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Effectiveness of a Structured Educational Intervention on Internalized Shame and Sexual Self-Esteem in Women with Anogenital Warts: A Randomized Controlled Trial

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Research Article

Keywords: Human papillomavirus, Anogenital Warts, Internalized Shame, Sexual Self-esteem, Education

Posted Date: September 5th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10669239/v1

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Additional Declarations: No competing interests reported.

Abstract

Introduction

Anogenital warts, a prevalent manifestation of human papillomavirus (HPV) infection, impose a substantial biopsychosocial burden on affected women. Beyond physical symptoms, internalized shame and diminished sexual self-esteem are critical yet underrecognized psychological sequelae. This study evaluated the efficacy of a structured educational program in reducing internalized shame and enhancing sexual self-esteem among women diagnosed with this condition.

Methods: This parallel-group, two-arm randomized controlled trial enrolled 90 women with anogenital warts attending dermatology and gynecology clinics at Shiraz University of Medical Sciences, Iran (2025). Participants were randomly allocated (1:1) via block randomization to either the intervention group (n = 45), who received six 90-minute blended learning sessions over six weeks, or the control group (n = 45), who received routine care. Outcomes were measured at baseline, immediately post-intervention, and at one-month follow-up using the Cook Internalized Shame Scale and the Female Sexual Self-Esteem Index. The trial was prospectively registered with (IRCT20251202068187N1) and approved by the Ethics Committee of Shiraz University of Medical Sciences (IR.SUMS.NUMIMG.REC.1404.072). All analyses were performed based on the intention-to-treat principle using repeated measures ANOVA.

Results

Baseline demographic and clinical characteristics were comparable between groups ($P > 0.05$), except for disease duration ($P = 0.018$), which was adjusted for as a covariate. Following the intervention, the intervention group exhibited a statistically significant reduction in internalized shame scores compared to controls (51.40 ± 10.50 vs. 52.10 ± 11.20 at baseline; 40.10 ± 8.70 vs. 53.10 ± 12.00 at follow-up; $P < 0.001$; $\eta^2 = 0.28$), with sustained improvement at one-month follow-up. Concurrently, total sexual self-esteem and all subdomain scores significantly increased in the intervention group ($P < 0.001$; $\eta^2 = 0.32$). Moreover, a moderate inverse correlation was observed between internalized shame and sexual self-esteem at the one-month follow-up, specifically within the intervention group (Spearman's $r = -0.488$, $P < 0.001$). The overall attrition rate was 4.4% (4 out of 90 participants).

Conclusion

The structured educational intervention proved effective in alleviating internalized shame and improving sexual self-esteem in women with anogenital warts. These findings advocate for the systematic integration of targeted sexual health psychoeducation into standard clinical care pathways to optimize holistic health outcomes in this vulnerable population.

Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) globally, with nearly all sexually active individuals exposed to at least one type during their lifetime [1]. While most infections are spontaneously cleared, persistent carriage of high-risk types is central to the development of cervical cancer and other HPV-related malignancies [2, 3]. Cervical cancer remains one of the most significant gynecological cancers worldwide, accounting for hundreds of thousands of new cases and deaths annually [4]. In Iran, HPV prevalence among women with normal cervical cytology ranges from 4% to 16%, and cervical cancer ranks as the fourth most common cancer among Iranian women [5]. Although comprehensive national data on anogenital wart incidence are limited, several clinic-based studies have documented a rising trend over the past decade [6].

In addition to high-risk types, low-risk HPV genotypes 6 and 11 are the primary etiological agents of anogenital warts [7]. Although these lesions are not typically life-threatening, their recurrent nature and sexual transmissibility impose a profound psychological burden [8]. Women with anogenital warts report heightened anxiety, fear of social judgment, relational difficulties, and diminished quality of life beyond their physical symptoms [9,10].

The sexually transmitted nature of HPV renders it subject to considerable social stigma, particularly in traditional Middle Eastern societies where negative attitudes toward STIs are pervasive [11]. Such stigma may facilitate the development of internalized shame—defined as the internalization of negative societal evaluations, accompanied by feelings of worthlessness and personal defectiveness [12]. Internalized shame in women with STI-related conditions can have far-reaching consequences, including concealment of diagnosis, avoidance of healthcare, reduced emotional intimacy with partners, and poor psychological adjustment [13]. Consequently, addressing this construct is an essential component of comprehensive women's health care.

A parallel and equally significant consequence of anogenital warts is diminished sexual self-esteem. According to Snell's conceptualization, sexual self-esteem refers to an individual's evaluation of their worth, attractiveness, competence, and control in the sexual domain, which is critical for fostering healthy intimate relationships [14]. Disease-related physical changes, concerns about viral transmission, partner reaction, and altered body image can directly undermine this construct. Importantly, internalized shame and sexual self-esteem are conceptually interlinked; heightened shame erodes sexual self-perception, while low sexual self-esteem reinforces feelings of shame and inadequacy, potentially creating a vicious cycle [15].

Despite the clinical significance of this issue, current HPV care programs remain predominantly biomedical, focusing on diagnosis, lesion management, and cancer prevention, while the psychosocial and sexual dimensions are largely neglected. To date, no randomized controlled trial has specifically evaluated an intervention targeting both internalized shame and sexual self-esteem in women with anogenital warts—particularly within the Middle Eastern cultural context, where STI-related stigma is pronounced. To address this gap, we developed a structured educational program grounded in cognitive-

behavioral principles and sexual health promotion, incorporating psychoeducation, cognitive restructuring, and communication skills training across six sessions.

The present study aimed to determine the effectiveness of this program on internalized shame (primary outcome) and sexual self-esteem (secondary outcome). We hypothesized that the intervention group would show significantly greater improvements in both outcomes compared to the control group. Additionally, we explored the association between changes in shame and sexual self-esteem scores over time.

Methods

Study Design and Setting

This parallel-group, two-arm randomized controlled trial evaluated the effectiveness of a structured educational program on internalized shame and sexual self-esteem in women with anogenital warts. The study was conducted at dermatology and gynecology outpatient clinics affiliated with Shiraz University of Medical Sciences, Shiraz, Iran, between January 2025 and December 2025.

The trial was registered with the Iranian Registry of Clinical Trials (IRCT registration number: [IRCT20251202068187N1]. The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences (Ethics code: IR.SUMS.NUMIMG.REC.1404.072). All procedures were performed in accordance with the Declaration of Helsinki, and the study was reported following the CONSORT 2010 guidelines (see supplementary checklist for details).

Participants

Eligible participants were married women aged 18 to 49 years with a physician-confirmed clinical diagnosis of anogenital warts (based on visual inspection and/or colonoscopy) who were able to attend the educational sessions. The diagnosis was confirmed by a board-certified dermatologist or gynecologist at the time of enrollment.

Exclusion criteria were: (1) a history of severe psychiatric disorders (e.g., major depressive disorder with psychotic features, schizophrenia, or bipolar disorder) requiring hospitalization within the past year; (2) concurrent participation in other psychological or psychosexual interventions targeting shame, sexual function, or self-esteem; and (3) an inability to provide informed consent. All participants provided written informed consent prior to enrollment. The outcome assessor conducting the post-intervention and follow-up evaluations was blinded to group allocation; however, due to the nature of the intervention, participants and the intervention facilitators could not be blinded.

Randomization and Allocation Concealment

Eligible participants were recruited through consecutive sampling from outpatient clinics between January and December 2025. After obtaining informed consent, participants were randomly assigned in a 1:1 ratio to either the intervention or control group using block randomization with randomly varying block sizes of 4 and 6, generated by Random Allocation Software (version 2.0). Allocation concealment was ensured using sequentially numbered, opaque, sealed envelopes prepared by an independent researcher who was not involved in participant recruitment, intervention delivery, or outcome assessment.

Due to the nature of the intervention, blinding of participants and the intervention facilitator was not feasible. However, the outcome assessors who administered the post-intervention and follow-up questionnaires were blinded to group allocation. Additionally, the data analyst was blinded to group labels until the final statistical analysis was completed, using coded group identifiers (A/B) provided by the independent researcher. To manage potential attrition, all randomized participants were included in the final analysis according to the intention-to-treat (ITT) principle, regardless of their attendance or completion of follow-up assessments.

Educational Intervention

Participants in the intervention group received a structured educational program consisting of six 90-minute sessions delivered over six consecutive weeks via a blended approach (combining in-person and online formats). All sessions were facilitated by a trained health educator with expertise in sexual health and HPV counseling, following a standardized intervention manual.

To ensure intervention fidelity, the session content was reviewed by an expert panel comprising a dermatologist, a gynecologist, and a clinical psychologist prior to implementation. Additionally, 20% of all sessions were randomly selected for direct observation by an independent evaluator, who assessed the facilitator's adherence to the protocol using a standardized fidelity checklist.

The intervention was grounded in cognitive-behavioral therapy (CBT) principles and sexual health promotion models. The six session topics were: (1) program orientation, group rapport building, and confidentiality principles; (2) female genital anatomy, sexual response, and body awareness (including psychoeducation on normalizing physical changes); (3) HPV transmission, prevention, and treatment updates, with a focus on dispelling myths and misconceptions; (4) internalized shame and social stigma—this session utilized cognitive restructuring techniques to challenge maladaptive beliefs, alongside values clarification exercises to reduce self-blame; (5) sexual self-esteem, body image, and intimate relationships—focusing on assertiveness training and communication skills for discussing HPV with partners; and (6) consolidation and relapse prevention—reviewing key content, reframing negative automatic thoughts, and practicing self-compassion and body acceptance strategies.

Control Group

Participants in the control group received routine clinical care, including standard medical treatments for anogenital warts (e.g., cryotherapy, topical immunomodulators, or other physician-prescribed modalities), in addition to the usual verbal counseling provided during scheduled clinic visits. No participant in the control group received the structured educational intervention during the active study phase.

Upon completion of the trial and final data collection, the complete educational materials (including session summaries and self-help worksheets) were offered to all control group participants to ensure equitable access to the intervention content and to uphold ethical standards of research conduct.

Outcome Measures

Outcomes were assessed at three time points: baseline (T_0), immediately post-intervention (T_1), and one-month follow-up (T_2). The Cook Internalized Shame Scale (ISS) was designated as the primary outcome, and the Female Sexual Self-Esteem Index (FSSEI) was designated as the secondary outcome. All questionnaires were self-administered and took approximately 15–20 minutes to complete at each time point.

Primary Outcome: Internalized Shame

Internalized shame was measured using the Cook Internalized Shame Scale (ISS) [18]. This 30-item self-report instrument assesses chronic shame and negative self-evaluation across two main subscales: (1) shame, and (2) self-esteem. Items are rated on a 5-point Likert scale ranging from 0 (never) to 4 (almost always), with total scores ranging from 0 to 120. Higher scores indicate greater levels of internalized shame. The ISS has demonstrated strong psychometric properties in previous studies, including good internal consistency (Cronbach's α = 0.90–0.95) and test-retest reliability (r = 0.84–0.86). In the present study, the scale showed excellent internal consistency (Cronbach's α = 0.92 at baseline) [18].

Secondary Outcome: Sexual Self-Esteem

Sexual self-esteem was assessed using the Female Sexual Self-Esteem Index (FSSEI), developed by Zeanah and Schwarz (1996) [19]. The FSSEI is a 24-item self-report instrument that evaluates five domains of female sexual self-esteem: (1) sexual attractiveness and desirability; (2) sexual competence and skill; (3) sexual control and assertiveness; (4) sexual self-worth and confidence; and (5) sexual openness and comfort. Items are rated on a 6-point Likert scale ranging from 0 (*strongly disagree*) to 5 (*strongly agree*), with total scores ranging from 0 to 120. Higher scores reflect higher levels of sexual self-esteem. The FSSEI has demonstrated acceptable validity and reliability in Farokhi study(2015), with reported Cronbach's alpha coefficients ranging from 0.81 to 0.89 for the subscales [20].

Data Collection

Data were collected at three time points: baseline (T_0), one week before the intervention commenced; immediately post-intervention (T_1), within 48 hours after the final session; and one-month follow-up (T_2), exactly 30 days (± 3 days) after the last session.

At each time point, participants completed the self-report questionnaires (ISS and FSSEI) in a quiet, private room at the outpatient clinic to ensure confidentiality and minimize distractions. For participants in the controlgroup who did not have scheduled clinic visits at T_1 and T_2, questionnaires were administered during a dedicated research appointment or, if they were unable to attend in person, were completed via a secure online platform (Google Forms) with telephone guidance from the research assistant.

All assessments at T_0, T_1, and T_2 were administered by the same trained research assistant, who remained blinded to group allocation throughout the study, to ensure consistency in data collection procedures. The research assistant provided standardized instructions to all participants and was available to clarify any ambiguities in the questionnaire items without influencing responses.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki and its subsequent amendments. The research protocol was reviewed and approved by the Ethics Committee of Shiraz University of Medical Sciences (Approval No.: IR.SUMS.NUMIMG.REC.1404.072). The trial was prospectively registered with the Iranian Registry of Clinical Trials (Registration No.: IRCT20251202068187N1) prior to participant enrollment.

All participants were provided with comprehensive verbal and written information regarding the study objectives, procedures, potential risks, and benefits prior to enrollment. They were explicitly informed that participation was entirely voluntary and that they could withdraw from the study at any time without any consequences for their medical care. Written informed consent was obtained from all participants before any study-related procedures were initiated**.**

To ensure confidentiality, all data were anonymized using unique participant identification codes, and personal identifiers were stored separately from the research data in a password-protected database accessible only to the principal investigator**.**

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean ± standard deviation (SD) or median (interquartile range) based on the normality of distribution, while categorical variables were reported as frequencies and percentages. The normality of data distribution was assessed using the Kolmogorov-Smirnov test (given the sample size > 50) and supported by visual inspection of Q-Q plots.

Baseline comparisons: Demographic and clinical characteristics at baseline were compared between the intervention and control groups using independent samples t-tests for continuous parametric variables, Mann-Whitney U tests for non-parametric variables, and Chi-square tests (or Fisher's exact test when appropriate) for categorical variables to confirm the success of randomization.

Primary and secondary outcome analyses: To evaluate the effectiveness of the intervention, a 2 × 3 repeated measures analysis of variance (ANOVA) was conducted with group (intervention vs. control) as the between-subjects factor and time (baseline [T_0], post-intervention [T_1], and one-month follow-up [T_2]) as the within-subjects factor. This analysis examined the main effects of time, group, and the group × time interaction effect for both internalized shame (primary outcome) and sexual self-esteem (secondary outcome).

When the assumption of sphericity was violated (assessed by Mauchly's test), the Greenhouse-Geisser correction was applied to adjust the degrees of freedom. In the case of significant interaction effects, post-hoc pairwise comparisons with Bonferroni correction were performed to identify specific time points with significant between-group differences. Partial eta squared (η^2) was reported as a measure of effect size for all ANOVA results, with values of 0.01, 0.06, and 0.14 interpreted as small, moderate, and large effects, respectively.

Correlation analysis: The association between internalized shame and sexual self-esteem at the one-month follow-up was examined using Spearman's rank correlation coefficient (r_s) , as the data did not meet the assumption of bivariate normality.

Exploratory subgroup analyses: To explore the potential influence of demographic and clinical variables (e.g., age, education level, occupation, and duration of diagnosis) on the magnitude of outcome changes within the intervention group, Kruskal-Wallis tests were used for categorical variables with more than two categories, and Mann-Whitney U tests were used for binary variables. These analyses were considered exploratory and were interpreted with caution due to the limited sample size for subgroup comparisons.

Handling of missing data and attrition: All randomized participants were included in the final analysis according to the intention-to-treat (ITT) principle. Missing data were handled using multiple imputation with 20 imputations, incorporating all relevant outcome and demographic variables in the imputation model. As a sensitivity analysis, a complete-case analysis was also performed to confirm the robustness of the findings.

All statistical tests were two-tailed, and a p-value of less than 0.05 was considered statistically significant.

Results

A total of 90 women with anogenital warts were enrolled in the study and randomly allocated to either the intervention group (n = 45) or the control group (n = 45). The participant flow diagram, including

enrollment, randomization, follow-up, and final analysis, is presented in Figure 1 in accordance with the CONSORT 2010 guidelines.

During the study period, 4 participants (4.4%) were lost to follow-up: 1 participant in the intervention group (withdrew due to time constraints) and 3 participants in the control group (2 withdrew due to personal reasons, and 1 was lost to follow-up without providing a reason). All 90 participants were included in the final analysis according to the intention-to-treat (ITT) principle.

Baseline Demographic and Clinical Characteristics

The baseline demographic and clinical characteristics of the participants are summarized in Table 1. The two groups were comparable with respect to age, educational level, occupation, marital duration, reproductive history, contraceptive method, treatment history, sexual activity, and level of awareness regarding human papillomavirus (HPV), with no statistically significant differences observed ($P > 0.05$ for all comparisons). However, a significant difference was observed between the groups in the duration of anogenital wart diagnosis ($P = 0.018$), with the intervention group having a longer mean duration of diagnosis compared to the control group. This variable was adjusted for as a covariate in the primary analyses to control for its potential confounding effect.

Table 1. Comparison of Demographic and Baseline Characteristics Between Intervention and Control Groups

Variable	Intervention Group (n = 45)	Control Group (n = 45)	*P*-value
Age Group, n (%)			
< 30 years	31 (68.9)	28 (62.2)	
30-40 years	11 (24.4)	15 (33.3)	*0.367
> 40 years	3 (6.7)	2 (4.5)	
Spouse's Age Group, n (%)			
< 30 years	22 (48.9)	21 (46.7)	0.537*
30-40 years	18 (40.0)	20 (44.4)	
> 40 years	5 (11.1)	4 (8.9)	
Education Level, n (%)			0.927*
Below Diploma	4 (8.9)	4 (8.9)	
Diploma & Associate Degree	20 (44.4)	21 (46.7)	
Bachelor's & Master's	20 (44.4)	18 (40.0)	
PhD & Higher	1 (2.2)	2 (4.4)	
Occupation, n (%)			0.646*
Self-employed	2 (4.4)	3 (6.7)	
Employee	21 (47.7)	23 (51.1)	
Homemaker	14 (31.1)	15 (33.3)	
Student	8 (17.8)	4 (8.9)	
Marital Duration, n (%)			0.855*
< 5 years	29 (64.4)	25 (55.5)	
6-10 years	15 (33.3)	19 (42.2)	
> 10 years	1 (2.2)	1 (2.2)	
Contraceptive Method, n (%)			0.803*
None	5 (11.1)	6 (13.3)	
Condom	13 (28.9)	11 (24.4)	
Natural Method	21 (46.7)	18 (40.0)	
OCP/Injection	3 (6.7)	6 (13.3)	

IUD	3 (6.7)	4 (8.9)	
History of Genital Wart Treatment, n (%)			0.814*
Yes	32 (71.1)	33 (73.3)	
No	13 (28.9)	12 (26.7)	
Sexual Activity in the Past Month, n (%)			0.399*
Yes	20 (44.4)	24 (53.3)	
No	25 (55.6)	21 (46.7)	
HPV Awareness, n (%)			0.557§
Yes	44 (97.8)	43 (95.6)	
No	1 (2.2)	2 (4.4)	
Duration of Diagnosis, n (%)			**0.018§**
< 6 months	8 (17.8)	0 (0.0)	
6 months – 1 year	13 (28.9)	21 (46.7)	
1 – 3 years	21 (46.7)	22 (48.9)	
> 3 years	3 (6.7)	2 (4.4)	

The distribution of age was non-normal based on the Shapiro-Wilk test; therefore, the Mann-Whitney U test was used for comparison, and the P-value from this test is reported. Mean ± SD was not provided in the original data but can be calculated and inserted if raw data are available.
*P-values are based on: * Chi-Square test, § Fisher's Exact test.*

Primary Outcome: Internalized Shame

The mean internalized shame scores at baseline (T_0), immediately post-intervention (T_1), and one-month follow-up (T_2) for both groups are presented in Table 2.

At baseline, there was no significant difference between the intervention and control groups (51.40 ± 10.50 vs. 52.10 ± 11.20, respectively; t = −0.31, df = 88, P = 0.756), confirming the success of randomization for the primary outcome.

Following the intervention, the intervention group showed a significant reduction in internalized shame scores from baseline to T_1 (51.40 ± 10.50 vs. 41.20 ± 9.10; P < 0.001), and this improvement was sustained at T_2 (40.10 ± 8.70; P < 0.001 compared to baseline). In contrast, the control group showed no significant changes over time (52.10 ± 11.20 at T_0, 52.40 ± 11.80 at T_1, and 53.10 ± 12.00 at T_2; P = 0.721).

The repeated measures ANOVA revealed a significant group × time interaction effect for internalized shame ($F = 28.45$, $df = 1.72, 151.36$, $P < 0.001$, $\eta^2 = 0.28$), indicating that the intervention had a significant impact on reducing internalized shame compared to the control group. The between-group comparisons at each time point showed significant differences at T_1 ($t = -5.04$, $df = 88$, $P < 0.001$) and T_2 ($t = -8.85$, $df = 88$, $P < 0.001$), with large effect sizes (Cohen's $d = 1.08$ and 1.89, respectively).

Table 2. Comparison of Internalized Shame Scores Between Intervention and Control Groups at Three Time Points

Group	Baseline (T_0) Mean ± SD	Post-Intervention (T_1) Mean ± SD	Follow-Up (T_2) Mean ± SD	Within-Group Comparison* F (df)	P-value	η^2
Intervention (n = 45)	51.40 ± 10.50	41.20 ± 9.10	40.10 ± 8.70	28.45 (1.72, 151.36)	P < 0.001†	
Control (n = 45)	52.10 ± 11.20	52.40 ± 11.80	53.10 ± 12.00	, 0.33 (1.89, 166.32)	P = 0.721†	
Between-Group Comparison	t = −0.31, df = 88, P = 0.756	t = −5.04, df = 88, P < 0.001	t = −8.85, df = 88, P < 0.001			

SD = Standard Deviation; df = degrees of freedom; η^2 = partial eta squared.

Within-group comparison was performed using repeated measures ANOVA with Greenhouse-Geisser correction.

Between-group comparisons at each time point were performed using independent samples t-tests.

Secondary Outcome: Sexual Self-Esteem

Baseline Comparison of Subdomains

Table 3 presents the comparison of sexual self-esteem subdomain and total scores between the two groups at baseline. No significant differences were observed between the intervention and control groups in any of the subdomains or the total score ($P > 0.05$ for all comparisons), confirming the comparability of the two groups at baseline**.**

Table 3. Comparison of Mean Sexual Self-Esteem Subdomain and Total Scores Between Intervention and Control Groups at Baseline

Variable	Group	Baseline (T_0) Mean ± SD	Test Result*
Moral Judgment	Intervention	28.45 ± 5.12	F = 0.21, P = 0.648
	Control	27.96 ± 5.07	
Adaptation	Intervention	24.10 ± 4.02	F = 0.19, P = 0.661
	Control	23.69 ± 4.71	
Control	Intervention	21.18 ± 4.71	F = 0.47, P = 0.492
	Control	21.80 ± 3.70	
Skill and Experience	Intervention	21.33 ± 4.70	F = 0.27, P = 0.604
	Control	21.82 ± 4.10	
Sexual Attractiveness	Intervention	26.62 ± 3.95	F = 0.34, P = 0.556
	Control	26.09 ± 4.52	
Total Score	Intervention	121.68 ± 17.81	F = 0.006, P = 0.936
	Control	121.36 ± 17.50	

SD = Standard Deviation.
Between-group comparisons were performed using analysis of variance (ANOVA). The Kolmogorov–Smirnov test was used to assess the normality of data distribution prior to analysis..

Post-Intervention Comparison of Subdomains

Table 4 presents the comparison of sexual self-esteem subdomain and total scores between the two groups immediately post-intervention (T_1). The intervention group showed significantly higher scores in all subdomains and the total score compared to the control group ($P < 0.05$ for all comparisons), confirming the positive effect of the intervention on sexual self-esteem.

Table 4. Comparison of Sexual Self-Esteem Subdomain and Total Scores Between Intervention and Control Groups Immediately Post-Intervention (T_1)

Variable	Group	Post-Intervention (T_1) Mean ± SD	Test Result*
Moral Judgment	Intervention	30.62 ± 4.50	F = 5.47, P = 0.021
	Control	28.15 ± 5.30	
Adaptation	Intervention	26.78 ± 4.38	F = 8.46, P = 0.004
	Control	24.03 ± 4.59	
Control	Intervention	23.58 ± 3.49	F = 5.85, P = 0.017
	Control	21.69 ± 3.91	
Skill and Experience	Intervention	23.09 ± 4.09	F = 3.92, P = 0.041
	Control	21.43 ± 4.62	
Sexual Attractiveness	Intervention	29.42 ± 3.84	F = 10.11, P = 0.002
	Control	26.40 ± 5.11	
Total Score	Intervention	133.49 ± 15.55	F = 10.56, P = 0.001
	Control	121.70 ± 18.72	

SD = Standard Deviation.
Between-group comparisons were performed using analysis of variance (ANOVA).

Follow-Up Comparison of Subdomains

Table 5 presents the comparison of sexual self-esteem subdomain and total scores between the two groups at one-month follow-up (T_2). The intervention group maintained significantly higher scores in all subdomains and the total score compared to the control group ($P < 0.001$ for all comparisons), demonstrating the sustainability of the intervention effects.

Table 5. Comparison of Sexual Self-Esteem Subdomain and Total Scores Between Intervention and Control Groups at One-Month Follow-Up (T_2)

Variable	Group	Follow-Up (T_2) Mean ± SD	Test Result
Moral Judgment	Intervention	33.15 ± 4.02	F = 24.50, P < 0.001
	Control	28.10 ± 5.40	
Adaptation	Intervention	27.89 ± 4.09	F = 36.24, P < 0.001
	Control	23.87 ± 4.96	
Control	Intervention	25.04 ± 3.66	F = 51.98, P < 0.001
	Control	21.50 ± 3.87	
Skill and Experience	Intervention	24.98 ± 3.93	F = 26.83, P < 0.001
	Control	21.93 ± 4.66	
Sexual Attractiveness	Intervention	30.53 ± 3.12	F = 50.41, P < 0.001
	Control	26.29 ± 5.00	
Total Score	Intervention	140.02 ± 14.54	F = 58.98, P < 0.001
	Control	121.51 ± 19.03	

SD = Standard Deviation

*Between-group comparisons were performed using analysis of variance (ANOVA).

Repeated Measures ANOVA for Sexual Self-Esteem

The repeated measures ANOVA revealed a significant **group × time interaction** effect for sexual self-esteem (F = 32.18, df = 1.85, 162.80, P < 0.001, $\eta^2 = 0.32$), confirming the effectiveness of the intervention in improving sexual self-esteem. Between-group comparisons showed significant differences at T_1 (P < 0.001) and T_2 (P < 0.001), with large effect sizes (Cohen's d = 1.09 and 1.80, respectively).

Correlation Between Internalized Shame and Sexual Self-Esteem

At the one-month follow-up, a moderate inverse correlation was observed between internalized shame and sexual self-esteem within the intervention group (Spearman's r = −0.488, P < 0.001), indicating that participants who experienced greater reductions in shame also reported higher levels of sexual self-esteem. In contrast, no significant correlation was observed in the control group (r = −0.112, P = 0.465). These findings suggest that the relationship between reduced shame and improved sexual self-esteem was specifically associated with the educational intervention. Detailed correlation results are presented in Table 6.

Table 6. Correlation Between Internalized Shame and Sexual Self-Esteem at One-Month Follow-Up in Intervention and Control Groups

Group	Spearman's Correlation Coefficient (r_s)	P-value
Intervention Group (n = 45)	−0.488	< 0.001
Control Group (n = 45)	−0.112	0.465

Exploratory Subgroup Analyses

To explore whether the intervention effect varied across demographic and clinical characteristics, subgroup analyses were conducted within the intervention group. The Kruskal-Wallis test was used to compare the magnitude of changes in both primary (internalized shame) and secondary (sexual self-esteem) outcomes across categories of education level, occupation, disease duration, and source of HPV-related information. As presented in Supplementary Table S1, no statistically significant differences were observed across any of the demographic or clinical subgroups ($P > 0.05$ for all comparisons). These findings indicate that the effectiveness of the educational program was consistent and independent of participants' individual characteristics. However, due to the small sample sizes in some categories (particularly the "Books & Magazines" subgroup), these results should be interpreted with caution.

Discussion

Human papillomavirus (HPV) infection and particularly the development of anogenital warts impose not only physical consequences but also a complex array of psychological, social, and sexual challenges for affected women. The main finding of the present study demonstrated that a structured six-session educational program significantly reduced internalized shame and enhanced sexual self-esteem in women with anogenital warts, with sustained effects persisting up to one month post-intervention. This finding underscores the importance of simultaneously addressing the biological, psychological, and social dimensions of HPV-related diseases, as purely medical care may not adequately address the full spectrum of needs in this patient population [21,22]. [21,22].

The baseline comparability of the intervention and control groups with respect to most demographic and clinical characteristics ($P > 0.05$) supports the internal validity of the study by reducing the likelihood of confounding factors influencing the final outcomes. Regarding age distribution, the highest frequency in both groups was observed among women under 30 years of age. This finding is consistent with existing epidemiological evidence, which has consistently reported higher prevalence of HPV infection and its associated consequences among young women of reproductive age [23]. Furthermore, research has demonstrated that young women, due to higher sexual activity and greater sensitivity to body image and emotional relationships, are more susceptible to the psychological and sexual consequences of this disease [24,25]. The only significant baseline difference was disease duration ($P = 0.018$), with a longer

mean duration of diagnosis in the intervention group compared to the control group. Although this imbalance represents a potential limitation, its impact is likely limited given the comparability of other baseline characteristics. Nevertheless, previous studies have suggested that psychological distress, including anxiety, fear, and shame, is often greater shortly after diagnosis and may decrease over time [25].

One of the principal findings of this study was the significant reduction in internalized shame following the educational intervention. Before the intervention, both groups reported similarly high levels of shame, reflecting the considerable psychological burden associated with anogenital warts. Following the intervention, internalized shame decreased significantly in the intervention group, whereas no meaningful change was observed in the control group, and this improvement was sustained at one-month follow-up.

Internalized shame is a common psychological consequence of sexually transmitted infections and is characterized by persistent negative self-evaluation, self-blame, and fear of social rejection. Women with HPV frequently experience guilt, concerns about partner reactions, and anxiety regarding disclosure because sexually transmitted infections are often associated with cultural misconceptions and moral judgment [26,27]. The educational intervention in the present study addressed these psychological processes through several interconnected mechanisms. First, by providing accurate, evidence-based information about HPV transmission, natural history, and treatment, the program directly challenged common misconceptions and reduced uncertainty—a key driver of anxiety and shame [28]. Second, the cognitive restructuring components of the intervention helped participants reframe maladaptive beliefs about their diagnosis, shifting from self-blame toward a more balanced understanding of HPV as a common and manageable infection [29]. Third, the supportive group environment and communication skills training likely reduced feelings of isolation and empowered participants to discuss their concerns with partners and healthcare providers, thereby alleviating the burden of secrecy and stigma [30].

These findings are consistent with previous studies demonstrating that educational and counseling interventions reduce stigma and improve psychological adjustment among individuals with HPV infection [28–32]. Waller and colleagues reported that improved HPV knowledge reduced misconceptions and disease-related fears [31], while other studies have emphasized that patient-centered education and supportive communication are essential, as psychological distress often persists despite successful physical treatment [32]. Similarly, the phenomenological study by Bastanmehr and colleagues identified shame, anxiety, fear of social judgment, and impaired self-concept as dominant experiences among Iranian women with anogenital warts, highlighting the importance of interventions that address emotional as well as medical needs [25].

The findings of Badhadah and colleagues (2010) further support this conclusion; they demonstrated that shame, even more than knowledge level, is a predictor of negative attitudes toward sexually transmitted diseases [33]. Therefore, reducing shame requires interventions that go beyond information transfer, and

education must address cultural attitudes and misconceptions—an aspect that was carefully considered in the design of the educational program in the present study.

The reduction in shame observed in this study may be explained by several interconnected mechanisms. First, accurate education helps women recognize that HPV is one of the most common sexually transmitted infections and does not necessarily indicate irresponsible sexual behavior. Second, increased knowledge improves perceived control over the disease and reduces uncertainty regarding its prognosis and management. Third, the opportunity to discuss sensitive issues in a nonjudgmental environment normalizes emotional reactions and reduces feelings of isolation. Together, these factors likely contributed to the sustained reduction in internalized shame observed after the intervention [27–30].

The educational intervention also significantly improved sexual self-esteem, and this improvement remained stable at one-month follow-up. Sexual self-esteem reflects an individual's perception of sexual attractiveness, competence, and confidence within intimate relationships [34]. Women with anogenital warts often report diminished sexual confidence because of concerns about body image, fear of transmitting the infection, and anxiety regarding sexual relationships [35]. By increasing knowledge and addressing emotional concerns simultaneously, the intervention may have helped participants develop a more positive and confident perception of themselves as sexual partners.

Regarding psychological and relational indicators, the high prevalence and intensity of shame and reduced sexual self-esteem among female participants in the present study is consistent with both domestic and international evidence. McCaffery and colleagues (2006) demonstrated that merely receiving a positive HPV test result could induce anxiety, heighten concerns about social judgment, increase fear of disease disclosure, and disrupt emotional relationships [36].

Importantly, the improvement in sexual self-esteem observed in this study is unlikely to be explained solely by increased knowledge. Educational interventions that combine accurate information with emotional support may facilitate changes in self-perception, body acceptance, and confidence in intimate relationships. By reducing misconceptions and encouraging open discussion of sexual concerns, participants may become more accepting of their condition and less likely to define themselves according to the disease. These findings suggest that educational programs addressing both cognitive and emotional aspects of HPV may be more effective than information-based approaches alone.

Another important finding was the significant inverse correlation between internalized shame and sexual self-esteem one month after the intervention. Women reporting lower levels of shame demonstrated higher sexual self-esteem, supporting theoretical models suggesting that shame negatively influences body image, interpersonal relationships, and sexual functioning [37]. Therefore, reducing internalized shame may represent an important pathway through which educational interventions improve sexual well-being.

Interestingly, demographic and clinical characteristics were not significantly associated with changes in internalized shame or sexual self-esteem. Although the relatively small sample size may have limited the statistical power to detect subgroup differences, these findings suggest that the psychological burden of anogenital warts is experienced across women with diverse backgrounds. This observation supports previous evidence indicating that shame, fear of judgment, and concerns regarding intimate relationships are common experiences among women living with HPV regardless of demographic characteristics [25].

Strengths and Limitations

This study has several notable strengths that enhance the validity and credibility of its findings. First, the use of a randomized controlled trial (RCT) design with a parallel two-arm structure provides robust evidence for the causal effects of the educational intervention, minimizing selection bias and confounding [1]. Second, the inclusion of a one-month follow-up assessment allowed for the evaluation of the sustainability of the intervention effects beyond the immediate post-intervention period, addressing a common limitation in psychosocial intervention studies. Third, the comprehensive nature of the educational program—addressing both cognitive components (accurate HPV-related knowledge, transmission, and treatment) and emotional components (shame reduction, cognitive restructuring, and self-esteem enhancement)—reflects a holistic, biopsychosocial approach to patient care that is increasingly recognized as essential in managing chronic and stigmatizing conditions [21,22].

Fourth, the use of validated instruments with established psychometric properties— the Cook Internalized Shame Scale (ISS) [18] and the Female Sexual Self-Esteem Index (FSSEI) [19] enhances the reliability and validity of the outcome assessments. The high internal consistency observed in our sample (Cronbach's $\alpha = 0.92$ for ISS and 0.87 for FSSEI) further supports the appropriateness of these measures for this population. Fifth, the rigorous methodological approach, including allocation concealment using sequentially numbered opaque sealed envelopes, blinded outcome assessment, and adherence to the CONSORT 2010 guidelines for reporting, strengthens the methodological transparency, reproducibility, and overall quality of the research [1].

Sixth, the high retention rate (95.6%) and the use of intention-to-treat (ITT) analysis with multiple imputation for missing data minimize attrition bias and ensure the robustness of the findings. Seventh, and perhaps most importantly, this study addresses a significant gap in the literature by focusing on a culturally specific population (Iranian women) where stigma and shame surrounding sexually transmitted infections are particularly pronounced due to cultural and religious norms [11,25]. To the best of our knowledge, this is the first randomized controlled trial in Iran to specifically examine the effectiveness of a structured educational intervention targeting both internalized shame and sexual self-esteem in women with anogenital warts, underscoring the novelty and contribution of this research to the field.

Despite these strengths, several limitations should be acknowledged when interpreting the findings. First, the relatively short follow-up period (one month) limits our ability to assess the long-term

sustainability of the intervention effects. While the sustained improvements at one month are encouraging, it remains unclear whether these benefits persist beyond this timeframe. Future studies with extended follow-up periods (e.g., 6 or 12 months) are needed to determine the durability of the intervention effects and to identify factors that may influence long-term outcomes.

Second, although participants were randomly assigned to groups, a significant baseline difference was observed in the duration of anogenital wart diagnosis (P = 0.018), with the intervention group having a longer mean duration of diagnosis compared to the control group. While this variable was adjusted for as a covariate in the primary analyses to control for its potential confounding effect, and despite the overall comparability of other baseline characteristics, this imbalance represents a potential limitation that should be considered when interpreting the results. Previous research has suggested that psychological distress may be greater shortly after diagnosis and may decrease over time [25], which could theoretically attenuate the observed intervention effects.

Third, the absence of blinding for participants and intervention providers—inherent to the nature of educational interventions—may have introduced performance bias, as participants' expectations and beliefs about the intervention could have influenced their responses. However, this limitation was partially mitigated by blinding the outcome assessors and the statistician to group allocation throughout the study, reducing the risk of detection bias.

Fourth, the use of convenience sampling (or consecutive sampling from two outpatient clinics in a single geographic region—Shiraz, Iran) may limit the generalizability of the findings to the broader population of women with anogenital warts. The specific cultural, religious, and social context of southern Iran may differ from other regions within the country or internationally, and the findings may not be directly transferable to other populations or settings.

Fifth, the study included only married women, and the findings may not be generalizable to unmarried women, divorced women, or those in non-marital relationships. The psychological and sexual challenges faced by these populations may differ significantly, and future research should examine the intervention's effectiveness in diverse relationship status groups.

Sixth, the study did not assess certain potential mediators of the intervention effects, such as changes in HPV-related knowledge, attitudes toward the disease, self-efficacy, or coping strategies. Examining these mediating pathways could have provided deeper insight into the mechanisms of action underlying the observed improvements in shame and sexual self-esteem and could inform future refinements of the intervention.

Seventh, the use of self-report questionnaires may have introduced social desirability bias, as participants may have over- or under-reported their symptoms, feelings, or behaviors. However, the use of validated instruments with established psychometric properties and the assurance of confidentiality likely minimized this risk.

Eighth, the relatively small sample size in some demographic subgroups (particularly the "Books & Magazines" category in the source of awareness variable) limited the statistical power of the exploratory subgroup analyses, and the results of these analyses should be interpreted with caution.

Ninth, the study did not include a treatment adherence assessment to monitor whether participants in the intervention group attended all sessions and actively engaged with the educational content. Future studies should incorporate adherence measures to better understand the relationship between intervention dose and outcomes.

Tenth, the study did not assess clinical outcomes such as wart recurrence rates, treatment response, or cervical cancer screening behaviors. Future research could explore whether improvements in psychological outcomes translate into improved clinical outcomes, as this would strengthen the clinical relevance of the intervention.

Conclusion

The findings of this study demonstrate that a structured educational program can effectively reduce internalized shame and enhance sexual self-esteem in women with anogenital warts. These results underscore that comprehensive HPV management must extend beyond physical lesion treatment to address the psychological, social, and sexual dimensions of the disease. We recommend that educational and counseling programs addressing the psychosocial aspects of HPV be integrated into routine clinical care, with healthcare providers—including midwives, gynecologists, and dermatologists—playing a pivotal role in reducing stigma and promoting sexual health through accurate information and non-judgmental support.

While the present study provides robust evidence for the intervention's effectiveness, the relatively short follow-up period (one month), single-center design, and inclusion of only married women limit the generalizability of the findings. Future multicenter studies with longer follow-up periods and diverse populations, including couple-based and digital health interventions, are warranted.

In conclusion, simultaneous attention to the physical, psychological, and social dimensions of HPV is essential. Educational and supportive programs should be considered an integral component of healthcare protocols and systematically implemented within routine services to improve the quality of life of women affected by anogenital warts.

Declarations

Conflict of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding: This study was derived from a master's thesis approved by Shiraz University of Medical Sciences (Project No: IR.SUMS.NUMIMG.REC.1404.072). The funding source had no role in the study

design, data collection, analysis, interpretation, or manuscript preparation.

Authors' Contributions: First Author: Conceptualization, study design, data collection, intervention implementation, data analysis, and drafting of the initial manuscript. Second Author: Supervision, methodology design, critical revision of the manuscript, and final approval of the version to be published. Third Author: Statistical analysis, data interpretation, and validation of the results. Corresponding Author: Supervision, study design, critical revision, and overall responsibility for the integrity of the work.

Data Availability Statement: The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Acknowledgments: The authors would like to thank all the women who participated in this study for their time and cooperation. We also extend our gratitude to the staff of the dermatology and gynecology outpatient clinics at Shiraz University of Medical Sciences for their assistance with participant recruitment and logistical support.

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Figures

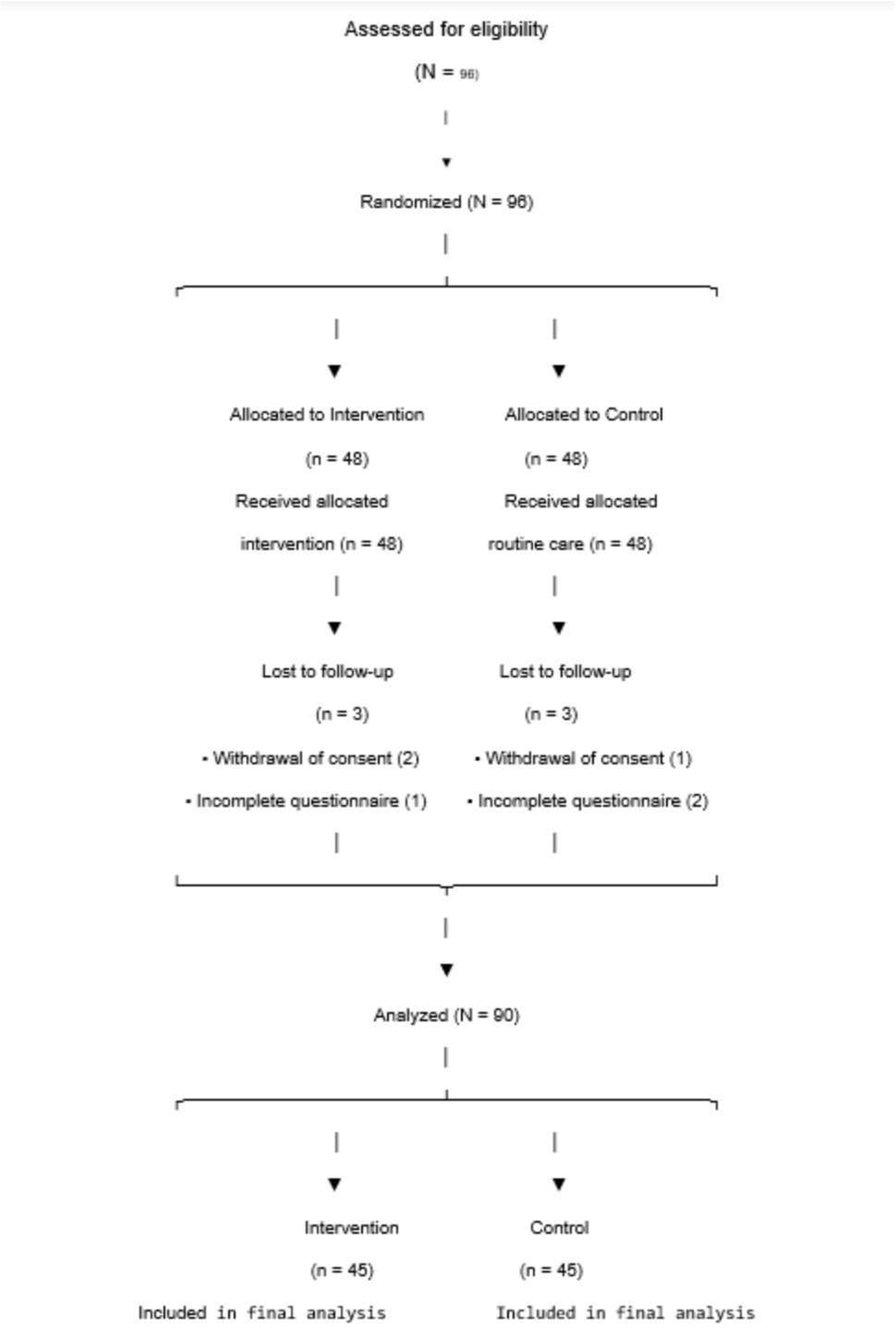


Figure 1

The flow of participants through the study is illustrated in Figure 1, which was prepared in accordance with the CONSORT (Consolidated Standards of Reporting Trials) statement. Of the 96 women assessed for eligibility, all were randomized to either the intervention group (n = 48) or the control group (n = 48). Three participants in each group were lost to follow-up, resulting in a final analytical sample of 45 participants in each group (total N = 90). No adverse events were reported during the study."

Supplementary Files

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- SupplementaryTableS1.docx