

The Acceptance of Human Papillomavirus Self-Sampling Test among Muslim Women:A Systematic Review

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Abstract

Introduction: Human Papillomavirus (HPV) self-sampling test has the potential to increase cervical cancer screening rate. Although every screening test has its own advantages and disadvantages, culture and religion can be significant predictors for the acceptability of screening tests among patients, including the HPV self-sampling test. This systematic review intends to identify and review published literature on the acceptance of HPV self-sampling test among Muslim women globally. **Methods:** The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) review protocol was utilised to guide this systematic review. We also used the Mixed Method Appraisal Tool (MMAT) for the evaluation of articles, and data from selected papers were retrieved and analysed using thematic analysis. **Results:** This systematic review includes seven publications that discussed on Muslim women's perceptions of HPV self-sampling test. This comprises articles that revealed Muslim women's acceptance of the HPV self-sampling test, including considerable positive factors that influenced their approval. On the other hand, the test's disadvantages were mentioned, which served as barriers for these women's participation. Convenience, cultural sensitivity, and availability were positive features, whereas religious taboo, low self-confidence, and perceived cost were some of the negative factors that were discussed. **Conclusion:** This review emphasises the positive and negative aspects that have an impact on the acceptance of HPV self-sampling test among Muslim women. Identifying the elements that influence HPV self-sampling test acceptance will help policymakers to better understand cervical cancer screening programmes and further guide future plans in reducing the incidence of cervical cancer.

Keywords: Human papillomavirus- self-sampling- acceptance- muslim women- systematic review

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Introduction

Cervical cancer is a preventable disease and with appropriate and comprehensive approaches, it is hoped to move towards elimination as a global public health issue (Canfell, 2019). Towards achieving this, the World Health Organization (WHO) urges all nations to scale up all levels of disease prevention efforts, including screening and treatment of cervical cancers, for eligible populations (Organization, 2020). Women who get examined regularly have a better probability of early detection and are less likely to be detected at an advanced stage, thus reducing cervical cancer's morbidity and mortality (Loud and Murphy, 2017; Niu et al., 2019). The critical discovery that cervical cancer is caused by recurrent oncogenic Human Papillomavirus (HPV) infections has prompted a significant change in cervical cancer screening and prevention approaches (Schiffman et al., 2007; Cohen et al., 2019). By implementing the HPV self-sampling test as part of the prevention program, efforts to reduce the incidence and mortality of cervical

cancers are thus achievable in all developed, developing, and underdeveloped countries (Organization, 2020).

The HPV self-sampling test was introduced in the United States (US) as a co-testing test along with the Papanicolaou smear test (Pap smears) in 2003 (Saraiya et al., 2013). It is a molecular test for identifying HPV deoxyribonucleic acid (DNA) in cervical swab samples (Yeh et al., 2019). Various studies have shown that HPV self-sampling test has more advantages than the Pap smear test. The benefits include better sensitivity and high negative predictive value, better cost-effectiveness, and the method of self-sampling approach could reduce women's barriers when undertaking the Pap smear test (van Rosmalen et al., 2012; Ronco et al., 2014). In addition, the HPV self-sampling tests can improve the cost-effectiveness of the screening programme by boosting screening coverage among under-screened women in high-burden locations (Malone et al., 2020).

In developed countries, the incidence rate of cervical cancers is much lower than in developing countries due to comprehensive screening for cervical cancers. In fact,

only one out of ten global cervical cancer mortality cases occurred in developed countries (Arbyn et al., 2020; Organization, 2020). However, developed countries may face disparities in screening rates, especially among the marginalised and hard-to-reach women who do not participate in this screening due to various reasons. These underscreened women include those with particular religious and cultural beliefs that are significant to Muslim women (Szarewski et al., 2009; Padela et al., 2014; Fuzzell et al., 2021). Due to religion-related reasons, Muslim women have been linked to delayed healthcare-seeking behaviour, attributed to poor health outcomes (Vu et al., 2016). In addition, Muslim women were more likely to get preventable female cancers than non-Muslim women, and were more likely to be detected at an advanced stage (Namoos et al., 2021). This finding corresponded to a study in a different location, which discovered that Muslim women had nearly twice the likelihood of being diagnosed late when compared to women of other religions (Niu et al., 2019).

The traditional Pap smear test as a cervical cancer screening method has recognised that the non-participating issues among Muslim women were primarily due to their religious and cultural background (Guimond and Salman, 2013). The health practices among Muslim women were influenced by their religious faiths, in addition to cultural and health perception (Salman, 2012). Muslim women have their own set of cultural and religious practices, and these customs and beliefs had an impact on how they utilise the healthcare system (Padela and Curlin, 2013). This includes negative perceptions of cancer-preventive programs, unwillingness to undergo physical examinations, and their beliefs that medical providers were not sensitive to their culture and values (Guimond and Salman, 2013). Now that there is the availability of HPV tests, a different approach is applied by utilising a self-sampling method, which is believed could reduce the common barriers in Pap smear testing among women. Studies on the acceptance of this test are being conducted among diverse populations around the world, including under-screened Muslim women. Therefore, this systematic review intends to identify and review published literatures on the acceptance of HPV self-sampling tests among Muslim women globally, as well as the factors that influence their acceptance.

Materials and Methods

The review protocol

This review utilised Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), a review protocol widely used for systematic review (Moher et al., 2015). Guided by this protocol, we commenced this systematic review by determining the intended research question. The systematic search was carried out through identification, screening, and eligibility phase. The Mixed Methods Appraisal Tool (MMAT) was used next, to appropriately evaluate the quality of the selected articles for reviewing (Hong et al., 2018). We explored every chosen study in detail through data extraction and analysis using the thematic analysis method.

Formulation of research questions

We used PICO, namely Population (P), Interest (I) and Context (C), and Outcome (O), to assist with the research question formulation (Lockwood et al., 2015). We have included Muslim women (Population), the HPV self-sampling test (Interest and Context) and acceptance (Outcome), in which the researchers formulated the main research question, i.e. 'Is HPV self-sampling test accepted among Muslim women?'

Systematic searching strategies

The searching strategies include identification, screening, and eligibility (Figure 1) of existing works of literature.

Identification

These steps include the identification of synonyms, related terms, and variations of the primary keywords. Identification allows comprehensive options for more relevant articles to be captured from the databases. We used four databases for literature search, namely World of Science (WOS), PubMed, Ovid Medline, and Scopus. Boolean operators and phrase searching techniques were utilised, where we managed to retrieve 98 articles. We transferred the articles from the databases and arranged them for screening processes by using an excel sheet. The keywords used to search are shown in Table 1.

Screening

In the screening phase, the articles were screened and chosen based on criteria determined in the earlier stages of the review process. We removed 11 duplicates from the 98 articles that were initially retrieved from all four databases. The remaining 87 articles were further studied for title screening. We later removed 73 articles as they did not fulfil the inclusion and exclusion criteria, which all researchers had discussed and agreed upon. The inclusion criteria were: (1) articles published from 2012 to 2021, (2) full original articles related to the current study PICO, and (3) articles that were published in the English language. The exclusion criteria included conference abstracts, book chapters, reports, systematic reviews, and meta-analysis studies. The remaining 14 articles were then processed for eligibility phase.

Eligibility

The third phase was the eligibility process; where we personally checked the screened and selected articles from the screening stage for their eligibility (Mohamed Shaffril et al., 2020). We retrieved the full articles and divided them among the researchers to be read thoroughly. Articles that focused and answered the reviewers' questions were included for data synthesis. This stage excluded seven more articles as they were not focusing on the acceptance of the HPV self-sampling test but concentrated on the general cervical cancer prevention program. Therefore, seven remaining articles were then processed for quality appraisal.

Quality appraisal

The Mixed Method Appraisal Tool (MMAT), a helpful

tool that is used to appraise and determine the quality assessment of mixed-method reviews, was utilised to rate the final list of studies. A standardised predesigned data extraction form was used to assure that all associated information was captured accurately (Hong et al., 2018). All seven articles had good quality; therefore, they were included for data extraction and analysis (Appendix A).

Data extraction and analysis

Our final phase for this review was data extraction and analysis. We used thematic analysis to merge the data from various studies (Vaismoradi et al., 2013). We examined all chosen articles, extracted the findings, and presented them in a table. The thematic analysis involved identifying patterns in the retrieved data from the reviewed articles before categorising them into themes and subthemes (Vaismoradi et al., 2013). To approve the suitability of the themes and subthemes, we discussed the themes with a group of experts in public health as well as experts in systematic reviews.

Results

Characteristics of Included Studies

A total of seven studies from 2016 to 2020 were included in this systematic review (Table 2) (Ma'som et al., 2016; Vahabi and Lofters, 2016; Lofters et al., 2017; Abdullah et al., 2018; Fall et al., 2019; Gottschlich et al., 2019; Afzal et al., 2020). Out of the seven articles, two studies were conducted in Canada and Malaysia, while one study was conducted in Liberia, Senegal, and Thailand. Six studies had a cross-sectional study design using questionnaires, while one was done qualitatively which was conducted via focus group interviews. The sample size for the selected studies ranged from 30 to 839 participants, and Muslim women were the majority respondents in all studies, ranging from 47.9 to 100 per cent. The age range of the participants was from 17 to 73 years; however, one study by Fall (2019) did not mention their participants' age range.

All included articles concluded that the acceptance of the HPV self-sampling test among Muslim women

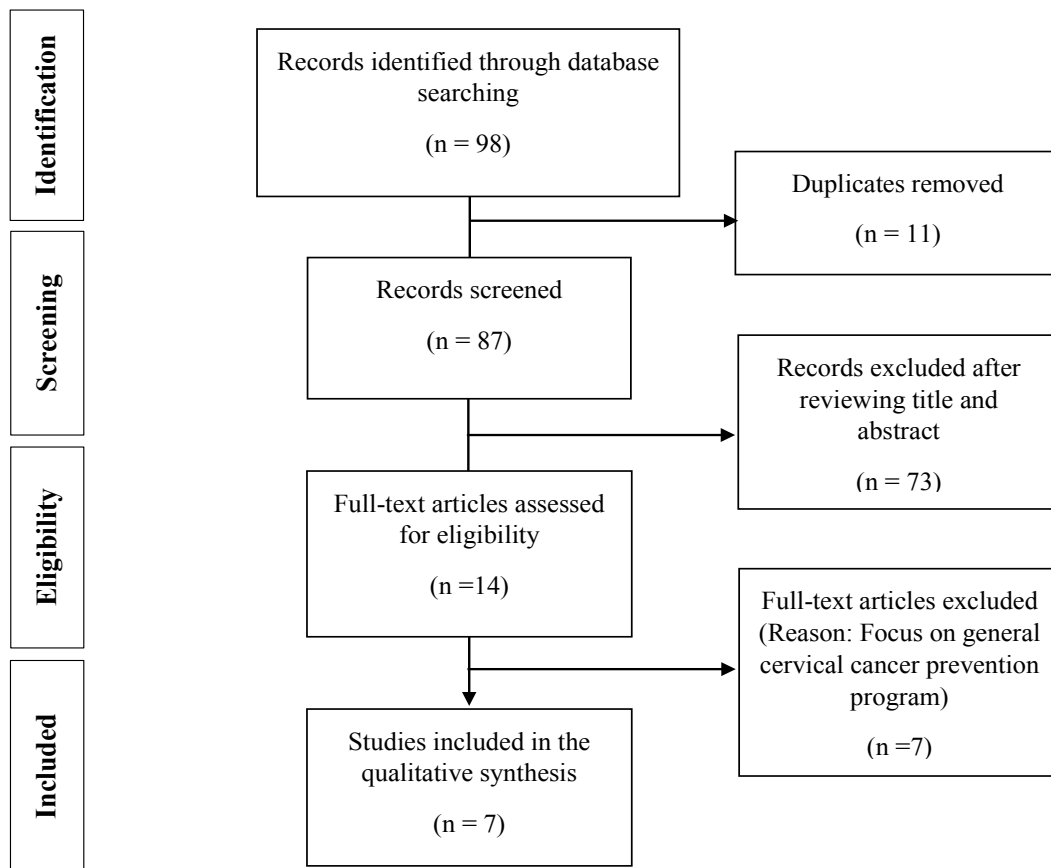


Figure 1. The PRISMA Flow Diagram

Table 1. Keyword Search Used in the Identification Process

Database	Search string
Web of Science	TS= ((human papillomavirus or HPV) and ('self-sampling' or 'self-collected' or 'self-testing') and (test or screening) and (Muslim or Islamic) and (accept or acceptability or acceptance))
Ovid Medline and PubMed	((human papillomavirus or HPV) and ('self-sampling' or 'self-collected' or 'self-testing') and (test or screening) and (Muslim or Islamic) and (accept or acceptability or acceptance))
SCOPUS	((human papillomavirus or HPV) and ('self-sampling' or 'self-collected' or 'self-testing') and (test or screening) and (Muslim or Islamic) and (accept or acceptability or acceptance))

Table 2. Summary of the Included Studies

No	Authors and publication year	Country	Methodology and study tools	Sample size (n)	Proportion of Muslim women (%)	Age range of the participants (years)	Proportion of participants accepting the test (%)	Acceptance	Positive factors	Negative factors
1	Afzal et al., 2020	Liberia	Cross-sectional/ Questionnaire	150	97.8	17-73	66.7	Good	Convenience	Less self-confidence
2	Gottschlich et al., 2019	Thailand	Cross-sectional/ Questionnaire	267	50	25-60	94	Good	Cultural sensitive Convenience	Religious taboo Less self-confidence
3	Lofthers et al., 2017	Canada	Cross-sectional/ Questionnaire	30	100	21-69	67	Good	Cultural sensitive Convenience	Perceived cost
4	Yahabi et al., 2016	Canada	Qualitative/ Focus groups interview	30	100	21-69	NA	Good	Cultural sensitive Availability Convenience	Less self-confidence Religious taboo
5	Fall et al., 2019	Senegal	Cross-sectional/ Questionnaire	133	100	ND	98.5	Good	Cultural sensitive Convenience	Perceived cost Religious taboo
6	Ma'som et al., 2016	Malaysia	Cross-sectional/ Questionnaire	839	47.9	21-65	68.2	Good	Cultural sensitive Availability Convenience	Perceived cost Religious taboo
7	Abdullah et al., 2018	Malaysia	Cross-sectional/ Questionnaire	164	93.9	28-60	93.2	Good	Convenience	Perceived cost

ND – no data, NA – not applicable

was good. We set the benchmark for good acceptance if more than 50 per cent of the participants accepted the test (Thompson et al., 2020). The HPV self-sampling test was approved by more than half of the participants in each included study, as evidenced by the proportions of participants accepting the test, ranging from 66.7 to 98.5 per cent. Participants were asked about factors influencing their acceptance, and many positive aspects of the test were elaborated. However, some unfavourable concerns were also mentioned in these studies. The

identified factors that determined the HPV self-sampling test acceptance conveyed by the Muslim women in the included studies were classified into two main themes, i.e., positive and negative.

Discussion

Positive Factors

This review's first theme was positive factors that were the driving features for the approval of the HPV

self-sampling test among Muslim women. The positive aspects include convenience, being culturally sensitive, and availability. We found that the positive factors were related to better acceptance of the test among Muslim women.

The attractive features of the HPV self-sampling test perceived by the Muslim women were the convenience of the procedure, which were mentioned in almost all included studies (Ma'som et al., 2016; Vahabi and Lofters, 2016; Lofters et al., 2017; Abdullah et al., 2018; Gottschlich et al., 2019; Afzal et al., 2020). The self-sampling approach enabled women to do the test comfortably by themselves without the presence of healthcare workers, with whom the women felt hesitant to share with the healthcare workers as their companion while doing the procedure (Afzal et al., 2020). Women felt less or no pain as they had complete control when doing the procedure (Ma'som et al., 2016; Gottschlich et al., 2019). The test could be done in a quick manner as it was perceived as a straightforward procedure, and these women could complete it by just following the simple instructions given (Maza et al., 2018). This feature reflects the outcomes recognised from the respondent's encounter during the HPV self-sampling test procedure, which may affect their perception and acceptability of the test (Chatzistamatiou et al., 2020). These convenience features were seen as essential to many populations, as many studies on test acceptance focused on these features, including those hard-to-reach women. In a review involving indigenous communities, HPV self-sampling test was seen as more appealing and a more feasible alternative to Pap smear, because it was described as comfortable, easy and convenient (Styffe et al., 2020). In a qualitative study among never- and under-screened women in Australia, positive response towards HPV self-sampling test were due to its appealing convenience and less discomfort characteristics, and could be seen as features that may increase the likelihood of cervical cancer screening participation (Sultana et al., 2015).

Another positive factor that influence test's acceptance was culturally sensitive issues. Muslim women found the test to be culture-sensitive as it contained elements of a self-sampling technique, which provides complete privacy and modesty, and these were essential values for Muslim women (Vahabi and Lofters, 2016; Gottschlich et al., 2019; Afzal et al., 2020). Cultural and religious beliefs were related to the preference of self-sampling and were also strongly applicable to married Muslim women (Dareng et al., 2015). Muslim women believes in asking permission from their husband with regard to any life matters, including health procedures. Women and their husbands felt at ease as healthcare staffs participation (whether they were of the same sex or not), were not needed during the sampling procedure (Rosenbaum et al., 2014). Muslim women's health behaviours appeared to be influenced by their religious views and values; they always seek Islamic ethics guidance when choosing health interventions, and they uphold considerations about maintaining modesty throughout medical encounters (Padela et al., 2014).

The test was also suitable from the availability perspective, especially for women with limited access

to healthcare facilities. In two included studies, the researchers sent the test kit directly to the participants' houses by postal service. Women found this service availability as practical because they did not have to travel far to healthcare facilities to complete the procedure (Fall et al., 2019; Afzal et al., 2020). This practicality was demonstrated in a published study that found that combining the interventions (sending reminder letters and self-sampling kits via postal service) could increase total participation from 63 to 78 per cent. This finding indicated that the intervention had a more significant effect on participation (Arbyn and Castle, 2015). One of the methods used in a randomised controlled study to boost cervical cancer screening participation was the HPV self-sampling kit, which was mailed directly to women's homes. This trial also featured written invitations, pre-arranged appointments, and healthcare personnel providing assistance and guidance. These methods have been proven cost-effective and feasible to implement (Tsiachristas et al., 2018). Service availability by postal service is suitable for women with difficult access to healthcare facilities, though further research on its feasibility in different settings are still required.

Negative Factors

The second theme that was identified, was the negative factors that adversely influenced the HPV self-sampling test acceptance among Muslim women. The negative aspects include religious taboo, low self-confidence, and perceived cost. We found that these negative factors were concerns about the test that could disrupt the cervical screening acceptance level.

Cervical cancer screening as a whole was perceived as a religious taboo among Muslim women (Vahabi and Lofters, 2016; Lofters et al., 2017), thus the low uptake of the screening among this population even when there was the availability of a new type of test and approach. Women's perceptions and responses to cancer appeared to be influenced by religious elements, as they perceived cancer as a trial from God and could not be avoided. Cervical cancer was rarely discussed or shared among family members and acquaintances because they connect it with promiscuous sexual behaviour and thought of it as a sexually transmitted disease (Vahabi and Lofters, 2016). These findings corresponded to a previous study that mentioned how Muslims believe that cervical cancer screening tests could endanger one's virginity, contributing to fear and testing-related stigmas among these Muslim societies (Padela et al., 2014). Faith-based messaging by a religious leader in a community appeared to reinforce the opinions of individuals who were encouraged to view screening favourably, resulting in participants reporting higher inclination in screening due to religious and community leaders' advocacy and promotion (Vahabi and Lofters, 2016). This was further proved in a subsequent study among Somali American Muslim women. The study concluded that the impacts of religious-tailored workshops by male imams (religious leaders) in delivering cervical cancer screening led to better attitudes and favourable perceptions among participants. This type of programme was seen as a viable option for engaging women on the

importance of screening (Pratt et al., 2020).

Another negative factor concerning HPV self-sampling test acceptance was low self-confidence among the participants. As HPV self-sampling test necessitates women performing the test themselves, it is thus critical that they feel confident in doing so. Participants in previous studies who took the HPV test stated that it was a user-friendly and straightforward test; thus, they felt confident and preferred it to cytology testing (Murchland et al., 2019; Wong et al., 2020). However, in this review, three included studies mentioned that Muslim women felt less confident in doing the test (Lofters et al., 2017; Abdullah et al., 2018; Afzal et al., 2020). Some participants worry whether they could collect the correct sample from the right location for testing, thus preferred provider-administered sampling (Lofters et al., 2017). When the test procedure was carried out in a healthcare clinic, participants needed to listen and understand the instructions given by the healthcare personnel. They will then be asked to enter an isolated room and do the test by themselves. Although a full explanation were given before the procedure, Azrai et al., (2015) mentioned in his study that the majority of the respondents were not keen to perform HPV tests by themselves because they were worried that their technique might be improper. This review also found that older Muslim women were less likely to prefer self-sampling, as they were not confident with their skills and preferred to choose health staff-assisted procedure instead (Ma'som et al., 2016; Vahabi and Lofters, 2016). Self-confidence is an essential personal predictor for self-sampling test acceptance. Lower self-confidence was associated with a lower intention of doing the test, which led to a postponement of the screening procedure (Williams et al., 2017). Confidence can be gained by enhancing knowledge, perceived capability in self-sampling and proper guidance and reassurance from healthcare professionals (Williams et al., 2017; Sormani et al., 2021).

This review also discovered that Muslim women, most of them from lower socioeconomic background, perceived cost as their concern in doing the HPV self-sampling test (Vahabi and Lofters, 2016; Abdullah et al., 2018; Fall et al., 2019). Muslim women were less willing to buy the test kit even if they felt that the HPV self-sampling test was acceptable (Abdullah et al., 2018). Several participants in the included study had limited access to healthcare services. At the same time, not every country provided a postal service of the test kit for women to do the test at home. Consequently, women perceived additional costs such as commuting to the healthcare clinics as a significant obstacle (Fall et al., 2019; Gottschlich et al., 2019; Afzal et al., 2020). Cost concerns, a lack of financial means and insurance coverage can all be seen as individual-level issues influencing screening. Furthermore, the hurdle can also be at the provider level, health system, or even originating from the policy levels. These women may best be served through community outreach programs, individual healthcare systems, promotion of low-cost or no-cost screening, and possible insurance reform that covers the complete range of services, including screening, diagnosis, and treatment (Fuzzell et al., 2021).

Strengths and Limitations

To the researcher's knowledge, this current review is the first review paper that looks at the acceptance of the HPV self-sampling test among Muslim women. This research is valuable mainly to countries where Muslims make up the majority of the population and for nations where Muslims make up a significant portion of their hard-to-reach community. This review benefits in recognising the cultural and religious factors affecting the HPV self-sampling test acceptance, where suitable approaches could be made and implemented.

The first limitation in our review was that, out of the seven included articles only one study utilised the qualitative method. A qualitative approach could help in more profound understanding and insight into underlying reasons, opinions, and experiences of human beings, which we think could be more favourable when looking at religious and cultural concerns. Another limitation was that only three included studies had full participant of Muslim women. Nevertheless, Muslim women were the majority in the other four studies, ranging from 47.9% to 97.8%.

In conclusion, analysing the culture and religious factors on the acceptability of the HPV self-sampling test could help better understand Muslim women's perspectives. This is beneficial, particularly in countries where Muslims make up the majority of the population. This review is also helpful for countries where Muslim women are part of their hard-to-reach and under-screened population, regardless in developed or less developed countries. Positive acceptance of the test will eventually increase cervical cancer screening rates, thus providing room for prevention and early interventions. In overcoming the religious and cultural challenges that Muslim women face throughout the world, targeted measures are necessary. The cervical cancer screening rate could be increased, minimising the morbidity and mortality burden associated with this disease.

Author Contribution Statement

Conceptualisation, SM.A and IBI; Methodology, SM.A and IBI; Validation IBI and HMY; Writing-Original Draft Preparation, SMA; Writing-Review and Editing, IBI and HMY; Visualisation, SMA and IBI; Supervision, IBI and HMY. All authors approved the final manuscript for submission.

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Ethics approval

Ethical approval will not be required because this study retrieved and synthesised data from already published studies.

Availability of data

Not applicable

Conflict of interest

The authors declare no conflict of interest.

References

- Abdullah NN, Daud S, Wang SM, et al (2018). Human Papilloma Virus (HPV) self-sampling: do women accept it?. *J Obstet Gynaecol*, **38**, 402-7.
- Afzal O, Lieb W, Lieber M, Chowdhury S, Beddoe AM (2020). Cervical cancer risk factors and screening preferences among Muslim women in Monrovia, Liberia. *Afr J Reprod Health*, **24**, 101-7.
- Arbyn M, Castle PE (2015). Offering self-sampling kits for HPV testing to reach women who do not attend in the regular cervical cancer screening program. *Cancer Epidemiol Biomarkers Prev*, **24**, 769-72.
- Arbyn M, Weiderpass E, Bruni L, et al (2020). Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. *Lancet Glob Health*, **8**, e191-e203.
- Azrai A, Nirmala C, Nur Azurah A, et al (2015). Knowledge towards human papilloma virus (HPV) and acceptability of hpv dna self sampling testing for cervical cancer prevention in rural population. *Int J Curr Res*, **7**, 12052-6.
- Canfell K (2019). Towards the global elimination of cervical cancer. *Papillomavirus Res*, **8**, 100170.
- Chatzistamatiou K, Vrekoussis T, Tsertanidou A, et al (2020). Acceptability of self-sampling for human papillomavirus-based cervical cancer screening. *J Womens Health (Larchmt)*, **29**, 1447-56.
- Cohen PA, Jhingran A, Oaknin A, Denny L (2019). Cervical cancer. *Lancet*, **393**, 169-82
- Dareng EO, Jedy-Agba E, Bamisaye P, et al (2015). Influence of spirituality and modesty on acceptance of self-sampling for cervical cancer screening. *PLoS One*, **10**, e0141679.
- Fall NS, Tamalet C, Diagne N, et al (2019). Feasibility, acceptability, and accuracy of vaginal self-sampling for screening human papillomavirus types in women from rural areas in Senegal. *Am J Trop Med Hyg*, **100**, 1552.
- Fuzzell LN, Perkins RB, Christy SM, Lake PW, Vadaparampil ST (2021). Cervical cancer screening in the United States: Challenges and potential solutions for underscreened groups. *Prev Med*, **144**, 106400.
- Gottschlich A, Nuntadusit T, Zarins KR, et al (2019). Barriers to cervical cancer screening and acceptability of HPV self-testing: a cross-sectional comparison between ethnic groups in Southern Thailand. *BMJ Open*, **9**, e031957.
- Guimond ME, Salman K (2013). Modesty matters: cultural sensitivity and cervical cancer prevention in Muslim women in the United States. *Nurs Womens Health*, **17**, 210-7.
- Hong QN, Fàbregues S, Bartlett G, et al (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Edu Inform*, **34**, 285-91.
- Lockwood C, Munn Z, Porritt K (2015). Qualitative research synthesis: methodological guidance for systematic reviewers utilising meta-aggregation. *Int J Evid Based Healthc*, **13**, 179-87.
- Lofters AK, Vahabi M, Fardad M, Raza A (2017). Exploring the acceptability of human papillomavirus self-sampling among Muslim immigrant women. *Cancer Manag Res*, **9**, 323.
- Loud J, Murphy J (2017). Cancer screening and early detection in the 21st century. *Semin Oncol Nurs*, **33**, 121-8.
- Ma'som M, Bhoo-Pathy N, Nasir NH, et al (2016). Attitudes and factors affecting acceptability of self-administered cervicovaginal sampling for human papillomavirus (HPV) genotyping as an alternative to Pap testing among multiethnic Malaysian women. *BMJ Open*, **6**, e011022.
- Malone C, Barnabas RV, Buist DS, Tiro JA, Winer RL (2020). Cost-effectiveness studies of HPV self-sampling: A systematic review. *Prev Med*, **132**, 105953.
- Maza M, Melendez M, Masch R, et al (2018). Acceptability of self-sampling and human papillomavirus testing among non-attenders of cervical cancer screening programs in El Salvador. *Prev Med*, **114**, 149-55.
- Mohamed Shaffril HA, Ahmad N, Samsuddin SF, Abu Samah A, Hamdan ME (2020). Systematic literature review on adaptation towards climate change impacts among indigenous people in the Asia Pacific regions. *J Clean Prod*, **258**, 120595.
- Moher D, Shamseer L, Clarke M, et al (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev*, **4**, 1.
- Murchland AR, Gottschlich A, Bevilacqua K, et al (2019). HPV self-sampling acceptability in rural and indigenous communities in Guatemala: a cross-sectional study. *BMJ Open*, **9**, e029158.
- Namooos A, Abosamak NE, Abdelkarim M, et al (2021). Muslim women and disparities in cancer diagnosis: A Retrospective Study. *J Muslim Minor Aff*, **41**, 541-7.
- Niu L, Virani S, Bilheem S, Sriplung H (2019). The effect of Pap smear screening on cervical cancer stage among southern Thai women. *Sci Rep*, **9**, 16921.
- Padela AI, Curlin FA (2013). Religion and disparities: Considering the Influences of Islam on the Health of American Muslims. *J Relig Health*, **52**, 1333-45.
- Padela AI, Peek M, Johnson-Agbakwu CE, Hosseinian Z, Curlin F (2014). Associations between religion-related factors and cervical cancer screening among Muslims in greater Chicago. *J Low Genit Tract Dis*, **18**, 326-32.
- Pratt R, Mohamed S, Dirie W, et al (2020). Testing a religiously tailored intervention with Somali American muslim women and Somali American imams to increase participation in breast and cervical cancer screening. *J Immigr Minor Health*, **22**, 87-95.
- Ronco G, Dillner J, Elfström KM, et al (2014). Efficacy of HPV-based screening for prevention of invasive cervical cancer: follow-up of four European randomised controlled trials. *Lancet*, **383**, 524-32.
- Rosenbaum AJ, Gage JC, Alfaro KM, et al (2014). Acceptability of self-collected versus provider-collected sampling for HPV DNA testing among women in rural El Salvador. *Int J Gynaecol Obstet*, **126**, 156-60.
- Salman KF (2012). Health beliefs and practices related to cancer screening among Arab Muslim women in an urban community. *Health Care Women Int*, **33**, 45-74.
- Saraiya M, Steben M, Watson M, Markowitz L (2013). Evolution of cervical cancer screening and prevention in United States and Canada: implications for public health practitioners and clinicians. *Prev Med*, **57**, 426-33.
- Schiffman M, Castle PE, Jeronimo J, Rodriguez AC, Wacholder S (2007). Human papillomavirus and cervical cancer. *Lancet*, **370**, 890-907.
- Sormani J, Kenfack B, Wisniak A, et al (2021). Exploring factors associated with patients who prefer clinician-sampling to HPV self-sampling: A Study Conducted in a Low-Resource

- setting. *Int J Environ Res Public Health*, **19**.
- Styffe C, Tratt E, Macdonald ME, Brassard P (2020). HPV Self-sampling in indigenous communities: A Scoping Review. *J Immigr Minor Health*, **22**, 852-9.
- Sultana F, Mullins R, Murphy M, et al (2015). Women's views on human papillomavirus self-sampling: focus groups to assess acceptability, invitation letters and a test kit in the Australian setting. *Sex Health*, **12**, 279-86.
- Szarewski A, Cadman L, Ashdown-Barr L, Waller J (2009). Exploring the acceptability of two self-sampling devices for human papillomavirus testing in the cervical screening context: a qualitative study of Muslim women in London. *J Med Screen*, **16**, 193-8.
- Thomson EL, Galvin AM, Daley EM, et al (2020). Recent changes in cervical cancer screening guideline: U.S. women's willingness for HPV testing instead of Pap testing. *Prev Med*, **130**, 105928.
- Tsiachristas A, Gittins M, Kitchener H, Gray A (2018). Cost-effectiveness of strategies to increase cervical screening uptake at first invitation (STRATEGIC). *J Med Screen*, **25**, 99-109.
- Vahabi M, Lofters A (2016). Muslim immigrant women's views on cervical cancer screening and HPV self-sampling in Ontario, Canada. *BMC Public Health*, **16**, 868.
- Vaismoradi M, Turunen H, Bondas T (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nurs Health Sci*, **15**, 398-405.
- van Rosmalen J, de Kok IM, van Ballegooijen M (2012). Cost-effectiveness of cervical cancer screening: cytology versus human papillomavirus DNA testing. *Bjog*, **119**, 699-709.
- Vu M, Azmat A, Radejko T, Padela AI (2016). Predictors of delayed healthcare seeking among American muslim Women. *J Womens Health (Larchmt)*, **25**, 586-93.
- Williams D, Davies M, Fiander A, et al (2017). Women's perspectives on human papillomavirus self-sampling in the context of the UK cervical screening programme. *Health Expect*, **20**, 1031-40.
- Wong EL-Y, Cheung AW-L, Wong AY-K, Chan PK-S (2020). Acceptability and feasibility of HPV self-sampling as an alternative primary cervical cancer screening in under-screened population groups: A Cross-Sectional Study. *Int J Environ Res Public Health*, **17**, 6245.
- Yeh PT, Kennedy CE, de Vuyst H, Narasimhan M (2019). Self-sampling for human papillomavirus (HPV) testing: a systematic review and meta-analysis. *BMJ Glob Health*, **4**, e001351.



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