



## Women's knowledge, awareness and attitudes toward newly implemented national HPV-based screening in Turkey

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### ABSTRACT

**Objective:** The success of any cancer screening policy is known to be closely related to the population's participation in screening programs and baseline knowledge about cancer and the screening program. We investigated popular awareness, knowledge and attitudes towards cervical cancer, HPV and the screening program after HPV-based screening began in Turkey.

**Methods:** A gynecologist administered questionnaire was conducted to 429 women aged 30–65 years in a tertiary care settings. Sociodemographic characteristics, awareness, knowledge and attitude toward HPV, cervical cancer, HPV vaccine national HPV based cervical cancer screening was assessed. Factors affecting for attendance to national cervical cancer screening was investigated.

**Results:** 53 participants (12.4%) had heard about HPV, and only 11 (2.6%) had knowledge of HPV transmission. 123 (28.7%) participants had attended national cervical cancer screening. After giving information about cervical cancer and the national cervical cancer screening program to participants who had not attended cervical cancer screening, 295 (96.4%) participants stated that they would attend national cervical cancer screening. Having a university education (OR: 2.895, 95% CI: 1.349–6.213,  $p = 0.006$ ), being an employer (OR: 2.540, 95% CI: 1.513–4.264,  $p < 0.001$ ), and total family income above the poverty line (OR: 2.438, 95% CI: 1.204–4.935,  $p = 0.01$ ) were related to participation in national cervical cancer screening.

**Conclusion:** Education regarding cervical cancer and screening program especially from a gynecologist is important for participation of women in a screening program. Women's being a university graduate, having a job in the community and high financial power should be encouraged.

### 1. Introduction

The World Health Organization estimates that approximately 570,000 women were diagnosed with cervical cancer in 2018 and that 311,000 women died due to the disease [1]. More dramatically, 80% of these cases occur in developing and underdeveloped countries [2]. Decreasing rates of cervical cancer incidence and disease mortality over the past 5 decades can be attributed to well-organized high-quality population-based cervical cytology screening programs in developed countries [3]. However, the implementation and execution of cytology-based screening for a whole population is complex, expensive and has failed to achieve similar results in developing countries. Turkey initiated population-based cervical cancer screening using cytology in 2004; however, the annual attendance rate remained only 1–2%, without any increase in the years following implementation.

HPV-based primary screening is a new screening strategy currently recommended by the WHO, IARC and European Union [4,5]. HPV-

based population screening strategies have been implemented in developed countries such as Australia, Norway and Netherlands. After 10 years of low attendance rates and difficulties in cytology-based screening, Turkey initiated a new nationwide screening policy using HPV DNA analysis in 2014 [6].

The success of any cancer screening policy is known to be closely related to the population's participation in screening programs and baseline knowledge about cancer and the screening program. Numerous studies have reported the attendance rates, cervical cancer knowledge levels, and popular attitudes towards population-based cytology screening globally [7–14]. We investigated popular awareness, knowledge and attitudes towards cervical cancer, HPV and the screening program after HPV-based screening began in Turkey. We aimed to define the factors underlying participation in national HPV-based cervical cancer screening in the setting of a low socioeconomic level.

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## 2. Material and methods

### 2.1. Ethics

The study protocol was in accordance with the Declaration of Helsinki and was approved by both the Turkish Ministry of Health (approval number: 23776858-622.03) and the institutional Ethics Committee at Dumlupınar University (approval number: 2017/6-11). Each participant was given an explanation of the study purpose. Written informed consent was obtained in accordance with the Helsinki Declaration, including protections of confidentiality and privacy, voluntary participation and the right to withdraw from the study at any time without any problems in receiving healthcare services.

### 2.2. Cervical cancer screening in Turkey

HPV-based screening was first implemented in Turkey in 2014. Women aged 30–65 years are invited for screening every 5 years. A subsequent 5-fold increase in the cervical cancer screening rate was established compared with the cytology-based screening that began in 2004 [6].

### 2.3. Study design

The study was conducted in the small city of Kütahya in Turkey. Kütahya is located in the western (Aegean) part of Turkey, but it is one of the most socioeconomically underdeveloped cities in Turkey [15]. Most people in this region live below the poverty line. There is only one government hospital with a gynecology clinic in the city center. The city hospital is free of charge for people with national government insurance.

Participants completed the questionnaire in a gynecologist's office between September 15, 2017 and March 1, 2018. Participants were referred to the gynecologist's office for any general gynecological problem or consultation, such as abnormal uterine bleeding, amenorrhea, pelvic pain, vaginal discharge, etc. Gynecologists provided information directly and asked each question during a face-to-face interview after the gynaecological examination. Patients were asked to participate in the survey by the gynaecologist who examined them, which may have contributed to the 100% participation rate. Women aged between 30 and 65 years were included in the present study. Hysterectomized patients, pregnant women, participants who could not be communicated with due to either language or mental disabilities, participants with a known history of cervical cancer or a cervical premalignant disease, referral patients from cancer screening centers and virgins were excluded from the study.

### 2.4. Questionnaire

The questionnaire contained 22 questions prepared based on a literature review and the experiences of a gynecological oncologist about public awareness of cervical cancer. The questionnaire was designed in the Turkish language and grouped into 4 parts: Part 1: Demographic and sociocultural questions including age, marital status, age at marriage, level of educations, gravidity, parity, and whether the monthly family income is above the poverty line. The poverty line was calculated based on governmental official data as approximately 1.190 € for a family of four. Part 2: Awareness, knowledge and attitude toward HPV infection, cervical cancer and HPV vaccination, Part 3: Awareness and attitude about cervical cancer screening (whether she had participated in the national cancer screening, and for what reason if not, Part 4: After brief information was given to the participant by a gynecologist about cervical cancer and the national cervical cancer screening program (Appendix 1), the participant's attitude towards the national cervical cancer screening program was obtained.

### 2.5. Statistical method

The data collected from participants were transferred into SPSS version 23.0 for Windows (SPSS, Chicago, IL). Normal distribution of the continuous variables (age and parity) was evaluated using visual (e.g., histograms and probability plots) and analytical (Kolmogorov–Smirnov and Shapiro–Wilk's tests) methods. Because none of the data sets were normally distributed, data were expressed as medians and percentiles. Continuous variables were also compared using Mann–Whitney U tests and expressed as median values in the entire study group. Categorical descriptive features, knowledge and attitude about HPV, cervical cancer and national screening are shown as numbers and percentages and compared using Chi-square tests. Participation in cervical cancer screening was defined as the dependent variable. Participant age, smoking habits, parity, educational status, marital status, occupational status, age at marriage, living place, and total family income were defined as the independent variables. Independent variables with p values < 0.1 in the univariate analysis were included in the multiple logistic regression analysis. The forward likelihood ratio method was used, and p values < 0.05 were defined as statistically significant.

## 3. Results

A total of 429 women participated in the survey and were evaluated within the scope of the study. None of the patients had a history of HPV vaccine.

### 3.1. Demographic and sociocultural characteristics

Demographic and sociocultural characteristics of the participants are shown in Table 1. The median participant age was 42 years. 41 (9.6%) participants had graduated from a university or received higher education. 279 (65%) women were living in the city center, and 51 (11.9%) participants had an annual family income above the poverty line.

**Table 1**  
Demographic and sociocultural characteristics of participants.

Characteristic	Parameters	Values (%)
Age (years)	Median	42
	25th–75th percentiles	37–50
Smoking status	Smoker	73 (17.0)
	Non-smoker	356 (83.0)
Parity	Median	2
	25th–75th percentiles	1–3
Educational status	Secondary school	388 (90.4)
	University	41 (9.6)
Marital status	Married	339 (79.0)
	Single, divorced, widow	90 (21.0)
Occupational status	Employed	103 (24.0)
	Unemployed	326 (76.0)
Age at marriage	≤ 26	384 (89.5)
	> 26	28 (6.5)
Living place	Urban	279 (65.0)
	Rural	150 (35.0)
Use of contraceptive method	None	195 (45.5)
	Condom	81 (18.9)
	Intrauterine device	73 (17.0)
	Oral contraceptive	10 (2.3)
	Tubal ligation	6 (1.4)
	Other	64 (14.9)
Total family income	Below the poverty line	378 (88.1)
	Above the poverty line	51 (11.9)

**Table 2**  
Knowledge and attitude about HPV, cervical cancer and national cervical cancer screening.

Question	Answer	N (%)
Have you ever heard of HPV?	Yes	53 (12.4)
	No	376 (87.6)
Do you know the routes of the transmission of HPV?	Yes	11 (2.6)
	No	418 (97.4)
Do you know about HPV-related cancers?	Yes	3 (0.7)
	No	426 (99.3)
Is cervical cancer preventable?	Yes	186 (43.4)
	No/I don't know	243 (56.6)
Do you know about national cervical cancer screening?	Yes	203 (47.3)
	No	226 (52.7)
Where did you learn of national cervical cancer screening? <sup>a</sup>	Health professionals	152 (74.9)
	Others	51 (25.1)
	Yes	123 (28.7)
Did you participate in national cervical cancer screening?	Yes	123 (28.7)
	No	306 (71.3)
Why didn't you participate in national cervical cancer screening? <sup>b</sup>	Lack of knowledge	20 (25.0)
	No risk	20 (25.0)
	Fear	27 (33.8)
	Lack of time	13 (16.2)
Would you like to participate in national cervical cancer screening? <sup>c</sup>	Yes	295 (96.4)
	No	11 (3.6)

Abbreviations: IQR, interquartile range; HPV, human papilloma virus.

<sup>a</sup> Among women who know about the national cervical cancer screening program.

<sup>b</sup> Among women who know about but did not participate in the national cervical cancer screening program.

<sup>c</sup> Among women who did not participate in the national cervical cancer screening program.

### 3.2. Knowledge and attitude about HPV, cervical cancer and national screening

Table 2 shows the participants' knowledge and attitude about HPV, cervical cancer and national screening. 53 participants (12.4%) had heard about HPV, and only 11 (2.6%) had knowledge of HPV transmission. 203 (47.3%) participants had heard about the national cervical cancer screening program, and 152 (74.9%) indicated that health professionals were the source of information. 123 (28.7%) participants had attended national cervical cancer screening. Among the 80 participants who had knowledge of the national cervical cancer screening program, 25 (33.8%) stated fear as a major reason for not participating in the screening program. After giving information about cervical cancer and the national cervical cancer screening program to participants who had not attended cervical cancer screening, 295 (96.4%) participants stated that they would attend national cervical cancer screening.

### 3.3. Features predicting attendance in national cervical cancer screening program

A comparison of descriptive features based on participation in national cervical cancer screening is shown in Table 3. According to the univariate analysis, age, parity, educational status, occupational status and total family income were analyzed by logistic regression analysis (Table 4). Having a university education (OR: 2.895, 95% CI: 1.349–6.213,  $p = 0.006$ ), being an employer (OR: 2.540, 95% CI: 1.513–4.264,  $p < 0.001$ ), and total family income above the poverty line (OR: 2.438, 95% CI: 1.204–4.935,  $p = 0.01$ ) were related to participation in national cervical cancer screening.

**Table 3**  
Comparison of descriptive features based on participation in national cervical cancer screening.

Characteristics	Parameters	Participation in national cervical cancer screening		Univariate analysis P value
		Yes	No	
Age (years)	Median	41	44	0.079
	IQR	10	14	
Parity	Median	2	2	0.208
	IQR	2	2	
Smoking habitus	Smoker	21 (28.8)	52 (71.2)	0.984
	Non-smoker	102 (28.7)	254 (71.3)	
Educational status	Secondary school	96 (24.7)	292 (75.3)	< 0.001
	University	27 (65.9)	14 (34.1)	
	Married	100 (29.5)	239 (70.5)	
Marital status	Single, divorced, widow	23 (25.6)	67 (74.4)	0.462
	Employed	53 (51.5)	50 (48.5)	
Occupational status	Unemployed	70 (21.5)	256 (78.5)	< 0.001
	Age at marriage	≤26	102 (27.3)	
Living place	> 26	15 (39.5)	23 (60.5)	0.112
	Urban	92 (33.0)	187 (67.0)	
Total income of family	Rural	31 (20.7)	119 (79.3)	0.007
	Below the poverty line	91 (24.1)	287 (75.9)	
	Above the poverty line	32 (62.7)	19 (37.3)	

Abbreviation: IQR, interquartile range.

## 4. Discussion

This is the first study to evaluate knowledge and attitudes about HPV, cervical cancer and screening following implementation of the new HPV-based national cervical cancer screening strategy in Turkey. In the present study, a majority of participants had inadequate knowledge about HPV, cervical cancer and national cervical cancer screening; 87.6% have never heard of HPV, and 56.6% did not know that cervical cancer is preventable. Additionally, 52.7% were unaware of the national cervical cancer screening program. Similarly, in a recent study from England evaluating women's awareness and attitude of primary HPV screening, the authors stated that most women did not know about HPV or the fact that cervical cancer screening currently includes HPV testing in England [16].

In a recent review analyzing barriers affecting cervical cancer screening attendance in low- and middle-income countries, lack of knowledge about the causes of cervical cancer and its treatment was the most common reported barrier [7]. Lack of knowledge of HPV, the causal relationship of HPV with cancer and its transmission route are most likely due to low education levels, cultural factors and a lack of emphasis on disease prevention among the population. Indeed, in our study, when we provided information about cervical cancer and the national cervical cancer screening program, 96.4% of the participants who had not undergone national cervical cancer screening stated that they would participate in the screening program. The effect of education on early diagnosis of cervical cancer seems to be a key factor for popular participation in screening programs. A recent study from Turkey showed that 33.6% of educated women with knowledge of the importance of disease prevention attended the screening program [17]. In a metropolis in Turkey, Dursun et al. reported in 2006 that 45% of women knew about HPV and 52% were of its transmission mode [18]. However, in the present study conducted in one of the least developed cities of Turkey, only 12.4% of women had heard of HPV, and a mere 2.6% of women knew about its transmission modes. Comparing the sociocultural and educational level of these groups, we can conclude that the level of knowledge about HPV and cervical cancer in the least-developed regions of a given country would not reach the levels in well-

**Table 4**  
Logistic regression analysis for participation in the national cervical cancer screening program.

	Coefficient	S.E.	Wald	df	p	P value	OR	95% CI for OR	
								Lower	Upper
University education	1.046	0.391	7.178	1		0.006	2.895	1.349	6.213
Employment	1.285	0.274	22.006	1		< 0.001	2.540	1.513	4.264
High income	1.091	0.396	7.605	1		0.01	2.438	1.204	4.935

Abbreviations: SE, standard error; df, degrees of freedom; OR, odds ratio; CI, confidence interval.

Hosmer and Lemeshow test value: 0.741.

Nagelkerke R square test value: 0.165.

developed regions even after more than a decade.

Four years after implementing the national HPV-based cervical cancer screening program in Turkey, the attendance rate in this hospital-based survey was higher than the average rate among 30 developing countries (28.7% vs. 19%) [8]. However, the attendance rates here are much lower than those in developed countries. The attendance coverage was reported at 63% in developed countries and higher than 80% in countries such as Austria and Luxemburg [8]. According to surveys by general practitioners working primarily in cancer screening centers, 36.5% of women accepted an invitation to attend Turkey's nationwide HPV DNA screening program and 17% did not participate in the screening program [19]. They also reported that the acceptance rate was higher with direct doctor-to-patient communication. Indeed, in our study, 74.9% of women who were aware of the national cervical cancer screening program indicated health workers as the source of information.

In our study, we found that women who are university graduates are 2.895 times more likely to attend cervical cancer screening than women with less education. A meta-analysis of 10 studies reported an increased rate of cervical cancer screening participation in women with higher educational levels (OR = 1.96, 95% CI 1.79–2.16; I (2) = 0%) [20]. The positive impact of education on cancer screening is thought to be due to its effects on socioeconomic status and via its association with knowledge of cancer screening [9]. Having a university education is also related to knowledge of other cervical cancer prevention strategies such as HPV vaccination. In a study conducted in Turkey, it has been shown that graduating from a university increases the HPV vaccine rate (OR = 3.4, 95% CI 2–5.8) [21]. In addition, we believe that being a university graduate has a positive effect on a women's self-education in a sociocultural sense and enhances her ability to understand and take action based on knowledge such as the fact that cervical cancer is preventable by screening.

In accordance with previous studies on cytology-based screening, our study demonstrates that women's employment status and financial power were positively associated with cervical cancer screening [10–13]. In our study, employed women and women with income levels above the poverty line were more likely to attend the cervical cancer screening program (OR 2.540, 95% CI 1.513–4.264 and OR: 2.438, 95% CI 1.204–4.935, respectively). A similar study from Kenya found that the rate of cervical cancer screening was 1.21-fold higher in employed women compared with unemployed women (OR = 1.21, 95% CI 1.08–1.39) [10]. In Peru, the ratio of cervical cancer screening was 43.9% in women with the lowest socioeconomic status compared with 61.7% among those of middle socioeconomic status and 72.1% in the top socioeconomic status group [11]. In Brazil, women with the lowest socioeconomic levels are 1.59 times less likely to attend screening compared with women in middle and upper socioeconomic levels [12]. In Mexico, this difference is very apparent (23.4% vs. 4.4% participation for middle-and upper-status vs. lower-status women,  $p < 0.001$ ) [13]. In a study of Korean national cancer screening, a survey reported a similar finding of low cervical cancer screening rates in low-income levels; however, that study also stated that the cancer screening rate increased from 2004 to 2012 among low-income women [14]. The

lower prevalence of cervical cancer screening among unemployed and poorer women may reflect a greater financial burden, which is a barrier to accessing cervical cancer screening services.

This study had several limitations and advantages that should be highlighted. First of all, this study is unique in that it analysed the common knowledge and attitudes regarding cervical cancer and the national screening practices present following the implementation of a new screening program and campaign in Turkey. The disclosure and presentation of the questionnaire to women by the gynaecologists who examined them led to the participation of all of the women who were asked as well as facilitated an easier understanding and completion of the questionnaire amongst the participants. However, gynaecologists did not ask women to participate in the survey if they were unsatisfied with the health service. Therefore, the knowledge, awareness, and attitudes of women with a negative perception of the health system and who are more likely to stay away from health care services could not be evaluated. Further, the study population was recruited from only one hospital in a single small, underdeveloped city in Turkey. Therefore, the findings may not be representative of those of the whole nation. However, our population included Turkish women of a low socio-cultural level and income who are therefore representative of the majority of the population in Turkey. In the country, people live mostly in less developed cities or rural areas than in larger developed city centres and experience lower education and income levels. Therefore, it is important to note that our study provides information on a highly prevalent population with a low sociocultural level and income in Turkey, and this population is known to be at a greater risk for developing cervical cancer due to their low attendance rates to cervical cancer screening. Therefore, we think that the results of our study reflect the realities of the majority of women in Turkey and consider our findings to be highly reflective of the status of this population. In a recent study, HPV awareness was inquired about in a similarly less developed city and it was found that HPV awareness is related with the level of education and total income of the family [22].

The results of our study suggest that the prevalence of cancer prevention and screening programs in society can be increased by providing citizens with a university education and encouraging them to have jobs, thus increasing their income levels. We believe that education is the most valuable example among these factors. Education positively affects people's health and increases their life expectancy. Education can also ensure that women have professions and jobs and thus have sufficient and independent income. The level of access to health and the use of health services among social classes in the society may be equalized through education [23]. In Turkey, we experienced that most people with low educational and socioeconomic status do not care about preventative health but, rather, only pay attention after a disease develops. Education enables people to achieve a level of competence in finding solutions and overcoming problems they face in life. In our country, young people have the opportunity to live in another city away from their family thanks to their university education. Further, education enables young women to take care of themselves and to gain the capacity to think and cope with life on their own terms. We believe that, when politicians take steps to overcome social barriers,

especially in the education of girls, and provide scholarships for girls' education, success can be achieved in improving the health of the population, including with regard to cervical cancer, over the long-term. In this respect, we believe that the ability of people to prevent and cope with cancer can be enhanced by increasing the education of people. Providing education to young women will increase their awareness of cancer and their desire to participate in the national cervical cancer screening program to adopt necessary precautions. For these reasons, we believe that the goals in cancer policy can be achieved by spreading and increasing the level of education among the young population.

In conclusion, our study has implications for national health care providers and policies for increasing participation in cervical cancer screening programs. We hypothesize that uneducated, jobless and poorer women become sociologically and financially dependent on their husbands. Having a job in the community, being a university graduate, and financial power increase women's self-confidence and facilitates autonomy in making decisions regarding their own health and utilization of health services.

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### Conflict of interest statement

The authors declare no conflicts of interest.

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