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Women's Preference for Cervical Cancer Screening Methods in Iran: A Contingent Valuation Survey

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Abstract

Background: Cervical cancer is the fifth most deadly cancer in women in Iran. The present study aimed to investigate the monetary value of cervical cancer screening benefits from a social perspective.

Methods: A cross-sectional study was conducted among 480 women aged 30 to 59 years in Mazandaran province, Iran, from 2020-21. The willingness to pay (WTP) for screening tests- Pap smear and simultaneous tests- was investigated using a researcher-made questionnaire based on the contingent valuation method (CVM) in 2 separate sample groups. The first group received basic information regarding cervical cancer (Scenario 1), while the second received complementary information in addition to basic knowledge (Scenario 2). Multivariate regression was applied to examine factors affecting WTP and the difference between the mean WTP in 2 scenarios was analyzed by a t-test.

Results: The mean WTP of Pap smear and simultaneous tests was estimated at US$135.08 and US$160.19, respectively. There were significant and negative relationships between age and household size with the WTP of the Pap smear test. The number of people with income, household expenses, a chronic illness, and suggested base price indicated significant and positive effects on WTP of the Pap smear test. The number of people with income and household expenses showed significant and positive relationships with the WTP of simultaneous tests. There was no significant difference between the mean WTP of each group and the demand for screening tests was not elastic.

Conclusion: The mean WTP of screening tests is notable when compared to their cost, demonstrating the need of concentrating on screening programs.

Keywords: Willingness to Pay, Screening Methods, Cervical Cancer, Contingent Valuation

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Introduction

As a chronic and noncommunicable disease, cancer is one of the top 3 causes of death worldwide, and it is extremely complicated due to its multifactorial nature (1). This disease, like other chronic diseases, occurs in every person, age group, and race an d is considered a major health problem that affects the health of society (2). Treating and caring for people with cancer is an important part of health care costs because of increasing the incidence of

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↑What is "already known" in this topic:
Cervical cancer screening procedures are critical for preventing and controlling the illness. However, the majority of cancer-stricken women have never been screened or have been screened incorrectly, and the benefits of using these procedures in Iran are unclear.

→What this article adds:
A significant number of women were willing to pay more for screening technologies than they were worth. There was a strong association between willingness to pay in considering screening tests and age and family size, a number of individuals with income, household expenses, having a chronic illness, and proposed base price.

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cancer, the aging population, improving care, as well as medical progress (3).

Among the most common cancers in the female population, cervical cancer is the fourth most common cancer in women worldwide, with 530,000 new cases per year. It accounts for 1.6% of cancer deaths in women and 15% of deaths from genital cancers (4). According to the World Health Organization (WHO), this cancer will kill nearly 474,000 women each year by 2030, with 99% of these deaths occurring in low- and middle-income countries (5). In Iran, cervical cancer is the second most common cancer after breast cancer and the fifth most deadly cancer in women (1).

Cervical cancer is a malignancy that can be prevented, and diagnostic and therapeutic procedures have greatly improved (6). Human papillomavirus infection (HPV) is the most well-known cause of cervical cancer (7). The human papillomavirus type, immunosuppression, multiple sexual partners, HPV infection with other sexually transmitted factors, human immunodeficiency virus, and family history are risk factors that increase the persistence of the human papillomavirus infection in the cervix (8).

This disease can be prevented by reducing risk factors and screening vulnerable groups. Cervical cancer screening is a process of identifying precancerous cells that occurs before the development of any symptoms of cancer in the body. In many countries around the world, cervical cancer screening programs have been implemented as the first strategy to reduce disability and cervical cancer mortality (9).

Considering that the precancerous stage of this disease is long and the survival rate of patients if treated at this stage is almost 100%, therefore, screening is very important in the early diagnosis of this disease (6). Cervical cancer screening should begin at the age of 21 because this age is the early stage of sexual desire (10). Various studies have shown that targeted screening reduces the incidence and risk of cervical cancer by 90% (11). In addition, the effectiveness of cervical cancer screening has been recorded during the last decades, particularly in Western countries compared to the majority of low- and middle-income countries (10).

The WHO has recommended several screening methods to diagnose cervical cancer, including the human papillomavirus test, visual inspection with acetic acid, and Papanicolaou test (cytology-based method for cervical cancer screening) (7). The Pap smear test is the most usable screening method the cervical cancer (7). Simultaneous human papillomavirus and Pap smear tests have also been established as the most sensitive and accurate cervical cancer screening approach, based on scientific evidence (12).

Unfortunately, despite progress in the prevention and treatment of cervical cancer, this disease is still one of the major health problems in Iranian women (13). The majority of women who have advanced cervical cancer have never been screened or have been screened incorrectly (14). In most studies in Iran, about 49% of women have had a cervical cancer screening test (mostly unorganized) in their lifetime. While the rate of doing it in other countries is reported as 85% to 93% (2). Evidence shows that over 50 years in the United States and Europe, the prevalence and mortality from cervical cancer have been reduced by about 70% through prevention and screening programs (14). According to the results of cervical cancer screening methods in other countries, the implementation of cervical cancer screening programs can play an important role in controlling this cancer in an organized and targeted way (2).

Despite the importance of cervical cancer screening methods in controlling the incidence and early diagnosis, and subsequently controlling the costs of the health system, the benefits of performing them in Iran are unclear. Given the financial constraints faced by healthcare systems, it is critical to analyze the costs and effects of cancer-prevention programs, such as screening (15). The stewardship of the health system needs the necessary evidence and documents, including information about the benefits of implementing these programs to develop these in the country.

In recent years, the use of cost-benefit analysis as a technique of economic evaluation of health services has become popular. Many studies have used the CVM to estimate people's WTP for health services. The WTP has been widely used in the economic evaluation and assessment of things like new health technologies, drugs, and surgical techniques (16). The method of stated preferences is the primary approach for estimating the monetary values of diagnostic and therapeutic interventions in the health sector because the advantages of public health initiatives such as screening programs and similar programs cannot be judged using market indicators. According to the importance of cost control in the health system and improving allocation and economic efficiency, this study aimed to estimate the monetary value of cervical cancer screening benefits (Pap smear test, simultaneous tests of Pap smear, and Human papillomavirus) from a community perspective. By understanding individual preferences and knowing the monetary value of the benefits of these interventions, the findings of this study assist health policymakers in making informed decisions about the targeted implementation of this program in Iran.

Methods

Study Design

In the present cross-sectional descriptive-analytical study, data were collected through a survey performed in Mazandaran province (one of the northern provinces of Iran) from September 2020 to February 2021. The WTP method was used to measure the monetary value of cervical cancer screening methods benefits (Pap smear test, simultaneous tests of Pap smear, and Human papillomavirus). The figure of WTP shows the price and value of the goods or services from the perspective of the society that contingent valuation method (CVM) is one of the most common methods for calculating it (17). The CVM includes questions whose answers are contingent on the hypothetical markets described to respondents (18). In this study, the estimation of monetary value (preferential extraction) of the cervical cancer screening methods was

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performed by double-bounded dichotomous choice variant of the CVM.

Sampling and Sample Frame

According to the instruction of the WHO (19), all women aged 30 to 59 years living in urban areas of Mazandaran province with the ability to read and understand the Persian language were the study population. The sample size of the study was calculated according to the number of samples of the CVM studies based on Michel and Carson's table for evaluation of appropriate sample size for CVM studies (20), and by using the following formula with the assumption of 95% confidence level and 0.111% relative error:

$$n = \frac{N t^2 S^2}{t^2 S^2 + N d^2}$$

where, N = the statistical population of women aged 30 to 59 years; T = the desired number in the table for a 95% confidence level; S^2 = the variance of the main research variable, and D is possible optimal accuracy, which is equal with d = ay

Therefore, the final sample size of the study was calculated at 513 women. Then, the following formula was used to attribute the sample to the cities of the province and control costs:

$$\frac{n_h}{N_h} = \frac{n}{N}$$

Where N_h = the size of the statistical population in the h class, and NH = the size of the sample size in the h class.

Participants were randomly selected from the population covered by healthcare centers and family physician execution centers. The data were collected using a researcher-made questionnaire based on the CVM. After explaining the objectives of the study to the selected samples, only 480 women were willing to pay for screening tests (response rate = 93%). Then, the samples were randomly divided into 2 equal groups. The first group was provided basic information about cervical cancer (Scenario 1) and the second group was given more complementary information in addition to basic information (Scenario 2).

WTP Scenario

Monetary valuation scenarios were designed by the objectives of the study and the 2 categories of basic and more complementary information. Because each country provides information to the research population in terms of its epidemiological statistics and diagnostic treatment protocols, information about the desired indicators in Iran was gathered through interviews with clinical specialists, a systematic review and survey of protocols and guidelines of internal clinical medicine related to this cancer and its common screening methods in the country, and a systematic review and survey of protocols and guidelines of internal clinical medicine related to this cancer and its common screening methods in the country. Scenarios were designed using the CVM about the hypothetical situation and the amount that people were willing to pay for the cervical cancer screening tests.

The hypothetical scenarios used to estimate the WTP were considered as follows:

1- Basic information on Pap smear test

2- Basic and complementary information on Pap smear test

3- Basic information on Simultaneous tests of Pap smear and Human papillomavirus

4- Basic and complementary information on Simultaneous tests of Pap smear and human papillomavirus.

Basic information was about cervical cancer infection statistics, therapeutic procedures, time-consuming and costly treatment, and the benefits of cervical cancer screening methods. Also, complementary information was related to limitations of diagnostic tests that include the sensitivity, complication, or possible disadvantages of the tests (false positive or negative probability), and time duration to perform the tests in addition to basic information (19, 21).

It should be mentioned in order to avoid any bias and also elicit true value of screening test from study participants, the Pap smear and simultaneous tests labeled as test A and B respectively and presented to the respondents.

Data Gathering Protocol

According to the nature of the study, the monetary valuation scenarios were designed and researcher-made questionnaires were developed by a double-bounded dichotomous choice variant of the CVM. The designed questionnaires for different screening methods had the same structures, which were edited after the result of the pilot test (pretest) and their face validity was examined by experts. These questionnaires were formed from 3 parts that included the introduction of the plan, measuring people's willingness to pay according to the proposed scenarios and questions about knowledge, attitude and cervical cancer screening methods, demographic questions, and health, and economic and individual status.

To complete the questionnaires, the selected samples were contacted and after explaining the objectives of the study and obtaining informed consent, the electronic link of the questionnaire was sent to them for completing the questionnaires, in addition to providing the necessary explanations. Also, the participants who were unable to respond via the link were asked to go to the family physician's office and complete the questionnaire.

Estimation of WTP Based on CVM

In this study, first, variables were extracted using a systematic review and reviewed by a panel of experts after designing them as forms. Designing the type of information and questionnaire was done in terms of the local conditions of Iran. The result of the systematic review was published separately (22). For the pilot study, 30 women referring to the staff department of Mazandaran University of Medical Sciences was randomly selected and evaluated by questionnaires (N = 55). Finally, the validity and reliability of the questionnaires were evaluated and modified.

After determining scenarios by chance, the number of 4 different base prices was considered in each scenario.

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When offering the base price to individuals, different figures (using Boyle et al method) were selected to control the starting point bias and one of these figures was randomly offered to each person. The base price was determined based on the figures extracted from the pretest, mean, median, and market prices of the cervical cancer screening tests. The considered prices for Pap smear test were 79.97, 41.65, 333.24, and 49.98 USD and for the simultaneous tests of Pap smear and Human papillomavirus were 99.97, 333.24, 59.98, and 233.27 USD. If the base price was approved, the individual was offered twice the first base price; if the base price was denied, the person was offered half of the first base price, and the final amount for each test was retrieved. Finally, an open question was posed to determine the person's maximum WTP. In this study, altruistic WTP was also examined. Altruistic WTP is the WTP to receive cervical screening services for other people (it is assumed that others have the disease). In fact, it is a kind of valuation of the individual for society (23). There are several sources of funding for WTP of screening services and in this study, financing through income was examined individuals willingness to cooperate with the government in providing screening tests was also assessed. Trimmed mean was used for more accurate calculations of the mean WTP (considering a 5% correction).

We considered purchasing power parity as the currency unit in the present study. Thus, the exchange rate during data collection in 2020 was 1 USD = 30007.635 IRR (24).

Factors Associated with WTP for Cervical Cancer Screening Tests

Multivariate regression analysis with the ordinary least squares (OLS) was applied to extract factors affecting the WTP of cervical cancer screening tests, which is as follows: $WTP=\alpha+\beta 1X1+\ldots+\beta nXn$

Where X represents socioeconomic variables, β shows the amount and direction of the relationship between the variable, and the WTP and α are the intercepts.

Extraction of Demand Functions

In this section, the demand function of the Pap smear test and simultaneous test of Pap smear and human papillomavirus were extracted from the amount of demand and price. The data were converted to logarithmic form for more accuracy to extract the demand function of screening tests. The demand for the screening test was estimated by using the following function with the OLS method and demand elasticity was calculated: $\ln Q = \alpha - \beta \ln P + \varepsilon$

Where Q represents the amount of demand (the number of suggested prices accepted), and P is the suggested and accepted price.

The Difference in Mean WTP of the Cervical Screening Tests

The comparison of the mean WTP in each scenario with basic and Basic and complementary information was performed using a t test. First, an analysis of variance was done. Then, depending on the significance or no significance of the variances, a t test with equal variance or a t test with unequal variance was chosen.

Data Analysis

In the present study, the OLS regression model was used to extract factors affecting the WTP. The Breusch-Pagan test was applied to analyze the data in terms of heteroscedasticity of variances in OLS models. Also, the difference between mean WTP in 2 scenarios in both tests was analyzed by a t test. Data analysis was performed using Excel Version 18 and STATA Version 14 software.

Results

Demographic Characteristics of the Respondents

The mean age of the respondents was 41±6.787 years. Table 1 shows that the majority of respondents were married (84%), employed (68%), had a university education (76%), and covered by basic insurance (90%).

Health Status, Knowledge, and Attitude of the Respondents

About 93% of women reported their health status as above average. Also, 88.75% of participants evaluated the risk of disease above. Most of the participants (89%) said cervical cancer was a disease with risk above average. Moreover, 54% of women knew somewhat of the symptoms of cervical cancer and almost 77% of participants determined that the prevalence of coronavirus disease-2019 (COVID-19) disease and its fear have been a barrier to referring to diagnostic and treatment centers and performing the cervical cancer screening tests (Table 2).

Valuation of Pap Smear and Simultaneous Tests

The value of cervical cancer screening tests (Pap smear

Table 1. Sociodemographic characteristics of respondents (N = 480)

Variable		Total Population	Scenario 1	Scenario 2
Age		6.787 ±41	6.820±40	6.882±41
Marital Status		83.83% (425)	85.42% (205)	83.75% (201)
Households		9.27% (47)	7.92% (19)	10% (24)
Household size		3	3	3
	University Education	75.54% (383)	79.17% (190)	72.08% (173)
Education	University Education related to health	18.93% (96)	21.25% (51)	16.67% (40)
Economic Status	Having Job or Income	67.26% (341)	69.58% (167)	65.42% (157)
	Working in the field of health or health insurance	13.21% (67)	15.83% (38)	10.83% (26)
Monthly household income over 370.91 USD		48.66% (236)	(117) 51.09%	46.72% (107)
Monthly household income over 370.91 USD		50.32%(235)	(108) 51.18%	49.57% (115)
Health insurance coverage	Basic insurance	89.95%(456)	(215) 89.58%	92.92% (223)
	Supplementary insurance	61.54%(312)	(147) 61.25%	62.08% (149)

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Table 2. The health status, knowledge, and attitude of the participants

Cases	Total Population	Scenario 1	Scenario 2
Health status above average	(467) 92.11%	(218) 90.83%	(224) 93.34%
Hospitalization experience in the last three years	(149) 29.38%	(83) 34.58%	(60) 25%
Abnormal test experience	(21) 4.14%	(10) 4.17%	(11) 4.58%
History of having gynecological cancer in a first-degree relatives	(130) 25.64%	(57) 23.75%	(65) 27.08%
Chronic, periodic illness, disability by a person or other family members	(207) 40.82%	(93) 38.75%	(103) 42.91%
Death of a first-degree relatives in the past year	(115) 22.68%	(47) 19.58%	(62) 25.83%
Screening tests due to Covid-19	(389) 76.73%	(183) 76.25%	(187) 77.92%
Risk assessment of disease above average	(450) 88.75%	(217) 90.42%	(210) 87.5%
Relative familiarity with the symptoms of cervical cancer	(272) 53.65%	(139) 57.92%	(126) 52.5%
Familiarity with cervical cancer prevention methods (screening)	(156) 30.77%	(88) 36.67%	(63) 26.25%
Familiarity with cervical cancer vaccine	(110) 21.7%	(59) 24.58%	(48) 20%

test and Simultaneous Pap smear and human papillomavirus testing) is shown in Table 3. Among participants in this study, the percentage of acceptance of the base price for the Pap smear test was 55.63%. The mean WTP and trimmed mean (considering 5% correction) were 135.08 and 103.81 USD, respectively. The minimum and maximum Pap smear test WTP were 0 and 1666.24 USD, respectively. The mean altruistic WTP was 38.23 and the altruistic WTP trimmed mean was 28.14 USD.

Also, willingness to a partnership with the government and finance the Pap smear test from the monthly household income was reported to be 70.42% and 58.73%, respectively.

Similarly, in the second test (Simultaneous tests of Pap smear and human papillomavirus), the percentage of acceptance of the base price has been 43.54%. The mean WTP and trimmed mean (considering 5% correction) were 160.19 and 130.17 USD, respectively. The minimum and maximum of simultaneous tests WTP were 0 and 1666.24 USD, respectively. The mean altruistic WTP was 48.23 and the altruistic WTP trimmed mean was 33.38 USD. The willingness to the partnership with the government and finance the simultaneous tests from the monthly household income reported 70.21% and 56.19%, respectively.

Regression Estimation of Factors Affecting WTP

Table 4 indicates the result of factors affecting WTP for screening tests by multivariate regression. In this regard, the household size and age had significant and negative effects on Pap smear test WTP. Pap smear WTP was also affected by the number of persons with income, monthly household expenses, having a chronic disease, and proposed basic pricing. The education state and familiarity with the symptoms of cervical cancer almost had a significant effect (considering a significance level of 10%).

The number of people with income and monthly household expenses showed significant and positive relationships with the simultaneous tests. Also, the household size and acceptance of the suggested base price had nearly a significant effect.

Table 3. The Valuation of different scenarios about cervical cancer screening methods (USD)

Variable	Smear test			Simultaneous tests (Smear& HPV)		
	Total	Scenario 1	Scenario 2	Total	Scenario 1	Scenario 2
Population	480	240	240	480	240	240
Basic Price Acceptance	(267) 55.63%	(131) 58.54%	(136) 56.67%	(209) 43.54%	(110) 45.83%	(99) 41.25%
WTP (USD)						
Minimum WTP	0	0	0	0	0	0
Maximum WTP	1666.24	666.5	1666.24	1666.24	999.75	1666.24
mean WTP	135.08	126.41	143.76	160.19	154.20	166.18
Confidence Interval	(116.84-153.32)	(106.68-146.13)	(112.95-174.56)	(140.73-179.65)	(130.59-177.82)	(135.09-197.28)
Trimmed mean WTP (5%)	103.81	104.95	104.19	130.17	131.23	129.11
Median WTP	66.65	66.65	66.65	99.97	91.64	99.97
Willingness to partnership with the government in paying for test	(338) 70.42%	(171) 71.24%	(167) 69.59%	(337) 70.21%	(172) 71.67%	(165) 68.74%
Financing the tests from the monthly household income	(259) 58.73%	(131) 59.82%	(128) 57.66%	(245) 56.19%	(125) 58.14%	(120) 54.3%
Altruistic WTP (USD)						
Minimum*	0	0	0	0	0	0
Maximum*	666.49	666.49	666.49	1666.24	666.49	1666.24
mean*	38.23	38.56	37.90	48.23	42.89	53.57
Confidence Interval*	(32.28 -44.19)	(30.64-46.49)	(28.96-46.85)	(38.41-58.05)	(34.27-51.50)	(25.86-71.28)
Trimmed mean*	28.14	29.59	26.69	33.38	33.77	32.99
Median*	16.66	16.66	16.66	16.66	16.66	16.66

*Altruistic WTP

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Table 4. Factors associated with WTP for smear and simultaneous test (Smear& HPV)

Explanatory Variables	Tests	B	SE	*P*-Value
Health Status	A	19,797.18	15,235.13	0.195
	B	26,201.23	17,314.58	0.131
Individual Assessment about severity of disease risk	A	27,089.09	21,237.11	0.203
	B	13,887.97	24,108.49	0.565
Age	A	-9,682.73	4,456.08	0.030*
	B	-8,085.11	5,062.851	0.111
Education	A	-83,669.89	45,542.3	0.067**
	B	13,313.65	51.581.76	0.796
Education in field of medicine	A	-111,472.7	80,242.62	0.166
	B	-122,145	90,977.59	0.180
Household Size	A	-64,006.32	33,044.81	0.053*
	B	-62,089.56	37,614.08	0.100
Basic Insurance	A	210,095.3	171,090.7	0.220
	B	193,263.7	194,174.9	0.320
Supplementary Insurance	A	-53,936.04	65,055.11	0.408
	B	-57,386.51	73,983.2	0.438
Number of people with income in the family	A	141,409.7	52,706.6	0.008*
	B	113,512.4	59,911.86	0.059**
Monthly household expenses	A	133,992.3	36,453.39	0.000*
	B	125,482	41,422.39	0.003*
Having a chronic illness by a person or first-degree members	A	154,470.8	61,198.31	0.012*
	B	100,328.3	69,644.33	0.150
Suggested basic price	A	0.5084398	0.780347	0.000*
	B	0.1804333	0.0994781	0.070
History of having one of the women's cancers in the family	A	-9,093.879	67,076.29	0.892
	B	-49,734.03	76,140.28	0.514
Individual familiarity with the symptoms of cervical cancer	A	91,708.14	50,969.84	0.073**
	B	82,291.14	57,828.95	0.156

A: Smear Test
B: Simultaneous tests (Smear& HPV)
* P-value: 0.05
** P-value: 0.10

Comparison of WTP Screening Tests

The comparison of the mean WTP for Pap smear test and simultaneous tests of Pap smear and human papillomavirus in 2 different scenarios has been shown in Table 5. Concerning the findings, in the Pap smear test, the mean WTP was not significantly different between the 2 scenarios (P = 0.350;|t|= 0.9343). There was no significant difference between the mean WTP in the 2 scenarios (P = 0.546; |t|= 0.6043). Therefore, it can be said that the mean WTP was not significantly different between the 2 scenarios.

The Demand Function for Pap Smear and Simultaneous Tests

The results of the Breusch-Pagan test for the Pap smear test demand function indicated heteroscedasticity of variances in the OLS regression (P; = 0. 522| chi^2 [1] = 0. 41). The results of this test for the simultaneous tests demand function were also similar (P = 0. 913 |chi2 [1] = 0. 01). The results of estimation of the demand function of Pap smear and simultaneous tests are presented in Tables 6 and 7. According to the logarithmic form of data, which were used to estimate demand function, the variable of the suggested price (β) shows demand elasticity for the demand of Pap smear test and simultaneous tests as 0.69082 and 0.55896, respectively. It indicates that the demand for screening tests was not elastic. In other words, as the price of Pap smear test and the simultaneous test increased by 1%, the amounts of their demands reduced by 0.69 and 0.55, respectively.

According to the cross-sectional nature of the data, the amount of R^2 showed good fitness of the selected model for the Pap smear (0.7783) and simul-

Table 5. Comparison of willingness to pay in 2 scenarios

Test	Scenario	Mean (USD)	t	*P*-value
Smear Test	Scenario 1	126.41	-0.9343	0.350
	Scenario 2	143.76		
Simultaneous tests (Smear& HPV)	Scenario 1	154.21	-0.6043	0.546
	Scenario 2	166.18		

Table 6. Demand Function for Smear Test

The Explanatory Variables	ß	SE	*P*-value
Intercept	13.46047	0.819565	<0.001
Suggested Price	0.69082	0.066228	<0.001
Goodness of fit indexes			
R^2	0.7783		
Adj R^2	0.7711		
F	108.8		<0.001

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Table 7. Demand function for simultaneous test (Smear& HPV)

The Explanatory Variables	ß	SE	*P*-value
Intercept	11.92964	0.871608	<0.001
Suggested Price	0.55896	0070437	<0.001
Goodness of fit indexes			
R^2	0.6701		
Adj R^2	0.6595		
F	62.97		<0.001

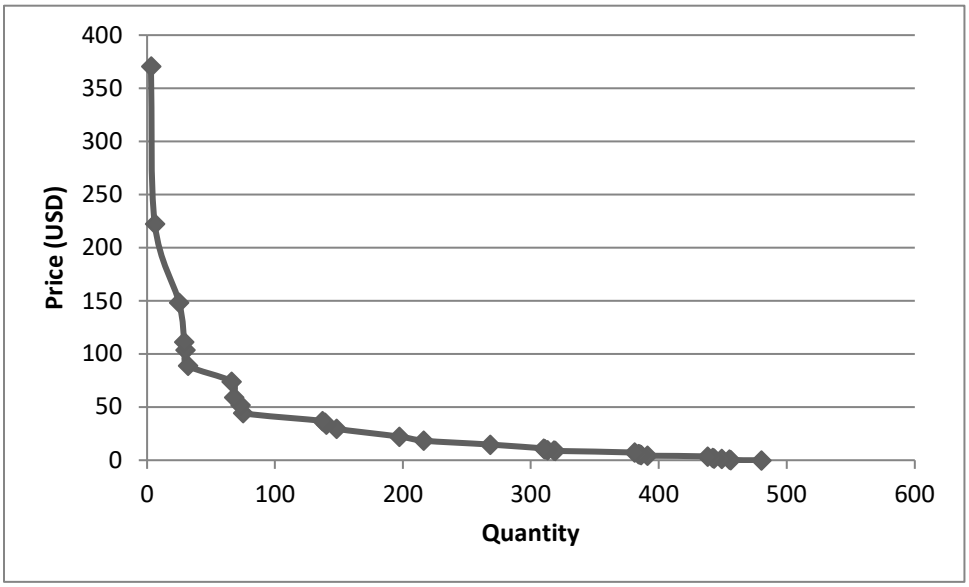

Fig. 1. Smear test demand curve

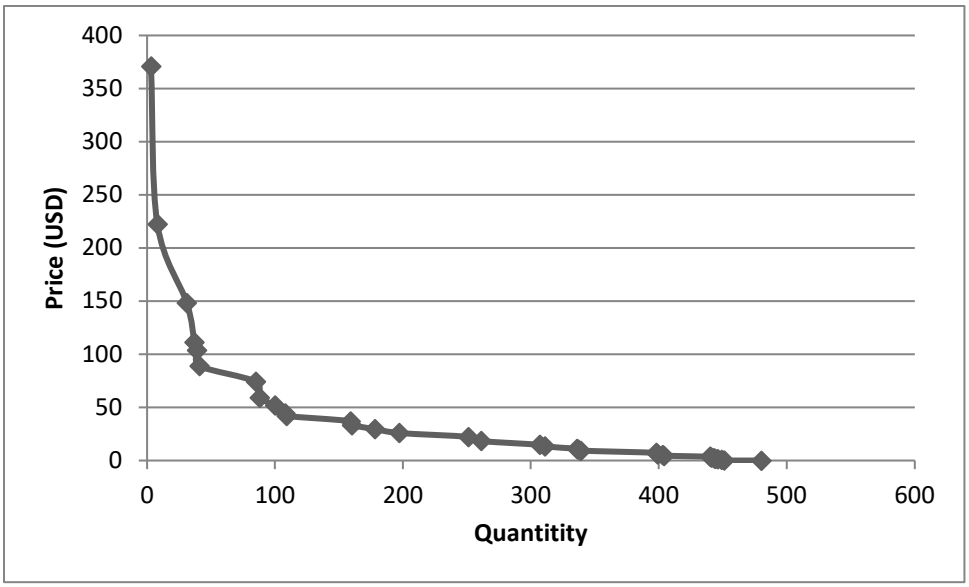

Fig. 2. Simultaneous tests (Smear& HPV) demand curve

taneous tests (0.6701). Also, the F statistics indicated the significance of the total regression. The demand function curve for one using of Pap smear and simultaneous tests were extracted as shown in Figures 1 and 2.

Discussion

The present study is the first in Iran to look into the WTP for 2 cervical cancer screening tests, as well as the factors that influence them. In this study, 91.32% of participants were WTP for screening tests. About 70% of women were willing to participate with the government for financing the cervical cancer screening services and approximately, and 57% of them were WTP for screening tests based on their income. In Ethiopia, the WTP of the cervical screening in a study has been 83.4% (9) which was less than in our study. It can be said that differences in the place of study, demographic, and cultural factors of the community, and the study population play a role in people's WTP (9). Furthermore, it appears that creating a suitable context for providing information, training, and

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proper access to screening services will play a large role in individuals performing the tests purposefully, based on their relatively noticeable participation with the government, particularly WTP from their income.

The mean WTP of the Pap smear test and simultaneous tests were 135.08 and 160.19 USD, respectively. The result of a study in Ethiopia indicated that the mean WTP of each the cervical cancer screening service was 7.16 USD (9). Findings from another study in Indonesia showed that the mean WTP of cervical screening was 56,000 IDR (10). Also, in a study conducted in the UK, participants were willing to pay 50.20 GBP for the Pap smear test every 3 years (25). In general, the reason for the different payment rates can be attributed to the population difference, currency inflation, differences in the health care services studied, and the appreciation of the target population for benefits and importance of health services (9). Another result of this study showed that the suggested base price had a significant positive effect on the WTP of the Pap smear test. It can be said that the WTP of Pap smear is higher than its market price. The frequency of testing (once a year), easy access to health centers for testing, lack of common alternative procedures, test sensitivity in early detection of cancer, gynecologists' recommendation, family physician training in general health, and midwives located in healthcare centers appear to be the main reasons. In the present study, the age of participants had a significant negative effect on the WTP of the Pap smear test. Respondents with younger ages were more willing to pay for the Pap smear test, which was contrary to previous studies (8, 26-31). It has been established that as women age, their life expectancy declines, and they are less willing to pay for screening measures and health monitoring. Another reason can be attributed to mothers' feeling of sacrifice and responsibility towards the family, especially at older ages, and the weaker sections of society that screening methods and diagnostic tests are considered unnecessary.

The household size also had a significant negative effect on the WTP of the Pap smear and simultaneous tests that means when the family population grows, the WTP of screening tests decreases. It seems that while the number of people in a household increases, living expenses like food, clothing, housing, et cetera increase, which can decrease the WTP of screening tests.

Moreover, the household size and monthly household income had significant positive effects on the WTP of Pop smear and simultaneous tests that were in line with previous studies (8, 26-28, 30-34). However, these results have contradicted the results of Yasunaga and Khaliq studies (21, 35). It can be determined that people with higher income are willing to pay more for health services. As a result, the economic power is effective in performing these tests. Therefore, the importance of planning, insurance, and the Ministry of Health support coverage are emphasized. Furthermore, the rise in monthly family expenses is a reason to pay attention to screening methods, because spending money on prevention and screening methods reduces the amount of excess and unpleasant costs associated with cervical cancer treatment.

Another finding supported by Tavakolian et al was that there was a strong positive relationship between catching a chronic illness by a person or other family members and the quantity of Pop smear WTP (36). In other words, people with chronic diseases were more likely to pay for the cervical cancer screening tests. According to the theory, the lower level of health of people, the higher their valuation for quality of life and WTP (37). It also seems that people with chronic diseases are more willing to perform screening tests due to their experience of suffering from the disease and paying extra money for its treatment.

The familiarity with the symptoms of cervical cancer has nearly had a significant positive relationship with WTP of screening methods, which is in line with the findings of previous studies (8, 31, 34, 38-40). As people become more aware of the symptoms of cervical cancer, their willingness to pay for screening tests increases. In other words, People's understanding and knowledge of health services have a positive effect on the WTP.

This study also showed that educational status had a negative effect on the WTP of cervical cancer, that is, while the level of education increases, the WTP of screening methods decreases, which was different from other studies (9, 28, 34). People with lower levels of education were more likely to pay for a Pap smear exam, which could be related to individual reasoning through basic health insurance package training provided by family physicians in the province. Based on the results of the present study, the elasticity of demand for the pap smear and simultaneous tests were reported as less than one that shows the community was not sensitive to price changes of screening tests. The elasticity of demand reflects how sensitive demand is to price changes, and elements impacting demand elasticity include the number of alternative items, the share of commodities in the household budget, and the pace at which goods are used. Hence, the low elasticity of demand can be justified due to the lack of alternative services for cervical cancer screening tests, and the intervals for performing pap smear tests (once a year) and simultaneous tests (every 5 years).

In this study, the mean WTP was not significantly different between the 2 scenarios in both screening tests. In other words, despite the differences between the information provided in scenarios, no significant difference was reported in the valuation of the tests. One possible reason for this finding is that tests are the only way to diagnose cancer early, and their effectiveness has been proven in clinical studies. As a result, knowing the tests' potential for error is not a deterrent for women not to take them.

Study Limitations

There were some limitations to this investigation. Because some participants refused to answer some of the questionnaire questions, the questionnaire was developed considering possible bias. Another limitation of this study was the social conditions induced by covid-19, as well as the lack of access to the research community, which was addressed by following health guidelines, developing

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electronic tools, and employing video conferencing. There is also the risk of early bias in various sorts of CVM questionnaire design. This means that the suggested base price has an impact on the WTP. Four base prices were explored to reduce this bias.

Conclusion

The mean WTP of the pap smear test and simultaneous test of Pap smear and human papillomavirus was about twice and somewhat less than their market price, respectively. Cervical cancer screening tests have a significant value, prompting healthcare policymakers to decide on the program's purposeful implementation and development at the national level, as well as to take steps to improve the target population's knowledge and motivation, and encourage healthcare providers to implement these programs systematically. The benefit of cervical cancer screening tests for women with particular conditions, such as cancer, is said to have been calculated. Another suggestion is to calculate the WTP for cervical cancer screening tests using different methods of monetary healthcare valuation.

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Ethics Approval and Consent to Participate

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Conflict of Interests

The authors declare that they have no competing interests.

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