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| RESEARCH ARTICLE

Impact of Access to Health Services on Early Detection of Cervical Cancer in Ecuadorian Women

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| ABSTRACT

Cervical cancer is the second most common cancer among women worldwide, primarily affecting those between the ages of 20 and 69, second only to breast cancer. According to the World Health Organization, over 90% of new cervical cancer cases occur in low- and middle-income countries. In Ecuador, approximately 1,600 new cases are diagnosed each year. Research has identified several factors that influence a woman's decision to undergo Pap smears, including her knowledge of the disease, presence of gynecological symptoms, and age (especially among women in their 20s and beyond).This study seeks to understand the perceptions of Ecuadorian women regarding the barriers that limit their access to Pap smear screening. Using data from a nationally representative sample of women aged 10 to 49, drawn from the National Health and Nutrition Survey (ENSANUT, 2018), we conducted descriptive statistical analyses to identify key trends. To ensure the reliability of our results, we tested for multicollinearity, heteroscedasticity, and autocorrelation. We then applied a binary logistic regression model and calculated Odds Ratios (OR) with 95% confidence intervals. The study's findings indicate that the main obstacles to Pap smear participation are embarrassment, lack of information, fear, distance from healthcare facilities, and financial limitations. Notably, the analysis revealed strong correlations between low income and low education levels with reduced screening adherence, while no significant barriers were found among women with higher education. Other factors, such as age, income, employment status, and education, also played a role in influencing screening behavior. By understanding the biopsychosocial characteristics of women, government initiatives can be tailored to improve Pap smear participation, promoting early detection of cervical cancer in a way that aligns with women's needs and comfort. Expanding research in this area is critical to addressing sexual health issues and enhancing both family and societal well-being.

| KEYWORDS

Pap smear, cervical cancer, barriers.

| ARTICLE INFORMATION

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1. Introduction

Squamous cell carcinoma of the cervix is the second most common cancer among women globally (Peto et al., 2000). This type of cancer is preventable with timely diagnosis and appropriate treatment of precancerous lesions. Since it develops slowly over time, it can be detected early through an exfoliative cytological sample of the cervix, commonly known as the Pap smear (Papanicolaou test), before symptoms appear (Levi et al., 2005).

Cervical cancer continues to be a significant global health issue, with an estimated incidence of 21.2 new cases per 100,000 women annually. This rate is slightly elevated in Latin America, where the incidence rises to 22.8 per 100,000 women per year. Globally, cervical cancer ranks as the third leading cause of cancer-related deaths, responsible for approximately 300,000 deaths each year, translating to a mortality rate of 10.3 deaths per 100,000 women. In Latin America, the burden is even more pronounced, as cervical

cancer is the second leading cause of cancer deaths among women, with a mortality rate of 10.1 deaths per 100,000 women annually(Mora et al., 2020).

Despite advances in medical research and screening technologies, cervical cancer remains a leading cause of cancer mortality, particularly in regions with limited access to healthcare resources and preventive services. In Latin America, where socioeconomic disparities and healthcare access gaps are more prevalent, the disease exerts an even more profound impact. The higher incidence and mortality rates in these regions underscore the urgent need for improved public health interventions, including widespread access to Pap smear screenings, HPV vaccinations, and educational campaigns aimed at raising awareness of the importance of early detection. Efforts to address cervical cancer globally must focus on reducing these disparities by targeting high-risk populations, ensuring equitable healthcare access, and promoting regular screenings, particularly in low- and middle-income countries. The combination of preventive strategies and early detection measures can significantly reduce both the incidence and mortality rates associated with cervical cancer, thereby improving the overall health outcomes for women worldwide(Ireen et al., 2018).

Experience in developed countries demonstrates that well-planned, systematic screening programs with high coverage can significantly reduce the number of new cases of cervical cancer, as well as the associated mortality rate(Novoa Vargas & Echegollen Guzmán, 2001). Currently, there are different interventions that have made it possible to prevent, detect and treat this pathology. These include vaccination against human papillomavirus (HPV), cervical cytology screening, HPV detection and treatment of premalignant lesions.(Luna-Abanto et al., 2020). Cervical cytology or "Papanicolaou" is the main tool in the early detection and timely treatment of cervical cancer.(Abdullah et al., 2013). United States Preventive Services (USPS) recommends Pap smear screening every 3 years for women between the ages of 21 and 65. In addition, the interval can be increased to 5 years if HPV testing is associated with screening for women over 30 years of age.(Luna-Abanto et al., 2020).

The Papanicolaou test has been used for the timely diagnosis of precursor lesions, and has meant a great advance in the prevention of cervical cancer, since its periodic use has been shown to significantly reduce morbidity and mortality from this neoplasm. (World Health Organization, 2002). In the long term, screening and treatment of premalignant lesions have a lower cost and greater benefit compared to medical-surgical treatment of cervical carcinomas.(Hidalgo-Martínez, 2006). Cervical cancer is the only cancer that is potentially preventable, yet it remains a major public health problem in the world, especially for developing countries with limited access to health care systems and poor resources.(Allemani et al., 2018).

In the last 30 years, screening has led to a 50% decrease in the incidence of cervical cancer; among women diagnosed with cervical cancer, 55% had never had a cervical cytology.(Schlichte & Guidry, 2015). On the other hand, high incidence and mortality rates have been associated with late or no screening, false negative test results, and lack of follow-up in patients with abnormal results.(Percac-Lima et al., 2010).

Therefore, it is evident that not going to a doctor's appointment for this cytology procedure can be very harmful to a woman's health, due to the risk of presenting a Sexually Transmitted Infection or a cancerous disease, but each person has different ways of thinking and seeing life, depending on the educational and socioeconomic level of women. That is to say, in each person there are a series of factors that influence their decision making and that is why it is important to know what these factors are and how they intervene in people's decisions.(Fernández-Esquer & Cardenas-Turanzas, 2004). Studies show that a higher percentage of participation (practices) would be related to a higher degree of knowledge and attitudes of the participant(Donoso S., 2003). Higher levels of education and economic levels and positive attitudes towards Pap have shown a greater use of this test.(Arevian et al., 1997).

In our country, cervical cancer represents a pathology of high incidence and high mortality, but no previous studies have been found that evaluate the barriers that impede women's access to cervical cancer screening (Papanicolau), nor that describe the characteristics of its periodic practice. Therefore, the results obtained in this research can contribute to rethink timely intervention strategies to increase the coverage rate in women attending health centers, in order to reduce the incidence, mortality and costs of treatment for cervical cancer in Ecuador.

2. Methodology

Study Design and Population: An ecological, cross-sectional study was carried out using data from the 2018 National Health and Nutrition Survey of Ecuador (ENSANUT), which was collected and made publicly available by the National Institute of Statistics and Census (INEC). Following a thorough data cleaning process to ensure accuracy and reliability, the final sample included 21,219 Ecuadorian women of reproductive age, ranging from 10 to 49 years old. This large dataset provided a robust foundation for analyzing the health behaviors and outcomes of women in this age group, offering valuable insights into patterns related to women's health and reproductive practices across the country.

Inclusion and Exclusion Criteria: Data from women between the ages of 10 and 49 years of childbearing age were included.

Source of Information: The ENSANUT 2018 is a survey included in the National Statistical Program that uses probability sampling applied every 5 years and whose target population is all household members in the 24 provinces of Ecuador. The ENSANUT 2018 includes the form MEF (Women of childbearing age) where all the characteristics of Ecuadorian women of childbearing age, whose ages range from 10 to 49 years, are shown to make representative estimates at the national level, urban-rural, by geographic domain for the 24 provinces of the country. In addition, the anthropometric measurements of women who are currently in their fertile age can also be found.

Study Variables. Our dependent variable is the question of whether a woman had a Pap smear (coded 1 and 0 otherwise). In addition, we used other variables as possible barriers to Pap smears such as wages, region of origin, age, ethnicity, marital status, educational level, employment status, urban density, economic development of the province, area of residence.

Statistical Analysis. The ENSANUT 2018 survey database was analyzed with the statistical package Stata v15 (Stata Corporation, College Station, Texas, USA). A value of $p<0.05$ was considered to determine statistical significance between variables. The Chi-square test was used to determine the overall correlation between the variables of interest. The association was evaluated by prevalence ratios with their respective 95% confidence intervals with an analysis for each of the variables included in the study, the independent variable of interest being the sociodemographic conditions of each participant.

$$Pap\ smear_i = \beta_0 + \beta_1 X_i + \sum_{j=2}^{12} \beta_j Z_i + \varepsilon_i \quad (1).$$

Where $Pap\ smear_i$ represents whether or not a woman has had a Pap smear, X_i represents a vector of individual characteristics and Z_i represents a set of socioeconomic and territorial control variables. Finally, ε_i represents the stochastic error term.

First, we conducted exploratory analysis on the various questions related to Pap smears. **Table 1** presents the percentages of women who indicated whether they have undergone a Pap smear. For instance, 65.68% of women reported never having had a Pap smear. Additionally, 6.56% stated that they have one annually. It was also found that 58.12% of women do not get a Pap smear due to a lack of information, while 18.74% do not believe it is necessary. Furthermore, 6.44% mentioned that they avoid it due to feelings of embarrassment or shame.

3. Result

Table 1. Percentage of women who have a Pap smear, time taken and reasons for not having it done

Variable and response	Percent
Have you ever had a Pap smear?	
Yes	34.32%
No	65.68%
How often is the Pap smear done?	
Is this the first time?	62.23%
Every year?	6.56%
Every two years?	8.21%
Every three years?	8.11%
Every four years?	9.43%
Every five years?	1.23%
Every six years or more?	2.62%
Don't you remember?	1.61%
What is the main reason you have not had a Pap smear?	
Lack of information?	58.12%
Do you not consider it necessary?	18.74%
Is the health facility far away?	11.45%
Out of shame or embarrassment?	6.44%
Lack of money?	1.20%
No one to leave the children with?	0.79%
Does your partner object?	1.32%
Out of fear or trepidation?	2.21%

Table 2 presents the descriptive statistics of the sociodemographic variables used in the linear regression model. From this data, we see that the average monthly labor income for the women surveyed is $432 USD. A significant proportion, 42.7%, reside in the highland region of Ecuador. The average age of the participants is 28.34 years, and the majority, 81.03%, identify as mestizo. In

terms of marital status, 40.7% of the women are single, while 38.1% are married. Educational attainment is another important factor, with 43.4% of the women having completed high school. Additionally, 64.57% are employed, highlighting a relatively high level of labor force participation. When looking at territorial characteristics, the data shows that there is an average population density of 151 inhabitants per square kilometer. The provincial gross value added (a measure of economic development) averages $1,297.65 USD. Furthermore, 59.33% of the women live in urban areas, suggesting a more urbanized population distribution in this sample. These sociodemographic variables offer crucial context for understanding the factors influencing women's health outcomes in Ecuador.

Table 2. Descriptive statistics of the variables used in this study.

Variable	Mean-Percent	Min	Max	95% CI		
Labor income						
Income in dollars	432.12	0		423.27	-	445.45
Region of origin						
Sierra	38.5%	0	1		-	
Costa	42.7%	0	1	41.21	-	43.09
Amazon	16.3%	0	1	15.98	-	17.01
Galapagos		0	1	1.96	-	2.51
Age						
Age in years	28.34			24.12	-	32.54
Ethnicity						
Indigenous	7.1%	0	1	6.6	-	7.28
Afro-Ecuadorian	5.3%	0	1	4.90	-	5.98
Mongrel	81.03%	0	1	80.22	-	81.86
White	1.4%	0	1	1.2	-	1.9
Montubio or Others	4.6%	0	1		-	5.1
Marital status						
Married	38.1%	0	1		-	
Single	40.7%	0	1	41.21	-	43.09
Widow	18.3%	0	1	15.98	-	19.01
Divorced		0	1	1.96	-	2.51
Educational level						
None	0.7%	0	1	0.3	-	1.1
Basic Education	27.3%	0	1	27.1	-	28.3
Middle/High School Education	43.4%	0	1	43.41	-	44.12
Higher Education	27.1%	0	1	26.87	-	27.98
Employment status						
Employee	64.57%	0	1	17.97	-	19.12
Unemployed	35.43%	0	1	80.05	-	82,66
Urban density						
Inhabitants per square kilometer	151.01	1152.5	321	146.32	-	160.33
Economic development of the province						
Provincial GVA per capita	1297.65	540.5	321	836.43	-	1456.67
Area						
Urbana	59.33%	0.54	0	55.51	-	61.51
Rural	44.49%	0.36	0	41.49	-	46.49

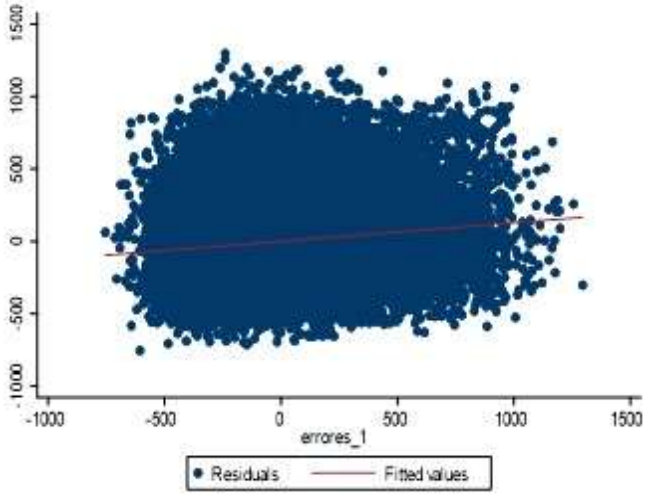
Next, we conducted a formal assessment to rule out the presence of multicollinearity among the independent variables in our regression model. **Table 3** presents the results of the multicollinearity analysis, which was performed using the Variance Inflation Factor (VIF). According to the literature, a VIF value greater than 5 indicates potential multicollinearity issues. As shown in the table, none of the variables have a VIF exceeding 5, allowing us to confidently rule out multicollinearity concerns in our data. This step is critical, as multicollinearity can lead to instability in the regression coefficients, incorrect sign estimations, inflated standard errors, and, ultimately, statistical insignificance of the variables. Ensuring the absence of multicollinearity enhances the reliability and validity of the model's parameters. In addition to the multicollinearity test, we conducted further diagnostic checks to confirm the robustness of our model. Specifically, we performed heteroscedasticity tests, which showed no evidence of heteroscedasticity, indicating that the variance of the residuals remains constant across the different levels of the independent variables. We also checked for autocorrelation by using a correlation graph, which revealed no issues of autocorrelation within the model. The results of these additional tests can be found in **Figure 1** and **Table 4**, providing further support for the adequacy of our regression model and the validity of its results.

Table 3. Multicollinearity test of the estimated model

Variable	VIF	SQRT VIF	Tolerance	R-Squared
Labor income	1.98	1.65	0.9863	0.0336
Region of origin	1.35	1.33	0.2331	0.1189
Age	1.98	1.65	0.9863	0.0336
Ethnicity	1.67	1.23	0.3313	0.1133
Marital status	1.33	1.85	0.6310	0.3690
Educational level	1.13	1.36	0.9136	0.0353
Employment status	1.33	1.64	0.8836	0.3353
Urban density	1.57	1.85	0.6310	0.3690
Economic development of the province	1.44	1.75	0.9653	0.0353
Area	1.63	1.11	0.8865	0.3097
Mean VIF	1.92			

Figure 1 shows the correlation between the fitted values and the residuals, as can be seen, these follow a pattern and it can be inferred that there is no heteroscedasticity.

Autocorrelation test through the correlation between adjusted values and residuals.



In **Table 4** we observe White's test for heteroscedasticity. Here we can infer that Prob > chi2 is greater than 0.05. Therefore, we do not reject the null hypothesis and therefore conclude that there is no heteroscedasticity in the model and it is homoscedastic.

Table 4. Heteroscedasticity Test

```
White's test for Ho: homoskedasticity
        against Ha: unrestricted heteroskedasticity

        chi2(8)      =   2603.27
        Prob > chi2  =    0.2000

Cameron & Trivedi's decomposition of IM-test
```

To further investigate the patterns observed in **Table 1**, we conducted a linear regression analysis to examine the impact of various sociodemographic factors on the likelihood of undergoing a Pap smear. For this purpose, we employed a logit model, with the results displayed in **Table 5**. In this model, the dependent variable is binary, taking a value of 1 if a woman had a Pap smear and 0 if she did not. The analysis reveals positive odds ratios for several key variables. For instance, income has a significant positive effect on the likelihood of having a Pap smear. Specifically, an increase in income more than doubles the probability of a woman undergoing the procedure (OR= 2.078, CI= 2.035; 2.086). Other sociodemographic factors also exhibit a positive relationship with Pap smear uptake. Age is associated with a higher probability of having the exam, as are certain marital statuses, such as being married, widowed, or divorced. Moreover, the results indicate that a higher level of education increases the likelihood of undergoing a Pap smear, suggesting that awareness and access to health information play a critical role. Additional factors contributing positively to the probability include employment status, living in densely populated urban areas, and residing in regions with greater economic development. These findings highlight the multifaceted influences of both individual and regional factors on women's health behaviors, reinforcing the importance of targeted health policies that address economic, educational, and territorial disparities. The results of this logit model provide valuable insights into the sociodemographic determinants of Pap smear uptake, offering important considerations for public health interventions aimed at improving cervical cancer screening rates in Ecuador.

Table 5. Logistic regression analysis between Pap smear performance and socioeconomic factors

	OR	P-value	95% CI
Var. dep.: If pap smear=1, 0 otherwise			
Labor income			
Income in dollars	2.078*	0.035	2.035-2.086
Region of origin			
Sierra	Ref.		
Costa	1.083*	0.030	1.010-1.369
Amazon	1.511	0.149	1.002-1.824
Galapagos	2.402	0.152	2.322-2.575
Age			
Age in years	0.822*	0.035	0.521-1.128
Ethnicity			
Indigenous	Ref.		
Afro-Ecuadorian	1.035	0.932	1.003-1.056
Mongrel	0.933**	0.006	0.626-2.086
White	0.903	0.864	0.276-1.071
Montubio or Others	0.818	0.620	0.692-0.991
Marital status			
Married	Ref.		
Widow	0.693	0.799	0.593-1.770
Divorced	0.976	0.981	0.083-2.034
Educational level			
None	Ref.		
Basic Education	2.262	0.125	2.221-2.860
Middle/High School Education	2.337	0.109	2.191-2.889
Higher Education	2.783*	0.060	2.042-2.889
Employment status			
Employee	Ref.		

Unemployed	-1.099	0.634	-1.0093--1.482
Urban density			
Inhabitants per square kilometer	1.654**	0.023	1.570-7.242
Economic development of the province			
Provincial GVA per capita	1.092**		1.017-2.097
Area			
Urbana	Ref.		
Rural	-1.456	0.123	-1.570 - -1.242
Constant	5.790***	0.007	5.472-5.940
Observations	21219		
AIC	1848.35		
BIC	2011.41		
Chi^2	152.4		
Chi^2 *p-value*	0.000		
Log-likehood	-898.174		

Notes: Asterisks mean: *p < 0.10,**p < 0.05, ***p < 0.01.

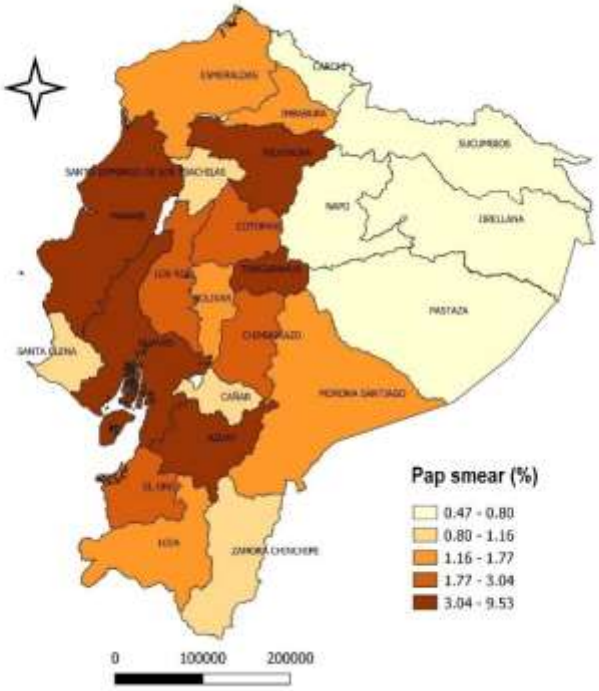
Then, the confusion matrix of the model is shown. In **Table 6** we can see that the estimated model is correctly specified. In the model we use as the dependent variable denoting whether a woman had a Pap smear, which is 80.09% specified by the independent variables. That is, the independent variables predict that a woman will have a Pap smear in 80.09% of the cases. It is worth mentioning that this percentage is relatively high, being an acceptable level higher than 60%.

Table 6. Confusion matrix of the estimated models

Model of Pap smear			
	True		
Classified	D	~D	Total
	3281	1423	1689
	2451	2231	6987
Total	4288	2966	5785
Correctly classified			80.09%

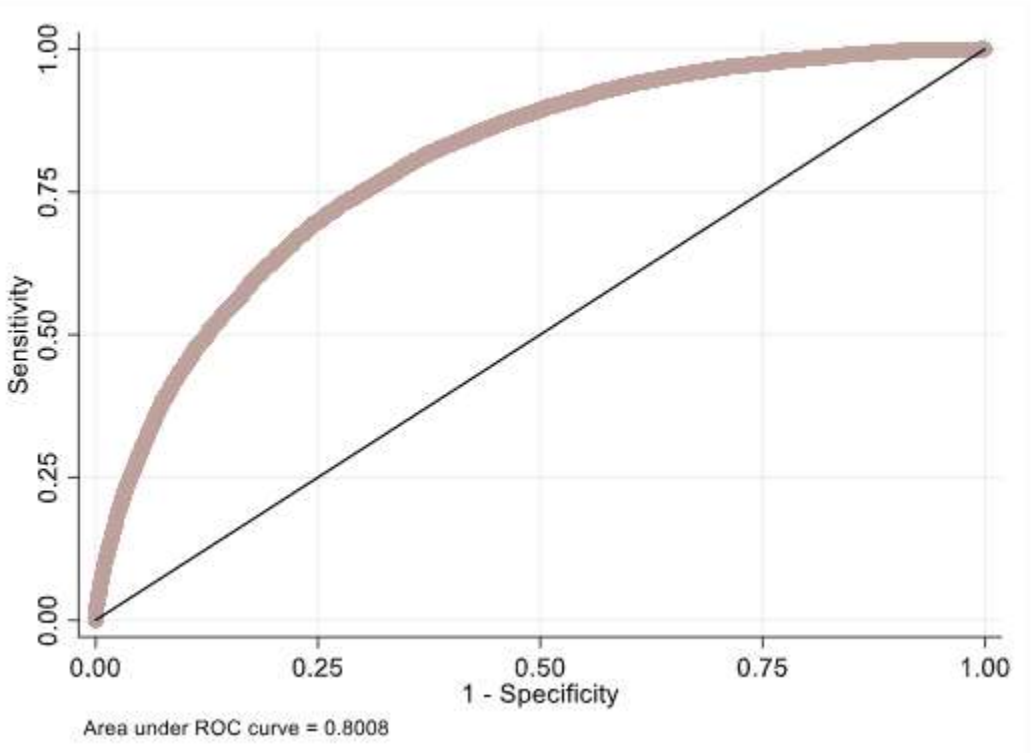
To further illustrate the case study, **Figure 2** displays the spatial distribution of women who have undergone a Pap smear across various provinces. The map highlights the regions where the percentage of women reporting a Pap smear is highest, with the provinces shaded in darker colors indicating higher screening rates. This visual representation reveals a clear geographic pattern: women who have had a Pap smear are predominantly concentrated in the Coastal and Highland regions of Ecuador. These areas, characterized by greater urbanization and access to healthcare services, tend to have higher rates of cervical cancer screening compared to other regions. The map provides valuable insight into the disparities in healthcare access and the uneven distribution of preventive health practices across the country. This geographic concentration underscores the importance of targeting under-screened areas, particularly in the Amazon and other rural regions, to ensure more equitable access to Pap smears and reduce the overall burden of cervical cancer in Ecuador.

Figure 2. Spatial distribution of the incidence of women undergoing Pap smears



Finally, to assess the fit and explanatory power of the independent variables, we applied the Receiver Operating Characteristic (ROC) curve using the probabilities estimated from the logistic regression model. The ROC curve, shown in **Figure 3**, illustrates the model's ability to correctly distinguish between women who had a Pap smear and those who did not, based on the significant predictor variables. In the worst-case scenario, the area under the curve (AUC) would be 0.50, indicating no predictive power. In our analysis, key variables such as family income, education level, employment status, and urban density demonstrated a strong predictive ability. The area under the curve was 0.80880 (95% CI: 0.752-0.854), which suggests that these variables can effectively predict whether a woman had a Pap smear, with a high degree of accuracy ($p < 0.001$). This AUC value indicates that the model performs well in distinguishing between cases and non-cases, significantly above the random chance threshold of 0.50. These results highlight the robustness of the model and the importance of the identified variables in predicting Pap smear uptake. The high AUC also underscores the critical role of socioeconomic factors, such as income, education, and employment, as well as urban living conditions, in influencing women's health-seeking behaviors. This analysis further emphasizes the need for targeted interventions that address these factors to improve cervical cancer screening rates.

Figure 3. ROC curve of the estimated model



4. Discussion

Among the structural barriers identified, several key sociodemographic factors stand out. The average labor income for women is $432 USD, with 42.7% of the women residing in the highland region of Ecuador. The average age of the women in the study is 28.34 years, and the majority (81.03%) identify as mestizo. In terms of marital status, 40.7% of the women are single, while 38.1% are married. Educational attainment shows that 43.4% of the women have completed high school, and 64.57% are employed. In relation to territorial characteristics, it was observed that the average population density is 151 inhabitants per square kilometer, with an average provincial gross value added (a measure of economic development) of $1,297.65 USD. Additionally, 59.33% of the women live in urban areas. The analysis reveals that certain sociodemographic and territorial variables are positively associated with higher Pap smear participation. For instance, being older, married, widowed, or divorced increases the likelihood of undergoing screening. Higher educational attainment also significantly improves the probability of having a Pap smear, as does being employed, living in a more densely populated urban area, and residing in regions with higher economic development. The women who reported undergoing Pap smears were primarily concentrated in the Ecuadorian Coastal and Highland provinces.

A crucial finding from the study is that a low level of education is one of the most significant barriers to Pap smear attendance. Women with limited education are less likely to participate in cervical cancer screening programs, a trend that mirrors findings from other studies. For example, a study conducted in Juchitán reported that 10,063 indigenous women over the age of 15 were illiterate, and low education levels were linked to limited knowledge and negative attitudes toward cervical cytology (Huamaní et al., 2008). Women with little or no education often lack awareness of the importance of screening, how to access it, and what the procedure entails (Valenzuela S. & Miranda, 2001). Moreover, a study by Roncancio et al. (2013) showed that many women have limited understanding of the anatomy of their reproductive organs, further hindering their likelihood to seek preventive care. This issue is not confined to Ecuador; similar findings have been reported globally. In one study involving adolescents, participants mistakenly believed that a Pap smear was the same as a general pelvic examination (S & Teresa, 2012). In another study conducted in Africa, women perceived the Pap smear as a treatment for infertility or as a "womb cleaning" procedure (Lartey et al., 2003). These misconceptions underscore the importance of educational outreach.

Educating women about cervical cancer screening is essential and should be a shared responsibility among healthcare professionals. Efforts should focus on improving understanding of the Pap smear procedure, its purpose, and the importance of early detection for cervical cancer prevention. Comprehensive education programs, especially targeted at women with low levels of formal education, can help dismantle these barriers and foster greater participation in life-saving screening programs. By addressing the root causes of these misconceptions and information gaps, healthcare systems can significantly improve women's health outcomes, particularly in low-resource settings.

In our results we were able to prove that income has a positive influence on having a Pap smear. That is, an increase in income increases the probability of having a Pap smear by 2 times (OR= 2.078, CI= 2.035; 2.086). Studies have shown that the low economic level within the sociodemographic characteristics, was seen as an important barrier, the participants reported that women do not have the resources to pay a private doctor and have no other option but to use public services, however, in many occasions the clinics do not have the necessary material, so they send them to private services with the risk that women cannot afford these services and do not get the test done(Zapata et al., 2018). in contrast to other results in which a significant association has been found between the wealth index (medium to very rich) and the acceptance of the test.(Gutiérrez et al., 2010) . This factor is very important since the present investigation documented that in the Ecuadorian population there are specific social and economic characteristics that make it difficult and impede the Pap test. Some authors (Urrutia S et al., 2008) suggest that the mass media and some other educational strategies are important, since they have been shown to have the capacity to increase the response rate to access preventive medical services, regardless of the economic disadvantage of the population. This leads us to think that the lack of information is a real problem, which needs to be addressed to increase the level of knowledge about the importance of the test, with greater emphasis on women who have not been tested.(Agurto et al., 2004).

Regarding the issue of shame and modesty around sexuality, the study found that 6.44% of participants reported avoiding the Pap smear due to feelings of embarrassment and discomfort an ongoing challenge in encouraging women to undergo this essential screening. The shame experienced by these women is closely tied to the exposure of their genitals during the procedure, as highlighted by reports from doctors in the study, who observed that many women were hesitant to remove their underwear for the exam (Valderrama Sanabria et al., 2022). These feelings of embarrassment could be mitigated if healthcare professionals offered more empathetic and compassionate care. Neglect by healthcare workers has been cited as a barrier in other studies as well (García A et al., 2006). This research further identifies being examined by male professionals as an obstacle, which amplifies the discomfort felt by women during the procedure—a finding that aligns with other studies identifying gender preferences in healthcare as a significant barrier (Saldaña-Téllez & Lena, 2017).

It is crucial to recognize that if women do not feel comfortable with healthcare providers or the clinical environment, they are less likely to return for follow-up visits or learn their test results. To address this, more comprehensive sex education in both homes and schools is recommended, alongside efforts to build trust between women and healthcare professionals. Empowering women to feel in control of their healthcare choices, including undergoing Pap smears, can improve participation rates (Roncancio et al., 2013). The behavior of healthcare personnel plays a critical role in whether women decide to undergo the Pap smear. Poor interactions with staff, including unempathetic or cold treatment and a lack of clear communication, can foster distrust and dissatisfaction with healthcare services. Studies, such as those by Huamán (Montes L et al., 2006), have shown that these negative experiences may deter women from adopting preventive health measures or seeking early detection services for cervical cancer. Therefore, it is essential that healthcare workers are trained to provide patient-centered care, addressing women's concerns with empathy and sensitivity. This can significantly improve patient satisfaction and encourage greater participation in preventive screenings.

The factors identified in this study are likely tied to broader healthcare policies and practices. The perception that healthcare professionals lack concern for women's needs also reflects systemic failures, where efforts to educate and raise awareness about the importance of the Pap smear have been insufficient. The burden of this issue is twofold: on one hand, healthcare professionals must offer higher-quality, compassionate care; on the other, the health system itself must implement more effective educational programs that emphasize the importance of early detection and prevention of cervical cancer.

5. Conclusion

The thematic analysis revealed that structural, psychosocial, and cultural factors are deeply intertwined and continuously interact, influencing women's participation in cervical cytology screening. The participants' narratives identified various barriers across these dimensions. The most prominent obstacles included lack of knowledge, feelings of embarrassment, and low-income levels. These factors significantly hinder both first-time and regular attendance at cervical cancer screening services. Specifically, misinformation, fear, taboos surrounding sexuality, and negative attitudes from partners toward the test were commonly cited reasons for avoiding screening. Additionally, prejudices and myths about cervical cancer and HPV further discourage women from seeking screening services.

The findings underscore the widespread misinformation regarding cervical cancer and the importance of early detection through cytology or the Papanicolaou (Pap) test. While many women had "heard of" cervical cancer, a significant portion lacked understanding of the risk factors, symptoms, and screening methods. This indicates a gap in effectively communicating these crucial health messages to the population. The results suggest that current public health efforts to raise awareness are not adequately reaching women, particularly those from marginalized or underserved communities, pointing to challenges in both information dissemination and reception.

To address these issues, the analysis recommends incorporating translators into the healthcare system and developing bilingual information campaigns, particularly targeted at indigenous communities. This would ensure that critical health information reaches all women, regardless of their ethnicity or language. Furthermore, giving women a platform to express their views and concerns is essential for better understanding their perceptions of cervical cancer and the barriers they face. By addressing these cultural, structural, and psychosocial barriers, health systems can create more inclusive and effective cervical cancer screening programs that cater to the diverse needs of women across all communities

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References

[1] Abdullah, F., O'Rorke, M., Murray, L., & Su, T. T. (2013). Evaluation of a worksite cervical screening initiative to increase Pap smear uptake in Malaysia: A cluster randomized controlled trial. *BioMed Research International*, *2013*, 572126. https://doi.org/10.1155/2013/572126
[2] Agurto, I., Bishop, A., Sánchez, G., Betancourt, Z., & Robles, S. (2004). Perceived barriers and benefits to cervical cancer screening in Latin America. *Preventive Medicine*, *39*(1), 91-98. https://doi.org/10.1016/j.ypmed.2004.03.040
[3] Allemani, C., Matsuda, T., Di Carlo, V., Harewood, R., Matz, M., Nikšić, M., Bonaventure, A., Valkov, M., Johnson, C. J., Estève, J., Ogunbiyi, O. J., Azevedo E Silva, G., Chen, W.-Q., Eser, S., Engholm, G., Stiller, C. A., Monnereau, A., Woods, R. R., Visser, O., … CONCORD Working Group. (2018). Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): Analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. *Lancet (London, England)*, *391*(10125), 1023-1075. https://doi.org/10.1016/S0140-6736(17)33326-3
[4] Arevian, M., Noureddine, S., & Kabakian, T. (1997). A survey of knowledge, attitude, and practice of cervical screening among Lebanese/Armenian women. *Nursing Outlook*, *45*(1), 16-22. https://doi.org/10.1016/s0029-6554(97)90053-1
[5] Donoso S., E. (2003). PLAN DE ACCION REGIONAL PARA LA REDUCCION DE LA MORTALIDAD MATERNA EN LAS AMERICAS: RESULTADOS DE CHILE. *Revista chilena de obstetricia y ginecología*, *68*(1), 13-15. https://doi.org/10.4067/S0717-75262003000100003
[6] Fernández-Esquer, M. E., & Cardenas-Turanzas, M. (2004). Cervical cancer screening among Latinas recently immigrated to the United States. *Preventive Medicine*, *38*(5), 529-535. https://doi.org/10.1016/j.ypmed.2003.12.009
[7] García A, E., Díaz P, J., Melo U, M., Parra F, F., Vera C, L., & Orozco V, L. (2006). VALIDACIÓN DE LA CITOLOGIA CÉRVICO UTERINA CONVENCIONAL CON PRUEBA DE REFERENCIA HISTOPATOLÓGICA EN LA IDENTIFICACIÓN DE CÁNCER ESCAMOCELULAR INVASOR. *Revista chilena de obstetricia y ginecología*, *71*(3), 184-188. https://doi.org/10.4067/S0717-75262006000300007
[8] Gutiérrez, C., Romaní, F., Ramos, J., Alarcón, E., & Wong, P. (2010). Factores asociados con el conocimiento y tamizaje para cáncer de cuello uterino (examen de Papanicolaou) en mujeres peruanas en edad fértil. Análisis del periodo 1996-2008. *Revista Peruana de Epidemiología*, *14*(1), 39-49.
[9] Hidalgo-Martínez, A. C. (2006). El cáncer cérvico-uterino, su impacto en México y el porqué no funciona el programa nacional de detección oportuna. *REVISTA BIOMÉDICA*, *17*(1), Article 1. https://doi.org/10.32776/revbiomed.v17i1.441
[10] Huamaní, C., Hurtado-Ortega, A., Guardia-Ricra, M., & Roca- Mendoza, J. (2008). Conocimientos y actitudes sobre la toma de papanicolaou en mujeres de Lima, Perú 2007. *Revista Peruana de Medicina Experimental y Salud Publica*, *25*(1), 44-50.
[11] Ireen, S., Raihan, M. J., Choudhury, N., Islam, M. M., Hossain, M. I., Islam, Z., Rahman, S. M. M., & Ahmed, T. (2018). Challenges and opportunities of integration of community based Management of Acute Malnutrition into the government health system in Bangladesh: A qualitative study. *BMC Health Services Research*, *18*(1), 256. https://doi.org/10.1186/s12913-018-3087-9
[12] Lartey, M., Joubert, G., & Cronje, H. S. (2003). Knowledge, attitudes and practices of rural women in South Africa regarding the Pap smear. *International Journal of Gynaecology and Obstetrics: The Official Organ of the International Federation of Gynaecology and Obstetrics*, *83*(3), 315-316. https://doi.org/10.1016/s0020-7292(03)00295-9
[13] Levi, F., Bosetti, C., Lucchini, F., Negri, E., & La Vecchia, C. (2005). Monitoring the decrease in breast cancer mortality in Europe. *European Journal of Cancer Prevention: The Official Journal of the European Cancer Prevention Organisation (ECP)*, *14*(6), 497-502. https://doi.org/10.1097/00008469-200512000-00002
[14] Luna-Abanto, J., Gil-Olivares, F., Deza Mendoza, Á., Luna-Abanto, J., Gil-Olivares, F., & Deza Mendoza, Á. (2020). Conocimientos, actitudes y prácticas sobre la prueba de citología cervical en una población rural peruana. *Revista Habanera de Ciencias Médicas*, *19*(1), 112-124.
[15] Montes L, L. M., Mullins P, M. J., & Urrutia S, M. T. (2006). CALIDAD DE VIDA EN MUJERES CON CÁNCER CÉRVICO UTERINO. *Revista chilena de obstetricia y ginecología*, *71*(2), 129-134. https://doi.org/10.4067/S0717-75262006000200010
[16] Mora, A. S., Castillo, A. S., & Ellis, C. G. (2020). Actualización de prevención y detección de cáncer de cérvix. *Revista Medica Sinergia*, *5*(3), Article 3. https://doi.org/10.31434/rms.v5i3.395
[17] Novoa Vargas, A., & Echegollen Guzmán, A. (2001). Epidemiología del cáncer de cérvix en Latinoamérica. *Ginecol. obstet. Méx*, 243-246.
[18] Percac-Lima, S., Aldrich, L. S., Gamba, G. B., Bearse, A. M., & Atlas, S. J. (2010). Barriers to follow-up of an abnormal Pap smear in Latina women referred for colposcopy. *Journal of General Internal Medicine*, *25*(11), 1198-1204. https://doi.org/10.1007/s11606-010-1450-6
[19] Peto, R., Boreham, J., Clarke, M., Davies, C., & Beral, V. (2000). UK and USA breast cancer deaths down 25% in year 2000 at ages 20-69 years. *Lancet (London, England)*, *355*(9217), 1822. https://doi.org/10.1016/S0140-6736(00)02277-7

[20] Roncancio, A. M., Ward, K. K., & Fernandez, M. E. (2013). Understanding Cervical Cancer Screening Intentions Among Latinas Using An Expanded Theory of Planned Behavior Model. *Behavioral medicine (Washington, D.C.)*, *39*(3), 66-72. https://doi.org/10.1080/08964289.2013.799452

[21] S, U., & Teresa, M. (2012). Creencias sobre Papanicolaou y cáncer cérvicouterino en un grupo de mujeres chilenas. *Revista chilena de obstetricia y ginecología*, *77*(1), 3-10. https://doi.org/10.4067/S0717-75262012000100002

[22] Saldaña-Téllez, M., & Lena, M. M. y L. (2017). Barreras percibidas por el personal de salud para la toma de la citología cervical en mujeres zapotecas de Juchitán, Oaxaca. *Psicooncología*, *14*(2-3), Article 2-3. https://doi.org/10.5209/PSIC.57090

[23] Schlichte, M. J., & Guidry, J. (2015). Current Cervical Carcinoma Screening Guidelines. *Journal of Clinical Medicine*, *4*(5), 918-932. https://doi.org/10.3390/jcm4050918

[24] Urrutia S, M. T., Poupin B, L., Concha P, X., Viñales A, D., Iglesias N, C., & Reyes I, V. (2008). ¿POR QUÉ LAS MUJERES NO SE TOMAN EL PAPANICOLAU?: BARRERAS PERCIBIDAS POR UN GRUPO DE MUJERES INGRESADAS AL PROGRAMA DE CÁNCER CERVICOUTERINO AUGE. *Revista chilena de obstetricia y ginecología*, *73*(2), 98-103. https://doi.org/10.4067/S0717-75262008000200005

[25] Valderrama Sanabria, M. L., Álvarez Najar, J. P., Loboa Rodríguez, N. J., & Peña Pita, A. P. (2022). Incertidumbre en la toma de citología cérvico uterina. *Revista Ciencia y Cuidado*, *19*(2 (May-August)), 31-39.

[26] Valenzuela S., M. T., & Miranda, A. (2001). ¿Por qué no me hago el papanicolau?: Barreras sicológicas de mujeres de sectores populares de Santiago de Chile. *Rev. chil. salud pública*, 75-80.

[27] World Health Organization. (2002). *Cervical cancer screening in developing countries: Report of a WHO consultation*. World Health Organization. https://apps.who.int/iris/handle/10665/42544

[28] Zapata, F. V., Miranda de la Cruz, A., Magaña-Olán, L., Hernández, J. M. G., & Madrigal, J. D. C. (2018). Factores Socioculturales Que Interfieren En La Realización Del Papanicolaou En Mujeres Indígenas Mexicanas. *European Scientific Journal, ESJ*, *14*(6), 69. https://doi.org/10.19044/esj.2018.v14n6p69