

Cervical Cancer Prevalence and Associated Risk Factors among Women Employees Working in Star Hotels in Gondar Town, Ethiopia

Mequanente Dagnaw¹, P. Srinivasan², G. Mallika³, Thamimul Ansari Peer Mohamed⁴, Alemu Tebje⁵, Zewdu Baye⁶, Meera Indracanti⁷

¹ University of Gondar, Institute of Public Health and Institute of Biotechnology, Gondar, Ethiopia; ² Koneru Lakshmiah Education Foundation-Deemed to Be University, Department of Hotel Management; ³ Department of Commerce, Arulmigu Kalasalingam College of Arts and Science, Krishnakovil; ⁴ Department of Hotel management, University of Gondar, Ethiopia; ⁵ Institute of Biotechnology, University of Gondar, Gondar, Ethiopia; ⁶ School of Nursing, University of Gondar, Gondar, Ethiopia; ⁷ Department of Medical Biotechnology, School of Allied Health Sciences, Malla Reddy University, Hyderabad, 500100, Telangana, India

*Email: mequanente@gmail.com

Received for publication: 09 May 2022.

Accepted for publication: 11 July 2022.

Abstract

The purpose of this study was to look into the prevalence of cervical cancer and its risk factors among women working in star rated hotels in Gondar town, Ethiopia. A prospective cross section research was done in Gondar Town from November 1, 2021 to March 31, 2022. The study enlisted the participation of 379 women. Using a data extraction form modified from various sources, data were collected from the face-to-face interview of women employees working in star rated hotels in Gondar town. Epi-data™ Version 4.5 was used to enter the data, and Stata™ Version 16 was used to analyze it. The prevalence of cervical cancer and its risk factors were investigated using descriptive and analytical analysis using logistic regression with an adjusted odds ratio of 95 percent CI and a p-value of less than 5 percent. This study included the records of 379 women who work in star rated hotels in Gondar town between November 1, 2021 to March 31, 2022. During the study period, the overall prevalence of cervical cancer was determined to be 39.8 percent (137/344) (95 % CI: 34.9-44.8 %). Unable to read and write educational status (OR= 3.78(1.44, 9.87), secondary educational status (OR=2.93(1.03,8.30), monthly income of less than 2500 ETB (OR= 1.88(1.12, 3.13), age at marriage less than 18 years (OR= 1.70(1.03, 2.79), STIs history (OR= 3.46(2.10, 5.70), genital herpes history (OR= 1.89 (1.14, 3.13), and trichomonas were the most associated factors of cervical cancer. The cervical cancer prevalence and associated risk factors in women Employees working in star rated hotels in Gondar town was comparable similar to that reported in other studies. Women with an unable to read and write educational status, secondary educational status, a collage and above educational status, a monthly income of less than 2500 ETB, a marriage age of less than 18 years, a history of STIs, a history of genital herpes, and a history of trichomoniasis vaginalis infections were all associated with an increased risk of cervical cancer.

Keywords: Cervical cancer, prevalence, star hotels, Ethiopia.

Introduction

Cancer is a disease in which abnormal cells grow and multiply uncontrollably, infiltrating nearby tissues and spreading to other parts of the body via the blood and lymphatic systems, inter-

fering with the function of healthy cells(Admasu, Vagreicha, & Endalew, 2015; Cordella & Huang, 2016; Shimbire, Girum, & Mesfin, 2019). The global burden of cancer is increasing due to the aging and expansion of the global population, as well as an increase in the adoption of cancer-causing behaviors, particularly smoking, in economically developing countries(Admasu et al., 2015).

Solid cancers and hematological cancers are the two types of cancer. A solid tumor is a mass of abnormal tissue that does not contain cysts or liquid areas(Baker et al., 2003). The various types of cells that comprise solid tumors are given names. Sarcomas, carcinomas, and lymphomas are examples of solid tumors (Bendall & Nolan, 2012). Hematologic malignancies are cancers that develop in blood-forming tissue cells, such as bone marrow, or immune system cells. Acute and chronic leukemia are examples of hematopoietic malignancies(Joshi, Bhadauria, Jadon, & Diwaker, 2012). Cancer causes are unknown, and in many cases, there is no single cause. So far, evidence suggests that cancer is linked to genetic changes(McSweeney et al., 2001). Changes in genes have been linked to smoking, a poor diet, and physical inactivity, as well as environmental factors such as infection and carcinogen exposure, as well as a longer life expectancy(Najafi, Khanjani, Ghotbi, & Masinaei Nejad, 2019; Woldu, Legese, Abamecha, & Berha, 2017).

Cancer is becoming more prevalent in economically developing countries due to population aging and expansion, as well as increased adoption of cancer-related lifestyle choices such as smoking, physical inactivity, and "westernized" diets. Despite this, cancer remains a low priority in health-care services in Sub-Saharan Africa(Organization, Regulation, & Initiative, 2008). Cancer is caused by a somatic DNA sequence(DeSantis et al., 2015).

Cancer genes are divided into two categories. Oncogenes are the first class of genes that positively regulate tumor formation(Berhane, Mariam, & Kloos, 2006; Yewhalaw et al., 2009). Tumor-suppressor genes are the second type of cancer gene that inhibits tumor growth. Oncogenes and tumor-suppressor genes both promote tumor growth by influencing cell division (cell birth) or cell death (apoptosis), but the methods are frequently complicated(Hanahan & Weinberg, 2011; Levine & Momand, 1990).

Around 25 million people worldwide are affected by cancer. Every year, 7 million people die as a result of it, and 11 million new cases are discovered worldwide. Cancer kills more people than AIDS, malaria, and tuberculosis combined each year, accounting for 12.5% of all deaths worldwide. The bad news is that cancer is on the rise(Weinberg & Hanahan, 2000).

Materials and Methods

Study areas, Approach and Design

The study was carried out between November 1, 2021 to March 31, 2022. The research was carried out in the town of Gondar. The town has a total population of 432191 and six sub-cities, including Markie 68229, Jan Tkele 175221, Fasil 68432, Ada 68418, Azezo 110367, and Zobebe 73798 with including total populations of reproductive women. To provide health care services, Gondar city has 24 public health facilities (3 hospitals, 8 health centers, and 14 health posts). In those health care facilities, 306 HWs from various professional disciplines work.

Target Population

The study population included women of all ages working in star rated hotels in Gondar Town.

Inclusion

All reproductive women work in Gondar star rated hotels were included in the study.

Exclusion

Reproductive women work in Gondar star rated hotels and have other diseased conditions were excluded from the study.

Sample and Sampling Technique for case control study

The sample size was calculated using the single proportion formula $Z = 95\%$ confidence interval, where $P = 17.3\%$ prevalence and $d = 4\%$ margin of error are used (Prugger et al., 2014).

$$n = (Za/2)^2 p(1-p) d^2$$

Where:

The critical point for the standard normal table is $Z_{a/2} = 1.96$, where $a =$ level of significance, $n =$ sample size, and $d = 4\%$ margin of error. $n = \frac{3.8416 * 0.173(1-0.173)}{(0.04)^2} = 344$ and 10% non-respondent rate which yields 35 so the total sample size for this study is $344 + 35 = 379$

Procedure for sampling

To select study participants, a simple random sampling technique was used, and all women during the data collection period were chosen from the star hotels.

Data collection tool and procedure

A well-designed, semi-structured questionnaire based on literature reviews was used to collect data from women employees in star rated hotels in Gondar town. The questionnaires were also properly formulated, pre-tested, and reviewed for completeness before being used. The interview was conducted by three nurses.

Data quality control

The data collectors were designated by the sub city clinic nurse were given one-day training to generate a consistent knowledge of how to collect data using the questionnaires.

With the use of Google Translate and an English-Amharic dictionary, the English surveys were translated into Amharic. Before one week from data collection, the questionnaires were pre-tested in Bahirdar star hotel with 5% of the sample size to ensure that they were reliable and valid data collection tool.

Processing and analysis of data

Data was manually reviewed and coded before being imported into Epi info 3.01. The data was then exported into STATA version 16 statistical software, where it was cleaned up and cross-checked. The data was recoded, classified, and sorted to facilitate analysis. Descriptive analysis was used to describe the percentages and number distribution of the respondents. Bivariate and multivariate logistic regression were used to investigate the relationship between cervical cancer and various associated characteristics. Finally, all explanatory variables that are significantly linked with the outcome variable in bivariate analyses ($P < 0.25$) were entered into a multivariate logistic regression model to identify independent factors. The adjusted odd ratio (AOR) was calculated with a 95% confidence interval (CI).

Results

Women's sociodemographic characteristics as employed in star rated hotels

The study finally included 344 women who employed in star hotels. More over half of the participants in the study, 44 (57.9%), were between the ages of 36 and 45 years old. 73 (54.5%) of the people were married by the time they were enrolled in cervical screening data collection. The majority of those who took part in the survey (53.1%) had more than five children. When it came to education, 65 percent of women (47.8%) were unable to read and write (**Table1**).

Table 1. Women working at star-rated hotels in Gondar Town, socio-demographic characteristics Ethiopia, 2020 (n=379).

Variables	Category	Frequency(N)	Percentage (%)
Age	15-25 year	53	21(39.6)
	26-35	88	36(40.9)
	36-45	100	44(44)
	46-49	101	35(34.7)
	Missing	2	1(50)
Marital status	Single	55	21 (38.2)
	Married	121	31(25.6)
	Divorced	134	73(54.5)
	Widowed	34	12(35.3)
Residence	Urban	153	62(40.5)
	Rural	191	75(39.3)
Religion	Orthodox	166	65(39.2)
	Muslim	112	44(39.3)
	Protestant	41	15(36.6)
	Others	25	13(52)
Family size	1-3	98	31(31.6)
	4-5	133	46(34.6)
	>5	113	60(53.1)
Education	Unable to write and read	136	65(47.8)
	Primary	111	38(34.2)
	Secondary	66	27(40.9)
	College	31	7(22.6)
Monthly income	<2500 ETB	222	100(45)
	>2500 ETB	122	37(30.3)
Behavioural factors	Tobacco	54	23(42.6)
	Alcohol	99	41(41.4)
	Both	95	34(35.8)
	Smoking	43	14(32.6)
	Chatting	30	13(43.3)
	Others	23	12(52.2)
Insurance status	Uninsured	75	31(41.3)
	Medicated	124	57(46)
	Chemical	103	29(28.2)
	Missing	42	20(47.6)
	Total	344	137(39.8)

Sexual, gynecological and reproductive history characteristics among women Employees working in star rated hotels in Gondar Town, Ethiopia

The final study included a total of 344 women employees working in star rated hotels in Gondar. Premature sexual activity was practiced by more than half of the study participants (86.9%). By the time of interviewed they were enrolled in the cervical screening program, 72 (46.2%) of the

participants had symptoms of STIs. The majority of the study participants were over the age of 18 when they married, with 77 (33.8 percent) of them being over the age of 18. Parity was more than five in 70 cases (54.7 percent). 90 percent (47.1%) did not utilize oral contraception. The majority of the participants in the study, 103 (43.1%), used vaginal delivery (**Table 2**).

Table 2. Characteristics of women's sexual, gynecological, and reproductive histories Employees that work in star-rated hotels in Gondar Town, Ethiopia, 2020(n=379).

Variables	Category	Frequency(N)	Percentage (%)
Premature sexual practice	No	124	51 (41.1)
	Yes	220	86(39.1)
STDs symptoms	No	188	65(34.6)
	Yes	156	72(46.2)
Non circumscribe	No	206	84(40.8)
	Yes	138	53(38.4)
No of life time	1	55	17(30.9)
	2	139	68(48.9)
	≥3	150	52(34.7)
Age at marriage	<18 years	116	60(51.7)
	>18 years	228	77(33.8)
Age at labour	<20 years	130	53(40.8)
	>20 years	214	84(39.3)
Parity	0	95	26(27.4)
	1-5	121	41(33.9)
	>5	128	70(54.7)
Deliver method	Vaginal	239	103(43.1)
	C-section	105	34(32.4)
Birth spacing	<2 years	139	45(32.4)
	>2 years	205	92(44.9)
OCs usage	No	191	90(47.1)
	Yes	153	47(30.7)
Durations of OCs	<5 year	103	41(39.8)
	>5 year	76	34(44.7)
	No use	165	62(37.6)

Medical and family history characteristics among women employees working in star-rated hotels in Gondar Town, Ethiopia

The final analysis comprised 344 women who employees working in star-rated hotels in Gondar. Obesity affected more than half of the study participants (69.3%). By the time they were enrolled in cervical screening, 93.5% of the participants had genital warts. The majority of the individuals in the study (92.9%) had genital herpes. A total of 81 (48.8%) people had a family cervical cancer history. In comparison to their ancestors' background, 83 (43.7 %) were cervical cancer positive. T. vaginalis was found in 93 (47.2%) of the study participants (**Table 3**).

Table 3. Medical and family history characteristics among women employees working in star-rated hotels in Gondar Town, Ethiopia, 2020(n=379).

Variables	Category	Frequency(N)	Percentage (%)
Obesity	Pre-obese	127	34 (37.8)
	Normal	90	34(26.8)
	Obese	127	69(54.3)
STDs history	No	159	38(23.9)
	Yes	185	99(53.5)
Genital warts	No	135	44(32.6)
	Yes	209	93(44.5)
Genital herpes	No	148	45(30.4)
	Yes	196	92(46.9)
T. vaginalis	No	147	44(29.9)
	Yes	197	93(47.2)
Cc positive family	No	178	56(31.5)
	Yes	166	81(48.8)
If yes, no 6	1 st degree	29	12(41.4)
	2 nd degree	73	27(37)
	3 rd degree	35	16(45.7)
	No use	207	82(39.6)
+CC other than family	No	190	83(43.7)
	Yes	154	54(35.1)

Cervical cancer prevalence among women employees that work in star-rated hotels in Gondar Town, Ethiopia

The overall prevalence of cervical cancer among women employees that work in five-star hotels was found to be 39.8% (137/344) (95% CI: 34.9-44.8%).

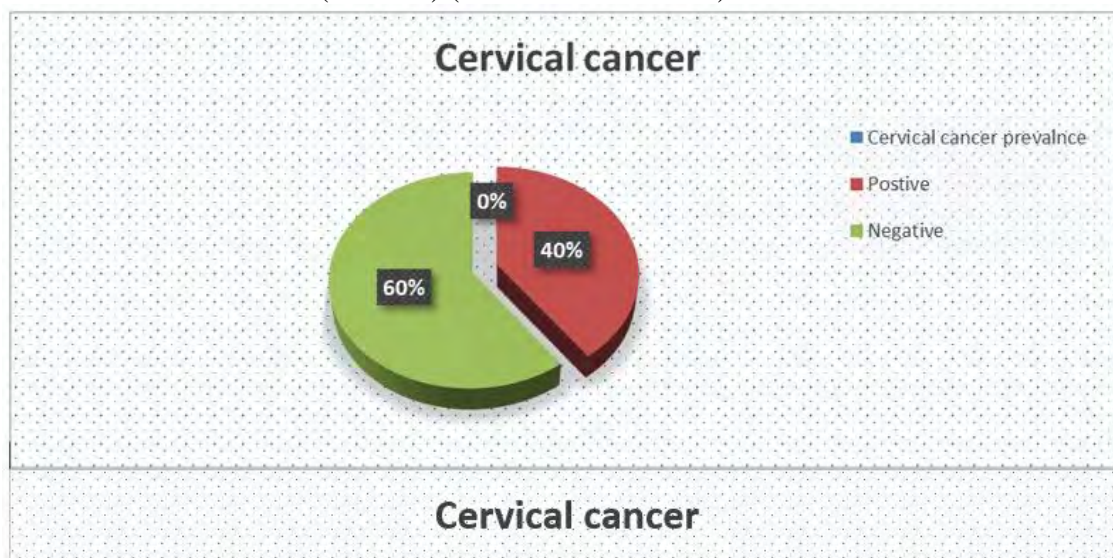


Figure 1. Cervical cancer prevalence among women employees that work in star hotels in Gondar Town, Ethiopia, 2020(n=379).

Factors linked to cervical cancer in females employees that work in star hotels in Gondar Town, Ethiopia

Characteristics of socio-demographic, sexual, gynecological, and reproductive histories

The association of selected socio-demographic, sexual, gynecological and reproductive history, medical and family history of women employees working in star rated hotels in Gondar town was investigated using bivariate and multivariate logistic regression analysis.

Educational status, women's monthly income, life time, and age at marriage were all found to be significantly related with cervical cancer in the bivariate study. Explanatory factors with a 95% level of significance (P 0.05) were included in multivariate logistic regressions with the outcome (P value up to 0.25). Finally, a multivariate logistic regression analysis revealed that women with unable to read and write and secondary educational status were more likely than those with a college or higher educational status to develop cervical cancer (AOR=3.78, 95 percent CI (1.44-9.87) and (AOR=2.93, 95 percent CI (1.44-9.87) respectively (**Table 4**).

Table 4. Women's sexual, gynecological, and reproductive history traits were studied bivariable and multivariable, Employees that work in star-rated hotels in Gondar Town, Ethiopia, 2020(n=379).

Variables	Category	COR (95%CI)	AOR (95%CI)	P-value
Education	Unable to read	3.14(1.268, 7.772)	3.78(1.44-9.87)	0.00**
	Primary	1.785(0.705, 4.518)	2.234(0.828-6.029)	0.11
	Secondary	2.374(0.896, 6.290)	2.93(1.03-8.30)	0.04**
	College and above	1	1	
Monthly income	<2500 ETB	1.883(1.179, 3.006)	1.88(1.12-3.13)	0.01**
	>2500 ETB	1	1	
No of life time	1	1	1	
	2	0.80(0.43, 1.64)	0.72(0.35-1.48)	0.38
	≥3	1.81(1.13, 2.90)	1.92(1.15-3.20)	0.01**
Age at marriage	<18 years	2.10(1.33, 3.32)	1.70(1.03-2.79)	0.04**
	>18 years	1	1	

Medical and family history factors among women employees working in star rated hotels in Gondar Town, Ethiopia

In the bivariate analysis, STIs history, Genital herpes, T. vaginalis, and Cc positive family were all found to be substantially linked with cervical cancer. The multivariate logistic regressions with the outcome at 95 % level of significance (P 0.05) included explanatory factors with (P value up to 0.25). Finally, a multivariate logistic regression analysis demonstrated that women with a history of STIs were more likely than women without a history of STIs to get cervical cancer (AOR=3.46, 95 percent CI (2.10-5.70). Cervical cancer was more common in women with genital warts than in women without warts (AOR=1.03 95 percent CI) (0.61-1.75). Cervical cancer was more likely in women with T. vaginalis than in women without (AOR=1.91 95 percent CI) (1.16-3.16) (**Table 5**).

Table 5. Bivariable and multivariable analysis of linked medical and family history factors among women hotel employees in Gondar, Ethiopia (n=379).

Variables	Category	COR (95%CI)	AOR (95%CI)	P-value
STIs history	No	1	1	0.00**
	Yes	0.273(0.171-0.434)	3.46(2.10-5.70)	
Genital warts	No	1	1	0.91
	Yes	0.60(0.38-0.95)	1.03(0.61-1.75)	
Genital herpes	No	1	1	0.01**
	Yes	0.49(0.32-0.77)	1.89(1.14-3.13)	
T. vaginalis	No	1	1	0.01**
	Yes	0.48(0.30-0.75)	1.91(1.16-3.16)	
CC positive	No	1	1	0.60
	Yes	0.48(0.31-0.75)	4.05(1.26-3.36)	

Discussion

This study focused on the prevalence of cervical cancer and its risk factors among women employees working in star rated hotels in Gondar Town. Invasive cervical carcinoma (ICC) is the second most common malignancy in women worldwide, according to the World Health Organization (WHO), and it is more common in low-income nations (Ferlay, Parkin, & Steliarova-Foucher, 2010). All HIV-positive women should have a yearly cervical cytologic screening after two initial normal Pap smears at a 6-month interval, according to new guidelines. In addition, any immunocompromised women with atypical squamous cells should have a colposcopy (Wright Jr et al., 2007). A total of 379 patients took part in the study. They were questioned their sociodemographic and their medical history were analyzed to determine the risk variables connected with cervical cancer. Cervical cancer was found to be prevalent in 39.8% of women who employees working in star rated hotels in Gondar Town (137/344). (95 percent CI: 34.9-44.8 percent). The outcome is consistent with previous research from around the world (Memiah et al., 2012; Woldu et al., 2017). For example, a study conducted at Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia, found that cervical cancer was Ethiopia's most common cancer, with a prevalence of 40%, which is close to our data of 39.8% (137/344) (95% CI: 34.9-44.8%) (Woldu et al., 2017). Other study done in Central Kenya, Kiambu district also show almost similar finding and the prevalence was revealed 26.7% (Memiah et al., 2012).

Many other studies have reported different risk predictors for cervical cancer prevalence and associated risk factors among women visiting oncology units; our study also assessed the patients' socio-demographic, sexual, gynecological and reproductive history characteristics, as well as medical and family history characteristics, which were collected based on interviewed their past medical history of women employees working in star rated hotels in Gondar Town. As a consequence, factors such as unable to read and write, secondary education, a monthly income of less than 2500 ETB, age at marriage less than 18 years, STIs history, genital herpes history, and trichomonas vaginalis infections history were found to be significant predictors of cervical cancer prevalence. This discovery is comparable to one made in Egypt (El-Moselhy, Borg, & Atlam, 2016), Ethiopia (El-Moselhy), Turkey (Reis, Beji, & Kilic, 2011), North of Iran (Andarieh, Delavar, Moslemi, & Esmaeilzadeh, 2016), India (Thulaseedharan et al., 2012).

In our study, women with an unable to read and write educational status were 3.78 times more likely than women with a collegiate or higher educational status (OR= 3.78). (1.44, 9.87). This finding is comparable to that of earlier Ghanaian studies conducted at the Catholic Hospital in Battor (Dunyo, Effah, & Udofia, 2018), However, the findings contrast from those of a study conducted at a university teaching hospital in Lagos, Nigeria (Okunade, Nwogu, Oluwole, & Anorlu, 2017). The findings show that as one's educational position improves, so does one's awareness, knowledge, attitude, and abilities about cervical cancer, which in turn reduces the occurrence of cervical cancer.

In our study, women with a monthly income of less than 2500 ETB were 1.88 times more likely than women with a monthly income of more than 2500 ETB (OR= 1.88). (1.12, 3.13). This discovery is comparable to one made at Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia (Woldu et al., 2017) and in Harare, Zimbabwe (Tapera et al., 2019). The findings show that when wealth rises, so does awareness, knowledge, attitude, and abilities about cervical cancer preventive and control methods, resulting in a decrease in cervical cancer prevalence.

In our study, women who were under the age of 18 at the time of marriage were 1.70 times more likely than women who were over the age of 18 at the time of marriage (OR= 1.70). (1.03, 2.79). Another study conducted at Shirdi Sai Baba Cancer Hospital and Research Centre in Manipal, Udupi District, came to the same conclusion (Sharma & Pattanshetty, 2018), Finote Selam city administration, West Gojjam Zone, Amhara Region, North West Ethiopia (Kasa, Tesfaye, & Temesgen, 2018). The findings show that women who marry when they are older than 18 are more vulnerable to gynecological and obstetric problems, which increases the risk of cervical cancer and decreases the risk of cervical cancer directly. In our study, women with a history of STIs were 3.46 times more likely than women without a history of STIs (OR= 3.46). (2.10, 5.70). This finding is comparable to that of another study conducted at Chandigarh's Post Graduate Institute of Medical Education and Research (PGIMER) (Kashyap, Krishnan, Kaur, & Ghai, 2019), in Addis Ababa, Ethiopia (Teame et al., 2018). Because those with chlamydia, gonorrhea, syphilis, or herpes have a higher chance of acquiring cervical cancer, the findings show that women with a history of STIs are more exposed to cervical cancer. There was no screening. The Pap and HPV tests can discover abnormal cells in the cervix before they grow into cancer (Kashyap et al., 2019).

In our study, women with a history of genital herpes had an increased risk of 1.89 times that of women without a history of genital herpes (OR= 1.89). (1.14, 3.13). This finding is comparable to that of another study conducted at Chandigarh's Post Graduate Institute of Medical Education and Research (PGIMER) (Kashyap et al., 2019), Germany (Viikki, 2000). Because HPV causes almost all cervical cancer, the discovery demonstrates that women with genital herpes are at risk for cervical cancer. HPV is also responsible for malignancies of the vulva, vagina, penis, anus, and oropharynx (back of the throat, including the base of the tongue and tonsils). HPV is responsible for nearly all cervical cancers (Peng, Liu, Mann, Rohan, & Rawls, 1991).

In our research, women with a history of trichomonas vaginalis infections were 1.91 times more likely than women without a history of trichomonas vaginalis infections (OR=1.91) (1.16, 3.16). This finding is similar to another study conducted in Spain (Rodriguez-Cerdeira, Sanchez-Blanco, & Alba, 2012), in Kerala, India (Varghese et al., 1999). The discovery demonstrates that women with a history of trichomonas vaginalis infections are at risk for cervical cancer because people infected with the parasite are more susceptible to other sexually transmitted diseases, such as HIV, which causes AIDS, and HPV, which is linked to cervical and prostate cancer. Miscarriage, preterm delivery, poor birth weight, and infertility are other trichomoniasis consequences (Mukanangezi et al., 2018).

Conclusion

The prevalence of cervical cancer among women employees working in star rated hotels in Gondar was similar to that reported in another research. Women unable to read and write educational status, college and above educational status, a monthly income of less than 2500 ETB, an age at marriage of less than 18 years, a history of STIs, a history of genital herpes, and a history of trichomoniasis vaginalis infections were all linked to a higher risk of cervical cancer.

References

- Admasu, S., Vagreacha, Y., & Endalew, M. (2015). Effectiveness of existential group therapy for treatment of psychological problem of cervical cancer patients. *Innovare Journal of Social Sciences*, 2(1), 5-9.
- Andarieh, M. G., Delavar, M. A., Moslemi, D., & Esmaeilzadeh, S. (2016). Risk factors for endometrial cancer: results from a hospital-based case-control study. *Asian Pacific journal of cancer prevention: APJCP*, 17(10), 4791.
- Baker, K. S., DeFor, T. E., Burns, L. J., Ramsay, N. K., Neglia, J. P., & Robison, L. L. (2003). New malignancies after blood or marrow stem-cell transplantation in children and adults: incidence and risk factors. *Journal of Clinical Oncology*, 21(7), 1352-1358.
- Bendall, S. C., & Nolan, G. P. (2012). From single cells to deep phenotypes in cancer. *Nature biotechnology*, 30(7), 639-647.
- Berhane, Y., Mariam, D. H., & Kloos, H. (2006). *Epidemiology and ecology of health and disease in Ethiopia*: Shama books.
- Cordella, M., & Huang, H. (2016). *Rethinking second language learning: Using intergenerational community resources*: Multilingual Matters.
- DeSantis, C. E., Bray, F., Ferlay, J., Lortet-Tieulent, J., Anderson, B. O., & Jemal, A. (2015). International variation in female breast cancer incidence and mortality rates. *Cancer Epidemiology and Prevention Biomarkers*, 24(10), 1495-1506.
- Dunyo, P., Effah, K., & Udofia, E. A. (2018). Factors associated with late presentation of cervical cancer cases at a district hospital: a retrospective study. *BMC Public Health*, 18(1), 1-10.
- El-Moselhy, E. Cervical Cancer: Sociodemographic and Clinical Risk Factors Females Steps Study in Ethiopia.
- El-Moselhy, E., Borg, H., & Atlam, S. (2016). Cervical Cancer: sociodemographic and clinical risk factors among adult Egyptian females. *Adv Oncol Res Treat*, 1(1), 106.
- Ferlay, J., Parkin, D., & Steliarova-Foucher, E. (2010). Estimates of cancer incidence and mortality in Europe in 2008. *European Journal of Cancer*, 46(4), 765-781.
- Hanahan, D., & Weinberg, R. A. (2011). Hallmarks of cancer: the next generation. *cell*, 144(5), 646-674.
- Joshi, S., Bhadauria, R., Jadon, G., & Diwaker, A. (2012). Introduction to neoplasm: 'tumor classification' a review article. *International Journal of Advanced Research in Pharmaceutical & Bio Sciences*, 1(3), 227-264.
- Kasa, A. S., Tesfaye, T. D., & Temesgen, W. A. (2018). Knowledge, attitude and practice towards cervical cancer among women in Finote Selam city administration, West Gojjam Zone, Amhara Region, North West Ethiopia, 2017. *African health sciences*, 18(3), 623-636.
- Kashyap, N., Krishnan, N., Kaur, S., & Ghai, S. (2019). Risk factors of cervical cancer: a case-control study. *Asia-Pacific journal of oncology nursing*, 6(3), 308.

- Levine, A. J., & Momand, J. (1990). Tumor suppressor genes: the p53 and retinoblastoma sensitivity genes and gene products. *Biochimica et Biophysica Acta (BBA)-Reviews on Cancer*, 1032(1), 119-136.
- McSweeney, P. A., Niederwieser, D., Shizuru, J. A., Sandmaier, B. M., Molina, A. J., Maloney, D. G., . . . Nash, R. A. (2001). Hematopoietic cell transplantation in older patients with hematologic malignancies: replacing high-dose cytotoxic therapy with graft-versus-tumor effects. *Blood, The Journal of the American Society of Hematology*, 97(11), 3390-3400.
- Memiah, P., Mbutia, W., Kiiru, G., Agbor, S., Odhiambo, F., Ojoo, S., & Biadgilign, S. (2012). Prevalence and risk factors associated with precancerous cervical cancer lesions among HIV-infected women in resource-limited settings. *AIDS research and treatment*, 2012.
- Mukanyangezi, M., Sengpiel, V., Manzi, O., Tobin, G., Rulisa, S., Bienvenu, E., & Giglio, D. (2018). Screening for human papillomavirus, cervical cytological abnormalities and associated risk factors in HIV-positive and HIV-negative women in Rwanda. *HIV medicine*, 19(2), 152-166.
- Najafi, E., Khanjani, N., Ghotbi, M. R., & Masinaei Nejad, M. E. (2019). The association of gastrointestinal cancers (esophagus, stomach, and colon) with solar ultraviolet radiation in Iran—an ecological study. *Environmental monitoring and assessment*, 191(3), 1-8.
- Okunade, K. S., Nwogu, C. M., Oluwole, A. A., & Anorlu, R. I. (2017). Prevalence and risk factors for genital high-risk human papillomavirus infection among women attending the outpatient clinics of a university teaching hospital in Lagos, Nigeria. *Pan African Medical Journal*, 28(1).
- Organization, W. H., Regulation, W. S. G. o. T. P., & Initiative, W. T. F. (2008). *The scientific basis of tobacco product regulation: second report of a WHO study group* (Vol. 951): World Health Organization.
- Peng, H., Liu, S., Mann, V., Rohan, T., & Rawls, W. (1991). Human papillomavirus types 16 and 33, herpes simplex virus type 2 and other risk factors for cervical cancer in Sichuan Province, China. *International journal of cancer*, 47(5), 711-716.
- Prugger, C., Wellmann, J., Heidrich, J., De Bacquer, D., Perier, M.-C., Empana, J.-P., . . . Kotseva, K. (2014). Passive smoking and smoking cessation among patients with coronary heart disease across Europe: results from the EUROASPIRE III survey. *European heart journal*, 35(9), 590-598.
- Reis, N., Beji, N. K., & Kilic, D. (2011). Risk factors for cervical cancer: results from a hospital-based case-control study.
- Rodriguez-Cerdeira, C., Sanchez-Blanco, E., & Alba, A. (2012). Evaluation of association between vaginal infections and high-risk human papillomavirus types in female sex workers in Spain. *International Scholarly Research Notices*, 2012.
- Sharma, P., & Pattanshetty, S. M. (2018). A study on risk factors of cervical cancer among patients attending a tertiary care hospital: A case-control study. *Clinical Epidemiology and Global Health*, 6(2), 83-87.
- Shimbre, M., Girum, T., & Mesfin, D. (2019). The burden of malignant neoplasms (cancer) in Ethiopia, 2000–16: analysis of Evidences from Global Burden of Disease Study 2016 and Global health estimates 2016.
- Tapera, O., Dreyer, G., Kadzatsa, W., Nyakabau, A., Stray-Pedersen, B., & Hendricks, S. (2019). Cervical cancer knowledge, attitudes, beliefs and practices of women aged at least 25 years in Harare, Zimbabwe. *BMC women's health*, 19(1), 1-10.

- Teame, H., Addissie, A., Ayele, W., Hirpa, S., Gebremariam, A., Gebreheat, G., & Jemal, A. (2018). Factors associated with cervical precancerous lesions among women screened for cervical cancer in Addis Ababa, Ethiopia: A case control study. *PloS one*, *13*(1), e0191506.
- Thulaseedharan, J. V., Malila, N., Hakama, M., Esmay, P. O., Cheriyann, M., Swaminathan, R., . . . Sankaranarayanan, R. (2012). Socio demographic and reproductive risk factors for cervical cancer-a large prospective cohort study from rural India. *Asian Pacific Journal of Cancer Prevention*, *13*(6), 2991-2995.
- Varghese, C., Amma, N., Chitrathara, K., Dhakad, N., Rani, P., Malathy, L., & Nair, M. (1999). Risk factors for cervical dysplasia in Kerala, India. *Bulletin of the world Health organization*, *77*(3), 281.
- Viikki, M. (2000). Gynaecological infections as risk determinants of subsequent cervical neoplasia. *Acta Oncologica*, *39*(1), 71-75.
- Weinberg, R., & Hanahan, D. (2000). The hallmarks of cancer. *cell*, *100*(1), 57-70.
- Woldu, M., Legese, D., Abamecha, F., & Berha, A. (2017). The prevalence of cancer and its associated risk factors among patients visiting oncology unit, Tikur Anbessa Specialized Hospital, Addis Ababa-Ethiopia. *J Cancer Sci Ther*, *9*(04).
- Wright Jr, T. C., Massad, L. S., Dunton, C. J., Spitzer, M., Wilkinson, E. J., & Solomon, D. (2007). 2006 consensus guidelines for the management of women with abnormal cervical cancer screening tests. *American journal of obstetrics and gynecology*, *197*(4), 346-355.
- Yewhalaw, D., Legesse, W., Van Bortel, W., Gebre-Selassie, S., Kloos, H., Duchateau, L., & Speybroeck, N. (2009). Malaria and water resource development: the case of Gilgel-Gibe hydroelectric dam in Ethiopia. *Malaria journal*, *8*(1), 1-10.