Turk J Public Health
Available online at: http://dergipark.org.tr/tjph/

Doi: 10.20518/tjph.1788076

ORIGINAL ARTICLE

Promoting gynecological cancer awareness and healthy lifestyle behaviors in sexual minority women: A pilot study results

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ABSTRACT

Objective: Women who have sex with women (WSW) are at an increased risk for gynecological cancers due to certain lifestyle-related factors. This pilot study aimed to evaluate the effect of gynecological cancer education on cancer awareness and healthy lifestyle behaviors in WSW.

Method: A quasi-experimental, single-group pre-test/post-test design was used. The sample consisted of 32 Turkish WSW (n=11 lesbian women, n=21 bisexual women). Before gynecological cancer prevention education was administered, the participants were administered the Personal Information Form, Gynecological Cancer Awareness Scale (GCAS), and Healthy Lifestyle Behavior Scale-II (HLSBS). Then, the participants were provided group education. In the following first and third months, participants were sent online GCAS and HLSBS forms.

Results: The mean age of WSWs was 25.75±5.71 years old. Mean GCAS scores increased from 143.25±16.40 (pre-education) to 177.03±17.40 (1st month) and 180.84±19.35 (3rd month). HLSBS scores rose from 125.84±16.62 (pre-education) to 141.75±22.97 (1st month) and 139.44±22.14 (3rd month). The GCAS and HLSBS by the participants increased significantly in the first and third months after the education.

Conclusion: A positive relationship was found between the WSW's gynecological cancer awareness levels and their healthy lifestyle behaviors. Educational interventions significantly improved gynecological cancer awareness and healthy lifestyle behaviors among WSW. Targeted education programs are essential to promote routine screenings, vaccination uptake, and health literacy in this population.

Keywords: Women Who have Sex with Women, Gynecological Cancer Awareness, Healthy Lifestyle Behaviors, Preventive Health Interventions

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Received: 20.11.2025 / **Accepted:** 14.04.2026 / **Published:** 27.07.2026
Cite This Article: Başoğlu M, Bilgic D. Promoting gynecological cancer awareness and health lifestyle behaviors in sexual minority women: A pilot study results.Turk J Public Health. 2026; (1): 264-277. 10.20518/tjph.1788076.

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INTRODUCTION

A growing body of evidence demonstrates the LGBT+ population experiences increased risk for cancers, reports lower satisfaction with cancer treatment, experiences higher rates of psychological distress, is less likely to engage in cancer screenings for early detection, and reports higher rates of perceived discrimination in health care settings[1,2]. LGBT+ population has lower rates of cancer screening participation compared to heterosexual population, as well as increased rates of certain cancer risk factors, such as smoking, alcohol consumption, obesity, HIV, and HPV infection[3,4].

Minority stress and other disadvantages stamming from stigmatization and oppression likely also manifest in disparities in cancer morbidity and mortality via multiple other mechanisms, including increased rates of mental distress, and mental illness as well as increased experiences of violence and higher stress levels, also called allostatic load[5-7]. Minority stress theory posits that cumulative stress from societal ostracization affects coping capacity, leading LGBT+ individuals to engage in risky health behaviors. Interventions are needed to reduce risky life behaviors among LGBT+ individuals, given that one of the goals of the Healthy People 2030 initiative is to "Improve the health, safety, and well-being of LGBT+[8,9]. Also, minority stress-in other words, the stress associated with experiences of discrimination and marginalization, in this case, related to sexual orientation or identity-has been directly linked to cancer incidence, cancer-related treatment side effects, and the expression of genes and pathways linked to cancer[5-7,9].

According to the Centers for Disease Control and Prevention (CDC) and the American College of Obstetricians and Gynecologists (ACOG), women who have sex with women (WSW) face health inequalities and engage in behaviors that increases gynecological cancer risk. CDC classifies risk factors as sexual-such as STIs and lack of barrier protection (not using condoms with sex toys etc.) -and non-sexual, such as obesity, smoking, alcohol and substance use, and stress exposure[10,11]. However, large-scale cancer incidence studies often exclude data on LGBT+ individuals[12]. The burden of cancer should not be overlooked in LGBT+ individuals, among whom morbidity and mortality rates are high due to minority stress[13].

Studies with WSW have shown that behaviors such as inconsistent condom use[14], sex toy use and sharing[15], and certain sexual practices[16], may increase cancer risk. International studies also indicate low levels of knowledge about STI and AIDS prevention among WSW[17,18]. Additionally, WSW face barriers to accessing healthcare and screening programs[18,19], including Pap tests and cervical cancer screening[20], and experience stigmatization from healthcare providers, which exacerbates health disparities[21]. These health disparities create an increased risk of gynecological cancer and also contribute to worse health outcomes.

Due to these factors, WSW use healthcare services and receive routine cancer screenings less frequently than heterosexual women. Stigmatization may lead to psychological issues including stress, disordered eating, depression, anxiety, and suicidal ideation[18-22]. As many of these factors are modifiable, raising awareness around prevention, early diagnosis, and healthy lifestyle development in WSW is crucial[13]. Educational studies with WSW show that targeted health promotion increases awareness and positive behavior change. For example, one study showed improvements in physical activity, intuitive eating, and cancer awareness post-intervention[23]. These findings highlight the importance of expanding education programs to promote cancer prevention and health-seeking behaviors in WSW.

This pilot study is among the few to assess gynecological cancer awareness and healthy lifestyle behaviors among WSW. It helps identify educational needs and highlights disparities in care. Education enhances health literacy, which is vital for early detection and prevention. It also supports WSW in recognizing and changing cancer-related risk behaviors, contributing to long-term reductions in gynecological cancer incidence.

This pilot study aimed to investigate the effect of gynecological cancer education provided to WSW on their awareness of gynecological cancers and their healthy lifestyle behaviors.

METHODS

This quasi-experimental study with a single group pre-

test and post-test design was conducted in a western metropolitan province of Turkey due to the ease of access to several LGBT+ related non-governmental organizations (NGO) within the province. The study was conducted in collaboration with an NGO for LGBT+ individuals between June-December 2019. Since WSW, as a disadvantaged population, face constant scrutiny and homophobia in Turkey; recruitments for studies can be a challenge. Therefore, snowball method was selected for its ease of reach within a specific community. Before the study, written approval was obtained from the LGBT+ NGO. Ethical approval was obtained from the local non-interventional clinical trials ethics committee (decision number: 2019/0936-GOA). After explaining the purpose of the study to the participants, informed consent was obtained from the individuals who agreed to participate in the study.

Participants

The sample size of the study was calculated as 27 WSW in accordance with the unknown sample characteristics, using the G*Power 3.1.9.2 program [effect size: 0.5, Type I error (α, significance level): 0.05, Type II error: 0.20 (80% power)]. Since there was no similar study conducted with the same design and sample, the effect size was accepted as an average value of 0.5[24]. Forty-one women who were recruited via snowball in collobaration with the NGO met the inclusion criteria (volunteering to participate in the study, being able to speak and understand Turkish, being 18 years of age or older, identifying as women who have sex with women, being assigned female at birth and being cisgender) and were invited to the study. According to the exclusion criteria of the study, nine women were excluded from the sample (having a history of gynecological cancer, being diagnosed with any type of gynecological cancer, and having a family history of cancer). This study was conducted with thirty-two WSW. In the power analysis made after the study, sufficient statistical power was reached at the rate of 99%.

Measures

In the study, the Personal Information Form, the Gynecological Cancer Awareness Scale (GCAS), and Healthy Lifestyle Behaviors Scale (HLSBS) were used.

Gynecological cancer awareness scale (GCAS): This scale was developed by Dal and Ertem[25] in Turkey to determine women's awareness of gynecological cancers[25]. The scale evaluates knowledge and awareness related to routine screening programs, symptoms and risk factors of gynecological cancers, and the significance of cancer prevention and early diagnosis. It consists of 41 items rated on a five-point Likert scale. The total score ranges from 41 to 205, with higher scores indicating greater awareness of gynecological cancers. In the current study, the Cronbach's alpha coefficient for the GCAS was 0.90, demonstrating high internal consistency.

Healthy lifestyle behaviors scale (HLSBS): The HLSBS was adapted into Turkish by Bahar et al.[26] to assess individuals' healthy lifestyle behaviors and habits. The scale includes 52 items rated on a four-point Likert scale. The minimum and maximum total scores are 52 and 208, respectively. Higher scores reflect more positive healthy lifestyle behaviors. Additionally, increases in the subscale scores indicate improvements in specific dimensions of healthy living. In this study, the Cronbach's alpha for the HLSBS was 0.89, indicating good internal reliability.

Intervention

Participants were recruited through announcements posted on the collaborating LGBT+ NGO's social media accounts. Educational sessions were conducted face-to-face at the NGO office to ensure a safe and inclusive environment. Thirty-two participants were randomly assigned to five small groups (5-6 participants) and attended a single educational intervention consisting of two 60-minute sessions separated by a 15-minute break. They were asked to fill in the Personal Information Form, GCAS and HLSBS before the education began and allocated 20 minutes for completing the forms. At the end of the session, booklet(s) on the same subject was distributed. In the following first and third months, participants were sent online GCAS and HLSBS forms. The online forms prepared by the researchers with Google Forms were sent to the participants via e-mail (Figure 1).

The curriculum was developed by the researchers based on current literature regarding gynecological cancer prevention and health risks among WSW. The curriculum included five key concepts: (1) female reproductive anatomy and physiology, (2) menstrual health, (3) gynecological cancers and warning symptoms, (4) WSW-specific risk factors and barriers to healthcare access, and (5) cancer prevention and healthy lifestyle behaviors. The primary learning objectives were to increase participants' awareness of gynecological cancer risk factors and symptoms, promote participation in screening programs, and encourage adoption of preventive health behaviors.

The intervention follows a health-promotion-oriented approach combining didactic teaching, interactive discussion, and question-and-answer sessions to facilitate engagement and contextual learning. The sessions were delivered by the researchers, who have professional backgrounds in nursing and women's health. To enhance cultural appropriateness, the curriculum content and language were reviewed with representatives of the collaborating NGO prior to implementation. To support intervention fidelity and reproducibility, standardized educational materials, including a structured presentation and an educational booklet, were used across all groups. Participants completed baseline questionnaires before the intervention, and follow-up assessments were conducted online at one and three months. Monthly reminder messages were also sent to reinforce the educational content (Figure 1).

Since the study was conducted via a single-group pretest-posttest quasi-experimental design, threats to internal validity were considered. Selection bias was minimized by applying predefined inclusion and exclusion criteria during participant recruitment. History effects were minimized by keeping the total duration of the study within a relatively short timeframe and by regular contact with the participants through monthly reminders. Maturation effects were considered unlikely with the brief follow up period. In order to minimize testing effect, the same instruments were used and the participants were not provided with feedback regarding their previous responses.Ethical approval was obtained from the Non-Interventional Research Ethics Committee of Dokuz Eylül University (decision number: 2019/0936-GOA) and performed in accordance with the principles of the Declaration of Helsinki. After explaining the purpose of the study to the participants, informed consent was obtained from the individuals who agreed to participate in the study.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (mean, standard deviation, frequency, and percentage) were calculated for participant characteristics and study variables. Normality of continuous variables was evaluated using skewness-kurtosis values and normality tests.

Changes in continuous outcomes measured at three time points (baseline, 1 month, and 3 months) were analyzed using repeated-measures analysis of variance (ANOVA). Assumptions of normality and sphericity were examined prior to analysis. Sphericity was assessed using Mauchly's test, and when the assumption was violated, Greenhouse-Geisser corrections were applied. To reduce the risk of Type I error associated with multiple hypothesis testing, Bonferroni adjustments were applied during post-hoc comparisons. Effect sizes were reported as partial eta squared (η^2p) to estimate the magnitude of the intervention effect. Values of approximately 0.01, 0.06, and 0.14 were interpreted as small, medium, and large effects, respectively.

For categorical variables measured across repeated time points, Cochran's Q test was used. Pearson correlation analysis was performed to examine associations between continuous variables. Internal consistency of the scales and their subdimensions was evaluated using Cronbach's alpha coefficients. A p value <0.05 was considered statistically significant.

RESULTS

The study included 32 single women with a mean age of 25.75 years and 50% of them were employed. Furthermore, 65.6% of the participants self identified as bisexual and all of them reported being sexually active. The sociodemographic characteristics of the participatintg WSW are shown in Table 1.

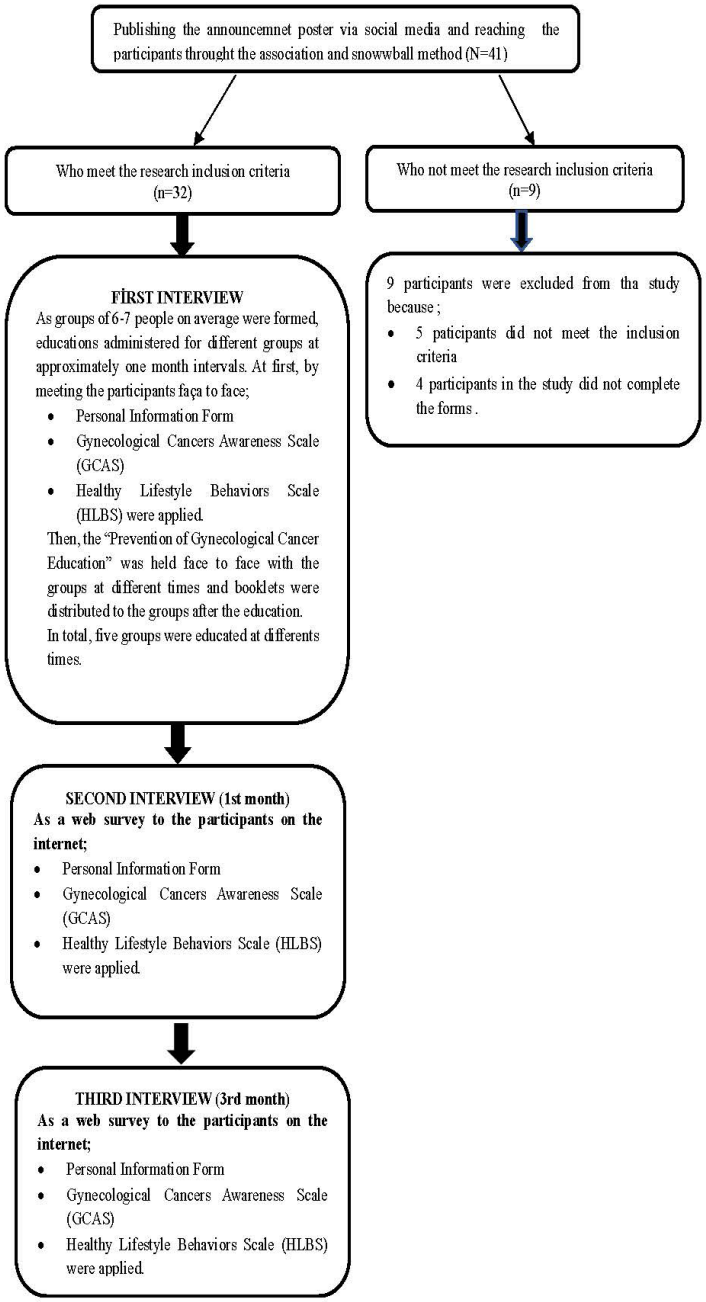


Figure 1. Flow diagram of the study

Table 1. The sociodemographic characteristics of WSW (N=32)

	n	(%)
Age		
≤ 25	13	(40.6)
> 25	19	(59.4)
Age (Mean±SD*)	25.75±5.31	
Educational status		
Highschool	7	(21.9)
Bachelor's degree or above	25	(78.1)
Marital status		
Single	32	(100.0)
Employment status		
Unemployed	16	(50.0)
Employed	16	(50.0)
Income perception		
Income equals expenses	32	(100.0)
Sexual orientation definition		
Lesbian	11	(34.4)
Bisexual	21	(65.6)
Sexually active		
Yes	32	(100.0)

N=32. *SD: Standard deviation, WSW: Sex with women

The sexual health behaviors of the WSW before and after education are shown in Table 2. Notably, the rates of self-vulvar examination (SVE) and the number of hygienic pads used during menstruation increased significantly across the follow-up periods ($p<0.001$). Attention to personal hygiene before and after sexual activities also showed a statistically significant improvement ($p<0.05$).

Table 2. Sexual health behaviors of WSW before and after education (N=32)

	Pre-education[1]		Post-education (1st Month)[2]		Post-education (3rd Month)[3]		Test value**	p*	Post-hoc
	n	(%)	n	(%)	n	(%)			
Attention to personal hygiene before/after sexual activities									
Yes	28	(87.5)	28	(87.5)	30	(93.8)	6.50	0.039	3 > 1
No	4	(12.5)	4	(12.5)	2	(6.2)			3 > 2
Self-vulvar examination behavior									
Yes	7	(21.9)	24	(75.0)	27	(84.4)	33.22	<0.001	2 > 1
No	25	(78.1)	8	(25)	5	(15.6)			3 > 1
Condom use during sexual activities									
Yes	12	(38.7)	14	(45.2)	16	(50.0)	1.00	0.607	-
No	19	(61.3)	17	(54.8)	16	(50.0)			
No response	1	(3.1)	1	(3.1)	0	(0.0)			

Table 2. Continued									
Sex toy usage									
Yes	7	(21.9)	9	(28.1)	10	(31.3)	1.75	0.417	-
No	25	(78.1)	23	(71.9)	22	(68.7)			
Sex toy cleaning[a]									
Yes	7	(100.0)	9	(100.0)	10	(100.0)	-	-	-
Number of hygienic pads usage during menstruation									
6 and more	12	(37.5)	22	(68.8)	24	(75.0)	16.53	<0.001	2 > 1
5 and less	20	(62.5)	10	(31.2)	8	(25.0)			3 > 1

*Significant (p<0.05) **Cochran's Q Test. Denominators may vary due to missing responses.

[a] Calculated only among participants who reported "Yes" to Sex Toy Usage (Pre-education n=7, 1st Month n=9, 3rd Month n=10).

Regarding health-seeking behaviors (Table 3), the educational intervention led to significant increases in the participants' willingness to engage with healthcare services. Post-education measurements revealed significantly higher rates of HIV testing behavior, Pap testing behavior (p <0.05), and general gynecological examination attendance (p <0.001).

Table 3. Health seeking behaviors of WSW before and after education (n=32)

	Pre-education[1]		**Post-education (1st Month)**[2]		**Post-education (3rd Month)**[3]		**Test value****	**p***	**Post-hoc**
	n	**(%)**	**n**	**(%)**	**n**	**(%)**			
HIV testing behavior									
Yes	10	(31.2)	20	(62.5)	26	(81.2)	11.14	0.004	3 > 2
No	22	(68.8)	12	(37.5)	6	(18.8)			
Pap testing behavior									
Yes	10	(31.2)	6	(18.8)	17	(53.1)	8.91	0.012	3 > 2
No	16	(50.0)	16	(50)	9	(28.1)			
No response	6	(18.8)	10	(31.2)	6	(18.8)			
Gynecological examination behavior									
Yes	12	(37.5)	12	(37.5)	23	(71.9)	16.13	<0.001	3 > 1
No	20	(62.5)	20	(62.5)	9	(28.1)			3 > 2

*Significant (p<0.05) **Cochran's Q Test. Denominators may vary due to missing responses

The total and sub-dimension mean scores obtained by the WSW before and after education are shown in Table 4. The mean GCAS total score increased from 143.25±16.40 at baseline to 177.03±17.40 at 1 month and 180.84±19.35 at 3 months following the intervention. Repeated-measures ANOVA indicated a statistically significant difference across time points (F=53.647, p<0.001). The effect size was large (partial η^2=0.634), suggesting that the educational intervention had a substantial impact on improving participants' awareness of gynecological cancers. Similar significant improvements were observed across all GCAS subdimensions. The GCAS scores of participants, which increased steadily from pre-education to the third-month post-education, indicating a substantial improvement in gynecological cancer awareness following the educational intervention.

Table 4. Gynecological Cancer Awareness Scale total and sub-dimension mean scores of WSW before and after education (N=32)

Scores	Mean	SD	F	p*	Partial Eta Squared	Post-hoc Bonferroni
GCAS total score						
Pre-education[1]	143.25	16.40	53.64	<0.001	0.63	1<2,3
Post-education 1st Month[2]	177.03	17.40				
Post-education 3rd Month[3]	180.84	19.35				
Routine control and serious disease perception awareness in gynecological cancers						
Pre-education[1]	81.06	10.09	31.08	<0.001	0.50	1<2,3
Post-education 1st Month[2]	96.53	10.18				
Post-education 3rd Month[3]	97.34	9.98				
Gynecological cancer risks awareness						
Pre-education[1]	26.78	4.65	67.73	<0.001	0.69	1<2,3
Post-education 1st Month[2]	37.22	5.49				
Post-education 3rd Month[3]	39.00	6.82				
Gynecological cancer prevention awareness						
Pre-education[1]	18.44	5.17	33.45	<0.001	0.52	1<2,3
Post-education 1st Month[2]	24.44	3.67				
Post-education 3rd Month[3]	25.53	3.41				
Early diagnosis and information awareness in gynecological cancers						
Pre-education[1]	16.97	2.02	21.16	<0.001	0.41	1<2,3
Post-education 1st Month[2]	18.84	1.39				
Post-education 3rd Month[3]	18.97	1.62				

F: repeated measures ANOVA; SD: Standard deviation. *Significant (p<0.05)

The distribution of the mean score the participants obtained from the overall HLSBS and its sub-dimensions before and after the education are shown in Table 5. Participants' scores exhibited a significant increase from 125.84 before the education to 139.44 at the third month (p <0.001, Partial Eta Squared=0.226) Repeated-measures ANOVA showed a statistically significant change across time points (F=9.063, p <0.001). The effect size was large (partial η^2=0.226), indicating that approximately 22.6% of the variance in healthy lifestyle behavior scores was attributable to the educational intervention. These findings suggest that the intervention produced a meaningful improvement in participants' health-promoting lifestyle behaviors. Significant enhancements were recorded in most HLSBS sub-dimensions, including health responsibility, physical activity, nutrition, mental development, and stress management (p<0.05). Only the interpersonal relationships sub-dimension did not show a statistically significant change.

Table 5. Healthy Lifestyle Behavior-II Scale total and sub-dimension mean scores of WSW before and after education (N=32)

Scores	Mean	SD	F	p*	Partial eta squared	Post-hoc Bonferroni
HLSBS total score						
Pre-education[1]	125.84	16.62	9.06	<0.001	0.23	1<2,3
Post-education 1st Month[2]	141.75	22.97				
Post-education 3rd Month[3]	139.44	22.14				

Table 5. Continued

Health responsibility						
Pre-education[1]	20.59	3.95	12.06	<0.001	0.28	1<2,3
Post-education 1st Month[2]	23.72	5.06				
Post-education 3rd Month[3]	23.97	5.24				
Physical activity						
Pre-education[1]	15.56	5.47	7.60	<0.001	0.19	1<2,3
Post-education 1st Month[2]	19.12	5.66				
Post-education 3rd Month[3]	18.16	5.30				
Nutrition						
Pre-education[1]	20.53	4.42	6.39	0.003	0.17	1<2
Post-education 1st Month[2]	23.22	4.42				
Post-education 3rd Month[3]	22.38	3.72				
Mental development						
Pre-education[1]	24.37	3.78	4.61	0.014	0.13	1<2
Post-education 1st Month[2]	26.78	4.70				
Post-education 3rd Month[3]	26.09	4.88				
Interpersonal relationships						
Pre-education[1]	26.31	3.71	2.30	0.124	-	-
Post-education 1st Month[2]	27.75	4.49				
Post-education 3rd Month[3]	27.63	4.29				
Stress management						
Pre-education[1]	18.47	3.29	6.91	0.002	0.18	1<2,3
Post-education 1st Month[2]	21.16	4.73				
Post-education 3rd Month[3]	21.22	4.74				

F: repeated measures ANOVA; SD: Standard deviation. *Significant (p<0.05)

As shown in Table 6, no significant correlation was present before the education. A positive, moderate, and statistically significant relationship was found between the mean scores the WSW obtained from the overall GCAS and HLSBS in the first and third months after the education, and as the level of awareness of gynecological cancers increased, an improvement was observed in their healthy lifestyle behaviors (p<0.05).

Table 6. Relationship between Gynecological Cancer Awareness Scale and Healthy Lifestyle Behaviors Scale scores in WSW before and after education (N=32)

	HLSBS total score (Pre-education)		**HLSBS total score (Post-education 1st month)**		**HLSBS total score (Post-education 3rd month)**	
	r	**p***	**r**	**p***	r	**p***
GCAS total score (Pre-education)	0.14	0.447	-	-	-	-
GCAS total score (Post-education 1st month)	-	-	0.48	0.006	-	-
GCAS total score (Post-education 3rd month)	-	-	-	-	0.47	0.007

r =correlation coefficient. *Significant (p<0.05), HLSBS: Healthy Lifestyle Behaviors Scale, GCAS: Gynecological Cancer Awareness Scale

DISCUSSION

Following education, the participants' gynecological cancer awareness level scores increased steadily. There were also improvements observed in their health responsibility, physical activity, nutrition, spiritual development and stress management behaviors. A significant correlation was found between the gynecological cancer awareness levels of WSWs and their development of healthy lifestyle behaviors.

The gynecological cancer awareness level of the participants prior to the education was lower compared to the results of the other two studies in which the same scale was used[25,27]. This difference might be attributed to the fact that this study sample consisted of WSW. While there is no biological or physiological difference between WSW and heterosexual women, intergroup differences can be attributed to minority stress, socioeconomic inequalities, and a range of healthy lifestyle behaviors[28,29]. The lack of accessibility for WSW to quality health care services and bespoke education may explain the low pre-education level of gynecological cancer awareness of these women compared to heterosexual women.

WSW are known to experience health inequalities in health care settings and have some unhealthy lifestyle behaviors[22]. Due to discrimination, WSW prefer delaying or refraining altogether from healthcare services, which reduces the possibility of early diagnosis and treatment options. Therefore, the morbidity/mortality rates are higher in WSW.10 Consequently, health education and consultancy services specially prepared for WSW assume particular importance. To reduce the risk of gynecological cancers in this population, they should be encouraged to receive HPV vaccination, join screening programs at regular intervals, seek timely medical care, and to report any genetic predisposition to their healthcare professional. In addition, promoting safer sexual practices such as use of barrier methods, to reduce the risk of STIs is essential.

A number of risk factors that finds more prevalence among WSW such as; lack of contraceptive/barrier method use, frequent sexual partner changes, improper genital and menstrual hygiene habits, widespread and shared sex toy usage without proper cleaning, these also affect their sexual and reproductive health[16,19,20]. While these risk factors can be minimized, it is important to highlight the sexual and reproductive health needs of WSW because of the group's increased burden of mortality and morbidity due to their aversion to presenting to health services with a fear of discrimination. Power et al.[30] found that, the participants presumed that the sexual health materials provided for "all women" were not intended for WSW's sexual health. It can be suggested the development of materials specific to WSW's sexual health in order to improve their sexual health behaviors. In this study, it was observed that with the education provided to WSW, there was an improvement in the behavior of paying attention to personal hygiene in sexual relations and performing SVE, and an increase in the number of hygienic pads they use during menstruation.

Due to a lack of domestic research into healthy lifestyle behaviors focused on WSW, their healthy lifestyle behaviors were compared with other recent studies using the same scale investigating Turkish women. Pre-Intervention healthy lifestyle behaviors of WSW are consistent with the results from the aforementioned study[31]. Considering the factors such as minority stress, homophobia and other disadvantages WSW face in everyday life, it is pleasing that the healthy lifestyle behaviors of WSW were similar to other women in Turkey, because they are expected to be weaker.

In the first and third months after intervention significant improvements were observed in participants' healthy life style behaviors such as health responsibility, physical activity, nutrition, spiritual development and stress management. The increase observed in the participants' healthy lifestyle behaviors may not directly protect them from gynecological cancers; however, it can be interpreted as potentially leading to a reduction in risky lifestyle behaviors associated with cancer.

Prior to the education, participants were less likely to display health responsibility behavior compared to their peers in Turkey[31]. Studies show that even when WSW experience health issues, they may refrain from getting proper treatment for the fear of being exposed to homophobia[32,33]. This phenomenon is more profound for LGBT migrants. A Qualitative Meta-

Synthesis found that most LGBT migrants prefer not to discuss any health issues with their doctors for fear of being exposed, mistreated and/or stigmatized. Expanding LGBT-friendly health services is of crucial importance[34]. Therefore, it is important for health professionals to foster judgement free environments, thereby promoting health responsibility in all minority populations.

Prior to the education the WSW's physical activity behaviors were consistent with other women in Turkey. 31 WSW who regularly do physical activities are more likely to be able to cope with stress and obesity more effectively[21,28]. The WSW's pre-education nutrition behaviors were similar to other women in Turkey[31]. WSW also suffer from eating disorders as well as more frequent weight problems, which is usually attributed to minority stress[35]. In another education-based study on WSW, it was observed that the eating habits of the participants improved[21]. Therefore, educational programs aimed at promoting physical activity as well as nutritional habits among WSW developed by public healthcare institutions gain particular importance, especially in Turkey.

Prior to the education, the WSW's spiritual development and stress management behaviors were poorer than other women in Turkey[31]. After education, the WSW's spiritual development and stress management behaviors improved significantly. Homophobia and minority stress faced by WSW leads to a more stressful life[18]. Therefore, it is expected for WSW to have poorer mental and spiritual development and stress coping mechanisms prior to education in this study. Following education, participants reported elevated stress management skills, lower substance usage, which are contributing factors in reducing risk for gynecological cancer development.

Some studies highlight the lack of participation in health screening programs by WSW, as this population usually does not possess sufficient information about said programs. In this study, screening behavior of participants were low before the education, with an increase following education. Counseling on health screening behaviors can be provided to WSW by primary healthcare services. Thus, the rate of WSW benefiting from screening programs can be increased. In the results of the study of Hutchcraft et al.[36] conducted with cancer survivors, it was reported that WSW compared to heterosexual women, had fair/poor health conditions, chronic obstructive pulmonary disease, severe psychological distress, heart conditions, and food insecurity. In the results, the rate of using tobacco products was higher and the rate of participation in the screening programs was lower in WSW, compared to heterosexual women. Therefore, it is important for WSW to increase their cancer awareness, adopt healthy lifestyle behaviors and turn these positive behaviors into habits. The results identify the need to build education programs tailored to WSW, to promote healthy life style behaviors and increase gynecological cancer awareness. Gynecological cancer prevention education positively affects these women's gynecological cancer awareness.

This study has several important limitations that should be considered when interpreting the findings. First, the absence of a control group limits the ability to attribute the observed improvements solely to the educational intervention. Without a control group, it is not possible to fully rule out alternative explanations such as temporal effects, participant reactivity, or external influences. Second, the relatively small sample size restricts the statistical power and may increase the risk of Type II error, while also limiting the robustness and stability of the findings. Small samples may not adequately capture the variability within the broader population of WSW, thereby reducing confidence in the generalizability of the results. Third, the use of snowball sampling, although practical for reaching a hard-to-access and potentially stigmatized population, introduces a risk of selection bias. Participants recruited through social networks may share similar sociodemographic and behavioral characteristics, such as being more educated, urban, or socially connected. This homogeneity may further limit the external validity and generalizability of the findings to the wider WSW population. Previous literature has highlighted that non-probability sampling methods, including snowball sampling, may compromise representativeness and should therefore be interpreted with caution[37-40]. Taken together, these methodological limitations suggest that while the findings provide valuable preliminary insights, they

should be interpreted as exploratory. Future research should prioritize larger, more diverse samples and controlled study designs to enhance the validity and applicability of the results.

CONCLUSION

Following education, participants' awareness of gynecological cancers increased and their healthy lifestyle behaviors improved. Participants' health responsibility behaviors, physical activity behaviors, nutrition behaviors, spiritual development behaviors, and stress management were also improved compared to their pre-education levels. A significant positive improvement was also observed with health seeking behaviors (HIV testing, pap smear testing and gynecological examination) as well as sexual health behaviors (attention to personal hygiene during sexual intercourse, vulva self-examination and menstrual hygiene).

Our findings demonstrate that strategies aimed at improving the health behaviors of a socially marginalized and underserved population can be effective. In this context, the data provide a valuable basis for informing health policies that seek to make community-based health education and preventive services more inclusive. The increased awareness and positive behavioral changes observed following the educational intervention may contribute, in the long term, to higher rates of participation in screening programs and self examination, leading to more early diagnosis and in turn a possible reduction in the incidence of gynecologic cancers. It is essential for nurse educators and public health nurses to engage directly with LGBTQ communities to address a wide range of health needs. Within this context, women who have sex with women represent a population that faces significant disparities in accessing qualified health counseling. Expanding cancer prevention education interventions at the level of primary healthcare in a universal and inclusive manner for WSW, and actively supporting their participation in such programs, is of critical importance.

Author Contributions: Concept and design: M.B., D.B., Data collection: M.B., D.B., Analysis and interpretation of data: M.B., D.B., Drafting the manuscript: M.B., D.B., Critical revision of the article: M.B., D.B., Final approval the article: M.B., D.B.

Ethical Declaration: Ethical approval was obtained from the Non-Interventional Research Ethics Committee of Dokuz Eylül University (decision number: 2019/0936-GOA) and performed in accordance with the principles of the Declaration of Helsinki. After explaining the purpose of the study to the participants, informed consent was obtained from the individuals who agreed to participate in the study.

Conflict of Interest: The authors declare no conflict of interest.

Financial Support: The authors declare that there is no monetary or financial support received for this article.

REFERENCES

1. Power R, Ussher JM, Allison K, Hawkey A, Perz J, Out with Cancer Study Team. A sweating moment": Impact of disclosure in cancer care on LGBTQI patient satisfaction. Journal of Cancer Survivorship. 2024; Sep 21. https://doi.org/10.1007/s11764-024-01677-1
2. Jackson SS, Patel S, Parker K. Cancer disparities among sexual and gender minority populations. Journal of the National Medical Association. 2023;115(2S):32-7.
3. Compton ML, Taylor SS, Weeks AG, Weiss VL, Hogan MM, Wang H, Ely KA. Cytology and LGBT+ health: Establishing inclusive cancer screening programs. Journal of the American Society of Cytopathology. 2022;11(5):241-52.
4. American Cancer Society. Cancer Facts & Figures 2024. Available at: https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/2024-cancer-facts-figures.html Accessed March 25, 2024.
5. Haviland KS, Swette S, Kelechi T, Mueller M. Barriers and facilitators to cancer screening among LGBTQ individuals with cancer. Oncology Nursing Forum. 2020;47(1):44-55.
6. Acheampong T, Jiang L, Ziogas A, Odegaard AO. Multi-systemic biological risk and cancer mortality: The NHANES III study. Scientific Reports. 2020;10(1):5047.

7. Flentje A, Heck NC, Brennan JM, Meyer IH. The relationship between minority stress and biological outcomes: A systematic review. Journal of Behavioral Medicine. 2020; 43(5):673-94.
8. Moore JX, Andrzejak SE, Casanova T, Langston ME, Estvold S, Adsul P. Investigating the joint effect of allostatic load among lesbian, gay, and bisexual adults with risk of cancer mortality. Int J Environ Res Public Health. 2023;20(12):6120.
9. U.S. Department of Health and Human Services. Healthy People 2030: LGBT. Available at: https://health.gov/healthypeople/objectives-and-data/browse-objectives/lgbt Accessed December 8, 2023.
10. Squires LR, Bilash T, Kamen CS, Garland SN. Psychosocial needs and experiences of transgender and gender diverse people with cancer: A scoping review and recommendations for improved research and care. LGBT Health, 2022;9(1):8-17.
11. Centers for Disease Control and Prevention (CDC). Lesbian, gay, bisexual, and transgender health: Lesbian and bisexual women. Available at: https://www.cdc.gov/lgbthealth/women.htm Accessed April 24, 2022.
12. UpToDate. 2023. Sexual and gender minority women (lesbian, gay, bisexual, transgender, plus): Medical and reproductive care. Available at: https://www.uptodate.com/contents/sexual-and-gender-minority-women-lesbian-gay-bisexual-transgender-plus-medical-and-reproductive-care/ Accessed March 5, 2023.
13. National LGBT Cancer Network. 2021 Annual report. Available at: https://cancer-network.org/2021/ Accessed March 5,2023.
14. Zachry CE, O'Brien RP, Clark KA, Ding ML, Blosnich JR. Mortality among sexual and gender minority populations: A systematic review. PLOS ONE 2025;20(2):e0307688.
15. Hald GM, Pavan S, Øverup CS. Do sex toys make me satisfied? The use of sex toys in Denmark, Norway, Sweden, Finland, France, and the UK. J Sex Res 2025;62(5):735-49.
16. Wood J, Crann S, Cunningham S, Money D, O'Doherty K. A cross-sectional survey of sex toy use, characteristics of sex toy use hygiene behaviors, and vulvovaginal health outcomes in Canada. The Canadian Journal of Human Sexuality 2017;26(3):196-204.
17. Kowalczyk R, Nowosielski K. Impact of social factors and sexual behaviors on the knowledge of sexually transmitted infections among women who have sex with women/women who have sex with women and men. International Journal of STD & AIDS 2019;30(2):163-72.
18. Parenti ABH, Ignácio MAO, Buesso TS, Almeida MAS, Lima Parada CMG, Duarte MTC. Knowledge of women who have sex with women about sexually transmitted infections and AIDS. Cien Saude Colet. 2023;28(1):303.
19. Kara Y. Implications of a qualitative study: Being LGBTQ+ in Turkey. Pamukkale Univ J Soc Sci Inst. 2022; 52:399-415.
20. Duman NB, Yıldırım F. Gynecological and breast cancer risk factors and screenings in lesbian and bisexual women. Univ Med. 2022;41(2):184-93.
21. Griggs J, Maingi S, Blinder V, Denduluri N, Khorana AA, Norton L, Francisco M, Wollins DS, Rowland JH. American Society of Clinical Oncology position statement: Strategies for reducing cancer health disparities among sexual and gender minority populations. Journal of Clinical Oncology. 2017;35(19):2203-8.
22. Lewis RJ, Ehlke SJ, Shappie AT, Braitmant AL, Heron KE. Health disparities among exclusively lesbian, mostly lesbian, and bisexual young women. LGBT Health. 2019;6(8):400-8.
23. Eliason MJ. Doing it for ourselves: Building communities for health education and support for older lesbian/bisexual women. Journal of Gay & Lesbian Social Services. 2015;27(3):326-49.
24. Hayran O, Özbek H, editors. Research and statistical analysis in health sciences. Istanbul: Nobel Tıp Kitabevleri; 2019.
25. Dal NA, Ertem G. Gynecological cancer awareness scale development study. J Human Soc Sci Res. 2017;6(5):2351-67.
26. Bahar Z, Beşer A, Gördes N, Ersin F, Kıssal A. Healthy lifestyle behavior scale II: A reliability and validity study. Cumhuriyet Univ Sch Nurs J. 2008;12(1):1-13.
27. Gözüyeşil E, Düzgün AA, Taş F. Evaluation of gynecological cancer awareness of women applying to a family health center. Turk J Fam Med Prim Care. 2020;14(2):177-85.
28. Kralik N. Health risk behaviors in the gender and sexual minority population. In: Smalley KB, Warren JC, Barefoot KN, editors. LGBT health: Meeting the needs of gender and sexual minorities. Springer Publishing; 2018. p. 27-42.
29. McClain Z, Thomas R, Yehia BR. Sociocultural and systemic barriers to health for gender and sexual minority populations. In: Smalley KB, Warren JC, Barefoot KN, editors. LGBT health: Meeting the needs of gender and sexual minorities.

Springer Publishing; 2018. p. 15-26.

30. Power J, McNair R, Carr S. Absent sexual scripts: Lesbian and bisexual women's knowledge, attitudes, and action regarding safer sex and sexual health information. Cult Health Sex. 2009;11(1):67-81.
31. Dönmez A, Saydam BK. The effect of planned training aiming to prevent cervical cancer in women with HPV positive on health lifestyle behaviors. J Midwifery Health Sci. 2019;2(3):81-7.
32. Rahman M, Fikslin RA, Matthews E, Vazquez Sanchez MA, Ahn GO, Kobrak PH, Lovinger ES, Golup SA. Exploring factors affecting patient-provider interactions and healthcare engagement among a diverse sample of women who have sex with women in New York City. Arch Sex Behav. 2023;52(2):833-49.
33. Ellis SJ. Are women-who-have-sex-with-women an 'at-risk' group for cervical cancer? An exploratory study of women in Aotearoa New Zealand. Sex Health. 2024;21(1). https://doi.org/10.1071/SH23145
34. Gottvall M, Péter-Szabó O, Isaac R, Aav C, Norgren E, Carlsson T. Sexual and gender minority migrants' experiences of health service access and utilisation: A qualitative meta-synthesis. J Clin Nurs. 2025. Advance online publication. https://doi.org/10.1111/jocn.17683
35. Ferrero EM, Yunker AG, Cuffe S, Gautam S, Mendoza K, Bhupathiraju SN, Mattei J. Nutrition and Health in the Lesbian, Gay, Bisexual, Transgender, Queer/Questioning Community: A Narrative Review. Adv Nutr. 2023;14(6):1297-306.
36. Hutchcraft ML, Teferra AA, Montemorano L, Patterson JG. Differences in health-related quality of life and health behaviors among lesbian, bisexual, and heterosexual women surviving cancer from the 2013 to 2018 National Health Interview Survey. LGBT Health. 2021;8(1):68-78.
37. Polit DF, Beck CT. Nursing Research: Generating and Assessing Evidence for Nursing Practice 11th Edition. Lippincott Williams & Wilkins; 2021.
38. Atkinson R, Flint J. Accessing hidden and hard-to-reach populations: Snowball research strategies. Social Res Update. 2001; 33.
39. Button KS, Ioannidis JP, Mokrysz C, Nosek BA, Flint J, Robinson ES, Munafò MR. Power failure: why small sample size undermines the reliability of neuroscience. Nat Rev Neurosci. 2013 May;14(5):365-76.
40. Shadish WR, Cook TD, Campbell DT. Experimental and quasi-experimental designs for generalized causal inference. Boston: Houghton Mifflin; 2002.