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Original Research Article

Effect of BMRT on Pelvic Floor Muscle Activity and QOL among Pregnant Women's with Urinary Incontinence: A New Approach of Intervention Study

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Abstract

***Introduction*:** Pregnancy is the period when the women is undergoes through physical and emotional changes. The physical changes can lead to impaired pelvic floor muscle strength and psychological changes in body. So, the present study was conducted to evaluate the effectiveness of BMRT protocol on pelvic floor muscle and QOL among pregnant females. ***Method*:** A quasi experimental study was conducted to evaluate the effectiveness of BMRT protocol on urinary incontinence and QOL among pregnant females. Convenience sampling method was used to recruit the participant in the study according to inclusion and exclusion criteria. ICIQ-UI SF outcome measure was used to evaluate the status of urinary incontinence and QOL-GRAV-U scale was used to evaluate the QOL of pregnant females. Afte data collection statical analysis was done using SPSS version 20. ***Result*:** Total 113 females participated in the study. All the females received the treatment protocol and the pre-post intervention assessment was done and the finding of paired t test is showing the significant improvement in symptoms of urinary incontinence with the p value of 0.00. The combination of music therapy and breathing exercise was also effective to improve the quality of life with the p value of 0.00. ***Conclusion*:** The study concludes that BMRT protocol is effective to improve the urinary incontinence symptoms and quality of life among pregnant females.

Keywords: Women's health, Breathing exercise, Music therapy, Physiotherapy, Quality of life, Pelvic floor muscle, Urinary incontinence.

INTRODUCTION

Pregnancy is a remarkable period in a woman's life during which a fetus develops inside the uterus [1]. It generally lasts about 40 weeks, or just over 9 months. Health care providers divide this time into three segments called trimesters [2]. Each trimester lasting around 12 to 14 weeks which from the first day of the last menstrual period (LMP) to the delivery of the baby [1, 2]. In India, there are 48.1 million pregnancies, with a rate of 144.7 pregnancies per 1000 women aged 15-49 years, and a rate of 70.1 unintended pregnancies per 1000 women aged 15-49 years. Abortions make up a third of all pregnancies, and almost half of pregnancies are unintended [2].

According to the International Continence Society (ICS), Urinary incontinence (UI) in pregnant women is characterized by experiencing involuntary urine loss during activities such as physical exertion, sneezing, or coughing [3]. Urinary incontinence (UI) prevalence ranges from 18.6% to 75% [4, 5], escalating as pregnancy progresses [6, 7]. Typically, it is most pronounced in the third trimester [8].

Pregnancy is a key risk factor for the onset of urinary incontinence (UI) in young women. During pregnancy, there may be decrease in pelvic floor muscle (PFM) strength, which can result in diminished support and sphincter function of the PFM, leads to UI [9]. Nonetheless, the precise mechanism behind pregnancy-related UI remains poorly understood [10, 11]. Physiological changes that occur during pregnancy, such

as increased abdominal pressures and progesterone levels, along with pelvic floor injury, can lead to increased susceptibility to urinary incontinence [12-14]. This condition affects over half of women during pregnancy, peaking in the third trimester [15]. Furthermore, it is a significant indicator of postpartum and long-term urinary incontinence risk, even for those who initially recover after giving birth [16, 17].

The diaphragm, which expands the rib cage during inhalation, is comprised of a central tendon and muscular component. Earlier research has indicated the coordinated function of the diaphragm, deep abdominal muscles, and pelvic floor in breathing and coughing [18]. Talas *et al*., observed through dynamic MRI that the pelvic floor moves in a Cranio-caudal direction parallel to the diaphragm during respiration [19]. Their study suggested that during exhalation, the pelvic floor muscles contract in unison with the abdominal muscles, elevating the abdominal organs and increasing intra-abdominal pressure (IAP) towards the diaphragm. Furthermore, Park *et al*., found that integrating pelvic floor muscle exercises into diaphragmatic breathing (DB) enhances breathing efficiency and proposed adding these exercises to respiratory rehabilitation programs to address urinary incontinence issues [20].

Urinary incontinence (UI) presents a dual challenge as it impacts both medical and social spheres, diminishing one's quality of life [21]. It can lead to feelings of inadequacy, potentially triggering, emotional struggles like depression [22]. It is characterized by a multifaceted pathogenesis [23]. Various risk factors, including advanced age, childbirth, birth-related injuries, obesity, smoking, chronic cough, constipation, pelvic organ prolapse, menopause, and toileting habits, contribute to the development of UI [24].

According to the International Continence Society (ICS), Urinary Incontinence can significantly decrease quality of life due to its unpleasant and stressful nature, often restricting women's activities and leading to social isolation in many instances [25-27]. The relationship between socio-demographic variables, UI, and its impact on quality of life remains poorly understood [28].

There is ongoing research on ways to evaluate and re-educate the PFMs, and the literature on women's health has proposed a number of workout regimens [29]. A persistent issue is patient compliance with PFM training programs [30, 31]. According to Haslam (2004), enjoyable equipment and contemporary technology seem to increase motivation and encourage compliance by aiding in the co-activation of different muscle groups [32]. PFM activation or workouts should be carried out during the expiratory phase of breathing or during breath control, according to Sapsford (2001) [33].

The current author, who has professional training in this field and a degree in Hindustani classical music, says that singing is one technique to develop motivation and compliance because it takes specific breath control [34]. Little work has been done on PFM contractions in conjunction with functional activity, or on the relative importance of isometric, concentric and eccentric muscle work [35].

Hung *et al*., reported that the higher cure/recovery rates when PFM exercises are combined with abdominal and breathing exercises in the treatment of urinary incontinence (Hung *et al*., 2010) [36]. However, as far as known, there is not known study states the effect breathing exercises and music therapy on incontinence in pregnant females. Thus, the objective of this study was to see a combine effect of breathing exercises along with music therapy in pregnant females with urinary incontinence and to find out its effect on their quality of life.

Study design and Methodology -

A quasi-intervention study was conducted in department of physiotherapy in NIMS University, Jaipur, Rajasthan. And data collection was done from Dr. Roshitha's women's health clinic, Kasaragod, Kerala.

Sampling and Sample size

Convenience sampling method was use to recruit the participants in the study. Total 130 females participated in the study. Sample size was calculated with epi info software with 80 % of confidence interval, 5% of confidence limit and 50% of expected frequency and sample size was 118. 10% of dropout was added in the study and final sample size for the study was 130.

Eligibility Criteria

Women's who were in third trimester and had uncomplicated pregnancy, age between 22 to 30 years and suffering with urinary incontinence were included in the study. Women's with any type of mental, cardiorespiratory, metabolic disorders and any complications related with the pregnancy were excluded from the study. All the participants were informed about the nature of the research and about the confidentiality of their data. A prior written consent was taken from all the participants before participation in the study.

Procedure

All the pregnant women's who were in third trimester were screened for the study. Women's who were falling under the inclusion and exclusion criteria were included in the study with their consent. After the study enrolment BMRT intervention was given to all the participants for 8 weeks once in a day for 45 minutes. All the participants were instructed to follow the same protocol at home in a day. So, all the participants received the intervention twice in a day. Everyone was instructed to emptying their bladder before the intervention to maintain the continuity of intervention.

The pre-post assessment was done for all the participants. After the 4 week of intervention an assessment was taken from participants to see the effect of intervention. A final assessment was taken after 8 weeks of intervention.

Follow by that statistical analysis was done with SPSS version 20. T-test was used to find out the effectiveness of intervention among participants.

Intervention

BMRT (Breathing & Music Rhythm Therapy Protocol) PROTOCOL

Breathing exercise

Position 1 – Subject should be in sitting position on chair with back fully supported. Instruct the subject to keep a pillow between both the legs and hold it while performing the breathing exercise. Instruct the patient to breath in through the nose and expire the air through mouth slowly. Repeat this process for 20 times.

Position 2- Subject should be in clam shell position with body full supported. Keep the pillow between both the thighs/ leg and instruct the subject to hold the pillow between the legs while performing breathing exercise. Ask the patient to breath in through the nose and expire the air through mouth slowly. Repeat this process for 20 times.

Note – The pillow was adjusted between the legs of pregnant females and it was taken care that its comfortable and subject is able to hold the pillow easily between the leg. If it was required to customized the pillow it can be done for the subject.

Music rhythm therapy

Subject is instructed to singing the song which they like or used to. They were told to keep the list of their favorite songs and sing the song for 15 minutes twice in a day.

Outcome Measure

In present study two outcome measure was used to evaluate the status of urinary incontinence and other one to evaluate the QOL of participants.

1. The International Consultation on Incontinence Questionnaire–Urinary Incontinence Short Form (ICIQ-UI SF)- Used to evaluates the severity of UI symptoms. The total score is range between 0 -21 which achieved from the first three questions. A score of zero means no leakage of urine and no affection on quality of life. Question 1 (Q1) quantifies the frequency of urinary leaking, question 2 (Q2) evaluates the amount of leaking and question 3 (Q3) how much the urinary incontinence interferes with the everyday life.

2. QOL-GRAV-U - The QOL-GRAV-U is a 9-item questionnaire where three items out of nine [item 7, 8, and 9] are reverse coded and are presented in a 5-point Likert format. The Likert rating of 1 represents the best QOL and 5 the worst state of QoL. The QoL is measured as excellent [mean score of 9–18], very good [mean score of 19–27 points], good [mean score of 28–36 points], and not very good [man score of 37–45 points].

RESULT

Total 130 females participated in the study out of these 6 females discontinued the intervention and finally data was calculated for 113 females. The reason for discontinuing the intervention was pre term delivery.

Female age between 22-30 year participated in the study with the mean value and SD of ± 25.58 and 2.496 as shown in Table 1.

Pair t-test was done to find out the effectiveness of BMRT intervention among pregnant females and it was found that there was a significance improvement was present after the intervention with the p value of 0.000. The BMRT protocol is effective to improve urinary incontinence in pregnant females. As shown in Table 2.

Table 1: Demographic details

	n	Mean ± SD
Gender	113	1.00± .000
Age	113	25.58± 2.496

Table 2: Paired samples t- test

	Mean ± SD	SE	t-value	df	Significance
Pre QOL	1.14 ± 0.305	0.053	-24.470	112	0.000
Post QOL	2.44 ± 0.499				
Pre UI	1.73 ± 0.444	0.079	6.080	112	0.000
Post UI	1.26 ± 0.429				

DISCUSSION

Present study was conducted to find out the effect of BMRT Protocol in pregnant females with urinary incontinence. The study finding shows that BMRT protocol is effective and safe for pregnant females to improve the symptoms of urinary incontinence and QOL.

According to present study BMRT protocol is the combination of breathing exercise and music therapy and according to literature the pelvic floor muscle act as a synergy with anterolateral abdominal muscle during inspiration and expiration, and strenuous effort is required to protect the abdominal muscle from excess stress [19, 37]. In BMRT protocol the patient were instructed to keep and hold the ordinary pillow between both the legs so the subject can easily release the excess pressure or stress on the pillow and the maximum pelvic floor muscle contraction can be achieve without any strenuous activity or movement. A repeated assessment was done for all the females and it was found that the combination of breathing exercise is beneficial to improve the symptoms of incontinence.

According to literature antenatal exercise is also beneficial to improve the postnatal urinary incontinence among females. The 3 months of antenatal exercise considering the pelvic floor training is helps to improve the post-natal complications related incontinence [38]. In present study the postnatal follow up was not taken from the participants to find out the effectiveness of intervention after delivery. According to a systemic review conducted by Aarburg *et al*., 2021 [4] women's should encouraged to engaged in physical activity or pelvic floor muscle training to prevent complications related to urinary incontinence. Its recommended to prescribe the home exercise protocol also to improve the health status of patriciates [39].

According to a pilot study conducted by N. Bedekar *et al*., in 2012 [34] during singing there will be activation of pelvic floor muscle takes place and it was concluded that music therapy is beneficial to improve the strength of pelvic floor muscle. The EMG findings confirm that Singing requires the special breathing control at various level and this breathing control helps to activate the muscle of diaphragm, abdominal and pelvic floor muscle. But this study was conducted among healthy individuals and in present study the music therapy was given as a intervention to the pregnant females and it was found that 30 minutes of music therapy was effective to improve the pelvic floor muscle activity and it was found that the combination of breathing exercise and music therapy is effective to improve the symptoms of urinary incontinence in pregnant females.

Pregnancy is the period of physical and emotional transition of female takes place even if it uncomplicated pregnancy. Its highly recommended to check the QOL of females during pregnancy as it is directly affecting the life of mother and child [40] physical and emotional changes during pregnancy changes the mental health, self-esteem, and confidence [41]. In present study QOL of females was assessed to find out the effect of breathing and music therapy in females. And it was found that BMRT protocol was effective to improve the QOL of pregnant females. According to literature music therapy and breathing exercise both techniques help to reduce stress, anxiety, depression and have positive effect on postpartum situations including mother and child [42]. There is no negative effect of both the approaches during pregnancy. According to a systemic review conducted by Leutenegger, *et al*., 2022 [43] antenatal breathing exercise helps to improve the self-confidence and self-efficacy of females it also increased feeling of being in control during labor. Findings of present study is similar to the study previously conducted as there is lesser chances of any harmful effect of BMRT protocol on QOL and health status of participants but complete care was taken during the intervention and if some complication was seen the protocol was immediately stopped.

Overall, the study concludes that breathing exercise and music therapy both are beneficial to improve the strength of pelvic floor muscle strength and effective to improve the symptoms the symptoms of urinary incontinence in pregnant females. Moreover, that BMRT protocol was also effective to improve the QOL of pregnant females. Its also improve the postpartum complications in females but the postpartum status was not assessed in females.

CONCLUSION

The study concludes that breathing exercise and music therapy (BMRT Protocol) is effective and beneficial to improve the symptoms of urinary incontinence in pregnant females. It also helps to improve the other psychological symptoms and improve the quality of life of pregnant women's. There is no harmful effect of BMRT protocol which is the main advantage to along with the improvement of pelvic floor muscle strength.

LIMITATIONS

The females who delivered the child before ninth month or the women's who were not able to complete the intervention so, they discontinued their participation from the study. Urinary incontinence is common in third trimester so females who were in second trimester were not include in the study.

Clinical Implication

BMRT Protocol is safe and effective to improve the strength of pelvic floor muscle. So, this protocol can be easily implemented or recommend for pregnant women to improve the QOL and symptoms of urinary incontinence.

Ethical Consideration

The study was reviewed by NIMS college of physiotherapy departmental ethical committee and approved by departmental committee without any objection. (Ref. No. NIMS/PTOT/April/2024) A written consent was taken from all the participants during the

process of recruitment and All data were coded for anonymity and kept confidential.

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