RESEARCH PAPER

"EFFECTIVENESS OF M- HEALTH TECHNOLOGY MODULE USAGE ON KNOWLEDGE REGARDING MENOPAUSE AMONG WOMEN IN SELECTED RURAL AREAS OF RAIGAD DISTRICT."

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ABSTRACT

M-health technologies can help women manage menopause symptoms. This study found that a mobile-based intervention effectively improved knowledge and outcomes for menopausal women, showing promise for addressing their unique needs.

TITLE OF THE STUDY: A study to assess the effectiveness of m-health technology module usage on knowledge regarding menopause among women in selected rural areas of Raigad district.

OBJECTIVES: This study aims to assess the knowledge regarding menopause before and after m-health technology module usage, evaluate the effectiveness of m-health technology module usage regarding menopause, and find the association between pre-test knowledge and demographic variables.

MATERIALS AND METHODS: This quantitative study used a one-group pretest-posttest design among 90 rural women. After obtaining ethical clearance, a pretest was administered, followed by a WhatsApp-based intervention of one week (1 pamphlet, 2 videos, and to-do lists for 3 days with reinforcement for 3 days) in regional language. A post-test was conducted after one week to assess the effectiveness of the m-health module, with online feedback collected via Google Forms.

RESULTS: The study's findings showed that initially, 81.11% of the 90 women had average knowledge scores, and 18.89% had poor knowledge scores. Following the intervention, knowledge scores improved significantly, with 94.4% achieving good scores and 5.56% scoring average. The pretest mean score was 8.9 (SD = 1.54), which increased to 17.38 (SD = 1.40) at post-test. Statistical analysis confirmed intervention's effectiveness, with a calculated t-value of 43.062 exceeding tabulated t-value of 1.984. The m-health technology module proved effective, with demographic factors like age and education associated to pre knowledge score.

CONCLUSION: The study demonstrated the effectiveness of an m-health technology module in improving knowledge and outcomes among rural women regarding menopause, showcasing its potential as a valuable tool for enhancing health education and support in rural settings.

KEYWORDS: Knowledge, M-Health Technology Module, Menopause

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INTRODUCTION

Menopause can be a hidden experience for women due to the factors like parity, occupation, education, cultural factors etc. as well it affects the level of knowledge of menopause. Women living in rural area have the tendency to keep the health of the family over her health especially reproductive[1]. To break this culture, we must make a room where women feel comfortable while discussing their menopausal experiences without any fear of judgement.

M-health, or digital health, is therefore used to improves the health of the women. While rural women are gradually witnessing improvements in their health, metropolitan women are reaping substantial gains. At the nexus of digital technology and healthcare is the transdisciplinary idea of digital health. Through the use of telemedicine, customer relationship management, mobile health apps, & other technologies, it helps to enhance health for different populations. "Mobile computing, medical sensor, and communication technologies used for healthcare" is the another way to describe it[2]. M-health services serve as an essential conduit between communities and healthcare practitioners. Mobile phones work as a powerful tool for communicating with the local people to address their needs and by making them a part of health system so as to help them in managing their own health.

Women are spending a larger portion of their lives in the menopausal stage as a result of increased life expectancy brought about by modernity and globalization. The WHO estimates that more than 1.2 billion women would experience menopause globally by 2030[3].According to Y. Mercy Famila's essay in The Hindu Digital on October 20, 2024, senior women are mostly overlooked or stigmatized in Indian society, which primarily emphasizes women's eproduction[4]. Even in rural regions, the conversation about menopause is frequently sabotaged. A 2023 article by Miss Jyoti and Dr. Poonam in The Pharma Journal emphasizes that limited healthcare access significantly affects rural women's quality of life[5].

After covid-19 pandemic technology has been raised very rapidly. According to the survey done by STATISTA on the count of individuals using smartphones in India from 2010 to 2023, India ranks second globally. The smartphone penetration rate will reach close to 71 percent by 2023[6]. According to a Jan 2023 report in the New Indian Express, lockdown sparked a remarkable surge in rural smartphone 3 adoption; in 2018- 36% and in 2022-74.8% rural households owned smartphones, represents more than two-fold increase[7]. M-health technology has a wide range of social platforms and WhatsApp is one of those platforms. More than 460 million people living in India are using WhatsApp[8].

NEED OF THE STUDY

m-health can enhance maternal healthcare access and preventive care in rural areas, thereby advancing UN Sustainable Development Goal 3: good health and well being[9].

Ms. Dorwin D. and Dr. Jitendra C. (2023) conducted the study to evaluate the effectiveness of structed teaching session which includes knowledge & management at home to reduce the symptoms which occurs before menopause in the rural women of M.P. Pretest- post-test was conducted on 60 women in the current study. Samples were selected by using targeted sampling approach. PowerPoint presentation was used to give STP. Self-made questionnaire was used to assemble the facts. The research outcome reveals that the mean value for pretest was 9.32 (SD-5.36) and for post-test it was 21.92 (SD-4.42). 12.60 was the mean variance. Measured t-value was 12.80 (>0.05%), suggests that STP is a useful strategy to upgrade the knowledge in the females staying in remote places[10].

Srishti (July 23, 2023) conducted the study in rural Bihar with the main focus to explore potential of m-Health to improve maternal health care services. A residential survey was conducted in the village named Malpur, situated in the district of Samastipur, Bihar. Total 31 women were selected by selective random analysis 4 technique for sampling. Collection of information and was done by mixed approach. Results show that women living in rural area depends on their families for the details related to maternal health, while ASHAs and AWWs struggle to reach lower-caste women. In this scenario, m- health is vital for providing maternal health education. The study highlights that m-health effectively shares important information in women's native languages, serving as a strong tool for health promotion[11].

According to the pilot survey done by the researcher in the same setting, gives the result of inadequate knowledge & feeling of timidness while discussing about the menopause publicly among the women. Another pilot survey done by the researcher in community area regarding the availability of smart phones, shows that at least one smart phone is accessible in each house.

The main reason to choose WhatsApp which is a part of m-health technology for the intervention is to develop the knowledge as these women feels shy to talk about menopause even with each other. Structured teaching program will not that much effective & interactive because of the social taboo among the rural women. The content shared, to the women during the whole intervention period will be with the participants for longer period & they can go through it anywhere anytime without any hesitation. WhatsApp's various comprehensive capabilities make it a cost-effective tool for sharing the information that helps in promoting the health.

STATEMENT

A study to assess the effectiveness of m-health technology module usage on knowledge regarding menopause among women in selected rural areas of Raigad District.

OBJECTIVES

1. To assess the knowledge regarding Menopause before m-health technology module usage

2. To assess the knowledge regarding Menopause after m-health technology module usage

3. To evaluate the effectiveness of m-health technology module usage regarding the knowledge of Menopause

4. To find out the significant association between the pretest knowledge score with selected demographic variables`

MATERIALS AND METHODS

In the current study Quantitative research approach was used to assess the effectiveness of m-health technology module usage among the rural women. Researcher conducted the study by using one group pretest-posttest research design. The method for sample determination was non-probability convenient method. Total sample size for the study was 90, which was based on the power analysis. Participants were selected by inclusion and exclusion criteria set by the researcher.

Women who were able to speak, read and write in Marathi as well as women having access to WhatsApp on smart phone were included in the study. Those who have undergone the similar study and having sensory deprivation were excluded.

The study was approved by the Institutional Ethical Committee, permission from the authorities were taken by the researcher to conduct the study. Purpose and the objectives of the study were explained to the participants and then informed consent was obtained from them.

DATA COLLECTION PROCEDURE

After taking the permission from the authorities (sarpanch), a short survey was conducted by the researcher with the help of ASHA worker and Anganwadi worker for selection of the participants. Along with the informed consent their phone numbers were also collected. Tool for data collection consists of two sections. Section A : demographic factors made up of of age, education, occupation, type of family, religion, marital status, no.of children, monthly income, menstrual cycle regularity, problems related to menopause, past/present history, previous knowledge and its source and Section B: 20 self-structured questionnaire on knowledge regarding menopause consists of general knowledge, definition, leading factors, sign and symptoms, management and myths. Score interpretation to assess the knowledge used in the current study by the researcher ranged from poor, average and good. The tools, pamphlet, videos, to do list was validate from total 21 experts. The reliability coefficient was found to be 0.88 by the test-retest method with the help of Karl Pearson's correlation coefficient formula.

The data collection process was of total 16 days. On day 1 pretest was conducted personally. From day 2 to day 7 i.e. one week the intervention was provided through WhatsApp, on second day pamphlet was send to the women consisting of definition, stages, leading factors and myth. On day third 2 video clips were delivered to them which included menstrual pattern prior to the menopause, symptoms and management. On fourth day to do list which mentioned about the care during menopause in the points were sent. From day 4 to day 5 reinforcement of the knowledge was done in the above-mentioned sequence. Feedback was also collected from the sample regarding the m-health technology module on day 8 through WhatsApp messages by sending the google form link. After one week (day 9 to day 15; latent week) researcher conducted the post-test on 16th day by giving self-structured questionnaire of knowledge regarding menopause.

RESULTS

The results were organised into following sections:

SECTION A: Frequency and percentage of demographic variables

Table No. 1. Frequency and percentage of demographic variables n=90

Demographic variables		Frequency (*f*)	Percentage (%)
Age in years	40-42	34	37.77
	43-45	25	27.78
	46-48	22	24.45
	49-50	9	10.00
Education	Primary	12	13.34
	Secondary	38	42.22
	Higher secondary	34	37.78
	Graduate	6	6.66
	Postgraduate	0	0.00
Primary occupation	Housemaker	48	53.33
	Employed	30	33.34
	Business	12	13.33
Type of family	Nuclear	20	22.22
	Joint	70	77.78
Religion	Hindu	90	100.00

	Muslim	0	0.0
	Christian	0	0.0
	Other	0	0.0
Marital status	Unmarried	2	2.22
	Married	74	82.23
	Widow	11	12.22
	Divorce	3	3.33
Children	No child	5	5.53
	Yes	85	94.47
Monthly family income	<15000	9	10.00
	16,000-20,000	33	36.66
	21000-25000	47	52.22
	>25000	1	1.12
Menstrual cycle regularity	Regular	58	64.46
	Irregular	32	35.54
Associated problems related to menopause	Yes	29	32.22
	No	61	67.78
Past/present medical history	Yes	21	23.34
	No	69	76.66
Previous knowledge of menopause	Yes	47	52.23
	No	43	47.77
If yes, the Source of information	Mass media	13	27.66
	Family members	28	59.58
	Friends	6	12.76

Table 1 reveals the results of demographic variables in frequency and in percentage. In terms of age, most participants (37.77%) fall within the 40-42 years range, followed by 27.78% aged 43-45 years, 24.45% aged 46-48 years, and 10% aged 49 50 years. Regarding education, 42.22% have a secondary education, 37.78% have completed higher secondary, 13.34% have a primary education, and 6.66% are graduates, while none have pursued postgraduate studies. In terms of occupation, the majority (53.33%) are homemakers, while 33.34% are employed, and 13.33% are engaged in business. Most respondents (77.78%) belong to joint families, while 22.22% come from nuclear families. All participants (100%) follow the Hindu religion. Marital status data shows that 82.23% are married, 12.22% are widowed, 3.33% are divorced, and 2.22% are unmarried. The majority (94.47%) have children, while 5.53% do not. Regarding monthly family income, 52.22% earn between ₹21,000-₹25,000, 36.66% earn between ₹16,000-₹20,000, 10% earn less than ₹15,000, and only 1.12% have an income above ₹25,000. Menstrual cycle regularity is reported as regular in 64.46% of participants, whereas 35.54% experience irregular cycles. About 32.22% report menopause-related problems, while 67.78% do not. Medical history data shows that 23.34% have a past or present medical history, whereas 76.66% do not. Awareness about menopause is equally distributed, with 52.23% having prior knowledge and 47.77% lacking it. Among those aware,

59.58% received information from family members, 27.66% from mass media, 12.76% from friends, and 0% from other than these sources

SECTION B: Assessment of the knowledge regarding menopause before m-health technology module usage

Table 2. Frequency and percentage distribution of level of knowledge regarding menopause before m-health technology **[n=90]**

PRETEST		
Interpretation	**Frequency (*f*)**	**Percentage (%)**
Poor (1-7)	17	18.90 %
Average (8-14)	73	81.11%
Good (15-20)	0	0.00%

Table 2 interprets the Interprets the result of knowledge regarding menopause among women before m-health technology out of 90 samples; majority participants, 73 (81.1%) samples have average knowledge level and 17 (18.9%) has poor knowledge level.

SECTION C: Assessment of the knowledge regarding Menopause after m-health technology module usage

Table 3. Frequency and percentage distribution of level of knowledge regarding menopause after m-health technology

POSTTEST		
Interpretation	**Frequency (*f*)**	**Percentage (%)**
Poor (1-7)	0	0.00%
Average (8-14)	5	5.56%
Good (15-20)	85	94.44%

The result in the table 3 shows us the frequency and percentage distribution level of knowledge regarding menopause after using m-health technology which says that majority 85 (94.4%) samples had good knowledge level, 5 (5.6%) samples were having average knowledge level & none of the them had poor knowledge. This shows the shifting of knowledge from average to good in post-test.

SECTION D: Effectiveness of m-Health Technology Module Usage Regarding Knowledge of Menopause

Table 4. Effectiveness of m-health technology module usage regarding the knowledge of Menopause among women n = 90

	Mean	**SD**	**df**	**Calculated 't' value**	**Table value**	**p value**	**Remark**
Score at pretest	8.9	1.54	89	43.062	1.984	<0.001	Significant
Score at post test	17.38	1.40					

The data shown in table 4 indicates that the paired t-test was used to find out the effectiveness of m-health technology module usage by comparing the pretest and post test knowledge score. The finding suggested that there was an significant increase in level of knowledge score. Mean score at postest was standard deviation was 1.40

with df of 89 and calculated t-value (43.062) is greater than tabulated t-value (1.984) hence H01 is rejected, therefore there is statistically significant modification between pretest and post-test knowledge score among women at 0.05 level of significance.

SECTION E: Association between the pretest knowledge score with selected demographic variables

Table 5. Association between pretest knowledge score and selected demographic variables of subject n=90

Demographic variables		Level of knowledge		(f)	Chi square value	df	P value	S/NS
		Poor	Avg					
Age in years	40-42	26	8	34	12.104	3	0.007	S
	43-45	22	3	25				
	46-48	21	1	22				
	49-50	4	5	9				
Education	Primary	6	6	12	9.369	3	0.025	S
	Secondary	34	4	38				
	Higher secondary	28	6	34				
	Graduate	5	1	6				
	Postgraduate	0	0	0				
Primary occupation	Homemaker	36	12	48	2.647	2	0.266	NS
	Employed	26	4	30				
	Business	11	1	12				
Type of family	Nuclear	16	4	20	0.031	1	0.886	NS
	Joint	57	13	70				
Religion	Hindu	73	17	90	No statistics are computed because the variable religion is constant			
	Muslim	0	0	0				
	Christian	0	0	0				
	Other	0	0	0				
		Poor	**Avg**					
Marital status	Unmarried	2	0	2	0.878	3	0.831	NS
	Married	60	14	74				
	Widow	9	2	11				

	Divorce	2	1	3				
Children	No child	4	1	5	0.004	1	0.948	NS
	Yes	69	16	85				
Monthly family income	<15000	7	2	9	1.910	3	0.591	NS
	16000-20000	29	4	33				
	21000-25000	36	11	47				
	>25000	1	0	1				
Menstrual cycle regularity	Regular	46	12	58	0.345	1	0.557	NS
	Irregular	27	5	32				
Associated problems related to menopause	Yes	28	1	29	6.658	1	0.010	S
	No	45	16	61				
Past/present medical history	Yes	18	3	21	0.379	1	0.538	NS
	No	55	14	69				
Previous knowledge of menopause	Yes	43	4	47	6.976	1	0.009	S
	No	30	13	43				
If yes, the Source of information	Mass media	12	1	13	0.748	3	0.862	NS
	Family members	24	4	28				
	Friends	5	1	6				
	Others	0	0	0				

Table 5 interprets the data Significant Associations of pretest knowledge score with demographic data:

The test used to find out the association between pretest knowledge score and demographic data is Chi square. Since the p value for the demographic variables like age, education, associated problems related to menopause & previous knowledge of menopause is less than 0.05 level of significance shows the association between pre knowledge score and data of demographic variables ultimately, $H0_2$ association hypothesis is rejected for these variables, whereas other variables like primary occupation, type of family, marital status, children, monthly family income, regular menstrual cycle, past/present medical history and information sources doesn't show any association because the p value is greater than 0.05 level of significance so, $H0_2$ hypothesis is accepted for these variables.

Feedback:

Table 6. feedback regarding m-health technology [n=90]

Statement	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

About m-health technology	*f*	%	*f*	%	*f*	%	*f*	%
Easy to accessible	0	0	0	0	17	18.88	73	81.11
Extremely useful in improving knowledge	0	0	0	0	15	16.66	75	83.33
Ensures confidentiality and privacy	15	16.66	31	34.44	23	25.55	21	23.33
Effectively reinforce learning because of regular updates	0	0	4	4.44	31	34.44	55	61.11
Beneficial for sharing experiences and solving problems	0	0	0	0	18	20.00	72	80.00

Table 6 Interprets the result of feedback taken from women regarding m-health technology from 90 women; 73 strongly approved the m-health technology was easily accessible; 75 strongly agreed that m-health technology is extremely useful in improving knowledge; 31 gave neutral reaction regarding m-health technology ensures confidentiality and privacy; 55 strongly agreed that they feel confident because of regular updates from m-health technology was effectively reinforcing their learning; 72 strongly agreed to m-health technology is beneficial for sharing experiences and solving problems.

DISCUSSION

The discussion is based on the sections used in the analysis

SECTION A: Frequency and percentage of demographic variables

This study's demographic profile reveals that the majority of participants were women aged 40-42 (37.77%), with a secondary education level (42.22%), and primarily homemakers (53.33%). They predominantly resided in joint families (77.88%), identified as Hindu (100%), and were married with children (82.23% and 94.47%, respectively). The participants' monthly family income mainly fell within the 21,000-25,000 range (52.22%). In terms of health characteristics, most women reported regular menstrual cycles (64.46%), no menopause-related issues (67.78%), and no significant medical history (76.66%). Notably, over half of the participants had prior knowledge of menopause (52.33%), largely acquired from family members (59.58%).

The study "Deva Pon Pushpam" (2021) in Kashmir, involving 100 samples, revealed the demographic profile of the participants. The majority were 53-55 years old (37%), illiterate (47%), and married (94%). All participants were housewives, with a monthly income ranging from 18,953 to 31,589 rupees (27%). Half of the participants had two children (50%), and most gained previous knowledge about menopause from relatives (73%)[12].

A 2023 study by Amani Osman Abdelmola et al. in Saudi Arabia explored determinants of menopause knowledge and perception among 480 women. The participants were mostly 30-35 years old (42.1%), with menarche at 13-15 years (49.4%). The majority were married (76.2%) and mothers (72.9%). About half were non-working (51.9%), while 52.1% held bachelor's degrees. Most participants (56%) reported medium family income[13].

SECTION B: Assessment of the knowledge regarding menopause before m-health technology module usage

A 2024 study by Jyoti Sihag, Poonam Yadav, and Poonam Mallik in Haryana's Hisar district assessed menopause knowledge among 200 rural women aged 45-55. The findings revealed unsatisfactory knowledge levels: 101 (50.5%) women had low knowledge, 91 (45.5%) had average knowledge, and 8 (4%) had good knowledge[14]. In the current study from the total 90 women, 73 (81.11%) had average knowledge, while 17 (18.89%) had poor knowledge.

SECTION C: Assessment of the knowledge regarding Menopause after m-health technology module usage

A 2020 study by Helen G. et al. in Eritrea, Africa, evaluated the effectiveness of health education on menopause knowledge and attitudes among 99 middle-aged teachers. The semi-experimental design involved pre-intervention, post-intervention, and 3-month follow-up phases, using lectures, group discussions, brochures, and handouts. Results showed significant improvements in knowledge scores: pre-intervention (12.3, SD=3.06), post-intervention (17.3, SD=3.21), and 3-month follow-up (16.5, SD=2.52) ($p<0.0001$). Attitude scores also improved significantly ($p<0.0001$)[15]. In the current study post-intervention evaluation of 90 women revealed 85 (94.44%) had good knowledge and 5 (5.56%) had average knowledge.

SECTION D: Effectiveness of m-health technology module usage regarding the knowledge of Menopause

The current study showed a significant increase in mean knowledge scores from 8.9 (SD = 1.54) to 17.38 (SD = 1.40) with a p-value <0.0001 and a calculated t-value (43.062) exceeding the tabulated t-value (1.984). Whereas a 2018 Iranian study by Seyyed Kashfi et al. found that educating menopausal women about physical activity through social networks significantly improved their quality of life. One month after the intervention, the experimental group showed a notable increase in quality of life (mean = -8.89, SD = 3.78) compared to the control group (mean = 1.63, SD = 2.48), with a mean difference of -10.52 ($p < 0.0001$)[16]. A 2020 Egyptian study by Fatma Mohamed El Swerky et al. found that social platform instructions on menopause significantly improved middle-aged women's knowledge during the COVID-19 outbreak. The study showed a highly statistically significant difference between pre-test (77% unsatisfactory) and post-test scores (96% satisfactory) with a t-value of 35.045 and $p<0.001$[17].

SECTION E: Association between the pretest knowledge score with selected demographic variables

In the current study Significant association has been seen between age, education, associated problems related to menopause & previous knowledge of menopause at the 0.05 level of significance. Where the studies conducted by various researchers shows the association of knowledge score with the variables like age, education, and family income (Aswathy S.S. et al., 2020)[18]; education, monthly income, and number of co-morbidities (Mohammed Alijunaid et al., 2023)[19]; and age, education, occupation, type of family, number of children, and monthly income (N Sivasuramanian et al., 2024)[20].

RECOMMENDATION

- Same study can be planned in same setting with different participants as well as with different setting and samples.
- By using the same interventional technique but with different topic a study can be conducted.
- A comparative study can be planned by using m-health technology module and other teaching interventions.
- Alike study can be implemented in two dissimilar locations for comparison.
- A descriptive or exploratory study can be directed to estimate the attitude & perception among various populations in separate areas regrading m-health technology.

LIMITATIONS

- Study was limited to the rural area and the women residing in that area.
- Women should belong to the specific age group (40-50 years of age).
- Samples of the study are those women who were having at least one smartphone at their house and WhatsApp account.

CONCLUSION

Menopause is a natural transition marked by hormonal changes, causing physical and psychological symptoms. Educating women about menopause symptoms and treatments through m-health technology is beneficial, given its often unrecognized nature. The study's tools proved reliable with a score of 0.8, validated by 21 experts. After obtaining permission from authorities, a pilot and main study were conducted. The results showed increased knowledge scores post-intervention and significant associations between knowledge and factors like age, education, menopause-related problems, and prior knowledge. In future many more studies can be planned by using the results of this study.

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ETHICAL CONSIDERATION

The study received approval from the BVDU, College of Nursing, Navi Mumbai , Institutional Research Recognition Committee in February 2024. Following a thorough explanation of the study's significance, informed consent was obtained from all participants, ensuring their confidentiality. The approval was formally documented under letter no. 15/2024, dated 15/10/24.

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