Original article

Awareness about cervical cancer among women residing in urban slums of Mysuru city of Karnataka, India: A cross-sectional study

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ABSTRACT

Introduction: Globally, cervical cancer is the 4th most common cancer and is one of the leading cancers causing death in India. Cervical cancer is one of those cancers which can be easily prevented by screening women who are aged above 30 years and by vaccinating young girls against HPV. Lack of awareness about cervical cancer makes early detection and timely screening difficult. Awareness about cervical cancer among people will help us to decide on an appropriate model of behavior change communication to control the disease.
Objectives:

1. To assess the awareness about cervical cancer among women residing in urban slums.
2. To find the association between awareness and socio-demographic profiles of women.
3. To assess the awareness about HPV vaccination and screening.

Methodology: The cross-sectional study was carried out from October to November of 2018 in the urban slums of Mysuru city. Arbitrarily 5 registered slum areas were selected. 211 consenting participants were enrolled in the study. The Cervical Cancer Awareness Measure (CAM) was used as the survey tool for interviewing women.
Results: Among 211 women, 26.1% were aware of cervical cancer. Among those who were aware, 9.1% had good knowledge, 27.30% had average knowledge about cervical cancer and 63.60% had poor knowledge about cervical cancer. Chi-square test showed an association between age category, education level and awareness to be statistically significant at a p-value of < 0.05. 3.8% were aware of HPV vaccination

1. Introduction

Cervical cancer had an estimate of 570,000 cases and 311,000 deaths in 2018 worldwide. It ranks second in incidence and mortality in lower HDI settings. Globally, cervical cancer is the 4th most common cancer and is one of the leading cancers causing death in India. Every 2 min a woman is diagnosed with cervical cancer globally.[1,2] About 132,000 cases of cervical cancer occur in India every year, and more than 77,000 Indian women die from the disease annually.[3] According to Population-Based Cancer Registry 3 year report 2012–2014, Bengaluru, Karnataka, 15.3 is the age-adjusted incidence rate per 100,000 population.[4]

The most common cause of cervical cancer is Human Papillomavirus (HPV) infection, which is the most common sexually transmitted infection worldwide with women having multiple sex partners or who have sex with men who had many other partners.[5] Though there are 140 types of HPV virus, it is found that only 40 of them are sexually transmitted, and among them only two high risks HPV types 16 and18 are reported to be responsible for more than 80% of cervical cancer in

India.[5,6] There are co-factors that show high risk with HPV infection like the history of any other sexually transmitted infections, smoking, oral contraceptive pills usage for a longer duration, multiple sexual partners, early age of marriage, multiple pregnancies, and poor genital hygiene.[5–7] The first infection of Human Papilloma Virus often occurs soon after first sexual intercourse, so early age at sexual intercourse is a sensible substitution for the early age of exposure to HPV this is because the adolescent cervix is vulnerable to HPV infection.[7,8] Early age at marriage also results in multiple pregnancies, which can cause injury to cervical tissue leaving it vulnerable for infections.[8]

To understand why smoking is causing cervical cancer, 2 molecular mechanisms have been suggested: one involves direct exposure of DNA in cervical epithelial cells to nicotine and the second involves exposure to metabolic products because of other components of cigarettes.[10] Cervical mucus of smokers contains measurable amounts of cigarette constituents and their metabolite, which causes upregulation of the HPV genome, increases the probability of viral DNA integration into the host genome.[9] Smoking can cause indirect effects too; it reduces the immunity of an individual hence making them vulnerable for

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infections.[9] Coming to usage of oral contraceptive pills for a longer duration, studies have shown that the naturally occurring hormones estrogen and progesterone may stimulate the development and growth of some cancers since oral contraceptive pills have synthetic versions of these hormones, they could potentially increase the risk of cancer.[10] In addition, Oral contraceptive pills change the susceptibility of cervical cells to persistent infection with high-risk HPV types. And it's also proven that if oral contraceptive pills are not taken for longer duration and if discontinued after taking for about 2–3 years, it reverses the risk.[10] Hence, knowing these co-factors and preventing it can reduce the risk of HPV infection and altogether cervical cancer.

Cervical cancer is one of those cancers which can be easily prevented by providing by screening women who are aged above 30 years and by vaccinating young girls against HPV. Since there is a lack of awareness about cervical cancer among people and health care workers and also because of the limited access to health care facilities, early detection and timely screening have become very difficult.[11] Awareness is important because when we have a better understanding of the condition; individuals will be able to experience and are thus empowered to identify areas, to make the required improvements.[12,13,14] Awareness about cervical cancer among people will help us to decide on an appropriate model of behavior change communication to control the disease.

2. Objectives

1. To assess the awareness about cervical cancer among women residing in urban slums.
2. To find the association between socio-demographic variables and awareness.
3. To assess the awareness about HPV vaccination and screening.

3. Materials and methods

The cross-sectional study was carried out from October to November of 2018 in the urban slums of Mysuru city. A sample size of 232 was calculated based on a 15% prevalence of awareness in the study conducted by Montgomery MP et al.,[14] with a 5% precision rate and also taking to account of 10% non-response rate. Registered slum areas like B.M.Shrinagar, Bannimantap, Kumbarkoppulu, Medaar Block and Metgalli were selected arbitrarily. A total of 21,472 female population aged between 18 and 60 years were enumerated by taking the help of officials working in concerned primary health centers. Using population proportion method, 30 females from B.M. Shrinagar, 62 females from Bannimantap, 27 from Kumbarkoppulu, 54 from Medaar Block and 38 from Metgalli were taken for the study. A total number of houses were listed from that particular slum; sampling interval was calculated by dividing the total number of houses by sample size, which came to 5. The first house of that particular slum was identified by the observers and then every 5th house was taken till the attainment of the sample size of that slum. Only 1 woman was interviewed per house, if the house was found to be locked or if the study participants didn't satisfy the eligibility criteria then the next house was taken. 21 women did not give consent for the study; hence they were excluded from the study. So, the total study population came up to 211 (Fig. 1).

Eligibility criteria were women aged between 18 and 60 years irrespective of their marital status. The study was approved by the Institutional Ethics Committee, JSS Academy of Higher Education and Research, Mysuru, Karnataka, India. An informed, written consent was obtained from each participant and was interviewed personally. The survey instrument, the Cervical Cancer Awareness Measure (CAM) was developed by the UCL Health Behaviour Research Centre, in collaboration with the Department of Health Cancer Team and The Eve Appeal, with funding from The Eve Appeal. It forms part of the Cervical Cancer Awareness and Symptoms Initiative (CCASI). It is based on a generic CAM developed by Cancer Research UK, University College

London, King's College London and Oxford University in 2007-08.[15] This instrument was modified to the study area; it was translated to Kannada and was validated before interviewing the study population. The questionnaire collected information on socio-demographic variables, and it had sub-questions on signs and symptoms of cervical cancer, risk factors for cervical cancer, Pap smear, and HPV Vaccination. Questions were scored, participants who answered positively for less than 3 questions were graded as poor knowledge, and 4–7 questions answered positively were graded as average knowledge and who answered more than 7 questions were graded as good knowledge.

3.1. Statistical analysis

Data were entered in Microsoft Excel and were analyzed using SPSS v.23. Descriptive statistics like mean, standard deviation and frequencies were applied for socio-demographic variables. Inferential statistics like chi-square was applied to find out the association between socio-demographic variables and awareness about cervical cancer.

4. Results

Among the 232 sample size, 21 women did not give consent, so the total study population amounts to 211. The average age of the women who participated in the study was 35.84 ± 11.28 years. Among the interviewed, 83 (39.3%) belong to < 30 years age category, 150 of the participants belonged to the Hindu religion (71.1%), 34 (16.1%) of the participants were illiterate, 71 (33.6%) had finished their high schooling. Among the study participants, 146 of them belong to upper lower socioeconomic status (69.2%), and 198 (93.8%) of them were married (Table 1). Since the study was done by the house-to-house interview in the afternoons, couldn't reach the working women. So, most of the participants were homemakers and some were studying.

Among 211 questioned only 26.1% were aware (n = 55) about cervical cancer (Fig. 2). Among those who were aware (n = 55), 5 (9.1%) had good knowledge, 15 (27.3%) had average knowledge about cervical cancer and 35 (63.60%) had poor knowledge about cervical cancer.

Among aware study participants (n = 55), 15 (27.3%) were able to list out the risk factors. The risk factors listed by the subjects who were aware are multiple partners (n = 6), vaginal infections (n = 6), smoking (n = 2) and poor hygiene (n = 1). Among who were aware, 6 (10.9%) thought multiple partners was a risk factor, other 6 (10.9%) subjects thought infections as a risk factor, whereas only 2 (3.6%) subjects and 1 (1.8%) subject thought smoking and poor hygiene as a risk factor respectively (Fig. 3).

Though the knowledge about risk factors was low, 30 (54.5%) were aware of few symptoms like increased bleeding during the periods and in between the periods, foul-smelling white discharge per vagina and post-menopausal bleeding. Association between socio-demographic variables and awareness about cervical cancer was assessed using a chi-square test (Table 2).

Among 211 subjects, 68 women (82%) who were < 30 years, were unaware of cervical cancer. The majority of the women that are 30 (37%) of them were aware belonged to 31–45 years age category. This was found to be statistically significant at a p-value of < 0.05. 45 (30%) of the women belonging to the Hindu religion were aware of cervical cancer and 49 (83.1%) of them from the Muslim religion were unaware of cervical cancer. Religion and awareness had no statistical significance. 31 (91%) of illiterate women were unaware of cervical cancer. 9 (69%) of the graduate and 2 (100%) of the women who had done their post-graduation were aware of cervical cancer. This was found to be statistically significant at a p-value of < 0.05. 100% of the women belonging to the lower class, according to modified Kuppuswamy's classification were unaware of cervical cancer. The socio-economic status and awareness about the disease had no statistical significance. 3 (100%) of the single women were unaware of
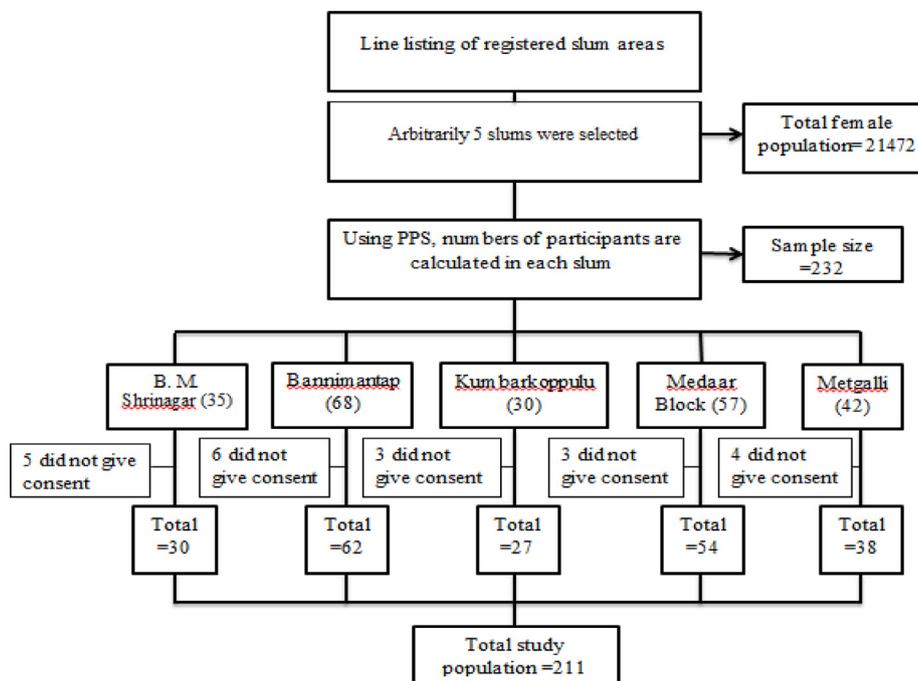
Fig. 1. Sample size estimation

Table 1
Demographic characteristics of the study population.

Demographic Characteristics		Number	Percentage
Age Category	< 30 years	83	39.3
	31–45 years	82	38.9
	46–60 years	46	21.8
Religion	Hindu	150	71.1
	Muslim	59	28
	Christian	02	0.9
Education	Illiterate	34	16.1
	Primary School	59	28
	High School	71	33.6
	Pre-University	32	15.2
	Graduate	13	6.2
	Post- graduate	02	0.9
Socio-economic status	Upper middle	05	2.4
	Lower middle	50	23.7
	Upper lower	146	69.2
	Lower	10	4.7
Marital Status	Single	03	1.4
	Never Married	02	0.9
	Married	198	93.8
	Widowed	08	3.9

Fig. 2. Awareness about Cervical cancer.

cervical cancer, though 4 (50%) of the widowed were aware of cervical cancer. The marital status of women and awareness had no statistical significance.

Among those who were aware (n = 55), 24 (43.6%) were not at all confident about noticing a cervical cancer symptom and 22 (40%) were fairly confident about it. Only 7 (12.7%) had got their Pap test done as a part of regular screening among the women who were aware. Among 211 subjects, only 8 (3.8%) were aware of HPV Vaccination and 34 (16.1%) about the screening of cervical cancer.

5. Discussion

Cervical cancer is one of the greatest threats to women's health. Nine out of 10 women who die from cervical cancer are in the least developed and developing countries.[2] This means some of the most vulnerable women in our world are dying unnecessarily. Though WHO is concentrating on eliminating cervical cancer globally, our study showed that the awareness about cervical cancer is present only in 1/4th of the study population. Among women who were aware of cervical cancer, 43.6% were not at all confident that they would notice cervical cancer symptoms. While 16.3% were aware of the screening of cervical cancer, only 12.7% had got their pap test done. Still fewer numbers of women amounting to 3.8% were aware of HPV Vaccination.

Previous studies in Karnataka shows that very fewer people had heard about cervical cancer, and who had heard, had very less knowledge about cervical cancer and also very fewer people were aware of a pap smear. Those studies also mentioned that smoking and poor hygiene have the most listed risk factors for cervical cancer, while in our study only 2 of them felt that smoking was a risk factor and only 1 of them considered poor hygiene as a risk factor. When pap test rates were compared with previous studies, our study showed a slightly higher rate of people getting their pap test done regularly.[16,17]

Among the studies carried out in India, about awareness of cervical cancer in women, a study done by Balaiah Donta et al.,[18] in the Mumbai slum area showed that awareness among the wives was slightly higher when compared to our study and very fewer people were aware of the Pap smear test. The study additionally included the husbands as study subjects, who play a major role in decision making for the health promotional activities in the family. They showed that when compared to
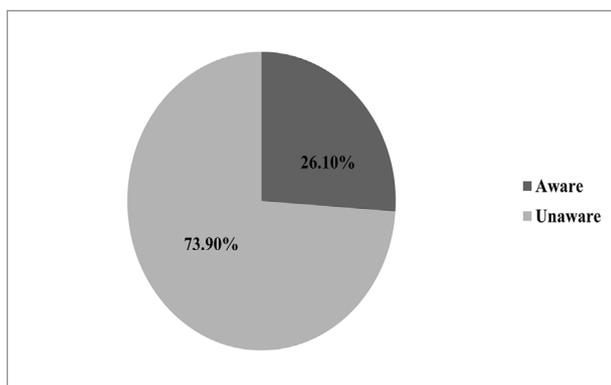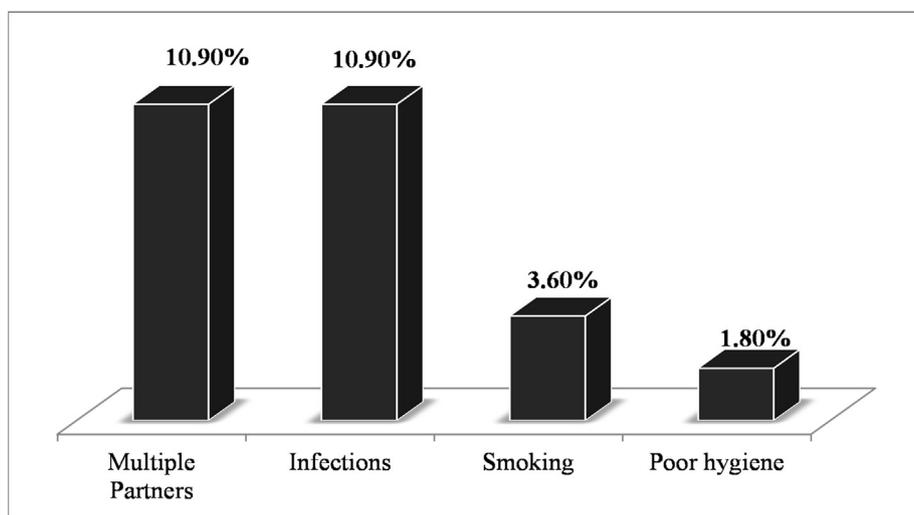
Fig. 3. Risk factors listed by subjects who were aware of cervical cancer.

Table 2
Participant's awareness about cervical cancer with respect to socio-demographic characteristics.

Categories	Aware of cervical cancer		Chi-square value	p-value
	Yes	No		
Age category				
< 30 years	15 (18%)	68 (82%)	**7.907**	**0.019***
31–45 years	**30 (37%)**	52 (63%)		
46–60 years	10 (22%)	36 (78%)		
Religion				
Hindu	**45 (30%)**	105 (70%)	**4.069**	**0.129#**
Muslim	10 (16.9%)	49 (83.1%)		
Christian	00 (0%)	02 (100%)		
Education				
Illiterate	3 (9%)	**31 (91%)**	**26.931**	**< 0.05***
Primary School	10 (17%)	49 (83%)		
High School	21 (30%)	50 (70%)		
Pre- University	10 (31%)	22 (69%)		
Graduate	**9 (69%)**	4 (31%)		
Post-graduate	**2 (100%)**	0 (0%)		
Socio-economic status				
Upper middle	1 (20%)	4 (80%)	**3.951**	**0.258#**
Lower middle	14 (28%)	36 (72%)		
Upper lower	40 (27%)	106 (73%)		
Lower	0 (0%)	10 (100%)		
Marital status				
Single	0 (0%)	3 (100%)	**3.252**	**0.338#**
Never married	0 (0%)	2 (100%)		
Married	51 (26%)	147 (74%)		
Widowed	4 (50%)	4 (50%)		

*p-value is found to be significant.
#Fisher exact value was taken.

wives, husbands had less awareness regarding cervical cancer and Pap test.[18]

High prevalence of a disease in an area actually influences the awareness of that disease, for example, a study done in Nigeria showed that more women were aware of cervical cancer when compared to our study. But this increase in knowledge about cervical cancer can amount to a higher prevalence of cervical cancer in African Countries.[19]

The next step in the study should be whether people who are aware will try to be cautious about the disease or not. There are studies that have analyzed the beliefs about people regarding cervical cancer and the Pap test. Many study participants of the study believed that the purpose of the Pap smear is to detect the existing cervical cancer and also many of them did not understand the need for early detection of the disease.[20]

To increase the attendance rate of women for pap test studies have shown that strategies like a scheduled appointment, reminder letter, telephone reminder, and SMS reminder will help in achieving the same. And also an opportunistic screening of Pap smear of all the women coming to Obstetrics and gynecology clinic will also help in early diagnosis of cervical cancer.[21,22]

The limitation of our study is that we couldn't assess the factors and beliefs which were hindering them to get a pap smear done. A future approach that would justify the study would be qualitative research to understand the beliefs of women regarding cervical cancer, screening, and vaccination. The strength of our study was that it was done by the house to house survey method, it was conducted by interview method and the cervical CAM study tool used was validated.

In conclusion, only 26.1% of the study populations were aware of cervical cancer and among them, 27.3% were able to list out risk factors and 54.5% were aware of the symptoms of cervical cancer. As a part of regular screening, just 7 women (12.7%) had got their Pap test done. Only 8 women (3.8%) were aware of HPV Vaccination and 34 (16.1%) of them were about the screening of cervical cancer. Health education to be given on cervical cancer, its symptoms, risk factors and prevention methods like screening and vaccination.

Funding

Declaration of competing interest

None.

References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries, CA A Cancer J Clin. . [Internet]. [cited 2019 Feb 12];0(0). Available from:. https://onlinelibrary.wiley.com/doi/abs/10.3322/caac.21492.
2. Cervical-cancer. . [Internet]. [cited 2019 Feb 12]. Available from:. https://www.who.int/cancer/cervical-cancer.
3. 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.
4. Three year report of PBCR 2012-2014. . [Internet]. [cited 2020 Jan 27]. Available from:. http://www.ncdirindia.org/All_Reports/PBCR_REPORT_2012_2014/ALL_CONTENT/Printed_Version.htm.
5. Rashid S, Labani S, Das BC. Knowledge, awareness, and attitude on HPV, HPV vaccine and cervical cancer among the College students in India. [Internet]. PloS One. 2016 Nov 18. [cited 2019 Feb 12];11(11). Available from:. https://www.ncbi.nlm.

nih.gov/pmc/articles/PMC5115771/.

6. Chichareon S, Herrero R, Muñoz N, et al. Risk factors for cervical cancer in Thailand: a case-control study. *J Natl Cancer Inst.* 1998 Jan 7;90(1):50–57.

7. Plummer M, Peto J, Franceschi S. Time since first sexual intercourse and the risk of cervical cancer. *Int J Canc.* 2012 Jun 1;130(11):2638–2644.

8. Rotkin ID. Epidemiology of cancer of the cervix. 3. Sexual characteristics of a cervical cancer population. *Am J Public Health Nation's Health.* 1967 May;57(5):815–829.

9. Fonseca-Moutinho JA. Smoking and Cervical Cancer. [Internet]. *ISRN Obstet Gynecol.* 2011. [cited 2019 Jul 1];2011. Available from:. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3140050/.

10. [Internet] *Oral Contraceptives and Cancer Risk.* National Cancer Institute; 2018. [cited 2019 Jul 1]. Available from: https://www.cancer.gov/about-cancer/causes-prevention/risk/hormones/oral-contraceptives-fact-sheet.

11. Joy T, Sathian B, Bhattarai C, Chacko J. Awareness of Cervix Cancer Risk Factors in Educated Youth: A Cross-Sectional, Questionnaire Based Survey in India, Nepal, and Sri Lanka: vol 6.

12. Awareness | definition of awareness by merriam-webster. . [Internet]. [cited 2019 Feb 12]. Available from:. https://www.merriam-webster.com/dictionary/awareness.

13. Now OW. Awareness - what does it mean to you? . [Internet]. [cited 2019 Feb 12]. Available from:. https://www.onewithnow.com/awareness-what-does-it-mean-to-you/.

14. Montgomery MP, Dune T, Shetty PK, Shetty AK. Knowledge and acceptability of human Papillomavirus vaccination and cervical cancer screening among women in Karnataka, India. *J Canc Educ.* 2015 Mar 1;30(1):130–137.

15. . health_professional_cervical_cancer_awareness_measure_toolk-it_version_2.1_09.02.11.pdf [Internet]. [cited 2019 Feb 12]. Available from: https://www.cancerresearchuk.org/sites/default/files/health_professional_cervical_cancer_awareness_measure_toolkit_version_2.1_09.02.11.pdf.

16. Bathija GV, Mallesh S, Gajula M. A study on awareness of cervical cancer among women of reproductive age group in urban slums of old Hubli, Karnataka, India. *Int J Community Med Public Health.* 2016 Dec 24;3(9):2579–2583.

17. Kumar HHN, Tanya S. A study on knowledge and screening for cervical cancer among women in mangalore city. *Ann Med Health Sci Res.* 2014 Jan 1;4(5) 751-756–756.

18. Donta B, Begum S, Nair S, Naik DD, Mali BN, Bandiwadekar A. Awareness of cervical cancer among couples in a slum area of Mumbai. *Asian Pac J Cancer Prev APJCP.* 2012;13(10):4901–4903.

19. Ezem BU. Awareness and uptake of cervical cancer screening in Owerri, South-Eastern Nigeria. *Ann Afr Med.* 2007 Sep 1;6(3):94.

20. Wong LP, Wong YL, Low WY, Khoo EM, Shuib R. Knowledge and awareness of cervical cancer and screening among Malaysian women who have never had a Pap smear: a qualitative study. *Singap Med J.* 2009 Jan 1;50(1):49.

21. Broberg G, Jonasson JM, Ellis J, et al. Increasing participation in cervical cancer screening: telephone contact with long-term non-attendees in Sweden. Results from RACOMIP, a randomized controlled trial. *Int J Canc.* 2013;133(1) 164 ± 71.

22. Broberg G, Wang J, Östberg A-L, et al. Socio-economic and demographic determinants affecting participation in the Swedish cervical screening program: a population-based case-control study. *PloS One.* 2018;13(1):e0190171.