



Impact of a structured educational campaign on awareness, perceptions, and attitudes towards HPV vaccination and cervical cancer in Jeddah, Saudi Arabia

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ABSTRACT

Objectives: Cervical cancer is the fourth most common cancer in the world and a prevalent type of cancer across Saudi Arabia, caused primarily by chronic infection with high-risk oncogenic strains of HPV. In 2013, The Saudi Ministry of Health introduced HPV vaccination program, but awareness of cervical cancer and HPV remains low among Saudi Arabia. Lack of awareness is a major barrier to increasing HPV vaccine acceptance. Studies have demonstrated that public health awareness campaigns, in particular, can drastically change people's perceptions of HPV and cervical cancer. This study aimed to determine whether a structured educational program on cervical cancer and the HPV vaccine in Saudi Arabia enhances community awareness and understanding of these issues.

Methods: We conducted a cross-sectional study, the questionnaire included knowledge about cervical cancer causes, screening program, and HPV vaccination. Participants were divided into two groups—campaign visitors who attended the campaign and the general population who lived in Jeddah, Saudi Arabia, but did not attend the campaign. We collected the data through face-to-face interviews and included those above 18.

Results: We have seen a significant difference in the level of awareness in those who attended compared to those who did not, with the latter having a lower rate of awareness. Demographic factors showed no significant correlation with the levels of knowledge.

Conclusion: Our study has shown that structured educational campaigns raise awareness regarding cervical cancer and HPV vaccination. We recommend doing more structured campaigns to increase awareness and acceptance of the vaccine and the screening program.

1. Introduction

Cervical cancer is the fourth most common cancer in the world and is considered a major health issue, with a combined worldwide incidence of almost half a million new cases annually, it is the ninth most prevalent malignancy in Saudi Arabian women aged 15 to 44 years (1-3). Almost all occurrences of cervical cancer are caused by chronic infection with high-risk oncogenic strains of the human papillomavirus (HPV) (4) and, as a result, risk factors include anything that can lead to HPV infection, a significantly weakened immune response to HPV infection, or both (5, 6). These risk factors included premarital or early sexual intercourse; several sexual partners; immunosuppression; history of sexually transmitted infection (STD); history of HPV-related vulvar or vaginal dysplasia; non-attendance-for-cervical cancer screening and under-screening in nations with established cervical cancer screening programs (resulting in an estimated two-thirds of cervical malignancies in such countries) (7-9). HPV infection is among one of the most common STDs in the world (10). The global prevalence of high-risk HPV (eg.16 and 18) infection is 10.4%, with some developing nations seeing as high as 36.5 percent (11-13). HPV transmission does not necessitate penetrative sexual intercourse, even though it is sexually transmitted. Genital contact between skin and skin is a well-known transmission mechanism (14). HPV vaccination is suggested to prevent new HPV infections and disorders connected with HPV, such as genital warts and cervical cancer (15). All HPV vaccines, whether bivalent, quadrivalent, or nine-valent, are designed to protect against the two most frequent carcinogenic viral subtypes, HPV16 and HPV18 (16). In 2010, the

Saudi Food and Drug Administration (FDA) approved a preventive HPV vaccine for females aged 11 to 26 years in Saudi Arabia (17). As a result, in 2013, the Saudi Ministry of Health (MOH) added a 2-dose HPV vaccination schedule to its national immunization program for girls aged 11 and 12 years old, as well as a 3-dose catch-up plan for females aged 15 to 26 years old (18).

Although HPV vaccination alone or in combination with screening, has been shown to reduce the burden and mortality of cervical cancer in various settings, basic knowledge about the cause of cervical cancer remains lacking in some communities, such as Saudi Arabian women, who have many misconceptions about cervical cancer and HPV (17). Previous literature has shown that many women in Saudi Arabia have a negative attitude toward cervical cancer screening and stated that there is no need to be screened if they are symptom-free, which acts as a barrier for them to get screened. A cross-sectional study conducted in Saudi Arabia showed that only a quarter of the participants has had a pap smear and less than 1% have taken the vaccine, with the majority of the participants lacking knowledge regarding cervical cancer, its screening, and vaccination (19).

One of the main barriers to increasing HPV vaccine acceptance is a lack of awareness. While reviewing the literature, we have found several studies stating that awareness campaigns especially in public health promotion showed significant change in knowledge and attitude among its visitors (20-22). The World Health Organization (WHO) recommended that nations incorporating the HPV vaccine into their national immunization programs invest in a thorough communication campaign to raise community awareness and acceptance of the vaccine and program. This approach involves specific program and communication objectives, and a better understanding of community knowledge, attitudes, and behaviors. All major target populations, particularly parents, should be reached through communication activities. The vaccine's acceptance and coverage may be impacted by parents' misconceptions and fears about immunization. To our knowledge, no study in Saudi Arabia has evaluated the impact of a structured educational intervention on the community's awareness, and perceptions of cervical cancer and HPV vaccination. The goal of this study is to see if a structured-educational intervention about cervical cancer and the HPV vaccine improves the community's awareness and understanding of cervical cancer and the HPV vaccine in Saudi Arabia.

2. Methodology

2.1. Ethical approval

This study was approved by the Research Ethics Committee of King Abdulaziz University (approval no. 450-22). All participants gave their consent after being informed of the study's goals and the anonymity of their responses.

2.2. Study setting and participants

This cross-sectional comparative study was carried out from May 2022 to January 2023 in Jeddah, Saudi Arabia. A 3-day educational campaign titled 'Cervical cancer and HPV vaccine awareness' was held in a shopping mall in Jeddah, Saudi Arabia under the supervision of obstetrics and gynecology consultants. The campaign included well-structured educational material distributed among five different booths. Three booths focused on cervical cancer signs and symptoms, diagnosis, and various treatment options, and two booths about preventive modalities with a focus on the screening program and HPV vaccination. A total of 206 participants filled out the questionnaire and met our inclusion criteria which are being 18 years and above and being a Jeddah resident. 103 participants agreed to undergo the personal interview at the campaign site, so we obtained in a similar manner an equal sample size from Jeddah residents (general population group) who didn't attend the campaign.

2.3. Data collection

Participants' data were obtained through interviews, which were later collected via electronic data collection sheets using Google forms and transferred into Excel sheets for analysis. The questionnaire was made by a gynae-oncology consultant and reviewed by various obstetrics and gynecology consultants. Moreover, a pilot study was done.

The questionnaire included 13 questions divided into four sections. The first section aimed at collecting demographic data, such as age, nationality, and level of education which was separated into two groups included basic educational level (highschool and below) and higher educational level (above highschool). The second section assessed the knowledge about HPV infection through two questions. The third section included four questions about cervical cancer screening. The last section asked four questions to evaluate awareness about HPV vaccine.

2.4. Data analysis

Quantitative variables are shown as means and standard deviations, whereas categorical variables are shown as percentages. To compare the continuous and dichotomous variable groups, the Student's t-test and the chi-square test were used, respectively. Statistical significance was set at $P < 0.05$, and all statistical analyses were performed using IBM SPSS Statistics for Windows (version 21; IBM Corp., Armonk, NY).

3. Results

3.1. Demographic characteristics

In this cross-sectional comparative study, a total of 206 participants were recruited, including people who attended our educational campaign and the general population data, and their records were analyzed. The mean age of the campaign visitors and the general population was 35.98 ± 11.02 , and 34.15 ± 12.48 , respectively. Table 1 shows the baseline demographic characteristics. 18 to 30 years were the most prevalent age group, making up 36.9% of campaign visitors and 49.5% of the general population. The majority of our study participants were Saudis and with a higher educational level. The campaign group had a higher percentage of people with higher education than the general population group (72.8% vs. 61.4%, respectively).

3.2. General populations knowledge and awareness

Of 103 general population participants, 27.2% stated that they knew the cause of cervical cancer yet only 13.6% reported it correctly (infection), Table 2. The most correctly answered question was "Have you ever heard of early screening for cervical cancer", as 59.2% answered "Yes" from the general population sample. When asked about the tool for cervical cancer screening, 49.5% knew that a pap smear is the principal screening tool with only 36.9% answering the correct starting age (18-21 years). "How often the pap smear should be done" was the least question answered correctly; only 7.8% chose "Every three years" as their answer. 36.9% answered "Yes" when they were questioned about if they ever heard of a vaccine for cervical cancer prevention, and only 33.0% knew that HPV-Gardasil is the vaccine. Almost 75% of the participants didn't know the proper age to start receiving the vaccine nor did they know that a woman must still go through the screening program even after the vaccination. An analysis of the relationship between knowledge and demographic characteristics of the general population was done, Table 3.

3.3. Campaign visitors and the general population comparison of knowledge and awareness

After the 103 campaign visitors included in this study were provided with educational material regarding cervical cancer and the HPV vaccine, they were interviewed using the same questionnaire as the general population. When they were questioned if they know the cause of cervical cancer, 61.2% answered "Yes" with a statistically significant difference in comparison to the general population ($P < .001$), and for the question of the main cause of cervical cancer, 52.4% answered "Infection" ($P < .001$), Table 2. There were significant differences in people who answered "Pap smear" as the screening tool for cervical cancer between the two groups (57.3% vs. 49.5%, $P = .024$) and the number of correct answers to the question of the age of pap smear was significantly higher among the campaign visitors ($P = .008$). 46.4% of the campaign visitors answered the interval of pap smear test as "Every three years", with a statistically higher difference compared to the general population ($P < .001$). When they were asked about a vaccine to prevent cervical cancer, a significantly higher proportion of campaign visitors heard about the vaccine (53.4%) and 49.5% provided the right answer "HPV-Gardasil vaccine" ($P = .025$ and $P = .027$, respectively). 52.4% of the campaign visitors responded correctly to the age of the vaccine compared to the general population ($P < .001$) and 46.6% answered "Yes" for the need for a pap smear after the HPV vaccine ($P < .001$) when compared to the general population.

Table 1. Respondents' demographic characteristics

Variable		Campaign	visitors	General	P-value
		(N=103)		(N=103)	
		n(%)		n(%)	
Age (years)	18-30	38(36.9)		51(49.5)	0.251
	31-40	30(29.1)		20(19.4)	
	41-50	23(22.3)		22(21.4)	
	>50	12(11.7)		10(9.7)	
Nationality	Saudi	81(79.4)		88(85.4)	0.342
	Non-Saudi	21(20.6)		15(14.6)	
Education	Basic education	28(27.2)		39(38.6)	0.112
	Higher education	75(72.8)		62(61.4)	

Table 2. Comparison of knowledge and awareness toward Cervical Cancer and HPV vaccine

Item	Campaign visitors)N=103(n(%)	General population (N=103) n(%)	P- value*
	Cervical Cancer		
Do you know what causes cervical cancer? (Yes)	(61.2)63	(27.2)28	0.001>
Cervical cancer caused by? (Infection)	(52.4)54	(13.6)14	0.001>
Have you ever heard of early screening for cervical cancer (Yes)	(67.0)69	(59.2)61	0.312
How the cervical cancer screening done? (Pap smear)	(57.3)59	(49.5)51	0.024
At what age should women start screening for cervical cancer? (18-21 years)	(51.0)52	(36.9)38	0.008
How often the pap smear should be done? (Every three years)	(46.4)48	(7.8)8	0.001>
HPV vaccine			
Have you ever heard about a vaccine helps with cervical cancer prevention? (Yes)	(53.4)55	(36.9)38	0.025
What is the vaccine? (HPV-Gardasil)	(49.5)51	(33.0)34	0.027
At what age receiving the vaccine would be more benefit? (9-25 years)	(52.4)54	(10.7)11	0.001>
Do you still need to do a pap test after receiving the vaccine? (Yes)	(46.6)48	(14.6)15	0.001>

Chi-square*

HPV = Human papillomavirus

Table 3. General population knowledge and awareness of Cervical cancer and HPV vaccine in relation to demographic characteristics

Item	Age			P- value	Nationality		P- value	Educational level		P- value
	All n(%)	<40 years n(%)	≥40 years n(%)		Saudi n(%)	Non- Saudi n(%)		Basic education n(%)	Higher education n(%)	
Do you know what causes cervical cancer? (N=103)										
Yes	28(27.2)	19(28.8)	9(24.3)	0.797	26(29.5)	2(13.3)	0.345	15(38.5)	13(21.0)	0.092
No	75(72.8)	47(71.2)	28(75.7)		62(70.5)	13(86.7)		24(61.5)	49(79.0)	
Total	103	66	37		88	15		39	62	
Have you ever heard of early screening for cervical cancer? (N=103)										
Yes	69(67)	44(66.7)	25(67.6)	1.000	59(67.0)	10(66.7)	1.000	29(74.4)	39(62.9)	0.328
No	34(33)	22(33.3)	12(32.4)		29(33.0)	5(33.3)		10(25.6)	23(37.1)	
Total	103	66	37		88	15		39	62	
Have you ever heard about a vaccine helps with cervical cancer prevention? (N=103)										
Yes	38(36.9)	29(43.9)	9(24.3)	0.077	32(36.4)	6(40.0)	1.000	13(33.3)	24(38.7)	0.738
No	65(63.1)	37(56.1)	28(75.7)		56(63.6)	9(60.0)		26(66.7)	38(61.3)	
Total	103	66	37		88	15		39	62	
At what age receiving the vaccine would be more benefit? (N=103)										
9-25 years	11(10.7)	5(7.6)	6(16.2)	0.081	9(10.2)	2(13.3)	0.364	3(7.7)	8(12.9)	0.667
26-40 years	12(11.7)	11(16.7)	1(2.7)		9(10.2)	3(20.0)		3(7.7)	8(12.9)	
41-50 years	4(3.9)	2(3.0)	2(5.4)		3(3.4)	1(6.7)		1(2.6)	3(4.8)	
I don't know	76(73.8)	48(72.7)	28(75.7)		67(76.1)	9(60.0)		32(82.1)	43(69.4)	
Total	103	66	11		88	15		39	62	

HPV = Human papillomavirus

4. Discussion

4.1 Cervical Cancer Causes Awareness

Cervical cancer has been shown to be within the top twelve most prevalent cancers in the Kingdom of Saudi Arabia (23). Our study has aimed to assess the knowledge among those who attended our campaign and those who didn't, we have seen that the majority of those who didn't attend the campaign lacked knowledge regarding the etiology of cervical cancer. A previous local study done in 2021 at Riyadh showed that the minority of the participants knew that HPV was the direct cause of cervical cancer, and only a few participants knew that of them knew that HPV infection is transmitted sexually (24). These findings were shared in another two local

studies, the first one showing a very large portion of their participants never heard of it, and about (72,6%) didn't know that HPV is the causative of most cervical cancers **(25)**. It was also observed in the latter study in which many heard about cervical cancer, but none knew the cause of it **(26)**. Other Arab countries have yielded comparable results, in a study conducted in Bahrain, less than a quarter of the participants heard about HPV infection yet more than half of those who heard about it knew that it caused cervical cancer **(27)**.

4.2 Cervical Cancer Screening Awareness

Cervical cancer is now a disease that can be prevented due to the availability of a viable vaccination and an early screening program. The community should have adequate knowledge of the screening procedure and vaccination to enhance acceptance of screening and vaccination in order to get these benefits and achieve better outcomes **(28)**. However, this outcome depends on the population's awareness level and intention to perform the screening test or receive the vaccination, which in our study was low in those who didn't attend the campaign, though many knew that the tool used to screen was Pap smears, the majority lacked knowledge regarding the recommended age for screening and the interval of the screening program. A local study has stated that though many of their participants have known about cervical cancer screening only a few have undergone it, and the main reason why the rest didn't was the lack of awareness **(29)**. Furthermore, a previous systematic review reported that an educational program about cervical cancer was claimed to have significantly increased cervical cancer screening rates **(30)**. In Saudi Arabia, there is an implemented cervical cancer screening program, though not for all women it's according to the woman's choice, and the advice of her healthcare professional, and due to our religious beliefs, the majority are Muslim and avoid premarital sexual activity **(28)**. In British Columbia where a screening program is strongly implemented, only 25% are identified at stage III or IV, compared to 43% of cases in Saudi Arabia **(31)**.

4.3 HPV vaccine awareness

Saudi Arabia has demonstrated a prevalence rate of HPV infection that is equivalent to global values **(32)**. Our study has shown that the participants lack knowledge regarding the HPV vaccine with a significant difference in knowledge between those who attended the campaign and those who didn't. A study conducted in Riyadh, Saudi Arabia has further proven our results by showing a very low rate of knowledge among young women regarding the HPV vaccine **(25)**. Another Saudi paper among healthcare providers showed that almost 30% lacked knowledge and awareness of cervical cancer, HPV, and the HPV vaccine **(17)**. Moreover, cross-sectional research was conducted among 966 female students at Hail University and also stated that the majority lacked knowledge regarding cervical cancer, pap smears, and HPV vaccines **(18)**. On an international scale, it has been shown that Romania had the highest incidence of cervical cancer so a cross-sectional survey study analyzed the awareness and knowledge of HPV infection and attitudes to vaccination they stated that although almost 60% knew about the vaccine, almost half of the participants had a negative attitude towards it, and their main barriers was the cost, afraid of adverse effects and claiming that it's a risky vaccine **(33,34)**. Another Chinese paper assessed the knowledge of mothers of teen daughters, a poor knowledge score was established in their results **(35)**.

4.4 Effects of Awareness Campaigns

In previous literature, it has been evident that many individuals hold negative perceptions due to a lack of knowledge. Various methods can be utilized to increase awareness, including public health campaigns **(36)**. Our results have demonstrated the significant effectiveness of awareness campaigns in improving public knowledge, which may, in the long run, lead to more positive perceptions and acceptance. For instance, a radio station presented a segment about cervical cancer and HPV vaccination, testing its effect on intervention and control groups. The study revealed higher rates of knowledge among the intervention group **(37)**. Another method used to increase public knowledge involved social media. A study assessing the impact of social media on HPV vaccine awareness showed a significant increase in awareness levels among mothers **(38)**. Similarly, a British online campaign reported a high level of interaction on social media, indicating increased public curiosity to learn about cervical cancer and its vaccine **(39)**. Upon reviewing the literature, we found very limited data regarding cervical cancer and HPV vaccine campaigns, unlike campaigns for other cancers such as colorectal and breast cancer. Studies on those cancers have shown that awareness campaigns led to higher rates of diagnosis, indicating greater acceptance of screening programs **(40,41)**.

5. Limitations

Like with much earlier research, this one had its share of weaknesses, chief among them being the fact that it was cross-sectional and included one Saudi Arabian city. Our campaign was organized into multi booths each talking about specific information many of the visitors didn't go through all the booths which may have affected our results.

6. Conclusion

Our study has shown a significant increase in awareness among those who attended the campaign than those who didn't in knowledge about cervical cancer causes, screening, and HPV vaccination. The participant's demographics such as (age, nationality, and level of education) didn't show any significant correlation with the level of knowledge. We recommend healthcare physicians and the Ministry of Health to do more educational campaigns regarding Cervical cancer and its vaccination as this might increase the rate of screening and vaccination in Saudi Arabia and decrease cervical cancer. We also recommend future researches to assess how educational campaigns affected the rate of screening and vaccination.

References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 2018; 68(6): 394-424. <https://doi.org/10.3322/caac.21492>
2. Franco EL, Schlecht NF, Saslow D. The epidemiology of cervical cancer. *Cancer J* 2003; 9(5): 348-359. <https://doi.org/10.1097/00130404-200309000-00004>
3. Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. *Lancet Glob Health* 2020; 8(2): e191-e203. [https://doi.org/10.1016/s2214-109x\(19\)30482-6](https://doi.org/10.1016/s2214-109x(19)30482-6)
4. Crosbie EJ, Einstein MH, Franceschi S, Kitchener HC. Human papillomavirus and cervical cancer. *Lancet* 2013; 382(9895): 889-899. [https://doi.org/10.1016/s0140-6736\(13\)60022-7](https://doi.org/10.1016/s0140-6736(13)60022-7)
5. Fonseca-Moutinho JA. Smoking and cervical cancer. *ISRN Obstet Gynecol* 2011; 2011: 847684. <https://doi.org/10.5402/2011/847684>
6. Grulich AE, Van Leeuwen MT, Falster MO, Vajdic CM. Incidence of cancers in people with HIV/AIDS compared with immunosuppressed transplant recipients: a meta-analysis. *Lancet* 2007; 370(9581): 59-67. [https://doi.org/10.1016/s0140-6736\(07\)61050-2](https://doi.org/10.1016/s0140-6736(07)61050-2)
7. Cohen PA, Jhingran A, Oaknin A, Denny L. Cervical cancer. *Lancet* 2019; 393(10167): 169-182. [https://doi.org/10.1016/s0140-6736\(18\)32470-x](https://doi.org/10.1016/s0140-6736(18)32470-x)
8. Bos AB, Rebolj M, Habbema JDF, van Ballegooijen M. Nonattendance is still the main limitation for the effectiveness of screening for cervical cancer in the Netherlands. *Int J Cancer* 2006; 119(10): 2372-2375. <https://doi.org/10.1002/ijc.22114>
9. Sultana F, English DR, Simpson JA, Brotherton JML, Drennan K, Mullins R, et al. Rationale and design of the iPad trial: a randomized controlled trial of home-based HPV self-sampling for improving participation in cervical screening by never-and under-screened women in Australia. *BMC Cancer* 2014; 14: 207. <https://doi.org/10.1186/1471-2407-14-207>
10. Burd EM. Human papillomavirus and cervical cancer. *Clin Microbiol Rev* 2003; 16(1): 1-17. <https://doi.org/10.1128/cmr.16.1.1-17.2003>
11. Muñoz N, Bosch FX, de Sanjosé S, Herrero R, Castellsagué X, Shah KV, et al. Epidemiologic classification of human papillomavirus types associated with cervical cancer. *N Engl J Med* 2003; 348(6): 518-527. <https://doi.org/10.1056/nejmoa021641>
12. Qiao Y-L, Sellors JW, Eder PS, Bao Y-P, Lim JM, Zhao F-H, et al. A new HPV-DNA test for cervical cancer screening in developing regions: a cross-sectional study of clinical accuracy in rural China. *Lancet Oncol* 2008; 9(10): 929-936. [https://doi.org/10.1016/s1470-2045\(08\)70210-9](https://doi.org/10.1016/s1470-2045(08)70210-9)
13. Okunade KS, Nwogu CM, Oluwole AA, Anorlu RI. Prevalence and risk factors for genital high-risk human papillomavirus infection among women attending the outpatient clinics of a university teaching hospital in Lagos, Nigeria. *Pan Afr Med J* 2017; 28: 227. <https://doi.org/10.11604/pamj.2017.28.227.13979>
14. Okunade KS. Human papillomavirus and cervical cancer. *J Obstet Gynaecol* 2020; 40(5): 602-608. <https://doi.org/10.1080/01443615.2019.1634030>
15. Meites E, Szilagyi PG, Chesson HW, Unger ER, Romero JR, Markowitz LE. Human papillomavirus vaccination for adults: updated recommendations of the Advisory Committee on Immunization Practices. *MMWR Morb Mortal Wkly Rep* 2019; 68(32): 698-702. <https://doi.org/10.15585/mmwr.mm6832a3>
16. Wang R, Pan W, Jin L, Huang W, Li Y, Wu D, et al. Human papillomavirus vaccine against cervical cancer: Opportunity and challenge. *Cancer Lett* 2020; 471: 88-102. <https://doi.org/10.1016/j.canlet.2019.11.039>
17. Jradi H, Bawazir A. Knowledge, attitudes, and practices among Saudi women regarding cervical cancer, human papillomavirus (HPV) and corresponding vaccine. *Vaccine* 2019; 37(3): 530-537. <https://doi.org/10.1016/j.vaccine.2018.11.065>
18. Altamimi T. Human papillomavirus and its vaccination: Knowledge and attitudes among female university students in Saudi Arabia. *J Family Med Prim Care* 2020; 9(4): 1849-1855. https://doi.org/10.4103/jfmpc.jfmpc_1205_19
19. Aldohaian AI, Alshammari SA, Arafah DM. Using the health belief model to assess beliefs and behaviors regarding cervical cancer screening among Saudi women: a cross-sectional observational study. *BMC Womens Health* 2019; 19(1): 6. <https://doi.org/10.1186/s12905-018-0701-2>

20. Livingston JD, Tugwell A, Korf-Uzan K, Cianfrone M, Coniglio C. Evaluation of a campaign to improve awareness and attitudes of young people towards mental health issues. *Soc Psychiatry Psychiatr Epidemiol* 2013; 48(6): 965-973. <https://doi.org/10.1007/s00127-012-0617-3>
21. Saha K, Torous J, Ernala SK, Rizuto C, Stafford A, De Choudhury M. A computational study of mental health awareness campaigns on social media. *Transl Behav Med* 2019; 9(6): 1197-1207. <https://doi.org/10.1093/tbm/ibzo28>
22. Ryz K, Tangri N, Verrelli M, Schneider J, Lesyk A, Eng A, et al. A before and after cross-sectional analysis of a public health campaign to increase kidney health awareness in a Canadian province. *BMC Res Notes* 2015; 8: 695. <https://doi.org/10.1186/s13104-015-1662-2>
23. Saudi Cancer Registry. 2010. [cited 2015 Jul 05]. Available from: [http://www.chs.gov.sa/Ar/mediacenter/NewsLetter/2010%20Report%20\(1\).pdf](http://www.chs.gov.sa/Ar/mediacenter/NewsLetter/2010%20Report%20(1).pdf).
24. Akkour K, Alghuson L, Benabdelkamel H, Alhalal H, Alayed N, AlQarni A, et al. Cervical Cancer and Human Papillomavirus Awareness among Women in Saudi Arabia. *Medicina (Kaunas)* 2021; 57(12): 1373. <https://doi.org/10.3390/medicina57121373>
25. Hussain AN, Alkhenizan A, McWalter P, Qazi N, Alshmassi A, Farooqi S, et al. Attitudes and perceptions towards HPV vaccination among young women in Saudi Arabia. *J Family Community Med.* 2016; 23(3): 145-150. <https://doi.org/10.4103/2230-8229.189107>
26. Dhaher EA. Knowledge, Attitudes, and Practices of Women in the Southern Region of Saudi Arabia Regarding Cervical Cancer and the Pap Smear Test. *Asian Pac J Cancer Prev.* 2019; 20(4): 1177-1184. <https://doi.org/10.31557/apjcp.2019.20.4.1177>
27. Husain Y, Alalwan A, Al-Musawi Z, Abdulla G, Hasan K, Jassim G. Knowledge towards human papillomavirus (HPV) infection and attitude towards its vaccine in the Kingdom of Bahrain: a cross-sectional study. *BMJ Open* 2019; 9(9): e031017. <https://doi.org/10.1136/bmjopen-2019-031017>
28. Zahid HM, Qarah AB, Alharbi AM, Alomar AE, Almubarak SA. Awareness and practices related to cervical cancer among females in Saudi Arabia. *Int J Environ Res Public Health* 2022; 19(3): 1455. <https://doi.org/10.3390/ijerph19031455>
29. Sait KH. Attitudes, knowledge, and practices in relation to cervical cancer and its screening among women in Saudi Arabia. *Saudi Med J.* 2009; 30(9): 1208-1212.
30. Bruni L, Barrionuevo-Rosas L, Albero G, Serrano B, Mena M, Gómez D, et al. Human papillomavirus and related diseases report. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). 2019: 307.
31. Manji M. Cervical cancer screening program in Saudi Arabia: action is overdue. *Ann Saudi Med* 2000; 20(5-6): 355-357. <https://doi.org/10.5144/0256-4947.2000.355>
32. Al-Muammar T, Al-Ahdal MN, Hassan A, Kessie G, Dela Cruz DM, Mohamed GE. Human papilloma virus-16/18 cervical infection among women attending a family medical clinic in Riyadh. *Ann Saudi Med* 2007; 27(1): 1-5. <https://doi.org/10.5144/0256-4947.2007.1>
33. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. *CA Cancer J Clin* 2005; 55(2): 74-108. <https://doi.org/10.3322/canjclin.55.2.74>
34. Grigore M, Teleman SI, Pristavu A, Matei M. Awareness and knowledge about HPV and HPV vaccine among Romanian women. *J cancer Educ* 2018; 33(1): 154-159. <https://doi.org/10.1007/s13187-016-1130-2>
35. Yu Y, Xu M, Sun J, Li R, Li M, Wang J, et al. Human papillomavirus infection and vaccination: awareness and knowledge of HPV and acceptability of HPV vaccine among mothers of teenage daughters in Weihai, Shandong, China. *PloS One* 2016; 11(1): e0146741. <https://doi.org/10.1371/journal.pone.0146741>
36. Santhanes D, Yong CP, Yap YY, Saw PS, Chaiyakunapruk N, Khan TM. Factors influencing intention to obtain the HPV vaccine in South East Asian and Western Pacific regions: A systematic review and meta-analysis. *Sci Rep* 2018; 8(1): 3640. <https://doi.org/10.1038/s41598-018-21912-x>
37. Kepka D, Coronado GD, Rodriguez HP, Thompson B. Evaluation of a radionovela to promote HPV vaccine awareness and knowledge among Hispanic parents. *J Community Health* 2011; 36(6): 957-965. <https://doi.org/10.1007/s10900-011-9395-1>
38. Ortiz RR, Smith A, Coyne-Beasley T. A systematic literature review to examine the potential for social media to impact HPV vaccine uptake and awareness, knowledge, and attitudes about HPV and HPV vaccination. *Human Vaccin Immunother* 2019; 15(7-8): 1465-1475. <https://doi.org/10.1080/21645515.2019.1581543>
39. Lenoir P, Moulahi B, Azé J, Bringay S, Mercier G, Carbonnel F. Raising awareness about cervical cancer using Twitter: content analysis of the 2015 #SmearForSmear campaign. *J Med Internet Res* 2017; 19(10): e344. <https://doi.org/10.2196/jmir.8421>
40. Pande R, Leung E, McCullough P, Smith S, Harmston C. Impact of the United kingdom national bowel cancer awareness campaign on colorectal services. *Dis Colon Rectum* 2014; 57(1): 70-75. <https://doi.org/10.1097/01.dcr.0000437689.19579.97>
41. Jacobsen GD, Jacobsen KH. Health awareness campaigns and diagnosis rates: evidence from National Breast Cancer Awareness Month. *J Health Econ* 2011; 30(1): 55-61. <https://doi.org/10.1016/j.jhealeco.2010.11.005>