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EFFECTS OF PELVIC FLOOR MUSCLE EXERCISES ON URINARY INCONTINENCE IN DIABETIC WOMEN

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ABSTRACT

Background: Urinary incontinence is a common condition among females and it is estimated that 20-40% females of age under 60 years suffer with urinary incontinence however for the females above 60 years the percentage is 30-50%. Keegal exercises are used to strengthen pelvic floor muscles which ultimately treats and reduces urinary incontinence. It is pretty definite that women with diabetes mellitus at advanced phases of age suffer with urine incontinence, but the severity of matter has yet been considered enough to put forth the cautionary measures to evade such concerns. Purpose of the study is to analyze the effect of pelvic floor exercises on the urinary incontinence in diabetic women.

Method: To evaluate the effect of Keegeal exercises (pelvic floor muscle exercises), quantitative research approach has been opted, in which patient were advised to perform the keegeal exercise for 3weekswith 4 weeks follow up. 45 diabetic women were recruited to analyze the effect of keegeal exercises to minimize the risk of urine incontinence. In due course, three types of keegeal exercises have been proposed to analyze their effect on urine incontinence i.e. adductor strengthening, pelvic bridging, and draw in maneuver with a follow up of 4 weeks.

Results: Reliability test was performed to evaluate the dependency between independent and dependent variable. Through ANOVA with Friedman's Test, it was observed that the data of correlation between the suggestive variables is highly significant. Cronbach's Alpha test was performed which has concluded the results to 0.753 which is quite significant in context of research hypothesis and approving the fact the with keegeal exercise, urine incontinence can be reduced.

Conclusion: With subjective research it was concluded that if the patient efficiently performs the exercise the urine incontinence can be improved.

Keywords: Diabetes mellitus (D.M), urinary incontinence (U.I), pelvic bridge (P.B), adductor strengthening (A.S), draw in maneuver (D.I.M)

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INTRODUCTION

Urinary incontinence, a disease characterized by uncontrolled urine leakage is a problem faced by 35.5% population worldwide out of which 43% are diabetic and 57% are non-diabetic women [1]. It is characterized as stress urinary incontinence, urge urinary incontinence and mixed urinary incontinence among which stress urinary incontinence is the most common of these all [2]. Normally pelvic floor muscles contraction compresses the urethra and avoids urine leakage whenever there is an increased intra-abdominal pressure and thereby prevents stress urinary incontinence. The weakness of pelvic floor muscle leads to leakage of urine which results in an increase intra-abdominal pressure i.e. coughing, sneezing, jumping, walking, or lifting [3]. On the other hand, Urge incontinence is a condition that is simply characterized by uncontrolled urine leakage while rushing towards toilet. Urinary incontinence has many risk factors and one of the associated factors of urinary incontinence is diabetes mellitus and it is found that diabetic women have a greater chance to have urinary incontinence than non-diabetic women [4,5,6].

Diabetes mellitus is one of the identified risk factors of urinary incontinence, a recent hypothesis describes that diabetes mellitus and obesity are related to each other and that this combination results in higher stress urinary incontinence rates due to increased intra abdominal and pelvic pressure. Research supports that stress UI is a result of dysfunction of the striated muscle of the urethral sphincter and pelvic floor muscles and their innervations. Mean while most studies elaborate that diabetes mellitus plays a chief role in Urge UI due to glycosuria, detrusor over activity, recurrent urinary tract infections, and diabetic cystopathy [7].

Keegeal exercises, muscle contraction exercises and pubococcygeus are some exercises used to strengthen the pelvic floor muscles and thereby prevent or manage urinary incontinence. Strengthening of pelvic floor muscles enhances the function of urethral or rectal sphincter. The success of Keegeal exercises depends on proper technique and practice. Patients are guided to “draw in” or “lift up” the peri-vaginal muscles and the anal sphincter in a similar way as is done to stop or prevent urination or defecation with least tightening of abdominal, buttock, or inner thigh muscles. Individuals should attempt to hold the “draw in” for at least 5 seconds (preferably 10 seconds) with an equal time of relaxation [8,9,10].

The purpose of the study was to evaluate the effects of pelvic floor muscle strengthening exercises on urinary incontinence in diabetic women.

MATERIAL AND METHODS

A convenience sample of 45 diabetic women between the age of 40 to 50 with urine incontinence was taken from Mayo Hospital, GangaRam Hospital, Bashir Memorial Trust Eye Hospital and some Private clinics to conduct experimental/interventional study. Inclusion and exclusion criteria were established. The female patients with a history of 10 years of type 2 diabetes mellitus with a complaint

of urine leakage i.e. stress, urge or mixed incontinence were included in the study. All the cases of urinary incontinence in female with complaint of non-diabetic urinary incontinence, pregnancy and with complaint of urinary incontinence once in a month were excluded from research. Glucose tolerance test was done for the confirmation of diabetes mellitus, whereas for the diagnosis of urinary incontinence; questionnaire regarding urinary incontinence diagnosis (QUID) was used before conducting the study and then after the completion of treatment plan so that pre and post treatment values may be evaluated. Questionnaires were circulated among participant to obtain demographic data and their consents were taken prior conducting research. Keegal exercises (draw in maneuver, pelvic bridging and adductor strengthening) were used for training pelvic floor muscle. Manual muscle testing was used to measure adductor strengthening. Three sets of 8-12 slow to maximal contractions sustaining for six to eight seconds were practiced on patients, they received treatment for 3 weeks (3 days per week) in clinics and were given a home plan of 4 weeks. For statistical analysis ANOVA, Friedman's test and correlation test were plotted by using SPSS version 22.

RESULTS

For the results, urine incontinence is considered as a dependent variable and keegal exercises are taken as independent variables. Through regression and reliability analysis of the suggestive variables it was analyzed that there is high correlation among the variables and the data is quite significant in context of observing the results. The subjective study has concluded the statistical analysis with regression analysis and reliability test. It was observed that with regression analysis that the confidence interval was considered to be 95% and the level of significance was taken at .05. In the regression analysis, the Anova test was performed with the results of high significance between the dependent and independent variable though there was a slight presence of insignificance through regression analysis. On the other hand, the reliability test was also performed to evaluate the dependency between independent and dependent variable. Through ANOVA with Friedman's Test; it was observed that the data for correlation between the suggestive variables is highly significant (Table 1). In order to check the significance of the data, regression was applied on the selective respondent's information. Through ANOVA and Durbin Watson test, it was observed that there is quite significant relationship between the dependent and independent variables. Before performing the test, the significance level was set to 95% confidence interval, which has proved that data is highly correlated and the effect of Keegeal exercises can be drawn to reduce the urine incontinence among the diabetic female patients. (Table 2). Furthermore, the proceeding with regression analysis beta for draw in maneuver (D.IM), pelvic bridging (P.B), and Abductor strengthening (A.S) was calculated to be .036, .122 and .521 respectively; whereas the limit of upper bond and lower bond with beta >1 also shows the significant impact of independent variables in the research. (Table 3). Correlation matrix was performed in order to analyze the cor-

relation between urine incontinence and effectiveness of keegeal exercises. It has been observed that every exercise has significant effect on reducing the urine incontinence among the patients (Table 4). The histogram line of the results showed that the contribution of keegeal exercises can further be investigated to avoid the urine incontinence among diabetic patients (Figure 1). The residual plot of the regression analysis reflecting the fact that data was normally distributed and there is quite a relevant significant among the dependency of variables (Figure 2). The test of the subjective hypothesis was not set to limit on the basis of regression analysis. Reliability tests were performed so that it should be analyzed that the effect of independent variables has significant impact on the dependent variable. In due course, Cronbach's Alpha test was performed which has concluded the results to .753 which is quite significant in context of research hypothesis and approving the fact the with keegeal exercise, urine incontinence can be reduced. While performing reliability test, correlation matrix was also performed and it has been concluded that there is positive relation among the variables and all the values in relation to dependent variables are positive (Table 5). Further with reliability test, Chi Square test has been performed in relation to ANOVA and Freidman test. It has been concluded that the data is highly significant and the results have been achieved to 60.84% which is quite a positive relation among the Urine incontinence and keegeal exercise.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Regression	.554 ^a	.307	.256	.54026	1.284

Table 1: Showing correlation between keegeal exercise and urinary incontinence

- a. Predictors: (Constant), A.S, P.B, D.I.M
- b. Dependent Variable: U. I

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	5.296	3	1.765	6.048	.002 ^b
Residual	11.967	41	.292		
Total	17.263	44			

Table 2: Showing ANOVA^a for urinary incontinence and keegeal exercise

- a. Dependent Variable: U. I
 - b. Predictors: (Constant), A.S, P.B, D.I.M
- Standard error and beta for urinary incontinence and keegeal exercises

Urinary incontinence							
Model	Unstandardized coefficients		Standardized coefficients	T	Sig.	95% confidence interval for B	
	B	Std. Error	Beta			Lower bond	Upper bond
(Constant)	1.751	1.038		1.687	.099	-.345	3.847
D.I.M	-.088	.335	-.036	-.263	.794	-.765	.588
P. B	.100	.110	.122	.912	.367	-.122	.322
A. S	.725	.193	.521	3.755	.001	.335	1.115

Table 3: Showing values for standard error and beta for D.I.M (Draw in maneuver, P.B (pelvic bridging) and A.S(Adductor strengthening))

	Exercise	A.S	P.B	D.I.M
Correlations ^a	A.S	1.000	.233	.267
	P.B	.233	1.000	.035
	D.I.M	.267	.035	1.000
Covariance ^a	A. S	.037	.005	-.017
	P. B	-.005	.012	.001
	D.I.M	.017	.001	.112

Table 4: Showing Coefficient Correlations and covariance for keegeal exercise

- a. Dependent Variable: U. I

	U. I	D.I.M	P. B	A. S
U. I	1.000	.107	.242	.540
D.I.M	.107	1.000	.029	.267
P. B	.242	.029	1.000	.232
A. S	.540	.267	.232	1.000

Table 5: Showing analysis of inter term correlation

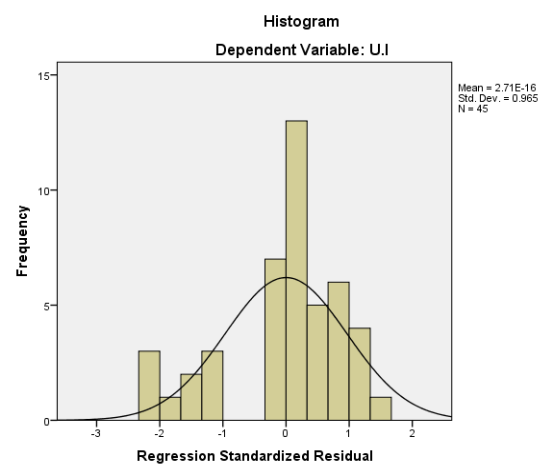


Figure 1

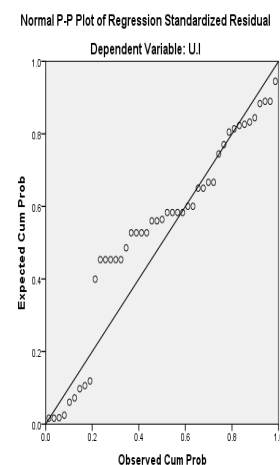


Figure 2

DISCUSSION

Urinary incontinence is a problem tackled by majority of females and is found to be related with diabetes mellitus, present study evaluated the effect of pelvic floor muscle exercise in diabetic women with complaint of urinary incontinence. Although there is no significant evidence to

make strong recommendations about the best approach for the pelvic floor muscle training but the results of this research, like previously conducted researches, revealed that pelvic floor muscle training helps in treating and reducing the risk of urinary incontinence [11]. During the course of study it was also noticed that participants who attended regular sessions of exercise showed more pronounced results as compared to those who missed sessions or didn't perform exercise properly. Although most of the previous researches were conducted on non-diabetic population but the results may be generalized for diabetic population too because of the involvement of same muscle and mechanism of urinary incontinence as is involved in non-diabetic women. Pelvic floor muscle training is not the only possible means to treat urinary incontinence as many researches revealed electrical stimulation and biofeedback assisted pelvic floor muscle training to be more effective than pelvic floor muscle training alone, Alex C. Wang proposed the subjective improvement rate of overactive bladder for electrical stimulation, assisted pelvic floor muscle training and pelvic floor muscle training as 51.4%, 50.0% , and 38.2% respectively, even then pelvic floor muscle training is recommended as a first line of treatment for urinary incontinence because of its ease of usage and patient's preference [12].

CONCLUSION

In due course it has been concluded that the diabetic women with urinary incontinence can get benefit from Keegel exercises, commonly known as pelvic floor muscle training. A supervised Keegel exercises for three months was found to be particularly helpful for reducing stress incontinence.

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