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Effect of Health Literacy Program on Improving Elderly Women's Self-Care Practice Regarding Atrophic Vaginitis

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Abstract

Background: Aging is associated with many different health-related challenges for women such as menopause and its associated problems. Atrophic vaginitis affects 10 to 40% of postmenopausal women worldwide. Self-care (SC) is a factor with potential effects on menopause and its consequences. Self-care education based on health literacy has the potential to improve menopausal women's self-care. **The aim of the study** was to evaluate the effect of Effect of health literacy program on improving elderly women's self-care practice regarding atrophic vaginitis.

Subjects and Methods: **Research design:** A quasi-experimental design was adopted to carry out this study. **Setting:** The study was conducted at Geriatric Social club at Zagazig city.

Subjects: Purposive sample of 70 elderly women who fulfilled the study inclusion criteria. **Tools for data collection: Tool I:** A structured interview questionnaire was used for data collection. It was composed of three parts. (Part I) elderly women demographic characteristics, (Part II) medical and obstetric history and (Part III) Risk factors of atrophic vaginitis.

Tool II: Self-care practice of elderly women regarding atrophic vaginitis.

Results: Out of the 70 elderly women, only 38.6% of the studied elderly women had adequate level of self-care regarding atrophic vaginitis pre the program which improved to 74.3% post program. Additionally, there was a highly statistically significant positive correlations between the studied elderly women' knowledge, self- care practice pre and post program at ($p < 0.01$), and there was a highly statistically significant difference between pre & posttest program as regarding health literacy self- care practice about atrophic vaginitis for elderly women.

Conclusion: The health literacy program produced substantial, clinically meaningful improvements in self-care among elderly women with atrophic vaginitis, translating into better hygiene practices.

Recommendations: Integrating culturally tailored education into geriatric and primary care pathways which, encourage healthy and positive self-care about atrophic vaginitis in women in early age rather than teaching them when grown up.

Keywords: Health literacy program, Elderly women's Self-care practice, Atrophic vaginitis.

Introduction:

Population aging and improved life expectancy have resulted in the increasing number of menopausal women so that most women currently spend one third of their life after menopause. According World Health Organization there will be 1.3 billion menopausal women in the world in 2030 (**Barati et al., 2021)**. Egypt is the most populous country in the Middle East; **Central Agency for Public Mobilization and Statistics (CAPMAS) 2021,** clarified that number of female elderly persons in Egypt is 3.2 million, which represent about 6.4% of total female population.

Atrophic vaginitis is an inflammation of the vagina which develops when there is a significant decrease in estrogen levels after menopause. More than half of menopausal women are concerned about the symptoms of atrophic vaginitis. However, only 25% of patients with the symptoms receive adequate therapy. Probably due to some patients are

embarrassed to discuss intimate complaints with a specialist or regard the symptoms as manifestations of the natural aging process and do not seek help. So, Atrophic vaginitis considered as a silent epidemic that affects up to 50%–60% of postmenopausal women who are suffering in silence from this condition **(Kaufman et al., 2023)**.

A decrease in vaginal lubrication is an early hallmark of hormone insufficiency leads to following signs and symptoms: Vaginal dryness, burning, dyspareunia · Loss of vaginal secretions, leukorrhea, vulvar pruritus. Feeling of pressure, itching and yellow malodorous discharge. Urethral discomfort, frequency, hematuria, urinary tract infection. Dysuria and stress incontinence. All atrophic vaginitis symptoms can be exacerbated by a simultaneous infection of candidiasis, trichomoniasis or bacterial vaginosis **(Mary Ann et al., 2022)**.

Atrophic vaginitis can affect quality of life and relationship with the partner. There are physical and emotional side effects of atrophic vaginitis. Physical symptoms like pain, burning, itching and leaking pee can disrupt all areas of the life. Emotional side effects are just as complicated as the physical side effects. People experiencing symptoms of vaginal atrophy may lose interest in sex and intimacy or lose confidence in themselves. Atrophic vaginitis is not a life-threatening disease, but it can significantly negatively affect patients' quality of life if not diagnosed and treated appropriately. Interprofessional communication and patient education are essential **(Krychman, 2023)**.

Certain factors may contribute to atrophic vaginitis, such as smoking that affects blood circulation, resulting in the vagina and other tissues not getting enough oxygen. Smoking also reduces the effects of naturally occurring estrogens in the body. In addition, women who smoke typically experience an earlier menopause, also no vaginal births. Researchers have observed that women who have never given birth vaginally are more likely to develop vaginal atrophy than women who have had vaginal deliveries, and no sexual activity **(Hafiz, et al., 2024)**.

Topical estrogen as vaginal estrogen cream which is directly applied into the vagina, usually at bedtime. Typically, women use it daily for one to three weeks and then one to three times a week thereafter. Although creams may offer faster relief than do other forms of vaginal estrogen, they can be messier. And vaginal estrogen ring, it is a soft, flexible ring into the upper part of the vagina. The ring releases a consistent dose of estrogen while in place and needs to be replaced about every three months. Many women like the convenience this offers. A different, higher dose ring is considered a systemic rather than a topical treatment **(Abd-El Rahman, et al.2024)**.

Health literacy (HL) is a major factor affecting Self-care. Health literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand the health information they need to make appropriate health decisions, including a constellation of reading, listening, analysis, and decision-making skills and applying these skills in health situations (**Beni et al., 2022)**.

From the perspective of the WHO, older adults need to acquire the necessary skills to support themselves and others and enjoy right decision-making and independence. Self-care is defined as “the ability of individuals, families, or communities to maintain and promote health, prevent illnesses, and cope with illnesses or disabilities with or without receiving healthcare providers’ support”. (**Ghalenow et al., 2023)**.

knowledge and awareness about self-care guideline for vaginitis play crucial role in individuals’ attitude, behavior and practice. Education of healthy practice skills and helping patients to acquire knowledge in order to make them follow self-care behaviors will result in disease prevention which improves their quality of life **(Abdelnaem et al., 2022)**.

Low health literacy is considered a worldwide health threat. Gerontological nurses have an advocator role for interventions to promote health literacy and improve health outcomes of older people to maximize their capacity to self-manage **(Mahnoosh et al., 2024)**.

Significance of the study:

Approximately 1.2 billion women worldwide will be menopausal or postmenopausal by the year 2030, with 47 million new entrants each year. About 45% of healthy postmenopausal women have symptoms related to atrophic vaginitis. Only about 25% of women who are experiencing symptoms actually seek medical attention. Instead, women believe that the symptoms are a normal, unavoidable part of getting older. Up to 40% of women who had gone through menopause were unaware of postmenopausal atrophic vaginitis **(Mohamady et al., 2023)**.

Egypt is the most populous country in the Middle East; **Central Agency for Public Mobilization and Statistics (CAPMAS) 2021,** clarified that number of female elderly persons in Egypt is 3.2 million, which represent about 6.4% of total female population. In this context, **Sturdee & Panay, (2023)** clarified that cultural and religious taboos in the Middle East regarding sexual life and related issues inhibit some women from discussing vaginal dryness and sexuality issues with health-care providers.

As well as, **Moustafa et al., (2019)** showed that In Egypt, especially the Upper Egypt region, women are not so open to talk about the problem of vaginitis. If the condition of atrophic vaginitis persists, it may lead to serious infection. Early diagnosis and treatment may prevent the progress of vaginal atrophy or control existing symptom.

Aim of the study:

The current study aimed to evaluate the effect of health literacy program on improving elderly women's self-care practice regarding atrophic vaginitis

Research Hypothesis:

Elderly women self-care practice regarding atrophic vaginitis can be improved after application of health literacy program than before application.

Subjects and methods:

Research design:

A quasi-experimental design was adopted to carry out this study.

Study setting:

The current study was carried out at Geriatric Social club at Zagazig city.

Study subjects:

A purposive sample of 70 elderly women attending to previously mentioned setting, who fulfill the following criteria:

Inclusion criteria:

1. Elderly women aged 55 years and above.
2. Alert and able to communicate.

Exclusion criteria:

1. Receiving chemotherapy or radiotherapy.
2. Suffering from mental disorder.

Sample size calculation:

Mohamady, et al 2023, found that percent of positive attitude regarding vaginal atrophy post intervention program was (85.4%) and (56.9%) pre intervention, confidence level is 95% two side with power of study 95% with Sample size calculated using Open Epi, is 70 elderly women.

Tools of data collection*:*

Two tools were used to collect the necessary data as following:

***Tool I*: Structured interview questionnaire:**

It was developed by researchers based on the literature review. It consisted of three main parts as follow:

- **Part 1: Demographic characteristics of the elderly women** This part included data about the elderly enrolled in the current study as follow: age, marital status, education, occupation, and work nature…etc.
- **Part 2: Medical and obstetric history:** This part included two sub items:

Medical and obstetric history: This part included questions about history of chronic diseases, previous surgery, investigations, medications taken and obstetric history, which were in the form of mix between closed and open-ended questions.

Current medical history of studied elderly women of atrophic vaginitis: This part included closed ended questions about; Do elderly women suffer from atrophic vaginitis, the number of times they suffer from atrophic vaginitis, character/color of vaginal discharge, it has a bad odor, if women suffer from vaginal itching or scratching, dryness & pain during intercourse and receiving early diagnosis and treatment by specialists.

- **Part 3: Risk factors of atrophic vaginitis:** it clarifies risk factors made studied elderly women at high risk for developing atrophic vaginitis as aging, exposure to frequent stressors, frequent pregnancy and childbirth, hypertension, diabetes, and frequent intercourse.

***Tool II*:** This tool is guided by **Abd-Elmohsen, (2013);** It was designed by the researcher after reviewing related literature:

- **Self-care practice assessment regarding to atrophic vaginitis**; It contains fifteen closed-ended questions about good genital hygiene and drink plenty of water daily& emptying the bladder frequently when full.

❖ **Scoring system:** Each step was scored one grade if done and scored zero if not done. These scores summed up and converted into a percent score. The total score of practices is (15). It was divided into two levels, where the woman who was their practices scores ≥60% (scoring 9 to 15), they considered on the adequate level, and those who were score<60% (scoring 8) are on the inadequate level.

Content validity & Reliability:

Once prepared, the tool was presented to a panel of three experts in the field of Obstetric & Gynecological Nursing, Community Health Nursing, Faculty of Nursing, Zagazig University and Community medicine, Faculty of Medicine, Zagazig University. The panel reviewed the tool content for relevance, clarity, comprehensiveness and understandability. This constituted the content validation of tools. All recommended modifications were applied. The reliability of this tool was tested by measuring their internal consistency. It demonstrated a good level of reliability with Cronbach's alpha as follow:

Cronbach α of elderly women's self-care practice regarding atrophic vaginitis questionnaire was 0.86.

Fieldwork

Once permission was granted to proceed with the study, the researcher started to prepare a schedule for collecting the data. The fieldwork was carried out within six months starting from the beginning of May 2024 to the ending of October 2024. Each elderly woman was interviewed individually in the Geriatric social club' garden. The researcher allocated two days weekly from 9 am to 1 pm.

Pilot study:

Before performing the main study, a pilot study was carried out on 7 elderly women representing 10% of the total studied sample, to test its feasibility, clarity, comprehensiveness and applicability of the study tools. Also, to estimate the necessary time for completion of the data collection tools sheet. All participants received a clear clarification about the study purpose. The elderly enrolled in the pilot, were included in the main study sample as there were no modifications done.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 27.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. The Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using a chi-square test (x2). The spearman rank correlation was used for assessment of the interrelationships among quantitative variables and ranked ones. In order to identify the independent predictors of the knowledge and self-care multiple linear regression

analysis was used after testing for normality, and homoscedasticity, and analysis of variance for the full regression models were done. Statistical significance was considered at p-value <0.05.

Results:

Concerning demographic characteristics of the studied subjects, the current study revealed that, (64.3%) of the elderly women's age was more than 70 years, with mean 71.2 ± 4.6 and (100%) of them were living in urban areas. In addition (80%) of the studied elderly women were widowed and (41.4%) of them were have basic education. Moreover (98.6%) of the studied elderly women not working and 57.1% of them living with husband's pension.

Figure (1): Nature of work of studied elderly women indicates that (75.7%) of the studied elderly women were have neurological and physical exhaustive with previous work while (24.3%) of them their work was need to physical power.

Regarding medical history, (74.3%) of studied elderly women were having hypertension, (68.6%) were having osteoporosis and osteoarthritis, while (61.4%) of them were having diabetes. In addition (100%) of studied elderly women were history of normal labor.

Figure 2 displays that (81.4%) of studied elderly women were taking anti-inflammatory, while (1.4%) of them were taking medication for irritable bowel.

Regarding obstetric history, (61.4%) of studied elderly women reached menarche at 12 years. Additionally (60%) of them had a parity of > 3times, (74.3%) of them had gravidity > 3 times and (71.4) of them reported no history of abortion.in addition (82.9%) of the studied elderly women were used contraceptive methods and (65.7%) of them were used IUD. Meanwhile (77.1%) of studied elderly women their age of last menses were at age >50 years.

Regarding history of studied elderly women of atrophic vaginitis; (100%) of studied elderly women suffering from atrophic vaginitis with (42.9) of them experiencing episodes every 6 months. Additionally vaginal discharge was presented in (82.9%) of studied elderly women suffering and (48.3%) of them reported white discharge. Moreover (82.7) of studied elderly women were having bad odor vaginal discharge, (87.1%, 55.6% and 85.7%) of them did not suffering from vaginal itching, redness or bloody and dryness & pain during intercourse respectively.

Figure 3 displays that (84.3%) of studied elderly women did not diagnosis and treatment early by specialists, while (15.7%) of them were diagnosis or treatment early by specialists.

Table 1 displays risk factors of atrophic vaginitis. As the table reveals that (100& 100% and 98.6%%) of studied elderly women mentioned aging, exposure to frequent stressors and frequent pregnancy and childbirth as risk factors of atrophic vaginitis respectively.

Table 2 displays the self-care practice pre and post program among studied elderly women. As the table reveals, there were improvements in self-care practice of elderly women post program with a highly statistically significant difference (P< 0.01) between pre and post program. As evidence, highly reported score of self-care practice post program among studied elderly women were cleanliness genital area after each toilet from front to back and not wearing other people's underwear (100% and 100%) respectively.

Figure 4 reveals that, pre the program, only 38.6% of the studied elderly women had adequate level of self-care regarding atrophic vaginitis which improved to 74.3% post program had adequate level of self-care regarding atrophic vaginitis.

Table 3 presents the relation between studied elderly women's self-care practice and their demographic characteristics. As the table clarifies that, there was a statistically significant relation between studied elderly women's total level of self-care practice and their age, level of education and work (p<0.05). As noticed from this table, elderly women whose aged ≥70, secondary level of education and neurological and physical exhaustive work had the highest level of self-care practice. Moreover, there was no statistically significant relation with their marital status and person sponsoring (p > 0.05).

Table 4 declares that, there was a highly statistically significant positive correlations between the studied elderly women' knowledge, self- care practice post program at (p < 0.01).

Table 5 shows that, age, and number of abortions were a highly statistically negative predictors of self-care practice score at p<0 .001, respectively. As well, positive level of education had slight frequency positive effect on total self-care

practice score at p value= 0.031. The model explains 641% of the variation at total self-care practice score as the value of r-square indicates.

Discussion:

Concerning demographic characteristics, it is clear from the results of the current study that age is the most important factor that affects health of women; in the present study approximately 65% of the elderly women were above 70 years old (≤70) with an average age of 71.2 ± 4.6 years, while 35.7% were between 60-70 years. This indicates that the majority of participants were in the advanced elderly age group, which aligns with the higher prevalence of atrophic vaginitis in older postmenopausal women. This finding is consistent with literature showing that vaginal atrophy symptoms increase with advancing age post- menopause **(Shah et al., 2018)**.

In consistence with our study, **Abd-Elaziz & Ahmed, (2019)** in Assiut city, founded that elderly women with an average age of 66.2 years old with a range of 60-80 years old. Also, **Koyuncu et al., (2018)** in the district center of Beylikova (Turkey) reported that an average age of 50.41 ± 6.36 years (range 40– 64) in their study.

In disagreement with our findings, other studies reported that significantly lower ages of included female participants, which indicates that atrophic vaginitis is not exclusive to old post-menopausal women, as it could similarly affect middle- aged menopausal women as well. **El Sayed et al., (2019)** in Benha city, reported that a mean average age of 29.63 ± 5.52 years for the group of women that had vaginitis. However, it should be noted that while a considerable percentage of women had atrophic vaginitis in this study, others suffered from inflammatory or infectious vaginitis. This could explain the relatively lower age compared to our study.

Also, Moreover, the current study findings revealed that all the participants (100%) lived in urban areas, which is mainly related to the geographical location of the study site, which is situated within the boundaries of a highly urbanized community. Consequently, the sample population was naturally drawn from an environment characterized by urban living conditions, limited exposure to rural lifestyles, and the availability of healthcare and social services that are concentrated in city settings. Urban residence may facilitate access to healthcare services and health education programs, though cultural taboos around discussing vaginal health issues persist even in urban settings, as noted in Middle Eastern contexts **(Mohamady et al., 2023)**. In agreement with our results, **Abd-Elaziz & Ahmed, (2019)** in Assiut city, reported that nearly 81% of the participants were living in urban areas. Also, this result agrees with **Ahmed, (2014)**, in his study about the effect of educational program on menopausal symptoms in Benha city, who mentioned that two thirds of the studied group and more than of control group lived in urban area.

Education is considered as one of the decisive and highly influential factor in reproductive behavior. The present study showed that, the levels of education were as following: 41.4% had basic education, 40% secondary education, 14.3% could read and write, and only 4.3% had university education. The predominance of lower educational levels may contribute to limited health literacy and awareness about atrophic vaginitis. Research demonstrates that higher educational levels are associated with better health knowledge and self-care practices **(Karakoç et al., 2019)**.

In agreement with our findings, **Koyuncu et al., (2018)** in the district center of Beylikova (Turkey) found that, nearly 81.5% of the participants had primary school or lower. Also, **Mohamady et al., (2023)** in Tanta city, reported that the majority of the females had only primary education (76.4%) with only 5.7% with a university degree. Additionally, **El habashy, (2017)** in the study about assessing the effect of menopausal symptoms on women's quality of life in Benha city, who mentioned that, the lowest proportion of the studied women are highly educated On the other hand, **Abd-Elaziz & Ahmed, (2019)** in Assiut city, found that approximately 74% of the included participants were illiterate or read & write; 17.0% primary/preparatory. Similarly, this result disagrees with **Shams-Eldin, (2018),** who studied knowledge, attitude and severity of menopausal symptoms among women attending primary health care centers in Cairo, Egypt, who reported that, the majority of the studied women were university and higher educational level. However, this may be due to differences in culture and society of women in setting of the study.

The objective of the present program was to evaluate the effect of health literacy program on improving elderly women's self-care practice regarding atrophic vaginitis; In our study, 100% of the participants were having or had some form of atrophic vaginitis, with 42.9% experiencing episodes every 6 months. This universal prevalence is higher than reported in other studies, which typically show 40-50% prevalence in postmenopausal women. This may reflect the specific demographics of the study population or selection criteria **(Mohamady et al., 2023)**.

The most common reported symptom was vaginal discharge (82.9%), followed by bad odor discharge (82.7%), pain during intercourse (14.3%) and vaginal itching (12.9%). The symptom profile aligns with typical atrophic vaginitis presentations, while the relatively low rates of sexual symptoms may be related to the high proportion of widowed women and reduced sexual activity in this age group **(Huang et al., 2019)**.

Despite the significant prevalence and symptomatic burden of atrophic vaginitis reported among the included participants, only 15.7% sought early diagnosis and treatment from specialists, while 84.3% did not. This finding reflects the global pattern of under-reporting and under-treatment of atrophic vaginitis. Studies consistently show that only 20-25% of symptomatic women seek medical attention, often due to cultural taboos and misconceptions about aging **(Nappi et al., 2019)**.

This global pattern of under-reporting and under-treatment is further supported by findings that cultural taboos, lack of awareness about available therapies, and limited proactive conversations between healthcare providers and patients contribute to delayed diagnosis and inadequate management **(Naumova & Castelo-Branco, 2018)**.

The theoretical knowledge gain obtained via our interventional program managed to translate practically and clinically to improved self-care practices. At baseline pre-program, only 38.6% had adequate self-care practices before the program, with poor baseline performance at all of the specific practices.

After the program, our analysis demonstrated that there was a statistically significant improvement in the self-care practices that reached up to 74.3% of the participants. Moreover, after the program all the participants started to improve their genital cleanliness and avoid wearing other's underwear (100% both). The substantial improvements in self-care practices demonstrate the program's practical effectiveness.

In accordance with our findings, **El Sharkaway et al., (2020)** in Ain- Shams University, demonstrated that the positive attitude of the participants increased up to approximately 80% after the program. Besides, **Abd-Elaziz & Ahmed, (2019)** in Assiut city, demonstrated that there was a significant in the awareness/self-practice, implying attitudinal change and overall program effectiveness ($P < 0.001$). Similarly, **El Sayed et al., (2019)** in Benha city, clarified that, similar improvements in health- promoting lifestyle dimensions (interpersonal relations, spiritual growth, health responsibility) indicating attitude/behavior change; all $P \leq 0.001$. In alignment with our findings, **Mohamady et al., (2023)** in Tanta city, reported that the positive emotional attitude increased significantly from 56.9% to 85.4% after the program.

Collectively, we can conclude that our health literacy program achieved a statistically and clinically significant improvement in the knowledge (18.6% to 65.7%) and the self-care practices (38.6% to 74.3%) of the included participants.

These results demonstrate exceptional program effectiveness, exceeding outcomes reported in similar studies, which confirms the value of targeted health education programs for addressing gaps in women's health knowledge, particularly for conditions that are culturally sensitive or poorly understood **(Nappi et al., 2019)**.

Also, Moreover, the current study findings revealed that a significant association between self- care practices and 60-70 age category, higher education and those with less physically demanding work had better practices ($P<0.05$). These correlations support the importance of education and functional capacity in maintaining health behaviors, consistent with studies on aging and self-care **(Karakoç et al., 2019)**.

Similarly, **Mohamady et al., (2023)** demonstrated in their analysis that education level positively correlated with knowledge, attitudes, and practices. Also, **El Sharkawy et al., (2020)** reported similar findings regarding the influence of education on knowledge and self-care practices.

In accordance with our findings, **Nappi et al., (2019)** found that women with higher education and those who were married demonstrated greater awareness and knowledge of genitourinary syndrome of menopause and atrophic vaginitis, highlighting the influence of social and educational factors on health literacy.

Conclusion:

Based upon the findings of the present study and answer of research hypothesis, it can be concluded that: the health literacy program produced substantial, clinically meaningful improvements in knowledge and self-care among elderly

women with atrophic vaginitis, translating into better hygiene practices and greater symptom awareness. Given the high burden of comorbidity, limited baseline literacy, and low care-seeking observed, these findings support integrating culturally tailored education into geriatric and primary care pathways to improve detection and management of genitourinary syndrome of menopause.

Recommendations

Based on the current study findings, the following recommendation is suggested that: Use a booklet and posters as methods to increase women's awareness about atrophic vaginitis in outpatient clinics. Activate the counseling program and provide guideline to couples about dyspareunia caused by atrophic vaginitis. Encourage healthy and positive attitude about atrophic vaginitis and menopause in women in early age rather than teaching them when grown up. Increase appropriate knowledge about the risk factors of atrophic vaginitis and importance of routine screening. Further studies are proposed to replicate the study on large sample size in different setting, and activate the counseling program for nurses about how to deal and manage atrophic vaginitis.

Table (1): Risk factors of atrophic vaginitis (n=70)

Risk factors*	No	%
Aging	70	100.0
Exposure to frequent stressors	70	100.0
Frequent pregnancy and childbirth	69	98.6
Hypertension	52	74.3
Diabetes	43	61.4
Frequent intercourse	8	11.4

Table 2: Self-care practice pre and post program among studied elderly women (n=70)

Items	Self-care practice									
	Pre				Post				χ^2 test	P – Value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Washing hand before and after toilet	39	55.7	31	44.3	52	74.3	18	25.7	5.3	0.02*
Cleanliness genital area after each toilet from front to back	65	92.9	5	7.1	70	100.0	0	0.0	5.2	0.02*
Not using soap and wipes with a strong scent to prevent genital area irritation	17	24.3	53	75.7	49	70.0	21	30.0	29.3	<0.01**
Avoid douching; Douching may worsen vaginitis symptoms	23	32.9	47	67.1	38	54.3	32	45.7	6.5	0.01*
Drying the area after washing	15	21.4	55	78.6	37	52.9	33	47.1	14.8	<0.01**
wearing cotton and loose underwear clothes	18	25.7	52	74.3	39	55.7	31	44.3	13	<0.01**
Continuous changing of underwear; don't be media for infection	22	31.4	48	68.6	47	67.1	23	32.9	17.9	<0.01**
washing underwear clothes by hot water	11	15.7	59	84.3	37	52.9	33	47.1	21.4	<0.01**
Avoid using cleaning substance as (cholorine, potash); can cause genital irritation	14	20.0	56	80.0	36	51.4	34	48.6	15.1	<0.01**

Exposing clothes to sun rays	41	58.6	29	41.4	52	74.3	18	25.7	3.9	0.04*
Not wearing other people's underwear	68	97.1	2	2.9	70	100.0	0	0.0	2.0	0.15
Cleaning the toilet after others enter to prevent transition of infection	20	28.6	50	71.4	41	58.6	29	41.4	12.8	<0.01**
Removal of pubic hair	14	20.0	56	80.0	28	40.0	42	60.0	6.7	0.01*
Drink plenty of water daily	17	24.3	53	75.7	43	61.4	27	38.6	19.7	<0.01**
Empty the bladder frequently when full	21	30.0	49	70.0	45	64.3	25	35.7	16.5	<0.01**

** Highly significant at $p \leq 0.01$ * statistically significant at $p \leq 0.05$ not significant at $p > 0.05$

Table 3: Relation between studied elderly women's self-care practice and their demographic characteristics

Demographic characteristics	self-care practice									
	Pre					Post				
	Adequate (n=27)		Inadequate (n=43)		χ2 test & P. value	Adequate (n=52)		Inadequate (n=18)		χ2 test & P. value
	No	%	No	%		No	%	No	%	
Age in years										
60<70	14	51.9	11	25.6	4.9	23	44.2	2	11.1	6.4
70 ≥	13	48.1	32	74.4	<0.05*	29	55.8	16	88.9	<0.05*
Marital status										
Single	0	0.0	1	2.3		1	1.9	0	0.0	
Married	7	25.9	3	7.0	5.3	8	15.4	2	11.1	0.6
Widowed	19	70.4	37	86.0	0.14	41	78.8	15	83.3	0.89
Divorced	1	3.7	2	4.7		2	3.8	1	5.6	
Level of education										
Reads and writes	7	25.9	3	7.0		9	17.3	1	5.6	
Basic education	13	48.1	16	37.2	10.7	16	30.8	13	72.2	9.8
Secondary	5	18.5	23	53.5	<0.05*	24	46.2	4	22.2	<0.05*
University	2	7.4	1	2.3		3	5.8	0	0.0	
Occupation										
Need to physical power	11	40.7	6	14.0	6.5	16	30.8	1	5.6	4.6
Neurological and physical exhaustive	16	59.3	37	86.0	<0.05*	36	69.2	17	94.4	<0.05*
Person sponsoring										
Husband's pension	13	48.1	27	62.8		26	50.0	14	77.8	4.5
Herself	9	33.3	11	25.6	1.9	18	34.6	2	11.1	0.21
Father's pension	3	11.1	2	4.7	0.6	4	7.7	1	5.6	
Son	2	7.4	3	7.0		4	7.7	1	5.6	

** Highly significant at $p \leq 0.01$ * statistically significant at $p \leq 0.05$ not significant at $p > 0.05$

Table 4: Correlation matrix between studied variables post intervention

Items	Person Correlation Coefficient	
	Knowledge	Self-Care Practice
Knowledge		r. 0.878 p< 0.001**
Self-Care Practice	r. 0.878	

	p< 0.001**	

r = Correlation coefficient.

** Highly significant at p ≤ 0.01 * statistically significant at p ≤ 0.05 not significant at p > 0.05

Table 5: Best fitting multiple linear regression model for total self-care practice score

Items	Unstandardized Coefficients	Standardized Coefficients	T test	P. value
	B	B		
Age	-0.493	-0.286	3.9	<0.001**
Level of education	.0524	0.291	2.3	0.031*
Number of abortion	-0.377	-0.332	2.8	<0.001**

Model	R2	Df.	F	P. value
Regression	0.641	2	9.81	<0.001**

a. Dependent Variable: Self-care practice

b. Predictors: (constant): Age, Level of education and Number of abortion

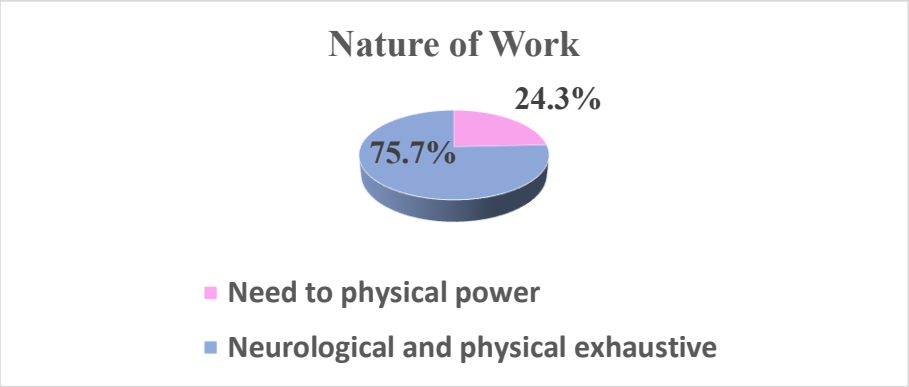
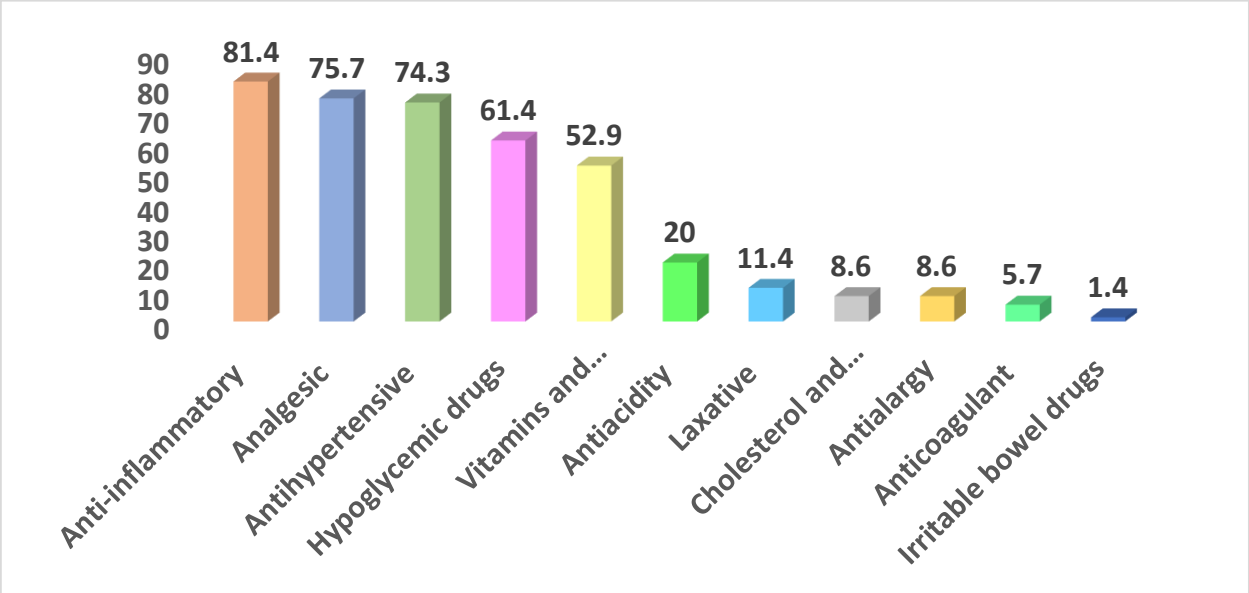


Figure 1: Natural of work of studied elderly women (n=70)



* More than one response

Figure 2: Medications of studied elderly women (n=70)

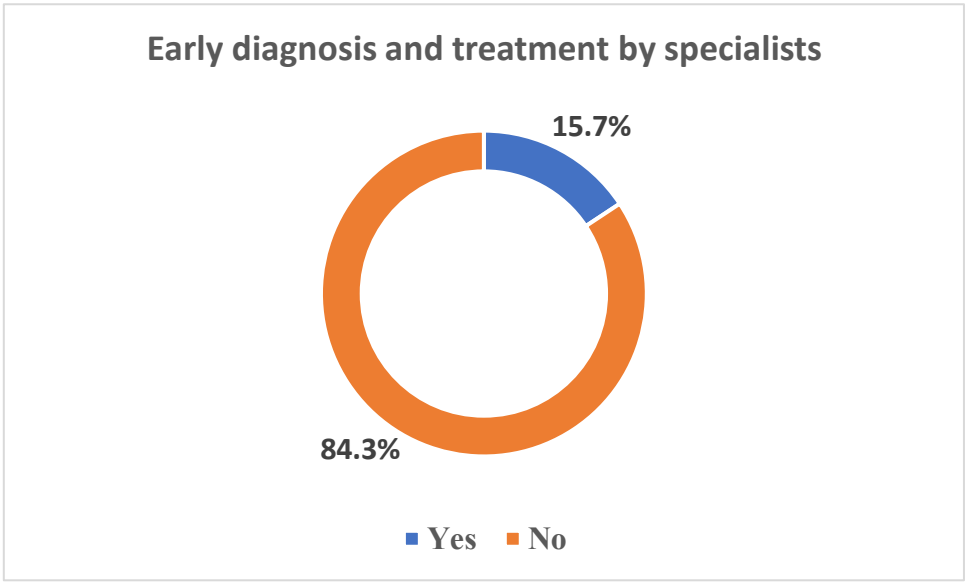


Figure 3: Early diagnosis and treatment by specialists of studied elderly women of atrophic vaginitis (n=70)

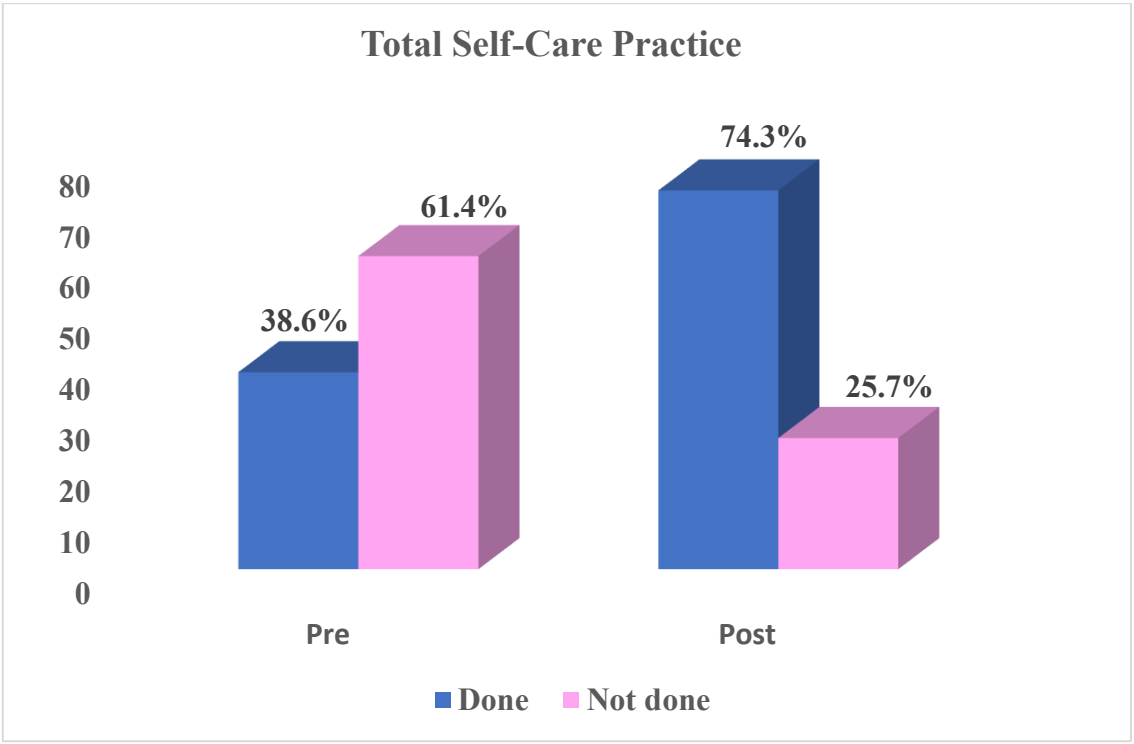


Figure 4: Total self-care practice pre and post program among studied elderly women (n=70)

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