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Knowledge, Attitude and Practice of Kegel Exercise among Parous Women in Prevention and Management of Urinary Incontinence

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ABSTRACT

Kegel exercises are a non-invasive method to strengthen pelvic floor muscles, yet awareness and implementation remained inconsistent. Aims: This study aimed to assess the knowledge, attitude, and practice of Kegel exercises among parous women in the prevention and management of urinary incontinence in Kota Tinggi district, Johor, Malaysia. It also explored the association between knowledge and practice and identified factors influencing knowledge level. Methods: A cross-sectional study was conducted among 384 women using a self-administered 29-item questionnaire on parous women that met eligibility criteria via Google Form between October and December 2024. Data were analysed with SPSS version 25.0. Results: Results showed that 63.5% of respondents had moderate knowledge of Kegel exercises, while only 13.8% had good knowledge. Although 60.9% exhibited a positive attitude, only 6.5% demonstrated good practice, highlighting a significant gap between awareness and action. Factors such as education level and healthcare professionals' recommendations significantly influenced knowledge and practice levels. Conclusion: The study concluded that while women in this study have moderate knowledge and a positive attitude toward Kegel exercises, their practice remains inadequate. To bridge this gap, healthcare professionals should prioritize structured education and regular reinforcement to improve adherence. Future research should focus on intervention programs to enhance long-term compliance with Kegel exercises

KEYWORDS: Kegel exercise, urinary incontinence, knowledge, attitude, practice.

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INTRODUCTION

Urinary incontinence (UI) is a common and distressing condition that affects millions of individuals worldwide, with substantial impacts on quality of life and psychological well-being (Abrams et al., 2020). UI alone affects approximately 40% of women and 15% men over the age of 60, highlighting the need for effective non-surgical intervention (Milsom et al., 2019). Kegel exercises are considered the first-line therapy for prevention and management of patients with urinary incontinence (Dumoulin & Hay-Smith, 2018). Despite the proven effectiveness of Kegel exercises in managing and preventing urinary incontinence, there is a significant gap in the knowledge, attitude, and practice (KAP) of these exercises among those who could benefit from them. Many individuals are either unaware of Kegel exercises or have insufficient knowledge regarding the correct techniques, which leads to ineffective practice and suboptimal outcomes (Mamatha et al, 2025). Furthermore, attitudes toward Kegel exercises vary widely, influenced by cultural, psychological, and socioeconomic factors. It was found that the negative attitudes towards the practice of Kegel exercise are stemming from misconceptions or embarrassment, can deter individuals from incorporating Kegel exercises into their daily routines (Sawettikamporn et al., 2022; Okeke et al., 2020, Hay-Smith et al., 2024). Even when individuals are knowledgeable and have a positive attitude, the consistency and correctness of practice are often inadequate, limiting the benefits of this non-invasive intervention.

This problem is compounded by the fact that healthcare providers may not consistently educate or reinforce the importance of Kegel exercises, further contributing to the low levels of knowledge, negative attitudes, and poor practice among patients (Temtanakitpaisan et al., 2020; Hyakutake et al., 2018). As a result, many individuals continue to suffer from urinary incontinence, experiencing a diminished quality of life and increased healthcare costs. Addressing the knowledge, attitude and practice gap regarding Kegel exercises is important for improving the prevention and management of urinary incontinence, enhancing patient outcomes, and reducing the overall burden of this condition. Therefore, there is an urgent need to investigate the factors contributing to the lack of knowledge, negative attitudes, and inconsistent practice of Kegel exercises, and to develop targeted interventions that can effectively address these issues. The purposes of this study were to determine the levels of knowledge, attitude and practice of Kegel exercise among parous women in the prevention and management of urinary incontinence, and to identify the influence of demographic factors on level of knowledge in Kegel exercises. This study also hypothesized there was a significant association between knowledge and practice of Kegel exercise.

METHODS

This was a cross-sectional study employed self-administered questionnaire to assess knowledge, attitude and practice of Kegel exercise in the prevention and management of urinary incontinence among parous women who responded to questionnaire survey. The study was conducted at Kota Tinggi district, Johor, Malaysia from 16th October to 15th December 2024 for a duration of three

months.

Population and Sampling

The study targeted residents of Kota Tinggi district in Johor, encompassing urban and rural communities. The population was parous women aged 18 years and above, who are potentially eligible to practice Kegel exercises. A purposive sampling technique was employed to ensure representation across various demographic groups, such as age, education level, race, gravida and parity. Women who have history of delivery via different mode, who agreed to voluntarily participate, and able to read and understand in English were included. However, women who have overactive pelvic floor muscle, with indwelling urinary catheter, recent pelvic surgery or injury, specific medical conditions such as persistent vaginal bleeding, placenta praevia were excluded.

Sample size Calculation

Based on the total population of Kota Tinggi (N=108000), the required sample size was calculated using Krejcie and Morgan (1970) formula, and a required sample size of 384 was deemed sufficient for statistical analysis. However, considering a possible attrition rate of 10%, and estimated total sample of 422 was determined.

Instrumentation

The instrument consists of a questionnaire that contains a total of 4 sections. The questionnaire was presented in English language. Section A consists of 12 socio-demographic data variables which include age, level of education, marital status, employment status, number of gravida, number of parity, number of abortion, mode of delivery and baseline information on Kegel exercise. Section B consists of 14 items designed to measure participants level of knowledge regarding Kegel exercise. The items were constructed on dichotomous scale with response on yes and no. Section C consists of 9 items that assess on attitude towards Kegel exercise. The items were constructed on 5 points Likert scale with responses range from Strongly Disagree (1); Disagree (2); Neutral (3); Agree (4) and Strongly Agree (5). While section D consists of 6 items were used to assess the frequency of Kegel exercise practice performed by the respondents. These items were measure with 5 points Likert scale – Never (1); Seldom (2); Usually (3); Frequent (4) and Always (5). The questionnaire items for assessment on knowledge, attitude and practice towards Kegel exercise were adapted and modified from Muhamad et al (2012) and Jaffar et al (2020) research instrument. The validity of the questionnaire was assessed by experts, including two (2) academicians who have Post Basic Midwifery qualification and one expert in Women Health. Any suggestion for changes or revision to the questionnaire were taken by researcher and amended accordingly based on experts' opinion. Reliability test was done to confirm the consistency of certain items. Kuder Richarson-20 test was used for items measuring on dichotomous scale (Uyanah & Nsikhe, 2023), while Cronbach's tests was used for items with multiple items such as Likert scale, to check for internal consistency and reliability (Taber, 2018; Malapane & Ndlovu, 2024). A score of 0.7 to 1.0 suggest that the reliability level is at an acceptable level.

Data Collection Method

Research protocol of this study had obtained ethical approval from AIMST University Human Ethical Committee (AUHEC) with reference number AUHEC/FAHP/SoN/11/10/2024/1. After receiving ethical clearance, researcher sought permission from Kota Tinggi district office to conduct the questionnaire survey. A total of 428 female subjects were selected from few rural villages, and semi-urban areas in Kota Tinggi district based on inclusion and exclusion criteria. Written informed consents were obtained from participants who agreed to participate. They were being briefed on the objectives of the study, risk and benefits of the study. The questionnaires were distributed to the participants through Google Form via WhatsApp or email. They were assured that their identities remain anonymous and information they provided were confidential and only used for research purpose. The completed questionnaire was returned to the researcher within 15-30 minutes on the same day.

Pilot Study

A pilot study was conducted from October 16, 2024, to October 24, 2024 on a total of 38 participants and these participants were excluded from the actual study. Following the completion of the pilot study, feedback regarding the questionnaire for improvement and amendment was done accordingly. From the pilot study that has been carried out by the researcher, the Kuder Richardson-20 and Cronbach's alpha for knowledge, attitude and practice were 0.764, 0.801 and 0.711 respectively (Table 1). The reliability coefficients in Kuder Richardson-20 and Cronbach's Alpha test for knowledge, attitude and practice were within the acceptable score of the minimum or more than 0.70 (Vivian Wong et al., 2023).

Table 1: Reliability coefficient of knowledge, attitude and practice items in the pilot study

	Kuder Richardson-20	Cronbach's Alpha
Knowledge	0.764	
Attitude		0.801
Practice		0.711

Data Analysis

The data was analyzed using the Statistical Package for the Social Science (SPSS) version 26 and the results were presented with appropriate statistics based on research objectives and hypotheses. Descriptive statistics with frequency, mean, standard deviation and percentage was used to describe the research samples while the inferential statistics with correlation test was employed to test for association between variables in this study. Test for assumptions including normality, homogeneity of variance, outliers or checking any co-variates or confounding variables that need to be controlled, were conducted on the dataset to determine whether they meet the criteria before deciding the appropriate use of parametric or non-parametric tests on these data.

RESULTS

Out of 422 women recruited, a total of 384 of them successfully responded in this study. The response rate was 91%. The age of the respondents was mostly between 41 – 50 years old (n=109, 28.4%) and majority of the respondents were Malay (n=151, 39.3%). A total of 96 (25.0%) respondents were Diploma holder in term of level of education. Most of the respondents were married (93.5%, n=359) and most of them are housewife (53.9%, n=207). Majority of the respondents (44.5%, n=171), had 1-2 gravida and parity. 78.6% (n=302) of respondents gave birth through spontaneous vaginal delivery (SVD).

In term on the knowledge on Kegel exercise, more than half of the respondents (54.4%, n=209) do not know about the important of Kegel exercise and they also do not aware that Kegel exercise can be practice after episiotomy (59.6%, n=229). A total of 218 (56.8%) claimed that doctor did not advise them to perform Kegel exercise and 53.9% (n=207) had urinary incontinence (Table 2).

Table 2: Demographic Data of the Participants (n=384)

Variables	n	%
Age		
20 and below	20	5.2
21 – 30	50	13.0
31 – 40	104	27.1
41 – 50	109	28.4
51 – 60	68	17.7
60 and above	33	8.6
Race		
Chinese	71	18.5
Malay	151	39.3
Indian	123	32.0
Others	39	10.2
Level of Education		
Primary/Secondary	89	23.2
Certificate	90	23.4
Diploma	96	25.0
Degree	71	18.5
Master	31	8.1
PhD	7	1.8
Marital Status		
Married	359	93.5
Divorced	7	1.8
Widowed	18	4.7
Employment Status		
Working	177	46.1
Housewife	207	53.9
Number of Gravida		
1 – 2	171	44.5
3 – 4	138	35.9
5 and above	75	19.5
Number of Parity		
1 – 2	171	44.5
3 – 4	138	35.9
5 and above	75	19.5
Mode of Delivery		
SVD	302	78.6
Both SVD and C-section	82	21.3
Do you know about the importance of Kegel exercise?		
Yes	175	45.6
No	209	54.4
Do you aware about Kegel exercise can be practice after cut through area between vagina opening?		
Yes	155	40.4
No	229	59.6
Did your doctor advise you on to practice Kegel exercise?		
Yes	166	43.2
No	218	56.8
Do you experience any leaking of urine?		
Yes	207	53.9
No	177	46.1

Note: n: frequency; %: percentage; M: Mean; SD: Standard Deviation

Level of Knowledge on Kegel Exercise among Women

The results from the analysis of knowledge level were based on scoring of 14 statements. The good knowledge level is achieved when the score is at least 11, for moderate level the score is in a range of 6-10 and the poor level is when the score is less than 5. The results revealed that 56.8% (n=218) of the respondents knew that muscles involved in Kegel exercise are situated at pubic region, 58.3% (n-224) of the respondents knew that Kegel exercise involved muscles at anal region, 60.4% (n=232) of respondents answered correctly that vagina muscles are not involved in the Kegel exercise. Most of the respondents (78.9%, n=303) agreed that Kegel exercise is important in controlling urinary bladder function, 58.3% (n=224) of respondents answered correctly that Kegel exercise does not involve in controlling anus and 53.9% (n=207) of respondents disagreed that Kegel exercise does not involve in tightening the vagina. Most of the respondents (60.4%, n=232) knew that buttocks muscle can be tightened by performing Kegel exercise, 78.1% (n=300) of respondents agreed that Kegel exercise can prevent urinary incontinence during laughing, sneezing or weight bearing and 71.1% (n=273) of respondents concurred that Kegel exercise can prevent or treat uterine prolapse. Most of the respondents (65.1%, n=250) agreed that Kegel exercise can be done at any time and 52.6% (n=202) of respondents knew that Kegel exercise can be done during performing daily routine activities such as cooking and standing. Most of the respondents (n=195, 50.8%) did not know that muscles involved in the Kegel exercise should be contracted for 8 seconds before being released and 53.9% (n-207) of respondent knew that Kegel exercise should be contracted for 8-10 times per exercise, and lastly 55.5% (n=213) of respondents agreed that Kegel exercise should be done at least 3 times a day which are in the morning, afternoon and night (Table 3).

Table 3: Level of Knowledge on Kegel exercise among women (n=384)

Items	Incorrect Response n (%)	Correct Response n (%)
Muscles involve in Kegel exercise are situated at pubic region. (M=0.568; SD=0.50)Answer: True	166 (43.2)	218 (56.8)
Kegel exercise involves muscles at anal region. (M=0.583; SD=0.49) Answer: True	160 (41.7)	224 (58.3)
Vagina muscles are not involved in the Kegel exercise. (M=0.604; SD=0.49)Answer: False	152 (39.6)	232 (60.4)
Kegel exercise is important in controlling urinary bladder function. (M=0.789; SD=0.41)Answer: True	81 (21.1)	303 (78.9)
Kegel exercise does not involve in controlling anus. (M=0.583; SD=0.49)Answer: False	160 (41.7)	224 (58.3)
Kegel exercise does not involve in tightening the vagina. (M=0.539; SD=0.50) Answer: False	177 (46.1)	207 (53.9)
Buttocks muscle can be tightened by performing Kegel exercise. (M=0.604; SD=0.49) Answer: True	152 (39.6)	232 (60.4)
Kegel exercise can prevent urinary incontinence during laughing, sneezing or weight bearing. (M=0.781; SD=0.41)Answer: True	84 (21.9)	300 (78.1)
Kegel exercise can prevent or treat uterine prolapsed. (M=0.711; SD=0.45) Answer: True	111 (28.9)	273 (71.1)
Kegel exercise can be done at any time. (M=0.651; SD=0.48). Answer: True	134 (34.9)	250 (65.1)
Kegel exercise can be done during performing daily routine activities such as cooking and standing. (M=0.552; SD=0.73). Answer: True	182 (47.4)	202 (52.6)
Muscles involved in the Kegel exercise should be contracted for 8 seconds before being released. (M=0.492; SD=0.50). Answer: True	195 (50.8)	189 (49.2)
Kegel exercise should be contracted for 8-10 times per exercise. (M=0.461; SD=0.50). Answer: True	207 (53.9)	177 (46.1)
Kegel exercise should be done at least 3 times a day which are in the morning, afternoon and night. (M=0.555; SD=0.50). Answer: True	171 (44.5)	213 (55.5)

Note: n: frequency; %: percentage; M: Mean; SD: Standard Deviation

Overall, majority of the respondents (63.5%, n=244,) had moderate knowledge on Kegel exercise while 22.7% (n=87) of respondents had poor knowledge, while only 13.8% (n=53) respondents had good knowledge. The overall knowledge mean score was 6.56 (SD=2.99) (Table 4).

Table 4: Level of Knowledge Scoring (n=384)

Level of Knowledge		n	%	M (SD)
Poor Knowledge	(0-5)	87	22.7	6.56 (2.99)
Moderate Knowledge	(6-10)	244	63.5	
Good Knowledge	(11-14)	53	13.8	

Note: n: number of participants; %: percentage; M: Mean; SD: Standard Deviation

Level of Attitude on Kegel Exercise among Women

From the analysis on level of attitude on Kegel exercise among women, the results for all statement were presented. The statement on "Kegel exercise should be done by all women, especially pregnant women and postnatal women, regardless they have urinary incontinence (UI)", had mean score of 3.83 (SD=1.04). Majority (37.2%, n=143) of the respondents selected the option 'agree'. For statement "I should practice Kegel exercise to prevent or treat UI." had mean score of 3.69 (SD=1.10). Majority (39.8%, n=153,) of the respondents selected option 'agree'. For statement "I feel that Kegel exercise is boring" had mean score of 2.40 (SD=1.17). Majority (30.5%, n=117) of the respondents chose option 'disagree'. Moving on with the statement "I view that Kegel exercise should be taught to all antenatal mothers at the antenatal clinic" had mean score of 3.88 (SD=1.00). Majority (39.3%, n=151) of the respondents chose option 'agree'. Continue with statement "Although the Kegel exercise make the recovering, it may harm to the pelvic muscles" had mean score of 2.74 (SD=1.21). Majority (27.3%, n=105) of the respondents chose option 'neutral'. For statement on "I support those who want to perform Kegel exercise" had mean score of 4.03 (SD=0.97). Majority (38.0%, n=146,) of the respondents selected the option 'strongly agree', Followed with the statement "I will find effort to search information on Kegel exercise." had mean score of 3.69 (SD=1.01). Majority (33.3%, n=128) of the respondents chose option 'agree'. Lastly, the statement "Performing day to day household activities gives adequate physical exercise to women, and they do not have to perform Kegel exercise" had mean score of 2.81 (SD=1.22). Majority (31.0%, n=119,), of the respondents chose option 'disagree'. Continue with statement "During postpartum the priority should be improving by nutrition and rest and not Kegel exercises" had mean score of 3.21 (SD=1.31). Majority (30.2%, n=116) of the respondents chose option 'agree' in the statement (Table 5).

Table 5: Level of Attitude on Kegel Exercise among Women (n=384)

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
Kegel exercise should be done by all women, especially pregnant women and postnatal women, regardless they have urinary incontinence (UI). M= 3.83; SD= 1.04)	10 (2.6)	35 (9.1)	80 (20.8)	143 (37.2)	116 (30.2)
I should practice Kegel exercise to prevent or treat UI. M= 3.69; SD= 1.10	19 (4.9)	36 (9.4)	83 (21.6)	153 (39.8)	93 (24.2)
I feel that Kegel exercise is boring. M= 2.40; SD= 1.17	104 (27.1)	117 (30.5)	83 (21.6)	64 (16.7)	16 (4.2)
I view that Kegel exercise should be taught to all antenatal mothers at the antenatal clinic. M= 3.88; SD= 1.00	9 (2.3)	28 (7.3)	80 (20.8)	151 (39.3)	116 (30.2)
Although the Kegel exercise make the recovering, it may harm to the pelvic muscles. M= 2.74; SD= 1.21	69 (18.0)	102 (26.6)	105 (27.3)	74 (19.3)	34 (8.9)
I support those who want to perform Kegel exercise. M= 4.03; SD= 0.97	6 (1.6)	22 (5.7)	71 (18.5)	139 (36.2)	146 (38.0)
I will find effort to search information on Kegel exercise. M= 3.69; SD= 1.01	10 (2.6)	31 (8.1)	121 (31.5)	128 (33.3)	94 (24.5)
Performing day to day household activities gives adequate physical exercise to women, and they do not have to perform Kegel exercise. M= 2.81; SD= 1.22	57 (14.8)	119 (31.0)	84 (21.9)	87 (22.7)	37 (9.6)

During postpartum the priority should be improving by nutrition and rest and not Kegel exercises. M= 3.21; SD= 1.31	56 (14.6)	60 (15.6)	83 (21.6)	116 (30.2)	69 (18.0)

Note: n: frequency; %: percentage; M: Mean; SD: Standard Deviation; UI: Urinary Incontinence

Overall attitude mean score was 37.87 (SD=8.78). Further analysis revealed that level of attitude can be divided into negative, neutral and positive attitude in which negative attitude had score range from 0-15, neutral attitude from 16-30 and positive attitude from 31-45. In term of proportion of respondents, 60.9% (n=234) of respondents had positive attitude towards Kegel exercise, while 39.1% (n=150) of respondents had neutral attitude and no respondents had negative attitude (Table 6).

Table 6: Level of Attitude Scoring (n=384)

Level of Attitude		*n*	%	M (SD)
Negative Attitude	(0-15)	0	0.0	37.97 (8.78)
Neutral Attitude	(16-30)	150	39.1	
Positive Attitude	(31-45)	234	60.9	

Note: n: number of participants; %: percentage; M: Mean; SD: Standard Deviation

Level of Practice on Kegel Exercise among Women

The analysis on the level of practice produced results for all statements related to practice of Kegel exercise. The statement on "I had performed Kegel exercise when I was not pregnant" had mean score of 2.02 (SD=1.33) and majority (54.7%, n=210) of the respondents selected the option 'never'. For the statement "I have spent time to perform Kegel exercise." had mean score of 3.24 (SD=1.38) and majority (26.3%, n=101) of the respondent chose the option 'frequent'. Followed by statement on "I have practice Kegel exercise daily" had mean score of 3.25 (SD=1.34) and majority (25.0%, n=96,) of the respondents chose option 'usually'. Continued by the statement "I perform Kegel exercise when I was reminded by my physician" had the mean score of 2.58 (SD=1.43) and majority (30.2%, n=116) of the respondents chose 'never' for this statement. For statement "I perform Kegel exercise with a video guidance by expert." had mean score of 2.66 (SD=1.43), and majority(32.0%, n=123) of the respondents chose 'never' with the statement. With the statement. "I practice Kegel exercise to prevent from urinary incontinence" had mean score (M=3.48, SD=1.36) and majority (30.7%, n=118,) of the respondents chose the option 'always' (Table 7).

Table 7: Level of Practice on Kegel Exercise among Women (n=384)

Item	Never	Seldom	Usually	Frequent	Always
I had performed Kegel exercise when I was not pregnant. **M= 2.02; SD= 1.33**	210 (54.7)	48 (12.5)	65 (16.9)	28 (7.3)	32 (8.3)
I have spent time to perform Kegel exercise. **M= 3.24; SD= 1.38**	62 (16.1)	55 (14.3)	80 (20.8)	101 (26.3)	86 (22.4)
I have practice Kegel exercise daily. **M= 3.25; SD= 1.34**	56 (14.6)	54 (14.1)	96 (25.0)	94 (24.5)	84 (21.9)
I perform Kegel exercise when I was reminded by my physician. **M= 2.58; SD= 1.36**	116 (30.2)	77 (20.1)	88 (22.9)	58 (15.1)	45 (11.7)
I perform Kegel exercise with a video guidance by expert. **M= 2.66; SD= 1.43**	123 (32.0)	61 (15.9)	71 (18.5)	81 (21.1)	48 (12.5)
I practice Kegel exercise to prevent from urinary incontinence. **M= 3.48; SD= 1.36**	46 (12.0)	52 (13.5)	77 (20.1)	91 (23.7)	118 (30.7)

Note: n: frequency; %: percentage; M: Mean; SD: Standard Deviation

Overall practice mean score was 15.22 (SD:6.66). Further analysis revealed that level of practice can be categorized into poor,

moderate and good practice in which poor practice had score range from 0-10, moderate practice from 11-20 and good practice from 21-30. In term of proportion of respondents, 63.8% (n=245) of respondents had moderate practice level, while 29.7% (n=114) of respondents had poor practice level, followed by only 6.5% (n=25) of respondents had good practice level (Table 8).

Table 8: Level of Practice Scoring (n=384)

Level of Practice		n	%	M (SD)
Poor Practice	(0-10)	114	29.7	15.22 (6.66)
Moderate Practice	(11-20)	245	63.8	
Good Practice	(21-30)	25	6.5	

Note: n: frequency; %: percentage; M: Mean; SD: Standard Deviation

Association between Knowledge and Practice of Kegel Exercise

A Pearson correlation test was performed to examine the relationship between the knowledge and practice of Kegel exercise. Analysis results revealed that there was a statistically significant positive association between knowledge and practice (r=0.299, p=0.000) and it implied that as participants' knowledge increased, there was a corresponding increase in the practice of Kegel exercise.

Table 9: Correlation between knowledge and practice on Kegel exercise (n=384)

Variable	M (SD)	r	p-value
Knowledge	8.47 (2.98)	0.299	0.000*
Practice	2.87 (0.84)		

Note: n: frequency; %: percentage; M: Mean; SD: Standard Deviation; r: Pearson Correlation; *Significance at level p<0.05

Factors that influence the level of knowledge of Kegel exercise among Women

In addition, analysis on factors that influence the level of knowledge of Kegel exercise among parous women. A Kendall Rank Correlation analysis was conducted to measure the factors that influence the level of knowledge of Kegel exercise. The results revealed that there was a statistically significant relationship between knowledge and educational level (τ_b=0.276, p=0.000), and age category (τ_b=0.109, p=0.005) (Table 10).

Table 10: Correlation Coefficient between knowledge and educational level, and age category (n=384)

Variable	**Kendall Rank Correlation (τ_b)**	**p-value**
Knowledge Educational level	0.276	0.000*
Knowledge Age Category	0.109	0.005*

Note: *Significance at level p<0.05*

DISCUSSION

This research involved 382 respondents. The respondents were all parous women from Kota Tinggi, Johor. All respondents voluntarily agreed to participate in this research study. The ages of most respondents (n=109, 28.4%) were between 41 and 50 years. The study revealed that majority of the participants were aged between 41-50 years (28.4%), followed by 31-40 years (27.1%). This is consistent with previous studies indicating that middle-aged women are more likely to experience urinary incontinence and therefore may have greater awareness of Kegel exercises (Jaffar et al., 2020). However, younger women may have lower awareness due to a lack of education on pelvic floor health. The study also found that most of the participants were Malay (39.3%), followed by Indian (32.0%) and Chinese (18.5%). Cultural perceptions and traditional beliefs about women's health may influence the practice of Kegel exercises, which should be considered in public health campaigns to improve adherence. In terms of education, 25% of respondents held a diploma, while 23.2% had only primary or secondary education. Education level plays an important role in determining awareness and practice of Kegel exercises. Women with higher education were found to have better knowledge and a more positive attitude towards Kegel exercises, similar to findings by Othman et al. (2024), which demonstrated a significant association between education level and practice adherence. Furthermore, 93.5% of participants were married, and 53.9% were housewives. Women who were married or had multiple childbirth experiences were more aware of pelvic floor issues, which may explain their interest in Kegel exercises. However, the study found that a significant number of women had never been advised by a doctor to perform Kegel exercises (56.8%), indicating a gap in healthcare provider education and reinforcement.

Level of Knowledge

The study findings indicate that the majority of respondents (77.3%) had a moderate to good knowledge regarding Kegel exercises. This finding aligns with the study by Okeke et al. (2020) in Nigeria, which found that 71.02% of participants had good

knowledge of pelvic floor muscle exercises and our study also in line with study conducted by Alharbi et al. (2019) in Saudi Arabia which reported 72.4% of women had good knowledge on Kegel exercise. However, the result was not in line with study conducted by Mbada et al. (2015) that reported only 26.7% of women had good knowledge in Nigeria which reflect healthcare variation due to geographical accessibility to certain population. More than half of the respondents (56.8%) correctly identified that Kegel exercises target the pelvic floor muscles located in the pubic region. Additionally, 58.3% understood that these exercises also involve muscles in the anal region. However, a significant proportion (60.4%) incorrectly believed that vaginal muscles were not involved in Kegel exercises, indicating a need for clearer educational materials. The benefits of Kegel exercises were widely recognized, with 78.9% of participants correctly stating that Kegel exercises help control bladder function and prevent urinary incontinence. Furthermore, 71.1% acknowledged that Kegel exercises could prevent or treat uterine prolapse. However, confusion remained about the duration and frequency of the exercises. While 65.1% knew that Kegel exercises could be done at any time, only 49.2% correctly identified that the muscles should be contracted for 8 seconds before release. Additionally, only 46.1% knew that Kegel exercises should be performed 8-10 times per session, highlighting the need for targeted education on proper technique.

Level of Attitude

The study findings showed that 60.9% of respondents had a positive attitude toward Kegel exercises, while 39.1% remained neutral. This supports the findings of Jaffar et al. (2020) in Malaysia, where 46.6% of respondents displayed a good attitude, yet the overall practice remained low. The majority of respondents (67.4%) agreed that Kegel exercises should be done by all women, especially pregnant and postpartum women, regardless of whether they experience urinary incontinence. However, 21.6% of participants remained neutral about the necessity of practicing Kegel exercises regularly. This suggests that while many women understand the importance of the exercises, some still need encouragement to incorporate Kegel exercise into their daily routines. A common barrier to adherence was that 21.6% of participants found Kegel exercises boring, which could reduce long-term commitment. Additionally, 27.3% were unsure whether Kegel exercises could cause harm to pelvic muscles, indicating a gap in understanding. Encouragingly, 74.2% of respondents supported others in performing Kegel exercises, suggesting that peer encouragement and healthcare provider recommendations could positively influence adherence. In comparison, a study by Jaffar et al. (2020) found that 46.6% of participants had a good attitude towards Kegel exercises, which is lower than the 60.9% found in this study. This suggests that awareness campaigns and educational efforts may have contributed to improving attitudes over time. However, Mohd Fauzey et al. (2023) found that despite moderate knowledge, attitude scores were still neutral for many women, indicating that further interventions are necessary to promote positive attitudes.

Level of Practice

Despite moderate knowledge and a relatively positive attitude, the study found that only 6.5% of respondents demonstrated good practice, while 63.8% showed moderate practice and 29.7% had poor practice. Many respondents did not perform Kegel exercise correctly in terms of frequency, consistency and methods. Only 16.9% of respondents reported regularly performing Kegel exercises when not pregnant, while 54.7% admitted to never practicing them before pregnancy. When asked about current practice habits, 26.3% frequently performed Kegel exercises, and 24.5% reported daily practice. However, a significant proportion (30.2%) only performed the exercises when reminded by their physician, indicating a lack of intrinsic motivation. Compared to Okeke et al. (2020), which found that only 38.37% of participants practiced Kegel exercises despite high knowledge levels, this study reports an even lower adherence rate. Similarly, Jaffar et al. (2020) found that only 45.2% of participants had good practice levels. These comparisons reinforce the idea that knowledge alone does not translate into effective practice, emphasizing the need for structured intervention programs to encourage adherence.

Association between Knowledge and Practice of Kegel Exercises

The study identified a significant association between knowledge and practice ($p<0.05$). The Pearson correlation coefficient between knowledge and practice was $r=0.299$, it shows positive correlation between knowledge and practice, consistent with the findings of Othman et al. (2024) in Saudi Arabia, which reported a significant correlation between knowledge level and practice of Kegel exercises. These findings suggest that knowledge plays a crucial role in encouraging practice, but other barriers such as cultural beliefs, lack of reinforcement by healthcare providers, and misconceptions may hinder effective implementation.

Factors Influencing Knowledge and Practice

The study revealed that factors such as age, educational level, and healthcare provider recommendations significantly influenced the knowledge and practice of Kegel exercises. This study revealed a positive relationship between knowledge and educational level ($r=0.276$). There was also a positive relationship between knowledge and age category ($r=0.109$). These findings align with the study by Yagmur & Gul (2021) in Turkey, which found that older women and those with lower educational levels had a higher prevalence of urinary incontinence and practice of Kegel exercises. Additionally, Jaffar et al. (2020) found that healthcare provider engagement played a critical role in influencing women's adherence to Kegel exercises, further emphasizing the importance of integrating pelvic floor education into routine healthcare consultations.

Implications

For women, the findings highlight the need for increased awareness and self-efficacy in performing Kegel exercises correctly and consistently. Women should be encouraged to seek guidance from healthcare professionals and actively incorporate Kegel exercises into their daily routines. Interventions should address common misconceptions and provide accessible resources to facilitate proper practice. The study of Kegel exercise and their impact on urinary incontinence holds substantial significance for the nursing field, contributing to clinical practice, patient education, and the overall women health. By understanding the benefits and proper techniques of Kegel exercise, nurses can incorporate these exercises into the care plans of patients with urinary

incontinence, leading to non-invasive management and potential reduction of symptoms.

Kegel exercises have broader implications for public health, particularly in addressing issues related to pelvic floor dysfunction and associated conditions. They offer a non-invasive, cost-effective intervention that can be easily incorporated into daily routines. Encouraging the adoption of Kegel exercises through various strategies can empower individuals to take proactive steps towards maintaining pelvic health and overall well-being.

Strengths and Limitations

One of the strengths of this study was the use of a structured questionnaire, ensuring consistency in data collection and reducing the likelihood of measurement errors. Furthermore, the research contributes valuable insights into the knowledge, attitude, and practice of Kegel exercises among women in Malaysia, an area with limited existing literature. However, this study also has several limitations. The reliance on self-reported data may have introduced recall bias or social desirability bias, where respondents provided answers, they perceived as socially acceptable rather than their actual behaviors. Additionally, the research was conducted in only one geographical area, which limits the generalizability of the findings to women in other regions or countries. Another limitation is the cross-sectional study design, which prevents the establishment of causal relationships between knowledge, attitude, and practice of Kegel exercises. Future research should consider a longitudinal approach to examine changes over time and the effectiveness of interventions aimed at improving Kegel exercise adherence.

Recommendations

The findings of this study have several important recommendations for future research. In future research, researcher should explore the effectiveness of various strategies, in improving the adherence to Kegel exercises. A longitudinal study design should be considered to assess behavioral changes over time and the long-term impact of Kegel exercises on pelvic floor health. Additionally, qualitative research could be conducted to understand the personal and cultural barriers that prevent women from practicing Kegel exercises consistently. Expanding the study to multiple geographical regions would also help determine whether knowledge, attitude, and practice differ among diverse populations. Lastly, collaboration with healthcare professionals to develop standardized guidelines for Kegel exercise training and adherence should be explored to improve overall effectiveness.

CONCLUSIONS

In conclusion, this study highlights the moderate level of knowledge, generally positive attitudes, and low practice of Kegel exercises among parous women in Kota Tinggi, Johor. A statistically significant value was found between women knowledge and practice ($p = 0.000$). While many women recognize the benefits of Kegel exercises, their actual implementation remains insufficient due to factors such as lack of awareness, misconceptions, and low motivation. The study underscores the importance of education and healthcare provider involvement in promoting Kegel exercise adherence. In future research, researcher should focus on intervention strategies, longitudinal studies, and cultural influences to improve women's engagement in Kegel exercises. Addressing these gaps can contribute to better pelvic floor health, reducing the prevalence of urinary incontinence and enhancing overall quality of life for women.

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