IAR Journal of Medicine and Surgery Research
https://doi.org/10.70818/iarjmsr.2024.v05i06.0152
Vol. 5, No. 6, 2024

ISSN (Print): 2709-1899
ISSN (Online): 2709-1902

ARTICLE

Major Risk Factor for Cervical Cancer in Rural Area: How to Reduce its incidence Along Mortality Rate

A.A.M. Abu Taher[1]*, Aziz Ahmed[2], Md. Jahangir Alam[3], Shilpi Rani Roy[4], Mominul Islam[5], Md. Lutfar Rahman[6], Maksuda Zahan Akhi[7], Israt Jahan Jui[8]

[1] UH & FPO and Oncologist, UHC, Islampur, Jamalpur, Bangladesh
[2] RMO and Child Specialist, UHC, Islampur, Jamalpur, Bangladesh
[3] Junior Consultant, ENT, UHC, Islampur, Jamalpur, Bangladesh
[4] Junior Consultant, Gynae & Obs, UHC, Islampur, Jamalpur, Bangladesh
[5] Junior Consultant, Ortho Surgery UHC Islampur, Jamalpur, Bangladesh
[6] Junior Consultant, Anaesthesiologist, UHC Islampur, Jamalpur, Bangladesh
[7] Junior Consultant, Skin and VD, UHC, Islampur, Jamalpur, Bangladesh
[8] Consultant, Gynae & Obs, Alhajj M. A Rashid Maa O Shishu Chokkhu Hospital, Maloncho, Melandah, Jamalpur, Bangladesh

ABSTRACT

Background: Cervical cancer is primarily caused by persistent infection with high-risk human papillomavirus (HPV) types. In rural areas, factors such as poor hygiene, early marriage, and inadequate healthcare access contribute to higher incidence and mortality rates. Despite being preventable through screening and vaccination, the disease continues to pose challenges in underserved regions. **Methods:** This cross-sectional study was conducted in rural Bangladesh, involving 450 participants aged more than 30 years up to 59 years selected via stratified random sampling. Data were collected through structured interviews, clinical assessments, and review of health records to identify sociodemographic, reproductive, and healthcare-related risk factors. Interventions, including HPV vaccination and education campaigns, were implemented, followed by evaluations to assess their effectiveness. **Results:** The study revealed significant risk factors, including HPV infection (20%), early marriage (44.4%), poor hygiene (55.6%), and limited access to healthcare (66.7%). Targeted interventions led to increased awareness, improved screening participation, and a reduction in HPV prevalence. **Conclusion:** This study highlights the urgent need for community-based strategies to address cervical cancer disparities in rural populations.

Keywords: Cervical Cancer, HPV, Rural Healthcare, Socio-Economic Factors, Public Health Intervention

| **Submitted:** 26.10.2024 | **Accepted:** 28.11.2024 | **Published:** 12.12.2024

***Corresponding Author**
Dr. A.A.M. Abu Taher, UH & FPO and Oncologist, UHC, Islampur, Jamalpur, Bangladesh
Email: dr.aamtaher@gmail.com

How to Cite the Article
A.A.M. Abu Taher, Aziz Ahmed, Md. Jahangir Alam, Shilpi Rani Roy, Mominul Islam, Md. Lutfar Rahman, Maksuda Zahan Akhi, Israt Jahan Jui: Major Risk Factor for Cervical Cancer in Rural Area: How to Reduce its incidence Along Mortality Rate. *IAR J Med Surg Res.* 2024;5(6): 140-149.

INTRODUCTION

Cancer ranks as the second leading cause of death globally, following heart disease, as noted by, resulting in significant societal burdens [1]. One of the most prevalent types of cancer among women is

gynecological cancer. According to, cervical cancer is the most prevalent kind of gynecological cancer [2]. It is, in fact, one of the leading causes of disability-adjusted life years (DALYs) and a significant public health issue worldwide [3]. However, one of the most avoidable malignancies is cervical cancer. It is a prevalent cause of death among women, particularly among those from less developed nations. Yet due to scientific investigations, we now have a better understanding of the viral etiology of cervical cancer [4]. Because of its slow growth, the existence of cytologically visible lesions, and the development of efficient treatments, this disease is one of the most preventable malignancies [5].528,000 new cases and 266,000 cervical cancer deaths were recorded in 2012.

Young adults have the highest incidence rate of cervical cancer, a condition that is constantly evolving [6]. Globally, the incidence and mortality of cervical cancer have been gradually declining. Since many instances were identified early, the death rate from cervical cancer has significantly decreased in developed nations. Numerous research findings indicate that socioeconomic disparities have a significant impact on the incidence, mortality, and survival rate of cervical cancer [7, 8, 9]. Numerous variables are linked to this, including limited access to screening. Petersen *et al*, inadequate and ineffective treatment, unsanitary conditions, and non-implementation of prevention programs [10]. Cervical cancer remains a significant public health challenge, particularly in rural areas where access to healthcare services is limited. The disease is primarily caused by persistent infection with high-risk human papillomavirus (HPV) types [11]. In rural settings, factors such as lack of awareness, inadequate screening programs, and limited access to vaccination contribute to higher incidence and mortality rates. This study aims to identify major risk factors for cervical cancer in rural areas and propose strategies to reduce its incidence and mortality.

OBJECTIVE OF THE STUDY

The primary objective of this study is to identify the major risk factors contributing to cervical cancer in rural areas and to develop effective strategies to reduce its incidence and mortality rate. The study focuses on understanding the socio-economic, cultural, and healthcare-related factors that influence cervical cancer outcomes in these regions.

METHODOLOGY

Study Design

This was a cross-sectional study conducted in Upazilla Health Complex Islampur, Jamalpur, Bangladesh to examine the prevalence of cervical cancer risk factors and the effectiveness of interventions aimed at reducing incidence and mortality. The research was carried out from January 2022 to January 2024. A total of 450 female participants from the rural area of Jamalpur district aged more than 30 years up to 59 years were recruited using a stratified random sampling technique to ensure diverse representation. The study population was stratified based on age, socioeconomic status, education level, and geographic location to capture a comprehensive demographic profile of the rural community.

Data Collection

Structured Interviews

Structured interviews were conducted with all 450 participants aged more than 30 years up to 59 to collect detailed information on socio-demographic characteristics and personal health history. The interviews gathered data on:

Demographics: Age, marital status, educational attainment, household income, and employment status.

Reproductive Health: History of early marriage, number of childbirths (parity), and previous use of contraceptive methods.

Healthcare Access: Utilization of healthcare services, history of cervical cancer screening, knowledge of HPV infection, and access to gynecological care in the local area.

Lifestyle Factors: Hygiene practices, use of sanitary products, and general awareness of reproductive health.

Trained data collectors conducted interviews in the local language, and all responses were recorded and later translated into English for analysis. Each interview lasted approximately 30-40 minutes, with additional time allocated for clarification when needed.

Clinical Assessments

A team consisted of an Oncologist, Gynaecologist, Anaesthesiologist, and Paediatrician along with other consultants where part of the comprehensive clinical assessments was conducted for each participant to gather objective health data:

Pap Smear Tests: All 450 participants underwent a Pap smear test, which is a cytological examination used to detect abnormal cervical cells. Pap smear results were

categorized as normal or abnormal based on cellular abnormalities.

Colposcopy for Abnormal Results: Participants with abnormal Pap smear findings were referred for colposcopy. This procedure involves a visual examination of the cervix using a colposcope to identify potential precancerous or cancerous lesions.

HPV Testing: For participants exhibiting suspicious lesions during colposcopy, additional HPV testing was conducted to confirm the presence of high-risk HPV strains, which are known to be significant risk factors for cervical cancer.

Health Records Review

To ensure the accuracy of self-reported data, participants' health records were reviewed with their consent. This review included verification of past medical history, previous cervical cancer screenings, and any documented cases of HPV infection or other sexually transmitted infections (STIs).

Study Procedure

The study procedure was conducted in three main phases:

Phase 1: Baseline Assessment

All participants underwent initial screening using a Pap smear. Those with abnormal results were scheduled for a follow-up colposcopy within two weeks. In parallel, structured interviews were conducted to assess socio-demographic variables, healthcare access, reproductive history, and lifestyle factors.

Health data from medical records were cross-checked to validate participant responses, ensuring data reliability.

Phase 2: Intervention Implementation

Community-Based Educational Programs: Education campaigns were organized in collaboration with local health workers to raise awareness of cervical cancer risk factors, the importance of screening, HPV vaccination, and reproductive health. These sessions were conducted in community centers and local schools.

HPV Vaccination Drives: HPV vaccination programs were initiated, targeting eligible women within the community to reduce the risk of HPV infection, a primary cause of cervical cancer.

Healthcare Access Initiatives: Mobile health clinics were deployed to remote areas to increase access to cervical cancer screening services and follow-up care. These clinics provided Pap smear testing, basic gynecological services, and educational resources.

Reproductive Health and Hygiene Programs: Family planning sessions were offered to promote contraceptive use and birth spacing. Hygiene kits, including sanitary products, were distributed to women in low-income households to encourage better menstrual hygiene practices.

Phase 3: Follow-Up and Evaluation

After the interventions, follow-up assessments were conducted to measure changes in screening uptake, risk factor prevalence, and healthcare access.

Participants who received vaccinations or attended educational programs were monitored for any changes in cervical health status, and their screening behaviors were recorded.

A second round of data collection involved repeating Pap smears for a subset of participants six months post-intervention to evaluate the impact of the educational campaigns and healthcare improvements.

Data Analysis

Data analysis involved a combination of descriptive and inferential statistical methods to provide a robust evaluation of the study outcomes:

1. Descriptive Analysis

Frequency and Percentages: Descriptive statistics were used to summarize socio-demographic characteristics and the prevalence of specific risk factors (e.g., HPV infection, early marriage, poor hygiene). The outcomes of Pap smear and colposcopy tests were also reported using frequency counts and percentages to illustrate the baseline prevalence of cervical abnormalities.

Mean and Standard Deviations: Mean values and standard deviations were calculated for continuous variables, such as age and household income, to describe the central tendency and variability within the sample.

2. Inferential Statistical Analysis

Relative Risk (RR) and Odds Ratios (OR): The association between interventions (e.g., education, HPV vaccination) and reduction in cervical cancer risk factors was evaluated using RR and OR. These effect sizes provided insight into the strength of association between interventions and health outcomes.

Chi-Squared Tests: Chi-squared tests were conducted to

examine the relationship between categorical variables, such as changes in screening behavior post-intervention and educational attainment. These tests helped determine whether observed differences were statistically significant.

t-Tests: Independent sample t-tests were used to compare mean differences between intervention and non-intervention groups, particularly in healthcare access and screening participation rates.

Regression Analysis: Multiple logistic regression models were constructed to identify predictors of regular screening behavior, early detection of cervical abnormalities, and the impact of educational interventions. Covariates included education level, household income, age, and access to healthcare.

Confidence Intervals (CI) and p-Values: 95% Confidence Intervals were calculated to provide a range for effect estimates, and p-values were used to assess statistical significance, with values below 0.05 indicating significant associations.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Review Board (IRB). Informed consent was collected from all participants before data collection, and confidentiality was strictly maintained throughout the study. Data were anonymized to protect participant identities, and findings were communicated in a manner that respects the privacy and cultural context of the rural communities involved. This comprehensive methodological framework allowed for an in-depth understanding of cervical cancer risk factors and the assessment of targeted intervention strategies in rural Bangladesh. The combination of structured data collection and rigorous statistical analysis ensured that the study's findings were both reliable and relevant to public health policy development.

RESULT

Table 1 showed the Participant Demographics and Screening Outcomes of the study participants. A total of 450 participants were included in the study, with a majority falling within the 40-49 age group (35.6%), followed by the 30-39 years group (26.7%). Pap smear testing revealed that 71.1% of participants had normal results, while 28.9% exhibited abnormal findings of those with abnormal results, 38.9% underwent colposcopy, which identified suspicious lesions in 42.9% of cases, while 57.1% showed normal findings. Regarding follow-up, 66.7% of participants required no further testing, whereas 33.3% were recommended for additional tests, such as biopsies. Socioeconomic analysis indicated that 62.2% of participants had a low education level (primary or less), and 68.9% belonged to low-income households earning less than 10,000 BDT per month.

Table 1: Participant Demographics and Screening Outcomes

Variable	Frequency (n)	Percentage (%)
Total Participants	450	100%
Age Distribution		
30-39 years	120	26.7%
40-49 years	160	35.6%
50-59 years	170	37.7%
Screening Method: Pap Smear Test		
Normal Results	320	71.1%
Abnormal Results	130	28.9%
Screening Method: Colposcopy		
Performed (Due to abnormal Pap smear)	175	38.9%
Normal Findings	100	57.1% of 175
Suspicious Lesions Detected	75	42.9% of 175
Follow-Up Recommendations		
No Follow-Up Required	300	66.7%
Further Testing (Biopsy, additional exams)	150	33.3%
Socioeconomic Factors		
Low Education Level (Primary or less)	280	62.2%

Higher Education Level (Secondary+)	170	37.8%
Low-Income Households (<10,000 BDT/month)	310	68.9%
Higher-Income Households (>10,000 BDT/month)	140	31.1%

Table 2 presents an analysis of the sensitivity, specificity, and percentage of abnormal findings for the two screening methods used. The Pap smear, performed on all 450 participants, demonstrated moderate sensitivity and high specificity, with 28.9% of participants showing abnormal findings. For those with abnormal Pap smear results, a colposcopy was conducted on 175 participants, yielding high sensitivity and very high specificity, with 42.9% showing suspicious lesions.

Table 2: Analysis of Screening Sensitivity and Accessibility

Screening Method	Number of Participants	Sensitivity	Specificity	Percentage of Abnormal Findings
Pap Smear	450	Moderate	High	28.9%
Colposcopy (for Abnormal Pap)	175	High	Very High	42.9%

Table 3 outlines the risk factors associated with cervical cancer in rural Bangladesh, based on a sample of 450 participants. Among the identified factors, 20.0% of participants tested positive for HPV, a primary cause of cervical cancer, with limited awareness and vaccination coverage in rural areas. Early marriage, occurring in 44.4% of participants, increases the risk of prolonged sexual activity and HPV exposure. The majority of participants (62.2%) had a low education level, hindering awareness of cervical cancer risks and prevention methods. Additionally, 68.9% of participants lived in low-income households, limiting access to essential healthcare services. A significant proportion (77.8%) had never undergone regular cervical cancer screening, and 66.7% faced challenges accessing healthcare facilities. High parity (40.0%) and poor hygiene practices (55.6%) further contribute to increased cancer risk. These findings highlight the complex interplay of socioeconomic and healthcare access issues in the region, exacerbating the risk of cervical cancer.

Table 3: Risk Factor Analysis for Cervical Cancer in Rural Bangladesh

Risk Factor	Frequency (n)	Percentage (%) of 450	Specific Context
HPV Infection (Detected Cases)	90	20.0%	HPV is a primary cause of cervical cancer, and awareness about HPV and vaccination is limited in rural areas.
Early Marriage (Below 18 years)	200	44.4%	Early marriage is prevalent in rural Bangladesh, increasing the duration of sexual activity and risk of HPV exposure.
Low Education Level (Primary or less)	280	62.2%	Access to education is limited in rural areas, reducing awareness of cervical cancer risks and prevention measures.
Low-Income Households (<10,000 BDT/month)	310	68.9%	Poverty limits access to healthcare services, including screening and follow-up care, contributing to higher cancer risks.
No Regular Screening Before Study	350	77.8%	Cervical cancer screening programs are often unavailable or underutilized in rural Bangladesh, leading to late diagnosis.
Limited Access to Healthcare Facilities	300	66.7%	Rural areas have fewer healthcare facilities, with limited gynecological

			services and specialized screening equipment.
High Parity (Multiple Childbirths)	180	40.0%	High parity is common in rural Bangladesh, with each additional childbirth increasing the risk of cervical cancer.
Poor Hygiene Practices	250	55.6%	Lack of awareness and access to sanitary products contribute to poor hygiene, increasing the risk of infections.

Table 4 presents the logistic regression analysis of significant risk factors associated with abnormal Pap smear results among women in rural Bangladesh. The analysis includes eight predictors: age, education level, income level, HPV infection status, early marriage, high parity, hygiene practices, and access to healthcare. The odds ratios (OR) indicate the likelihood of an abnormal Pap smear result for each risk factor, with values greater than 1 signifying an increased risk. For instance, women with lower education are 2.38 times more likely to have abnormal Pap smear results compared to those with higher education, while HPV-positive individuals exhibit nearly five times the risk. Factors like early marriage and high parity also significantly contribute to increased odds, emphasizing the importance of socio-economic and cultural influences in rural settings. The confidence intervals provide a range in which the true effect size is expected to fall, and p-values indicate statistical significance, with values below 0.05 denoting a meaningful predictor. This analysis highlights the multi-faceted nature of cervical cancer risk in rural Bangladesh, stressing the need for targeted interventions that address socio-economic disparities, healthcare accessibility, and educational outreach to reduce the prevalence of cervical abnormalities.

Table 4: Logistic Regression Analysis of Risk Factors for Abnormal Pap Smear Results in Rural Bangladesh

Independent Variable	Coefficient (β)	Standard Error (SE)	Odds Ratio (Exp(β))	95% Confidence Interval	p-value
Age (years)	0.038	0.011	1.039	1.016 - 1.062	0.002
Lower Education Level	0.865	0.218	2.376	1.535 - 3.678	<0.001
Lower Income	0.698	0.195	2.010	1.378 - 2.931	0.001
HPV Positive	1.583	0.320	4.868	2.606 - 9.086	<0.001
Early Marriage (Below 18 years)	0.432	0.195	1.541	1.063 - 2.233	0.027
High Parity (>3 children)	0.490	0.210	1.632	1.080 - 2.468	0.018
Poor Hygiene Practices	0.598	0.230	1.818	1.158 - 2.852	0.011
Limited Access to Healthcare	0.709	0.225	2.032	1.309 - 3.156	0.004

Table 5 illustrates the Kaplan-Meier survival analysis results, displaying the median survival time (in months) to the detection of cervical abnormalities across various risk factor groups. Survival probabilities at 1, 2, and 3 years are provided for each group, offering insights into how different factors influence the likelihood of remaining disease-free over time. The Median Survival Time indicates the point at which 50% of the group has experienced the event (detection of abnormality). If the median survival time is labeled "Not Reached," it means that more than 50% of the group was still disease-free at the end of the follow-up period. The Log-Rank Test p-value measures the statistical significance of survival differences between groups. A p-value < 0.05 suggests a significant difference in survival outcomes based on the respective factor. Women with lower education have a significantly shorter median survival time, reflecting a higher risk of early detection of abnormalities. HPV-positive women show a substantially lower survival probability over time compared to HPV-negative women. Adequate healthcare access significantly improves survival probabilities, indicating the importance of accessibility to gynecological services. Younger women (30-39) have higher survival probabilities, while older age

groups (50-65) demonstrate a faster rate of abnormality detection.

This analysis underscores the critical need for early intervention, HPV vaccination, and improved healthcare access to extend disease-free intervals and reduce cervical cancer risks among rural Bangladeshi women.

Table 5: Kaplan-Meier Survival Analysis for Time to Detection of Cervical Abnormalities in Rural Bangladesh

Risk Factor Group	Median Survival Time (Months)	1-Year Survival Probability (%)	2-Year Survival Probability (%)	3-Year Survival Probability (%)	Log-Rank Test p-value
Education Level					
Higher Education	Not Reached	98.5%	96.2%	93.8%	<0.001
Lower Education	30	85.6%	76.4%	65.3%	
HPV Status					
HPV Negative	Not Reached	99.0%	97.3%	94.9%	<0.001
HPV Positive	18	70.2%	55.8%	42.1%	
Access to Healthcare					
Adequate Access	Not Reached	97.8%	95.1%	91.4%	0.004
Limited Access	24	82.3%	68.9%	56.7%	
Age Group					
-30-39 Years	Not Reached	97.5%	94.8%	92.3%	0.015
-40-49 Years	28	88.9%	79.5%	68.2%	
-50-65 Years	22	81.4%	67.1%	55.0%	

This table presents a statistical analysis of various strategies aimed at reducing cervical cancer incidence and mortality in rural Bangladesh. The strategies target key risk factors identified in the study, such as HPV infection, early marriage, low education levels, low-income households, lack of regular screening, limited access to healthcare, high parity, and poor hygiene practices. For each risk factor, the table outlines the prevalence among participants, proposed intervention strategies, their effectiveness in reducing the risk factors, and the corresponding statistical analysis, including relative risk (RR), odds ratios (OR), and p-values. The expected outcomes include improved screening rates, increased access to healthcare, reduced HPV exposure, and better reproductive health practices, which are anticipated to lower both the incidence of cervical cancer and related mortality rates. Statistical significance is assessed to demonstrate the potential impact of these interventions in a rural healthcare context.

Table 5: Statistical Analysis of Mortality in Rural Bangladesh

Risk Factor	Prevalence (%)	Intervention Strategy	Effectiveness	Statistical Analysis (Effect Size)	Outcome Measure
HPV Infection	20.0%	HPV vaccination program, Awareness campaigns	60% reduction in HPV prevalence	Relative Risk (RR) = 0.4 (95% CI: 0.3-0.5)	Reduced HPV infection rates
Early Marriage	44.4%	Delay early marriage, Women's empowerment programs	30% reduction in early marriage rates	Odds Ratio (OR) = 0.7 (95% CI: 0.6-0.8)	Reduced early sexual activity and HPV exposure

Low Education Level	62.2%	Education campaigns, School-based programs	40% increase in screening participation	Chi-squared test: $p < 0.05$	Increased awareness, higher screening rates
Low-Income Households	68.9%	Subsidized screenings, Mobile health services	50% increase in screening access	t-test: $p < 0.01$	Improved access to healthcare and early detection
No Regular Screening	77.8%	Routine cervical cancer screening programs	80% increase in screening uptake	Chi-squared test: $p < 0.01$	Early detection and reduced mortality
Limited Access to Healthcare Facilities	66.7%	Improve healthcare infrastructure, Telemedicine	50% increase in healthcare access	Regression analysis: $p < 0.05$	Increased access to screening and treatment
High Parity	40.0%	Family planning programs, Birth spacing education	20% reduction in high parity rates	RR = 0.5 (95% CI: 0.4-0.6)	Reduced reproductive risk factors
Poor Hygiene Practices	55.6%	Sanitary product distribution, Hygiene education	30% improvement in hygiene practices	OR = 0.6 (95% CI: 0.5-0.7)	Reduced infections, lower cervical cancer risk

DISCUSSION

Cervical cancer remains a significant public health concern, particularly in rural areas where socioeconomic and healthcare disparities exacerbate its prevalence and mortality [12]. The findings of this study align with global evidence highlighting the role of HPV infection, early marriage, and poor hygiene in increasing cervical cancer risk. For instance, identified HPV as the primary etiological agent for cervical cancer, underscoring the importance of vaccination programs in reducing disease burden.

Socio-economic disparities significantly impact access to preventive measures and treatment. Low education levels, prevalent in 62.2% of participants, hinder awareness about cervical cancer risks and screening opportunities. This corroborates studies by Trewin-Nybråten *et al*., which found that socio-economic status strongly correlates with cancer screening uptake [13]. Furthermore, limited healthcare access, reported by 66.7% of participants, aligns with findings by Mahumud *et al*., who emphasized the underutilization of cervical cancer prevention services in low-income settings [14].

The study also highlights the effectiveness of targeted interventions. HPV vaccination and awareness campaigns reduced the prevalence of HPV infection and improved screening rates. These findings mirror global success stories, such as the Rajaguru *et al*., analysis of developed nations, where widespread vaccination and screening led to significant reductions in cervical cancer incidence [15]. Moreover, community-based programs addressing hygiene practices and reproductive health have shown promise in mitigating risk factors, supporting the findings by a similar study [16-20]. The integration of mobile health clinics demonstrated a practical approach to overcoming geographical barriers in rural settings. Such initiatives are vital in regions like Bangladesh, where healthcare infrastructure is often inaccessible. The study's limitations include its focus on a single region, which may limit generalizability, and its reliance on self-reported data, which could introduce bias. Future research should explore the longitudinal impacts of interventions and expand geographically to validate these findings.

CONCLUSION

This study underscores the pressing need to address cervical cancer disparities in rural areas through targeted interventions. The identification of key risk factors, such as HPV infection, early marriage, poor hygiene, and limited healthcare access, provides a foundation for effective public health strategies. Community-based educational campaigns, HPV vaccination, and improved healthcare access emerged as pivotal in reducing the burden of cervical cancer. Policymakers and healthcare providers must prioritize these interventions to achieve equitable cancer care and improve outcomes for underserved populations. Continued efforts to enhance awareness, accessibility, and affordability of preventive services are critical to

reducing cervical cancer incidence and mortality globally.

Funding: No funding sources

Conflict of interest: None declared

REFERENCES

1. Heer, E., Harper, A., Escandor, N., Sung, H., McCormack, V., & Fidler-Benaoudia, M. M. (2020). Global burden and trends in premenopausal and postmenopausal breast cancer: a population-based study. *The Lancet Global Health*, *8*(8), e1027-e1037.
2. Khazaei, Z., Namayandeh, S. M., Beiranvand, R., Naemi, H., Bechashk, S. M., & Goodarzi, E. (2021). Worldwide incidence and mortality of ovarian cancer and Human Development Index (HDI): GLOBOCAN sources and methods 2018. *Journal of preventive medicine and hygiene*, *62*(1), E174.
3. Morgan, E., Arnold, M., Gini, A., Lorenzoni, V., Cabasag, C. J., Laversanne, M., ... & Bray, F. (2023). Global burden of colorectal cancer in 2020 and 2040: incidence and mortality estimates from GLOBOCAN. *Gut*, *72*(2), 338-344.
4. Okunade, K. S. (2020). Human papillomavirus and cervical cancer. *Journal of Obstetrics and Gynaecology*, *40*(5), 602-608.
5. Huang, J., Deng, Y., Boakye, D., Tin, M. S., Lok, V., Zhang, L., ... & NCD Global Health Research Group. (2022). Global distribution, risk factors, and recent trends for cervical cancer: A worldwide country-level analysis. *Gynecologic oncology*, *164*(1), 85-92.
6. Osmani, V., Hörner, L., Nkurunziza, T., Rank, S., Tanaka, L. F., & Klug, S. J. (2024). Global prevalence of cervical human papillomavirus in women aged 50 years and older with normal cytology: a systematic review and meta-analysis. *The Lancet Microbe*.
7. Jeong, S., & Choi, Y. J. (2024). Association between Socioecological Status, Nutrient Intake, and Cancer Screening Behaviors in Adults Aged 40 and Over: Insights from the Eighth Korea National Health and Nutrition Examination Survey (KNHANES, 2019). *Nutrients*, *16*(7), 1048.
8. Ammitzbøll, G., Levinsen, A. K. G., Kjær, T. K., Ebbestad, F. E., Horsbøl, T. A., Saltbæk, L., ... & Dalton, S. O. (2022). Socioeconomic inequality in cancer in the Nordic countries. A systematic review. *Acta Oncologica*, *61*(11), 1317-1331.
9. Machado, M. (2023). Educational inequalities in cervical cancer mortality: a systematic review and meta-analysis.
10. Petersen, Z., Jaca, A., Ginindza, T. G., Maseko, G., Takatshana, S., Ndlovu, P., ... & Moyo, S. (2022). Barriers to uptake of cervical cancer screening services in low-and-middle-income countries: a systematic review. *BMC women's health*, *22*(1), 486.
11. Khan, M. J., Kannan, P., Sayma, & Winser, S. J. (2024). Population-based cross-sectional survey of cervical cancer screening prevalence and socio-demographic correlates in Bangladeshi women. *Research in Health Services & Regions*, *3*(1), 17.
12. Singh, D., Vignat, J., Lorenzoni, V., Eslahi, M., Ginsburg, O., Lauby-Secretan, B., ... & Vaccarella, S. (2023). Global estimates of incidence and mortality of cervical cancer in 2020: a baseline analysis of the WHO Global Cervical Cancer Elimination Initiative. *The lancet global health*, *11*(2), e197-e206.
13. Trewin-Nybråten, C. B. (2023). Changing socioeconomic patterns of breast cancer incidence, mortality and survival in Norway.
14. Mahumud, R. A., Keramat, S. A., Ormsby, G. M., Sultana, M., Rawal, L. B., Alam, K., ... & Renzaho, A. M. (2020). Wealth-related inequalities of women's knowledge of cervical cancer screening and service utilisation in 18 resource-constrained countries: evidence from a pooled decomposition analysis. *International journal for equity in health*, *19*, 1-15.
15. Rajaguru, V., Kim, T. H., Shin, J., & Lee, S. G. (2022). Income disparities in cancer screening: a cross-sectional study of the Korean National Health and Nutrition Examination Survey, 2013–2019. *Frontiers in Public Health*, *10*, 820643.
16. Begum, M. M. M., Gupta, R., Sunny, B., & Lutfor, Z. L. (2024). Advancements in Early Detection and Targeted Therapies for Breast Cancer; A Comprehensive Analysis. *Asia Pacific Journal of Cancer Research*, 1(1), 4-13.
17. Gupta, R., & Rahman, M. T. (2024). Revolutionizing Cancer Care; Breakthroughs in Therapeutics and Diagnostics for Precision Oncology. *Asia Pacific Journal of Cancer Research*, *1*(1), 1-3.
18. Khatun, M. M., & Begum, M. M. M. (2024). Enhancing Cervical Cancer Screening VIA vs. Colposcopy; A prospective study. *Asia Pacific Journal of Surgical Advances*, *1*(1), 15-25.
19. Parvez, M. H., Moula, S. G., Islam, M. M., Badruddoza, A. S. M., & Ali, M. I. (2024). Impact of Surgeon Experience on Outcomes in Prostate Cancer Surgery; A Study of Learning Curves and Best Practices. *Asia Pacific Journal of Cancer Research*, *1*(1), 23-31.

20. Borna, N. A., Khatun, W., Lina, K. S. N., Parven, R. P., & Haque, A. T. (2024). Assessing the Impact of Laparoscopic Surgery on Metabolic and Reproductive Outcomes in Women with Polycystic Ovary Syndrome. *Asia Pacific Journal of Surgical Advances*, *1*(1), 25-33.