

Determinants of PAP Smear Testing among Women Attending Primary Health Care Centers. A study in Hilla City / Babil Governorate / Iraq 2015

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Abstract: *This cross-sectional study assessed determinants of Pap smear uptake among 385 women aged 20–64 attending primary health centers in Hilla City, Iraq. Despite 86% awareness of cervical cancer, only 52% knew about Pap smears, with just 6% having ever undergone screening. Key barriers included fear (72.2%), embarrassment (70%), lack of provider recommendations (30.1%), and misconceptions (e.g., "no symptoms, no need"). Higher education and income correlated with better knowledge, while married and employed women had more positive attitudes. Most (97.4%) preferred female providers. Findings highlight critical gaps in knowledge, cultural barriers, and systemic weaknesses in healthcare promotion. Targeted education, provider engagement, and gender-sensitive services are urgently needed to improve screening rates in Iraq.*

Keywords: cervical cancer, Pap smear, screening barriers, women's health, Iraq

1. Introduction

Cervical cancer is a significant global health concern, particularly for women over 30, yet it is preventable through regular screening and early detection (1). The primary cause, human papillomavirus (HPV), is a sexually transmitted infection, making cervical cancer highly preventable with timely interventions (1). Despite this, cervical cancer remains a "silent killer" in many developing countries, because symptoms typically manifest in advanced stages, leaving women unaware until treatment options are limited (2). Screening programs, such as Pap smears, can reduce cervical cancer incidence by up to 90% where coverage and quality are high (3). However, disparities persist: while 40–50% of women in developed countries undergo screening, only about 5% do so in developing nations (4). In Iraq, particularly Babil Governorate, determinants of screening participation remain understudied, necessitating this investigation.

The cervix, connecting the uterus to the vagina, is where most cervical cancers originate, typically at the junction of the endocervix and ectocervix (5). Cervical cancer develops from precancerous dysplasia, which may progress if untreated (5). Squamous cell carcinoma (80–90% of cases) and adenocarcinoma are the main types, with the former linked to HPV-induced cellular changes (5). Globally, cervical cancer is the fourth most common female cancer, with over 527,000 new cases in 2012, disproportionately affecting low-resource regions (6). Incidence peaks at ages 30–34 and 80–84, reflecting HPV exposure and reduced immune function in older age (7, 8). In Iraq, incidence is relatively low (1.7 per 100,000), yet late-stage diagnosis is common, with 43% of cases occurring in women under 45 (5, 9). A WHO pilot study in Iraq highlighted that combining colposcopy, cytology, and HPV testing improves detection, but screening uptake remains inadequate (10).

Risk factors include early sexual activity, multiple partners, high parity, smoking, and immunosuppression (11). Persistent HPV infection (especially strains 16 and 18) is the primary cause, present in nearly all cervical cancers (5, 12).

Vaccination against HPV, recommended before sexual debut, offers significant prevention potential (13, 14). Countries like Italy have implemented free HPV vaccination for girls aged 12, yet vaccine uptake in many regions remains low (115).

The Pap smear, developed by George Papanicolaou, revolutionized cervical cancer prevention by detecting precancerous changes (16, 17). Organized screening programs in countries like Canada and Sweden have drastically reduced cervical cancer rates (18, 19). However, in developing nations, programs often fail due to logistical, financial, and sociocultural barriers (14). For instance, in Africa and parts of Asia, low awareness, economic constraints, and lack of healthcare access hinder screening (20, 21). Studies in Tanzania, India, and South Africa reveal that knowledge gaps and misconceptions—such as fear of pain or embarrassment—deter women from screening (22, 23, 24). Even among healthcare workers, awareness is often insufficient (25).

In the Middle East, cultural and structural barriers further complicate screening efforts. In Qatar, while 76% of women knew about Pap smears, practice was low among younger, less-educated women (26). Similarly, in Kuwait and Jordan, lack of physician recommendations and fear of results were major deterrents (27, 28). Iraqi immigrant women in Malaysia exhibited poor awareness, underscoring the need for targeted education (29). In Iraq, a 2012 screening pilot in Hilla faced administrative challenges, limiting implementation to high-risk women in select hospitals.

This study aims to identify barriers to Pap smear screening among women in Hilla, assessing knowledge, attitudes, and practices while exploring sociodemographic influences. Findings will inform policymakers on expanding screening programs to reduce cervical cancer morbidity and mortality in Babil Governorate.

2. Methodology

2.1 Study Design and Setting

This study employed a cross-sectional survey design to assess the determinants of Pap smear testing among women in Hilla City, Babil Governorate, Iraq. A total of 385 women aged 20–64 years were recruited from five randomly selected Primary Health Care Centers (PHCCs)

2.2 Study Population

Women aged 20–64 years attending selected PHCCs were included if they met the criteria:

- Married or previously married.
- Hilla residents.
- No speech/hearing impairments or cancer history.

2.3 Data Collection

A structured **Questionnaire** tool adapted from prior studies [(24, 26,30, 31, 32–34)] included four sections:

- **Socio-demographics:** Age, education, income, marital status, parity, contraception, smoking, family cancer history.
- **Knowledge:** Cervical cancer/Pap smear awareness, risk factors, screening intervals.
- **Attitude:** Health Belief Model (HBM) constructs: *perceived susceptibility, severity, benefits, barriers* [(35, 36–38)].
- **Practice:** Screening participation and behaviors.

2.4 Operational Definitions

- **Knowledge:** Understanding of cervical cancer screening (<60=poor, 60–80=moderate, ≥80=good) [(33)].
- **Attitude:** HBM-based Likert scales. *Barriers* were inversely scored.
- **Practice:** Self-reported screening behaviors.
- **Smoking Status:** Defined per CDC criteria [(36)].

2.5 Statistical Analysis

The collected data were analyzed using **SPSS version 21**. Descriptive statistics, including frequencies and graphical representations were used. Independent samples *t*-tests and analysis of variance (ANOVA) were employed to compare mean differences between groups for continuous variables, while chi-square tests assessed associations between categorical variables. Statistical significance was set at **p ≤ 0.05** for all tests.

2.6 Ethical Considerations

Written informed consent was obtained from all participants, clarifying the study's purpose, voluntary participation, and the right to withdraw at any stage. all collected data were anonymized and used exclusively for research purposes.

3. Results

1) Descriptive Statistics

a) Socio-Demographic Characteristics

- **Education:** Nearly half (47.8%) had primary education, while 23.9% had higher education.
- **Marital Status:** Most were married (92.7%).
- **Employment:** 76.1% were unemployed (housewives).
- **Income:** Only 16.4% reported sufficient monthly income.
- **Age at Marriage:** 72.5% married at ≥18 years.
- **Smoking:** 97.9% were non-smokers.

Table 1: Socio-Demographic Characteristics (n=385)

Variable	Category	N	(%)
Education Level	Illiterate	65	16.9
	Primary	184	47.8
	Secondary	44	11.4
	Higher	92	23.9
Marital Status	Married	357	92.7
	Divorced/Widowed	28	7.3
Monthly Income (IQD)	Not enough	158	41.0
	Marginal	164	42.6
	Enough	63	16.4

b) Gynecological/Obstetric History

- **Parity:** 42.6% had ≥4 children.
- **Contraception:** 45.5% never used any method; 35.3% used hormonal contraception.
- **Family History of Cancer:** 24.9% reported a positive history.

Table 2: Gynecological-Obstetric Characteristics (n=385)

Variable	Category	N	%
Parity	0	19	4.9
	1–3	202	52.5
	≥4	164	42.6
Contraception Use	None	175	45.5
	Hormonal	136	35.3

c) Continuous Variables

- **Mean age:** 35.59 ± 10.53 years.
- **Marriage duration:** 14.03 ± 11.03 years.
- **Last gynecologist visit:** 2.09 ± 3.36 years.

Table 3: Continuous Variables (Mean ± SD)

Variable	Mean ± SD	Range
Age (years)	35.59 ± 10.53	20–62
Marriage duration (years)	14.03 ± 11.03	1–45

2) Knowledge About Cervical Cancer and Pap Smear

- Awareness: Only 52% had heard of Pap smear; 14% were unaware of cervical cancer.
- Source of Knowledge: 42.2% learned from friends/relatives; 26.6% from healthcare providers (Figure 1).
- Knowledge Score: Mean score: 41.9 ± 22.94 (range: 8.33–91.63). 72.4% had poor knowledge.

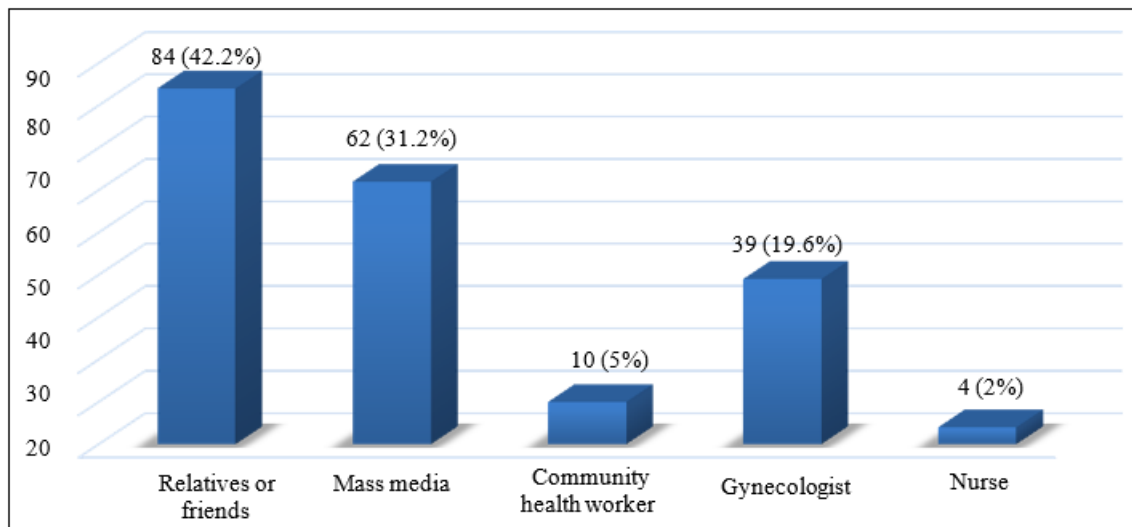


Figure 1: Distribution of the sample according to the participant's source of hearing about Pap smear

a) Key Knowledge Gaps

- Only 13.6% knew polygamy was a risk factor.
- 91% correctly linked early detection to better outcomes.
- 25.1% knew the recommended age for first Pap smear.

Table 4: Correct Responses to Knowledge Questions (n=199)

Question	Correct Answer (%)
"Polygamy is a risk factor for cervical cancer."	13.6%
"Early detection improves treatment outcomes."	91.0%

b) Factors Associated with Knowledge

- **Significant predictors:** Higher education ($p=0.004$), sufficient income ($p=0.000$), marriage age ≥ 18 ($p=0.04$).
- **Non-significant:** Age ($p=0.39$), smoking ($p=0.488$).

Table 5: Knowledge Score by Education Level

Education	Mean Score $\pm$ SD	p-value
Illiterate	28.6 $\pm$ 20.71	0.004
Higher Education	48.8 $\pm$ 24.83	

c) Attitude Toward Pap Smear

- Mean Attitude Score: 64.25 $\pm$ 10.42 (range: 41.17–88.20).
- Positive Attitude: Only 9.6%.
- Perceived Barriers: 63.1% feared pain; 70.1% found the test embarrassing.
- Attitude Predictors
 - Higher scores: Married women ($p=0.006$), employed ($p=0.04$), higher education ($p=0.013$).
 - Lower scores: Women married to polygamous men ($p=0.032$).

d) Practice/Behavior

- Pap Smear Uptake: Only 6% had ever undergone testing.
- Reasons for Non-Uptake: "No symptoms" (44.9%), "No doctor's recommendation" (30.1%).

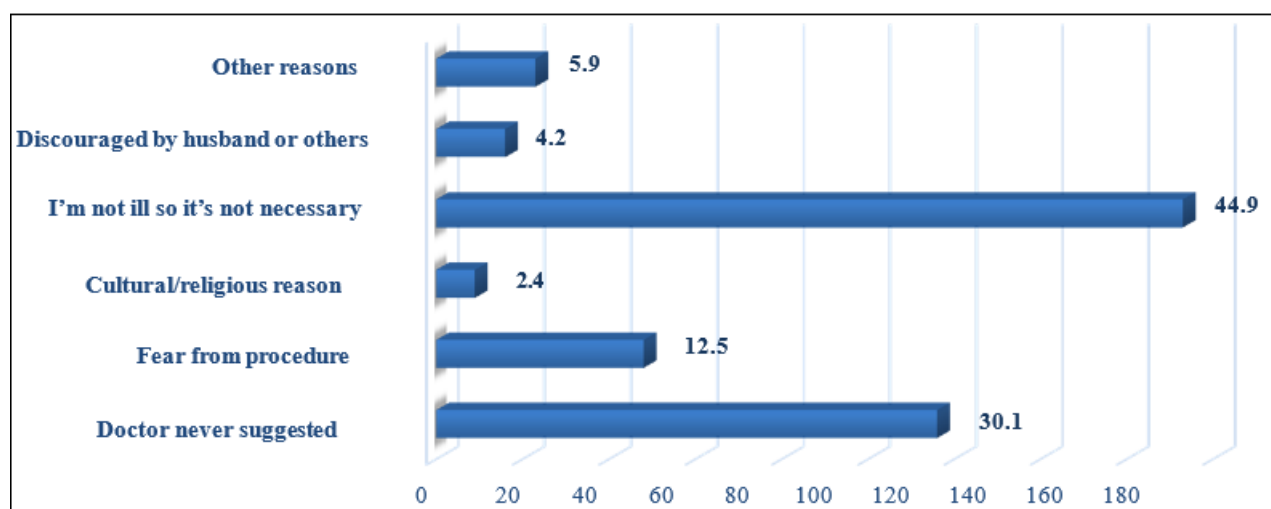


Figure 2: Reasons for Not Undergoing Pap Smear Test (n=362)

Preferences

- Preferred Venue: PHCCs (46%).
- Doctor's Gender: 97.4% preferred female providers.

3) Regression Analysis**a) Predictors of Knowledge**

- Significant: Age ($p=0.004$), education ($p=0.009$), miscarriages ($p=0.007$).
- Adjusted R^2 : 13% ($p=0.000$).

b) Predictors of Attitude

- Significant: Education ($p=0.05$), family cancer history ($p=0.04$).
- Adjusted R^2 : 41% ($p=0.001$).

Table 6: Multiple Linear Regression for Knowledge

Variable	Standardized β	p-value
Age	-0.271	0.004
Education Level	0.214	0.009

4. Discussion

High coverage of women at risk for cervical cancer is critical for successful screening programs (39). Despite the Pap smear's effectiveness, its utilization remains low, especially in primary care settings (28). Screening adherence depends on healthcare systems, providers, and women's awareness.

1) Socio-Demographic Characteristics

- Age and Education: Two-thirds of participants were illiterate or had primary education—higher than rates in Qatar (26), Turkey (40), and Iran (41) but lower than China (42). Unemployment was high (75%), potentially limiting exposure to health information.
- Employment: Unemployed women predominated, contrasting with higher employment rates in Qatar (26), Turkey (40), and Kuwait (28).

2) Knowledge

- Awareness: 86% knew about cervical cancer (higher than India (43) and Congo (44)), but only 52% knew about Pap smears (lower than India, Saudi Arabia (45), and Kuwait (64)).
- Information Sources: Friends/relatives (42.2%) were the primary source, followed by media (31.2%) and healthcare providers (26.6%), reflecting weak institutional health promotion.
- Risk Factors: Hormonal contraception (43.7%) and smoking (39.2%) were most recognized, but knowledge of polygamy (13.6%) and early marriage (21.6%) was poor.
- Screening Awareness: 54.3% knew Pap smears detect cancer early—lower than Qatar (26) but higher than Kuwait (28). Only 13.1% knew the correct screening frequency.

3) Determinants of Knowledge:

- Age/Education: Younger and more educated women scored higher (consistent with Qatar (26) and Brazil (46)).
- Income/Parity: Higher income and parity 1–2 correlated with better knowledge.

- Healthcare Engagement: No association with marital/employment status, but miscarriage history improved knowledge.

4) Attitude

- Perceived Susceptibility/Severity: Low perceived risk (18.4% felt vulnerable; 12.5% acknowledged risk). Severity awareness was moderate (half believed cervical cancer was curable).
- Barriers: Fear (72.2%), embarrassment (70%), and pain (63%) deterred participation, aligning with Turkish (40) and Kuwaiti (28) studies.

5) Determinants of Attitude:

- Education/Marital Status: Higher education and marriage improved attitudes.
- Employment/Family History: Working women and those with cancer family history had better attitudes.

6) Practice/Behavior

- Screening Rates: Only 5.5% had ever undergone a Pap smear—far lower than Jordan (27), Kuwait (28), and Brazil (46).
- Barriers:
 - No symptoms (44.9%) was the top reason.
 - Lack of provider recommendation (30.1%) highlighted systemic gaps.
 - Fear of pain/embarrassment (12%) also contributed.
- Preferences: 83% were willing to screen nationally; 97.4% preferred female providers.

5. Limitations

- Cross-Sectional Design: Causality cannot be inferred.
- Self-Reported Data: Potential bias in attitude/knowledge measurements.

6. Conclusion

Low screening rates stem from poor knowledge, negative attitudes, and systemic barriers (e.g., lack of provider recommendations). Targeted education, provider engagement, and addressing cultural fears (e.g., embarrassment) are essential for improving screening uptake in Iraq.

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