BMC Women's Health

RESEARCH

Open Access

Effectiveness of motivational interview on psychological distress of women with human papilloma virus: a randomized clinical trial

Mina Galeshi[1], Hoda Shirafkan[2], Shahla Yazdani[1] and Zahra Motaghi[3*]

Abstract

Introduction Human papillomavirus (HPV) is one of the most important sexually transmitted infections. In most cases, HPV infection resolves on its own, but some types of HPV infection cause genital warts, and some can cause various types of cancer, such as cervical and anal cancer. The psychological impact of HPV infection on individuals is significant. Hence, this study aimed to assess the impact of motivational interviewing on the anxiety, stress, and depression levels of women with HPV.

Methods This randomized controlled study utilized a pretest-posttest research design with a control group and involved 62 HPV patients from healthcare centers affiliated with Babol University of Medical Sciences, Iran. In 2023.06.11 after we received ethics code. The patients were divided into two groups: an experimental group consisting of 31 individuals and a control group also comprising 31 individuals. The allocation to these groups was determined using the blocked randomized allocation technique based on pretest scores of MS. The experimental group received motivational intervention over five sessions, while the control group received routine intervention. All participants completed the DASS-21 questionnaire before and immediately after the interventions. The significance level was set at 0.05.

Results The mean age in the intervention group was 33.58 ± 6.14 and in the control group was 34.96 ± 7.04 years. The effect of the intervention group was significant in decreasing the total score with Effect-size = 0.954 ($P < 0.001$). Thus, a significant decrease was observed in depression with an effect size of 0.932, anxiety with an effect size of 0.943, and stress with an effect size of 0.185, respectively with $P < 0.001$, $P = 0.009$, and $P = 0.001$. Anxiety, depression, and stress scores in the intervention group decreased by more than 50% on average compared to the control group.

Conclusion The results of the current research indicated that motivational interviewing may effectively enhance mental health in patients with HPV by reducing anxiety, depression, and stress. Additionally, it can offer useful recommendations to healthcare professionals for successful follow-up and improvement of the mental well-being of these patients.

*Correspondence:
Zahra Motaghi
zhrmotaghi@yahoo.com

Full list of author information is available at the end of the article

Trial registration number IRCT20230531058348N1, Approval Date: 2021.10.10.
Keywords HPV, MI, Anxiety, Stress, Depression, Women, Iran

Background

Human papillomavirus (HPV) is one of the most important sexually transmitted infections. Almost all cases of cervical cancer are caused by HPV infection [1]. HPV infection typically peaks in the first decade following the onset of sexual activity, usually between ages 15 and 25. It is estimated that at least 80% of sexually active individuals will be exposed to HPV at least once in their lifetime [2].

The prevalence of HPV virus in the world is between 10.5 and 55.4% and in Iran it is 49.5% [3, 4].

In addition to the physical dangers of the HPV virus and genital warts, this disease still has social risks such as overshadowing the professional and social life of the affected person due to hiding the disease and its treatment, loss of trust, intimacy and creating suspicion of the partner [5].

Women with abnormal Pap smear results may face negative psychological effects. The transmissible nature of HPV can increase anxiety and distress in those who test positive, leading to feelings of isolation, shame, and fear of recurrence. McCaffery et al. observed that common reactions among HPV-positive women included distress, embarrassment, and feelings of being "dirty" or "cheap." [6].

Studies of women with abnormal Pap test results have highlighted psychological consequences such as: anxiety, fear of cancer, sexual problems, and changes in body image, difficulty with reproductive functions, feelings of helplessness, anger, and fear of sticking [7, 8]. Also, Sexually Transmitted Infection (STI) stigma is associated with greater internalization of negative emotions, which in turn is associated with greater mental illness and sexual dissatisfaction [9].

Women who have warts in their genital area are worried about transferring warts to their husbands and become anxious [10]. The psychological and sexual vulnerability of these women increases with the number of recurrences of genital warts [11]. Furthermore, the psychological burden experienced by women diagnosed with genital warts can lead to significant emotional distress, often triggering feelings of shame and isolation [12]. This distress may not only affect their mental well-being but can also permeate their intimate relationships, resulting in avoidance of sexual activity or difficulties in pursuing new romantic connections [13]. The constant fear of transmission looms large in their minds, complicating their ability to engage freely and comfortably with partners [12]. Moreover, the stigma surrounding sexually transmitted infections (STIs) contributes to a cycle of silence and misinformation, preventing individuals from seeking help or discussing their experiences openly [14]. This lack of dialogue reinforces negative emotions and perpetuates the misconception that such conditions are associated solely with promiscuity or moral failure [15]. In reality, HPV is a prevalent virus that can affect anyone, highlighting the need for increased awareness and education around STIs [16]. As awareness campaigns about HPV become more widespread, it is crucial to address the psychological impact on those affected. Support groups and counseling may provide essential outlets for sharing experiences and reducing feelings of isolation [17]. Empowering women with knowledge about their condition can foster a more supportive environment, lessening the grip of stigma and ultimately promoting healthier emotional and sexual lives [18].

Women undergoing HPV testing need innovative solutions to provide them with information, counseling, and support that may increase their autonomy in accessing patient-centered information. Motivational interview can enhance the relationship between patients and health services providers and have been shown to increase adherence in primary care and gynecology care settings [19].

Motivational interviewing is a special form of counseling that aims to motivate the patient to start treatment and change their behavior [20]. Individuals experiencing mental disorders like anxiety, stress, and depression linked to specific illnesses, such as sexually transmitted diseases, often deny their condition to evade treatment. Their reluctance to change behavior stems from a lack of willpower or motivation, preventing them from seeking help [13]. Motivational interviewing helps those unsure about treatment by enhancing their willpower and giving therapists a practical, empathetic tool. This method involves the therapist engaging in supportive dialogue with the client to foster behavior change. In psychology, behavioral change occurs in four stages that must be followed for effective treatment [21, 22].

White and Miller assert that motivational interviewing assumes clients are reluctant to change, with therapists aiding their behavioral challenges [23]. Therapists focus on boosting patients' self-confidence and sense of responsibility during sessions to promote gradual habit change. By acknowledging their issues, patients can take charge of their behavior and recovery. This empowering approach helps individuals with challenges such as obsessions, PTSD, and binge eating by enabling them to change their thought patterns and regain control over their actions [24].

With the global rise of motivational interviewing and its proven benefits for various disorders and healthier behaviors, it's essential to implement this technique across different sectors in our country. Many local health issues arise from a lack of motivation for counseling, medication adherence, and healthy practices, necessitating active participation and behavioral change. Motivational interviewing can effectively address these issues, particularly for anxiety, depression, and stress. This research seeks to evaluate the impact of motivational interviewing on anxiety, depression, and stress in women with HPV and assess its potential use by healthcare professionals to mitigate related mental health challenges. Can motivational interviewing affect psychological problems have caused by HPV infection?

Materials and methods

Study design and subject selection

In 2023, a randomized clinical trial involving 62 HPV patients was conducted at the women's clinic in Babol, Iran. The study utilized a randomized, triple-blind, controlled design, ensuring that participants, assessors, and data analysts were unaware of the interventions administered. Approval was obtained from the Ethics Committee of the Research and Technology Deputy of Shahroud University of Medical Sciences (ethics code: IR.SHMU.REC.1400.154), and the study was registered with the Iranian Registry of Clinical Trials (IRCT20230531058348N1) on June 11, 2023. Sampling commenced after securing the necessary authorizations.

Table 1 The structure and content of the motivational interview in the intervention group

The first session	Introduction and initial conversations Establishing guidelines for the group (meeting schedule and privacy concerns) Announcing the goals of the counseling sessions Identifying the stage of change for each individual based on their current actions
The second session	Analyzing the pros and cons of sticking to or altering behaviors (such as not undergoing Pap testing). Generating ideas about the benefits and drawbacks of a specific behavior.
The third session	Exploring the meaning of values and engaging in prioritizing values Identifying the clash between values and present actions: impact of actions on values
The fourth session	Exploring the internal and external drive for change Engaging clients in activities that highlight the significance of health Developing decision-making skills to manage internal and external motivation Helping clients redefine and view their failures from their own perspective
The fifth session	Recapping the techniques covered in earlier sessions regarding approaching practice and getting ready for change.

Using convenience sampling, the researcher evaluated all women visiting the clinic based on inclusion criteria. Candidates were informed of the study's objectives and procedures before sampling and were asked to sign informed consent forms to indicate their willingness to participate. They were also assured they could withdraw at any time and completed a socio-demographic information form along with the DASS-21 questionnaires. The sample size was determined based on previous studies by Said et al. [25], with a minimum of 26 participants required in each group to achieve a power of 80% at a 0.05 error level, δDifference = 4.1 and σ Difference = 5. Factoring in a 20% attrition rate, the study required a minimum of 62 HPV patients.

$$n \geq \frac{2\left(Z_{1-\alpha/2} + Z_{1-\beta}\right)^2}{\left(\delta_{Difference}/\sigma_{Difference}\right)^2} + \frac{Z^2_{1-\alpha/2}}{2} \quad (1)$$

Inclusion criteria included infection with human papillomavirus, a minimum level of literacy, and willingness to participate. Exclusion criteria encompassed unwillingness to continue cooperation.

Randomization and intervention

Participants who met the entrance criteria were divided into two groups: the intervention group and the control group (receiving routine education). Block randomization was employed, with 4 blocks and an allocation ratio of 1:1.

This study adhered to the Helsinki protocol and followed CONSORT guidelines.

The intervention group received 90-minute counseling sessions once a week for five sessions, utilizing motivational interviewing techniques (see Table 1). The motivational interviewing framework used in this study was from Fields's five-session motivational interviewing group intervention workbook [26]. Each session's content underwent expert review, and CVR and CVI were calculated to ensure reliability and validity. The results of the content validity ratio study showed that this ratio was in the range of 0.7-1.

Feedback on clarity, relevance, and comprehensiveness enhanced educational value and pinpointed areas for improvement. The professors' diverse expertise facilitated systematic adjustments that refined the presentation for our varied audience. The validity of these sessions was evaluated by two professors specializing in psychology and psychiatry. The structure of the sessions can be found in Table 1. The control group received routine education on the HPV virus.

Data collection instruments

In this study, the data collection tools were socio-demographic information form and DASS-21 Questionnaires, which were filled out before intervention and 5 weeks after intervention. The social-demographic checklist contained questions such as age, educational level, marital status, their jobs and HPV type. Lovibond and Lovibond created the DASS survey to evaluate primary symptoms of depression, anxiety, and stress and it has been utilized to assess patient response to treatment. The survey has demonstrated sufficient psychometric properties and is on par with other reliable scales. The DASS-21 serves as the abbreviated version and research findings validate its credibility as an authorized tool for gauging negative mental states and depression, anxiety, and stress in adults (both patients and non-patients). The questionnaire's 21 items constitute a set of 3 self-reported scales intended to measure DASS. Subscale Questions: Depression: 3,5,10,13,16,17,21, Anxiety: 2,4,7,9,15,19,20 and Stress: 1,6,8,11,12,14,18.

The 7 items on the scales are rated using a Likert scale ranging from 0 to 3 (0: "Did not apply to me at all," 1: "Applied to me to some degree or some of the time," 2: "Applied to me to a considerable degree or a good part of the time," and 3: "Applied to me very much or most of the time"). Depression, anxiety, and stress scores are calculated by summing up the scores of the relevant items. The intensity of each subscale.

Severity	Depression	Anxiety	stress
Normal	0–9	0–7	0–14
Mild	10–13	8–9	15–18
Moderate	14–20	10–14	19–25
Severe	21–27	15–19	26–33
Very severe	+28	+20	+33

Given that the DASS-21 is a condensed version of the original 42-item DASS, the score for each subscale needs to be doubled to determine the final score.

As per the guidelines, the resulting scores are then categorized as: "normal, mild, moderate, severe, or extremely severe." [27, 28]. Lavibond (1995) reported the validity of the DASS-21 questionnaire as 0.77, and its Cronbach's alpha coefficient in each domain was: Total: 0.83, Anxiety: 0.84, Depression:0.89 and Stress:0.82 [27]. This tool was examined in the Iranian population and the internal consistency of the DASS scales was calculated using Cronbach's alpha and the following results were obtained: Depression scale 0.77, Anxiety scale 0.79, Stress scale 0.78 [29].

Statistical analysis

The analysis of the data involved the use of "SPSS version 23". To assess the normality of the quantitative data, the Kolmogorov-Smirnov test was employed. The total DASS-21 score variable exhibited normality both before and after the intervention. ANCOVA was utilized to adjust the baseline score post-intervention. A significance level of 0.05 was maintained throughout the process.

Result

The participants were recruited from 22 October 2023 to 20 December 2023.The initial screening consisted of 65 patients. Of those, 3 were excluded because of ineligibility. Thus, 62 participants were allocated to each group, and they were followed until the end of the 8th week after the intervention (Fig. 1).

The mean age ± standard deviation of the people in the intervention group was 33.58 ± 6.14 and in the control group was 34.96 ± 7.04 years, and the groups were similar in terms of age ($P = 0.412$). The age range is between 20 and 48 years. Other demographic information of people is given in Table 2.

According to the results of the analysis of covariance in the general examination of the DASS-21 score, Total Score in Motivational interview group before intervention 65.54 ± 9.06 and after intervention was 23.23 ± 5.23, the effect of the intervention group was significant in decreasing the average score with Effect-size = 0.954 ($P < 0.001$). Thus, The Depression score in motivational interview group befor intervention 21.64 ± 3.56 and after intervention 7.58 ± 2.17, a significant decrease was observed in depression with an effect size of 0.932, The anxiety Score in motivation interview group befor intervention21.64 ± 3.91 and after intervention 7.61 ± 1.14, anxiety with an effect size of 0.943, The Stress Score in motivation interview group befor intervention 22.19 ± 3.26and after intervention 7.61 ± 1.14 and stress with an effect size of 0.185, respectively with $P < 0.001$, $P = 0.009$, and $P = 0.001$ (Table 3)

Discussion

This study aimed to evaluate the impact of motivational interviewing on depression, anxiety, and stress levels in women with HPV. Results indicated that this intervention effectively improved the psychological well-being of these patients, resulting in significant reductions in depression, anxiety, and stress scores in the test group compared to the control group. Notably, prior to the intervention, there were no significant score differences between the groups, highlighting the potential for improved quality of life.

A critical aspect of informing and educating HPV-positive women is addressing the factors that can lead to the progression of cervical lesions to malignant forms. It's crucial to communicate these risk factors—such as smoking, oral contraceptive use, lack of condom use, and other sexually transmitted infections—to HPV-positive women. Therefore, providing education that enhances

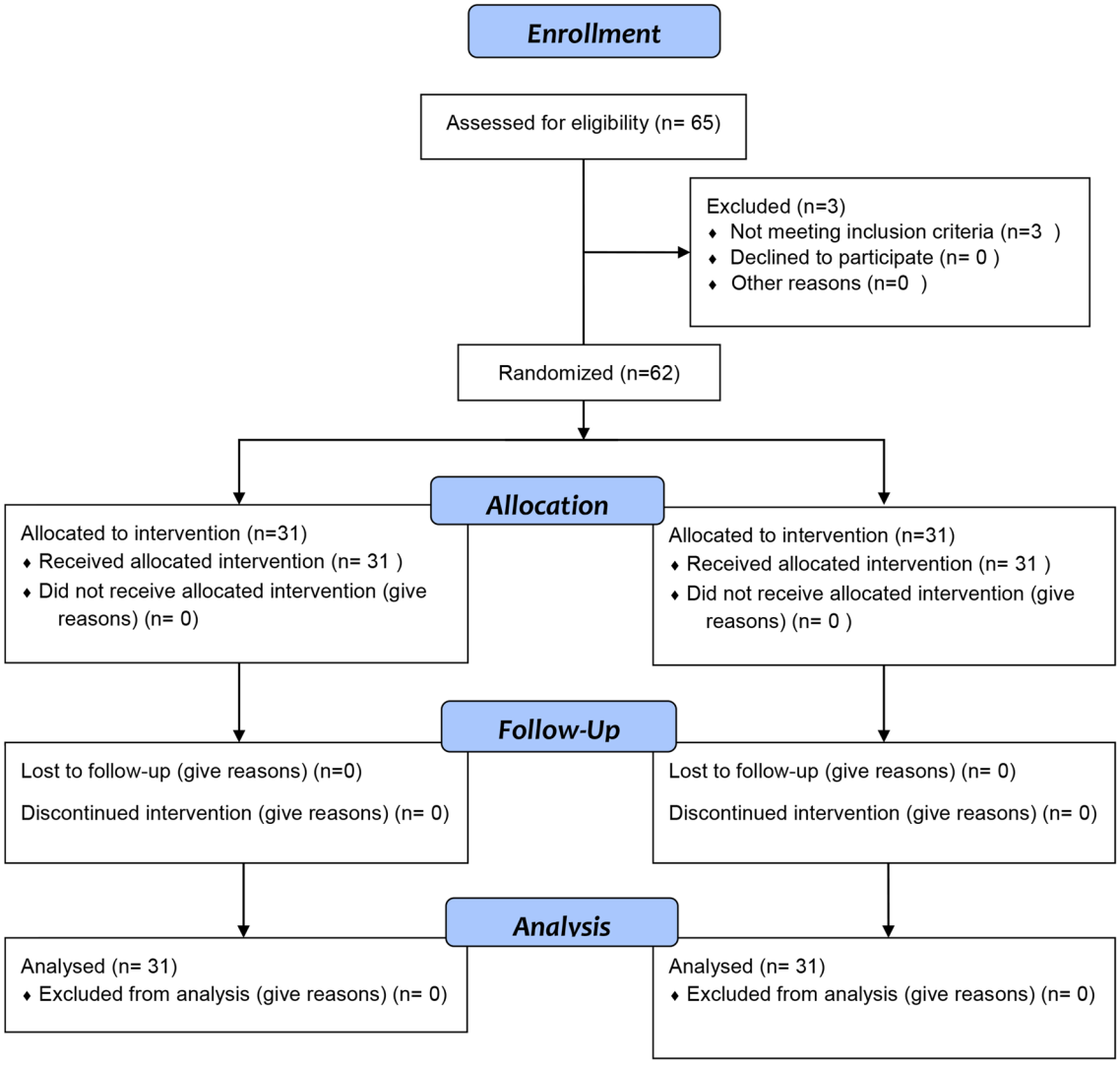

Fig. 1 Study Flowchart

knowledge, shifts attitudes, and ultimately modifies behaviors and lifestyles is essential.

The study also found that women with HPV experience psychological challenges, including stress, anxiety, and depression. Counseling proved effective in alleviating these issues. These findings align with the research conducted by Antelo et al.

Investigated the effect of counseling on the mental status [30] Ngu et al. (2018) of affected women using the depression, anxiety questionnaire (HADS), worry about cervical cancer, anxieties related to screening, shame caused by HPV, and knowledge related to cervical cancer screening. And in HPV infected women one week and 6 months after the intervention, it showed that the results before the intervention of the two groups were not significantly different in terms of psycho-social well-being. However, one week after completing the intervention, participants in the counseling group had higher scores in knowledge related to cervical cancer and HPV screening, although this difference was no longer significant six months after the intervention. Therefore, according to the results of this study, if the educational needs of HPV-positive patients are met, even if the educational booklet is provided 6 months after the intervention, the effect of the intervention on anxiety and depression will not disappear. Psychological and emotional counseling will probably not have much effect on improving the mental state of patients. The result of this study is not consistent with our study in terms of impact on psychological factors, one of the reasons for which could be the difference in follow-up duration and measurement tools in these two studies. Inconsistency between the studies may suggest the influence of cultural factors, individual psychological resilience, or even the specific nature of the counseling provided. For instance, tailoring interventions to address cultural stigmas associated with HPV and cervical cancer

Table 2 Frequency distribution of demographic variables in the two study groups

Variable		Intervention	Control	*P*-Value
Age (Mean ± SD)		33.58 ± 6.14	34.96 ± 7.04	0.412*
Marital status Frequency (%)	Single	7(22.6)	6(19.4)	0.097**
	Married	24(77.6)	25(80.6)	
Type of HPV virus frequency (%)	Low Risk	5(16.1)	6(19.4)	0.282**
	High Risk	7(22.6)	12(38.7)	
	Mixed	19(61.3)	19(41.9)	
Cervical cytology Frequency (%)	Normal	18(58.1)	11(35.5)	0.250**
	ASCUS	8(25.8)	10(32.3)	
	CIN-1	4(12.9)	6(19.4)	
	CIN2	1(3.2)	4(12.9)	

* Independent t-test

Chi-squre**

CINI: Cervical intraepithelial neoplasia grade1

CIN2: Cervical intraepithelial neoplasia grade2

ASCUS: Atypical Squamous Cells of Undetermined Significance

Table 3 Comparison of the average total score and areas of the DASS-21 questionnaire before and after the intervention

Variables	Time Group	Before Mean ± SD	After Mean ± SD	*p*-value *	Effect-size
Total Score	Intervention	65.54 ± 9.06	23.23 ± 5.23	< 0.001	0.954
	Control	65.64 ± 4.79	64.67 ± 4.79		
Depression score	Intervention	21.64 ± 3.56	7.58 ± 2.17	< 0.001	0.932
	Control	21.74 ± 2.32	21.35 ± 2.05		
Anxiety score	Intervention	21.64 ± 3.91	7.61 ± 1.14	0.009	0.943
	Control	21.74 ± 2.70	21.61 ± 2.34		
Stress score	Intervention	22.19 ± 3.26	7.83 ± 2.38	0.001	0.185
	Control	21.90 ± 3.22	21.70 ± 2.41		

* Adjusted based on the average score of the base (before the intervention)

could enhance their effectiveness. Understanding patient demographics and psychological profiles could further contribute to a more targeted approach, thereby optimizing outcomes for affected women. Furthermore, ongoing assessment and adaptation of educational materials are crucial in maintaining engagement and reinforcing knowledge over time. The dynamic nature of emotional responses necessitates a more holistic view rather than relying solely on passive information dissemination [12]. To truly foster a supportive environment for HPV-positive individuals, interdisciplinary collaboration between mental health professionals and medical practitioners can pave the way for comprehensive care models that effectively address both educational and emotional needs. In conclusion, while the immediate results of counseling may not translate into sustained improvements in mental health, they highlight the paramount importance of continuous support and education tailored to the unique experiences of HPV-positive women, paving the way for further research and intervention refinement in this crucial area of women's health [13].

The results of this study showed that counseling women with HPV virus, their needs, anxiety, worries and fears about the complications and consequences of this disease should be considered, because this can lead to improving the health of these people, as well as extracting these needs. It can change the way doctor's control and deal with people infected with HPV. In conclusion, while the immediate results of counseling may not translate into sustained improvements in mental health, they highlight the paramount importance of continuous support and education tailored to the unique experiences of HPV-positive women, paving the way for further research and intervention refinement in this crucial area of women's health. Moreover, it is vital to recognize the role of social support systems in shaping the psychological landscape for HPV-positive women [31, 32]. The presence of a robust support network, whether through family, friends, or community resources, can significantly influence emotional resilience and coping mechanisms. Future interventions should consider incorporating peer support groups or community outreach programs that foster a sense of belonging and understanding among affected individuals. By creating safe spaces where women can share their experiences and concerns, we can cultivate an environment that not only educates but also empowers [7].

A limitation of this study is the short duration and intensive intervention sessions. The findings suggest that motivational interviewing can be an effective and low-cost treatment option; however, the lack of a follow-up stage restricts our ability to evaluate its long-term efficacy. Future research should include follow-up periods to assess the sustainability of treatment effects. Additionally, integrating motivational interviewing with other therapies could enhance its effectiveness. It's important to consider individual variability in responses, which may require customizing approaches for different populations. Addressing these limitations in future studies will help us better understand the potential of motivational interviewing in patient care.

Conclusion

This study indicates that motivational interviewing effectively reduces anxiety, depression, and stress in HPV patients, providing valuable guidance for health care providers. Incorporating these techniques into routine care may enhance patient engagement and adherence to treatment. By fostering a supportive environment, providers can encourage patients to discuss their fears related to HPV, which often worsen their mental state. Effective

communication is essential for tailoring interventions to patients' needs. The findings also emphasize the importance of ongoing training in motivational interviewing for health care professionals to improve patient interactions and mental health outcomes. As the link between physical and psychological well-being is increasingly recognized, integrating these techniques into practice offers a more holistic approach to patient care. Overall, this research suggests a shift in managing HPV-related issues, emphasizing mental health to improve patients' quality of life and health care experiences.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03595-5.

Supplementary Material 1

Acknowledgements
We would like to thank all the participants in this study. In addition, we thanks to clinical research development unit of rohani hospital.

Author contributions
Conceptualization: ZM and MG Data curation: MG, H SH, SHY, ZMFormal analysis: MG and HSH Methodology: MG, H SH, SHY, ZM Project administration ZM and MG. Resources: MG, H SH, SHY, ZM.Supervision: MG, H SH, SHY, ZMValidation: MG, H SH, SHY, ZM.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

Data availability
All relevant data are within the paper however, any question or other file data is required you can contact us using the email address, upon reasonable request.

Declarations

Ethics approval and consent to participate
This survey was carried out in accordance with the guidelines of the Declaration of Helsinki, was approved by the Ethics Committee of Shahroud University of Medical Sciences (Ethics Code: IR.SHMU.REC.1400.154), and written informed consent was obtained from all individual participants who participated in the study. Also, all methods are carried out in accordance with relevant guidelines and regulations.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Clinical Research Development Unite of Rouhani Hospital, Babol University of Medical Sciences, Babol, Iran
[2]Social Determinants of Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran
[3]Department of Reproductive Health, School of Nursing and Midwifery, Shahroud University of Medical Sciences, Shahroud, Iran

Received: 13 October 2024 / Accepted: 5 February 2025
Published online: 19 February 2025

References

1. Kashyap N, Krishnan N, Kaur S, Ghai S. Risk factors of cervical cancer: a case-control study. Asia-Pacific J Oncol Nurs. 2019;6(3):308–14. https://doi.org/10.1093/jnci/90.1.50.
2. Henderson AW, Lehavot K, Simoni JM. Ecological models of sexual satisfaction among lesbian/bisexual and heterosexual women. Arch Sex Behav. 2009;38:50–65. https://doi.org/10.1007/s10508-008-9384-3.
3. Escobar N, Plugge E. Prevalence of human papillomavirus infection, cervical intraepithelial neoplasia and cervical cancer in imprisoned women worldwide: a systematic review and meta-analysis. J Epidemiol Community Health. 2020;74(1):95–102. https://doi.org/10.1136/jech-2019-212557.
4. Kesheh MM, Keyvani H. The prevalence of HPV genotypes in Iranian population: an update. Iran J Pathol. 2019;14(3):197. https://doi.org/10.30699/ijp.2019.90356.1861.
5. Veenhoven R. Quality of life (QOL), an overview. Encyclopedia of quality of life and well-being research. 2024:5668–71. https://doi.org/10.1007/978-3-031-17299-1_2353
6. McCaffery K, Waller J, Nazroo J, Wardle J. Social and psychological impact of HPV testing in cervical screening: a qualitative study. Sex Transm Infect. 2006;82(2):169–74. https://doi.org/10.1136/sti.2005.016436.
7. McBride E, Marlow LA, Forster AS, Ridout D, Kitchener H, Patnick J, et al. Anxiety and distress following receipt of results from routine HPV primary testing in cervical screening: the psychological impact of primary screening (PIPS) study. Int J Cancer. 2020;146(8):2113–21. https://doi.org/10.1002/ijc.32540.
8. Şahan A, Karaosmanoğlu N, Koç E. Evaluation of the Psychosocial effects of Long-Term Genital HPV infection. J Med Sci. 2020;5(1):88–92.
9. Shahhosseini Z, Gardeshi ZH, Pourasghar M, Salehi F. A review of affecting factors on sexual satisfaction in women. Materia socio-medica. 2014;26(6):378. https://doi.org/10.5455/msm.2014.26.378-381.
10. Samaan M, Gaber M. Effect of multiple genital and extragenital warts on quality of social life. Menoufia Med J. 2021;34(3):920. https://doi.org/10.4103/mmj.mmj_96_20.
11. Adeli M, Moghaddam-Banaem L, Shahali S. Sexual dysfunction in women with genital warts: a systematic review. BMC Womens Health. 2022;22(1):516. https://doi.org/10.1186/s12905-022-02073-6.
12. Liu Y, Wang X, Sun Y, Jiang N, Zhang K, Wang M, et al. The effect of HPV infection on mental health status in women. Infect Dis Res. 2024;5(4):18. https://doi.org/10.1016/j.ygyno.2007.07.013.
13. O'Donnell N, Waller J, Marlow L, Anderson NC, McBride E. Knowing that I had HPV, I literally just shut down: a qualitative exploration of the psychosocial impact of human papillomavirus (HPV) in women living with mental health conditions. Br J Health Psychol. 2024;29(1):80–94. https://doi.org/10.1111/bjhp.12688.
14. Ziaee A, Ziaee M, Asghari A, Elhamirad S, Azarkar G, Unpacking HPV, Stigma. Assessing Healthcare workers' knowledge and stigma towards HPV while exploring the connection between the two. J Med Educ Curric Dev. 2024;11:23821205241260596. https://doi.org/10.1177/23821205241260596.
15. Thomas-Purcell K, Bailey A, Sealy D-A, Song G, Ashing KT. Cervical Cancer Stigma among Caribbean Population: a descriptive paper. Int J Public Health. 2024;69:1606725. https://doi.org/10.3389/ijph.2024.1606725.
16. Heley K, Vanderpool RC, Vedham V. Global cancer stigma research: a US National Cancer Institute workshop report. JNCI Monogr. 2024;2024(63):4–10. https://doi.org/10.1093/jncimonographs/lgad038.
17. Bedi S, Strachan R, Zehbe I. Awareness of human papillomavirus infection among indigenous males in North America and Oceania: a scoping review. Cancer Causes Control. 2024;35(3):437–49. https://doi.org/10.1007/s10552-023-01804-w.
18. Calvo-Torres J, Rejas-Gutiérrez J, Ramírez-Mena M, Bradbury M, Del Pino M, González-Granados C, et al. Population-based norms for the human papillomavirus-quality of life (HPV-QoL) questionnaire: a cross-sectional multicenter study. Acta Obstet Gynecol Scand. 2024. https://doi.org/10.1111/aogs.14877.
19. Pourebrahim-Alamdari P, Mehrabi E, Nourizadeh R, Esmaeilpour K, Mousavi S, Hakimi S. The effect of face-to-face and phone call motivational interviewing on cervical cancer screening. Cancer Nurs. 2022;45(6):E897–902. https://doi.org/10.1097/NCC.0000000000001089.
20. Bischof G, Bischof A, Rumpf H-J. Motivational interviewing: an evidence-based approach for use in medical practice. Deutsches Ärzteblatt International. 2021;118(7):109. https://doi.org/10.3238/arztebl.m2021.0014.
21. Baldwin AS, Zhu H, Rochefort C, Marks E, Fullington HM, Rodriguez SA, et al. Mechanisms of self-persuasion intervention for HPV vaccination: testing memory and autonomous motivation. Health Psychol. 2021;40(12):887. https://doi.org/10.1037/hea0001075.

22. Langlois S, Goudreau J. Motivational interviewing implementation in primary care: a terrifying challenge becoming a Professional Revelation. Health Educ Behav. 2024;51(2):260–9. https://doi.org/10.1177/10901981221139808.
23. White WL, Miller WR. The use of confrontation in addiction treatment: history, science and time for change. Counselor. 2007;8(4):12–30.
24. Cascaes AM, Bielemann RM, Clark VL, Barros AJ. Effectiveness of motivational interviewing at improving oral health: a systematic review. Rev Saude Publica. 2014;48(1):142–53. https://doi.org/10.1590/S0034-8910.2014048004616.
25. Said S, Hassan H, Sarhan A. Effect of an educational intervention on women's knowledge and attitude regarding cervical cancer. Am J Nurs Res. 2018;6(2):59–66. https://doi.org/10.12691/ajnr-6-2-4.
26. Fields A. Resolving patient ambivalence: a five session motivational interviewing intervention. Hollifield Associates; 2006.
27. Lovibond S, Lovibond P. Manual for the depression anxiety stress scales. Sydney: Psychology Foundation; 1995.doi org/101037/t01004-000. 1995.
28. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression anxiety stress scales in clinical groups and a community sample. Psychol Assess. 1998;10(2):176. https://doi.org/10.1016/s0005-7967(96)00068-x.
29. Sahebi A, Asghari M, Salari R. Validation of depression anxiety and stress scale (DASS-21) for an Iranian population. Full Text in Persian; 2005.
30. Ngu SiewFei NS, Wei Na WN, Kwan T, Chu M, Tse KaYu TK, Chan K et al. Impact of different educational interventions on psychosocial well-being of women with a positive high-risk human papillomavirus and normal cervical cytology: a randomised trial. 2018. 39(2):146–55. https://doi.org/10.1080/0167482X.2017.1312335
31. Lugović-Mihić L, Cvitanović H, Djaković I, Kuna M, Šešerko A. The influence of psychological stress on HPV infection manifestations and carcinogenesis. Cell Physiol Biochem. 2021;55(S2):71–88. https://doi.org/10.33594/000000395.
32. Uzun SB, Sakin Ö, Hüseyin Ç, Şimsek EE. The effects of HPV test on anxiety, emotion and depression in women. 2020. https://doi.org/10.4274/jarem.galenos.2020.3106

Publisher's note