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Knowledge, perception, and utilization of cervical cancer screening and Human Papillomavirus (HPV) vaccination among immigrants and refugees in Central Ohio

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ABSTRACT

Background: Immigrants in the US are at higher risk of Human Papilloma Virus (HPV) infection and cervical cancer compared to the general US population. Low awareness surrounding cervical cancer inhibits associated preventive practices.

Purpose: This cross-sectional study examined the association between knowledge, attitude, and utilization of health services for cervical cancer screening and HPV vaccine among immigrant and refugee women in Ohio.

Method: Preliminary analyses were conducted on a total of 70 participants recruited from immigrant and refugee organizations and community centers, using a validated paper survey.

Results: There was a statistically significant association between cervical cancer screening and general knowledge on cervical cancer ($p = 0.038$). The study also revealed association between screening age ($p < 0.001$) and insurance status ($p = 0.033$). 61.2% of the participants perceived HPV vaccine to be ineffective at preventing cervical cancer, and 40.8% participants had never heard of the vaccine and consequently had not been vaccinated. 94% participants did not receive the HPV vaccine, however, 65.3% participants indicated willingness to be vaccinated against HPV for free or at reduced cost.

Conclusion: Culturally appropriate interventions are warranted to develop effective strategies that will influence HPV screening behavior and vaccine uptake in this target population.

KEY WORDS Human Papillomavirus, HPV, Ohio, Immigration, Vaccination

INTRODUCTION

Human Papillomavirus (HPV), a sexually transmitted infection (STI) is a major cause of cervical cancer among women in the United States of America (CDC, 2021). According to the Center for Disease Control and Prevention (CDC) cervical cancer is highly preventable and about 93% of infections could be averted through screening and HPV (human papillomavirus) vaccination (CDC, 2020). Research indicates that cervical cancer continues to be the second leading cause of cancer death in women aged 20 to 39 years, causing 9 deaths per week in this age group (Siegel, Miller, & Jemal, 2019). The World Health Organization (WHO) estimates cancer of the cervix as the fourth leading cause of death among women globally (WHO, 2021). In 2012, 527,000 new cases were recorded worldwide with half of this number (265,000) resulting in deaths (Torre, Siegel, Ward, & Jemal, 2016). In the U.S., deaths from cervical cancer have declined significantly over the past 40 years (CDC, 2020), however there exists grave disparities in incidence and death rates among specific populations. For

instance, immigrant and refugee women are more likely to die from and less likely to be screened for cervical cancer (CDC, n.d).

The WHO and the CDC recommend HPV vaccination as primary prevention among young girls and women between ages 9-26; both organizations also recommend pap smear and HPV testing every three to five years for women between ages 21-65 (WHO, 2019; CDC, .2021; CDC, 2019). In addition, women between ages 27-45 years who have not yet been vaccinated can do so after consulting with their doctors about the risks and benefits of the HPV vaccine (CDC, 2020). The United States has made significant progress in cervical cancer screening, however, there are still grave disparities in screening rates among immigrant women, particularly Hispanic-Latinos, women of African descent and Asian/Pacific Islanders (McGraw & Ferrante, 2014; Ward, *et al.*, 2004). Existing research has found that immigrants with a relatively wider social network and longer years of stay in the US (i.e., over a decade) are more likely to have knowledge about HPV and cancer screening and consequently are more willing to take a pap test (Sewali *et al.*, 2015; Read & Gorman, 2010; Schleicher, 2007). Nonetheless, gaps in screening rates persist and are attributed to several unique barriers that immigrant women face (Adunlin, Cyrus, Asare & Sabik, 2019; Schleicher, 2007).

One of such barriers is access to healthcare services. Immigrant women in the U.S. face significant barriers to cervical cancer screening in the form of lack of health insurance coverage, immigration status, cultural barriers, socioeconomic obstacles, integration, daily stress and health disparities (National Academies of Sciences, Engineering, and Medicine, 2015; Adunlin, Cyrus, Asare & Sabik, 2019; Sewali *et al.*, 2015; Echeverria & Carrasquillo, 2006). Another barrier that contributes to increased mortality from cervical cancer among immigrant women is the level of English proficiency. Existing research demonstrates that immigrants with little English proficiency and health literacy are less likely to have adequate knowledge to make the necessary health decisions including screening for HPV (Adunlin, Cyrus, Asare & Sabik, 2019; Beltran, Simms, Lee & Kwon, 2016; Luque et al, 2010; Garbers & Chiasson, 2004; Schleicher, 2007). Even when educational materials are made available, the language used is often too elevated to facilitate understanding, resulting in low health literacy rates among this population (Beltran, Simms, Lee, Kwon, 2016; Luque et al, 2010; Garbers & Chiasson, 2004). Moreover, certain cultural differences relating to sexual health also account for the limited knowledge pertaining to HPV screening (Maxwell, Bastani, & Warda, 2000). For example, in some African populations sexual health is not discussed openly and is shrouded in shame and embarrassment (Sewali et al, 2015; Anaman-Torgbor, King & Correa-Velez, 2017; Kingori et al, 2018). This promotes limited knowledge about cervical cancer and further promotes myths and misconceptions about the disease making women less likely to undergo HPV testing (Sewali et al, 2015; Dailey & Krieger, 2017).

Hispanic and African immigrant women are reported to have some of the highest cervical cancer incidence rates in the United States (Vanslyke et al, 2008; Pinder, Nelson, Eckardt, & Goodman, 2016). For instance, Luque et al. (2017) report that Hispanic/Latinas have 50% higher mortality rates as compared to non-Hispanic white women. Additionally, Pinder *et al.* (2016) examined cervical cancer incidence rates among African-born US immigrant women for the year 2012 and uncovered rates 29.3/100,000 and 42.7/ 100,000 among Western and Eastern African women respectively. These rates are especially alarming compared with the US general population average rate of 6.6/100,000 (Pinder *et al.*, 2016; pp 22). Owing to the disproportionate availability of cervical cancer screening options and resources for Hispanic and African immigrant women, there is generally low screening rates among this population. Due to these grave health disparities, women of Hispanic and African descent are more likely to die from cervical cancer (Amuta-Jimenez, Cisse-Egbounye, Jacobs, & Smith, 2019; Haile et al, 2018; Sewali et al, 2015). Among the above-mentioned populations, Somali and Mexican immigrant women are especially vulnerable to cervical cancer infection owing to a unique set of challenges that hinder screening and vaccination uptake in both populations (Sewali *et al.*, 2015; Vanslyke *et al.*, 2008). For instance, Luque *et al.* (2015) observed that Mexican women have a “26% higher rate of not being up to date with cervical cancer screening” (pp. 2) which is attributable to relatively lower levels of HPV knowledge (American Cancer Society, n.d.; Harcourt et al, 2013; Sewali *et al.*, 2015).

In this paper, we sought to test these findings by examining knowledge, perception and utilization of cervical cancer screening and Human Papillomavirus (HPV) vaccination among Somali and Mexican immigrants residing in Columbus, Ohio. To our knowledge, few studies have examined HPV and cervical cancer knowledge and screening utilization in both groups of immigrant women specifically residing in Ohio.

METHODS

Participant recruitment

A total of 70 Somali and Mexican immigrants were recruited in Central Ohio. Participants were recruited through convenience sampling from organizations and community centers that work with the study population via posters and word of mouth. A researcher-assisted, paper-based questionnaire (in English), with an estimated completion time of 20 minutes, was utilized to gather information on variables related to demographics, perception and utilization of cervical cancer screening and Human Papillomavirus (HPV) vaccine and other behavioral items.

Eligible participants were recruited based on the following criteria: 18 years and above, an immigrant or refugee, female, ability to understand English, born outside of the US but residing in Columbus, Ohio, at the time of the study. Consent was obtained from study participants prior to data collection and interview. The study was approved by the Institutional Review Board at an academic institution.

Measures

The survey comprised 81 questions on demographics, knowledge of human papillomavirus (HPV), vaccination and cervical cancer, utilization of cervical cancer screenings, and perception of HPV infection and vaccine. Demographic characteristics included age, marital status, education level, employment status, annual household income, health insurance coverage status, and place of birth. Questions on knowledge and attitude towards cervical cancer, HPV and HPV vaccination were assessed using closed-ended questions. The responses included “Yes”, “No”, “I don’t know” or “Refused.” For the purpose of data analyses most of the responses were dichotomized to “Yes” or “No.” Some questions had multiple choice responses, where participants could provide more than one answer. The following two measures were used to understand women’s cervical cancer screening uptake (outcome variable). “Have you ever had a test or exam to see if you had cervical cancer?” and “Have you ever had cervical cancer screening?”

The general HPV knowledge scale (10-item questionnaire), HPV vaccination scale (5-item questionnaire), and cervical cancer knowledge scale (5-item questionnaire) were used as main exposure variables. The covariates included the aforementioned demographic indicators that have been employed in other studies (Haile, Kingori, Chavan, *et al.*, 2018; Sewali *et al.*, 2015; Kobetz *et al.*, 2011). For the purpose of data analyses, we adjusted the sample size to only include the responses that did not have missing data. The final sample size consisted of 50 participants.

Statistical analysis

Data was evaluated for assumptions (e.g., normality, homogeneity of variances, etc.), checked for outliers, and assessed for systematic bias to ensure valid analysis. Transformations were applied, as necessary. Descriptive statistics was performed to describe and summarize the data. The corresponding frequency, percentage distribution, mean and standard deviation (SD) were reported. Fisher Exact test was done to determine association between cervical cancer screening uptake, main outcome variable, sociodemographic and knowledge characteristics. Significance was evaluated at $\alpha < 0.05$. All analyses were performed using SAS software, version 9.4 (SAS Institute, Inc., Cary, NC).

RESULTS

Demographic characteristics of the study sample are presented in Table 1. Majority of the study participants were between the age 18 and 25 (72%), not married (70%), employed (68%), had an annual income less than \$25,000 (82%), were uninsured (58%), and were born outside of the United States (84%).

Table 2 shows women’s knowledge, attitude, and perception towards HPV. Most women have heard of HPV (60%) and were aware that it can be transmitted through sexual contact (60%). Participants indicated schools (32%), followed by healthcare providers (24%) and the internet (20%) as their main source of information on HPV. Many women were aware that having multiple sexual partners (58%) and failure to use condoms (36%) increased the risk of contracting HPV. Among the participants, 85.7% were aware that HPV was preventable. Participants indicated being vaccinated (56%), using condoms (54%), and practicing abstinence (38%) as preventive measures against HPV. However, 78% of them also indicated taking antibiotics as a preventive measure. Among the women in the study, 26% of them did not know measures to prevent HPV infection and another 32.7% of women did not know that HPV causes cervical cancer. HPV knowledge, (Table 5) ranged from 0 to 10 and scores ranged from correctly answering 4 questions, to correctly answering 10 of the 10 questions. Data from the bivariate analysis indicated that women’s knowledge on HPV has no influence on cervical cancer screening and HPV vaccine uptake.

Knowledge, attitude, and perception towards HPV vaccination among the study participants is presented in Table 3. The study identified that 40.8% of women were not aware of HPV vaccination, and consequently did not know or believe if it was successful in preventing cervical cancer. Lack of knowledge about the vaccine and being sexually inactive were important barriers to HPV vaccination among the study participants. Majority of women (65.3%) were willing to get vaccinated if the vaccine was offered for free or at a reduced price. Thus, high vaccination cost is also an important barrier for HPV vaccine uptake. Only 40.8% of the women indicated that the vaccine protects against genital warts and most cervical cancers. The overall HPV vaccine uptake among the study participants was 6%. In addition, 40% of women were interested in getting the vaccine, and 27.7% were more likely to receive the HPV vaccine in the next 12 months. HPV vaccine knowledge (Table 5) ranged from 0 to 5 and scores ranged from not correctly answering any of the questions to correctly answering 4 of the 5

questions. None of the participants responded correctly to all 5 questions. No associations were found between knowledge on HPV vaccination and cervical cancer screening.

Table 4 presents women's knowledge, attitude, and perception towards cervical cancer. Majority of women (78%) have heard about cervical cancer and 68.8% were aware that HPV infection was a risk factor for developing cervical cancer. 68.8% participants indicated that having multiple sexual partners would increase their risk of developing cervical cancer later in life. Only 10 women (20%) had undergone a test for cervical cancer. 31.2% of women did not believe that cervical screening programs were effective at detecting cervical cancer at an early stage. Cervical cancer knowledge (Table 5) ranged from 0 to 5 and scores ranged from accurately answering 1 question to correctly answering 5 of the 5 questions.

Relationship between cervical cancer screening uptake and general knowledge on cervical cancer was established ($p = 0.038$). Results also indicate that there is a statistically significant association between screening uptake and age ($p < 0.001$) and insurance status ($p = 0.033$) (Table 6).

Table 1. Sociodemographic characteristics of the study sample (N=50)

	Overall n (wt. %)
Age	
18 - 25	36 (72)
26 - 35	5 (10)
36 - 50	9 (18)
Marital Status	
Not married	35 (70)
Married	15 (30)
Employment Status	
Unemployed	16 (32)
Employed	34 (68)
Annual Household Income	
< \$24, 999	41 (82)
> \$25,000	9 (18)
Insurance	
Insurance	21 (42)
Uninsured	29 (58)
Place of Birth	
Outside of US	42 (84)
In the US	8 (16)

Table 2. Knowledge, attitude, and practice toward HPV in women included in the study (N = 50)

Variables	N	Percent
Have you heard of HPV		
Yes	30	60
No	20	40
Source of information		
Health care provider	12	24
Family or friend	3	6
TV or Radio	9	18
Newspaper or magazine	6	12
Internet	10	20
School	16	32
HPV can be passed through sexual contact		
Yes	30	60
No	20	40
Increases the risk of contracting HPV		
Multiple sexual partner	29	58
Failure to use condom	18	36
I don't know	13	26
HPV can go away on its own, without any treatment		
Yes	3	6.3
No	45	93.7
HPV can be prevented		
Yes	42	85.7
No	7	14.3
Measures to prevent HPV infection		
Practicing abstinence	19	38
Taking antibiotics	39	78
Using condoms	27	54
Being vaccinated	28	56
I don't know	13	26
Who can be infected with HPV		
Only women	6	12.3
Both men and women	40	81.6
I don't know	3	6.1
Most women will not develop HPV infection in their lifetime		
True	31	67.4
False	15	32.6
HPV can affect a woman's ability to get pregnant		
Yes	39	79.6
No	10	20.4
HPV can cause cervical cancer		
Yes	30	61.2
No	3	6.1
I don't know	16	32.7
Had ever had HPV		
Yes	2	4
No	47	95.9
Do you know anyone who has had HPV		
Yes	3	6.1
No	46	93.9

Table 3. Knowledge, attitude, and perception toward HPV Vaccination in women included in the study (N = 68)

Variables	Number	Percent
Heard of HPV vaccine		
Yes	29	59.2
No	29	40.8
HPV vaccine is approved for people who have never been infected with HPV		
Yes	26	38.8
No	41	61.2
Who is eligible for HPV vaccine?		
Female	14	28
Both males and females	28	58
I don't know	8	16
Had received the HPV vaccine		
Yes	3	6
No	47	94
Interested in getting the HPV Vaccine		
Yes	20	40
No	30	60
Likelihood of receiving the HPV Vaccine in the next 12 months		
Yes	13	27.7
No	34	72.3
The reason for not having the HPV vaccination		
1 Does not need the vaccine	6	12
2 Not sexually active	14	28
3 My doctor did not recommend	8	16
5 Too expensive	6	12
7 Worried about safety of the vaccine	5	10
8 Don't know enough about the vaccine	12	24
Willingness to be vaccinated against HPV, for free or at a much lower cost		
Yes	32	65.3
No	6	12.2
I don't know	11	22.5
HPV vaccine protects against genital warts and most cervical cancer		
Yes	20	40.8
No	5	10.2
I don't know	24	49
Women who had an HPV vaccine no longer have to be screened for cervical cancer		
Yes	21	43.8
No	10	20.8
I don't know	17	35.4
Believes that HPV vaccine can successfully prevent cervical cancer		
Yes	19	38.8
No	10	20.4
I don't know	20	40.8

Table 5. Frequency distribution of women's knowledge on HPV, HPV vaccine and cervical cancer (N=50)

HPV Knowledge Questionnaire item	Correct	N	Percent
Have you heard of HPV?	Yes	30	60
HPV can be passed through sexual contact	Yes	30	60
Having multiple sexual partners and/or failure to use condom increases the risk of contracting HPV	Yes	37	74
HPV can go away on its own, without treatment	Yes	3	5.6
HPV can be prevented	Yes	42	85.7
Practicing abstinence, using condoms, and/or being vaccinated can prevent HPV infection	Yes	43	86
Both men and women can be infected with HPV	Yes	40	81.6
Most women will not develop HPV infection in their lifetime	Yes	31	67.4
HPV can affect a woman's ability to get pregnant	No	10	20.4
HPV can cause cervical cancer	Yes	30	61.2
HPV Vaccine Knowledge Questionnaire item			
Heard of HPV vaccine	Yes	20	40.8
HPV vaccine is approved for people who have never been infected with HPV	Yes	218	36.7
Both men and women are eligible for HPV vaccine	Yes	28	56
HPV vaccine protects against genital warts and most cervical cancer	Yes	20	40.8
Women who had an HPV vaccine no longer have to be screened for cervical cancer	Yes	21	43.7
Cervical Cancer Knowledge Questionnaire item			
Heard of cervical cancer	Yes	39	78
Rate of cervical cancer is increasing	Yes	42	85.7
Cervical screenings are not effective at detecting cervical cancer early	Yes	33	68.8
Having multiple sexual partners increase the risk of cervical cancer	Yes	33	68.8
HPV is a risk factor for development of cervical cancer	Yes	41	87

Table 6. Characteristics of the study sample by Screening uptake (N=50)

	Screening uptake		p value
	No n(Wt.%)	Yes n(Wt.%)	
Women's age			<0.001
18 - 25	29 (80.6)	7 (19.4)	
26 - 35	2 (40)	3 (60)	
36 - 50	2 (22.2)	7 (77.8)	
Insurance status			0.033
Insured	10 (47.6)	11 (52.4)	
Uninsured	23 (79.3)	6 (20.7)	
Knowledge of cervical cancer			0.038
No	12 (92.3)	1 (7.7)	
Yes	21 (56.8)	16 (43.2)	

DISCUSSION

In this paper, we examined the level of HPV and cervical cancer knowledge in a sample of Somali and Mexican immigrants residing in Columbus, Ohio. We also explored the association between knowledge of HPV and the utilization of cervical cancer screening in this population. Screening is the biggest preventive measure against HPV as its long-term complications including cervical cancer (WHO, n.d.). However, without adequate knowledge and awareness about the risks, symptoms and severity of the health issue; screening is difficult. Several studies have identified lack of adequate knowledge about HPV and cervical cancer as a significant barrier in reducing the rates of cervical cancer deaths in this population (Johnson *et al.*, 2008; Theil de Bocanegra *et al.*, 2008; Ndukwe *et al.*, 2013; Sewali *et al.*, 2015; Rositch *et al.*, 2012).

In our sample, we found a significant relationship between cervical cancer screening uptake and general knowledge on the health issue ($p=0.038$). Similar associations have been identified in previous studies; for instance, Marván, Ehrenzweig & Catillo-López (2013) found that although 80% of the 384 Mexican participants of their study had received a pap test in the last 3 years, their level of knowledge about the risk factors of the health issue was still inadequate (Marván *et al.*, 2013). The authors additionally found that the propensity for these women to take up screening services were directly impacted by their educational level as well as place of residence (rural or urban) (Marván *et al.*, 2013). In the same vein, Ghebre, Sewali, Osman *et al.* (2015) in their study with Somali immigrants living in Minneapolis, Minnesota found that a general lack of knowledge and general misconceptions about cervical cancer and its risk factors at the individual level, severely impacted screening rates among this population. The common perception within said community was that any type of screening denoted illness and that single, unmarried, divorced or older women were not at risk of cervical cancer infection (Ghebre *et al.*, 2015). While knowledge does not always lead to a change in behavior, it plays a significant role in influencing attitudes, perceptions and beliefs that can otherwise hinder targeted behaviors.

Similarly, in our study, we observed a significant relationship between the age of the respondents and the utilization of screening services ($p < 0.001$). This finding is consistent with previous studies that have found that older Mexican immigrant women were less likely to undergo pap screening compared to their younger counterparts (Reyes-Ortiz & Markides, 2010; Shelton *et al.*, 2012). Age, however, was not the only significant indicator of screening uptake. Reyes-Ortiz & Markides (2010) in their study of 1,272 Mexican immigrants living in 5 southwestern states aged 65+ uncovered that age coupled with other factors including educational level, socio economic status, access to health insurance coverage and physician's behaviors heavily impacted cervical cancer screening rates among this population (Reyes-Ortiz & Markides, 2010). Shelton *et al.* (2012) also found that younger Mexican women who were married or partnered were more likely to adhere to pap screening recommendations. Among the Somali community, there were no significant associations between age and utilization of screening services. Ghebre *et al.* (2015) in their study found that older women (aged 45-60) were less likely to screen compared to their younger counterparts (Ghebre *et al.*, 2015). Future studies can rally community navigators as well as peer groups to increase utilization of screening among the older women.

Moreover, we found a statistically significant association between health insurance status and cervical cancer screening uptake ($p=0.033$). Research indicates that a significant barrier to the utilization of screening services for many immigrant women is the lack of insurance coverage (Reyes-Ortiz & Markides, 2010; Ghebre *et al.*, 2015; Sewali *et al.*, 2015; Shelton *et al.*, 2012; Adegboyega & Hatcher, 2017). In a research study conducted by Sewali *et al.* (2015) with Somali immigrants living in Oslo, Minnesota, participants identified no insurance coverage as one of the main reasons why they would opt to not get screened for cervical cancer. Another qualitative study conducted with Somali youth in Columbus, Ohio, indicated that primary healthcare providers were the main source of sexual health information for this population as such "sensitive" topics were not to be discussed in public and among family and friends due to shame (Kingori *et al.*, 2018).

The 'taboo' nature of sexual health within the Somali community coupled with the lack of health insurance coverage prevents these women from gaining access to resources such as primary healthcare physicians, knowledge and information about cervical cancer screening services. Similarly, Mexican immigrants encounter peculiar challenges when accessing reproductive health services in the US. These barriers are even more pronounced among undocumented immigrants. Owing to national policies that exclude undocumented immigrants from even qualifying for health insurance subscription (Hacker *et al.*, 2015), many Mexican immigrants face extreme hardship in accessing healthcare when they are sick, not to talk of preventive services like screening. Having private insurance or Medicaid/Medicare was an important predictor of screening in this community (Reyes -Ortiz & Markides, 2010).

In summary, the existing gaps in knowledge about HPV and cervical cancer among Somali and Mexican immigrant women is a pervasive issue. Overall, most women reported having adequate information about HPV and cervical cancer. However, the need to scale up education efforts for the few who lack the information still exists. Participant age and lack of health insurance coverage (and its associated costs) were the most significant

factors for screening uptake in our population. For this reason, screening services need to be made available to this vulnerable population through more inclusive policy changes that allow for the easy procurement of health insurance coverage for all. Furthermore, cervical cancer screening and vaccination messages should be targeted towards women of all ages, not only the younger ones.

Limitations

The study has some weaknesses. Due to its small sample size, multivariate analysis could not be performed. Additionally, because the responses were self-reported, the possibility of a recall and social desirability bias cannot be excluded. The cross-sectional study design precludes causal inferences. However, given that this paper utilized preliminary findings, findings provide a snapshot of some of the gaps associated with knowledge and uptake of HPV screening and vaccination among Somali and Mexican immigrant population in the US.

CONCLUSION

The current study supports the position that increased knowledge about HPV and cervical cancer are critical in addressing the morbidity and mortality burden among Somali and Mexican immigrant populations in the U.S. Furthermore, the current study sheds light on factors impacting screening uptake among these populations which adversely affect early detection and treatment. Findings from this study are essential in identifying what areas need reinforcement and hopes to guide the development of culturally relevant strategies in addressing existing gaps identified. Future strategies should employ a multi-dimensional qualitative approach that examines the social, cultural, community and physical structures that account for the gaps in HPV and cervical cancer knowledge and screening among this population. The findings from this study can be used as a framework for future studies.

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