Original Article https://doi.org/10.70084/mru/pmrcc/00044.P44

# HPV-Positive Cervical Cancer in Central Sudan: Patient Characteristics, Clinical Presentation, and Stage at Diagnosis

*Sami Hummeda Elnour Hummeda* [1], *Altayeb Ahmed*[2], *Ahamed AL Mustafa3*, *Ibrahim Bakhit Yousif Elemam*[4]

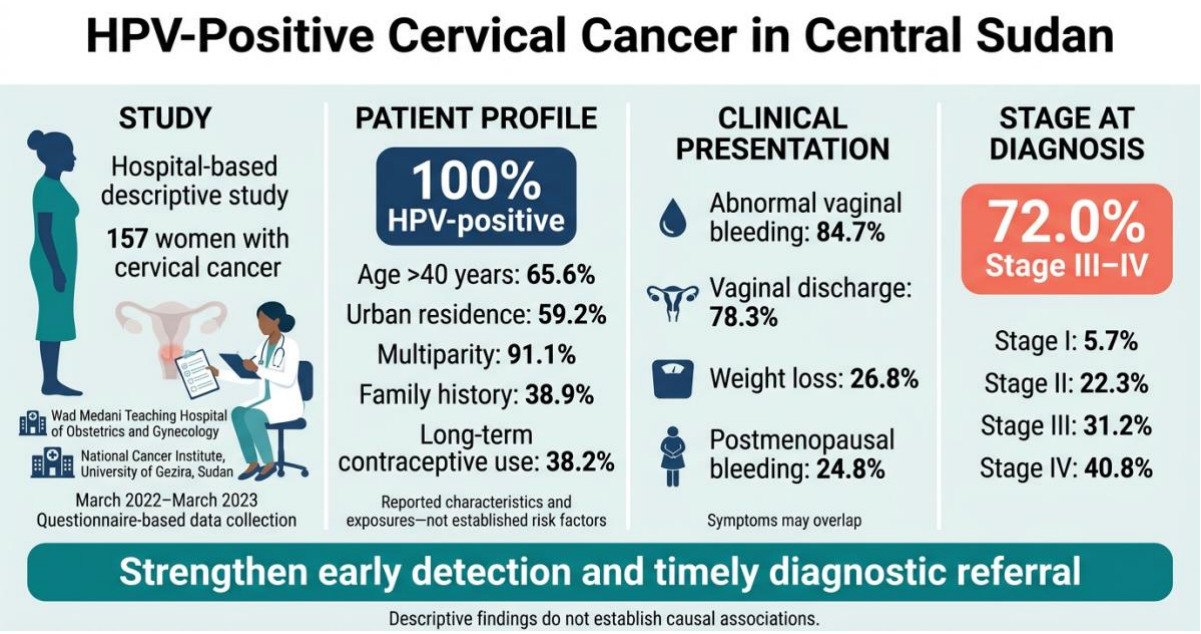
[1]Department of Obstetrics and Gynaecology Faculty of Medicine, Shendi University, Shendi, Sudan.
[2]Department of Obstetrics and Gynaecology, Al Mak Nimir Hospital, in Shendi locality, Sudan.
[3]Department of Obstetrics and Gynaecology, University of Gezira, Sudan [4]Department of Histopathology and Cytology, Faculty of Medical Laboratory Sciences, Shendi University, Shendi, Sudan.
**Correspondence to**: Eldisugi Hassan Mohammed Humida, Email: heldisugi@gmail.com

**Cite:** Hummeda, et al. HPV-Positive Cervical Cancer in Central Sudan: Patient Characteristics, Clinical Presentation, and Stage at Diagnosis. Medical Research Updates Journal 2026;4(4):36-44. https://doi.org/10.70084/mru/pmrcc/00044.P44

## ABSTRACT

**Background:** Understanding the characteristics and presentation of cervical cancer can inform strategies for earlier diagnosis. This study described patient characteristics, reported exposures, disease stage, and clinical presentation among women with cervical cancer in central Sudan. **Methods:** A hospital-based descriptive study included 157 women diagnosed with cervical cancer at Wad Medani Teaching Hospital of Obstetrics and Gynecology and the National Cancer Institute, University of Gezira, between March 2022 and March 2023. Data were collected using a questionnaire following informed consent. **Results:** Most participants were aged over 40 years (65.6%), resided in urban areas (59.2%), and were multiparous (91.1%). Human papillomavirus infection was reported in all participants. A family history of cervical cancer and long-term contraceptive use were reported by 38.9% and 38.2%, respectively. Diabetes mellitus was present in 35.0%, hypertension in 16.6%, and a history of sexually transmitted infections in 15.9%. Smoking and alcohol consumption were uncommon. Stage IV disease was most frequent (40.8%), followed by stage III (31.2%), stage II (22.3%), and stage I (5.7%); overall, 72.0% presented with stage III–IV disease. The most common presentations were abnormal vaginal bleeding (84.7%), vaginal discharge (78.3%), weight loss (26.8%), and postmenopausal bleeding (24.8%). **Conclusion:** Most women presented with advanced-stage cervical cancer, commonly accompanied by abnormal vaginal bleeding and discharge. These findings highlight the need to strengthen early detection and timely diagnostic referral. The descriptive design does not establish the reported characteristics or exposures as independent risk factors.

**Keywords**: Cervical cancer, vaginal bleeding; postmenopausal bleeding, Sudan.



## Introduction

Cervical cancer remains a major public health challenge despite the availability of effective prevention and early detection strategies. It is the fourth most common cancer among women worldwide, with approximately 660,000 new cases and 350,000 deaths estimated in 2022. Its burden is disproportionately concentrated in low- and middle-income countries, where limited access to vaccination, screening, and treatment contributes to preventable mortality [1].

Persistent infection with high-risk human papillomavirus (HPV) is the principal cause of cervical cancer. Most HPV infections resolve spontaneously; however, persistent oncogenic infection can lead to precancerous lesions and, subsequently, invasive disease. HPV types 16 and 18 account for most cervical cancers worldwide. The prolonged precancerous phase provides an important opportunity for screening and treatment before invasive cancer develops. Accordingly, HPV vaccination and screening linked to appropriate treatment constitute the foundations of cervical cancer prevention [2].

The preventable nature of cervical cancer has prompted an international commitment to its elimination as a public health problem. Following its global call to action in 2018, the World Health Organization adopted an elimination strategy in 2020. The strategy establishes three targets for 2030: full HPV vaccination of 90% of girls by age 15 years, screening of 70% of women using a high-performance test by age 35 years and again by age 45 years, and appropriate treatment or management of 90% of women with cervical precancer or invasive cancer. These targets emphasize the need for coordinated services across prevention, diagnosis, and treatment [3].

In Sudan, cervical cancer represents an important component of the female cancer burden. The 2023 ICO/IARC country fact sheet reported an estimated 1,227 new cases and 828 deaths annually, ranking cervical cancer as the second most frequent cancer among women. The same report highlighted limited population-level information on HPV infection and low estimated screening coverage. These findings underscore the importance of strengthening locally informed prevention and diagnostic services [4].

Characterizing women who present to clinical services can provide useful information on patient profiles, presenting symptoms, and disease stage. Although a descriptive study cannot establish independent risk factors, it can document reported exposures and identify priorities for subsequent analytical research. This study therefore aimed to describe the sociodemographic and reproductive characteristics, reported exposures, clinical presentations, and disease stages of women with cervical cancer attending Wad Medani Teaching Hospital of Obstetrics and Gynecology and the National Cancer Institute, University of Gezira, Sudan, between March 2022 and March 2023.

## Materials and Methods

**Study design and setting:** A prospective, descriptive, hospital-based study was conducted at Wad Medani Teaching Hospital of Obstetrics and Gynecology and the National Cancer Institute, University of Gezira, Sudan, from March 2022 to March 2023.

**Study participants:** The study included 157 Sudanese women diagnosed with cervical cancer who provided informed consent to participate.

**Data collection:** Data were collected through face-to-face interviews using a predesigned, structured quantitative questionnaire. Interviews were conducted by the researcher, registrars, and trained house officers in a private room provided by the hospital to ensure privacy. The questionnaire collected information on sociodemographic characteristics and reported exposures potentially associated with cervical cancer.

**Statistical analysis:** Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 25. Descriptive statistics were used to summarize

participant characteristics, reported exposures, clinical presentations, and disease stages. Categorical variables were presented as frequencies and percentages. Analyses were descriptive; no inferential testing or estimation of associations was performed.

## Results

A total of 157 women diagnosed with cervical cancer were included. All participants tested positive for human papillomavirus (HPV). Multiparity was recorded in 143 women (91.1%), a family history of cervical cancer in 61 (38.9%), and long-term contraceptive use in 60 (38.2%). Diabetes mellitus and hypertension were reported in 55 (35.0%) and 26 (16.6%) women, respectively. A history of sexually transmitted infections was reported by 25 women (15.9%), while smoking and alcohol consumption were reported by six (3.8%) and four (2.5%), respectively (Table 1, Fig. 1).

**Table (1) Distribution of the women diagnosed with cervical cancer according to risk factors**

| Risk Factors | Yes | No |
|---|---|---|
| HPV | 100 | 0 |
| Multiparity | 91 | 9 |
| Family History | 39 | 61 |
| Prolonged hormonal contraceptive use | 38 | 62 |
| DM | 35 | 65 |
| Hypertension | 23 | 77 |
| Multi-partner | 17 | 83 |
| History of STD | 16 | 84 |
| Smoking | 4 | 96 |
| Alcohol | 3 | 97 |

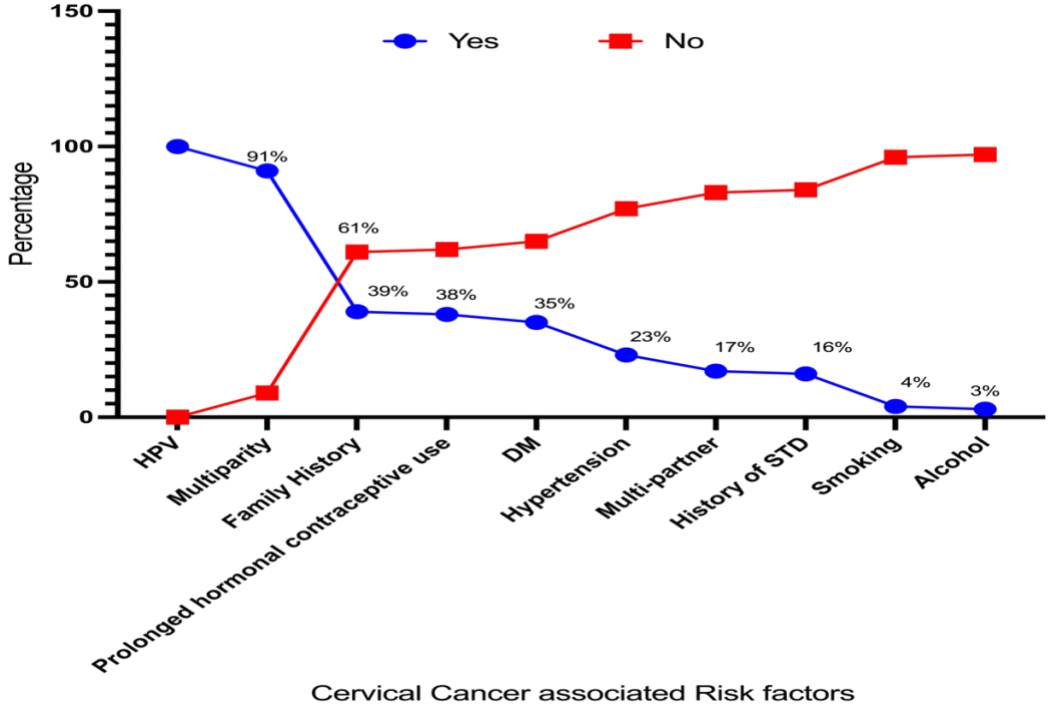



**Figure 1. Proportions of cervical cancer associated risk factors**

The most common clinical presentations were abnormal vaginal bleeding (133; 84.7%) and vaginal discharge (123; 78.3%), followed by weight loss (42; 26.8%), postmenopausal bleeding (39; 24.8%), and pelvic pain or infection (26; 16.6%) (Table 2, Fig 2).

**Table (2) Distribution of the women diagnosed with cervical cancer according to clinical presentations**

| Clinical presentations | Yes | No |
|---|---|---|
| Abnormal bleeding | 133 | 24 |
| Vaginal discharge | 123 | 34 |
| Weight loss | 42 | 115 |
| Postmenopausal bleeding | 39 | 118 |
| Pelvic pain | 26 | 131 |

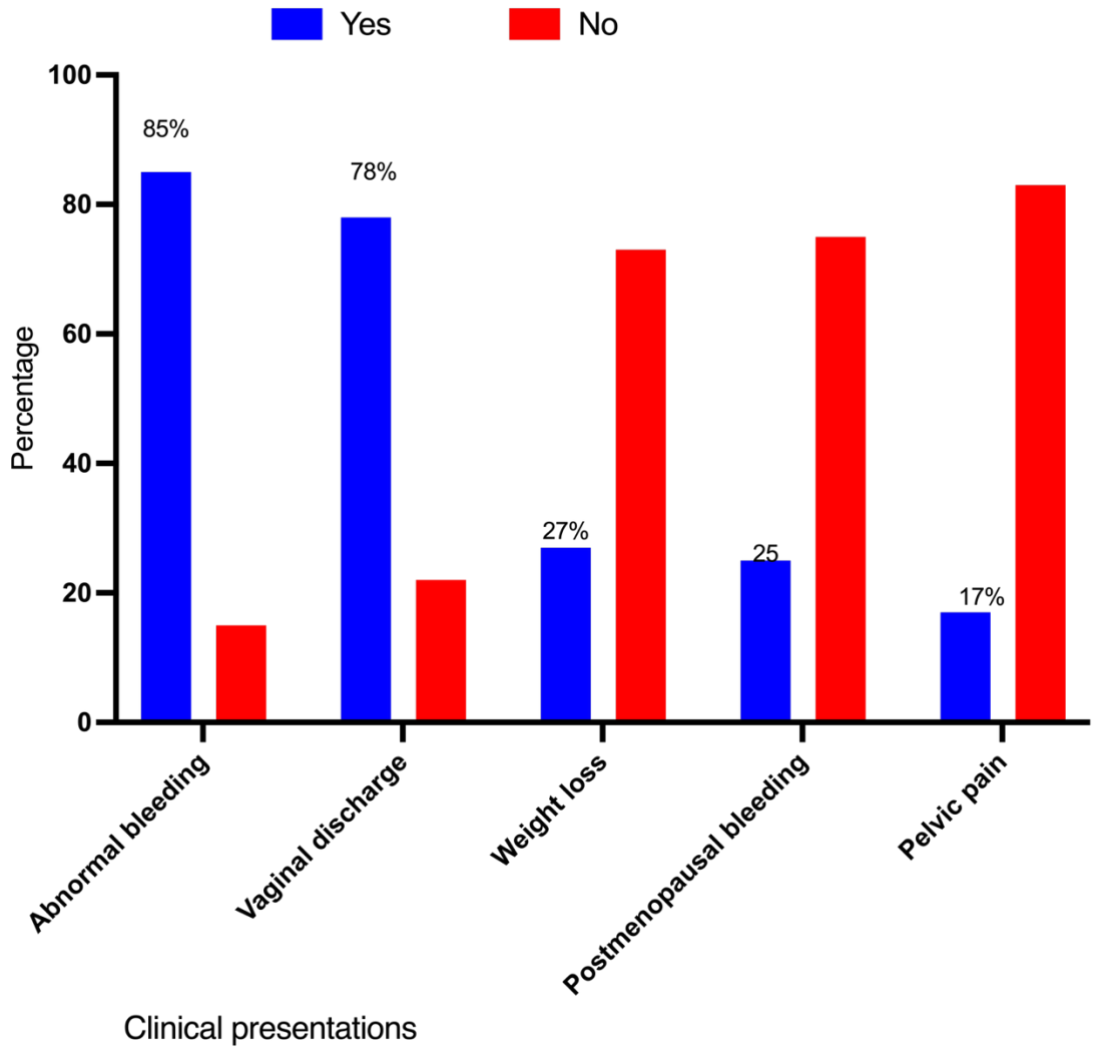



**Figure 2. Proportions of clinical presentations**

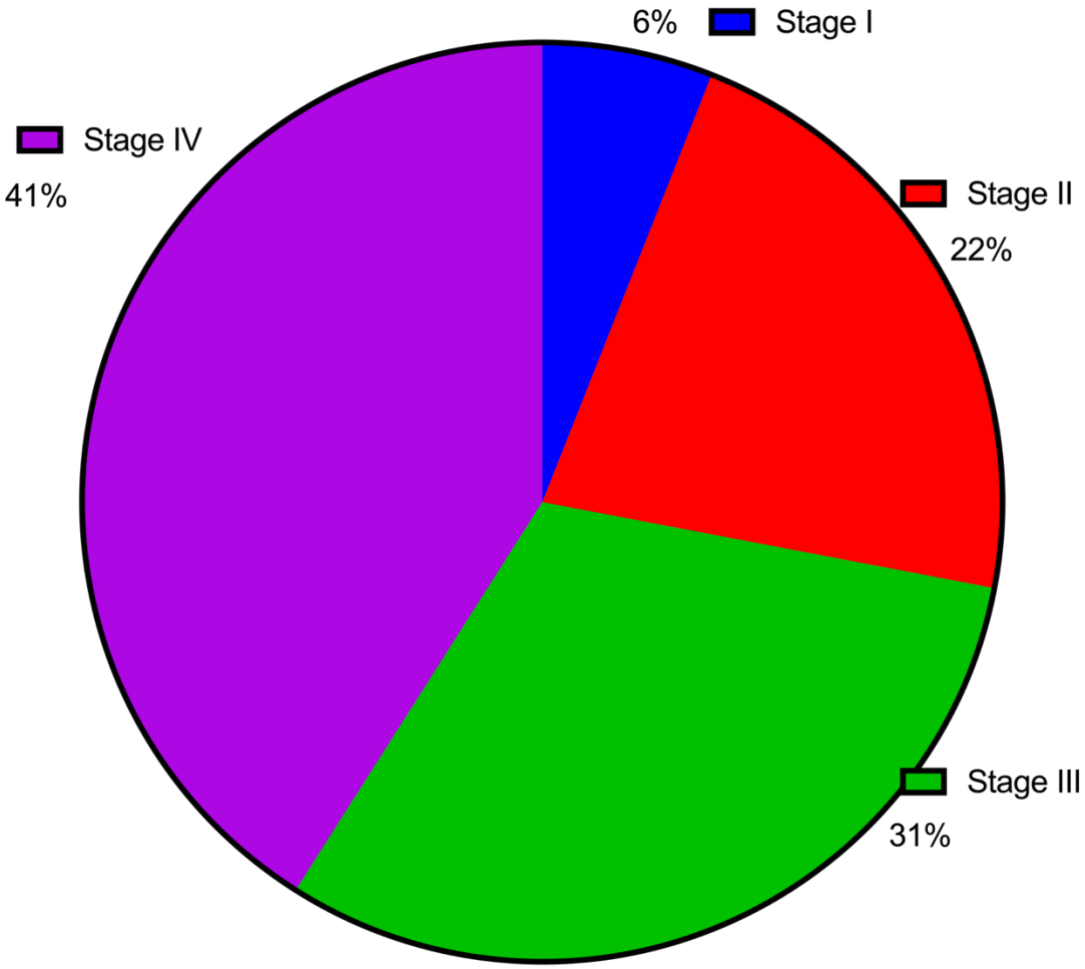



**Figure 3. Proportions of cervical cancer stages.**

Most women presented with advanced disease: 64 (40.8%) had stage IV and 49 (31.2%) had stage III cervical cancer. Stage II and stage I disease were identified in 35 (22.3%) and nine (5.7%) women, respectively. Overall, 113 women (72.0%) presented with stage III–IV disease (Fig. 3).

## Discussion

In this study, 157 women diagnosed with cervical cancer were included to assess the risk factors, staging, and presentations of cervical cancer among women attending Wad Medani Teaching Hospital of Obstetrics & Gynecology and the National Institute of Cancer (NCI), University of Gezira from March 2022 to March 2023. The study showed that the obstetric, medical, and lifestyle risk factors of cervical cancer among the studied women were human papillomavirus infection 157 (100%), multiparity 143 (91.1%), family history of cervical cancer 61 (38.9%), long-term use of contraceptives 60 (38.2%), diabetes mellitus 55 (35%), hypertension 26 (16.6%), history of sexually transmitted diseases 25 (15.9%), smoking 6 (3.9%), and alcohol drinking 4 (2.6%). Similar to a study that found that heavy alcohol consumption and current smoking are among the most common lifestyle factors associated with cervical cancer among Black women in South Africa [5]. Additionally, our study, which is comparable to a meta-analysis that reviewed 19 studies, concluded that the risk of invasive cancer from oral contraceptive use is significant, even though the status of HPV was unknown in those studies. Adenocarcinoma, squamous cell carcinoma, and carcinoma in situ had significant associations with the use of oral contraceptives [6]. The findings of the study showed that the common sociodemographic risk factors were age

group above 40 years (103, 65.6%), urban residence (93, 59.2%), illiteracy (65, 41.3%), and laborer occupation (52, 33.1%). The finding is in line with a study by Husain et al. in Khartoum State, which found that the most common age group affected was patients aged between 41 and 60 years (52%), followed by those aged 61-80 years (26.3%) [7]. In a study that examined the sociodemographic, clinical, and histological characteristics associated with late presentation of cervical cancer cases attended to by gynecological departments in Ghana. Approximately two-thirds (65.97%) of the cases presented in advanced stages of cervical cancer. Level of education, age at menarche, and previous screening history were included in a regression model and adjusted for age. Age at menarche (n = 66) was eliminated from the model after sensitivity analysis. Among the remaining variables, only previous screening history was predictive of the late stage at which cervical cancer cases presented. Previously unscreened cases of cervical cancer were nearly four times more likely to present late, compared to those who had been screened previously. No association was observed with sociodemographic and histological characteristics [8]. A study found that adenocarcinoma was positively associated with earlier staging, as well as women with ≥ 12 years of education who had no children or who had up to two children [9]. The study indicated that the clinical presentation of cervical cancer was abnormal vaginal bleeding 133 (84.7%), vaginal discharge 123 (78.3%), weight loss 42 (26.8%), postmenopausal bleeding 39 (24.8%), and pelvic pain or infection 26 (16.6%). The stages of cervical cancer were stage IV in 64 (40.8%) of the women, stage III in 49 (31.2%), stage II in 35 (22.3%), and stage I in 9 (5.7%) of the women. A similar study indicated that early stages of cervical cancer may be completely free of symptoms. Vaginal bleeding, contact bleeding (one of the most common forms being bleeding after sexual intercourse), or (rarely) a vaginal mass may indicate the presence of malignancy. Furthermore, moderate pain during sexual intercourse and vaginal discharge are symptoms of cervical cancer. In advanced disease, metastases may be present in the abdomen, lungs, or elsewhere [10]. Another study indicated that symptoms of advanced cervical cancer may include loss of appetite, weight loss, fatigue, pelvic pain, back pain, leg pain, swollen legs, heavy vaginal bleeding, bone fractures, and (rarely) leakage of urine or feces from the vagina. Bleeding after douching or after a pelvic exam is a common symptom of cervical cancer [11]. In a study determined the histopathological profile of cervical biopsies in a public tertiary hospital in Mzuzu, the northern region of Malawi. A total of 500 cervical biopsy reports were reviewed during the study period. The mean age of the patients was 41.99±12.5. Age ranged from 15 to 80 years. Cervicitis accounted for 46.0% (n=162) of the total non-malignant lesions seen, followed by cervical intraepithelial neoplasm, at 24.4% (n=86) and endocervical polyp, at 20.5% (n=72). Squamous cell carcinoma (SCC) accounted for 15.6% (n=78) of the total cervical biopsies studied and 85.7% of all total malignant lesions. Adenocarcinoma and undifferentiated carcinoma were 8.8% and 4.4%, respectively, of the total malignant diagnosis. All patients with malignant lesions had HIV [12].

In conclusion, our study highlights the alarming prevalence of advanced-stage cervical cancer among women in Central Sudan, with a predominance of HPV-positive cases. The findings underscore a critical need for enhanced awareness and education regarding cervical cancer symptoms and risk factors, particularly among women over 40 and those in urban areas. The high rates of multiparity, family history of cervical cancer, and comorbid conditions, such as diabetes and hypertension, further emphasize the complexity of this disease. Moreover, the most common clinical presentations, including abnormal vaginal bleeding and discharge, serve as important indicators for early detection. To improve patient outcomes, it is imperative to strengthen

screening programs, implement community-based awareness initiatives, and facilitate timely referrals for diagnostic evaluation. By addressing these gaps, we can strive for earlier diagnosis and intervention, ultimately reducing the burden of cervical cancer in this region.

**Acknowledgement**

The authors would like to thank people at Prof. Medical Research Consultancy Center (Pro. MRCC) for help in the manuscript preparation.

**Funding**

Self-funded

**Conflict of Interest**

The author declares that they have no conflict of interest to disclose.

**Ethical considerations**

Ethical approval was obtained from the local government authorities, and administrative authorization was received before data collection. The study adhered to the principles of confidentiality and responsible use of routinely collected health information**.**

**Ethical approval**

The protocol of this study had been approved by the Human Ethics Committee at Prof. MRCC. Approval number: IRB-0026/PMRCC.10/26.

**Disclosure**

This research was conducted without the use of artificial intelligence or assisted technologies, including the generation of figures.

**Data Availability**

The data supporting the conclusions of this article are included within the article, and further inquiries can be sent to the corresponding author.

**Author contributions:**

All authors approved the final version of the publishable manuscript.

Hummeda SHE: Concept and design, acquisition, analysis, or interpretation of the data, and drafting of the manuscript.

AL Mustafa A**:** Critical review of the manuscript for important intellectual content.

Elemam IBY**:** Supervision**,** concept and design, drafting of the manuscript.

## References

1-WHO, Cervical cancer, 2026. Available at: https://www.who.int/health-topics/cervical-cancer?utm_source=openai#tab=tab_1. Accessed on 21/10/2026.

2- Kim K, Porras C, Kreimer AR, Hempel H, Kemp TJ, Lowy DR, Pinto LA. Development of HPV 35 serology assays for assessment of immune responses to HPV 35 after infection and vaccination. Hum Vaccin Immunother. 2026 Dec;22(1):2610897. doi: 10.1080/21645515.2025.2610897.

3-Wilailak S, Kengsakul M, Kehoe S. Strategic approaches for global cervical cancer elimination: An update review and call for national action. Int J Gynaecol Obstet. 2025 Sep;171 Suppl 1(Suppl 1):120-128. doi: 10.1002/ijgo.70276.

4- Sung H, Filho AM, Laversanne M, Ferlay J, Siegel RL, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2024: GLOBOCAN estimates of incidence and mortality worldwide for 34 cancers in 186 countries. CA Cancer J Clin. 2026 Jul-Aug;76(4):e70090. doi: 10.3322/caac.70090.

5-Singini MG, Sitas F, Bradshaw D, Chen WC, Motlhale M, Kamiza AB, et al. Ranking lifestyle risk factors for cervical cancer among Black women: A case-control study from Johannesburg, South Africa. PLoS ONE 2021; 16(12): e0260319.

6-Asthana S, Busa V, Labani S. Oral contraceptives use and risk of cervical cancer-A systematic review & meta-analysis. Eur J Obstet Gynecol Reprod Biol. 2020 Apr; 247:163-175.

7- Husain N, Helali T, Domi M, & Bedri S. Cervical cancer in women diagnosed at the National Health Laboratory, Sudan: A call for screening. *Sudan Journal of Medical Sciences* 2012; *6*(3), 183–190. https://doi.org/10.4314/sjms.v6i3.

8- Dunyo P, Effah K, Udofia EA. Correction to: Factors associated with late presentation of cervical cancer cases at a district hospital: a retrospective study. BMC Public Health. 2018 Nov 7;18(1):1243. doi: 10.1186/s12889-018-6127-9. Erratum for: BMC Public Health. 2018 Oct 3;18(1):1156. doi: 10.1186/s12889-018-6065-6.

9- Rozario SD, Silva IFD, Koifman RJ, Silva IFD. Characterization of women with cervical cancer assisted at Inca by histological type. Rev Saude Publica. 2019 Oct 3;53:88. doi: 10.11606/s1518-8787.2019053001218.

10-Li H, Wu X, Cheng X. Advances in diagnosis and treatment of metastatic cervical cancer.

Journal of Gynecologic Oncology. 2016; 27 (4): e43.
11-Gadducci A, Barsotti C, Cosio S, Domenici L, Riccardo Genazzani A. Smoking habit, immune suppression, oral contraceptive use, and hormone replacement therapy use and cervical carcinogenesis: a review of the literature. Gynecological Endocrinology. 2011; 27 (8): 597–604.
12- Kaseka PU, Kayira A, Chimbatata CS, Chisale MRO, Kamudumuli P, Wu TJ, Mbakaya BC, Sinyiza FW. Histopathological profile of cervical biopsies in northern Malawi: a retrospective cross-sectional study. BMJ Open. 2022 Mar 11;12(3):e048283. doi: 10.1136/bmjopen-2020-048283.