

Cancer Epidemiology and Screening

Evaluating Knowledge Regarding Cervical Cancer and Its Screening among Woman in Rural India

Divya Khanna¹

¹Department of Preventive Oncology, Homi Bhabha Cancer Hospital, Varanasi, Uttar Pradesh, India

Address for correspondence Dr. Divya Khanna, MD, Department of Preventive Oncology, Homi Bhabha Cancer Hospital, Varanasi, Uttar Pradesh, India (e-mail: dkhannakgmc@gmail.com).

South Asian J Cancer 2020;9:141–146.

Abstract



Dr. Divya Khanna, MD

Context Cervical cancer is the most common cancer among rural women of India. However, awareness of cancer of the uterine cervix and its screening coverage among the general population of India remains insufficient.

Aims The study aims to assess awareness of cervical cancer and its screening among women attending a rural health care center in northern India and determine factors associated with satisfactory knowledge.

Settings and Design A cross-sectional observational study was done among women attending a rural secondary health care center from Uttar Pradesh, India.

Materials and Methods A total of 1088 women aged ≥ 30 years were interviewed using a pretested schedule. Data were collected for biosocial, reproductive, sexual, and personal habits of participants and their partners. Scoring for knowledge related to cervical cancer and its screening was done.

Statistical Analysis Used Descriptive statistics were calculated. Chi-square test was applied to detect the significant difference in distribution of bio-socio-demographic variables with knowledge score. Statistically significant variables were subjected to multinomial logistic regression. Unadjusted and adjusted odds ratios with 95% confidence interval were calculated as odds of having poor cervical cancer awareness. $p < 0.05$ was considered statistically significant.

Results Most participants knew about cervical cancer as a type of cancer in women. Very few knew about symptoms, risk factors, and screening of the disease. Illiteracy and multiple sexual contacts were significant predictors of awareness.

Conclusions The study demonstrates a lack of awareness in women regarding cervical cancer and its prevention, especially among those women who belonged to weaker sections of the society, because of illiteracy and poor socioeconomic status. Lack of awareness is a potential limiting step for a woman to seek cervical cancer screening. Multipronged strategies are needed to improve the level of cervical cancer awareness among women.

Keywords

- ▶ India
- ▶ knowledge
- ▶ rural health
- ▶ screening
- ▶ sexual partners
- ▶ uterine cervical neoplasms

How to cite this article: Khanna D. Evaluating Knowledge Regarding Cervical Cancer and Its Screening among Woman in Rural India. South Asian J Cancer 2020;9(3):141–146.

DOI <https://doi.org/10.1055/s-0041-1723072> ISSN 2278-330X.

© 2020. MedIntel Services Pvt Ltd.

This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

Introduction

Cervical cancer is the most prevalent cancer among women in developing countries and one of the most common causes of cancer-related death.^{1,2} Cancer of the uterine cervix is the second most common cancer in Indian women. The age-standardized incidence of invasive cervical cancer in India is 27/100,000 women and mortality is 15.2/100,000 women. Cancer cervix accounts for 10% of cancer-related mortality in India.^{3,4} As per GLOBOCAN (2018), an estimated 96,922 individuals developed cervical cancer and 60,0678 died of cervical cancer in India.⁵ India ranks highest in the age-standardized incidence of cervical cancer in South Asia at 22 (19.2 in Bangladesh and 13 in Sri Lanka).^{1,2,6}

Chronic persistent high-risk genotype human papillomavirus (HPV) infection is implicated with 99.7% of cervical cancer worldwide.⁷ Other risk factors contributing to cervical carcinogenesis are poor sexual habits, high parity, early age of sexual intercourse and pregnancy, sexually transmitted infections (STIs), poor genital hygiene, and smoking.⁸

Cervical cancer is a slow-growing malignant neoplasm, and symptoms appear when the disease has advanced. Cancer cervix has premalignant lesions, and it takes 10 to 20 years for these lesions to develop malignancy. Early detection of these premalignant lesions, through screening and their appropriate treatment, can significantly help in the reduction of cervical cancer incidence and associated mortality.⁹ Cervical cytology in the form of Pap smear test has shown a significant reduction in mortality in developed countries.¹⁰ Visual inspection after application of 3 to 5% acetic acid (visual inspection with acetic acid [VIA]) and Lugol's iodine (visual inspection with Lugol's iodine [VILI]) are alternative screening methods which are cost-effective in resource-poor settings.¹¹ There is evidence for reduction of cervical cancer-associated mortality with usage of VIA through population-based trial.^{12,13}

Utilization of screening in India is just 2.6 to 5%, mostly being opportunistic.¹⁴ Several factors have been implicated with poor utilization of cervical cancer screening. The Ministry of Health, Government of India, had launched a framework for noncommunicable disease screening in 2016 for oral, breast, and cervical cancers. These guidelines have designated subcenter as the first point of screening for cervical cancer.¹⁵

To a certain extent, it is the women's awareness level for health care that determines her health-seeking behavior. Women may demand screening if they are aware of its importance.¹² The current study aims to assess the awareness of cervical cancer and its prevention among women attending a community health center (CHC) in a rural setting in Uttar Pradesh and to determine the bio-socio-demographic characteristics that are associated with satisfactory awareness.

Materials and Methods

A descriptive cross-sectional study was performed among women attending CHC of Ghaziabad district from Uttar

Pradesh, India. All women aged ≥ 30 years who were never diagnosed or treated for cervical cancer and have never undergone cervical screening were enrolled between April and October 2017. The sample size was calculated based on the assumption that 50% of women will have an optimal knowledge score ($> 50\%$). Thus, the required sample size to estimate the proportion of women with optimum knowledge score with 95% confidence interval (CI) of 50% (95% CI: 45–55%) was 384. The final sample size with 10% nonresponse rate was 422. Purposive sampling was used to enroll all women who were attending the gynecology outpatient department at the health center and met eligibility criteria. A total of 1088 women were enrolled in the study period.

A semistructured pretested questionnaire was used which had four parts to gather information regarding the (1) bio-socio-demographic characteristics; (2) sexual practices and personal habits of the participant as well her husband; (3) knowledge about symptoms, risk factors, and prevention of cervical cancer; and (4) source of information for cancer (family, friends, health caregivers, and audio-visual and print media). The sociodemographic details included age, marital status, literacy level, place of residence (rural/urban), occupation of the participant and her husband, and parity. The questions related to sexual practices and personal habits included the number of sexual partners of both the participant and her husband, smoking and alcohol intake habits of both participant and her husband, usage of condom by husband during sexual intercourse, and if the participant was a known case of diabetes mellitus.

Questions related to cervical cancer were (1) if they knew that females can have cancer arising from cervix (yes/no); (2) symptoms of cervical cancer (1 point for at least two correct responses among symptoms such as bleeding per vaginal [p/v] in between periods, postmenopausal [p/v] bleeding, postcoital [p/v] bleeding, and excess foul-smelling vaginal discharge); (3) risk factors of cervical cancer (1 point for at least two correct responses among risk factors for cervical cancer such as multiple sexual partners, young age at the time of the first sexual intercourse, young age at the first childbirth, poor genital hygiene, multiple pregnancies, and STIs); (4) whether cervical cancer can be detected early by screening (1 point for responding yes); (5) name of any test available for screening (1 point for selecting any tests among Pap, VIA, and VILI); and (6) any vaccine is available for prevention of cervical cancer (1 point for responding yes). Each question had a score of 1 point for the correct answer, with a total score of 6. A score of ≤ 2 was considered poor knowledge and ≥ 3 was considered satisfactory knowledge.

Finally, participants were asked for the source of information for cervical cancer (multiple responses for family, friends/neighbors, health caregivers, and print or audio-visual media). Pretesting of the questionnaire was done on 10% of the total sample size, and the necessary modifications were made. For assessing socioeconomic status, modified Prasad's scale based on Consumer Price Index for 2017 was used.¹⁶ After interviewing participants, health education regarding cervical cancer was provided.

Statistical Analysis

Statistical analysis was performed using SPSS version 16. Descriptive statistics in the form of frequencies and percentages were calculated. Chi-square test was applied to find the significant difference in distribution of bio-socio-demographic variables with knowledge score. Statistically significant sociodemographic, reproductive, and personal history variables identified on Chi-square test were subjected to binary and multinomial logistic regression, and unadjusted and adjusted odds ratios with 95% CI were calculated as a risk of having poor score for cervical cancer awareness. $p < 0.05$ was considered statistically significant.

Ethical Consideration

The study was initiated after getting ethical clearance from the institutional review board. The objective, purpose, and method of the study were explained to all participants in their local language. Written consent was obtained from all participants.

Results

A total of 1088 eligible women who attended the CHC, Ghaziabad, during the study duration participated in the study.

Sociodemographic Characteristics

The mean age of women in the study population was 40.35 ± 3.7 years (range: 30–65 years). More than half were Hindu (585, 53.8%), and almost half of them were illiterate (520, 47.8%). Most of them were from rural residence (734, 67.5%). Majority were nonworking (1031, 94.8%) and their husbands were working as skilled/semiskilled/unskilled workers (966, 88.8%). All were married. Most belonged to Class III and IV socioeconomic status (705, 64.8%), based on the modified BG Prasad classification scale, 2017. Majority per-capita income was < 5000 INR (949, 87.2%). Majority had their first baby at an age < 22 years (718, 66%) and majority had three or more living children (681, 62.6%).

Cervical Cancer Awareness

► **Table 1** shows that most participants (672, 61.8%) knew about cervical cancer as a type of cancer in women. Just one-fourth (287, 26.4%) could enumerate two correct symptoms, and fewer (122, 11.2%) could tell two correct risk factors. The most common symptom stated was abnormal bleeding (160, 55.7%), followed by foul-smelling dirty discharge (102, 35.5%). The most common risk factor stated was multiple sexual contacts (88, 72.1%), followed by poor hygiene (68, 55.7%). Nearly one-fourth (255, 23.4%) knew that cervical cancer can be detected early by a screening test; however, very few (32, 2.9%) could name the test of screening method. Very few (41, 3.8%) knew of a vaccine that can help in the prevention of cervical cancer. Source of information on cervical cancer was family and friends (452, 41.5%), health workers and doctors (358, 32.9%), and media (278, 25.6%). Majority had poor knowledge score (851, 78.2%).

Predictors of Cervical Cancer Awareness

► **Tables 2** and **3** show that on binary logistic regression, place of residence, women's education status, working status, husband type of occupation, socioeconomic status, parity, number of sexual partners of women and her husband, and women being known case of diabetes mellitus were found

Table 1 Awareness of cervical cancer and its prevention in the study population ($n = 1088$)

Details	Yes (%)	No (%)
Knew cervical cancer as a type of cancer	672 (61.8)	416 (38.2)
Knew at least two symptoms	287 (26.4)	801 (73.6)
Knew at least two risk factors	122 (11.2)	966 (88.8)
Knew about cervical screening	255 (23.4)	833 (76.6)
Knew the name of the test(s) done for cervical screening	32 (2.9)	1056 (97.1)
Knew of vaccine for prevention of cervical cancer	41 (3.8)	1047 (96.2)

Table 2 Association of sociodemographic characteristics with awareness of cervical cancer ($n = 1088$)

Predictor	Category	Poor score (%)	Total (%)	UOR (95% CI)	AOR (95% CI)
Place of residence	Rural	588 (80.1)	734 (67.5)	1.4 (1.0–1.9) ^c	1.3 (0.9–1.8)
	Urban	263 (74.3)	354 (32.5)	Reference	Reference
Religion	Muslim	429 (73.3)	585 (53.8)	1.9 (1.4–2.6)	1.3 (0.9–1.8)
	Hindu	423 (83.9)	503 (46.2)	Reference	Reference
Education status of women	Illiterate	440 (84.6)	520 (47.8)	2.1 (1.6–2.8) ^c	1.6 (1.1–2.2) ^c
	Literate	411 (72.4)	568 (52.2)	Reference	Reference
Working status of women	Homemaker	835 (80.1)	1031 (94.8)	10.9 (6.6–19.9) ^c	9.6 (5.0–18.6) ^c
	Working	16 (28.4)	57 (5.2)	Reference	Reference
Husbands' job	Others ^a	777 (80.4)	966 (88.8)	2.7 (0.8–3.9) ^c	1.8 (1.1–2.9) ^c
	Professional	74 (60.7)	122 (11.2)	Reference	Reference
Socioeconomic status ^b	Class III–V	613 (87)	705 (64.8)	4.1 (3.0–5.5) ^c	3.8 (2.2–4.4) ^c
	Class I–II	238 (62.1)	383 (35.2)	Reference	Reference

Abbreviations: AOR, adjusted OR; CI, confidence interval; OR, odds ratio; UOR, unadjusted OR.

^aSkilled/semi-/unskilled workers/unemployed/retired, ^bmodified B.G. Prasad Scale, 2017 Revision, ^c p value significant < 0.05 .

Table 3 Association of reproductive and personal history of participants and their partners with awareness of cervical cancer (n = 1088)

Predictor	Category	Poor score (%)	Total (%)	UOR (95% CI)	AOR (95% CI)
Parity	> 2	554 (81.4)	681 (62.6)	1.6 (1.2–2.2) ^a	1.0 (0.7–1.5)
	0–2	297 (73)	407 (37.4)	Reference	Reference
Number of current sexual partners of participant	> 1	3 (21.4)	14 (1.3)	0.1 (0.02–0.3) ^a	0.1 (0.02–0.4) ^a
	1	848 (79)	1074 (98.7)	Reference	Reference
Number of current sexual partners of husband	> 1	12 (38.7)	31 (2.8)	0.2 (0.1–0.3) ^a	0.2 (0.1–0.5) ^a
	1	839 (79.4)	1057 (97.1)	Reference	Reference
Participant is smoking	Yes	40 (83.7)	48 (4.4)	1.4 (0.7–3.1)	1.6 (0.6–3.9)
	No	811 (78)	1040 (95.6)	Reference	Reference
Husband is smoking	Yes	545 (79.6)	685 (62.9)	0.8 (0.6–1.1)	1.1 (0.7–1.6)
	No	306 (75.9)	403 (37.0)	Reference	Reference
Husband takes alcohol	Yes	329 (77.8)	423 (38.9)	0.9 (0.7–1.3)	1.0 (0.7–1.5)
	No	522 (78.5)	665 (61.1)	Reference	Reference
Husband uses condom	Yes	416 (78.3)	531 (48.8)	1.0 (0.8–1.4)	0.9 (0.6–1.2)
	No	435 (78.1)	557 (51.2)	Reference	Reference
Participant known case of diabetes mellitus	Yes	32 (43.8)	73 (6.7)	0.2 (0.1–0.3) ^a	0.2 (0.1–0.3) ^a
	No	819 (80.7)	1015 (93.3)	Reference	Reference

Abbreviations: AOR, adjusted OR; CI, confidence interval; OR, odds ratio; UOR, unadjusted OR.

^ap value significant < 0.05.

statistically significantly related with poor score. History of smoking by both women and her husband, intake of alcohol, and usage of condom by husband were not found significantly related.

On multinomial logistic regression, risk of having poor knowledge score was significantly associated with women being illiterate, nonworking/homemaker, and poor socio-economic status. Women having multiple sexual partners or whose husband had multiple sexual partners were less likely to have poor score for cervical cancer awareness. Women who were diabetic were less likely to have poor score.

Discussion

Our study from the northern state of India revealed that majority of the study population had poor knowledge related to cervical cancer and its prevention. Population-based and health facility-based studies from Kerala,¹⁴ Tamil Nadu,¹⁷ and Andhra Pradesh¹⁸ (southern states of India) revealed better knowledge for cervical cancer among rural women. Our study found that although most women (61.8%) knew about cervical cancer as a type of cancer in women, just one-fourth (26.4%) could enumerate two correct symptoms of the disease, and less than one-fourth (23.4%) knew that cervical cancer can be detected early by a screening test. Very few knew about risk factors and HPV vaccination. In contrast, a study from Andhra Pradesh found that nearly two-third knew symptoms, risk factors, and screening methods of cervical cancer.¹⁸ A hospital-based study done in Lucknow, Uttar Pradesh,¹⁶ was also in line with our findings concerning cervical cancer awareness. These findings may suggest the role of demographic variations in awareness of cervical cancer.

We observed that the major source of awareness for cervical cancer was friends and family, followed by health caregivers, and finally media. Other studies from India observed media^{14,18} and health caregivers¹⁷ as the major source of information. The reason why media was not found as a major source of information in our study can be explained by the formative study done by Ganju et al who observed that the reach of mass media in the rural population of Uttar Pradesh is only approximately 20%. They found that irrespective of gender, the reach of mass media is low among nonliterate groups (around 20%). They also observed that women with no education, belonging to scheduled castes/tribes, from households with a poor standard of living, and residing in small villages (≤ 1000 population) had the least exposure to any mass media (9%) as compared with those with secondary or higher education, belonging to general castes, from households with a high standard of living, and residing in large villages (≥ 3000 population) (87%).¹⁹ This explains the reason why rural illiterate women with poor socioeconomic status, which constituted the majority of our study population, did not report mass media as an important source of information.

In our study, sociodemographic variables of participants such as illiteracy, being a homemaker, poor socioeconomic status, and occupation of the husband as semi-unskilled workers/farmers increased the odds of having poor score for knowledge. Our findings are in line with studies from other states of India.^{16,20,21}

We observed that on unadjusted logistic regression, higher parity (≥ 3) was statistically significantly associated with poor knowledge for cervical cancer. However, after adjustment, the finding was no longer significant. The study from Andhra Pradesh also supports our finding.¹⁸

High parity is itself a risk factor for development of cervical cancer.^{22,23} There is a possibility that these women with high parity may have received awareness of cervical cancer by health caregivers during their ante-/postnatal visits. This emphasizes the role of health caregivers in imparting awareness to all the ante- and postnatal women for cervical cancer, especially for risk factor prevention and early screening.

We observed that participants with a history of multiple sexual contacts or participants who reported their husband having multiple sexual contacts were less likely to have poor knowledge of cervical cancer. Multiple sexual partners of both women and their husband are likely to expose women with HPV and other STIs such as HIV and chlamydia trachomatis, which have been linked with cervical oncogenesis.^{24,25} Such persons who are exposed to multiple sexual contacts are also more likely to attend hospital for STI-related complaints. Therefore, they are likely to have received health education for cervical cancer by caregivers. A study conducted by in Japan observed that the number of sex partners (>5) during a women's lifetime and STI was positively associated with their behavior toward lifetime cervical cancer screening. They discussed that the reason being women who have more sex partners are more likely to visit obstetrics and gynecology clinics to access oral contraceptive pills or STI testing and are likely to be advised for cervical cancer screening.²⁶ These findings suggest that women who themselves, or their partners, indulge in multiple sexual contacts are also likely to be aware of the risk involved in the development of cervical cancer.

We found that preexisting diabetes mellitus also increased the chance of having better knowledge score for cervical cancer. Obesity and diabetes mellitus are known to be an independent risk factor for mortality associated with cervical cancer. Furthermore, they have a familial tendency. Diabetes mellitus, through hormonal actions, may play a role in the pathogenesis of cervical adenocarcinoma.^{27,28} These findings suggest that women who are obese or have diabetes mellitus may have received information about experiences of cervical cancer from their relatives and thus may be more likely to be aware than the general population. A population-based survey done in the US on 11,435 women aged between 18 and 75 years found that overweight and obese women were less likely to be screened for cervical and breast cancers with Pap smears and mammography, even after adjustment for other known barriers to care.²⁹ Thus, there is a doubt whether the awareness on cervical cancer in these women may reflect into early screening. Negative body image, fear of being judged or scolded, and technical difficulties in screening may impede early screening.²⁷

Conclusions

Our study revealed poor knowledge of cervical cancer among women who were attending the secondary health care center from a rural northern state of India. Women's education status, working status, husband occupation, socioeconomic status, number of sexual partners of women and her husband,

and women being known case of diabetes mellitus were found statistically significantly related with a poor score for cervical cancer awareness.

We observed that mass media, which is effective in imparting correct health-related information, was seen as the least important source of information. The quality of information received by population remains doubtful when their main source of information is family and friends. Lack of accurate knowledge on cervical cancer is one of the limiting steps in determining whether a woman will undergo early screening. It is the need of the hour to develop multipronged strategies for imparting health education for cervical cancer and its screening, especially for socially disadvantaged women, which will potentially contribute to improving cervical cancer screening coverage.

Financial Support and Sponsorship

Nil.

Conflicts of Interest

None declared.

References

- 1 Denny L. Cervical cancer: prevention and treatment. *Discov Med* 2012;14(75):125–131
- 2 World Health Organization: Cervical Cancer Screening in Developing Countries. Report of a WHO Consultation. Geneva, WHO Press, 2002
- 3 Gupta S, Kerkar RA, Dikshit R, Badwe RA. Is human papillomavirus vaccination likely to be a useful strategy in India? *South Asian J Cancer* 2013;2(4):193–197
- 4 Sharma A, Kulkarni V, Bhaskaran U, et al. Profile of cervical cancer patients attending Tertiary Care Hospitals of Mangalore, Karnataka: a 4 year retrospective study. *J Nat Sci Biol Med* 2017;8(1):125–129
- 5 GLOBOCAN. India Fact Sheet; 2018. Available from: <http://cancerindia.org.in/globocan-2018-india-factsheet/>. [Last accessed on 2018 Dec 12].
- 6 ICO Information Centre on HPV and Cancer. Human Papillomavirus and Related Diseases in India (Summary Report 2014–08–22). ICO Information Centre on HPV and Cancer; 2014 Barcelona, ICO
- 7 Aref Adib M, Freeman Wang T. Cervical cancer prevention and screening: The role of human papilloma virus testing. *Obstet Gynaecol* 2016;1(18):251–263
- 8 Mishra GA, Pimple SA, Shastri SS. Prevention of cervix cancer in India. *Oncology* 2016;91(Suppl 1):1–7
- 9 Burd EM. Human papillomavirus and cervical cancer. *Clin Microbiol Rev* 2003;16(1):1–17
- 10 Landy R, Pesola F, Castañón A, Sasieni P. Impact of cervical screening on cervical cancer mortality: estimation using stage-specific results from a nested case-control study. *Br J Cancer* 2016;115(9):1140–1146
- 11 Sankaranarayanan R, Nene BM, Dinshaw K, et al. Early detection of cervical cancer with visual inspection methods: a summary of completed and on-going studies in India. *Salud Publica Mex* 2003;45(Suppl 3):S399–S407
- 12 Shastri SS, Mittra I, Mishra GA, et al. Effect of VIA screening by primary health workers: randomized controlled study in Mumbai, India. *J Natl Cancer Inst* 2014;106(3):dju009
- 13 Sankaranarayanan R, Esmy PO, Rajkumar R, et al. Effect of visual screening on cervical cancer incidence and mortality in Tamil Nadu, India: a cluster-randomised trial. *Lancet* 2007;370(9585):398–406

- 14 Aswathy S, Quereshi MA, Kurian B, Leelamoni K. Cervical cancer screening: Current knowledge & practice among women in a rural population of Kerala, India. *Indian J Med Res* 2012;136(2):205–210
- 15 Bagcchi S. India Launches Plan for National Cancer Screening Programme; 2016. Available at: <https://www.bmj.com/content/355/bmj.i5574>. Accessed December 12, 2018
- 16 Nigar A. Awareness of cervical cancer risk factors and screening methods among women attending a tertiary hospital in Lucknow, India. *Int J Reprod Contracept Obstet Gynecol* 2017;6:5592–5595
- 17 Dhivya B, Balakrishnan PR. Cervical cancer screening: Knowledge, attitude and practices in a primary health centre in rural India. *J Evid Based Med Health Care* 2015;2:4530–4539
- 18 Narayana G, Suchitra MJ, Sunanda G, Ramaiah JD, Kumar BP, Veerabhadrapa KV. Knowledge, attitude, and practice toward cervical cancer among women attending Obstetrics and Gynecology Department: A cross-sectional, hospital-based survey in South India. *Indian J Cancer* 2017;54(2):481–487
- 19 Ganju D, Bhatnagar I, Hazra A, Jain S, Khan M. Reach of media and interpersonal communication in rural Uttar Pradesh. *J Fam Welf* 2010;56:83–91
- 20 Bansal AB, Pakhare AP, Kapoor N, Mehrotra R, Kokane AM. Knowledge, attitude, and practices related to cervical cancer among adult women: A hospital-based cross-sectional study. *J Nat Sci Biol Med* 2015;6(2):324–328
- 21 Siddharthar J, Rajkumar B, Deivasigamani K. Knowledge, awareness and prevention of cervical cancer among women attending a tertiary care hospital in Puducherry, India. *J Clin Diagn Res* 2014;8(6):OC01–OC03
- 22 Jemal A, Center MM, DeSantis C, Ward EM. Global patterns of cancer incidence and mortality rates and trends. *Cancer Epidemiol Biomarkers Prev* 2010;19(8):1893–1907
- 23 Brinton LA, Hamman RF, Huggins GR, et al. Sexual and reproductive risk factors for invasive squamous cell cervical cancer. *J Natl Cancer Inst* 1987;79(1):23–30
- 24 Buckley JD, Harris RW, Doll R, Vessey MP, Williams PT. Case-control study of the husbands of women with dysplasia or carcinoma of the cervix uteri. *Lancet* 1981;2(8254):1010–1015
- 25 Harris RW, Brinton LA, Cowdell RH, et al. Characteristics of women with dysplasia or carcinoma in situ of the cervix uteri. *Br J Cancer* 1980;42(3):359–369
- 26 Kaneko N. Factors associated with cervical cancer screening among young unmarried Japanese women: results from an internet-based survey. *BMC Womens Health* 2018;18(1):132
- 27 Maruthur NM, Bolen SD, Brancati FL, Clark JM. The association of obesity and cervical cancer screening: a systematic review and meta-analysis. *Obesity (Silver Spring)* 2009;17(2):375–381
- 28 Parazzini F, La Vecchia C. Epidemiology of adenocarcinoma of the cervix. *Gynecol Oncol* 1990;39(1):40–46
- 29 Wee CC, McCarthy EP, Davis RB, Phillips RS. Screening for cervical and breast cancer: is obesity an unrecognized barrier to preventive care? *Ann Intern Med* 2000;132(9):697–704