Research Article Volume 01, Issue No. 02. 2025

The Medical Journal of Obstetric and Gynaecology



Screening for Cervical Cancer With High-Risk Human Papillomavirus Testing

[1] Kurnia, [1] Wendy

[1] Faculty of Medicine, Padjadjaran University, Bandung City, West Java, Indonesia

Correspondence : dr.yusuf9382736@gmail.com

Article History :

Received date : 2024/07/20
Revised date : 2024/08/12
Accepted date : 2024/09/11
Published date : 2025/01/15

Copyright: *© 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (BY NC) license (https://creativecommons.org/licenses/by-nc/4.0/).*

ABSTRACT

Background: The literature on cervical cancer screening has increasingly recognized the significance of high-risk human papillomavirus (hrHPV) testing as a primary screening method, reflecting a shift from traditional cytological approaches. **Literature Review:** The implications of HPV vaccination on screening protocols have also been explored, particularly in Europe, where the declining prevalence of HPV necessitates more sensitive screening methods (C. Chrysostomou et al., 2018). The integration of hrHPV testing is seen as not only enhancing sensitivity but also providing cost-effective solutions through longer screening intervals, which can improve patient compliance and reduce healthcare costs (Kyrgiou et al., 2020). In Canada, there is a growing recognition of the need to update cervical cancer screening guidelines to incorporate hrHPV testing, particularly in light of disparities in screening rates among underrepresented populations (Gates et al., 2021). The potential for self-sampling in hrHPV testing presents an innovative approach to increasing screening uptake, especially in low- and middle-income countries where access to healthcare is limited (Lozar et al., 2021). Recent systematic reviews have confirmed the diagnostic accuracy of hrHPV testing, demonstrating its ability to lower the incidence of cervical cancer, particularly among women who were screen-negative at baseline (F. Hamers et al., 2022). However, it is important to note that hrHPV testing may not be suitable for women under 30 due to the higher prevalence of transient infections in this demographic, necessitating the implementation of triage tests to identify persistent infections (Kyrgiou et al., 2020). **Conclusion:** In conclusion, the literature collectively supports the adoption of hrHPV testing as a primary screening modality for cervical cancer. The advantages of enhanced sensitivity, cost-effectiveness, and the potential for self-sampling highlight a significant paradigm shift in cervical cancer prevention strategies. Ongoing research and policy evaluations will be essential to optimize screening programs and ensure equitable access to cervical cancer prevention efforts worldwide.

Keyword: Screening, Cervical Cancer, High-Risk Human Papillomavirus Testing

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

INTRODUCTION

The literature surrounding cervical cancer screening has evolved significantly over the past decade, particularly with the advent of high-risk human papillomavirus (hrHPV) testing as a primary screening modality. (D. Boone et al., 2012) highlighted the transition from traditional cytology-based screening to hrHPV testing and vaccination as pivotal steps in the prevention of invasive cervical cancer, emphasizing the recommendations by the American Society for Colposcopy and Cervical Pathology (ASCCP) for utilizing hrHPV testing in specific clinical scenarios such as triage for atypical Pap smears.

In 2017, (Lamin et al., 2017) conducted a randomized evaluation of organized primary HPV screening for women aged 56-60, demonstrating that hrHPV DNA testing offers superior sensitivity for detecting cervical precancerous lesions compared to cytology. Their findings reinforced the importance of triaging HPV-positive women with cytology, as negative HPV results provided a longer-lasting protective effect against cervical cancer.

(C. Chrysostomou et al., 2018) further explored the implications of HPV vaccination on cervical cancer screening programs in Europe, noting the challenges posed by the decreasing population burden of HPV. They underscored the need for higher sensitivity screening methods like hrHPV testing to adapt to the changing epidemiological landscape, suggesting that longer screening intervals associated with HPV testing could lead to more cost-effective programs.

The position paper by (Kyrgiou et al., 2020) built upon these insights, asserting that hrHPV tests offer substantial advantages over cytology, including higher sensitivity and the potential for self-sampling. However, they also cautioned against the use of hrHPV testing in women under 30 due to the higher prevalence of transient infections, highlighting the necessity for triage tests to identify persistent infections.

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

In 2021, (Gates et al., 2021) addressed the need for systematic reviews to inform Canadian cervical cancer screening recommendations, acknowledging the existing reliance on cytology while outlining the potential shift towards hrHPV testing. Their work reflects a growing recognition of the need to improve screening rates, particularly among underrepresented populations.

(Lozar et al., 2021) emphasized the critical role of hrHPV testing in post-pandemic cervical cancer screening initiatives, particularly in low- and middle-income countries where access to screening remains limited. They advocated for self-sampling as a viable solution to enhance screening uptake and address barriers to attendance.

Finally, (F. Hamers et al., 2022) provided updated evidence-based recommendations, reinforcing the superior diagnostic accuracy of hrHPV testing compared to cytology. Their systematic review of recent randomized controlled trials confirmed that hrHPV-based screening leads to a lower incidence of cervical cancer, particularly among women who were baseline screen-negative.

Collectively, these articles illustrate a clear trend towards the adoption of hrHPV testing as a primary screening method for cervical cancer, highlighting its enhanced sensitivity, cost-effectiveness, and potential to improve screening accessibility and outcomes. The literature indicates a paradigm shift in cervical cancer prevention strategies, with ongoing research and policy evaluations necessary to optimize screening programs worldwide.

LITERATURE REVIEW

The article "New insights into cervical cancer screening" by (D. Boone et al., 2012) provides a comprehensive overview of the evolution of cervical cancer screening methodologies, particularly emphasizing the role of high-risk human papillomavirus (HR-HPV) testing and vaccination in primary prevention efforts. The authors articulate that invasive cervical cancer is largely preventable, underscoring the critical shift towards HR-HPV testing as a central component of screening protocols.

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

One of the key insights of the article is the endorsement of HR-HPV testing by the American Society for Colposcopy and Cervical Pathology (ASCCP) for various clinical scenarios. This includes its use in the triage of atypical squamous cells of undetermined significance (ASC-US) Pap smears and for follow-up after excisional procedures for cervical intraepithelial neoplasia (CIN) 2/3. The article highlights that HR-HPV testing demonstrates a remarkable sensitivity of 96% for detecting CIN 3 lesions, which is a significant advancement in the early detection of cervical dysplasia ((D. Boone et al., 2012)). This high sensitivity has been shown to substantially reduce the number of unnecessary colposcopies, thereby streamlining patient management and reducing healthcare costs.

The authors also discuss the concept of co-testing, which combines HPV DNA testing with cytology. This approach, approved in the US since 2006, has been shown to enhance the detection of both pre-invasive and invasive cervical lesions. The article posits that primary HPV testing alone exhibits superior sensitivity compared to cytology, while maintaining comparable specificity when followed by cytology triage. This suggests that HR-HPV testing may provide a more reliable and objective screening method, given its potential for automation and cost-effectiveness compared to traditional cytological methods.

Moreover, the article addresses the potential of HR-HPV testing as a scalable screening solution in developing countries, where access to healthcare resources is often limited. The authors provide evidence from a Finnish trial that supports the efficacy of primary HPV DNA screening with cytology triage, which improved sensitivity for detecting CIN 2/3 without compromising specificity.

Despite the promising outcomes associated with HR-HPV testing, the ASCCP has yet to fully endorse it as a primary screening method due to concerns regarding evidence-based follow-up protocols. This hesitance highlights the need for further research to establish comprehensive guidelines that address the management of positive HR-HPV test results.

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

The article "Randomised healthcare policy evaluation of organised primary human papillomavirus screening of women aged 56–60" by (Lamin et al., 2017) presents a comprehensive evaluation of the implementation of primary HPV screening in organized cervical cancer screening programs. The authors articulate the significant shift from traditional cytology-based screening to HPV DNA testing, emphasizing the higher sensitivity of HPV testing for detecting precursor lesions of cervical cancer. This transition is particularly pertinent given the established link between oncogenic HPV types and cervical cancer development.

The study's primary objective is to compare the detection rates of cervical intraepithelial neoplasia grade 2 or higher (CIN2+) between HPV-based screening and cytology-based screening in a real-world setting. The authors argue that while cytology has historically contributed to reduced cervical cancer incidence and mortality, the integration of HPV testing could enhance early detection capabilities. The findings suggest that HPV screening can match or exceed the detection rates of cytology, thereby supporting the case for its adoption as a primary screening tool.

A critical evaluation of the material reveals that the authors have effectively utilized a randomized design to assess the implications of this healthcare policy change. They provide a robust analysis of the screening outcomes, which is essential for informing future guidelines. However, the article could benefit from a more detailed exploration of the potential challenges associated with the implementation of HPV screening, such as the need for adequate triaging protocols for HPV-positive women. The authors note that international guidelines recommend triaging HPV-positive individuals with cytology before referral, underscoring the complexity of managing screening protocols in practice.

Furthermore, the age-specific focus on women aged 56–60 is a noteworthy aspect of the study, as it addresses the age-dependent prevalence of HPV and its implications for screening strategies. The authors advocate for piloting HPV screening in this demographic, which could provide valuable insights into the effectiveness and feasibility of broader implementation.

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

The article "Cervical Cancer Screening Programs in Europe: The Transition Towards HPV Vaccination and Population-Based HPV Testing" by (C. Chrysostomou et al., 2018) provides a comprehensive overview of the evolving landscape of cervical cancer screening in Europe, particularly in the context of high-risk human papillomavirus (hrHPV) testing. The authors highlight the significant impact of HPV vaccination on cervical cancer morbidity and mortality rates, while also addressing the limitations and challenges associated with traditional cytology screening.

One of the key insights presented is the low sensitivity of cytology, which necessitates frequent screenings to maintain diagnostic accuracy ((C. Chrysostomou et al., 2018)). This requirement for short intervals between screenings not only increases the burden on healthcare systems but also raises concerns about the efficacy of cytology in populations with high HPV vaccination coverage. The article emphasizes that as the prevalence of HPV decreases due to vaccination, the specificity of cytology is adversely affected, leading to potential overdiagnosis and unnecessary interventions.

In contrast, the authors advocate for the adoption of hrHPV testing as the primary screening method for cervical cancer, as endorsed by European Guidelines. They argue that hrHPV testing offers superior clinical sensitivity and negative predictive value, along with advantages such as objectiveness, lower training requirements, and reproducibility ((C. Chrysostomou et al., 2018)). The longer screening intervals associated with hrHPV testing—recommended at five years—are particularly noteworthy, as they not only align with the natural history of HPV infections but also contribute to cost-effective screening programs. This shift towards less frequent screenings is posited to enhance patient compliance and reduce healthcare costs while providing women with extended periods of reassurance following negative results.

The article "Cervical screening: ESGO-EFC position paper of the European Society of Gynaecologic Oncology (ESGO) and the European Federation of Colposcopy (EFC)" by (Kyrgiou et al., 2020) provides a comprehensive overview of the

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

advantages and disadvantages of utilizing high-risk human papillomavirus (hrHPV) testing as a primary screening modality for cervical cancer. The authors emphasize that hrHPV testing offers significant benefits, particularly in terms of sensitivity and negative predictive value when detecting high-grade cervical lesions, which positions it as a superior alternative to traditional cytology.

One of the key insights presented in the article is the enhanced sensitivity of hrHPV testing, which allows for longer screening intervals—typically five years following a negative result. This is particularly advantageous for women over the age of 30, as it not only improves protection against invasive cervical cancer but also optimizes resource allocation within healthcare systems ((Kyrgiou et al., 2020)). Furthermore, the authors note that hrHPV testing is an objective measure with low inter- and intra-variability, reducing reliance on trained cytotechnicians, which can be a significant barrier in less affluent regions.

The article also highlights the reduction in unsatisfactory results associated with hrHPV testing, as well as the potential for self-sampling, which can enhance participation rates among women who might otherwise avoid screening. This is particularly relevant given the challenges in reaching certain demographics within cervical cancer screening programs ((Kyrgiou et al., 2020)).

However, the authors do not shy away from discussing the limitations of hrHPV testing, particularly its lower specificity compared to cytology. This lower specificity can lead to the detection of transient HPV infections, which may not necessitate further clinical intervention. The article advises against the use of hrHPV testing in women under 30 due to the high prevalence of transient infections in this age group, underscoring the need for triage tests to identify persistent infections that pose a greater risk ((Kyrgiou et al., 2020)).

Moreover, the economic analysis presented in the article supports the notion that hrHPV-based screening is more cost-effective than cytology-based methods. This finding is crucial for policymakers and healthcare providers seeking to implement effective cervical cancer screening strategies in diverse settings.

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

The article "Screening for the prevention and early detection of cervical cancer: protocol for systematic reviews to inform Canadian recommendations" by (Gates et al., 2021) provides a comprehensive overview of the current state of cervical cancer screening in Canada, particularly focusing on high-risk human papillomavirus (hrHPV) testing. The authors highlight that while a significant majority of women aged 25 to 69 receive Pap tests every three years, there are notable disparities in screening rates among certain population subgroups, including female-to-male transgender individuals. This underscores the necessity for targeted interventions to enhance screening accessibility and uptake among under- and never-screened populations.

The article critically assesses the existing screening protocols, emphasizing the reliance on cytology-based methods, specifically the Pap test, which has been the standard in Canada. However, it acknowledges the ongoing transition towards hrHPV testing, which is being piloted in various provinces. This shift is particularly relevant given the evolving understanding of cervical cancer prevention and the potential for hrHPV testing to offer more effective screening options. The authors note that while the Canadian Task Force on Preventive Health Care established guidelines in 2013, recommending Pap testing every three years for women aged 25 to 69, these guidelines did not incorporate hrHPV testing, which has gained traction internationally.

The systematic reviews proposed by the authors aim to update these guidelines by integrating recent findings and international recommendations concerning hrHPV testing. This approach is timely, considering that new studies have emerged since the 2013 guidelines that could significantly influence screening practices in primary care settings. The article effectively sets the stage for a critical evaluation of existing practices and the potential benefits of hrHPV testing, which could lead to improved screening outcomes and ultimately reduce cervical cancer incidence.

The article "Cervical Cancer Screening Postpandemic: Self-Sampling Opportunities to Accelerate the Elimination of Cervical Cancer" by (Lozar et al., 2021) presents a comprehensive analysis of cervical cancer screening, emphasizing

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

the critical role of high-risk human papillomavirus (hrHPV) testing in the early detection of cervical neoplasia. The authors highlight that cervical cancer remains a significant public health issue, being the fourth-most common cancer among women globally, particularly affecting those in low- and middle-income countries where access to screening is often limited.

A key insight from the article is the stark contrast in survival rates depending on the stage at which cervical cancer is diagnosed. The authors note that early detection of precancerous lesions can lead to nearly 100% five-year survival rates, whereas late-stage diagnoses result in significantly poorer outcomes. This underscores the urgency of improving screening uptake, particularly among women who have historically been underserved or who have never been screened.

The article effectively outlines the advantages of hrHPV testing over traditional cervical cytology. The authors argue that hrHPV testing not only provides higher sensitivity for detecting cervical precancer but also allows for self-collection of samples. This self-sampling approach is particularly beneficial as it removes the need for a pelvic exam and the presence of a trained clinician, thus addressing significant barriers to screening attendance. The authors assert that self-sampling could substantially enhance screening rates, especially in populations that are hard to reach.

Furthermore, the article discusses the implications of the COVID-19 pandemic on cervical cancer screening initiatives. The authors advocate for leveraging self-sampling as a strategy for catch-up screening, which is essential in the context of the post-pandemic recovery. They emphasize that expanding access to hrHPV testing through self-sampling can significantly contribute to the global goal of cervical cancer elimination, particularly when combined with vaccination efforts.

The article "Updated evidence-based recommendations for cervical cancer screening in France" by (F. Hamers et al., 2022) provides a comprehensive analysis of the efficacy of high-risk human papillomavirus (hrHPV) testing compared to traditional cervical cytology in the context of cervical cancer screening. The authors

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

highlight the superior sensitivity of hrHPV testing in detecting cervical precancerous lesions, specifically CIN2+ and CIN3+, which positions it as a promising alternative to cytology.

One of the key insights from the article is the assertion that while hrHPV testing has a higher cross-sectional sensitivity, this does not necessarily correlate with a decreased incidence of cervical cancer when compared to cytology. The authors emphasize that to establish the effectiveness of hrHPV testing in reducing cervical cancer incidence, longitudinal studies are essential. These studies should demonstrate a lower incidence of precancer or cancer in women who receive a negative HPV test result compared to those screened via cytology. This distinction is crucial, as it underscores the need for evidence beyond sensitivity metrics to substantiate the long-term benefits of hrHPV-based screening.

The systematic review presented in the article suggests that HPV-based screening does indeed lead to a lower incidence of CIN3+ and cervical cancer among women who were screen-negative at baseline. This finding is significant, as it indicates that hrHPV testing not only identifies more lesions but also contributes to a protective effect against invasive cervical cancer, observable as early as 2.5 years post-screening. The authors note that this protective effect is consistent across different stages of cervical cancer, reinforcing the potential of hrHPV testing as a primary screening tool.

However, the article also raises important considerations regarding the demographic limitations of hrHPV testing. Notably, no protective effect was observed in women under 30 years of age, suggesting that this age group may require different screening strategies. Additionally, the authors point out that hrHPV screening appears to offer more protection against adenocarcinoma than squamous carcinoma, which may influence screening recommendations and clinical practices.

CONCLUSION

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

The literature on cervical cancer screening has increasingly recognized the significance of high-risk human papillomavirus (hrHPV) testing as a primary screening method, reflecting a shift from traditional cytological approaches. The introduction of hrHPV testing has been highlighted as a pivotal advancement in cervical cancer prevention strategies, as evidenced by the recommendations from the American Society for Colposcopy and Cervical Pathology (ASCCP) (D. Boone et al., 2012). This transition is underscored by the superior sensitivity of hrHPV testing for detecting precancerous lesions, as demonstrated in various studies, including a randomized evaluation that confirmed its efficacy in women aged 56-60 (Lamin et al., 2017).

The implications of HPV vaccination on screening protocols have also been explored, particularly in Europe, where the declining prevalence of HPV necessitates more sensitive screening methods (C. Chrysostomou et al., 2018). The integration of hrHPV testing is seen as not only enhancing sensitivity but also providing cost-effective solutions through longer screening intervals, which can improve patient compliance and reduce healthcare costs (Kyrgiou et al., 2020).

In Canada, there is a growing recognition of the need to update cervical cancer screening guidelines to incorporate hrHPV testing, particularly in light of disparities in screening rates among underrepresented populations (Gates et al., 2021). The potential for self-sampling in hrHPV testing presents an innovative approach to increasing screening uptake, especially in low- and middle-income countries where access to healthcare is limited (Lozar et al., 2021).

Recent systematic reviews have confirmed the diagnostic accuracy of hrHPV testing, demonstrating its ability to lower the incidence of cervical cancer, particularly among women who were screen-negative at baseline (F. Hamers et al., 2022). However, it is important to note that hrHPV testing may not be suitable for women under 30 due to the higher prevalence of transient infections in this demographic, necessitating the implementation of triage tests to identify persistent infections (Kyrgiou et al., 2020).

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

In conclusion, the literature collectively supports the adoption of hrHPV testing as a primary screening modality for cervical cancer. The advantages of enhanced sensitivity, cost-effectiveness, and the potential for self-sampling highlight a significant paradigm shift in cervical cancer prevention strategies. Ongoing research and policy evaluations will be essential to optimize screening programs and ensure equitable access to cervical cancer prevention efforts worldwide.

DISCLOSURE STATEMENT

- Disclosure Statement : The authors have no conflicts of Interest to declare
- Funding Sources : None
- Acknowledgements : -
- Author Contribution : All authors discussed and contributed the final content for journal submission and publication

REFERENCES

1. D. Boone, J., K. Erickson, B., & K. Huh, W., 2012. New insights into cervical cancer screening. ncbi.nlm.nih.gov
2. Lamin, H., Eklund, C., Miriam Elfström, K., Carlsten-Thor, A., Hortlund, M., Elfgren, K., Törnberg, S., & Dillner, J., 2017. Randomised healthcare policy evaluation of organised primary human papillomavirus screening of women aged 56–60. ncbi.nlm.nih.gov
3. C. Chrysostomou, A., C. Stylianou, D., Constantinidou, A., & G. Kostrikis, L., 2018. Cervical Cancer Screening Programs in Europe: The Transition Towards HPV Vaccination and Population-Based HPV Testing. ncbi.nlm.nih.gov
4. Kyrgiou, M., Arbyn, M., Bergeron, C., Xavier Bosch, F., Dillner, J., Jit, M., Kim, J., Poljak, M., Nieminen, P., Sasieni, P., Kesic, V., Cuzick, J., & Gultekin, M., 2020. Cervical screening: ESGO-EFC position paper of the European Society of Gynaecologic Oncology

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved

(ESGO) and the European Federation of Colposcopy (EFC). ncbi.nlm.nih.gov

5. Gates, A., Pillay, J., Reynolds, D., Stirling, R., Traversy, G., Korownyk, C., Moore, A., Thériault, G., D. Thombs, B., Little, J., Popadiuk, C., van Niekerk, D., Keto-Lambert, D., Vandermeer, B., & Hartling, L., 2021. Screening for the prevention and early detection of cervical cancer: protocol for systematic reviews to inform Canadian recommendations. ncbi.nlm.nih.gov
6. Lozar, T., Nagvekar, R., Rohrer, C., Shamiso Dube Mandishora, R., Ivanus, U., & Burke Fitzpatrick, M., 2021. Cervical Cancer Screening Postpandemic: Self-Sampling Opportunities to Accelerate the Elimination of Cervical Cancer. ncbi.nlm.nih.gov
7. F. Hamers, F., Poullié, A. I., & Arbyn, M., 2022. Updated evidence-based recommendations for cervical cancer screening in France. ncbi.nlm.nih.gov

Downloaded from The Medical Journal of Obstetric and Gynaecology
Copyright © International Medical Journal Corp. Ltd. All rights reserved