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Research Article

Cervical Cancer Prevention in Tunisia: Women's Knowledge, Practices, and Barriers to Pap Smear Screening – A Cross-Sectional Study

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Abstract:

Background/Aim:

Cervical cancer remains a major public health problem, particularly in low- and middle-income countries. In Tunisia, cervical smear screening is the cornerstone of secondary prevention, yet coverage remains insufficient. This study aimed to assess women's knowledge, attitudes, and barriers towards cervical smear screening.

Methods:

We conducted a descriptive cross-sectional study using an online questionnaire distributed via social media between April 27 and May 31, 2025. Eligible participants were sexually active Tunisian women. The questionnaire included sociodemographic characteristics and knowledge, attitudes, and practices regarding cervical smear screening. Data were analyzed using Microsoft Excel.

Results:

A total of 104 responses were analyzed. Most participants were aged 18–34 years (71%) and had a higher education level (78%). Only 24% reported having undergone a cervical smear in the last three years. Knowledge gaps were identified: 42% believed screening should start after 30 years or only in case of symptoms, and only 14% knew the recommended 3-year interval between two normal smears. Although 68% were aware of the HPV vaccine, only 39% could identify it by name. The main barriers to screening were lack of information (54%) and fear of the procedure (22%).

Conclusion:

Despite the availability of cervical smear screening in Tunisia, uptake remains low and misconceptions persist. Lack of information and misconceptions represent major obstacles. Strengthening health education, involving primary healthcare providers, and integrating HPV vaccination programs are essential to improve cervical cancer prevention strategies.

Keywords: cervical smear; cervical cancer; screening; HPV; prevention; women

Introduction

In 2022, cancer was responsible for nearly 9.7 million deaths worldwide, with approximately 44% occurring in women [1] This alarming figure highlights the substantial burden of cancer on global public health, particularly cervical cancer, which remains a major cause of preventable mortality in women. Cervical cancer ranks as the fourth most common cancer among women, with around 660,000 new cases reported in 2022. More than 94% of the approximately 350,000 deaths related to this cancer occur in low- and middle-income countries, where access to screening and healthcare services is limited [2].

In Tunisia, cervical cancer screening primarily relies on the Pap smear, offered to women aged 25 to 65 years, with a triennial interval after two consecutive normal smears performed one year apart. Human papillomavirus (HPV) testing can serve as a complementary tool, allowing identification of women carrying high-risk HPV strains even in the absence

of visible cytological lesions. However, its use remains limited in resource-constrained settings due to cost and accessibility [1]

HPV vaccination also represents a major advance in primary prevention. It targets the most oncogenic genotypes, particularly types 16 and 18, which are responsible for nearly 70% of invasive cervical cancer cases [3] . Despite the availability of these preventive measures, cervical cancer remains a significant concern in Tunisia, with more than 300 new cases and approximately 185 deaths reported annually. Most cases are diagnosed at an advanced stage, reflecting insufficient screening coverage [4].

In this context, the introduction of HPV testing and the imminent rollout of HPV vaccination offer new opportunities to strengthen cervical cancer prevention in Tunisia. A reflection is needed on the paradox between advances in medical care and the persistent mortality rates.

This study aims to:

- Assess women's knowledge and attitudes regarding Pap smear screening.
- Demonstrate the importance of this examination, provide educational and preventive messages, and identify barriers to its utilization.

Materials and Methods:

Studydesign

This was a descriptive cross-sectional study.

Study setting and period

The survey was conducted online via social media platforms over a five-week period, from April 27 to May 31, 2025.

Study population

The study targeted sexually active Tunisian women from different sociocultural and educational backgrounds.

- **Inclusion criteria:** all sexually active Tunisian women with internet access who agreed to participate.
- **Exclusion criteria:** women who had never engaged in sexual activity and those without access to the internet.

Data collection

Data were collected using a self-administered online questionnaire developed on Google Forms. The questionnaire consisted of 24 items divided into two sections:

1. Sociodemographic and clinical characteristics (11 questions).
2. Knowledge, attitudes, and practices related to cervical smear screening (13 questions).

Data analysis

Responses were coded and analyzed using Microsoft Excel 2007. Descriptive statistics were used to summarize the data.

Literature review

Relevant literature was reviewed using PubMed, Google Scholar, and ScienceDirect. The main keywords used were: *cervical smear, cervical cancer, screening, prevention, knowledge, women*.

Ethical considerations

Ethical principles were respected. Participation was voluntary, and the questionnaire was anonymous and confidential. No personal identifiers were collected, ensuring participant privacy.

Results:

A total of 110 responses were collected, of which 104 were retained for analysis after excluding six incomplete questionnaires.

Sociodemographic and clinical characteristics

Most participants were young women, with 71% aged between 18 and 34 years. A large majority (78%) had a higher education level. Regarding obstetric history, 89% of the women had children, and more than half (54%) were multiparous. Cesarean section was the most frequent mode of delivery, reported in 59% of cases. Symptoms of gynecological disorders were reported by 24% of respondents, with vaginal infections being the most common (60%) (Figure 1), motivating them to seek Pap smear screening.

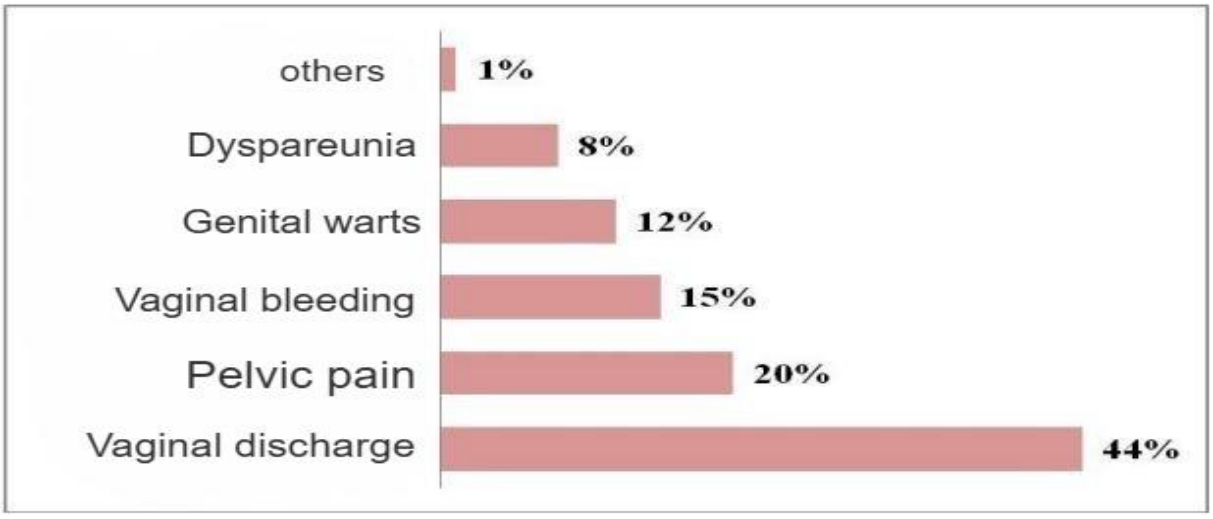

Figure 1: Reported indications for undergoing a Pap smear among participants

All women in this subgroup reported having consulted a healthcare professional. With regard to gynecological follow-up, 27% of participants declared never attending regular consultations, seeking care only during pregnancy or when symptomatic. The mean age at first sexual intercourse was 26 years (range: 17–35 years). Almost all participants (95%) reported having a single sexual partner, usually their husband.

Knowledge and attitudes towards screening and prevention

Knowledge about the Pap smear was variable. Two-thirds of the women (66%) recognized it as a test to detect abnormal or precancerous cervical cells, while 9% had no knowledge of it (figure 2).

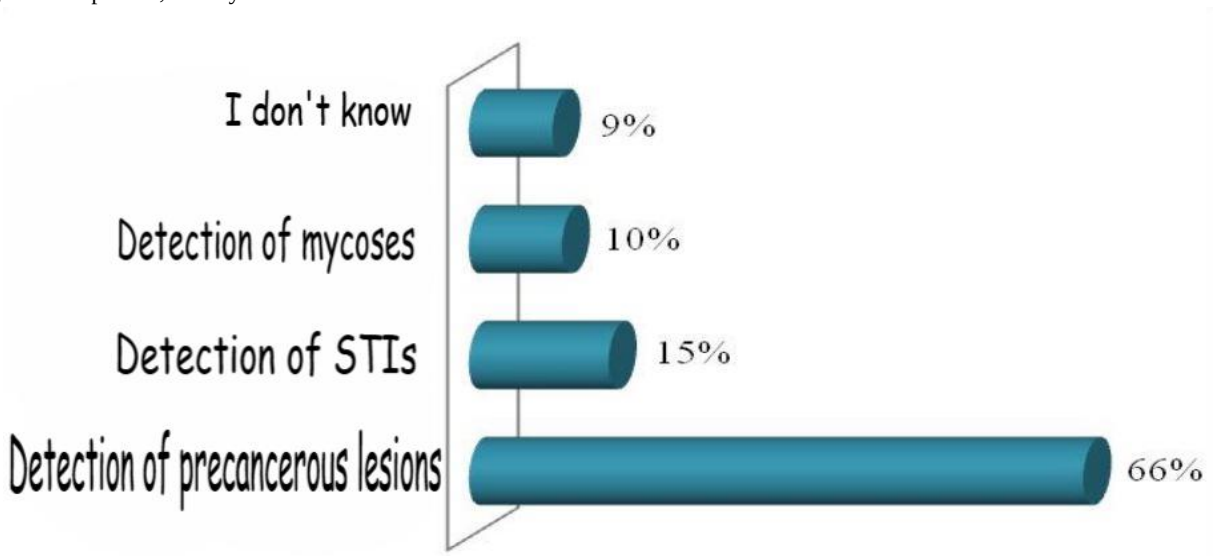

Figure 2: Distribution according to participants' understanding of the Pap smear

Concerning the perception of qualified professionals, gynecologists were most frequently cited (75 mentions, including 29 as the only professional), followed by midwives (50 mentions) and biologists (47 mentions). General practitioners were rarely mentioned (2 mentions), and nurses were almost never cited.

Regarding screening initiation, 42% of participants believed that screening should start late, between 30 and 45 years of age or only in the presence of symptoms. By contrast, only 27% gave answers consistent with international recommendations, placing the start of screening at 25 years or at the beginning of sexual activity (figure 3).

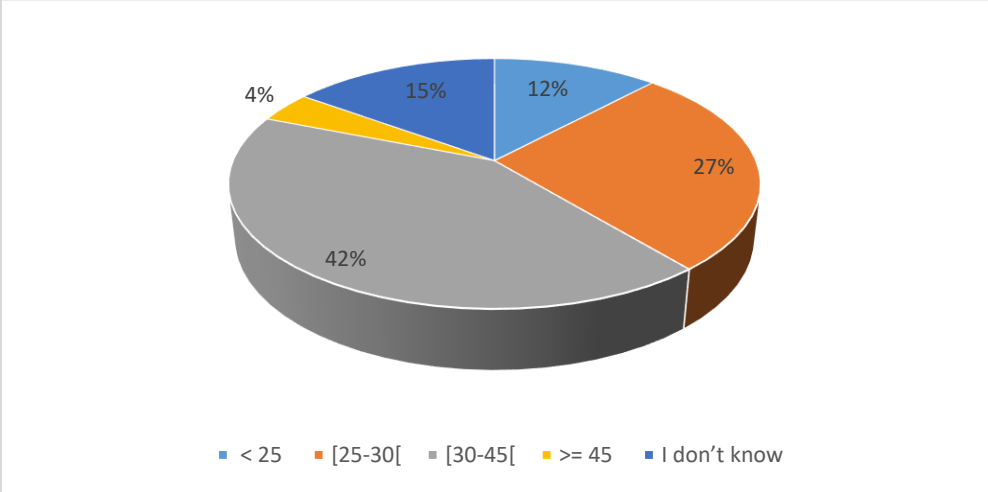

Figure 3: Perceived starting age of cervical smear screening among participants

Knowledge of the upper age limit for screening was low: only 9% correctly identified 65 years as the limit, while nearly one-third (29%) were unaware of any limit. Similarly, knowledge about the recommended interval between two normal smears was limited; 26% did not know, 22% believed the interval should be one year, and only 14% correctly identified three years.

Awareness of alternative screening methods was also poor. Only 23% of women knew about other methods of cervical cancer screening, most often citing biopsy (33%) and HPV testing (30%). Regarding HPV vaccination, 68% of participants reported being aware of the existence of a preventive vaccine, although only 39% could name it correctly. The majority of women (85%) believed that Pap smear screening remains necessary even among vaccinated women.

Practices and barriers to screening

In terms of actual practice, only 24% of the participants had undergone a Pap smear during the previous three years. The most frequent indications

for screening were pregnancy (28%) and the occurrence of genital warts (24%). The main barriers to screening were insufficient information, reported by more than half of the women (54%), followed by fear of the procedure (22%) (figure 4).

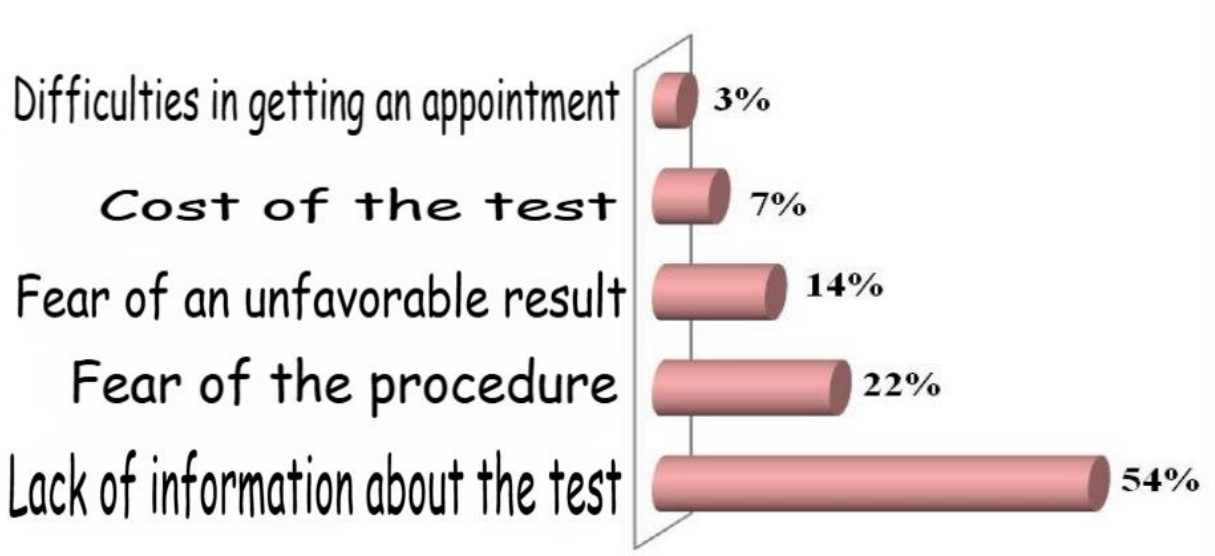

Figure 4: Reported barriers to undergoing a Pap smear among participants

Discussion:

1. Characteristics of the study population

The human papillomavirus (HPV) is recognized by the Haute Autorité de Santé as the main causal agent of cervical cancer [5]. and data from the Institut Pasteur indicate that approximately one in three women becomes infected with HPV between adolescence and early adulthood, highlighting its high prevalence among young women [6]. In our study, 89% of participants had children, with 54% being multiparous, a factor consistently associated with increased cervical cancer risk. A recent meta-analysis confirmed that women with multiple pregnancies are up to 2.6 times more likely to develop cervical cancer, particularly in the presence of persistent HPV infection [7]. Vaginal delivery, observed in 41% of cases, may contribute to cervical trauma, facilitating viral genome integration into epithelial cells and promoting precancerous lesions, as supported by the multicentric IARC case-control study showing a significant risk increase among HPV-positive multiparous women [8]. Regarding gynecological history, 24% of participants reported disorders, mainly vaginal infections (60%), pelvic pain (22%), abnormal bleeding (15%), and genital condylomas (12%), consistent with WHO reports on the high prevalence of gynecological disorders among women of reproductive age (9). Such conditions, particularly recurrent vaginal infections, may coexist with high-risk HPV infections and often prompt medical consultation and Pap smear testing, occasionally leading to incidental detection of intraepithelial neoplasia [10]. Despite 100% of symptomatic women consulting a healthcare professional, only 40% underwent a Pap smear, illustrating a missed opportunity for systematic screening in line with WHO recommendations (2). Only 51% of respondents reported regular annual gynecological follow-up, whereas 27% had irregular or no follow-up, often consulting only in response to symptoms or during pregnancy, delaying early detection of precancerous lesions [11]. The mean age at first sexual intercourse was 26 years (range 17–35), higher than reported in the French Baromètre Santé survey (17.6 years) [12] ; early sexual initiation, especially before age 20, doubles the risk of cervical precancerous lesions due to prolonged HPV exposure [13]. Although multiple sexual partners are a major risk factor, 95% of participants reported only one lifetime partner, usually their husband, but partner sexual behavior remains a key determinant of HPV exposure, as monogamous women can still contract HPV through partners with multiple sexual contacts [14]. These findings underscore the importance of prioritizing cervical cancer screening, HPV vaccination programs before sexual debut, and comprehensive prevention strategies combining vaccination, regular screening, and sexual health education

In our study, 66% of participants correctly identified the Pap smear as a screening tool for detecting precancerous lesions. However, misconceptions were common: 10% associated it with yeast infection diagnosis, 15% with sexually transmitted infections, and 9% admitted ignorance. Similar findings have been reported in Morocco [15] and Nepal [16]. These misconceptions suggest confusion between different gynecological examinations and highlight the urgent need for clearer education regarding the Pap smear's purpose.

Participants most frequently identified gynecologists as competent to perform Pap smears, followed by midwives, biologists, and general practitioners. These results echo earlier studies showing that gynecologists are perceived as the primary providers for cervical screening [17]. However, the limited awareness of other qualified professionals, particularly general practitioners and midwives, may constitute a barrier to screening uptake. Expanding information on the diversity of qualified providers could improve accessibility.

Our findings revealed gaps in knowledge regarding screening guidelines. While 27% aligned with recommendations (initiation at age 25 or sexual debut [14],42% believed screening should begin later (30–45 years or symptomatic), and 15% reported no knowledge. Regarding frequency, only 14% correctly cited the recommended three-year interval after two normal smears, while 22% thought annual screening was necessary, and 26% admitted not knowing [18]. These misconceptions may lead to under-screening or unnecessary overuse of medical resources [2].

Only 23% of participants reported awareness of alternatives to Pap smear, with few citing HPV testing. This limited awareness mirrors findings among healthcare workers in Cameroon, where HPV test knowledge was

low [18] Similarly, while 68% knew of the HPV vaccine, only 39% could correctly name it, reflecting superficial knowledge also observed in sub-Saharan Africa [3]. These results emphasize the need for better communication strategies to promote HPV testing and vaccination as complementary preventive tools.

Only 24% of participants reported having undergone a Pap smear in the past three years. Most screenings were opportunistic, performed during pregnancy (28%) or due to genital warts (24%), while only 20% were systematic. This trend is consistent with WHO data, which highlight the predominance of opportunistic screening in low-resource settings [3] . In Tunisia, coverage remains particularly low, estimated at 12.7% in 2018 [4] . These findings call for the integration of cervical cancer screening into maternal and reproductive health services to ensure systematic access.

The main barrier identified in our study was lack of information (54%), followed by fear of the procedure (22%), fear of results (14%), cost (7%), and difficulty obtaining an appointment (3%). These findings align with earlier work by Chabrot et al. [19] . The intimate nature of the examination may contribute to discomfort and reluctance [20] . Improving patient education, providing reassurance, and ensuring respectful care are critical to overcoming these barriers.

3. Strengths and limitations of the study

The online format enabled rapid data collection and reduced costs but introduced selection bias, excluding women with limited internet access or low literacy. The inability to conduct follow-up interviews limited the depth of qualitative analysis. Nevertheless, this study highlights key issues related to women's knowledge, attitudes, and barriers regarding cervical cancer screening in Tunisia.

4. Recommendations and perspectives

Based on our findings, several recommendations can be made:

- Strengthen education and awareness campaigns on Pap smear and HPV vaccination, using community media and social networks to reach underserved women.
- Involve general practitioners and midwives more actively in screening programs.
- Integrate cervical screening systematically into maternal and reproductive health consultations.
- Provide continuous training for healthcare professionals on patient education and communication.
- Develop culturally appropriate educational materials to improve women's knowledge and adherence.

Conclusion:

This study highlights significant gaps in knowledge, attitudes, and practices regarding cervical smear screening among Tunisian women. Screening uptake remains low, with major barriers including lack of information and fear of the procedure. Targeted education, integration of screening into routine reproductive health services, and HPV vaccination are essential to improve prevention and reduce the burden of cervical cancer in Tunisia.

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