women with pelvic floor dysfunction at selected rural community - India.

Objectives:

1. To assess and compare the pre and post test pelvic floor muscle strength among women with pelvic floor dysfunction between experimental and control group.
2. To assess the effectiveness of interventional package on pelvic floor muscle strength among women with pelvic floor dysfunction between experimental and control group.
3. To associate the mean differed pelvic floor muscle strength among women with pelvic floor dysfunction with selected variables in experimental group and control group.

NULL HYPOTHESES

NH_1: There is no significant difference in the pre and posttest pelvic floor muscle strength among women with pelvic floor dysfunction between the experimental and control group at $p < 0.05$.

NH_2: There is no significant association between the mean differed pelvic floor muscle strength among women with pelvic floor dysfunction with selected variables in experimental and control group at $p < 0.05$.

MATERIALS AND METHODS

RESEARCH APPROACH

A Quantitative research approach was used for the study considering the nature of the problem being studied as the variables under the study are quantitative in nature.

RESEARCH DESIGN

A true experimental design was used for the study, randomization of groups was done at the village level. The investigator administered the interventional package on pelvic floor muscle strength to women and a comparison group was included to test the effectiveness of the intervention.

VARIABLES OF STUDY

Background Variables

Age, education, type of family, monthly income, religion, type of occupation, type of work, food habit, number of child birth, birth spacing between kids, mode of child birth, height, weight, weight gain during pregnancy, birth weight of the baby.

Independent variables

Interventional package comprising of video assisted teaching, demonstration and return demonstration on improving the pelvic floor muscle strength and knowledge of the women on pelvic floor dysfunction.

Dependent Variables

The depended variable comprised of knowledge regarding pelvic floor dysfunction and pelvic floor muscle strength.

Extraneous Variable

The variables considered as extraneous through various reviews and researchers experience were number of vaginal delivery, number of LSCS, BMI, induction of labor, duration of second stage of labor, post-natal period, history of perineal trauma, previous information about pelvic floor exercise.

POPULATION

Target Population

Comprised of all women between 3 months to 1 year post delivery status and having either of the symptoms of urinary incontinence, bowel incontinence, pelvic organ prolapse, pelvic pain or dyspareunia residing in the villages.

Accessible Population

Comprised of all women between 3 months to 1 year post-delivery status either with urinary incontinence, bowel incontinence, pelvic organ prolapses, pelvic pain or dyspareunia in the 26 selected villages which comprised a total of 424 women.

SAMPLE

The samples of the study consisted of women between 3 months to 1 year post-delivery status who were identified using pelvic floor distress inventory and fulfilled the inclusive criteria.

SAMPLE SIZE

The sample size for the present study was calculated based on the pilot study and prevalence rate of pelvic floor dysfunction in the rural areas after the survey. The calculated sample size using the effect size of 0.40 at power 0.80 and 0.05 level of significance was estimated to be 106 in each group. The final sample size estimated for the study was 212 women with pelvic floor dysfunction 110 each in the experimental and control group. There were 232 women who had pelvic floor dysfunction, 116 each in experimental and control group. Final sample size used for analysis was 110 in each group.

SAMPLE SELECTION CRITERIA

Inclusive Criteria

- Women who are willing to participate in the study
- Women who can understand Tamil
- Women between 3 months to 1 year post-delivery status with pelvic floor dysfunction.

Exclusive Criteria

- Women who had already undergone pelvic floor exercise training programme.

- Women who had undergone any surgery in the pelvis.
- Women with severe medical and surgical conditions (Stroke, Colostomy)
- Women with postpartum complication (wound gaping, infection, cervical tear)

DEVELOPMENT AND DESCRIPTION OF THE TOOL

Pelvic floor dysfunction was assessed using pelvic floor distress inventory scale. Women who had the presence of either one of the following, urinary incontinence/bowel incontinence/pelvic organ prolapsed/pelvic pain or /dyspareunia were included for the study.

Muscle strength was assessed by per vaginal examination by the investigator and graded using modified Oxford grading scale. Pelvic floor muscle strength was assessed under 5 categories such as Power, Endurance, Repetitions, fast contraction and every timed contraction timed as given in table For credibility of assessing the PFM every 10th sample was assessed by the gynaecologist organized by the investigator.

Oxford scale for grading pelvic floor muscle strength

Grade	Characteristics
0	No discernible contraction
1	Barely palpable, flickering contraction, not visible on inspection of the perineum
2	Weak, distinctly palpable contraction, felt as slight pressure on the examining finger
3	Moderate muscle strength, distinct pressure on the examining finger, and palpable upward and forward movement, visible on the perineal surface
4	Good muscle strength, elevation possible against slight resistance, circular pressure can be felt around the examining finger. During simultaneous examination by the index and middle finger these are pressed against each other
5	Very strong muscle strength, contraction possible against vigorous resistance, with suction-type effect on the examining finger. During simultaneous examination by the index and middle finger, these are pressed against each other despite resistance.

PERFECT Scheme

P Power	The power/strength of the maximum voluntary contraction (MVC) is determined from the modified Oxford scale
E Endurance	The duration of the contraction is noted, up to 10 seconds.
R Repetitions	This represents the number of times the maximum voluntary contraction (a product of power and endurance) can be repeated, with 4 seconds rest between each contraction, until the muscles fatigue.
F Fast	Fast-twitch muscle fibres are only recruited when speed or power are required, thus necessitating the need to assess the number of fast (1 second) contractions the patient can perform before the, muscle fatigues.
ECT	Every contraction timed.

INTERVENTION TOOL

Interventional package consisted of video assisted teaching, demonstration and return demonstration techniques provided by the investigator to strengthen the pelvic floor muscle and to improve the knowledge of the women regarding pelvic floor dysfunction.

- Video assisted teaching was given using laptop for 45 minutes which included anatomy and physiology of pelvic floor, causes of pelvic floor muscle weakness, effect of pelvic floor muscle weakness, medical and surgical management, and prevention of complications and importance of maintaining a healthy pelvic floor. This individual teaching was conducted at households of the women.
- Exercise programme was also provided through video assisted teaching using a laptop, demonstration and return demonstration on Kegel exercise, abdominal clams core stabilizer exercise, bladder control spinal rotation exercise, side leg circles exercise, rolling knee step, push up exercises and bridging exercises were demonstrated by the investigator and return demonstrated by the women.
- The interventional package was administered individually at their home and return demonstrated by the individual women. Every woman was given a pictorial diary with calendar to fix a bhindi in the column if they performed the exercises. They were given reminders through SMS using mobile phone to perform exercises. Reinforcement was given through the form of booklet and community level volunteers identified by the investigator to reinforce them to do regular exercises.

ETHICAL CONSIDERATIONS

Consent was obtained from the Head of the institution, the in-charge and the concerned village leaders. The data collection and risk assessment was a done after the consent from the women. No intensive questions were asked to the women during data collection. No coercion was used in encouraging the women to adhere to the lifestyle modification especially dietary choices, control of habits. The women were informed that they could discontinue their participation if they perceived any stress or fatigue due to their involvement. The women were not subjected to any form of exploitation. Complete information on the role and expectations of the women in the study was explained to them prior to the obtaining consent. The women were given autonomy to decide the participants to continue in the study. The women were given the choice of voluntarily deciding whether to take part in the study. They were also allowed to clarify their doubts regarding the purpose of the study and the nature of their involvement in it. Freedom to withhold any information or to withdraw from the study at anytime of their choice was also informed to them. Written informed consent signed by the participant, a witness and the investigator was ensured before the data collection. They were assured of anonymity and strict confidentiality of their identity or the information shared by them during reporting, presentation or publication of this research work.

DATA COLLECTION PROCEDURE

The villages were selected by probability sampling that is simple random sampling (lottery method). Cluster randomization was utilized to categorize the experimental and control group samples. Investigator visited the villages one by one and got the list of the women (3 months post labour to 1 year) from balwadi workers and village health nurse. Then the investigator met the women individually at their households, they were seated comfortably with adequate privacy. To obtain the true and free responses the women were explained regarding the purpose and usefulness of the study. The investigator assured the clients about anonymity and confidentiality. The background data of the women was then collected, and they were screened for pelvic floor dysfunction using the pelvic floor distress inventory.

The pelvic floor muscle strength was assessed using per vaginal examination done after ensuring privacy, which took approximately 15 minutes. After assessment, women in the experimental group were given individual education using video assisted teaching on pelvic floor dysfunction for about 45 minutes with the help of laptop. Later demonstration of exercises was done by the investigator for 30 minutes and return demonstration was done by the women on the same day. Women were given a pictorial diary to maintain daily and were asked to fix a bhindi daily after performing exercises. They were given reminder through SMS through their mobile phone to perform exercises daily as reinforcement. One volunteer from each village was identified to reinforce the women to perform daily exercises. Women were also given pictorial information booklet as a follow up guide and reinforcement.

In a day the investigator visited an average of 5-6 women during the study period. The investigator visited the women once in 4 weeks for follow up and clarified their doubts. After 8 weeks the investigator performed the post test assessment of pelvic floor muscle strength. For credibility of assessing pelvic floor muscle every 10^{th} sample was assessed by the gynecologist organized by the investigator. All Women were encouraged to maintain their general health and pelvic floor muscle strength. After the completion of post-test, the same intervention package was administered to the women in the control group as wait list control group.

A total of 116 and 113 samples were included for the experimental and control group respectively. However due to change in residences and non-adherence to the exercise pattern there was an attrition of 6 from experimental group and 3 from control group samples. Hence a total of 220 women were the final sample size for the study.

RESULTS AND ANALYSIS

With regard to the demographic variables among the 220 women, Most of the women 82(74.5%) and 76(69%) were between 21 – 30 years of age in experimental and control group respectively. Most of them 42(38.2%) and 47(42.7%) had middle school education, 84(76.4%) and 79(71.9%) were Hindus, 54(49.1%) and 63(57.2%) were belonging to joint family, 84(76.4%) and 87(79.1%) had monthly income within Rs. 11361, 83(75.5%) and 85(77.2%) were unemployed and having sedentary lifestyle and 106(96.4%) and 107(97.3%) of the women were having non vegetarian food pattern among the experimental and control group respectively.

With regard to the Obstetrical factors, the study participants most of them 48(43.6%) and 42(38.2%) had one child birth, 29(26.4%) and 33(30%) had 2-3 years birth spacing between two children and 60(54.5%) and 55(50%) had normal vaginal delivery among the experimental and control group respectively.

Description of clinical variables among the women with pelvic floor dysfunction in experimental and control group

Table 1: Frequency and Percentage distribution of Clinical variables (weight gain, induction of labor, duration of second stage of labor, last child birth and weight of baby of last child birth) among the experimental and control group. N=220

Clinical Variables	Group				Chi square test
	Experimental (N=110)		Control (N=110)		
	N	%	N	%	
Weight gain (kgs) during last pregnancy					
< 5	11	10.0	15	13.6	χ^2=5.09 P=0.17
6 -10	65	59.1	53	48.2	DF=3
11 -15	26	23.6	25	22.7	NS
16 -20	8	07.3	17	15.5	
Induction of labour of last child birth					χ^2=0.20 P=0.66
Medical Induction	77	70.0	80	72.7	DF=1
Nil	33	30.0	30	27.3	NS
Duration of second stage labour of last child birth					χ^2=0.09 P=0.76
Less than One Hour	49	57.0	41	59.4	DF=1
More than One Hour	37	43.0	69	40.6	NS
Weight of baby of last child birth in Kgs					
< 2	11	10.0	10	09.1	χ^2=2.83 P=0.41
2 - 3	69	62.7	72	65.5	DF=3
3 - 4	28	25.5	22	20.0	NS
> 4	2	01.8	6	05.5	
Present BMI in kg/m2					
Underweight	13	11.8	12	10.9	χ^2=4.02 P=0.26
Normal	59	53.7	64	58.2	DF=3
Over weight	23	20.9	13	11.8	NS
Obese	15	13.6	21	19.1	

NS – Not Significant

The above table shows the clinical variables of the study participants in the experimental and control group. Most of the women had 6-10 kgs weight gain during last pregnancy, had medical induction of labour, had less than one hour second stage among experimental and more than one hour second stage for control group, had baby with 2-3 kgs and were having normal BMI.

Table 2 (a): Frequency and percentage distribution of clinical variables among women with pelvic floor dysfunction with respect to duration of second stage of labor, weight of the baby, postnatal period, history of perineal tear and its degree N = 220

Clinical Variables		Group				Chi square test
		Experimental (N=110)		Control (N=110)		
		N	%	N	%	
Duration of second stage labour	Less than One Hour	49	57.0	41	59.4	χ^2=0.09 P=0.76
	More than One Hour	37	43.0	69	40.6	DF=1 NS
Weight of baby in KG	< 2	11	10.0	10	9.1	
	2 – 3	69	62.7	72	65.5	χ^2=2.83 P=0.41
	3 – 4	28	25.5	22	20.0	DF=3 NS
	> 4	2	1.8	6	5.5	
Postnatal period in months	3 - 6	39	35.5	34	30.9	
	7 - 9	43	39.1	40	36.4	χ^2=1.45 P=0.48
	10 - 12	28	25.5	36	32.7	DF=2 NS

History of perineal trauma during vaginal delivery	Yes	31	28.2	36	32.7	χ^2=0.53 P=0.46 DF=1 NS
	No	79	71.8	74	67.3	
Degree of perineal trauma	I degree	21	67.7	30	83.3	χ^2=2.56 P=0.27 DF=2 NS
	II degree	8	25.8	4	11.1	
	III degree	2	6.5	2	5.6	

NS – Not Significant

The table illustrated that majority of the women's duration of second stage of labour was < 1 hour in both the groups. Weight of the baby was between 2-3 kg in experimental group and between 2-3 and 3-4 kg in control group. The majority of the women were in the postnatal period of 7-9 months, one third of them had the history of perineal trauma during delivery and more numbers of women had I degree of perineal tear in both the groups.

Table depicted no statistical significant difference between experimental and control group thus it inferred they are homogenous group

.

Table.2(b): Frequency and percentage distribution of clinical variables among women with pelvic floor dysfunction with respect to duration of second stage of labor, weight of the baby, postnatal period, history of perineal tear and its degree
N = 220

Clinical Variables		**Group**				**Chi square test**
		Experimental (N=110)		**Control (N=110)**		
		N	**%**	**N**	**%**	
Duration of second stage labour	Less than One Hour	49	57.0	41	59.4	χ^2=0.09 P=0.76 DF=1 NS
	More than One Hour	37	43.0	69	40.6	
Weight of baby in KG	< 2	11	10.0	10	9.1	χ^2=2.83 P=0.41 DF=3 NS
	2 – 3	69	62.7	72	65.5	
	3 – 4	28	25.5	22	20.0	
	> 4	2	1.8	6	5.5	
Postnatal period in months	3 - 6	39	35.5	34	30.9	χ^2=1.45 P=0.48 DF=2 NS
	7 - 9	43	39.1	40	36.4	
	10 - 12	28	25.5	36	32.7	
History of perineal trauma during vaginal delivery	Yes	31	28.2	36	32.7	χ^2=0.53 P=0.46 DF=1 NS
	No	79	71.8	74	67.3	
Degree of perineal trauma	I degree	21	67.7	30	83.3	χ^2=2.56 P=0.27 DF=2 NS
	II degree	8	25.8	4	11.1	
	III degree	2	6.5	2	5.6	

NS – Not Significant

The table 2(a) illustrated that majority of the women's duration of second stage of labour was < 1 hour in both the groups. Weight of the baby was between 2-3 kg in experimental group and between 2-3 and 3-4 kg in control group. The majority of the women were in the postnatal period of 7-9 months, one third of them had the history of perineal trauma during delivery and more numbers of women had I degree of perineal tear in both the groups.

Tables 2(a) and 2(b) depicted no statistical significant difference between experimental and control group thus it inferred they are homogenous group

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Table 3. Description of study specific variables among the women with pelvic floor dysfunction in experimental and control group

Table 3: Frequency and Percentage distribution of Study Specific variables among women in the experimental and control group

N=220

Study Specific Variables	Group				Chi square test
	Experimental (N=110)		Control (N=110)		
	n	%	n	%	
Family history of pelvic floor dysfunction					χ^2=1.28 P=0.26 DF=1 NS
Yes	42	38.2	34	30.9	
No	68	61.8	76	69.1	
If Yes Family relationship					χ^2=0.00 P=1.00 DF=1 NS
I degree	42	100	34	100.0	
Type of pelvic floor dysfunction among the family member					χ^2=0.25P=0.88 DF=2 NS
Urinary incontinence	26	61.9	22	64.7	
Bowel incontinence	8	19.0	7	20.6	
Pelvic organ prolapses	8	19.0	5	14.7	
Previous Source of information					χ^2=0.30 P=0.58 DF=1 NS
Yes	6	05.5	8	07.3	
No	104	94.5	102	92.7	
If yes specify					χ^2=0.0 P=1.00 DF=1 NS
Health care personnel	6	100	8	100	
Are you doing any type of exercises					χ^2=0. 0 P=1.00 DF=1 NS
No	110	100	110	100	

NS – Non Significant

The above table 3 showed that few of the women were having family history of pelvic floor dysfunction in both groups, few of them who had a family history had the first degree relation, few women had urinary incontinence in the family, Most of them had not received any previous information regarding pelvic floor dysfunction in experimental group, only few received information through health care personnel and none of them are not doing any type of exercises in both groups. No statistical significant difference between experimental and control group was seen, thus it inferred they are homogenous group.

Table 4. Assessment of pre and post test pelvic floor muscle strength among women with pelvic floor dysfunction in the experimental and control group.

Table 4(a): Assessment of pre and post test pelvic floor muscle strength among women with pelvic floor dysfunction in the experimental group.

N = 110

Domains	Experimental Group			
	Pretest		Posttest	
	Mean	%	Mean	%
Power	1.94	38.8	3.14	62.8
Endurance	2.10	42.0	3.21	64.2
Repetitions	1.77	35.4	3.21	64.2
Fast Contraction	1.62	32.4	3.25	65.0
Every Contraction Timed	1.65	33.0	3.01	60.2
Overall	**9.07**	**36.3**	**15.81**	**63.2**

The above table 4(a) showed that the pre and post test mean pelvic floor muscle strength score domain wise in the experimental group women. The mean scores in all the domains have improved in the posttest. The overall mean

score of 9.07 in the pretest has improved to 15.81 in the posttest.

Table 4(b): Assessment of pre and post test pelvic floor muscle strength among women with pelvic floor dysfunction in the control group.
N = 110

Domains	Control group			
	Pretest		Posttest	
	Mean	%	Mean	%
Power	2.02	40.4	2.05	41.0
Endurance	2.09	41.8	2.15	43.0
Repetitions	1.90	38.0	1.92	38.4
Fast Contraction	1.67	33.4	1.77	35.4
Every Contraction Timed	1.59	31.8	1.63	32.6
Overall	**9.27**	**37.1**	**9.52**	**38.1**

The above table 4(b) showed the pre and post test mean pelvic floor muscle strength score domain wise among the control group women. There was no improvement in the total mean score observed in the post test.

Table 5(a): Comparison of pre and posttest pelvic floor muscle strength score in the experimental group.
N = 110

Domains	Pretest		Posttest		Mean Difference	Student paired t-test
	Mean	SD	Mean	SD		
Power	1.94	0.62	3.14	0.58	1.2	t=14.37 p=0.001***
Endurance	2.10	0.63	3.21	0.58	1.11	t=15.33 p=0.001***
Repetitions	1.77	0.44	3.21	0.65	1.44	t=17.91 p=0.001***
Fast Contraction	1.62	0.65	3.25	0.61	1.63	t=20.48 p=0.001***
Every Contraction Timed	1.65	1.04	3.01	0.57	1.36	t=12.46 p=0.001***
Overall	**9.07**	**1.53**	**15.81**	**1.76**	**6.74**	**t=31.02 p=0.001*** **

***** = High statistical significance at p< 0.001**

The above table depicts that there was a statistical significant improvement in the Pelvic floor muscle strength among women in the experimental group during the posttest. There was an overall mean difference of 6.74 in the posttest there by showing an overall improvement in the pelvic floor muscle strength among the women in pelvic floor dysfunction.

Table 5(b): Comparison of pre and posttest pelvic floor muscle strength score in the control group.
N = 110

Domains	Pretest		Posttest		Mean Difference	Student paired t-test
	Mean	SD	Mean	SD		
Power	2.02	0.45	2.05	0.48	0.03	t=1.34P=0.18 NS
Endurance	2.09	0.52	2.15	0.53	0.06	t=1.71 P=0.09 NS
Repetitions	1.90	0.59	1.92	0.62	0.02	t=0.37 P=0.70 NS
Fast Contraction	1.67	0.67	1.77	0.73	0.10	t=1.77 P=0.08 NS
Every Contraction Timed	1.59	0.64	1.63	0.68	0.04	t=0.89 P=0.37 NS
Overall	**9.27**	**1.94**	**9.52**	**2.25**	**0.25**	**t=1.45 P=0.14 NS**

NS – Not Significant

The above table 5(b) shows that the women in the control group did not show any change in the pelvic floor muscle strength score in the posttest.

Effectiveness of an Interventional Package on Pelvic Floor Muscle Strength among Women with Pelvic Floor Dysfunction

Table 6: Effectiveness of intervention package on pelvic floor muscle strength among women with pelvic floor dysfunction.

Table 6(a): Comparison of pretest pelvic floor muscle strength among women with pelvic floor dysfunction between experimental and control group

N=220

Domains	Group				Mean difference	Student independent t-test
	Experimental (N=110)		Control (N=110)			
	Mean	SD	Mean	SD		
Power	1.94	0.62	2.02	0.45	0.08	t=1.11p=0.26 NS
Endurance	2.10	0.63	2.09	0.52	0.01	t=0.12 p=0.91 NS
Repetitions	1.77	0.44	1.90	0.59	0.13	t=1.81 p=0.07 NS
Fast Contraction	1.62	0.65	1.67	0.67	0.05	t=0.61 p=0.53 NS
Every Contraction Timed	1.65	1.04	1.59	0.64	0.14	t=0.47 p=0.63 NS
Overall	**9.07**	**1.53**	**9.27**	**1.94**	**0.20**	**t=0.84 p=0.39 NS**

NS – Not Significant

The above table 6(a) showed the comparison of pretest mean and standard deviation scores of the pelvic floor muscle strength between the experimental and control group. No significant statistical difference was noted in the pretest scores between the experimental and control group women. This indicated that the muscle strength was weak before intervention in both experimental and control group.

Table 6(b): Comparison of post test mean pelvic floor muscle strength among women with pelvic floor dysfunction between experimental and control group

N=220

Domains	Group				Mean difference	Student independent t-test
	Experimental (N=110)		Control (N=110)			
	Mean	SD	Mean	SD		
Power	3.14	0.58	2.05	0.48	1.09	**t=15.20 p=0.001*** **
Endurance	3.21	0.58	2.15	0.53	1.05	**t=14.15 p=0.001*** **
Repetitions	3.21	0.65	1.92	0.62	1.29	**t=15.03 p=0.001*** **
Fast Contraction	3.25	0.61	1.77	0.73	1.47	**t=16.31 p=0.001*** **
Every Contraction Timed	3.01	0.57	1.63	0.68	1.38	**t=16.44 p=0.001*** **
Overall	**15.81**	**1.76**	**9.52**	**2.25**	**6.29**	**t=23.13 p=0.001*** **

***High statistical significance at p< 0.001**

The above table 6(b) showed the posttest mean and standard deviation scores of the pelvic floor muscle strength between the experimental and control group. High level of statistical significant difference was found between the experimental and control group after the intervention in all domains. The overall Pelvic floor muscle strength mean difference score was 6.29 which had high statistical significant difference at p< 0.001 level. The intervention package has been very effective in enhancing the pelvic floor muscle strength of women.

Table 6(c): Effectiveness of interventional package on pelvic muscle strength score among women in the experimental and control group

N=220

Group	Assessment	Maximum score	Mean ±SD	Strength gain score with 95%CI	% of strength gain score with 95%CI
Experiment (n=110)	**Pretest**	25	9.07±1.53	6.74 (6.30 -7.17)	26.9(25.2% - 28.7%)
	Post-test	25	15.81±1.76		
Control (n=110)	**Pretest**	25	9.27±1.94	0.25 (0.09-0.58)	1.0% (0.3% - 2.3%)
	Post-test	25	9.52±2.25		

The above table 6(c) depicted that the pelvic floor muscle strength gain in the experimental group was 6.74 in comparison with control group women i.e., 0.25. Similarly the percentage of strength gain score for experimental group was 26.9 whereas for control group it was 1%. This inferred that the interventional package had improved the pelvic floor muscle strength of women in the experimental group.

The associate the mean differed gain score of pelvic floor muscle strength with selected variables in experimental and control group

The association between the mean differed gain score of pelvic floor muscle strength with the selected variables among women in the experimental group more than 30 years of age had better gain score than women younger than 30 years. Women above 30 years have understood the seriousness of pelvic floor dysfunction and might have performed pelvic floor exercises regularly. Women who had undergraduate education and more had reported to have more gain score than women with low education which showed that knowledge influenced the pelvic floor muscle strength as observed with correlation score.

Women with monthly income of more than Rs. 11362 reported more gain score than women in low income level. Socio economic influence on performance of regular exercises noted with this observation. Women with one to two childbirths had more gain score than women with three or more childbirths. Women with more childbirth had weak pelvic floor muscle strength.

Women with birth spacing of 1-2 years had more gain score than women with less than one year spacing. Birth spacing was considered important in regaining the pelvic floor muscle strength between childbirths. Women with normal BMI had more gain score than overweight and obese women. Increased body weight weakens the pelvic floor muscle strength with more straining placed on the muscles.

Women who had medical induction during last labour process had more gain score than women who had no induction. Women who had no induction might have strained a lot which would have weakened the pelvic floor muscle strength. Women with family history of pelvic floor dysfunction had more gain score than women without family history. Women might have taken seriously the risk as they have observed their family member suffer from the problem and would have had an influence.

The above findings were supported by univariate and multivariate analysis using unadjusted odds ratio with 95 % Confidence interval scores.

Association of mean differed gain score of pelvic floor muscle strength with selected variables among women in the control group

The association of mean differed gain score pelvic floor muscle strength with the selected variables among women in the control group who had family history of pelvic floor dysfunction had better gain score than women without family history and as discussed earlier family history would have improved their awareness towards the prevention.

Conclusion:

Pelvic floor dysfunction causes a lot of burden among the women and studies have showed a trend of increasing prevalence. Pelvic floor dysfunction can be easily prevented by women with improved awareness and by performing regular pelvic floor strengthening exercises. The major problem in India and other developing countries was the lack of awareness about the preventing measures and contributing factors of pelvic floor dysfunction.

Simple, yet effective, community based nursing interventions are very much needed to prevent women from encountering pelvic floor dysfunction which will significantly affect their quality of life. Keeping in view of this, the present study was designed and executed.

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