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CLINICAL ARTICLE

Factors affecting the uptake of cervical cancer screening among nurses in Singapore☆

Kaijun Tay, Sun K. Tay *, Katherine C. Tesalona, Nadia M.R. Rashid, Esther Y.S. Tai, Sitti J.M. Najib

Department of Obstetrics and Gynecology, Singapore General Hospital, Singapore

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ABSTRACT

Objective: To identify factors other than socioeconomic status that influence participation in cervical cancer screening. *Methods:* A prospective, questionnaire-based, cross-sectional study was conducted among all female nurses working at Singapore General Hospital, Singapore, between November 1 and December 15, 2013. Characteristics assessed included age, knowledge score (0–10, on the basis of 10 true-or-false statements), perceived risk of cervical cancer, and health facility use. *Results:* Among 2000 nurses, 1622 (81.1%) responded. The mean knowledge score was 4.70 ± 1.76. Among 1593 nurses who reported on self-perception of risk, 97 (6.1%) reported high risk, 675 (42.4%) reported low risk, and 821 (51.5%) reported uncertainty. Of the 815 nurses reporting on their history of screening, 344 (42.2%) were screened regularly, 103 (12.6%) underwent opportunistic screening, and 368 (45.2%) had never undergone screening. The likelihood of screening was increased among women aged 35–49 years, those who had recent experience of medical screening, those who had recently had a specialist consultation, or those who had recently had a consultation with a gynecologist ($P < 0.001$ for all). Nurses undergoing regular screening reported positive effects of a doctor's recommendation, husband's encouragement, people talking about screening, and people close to the respondent undergoing screening. *Conclusion:* Advocacy and herd signaling positively influenced the cervical cancer screening rate.

1. Introduction

Cervical cancer is the third most frequent cancer reported among women worldwide, with approximately 528 000 new cases diagnosed each year [1]. Cytology screening is an effective method to reduce cervical cancer incidence and the associated mortality [2]. However, this screening method is generally not available in low-resource countries, and even in high-resource countries, screening is often associated with suboptimal participation among eligible women [3–5]. In Singapore, the participation rate for 3-yearly screening recorded in the 2012 national household survey was 47%, which was far below the rate of 80% required to achieve optimal effects of cervical cancer screening in this population [6].

Several factors affect the overall success of screening programs, including age, socioeconomic status, cultural attitude, and awareness of screening [7–9]. These factors are rapidly changing in metropolitan areas following urbanization and globalization; consequently, they pose a great challenge for screening. Among these factors, knowledge of cervical cancer and awareness of screening programs are the most amenable to interventional modification through education and public awareness campaigns. Evaluating the impact of these interventions is, however, extremely difficult because of the confounding effects of age, socioeconomic status, and cultural attitudes. As a result, data to support an evidence-based recommendation for these interventions are lacking. This information gap must be closed to justify appropriate allocation of limited resources in the face of intense competitive demands, even in high-resource countries.

The aim of the present study was to identify factors other than socioeconomic status that affect the uptake of cervical cancer screening.

2. Materials and methods

A prospective, questionnaire-based, cross-sectional study was conducted from November 1 to December 15, 2013, among female nurses working at Singapore General Hospital—a large tertiary health facility with 24 wards. The protocol was approved by the hospital's institutional review board for clinical research. Informed consent was deemed unnecessary because participation was entirely voluntary and all information was anonymous.

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* Corresponding author at: Department of Obstetrics and Gynecology, Singapore General Hospital, 20 College Road, Singapore 169856. Tel.: +65 63214673; fax: +65 62253464.

E-mail address: tay.sun.kuie@sgh.com.sg (S.K. Tay).

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The present study was conducted among female nurses to exclude the confounding factor of socioeconomic status on cervical cancer screening behavior. A printed questionnaire was delivered to all the female nurses working in this hospital. Information requested included age, years spent in nursing practice, ethnic origin, marital status, sexual relationship status, history of medical consultations within the previous 3 years, previous experiences of cervical cancer screening, and the main reasons for any past decisions about whether to undergo screening. The questionnaire also included 10 true-or-false statements assessing common knowledge of epidemiology and risk factors for cervical cancer. Participants eligible for screening with cervical smears were defined as those aged 25 years or older and those who had ever had vaginal sexual intercourse. Participants were given 3 days to respond and were asked to return completed questionnaires by dropping them into sealed boxes located on each ward.

Information provided in the questionnaire was transcribed into a spreadsheet for analysis. The data were analyzed using SPSS version 22 (IBM, Armonk, NY, USA). Descriptive analysis was performed to determine the frequency distribution of demographic characteristics. One point was assigned to each correct response to the true-or-false statements, and an aggregate score was calculated for each participant (possible score 0–10). Participants eligible for cervical screening were divided into three groups: never screened, opportunistic screening more than 3 years previously, and regular screening at 3-year intervals. A χ^2 analysis was performed to test differences between attributes and knowledge score, and between attributes and cervical screening behavior. $P \leq 0.05$ was considered statistically significant.

3. Results

A total of 2000 nurses received a copy of the questionnaire and 1622 (81.1%) returned the completed form. The demographic details are summarized in Table 1. Overall, 1296 (79.9%) of the respondents were citizens or permanent residents of Singapore.

Table 1
Demographic characteristics (n = 1622).

Characteristic	No. (%)
Age, y	
Not stated	22 (1.4)
<25	445 (27.4)
25–29	456 (28.1)
30–34	220 (13.6)
35–39	121 (7.5)
40–44	112 (6.9)
45–49	86 (5.3)
50–54	86 (5.3)
>54	74 (4.6)
Nursing experience, y	
Not stated	11 (0.7)
<5	553 (34.1)
5–9	461 (28.4)
10–14	212 (13.1)
15–19	97 (6.0)
20–24	122 (7.5)
>24	166 (10.2)
Ethnic origin	
Not stated	12 (0.7)
Chinese	718 (44.3)
Malay	362 (22.3)
Indian	216 (13.3)
Asian	189 (11.7)
Other	125 (7.7)
Residency status	
Not stated	11 (0.7)
Singaporean	1062 (65.5)
Permanent resident	234 (14.4)
Work permit holder	315 (19.4)

A subgroup of 1592 participants provided valid information on their knowledge about cervical cancer. More than 70% answered correctly that a history of multiple sexual partners, sexually transmitted infections, and genital warts and/or HPV infection are risk factors for cervical cancer (Fig. 1). By contrast, more than 90% answered incorrectly that the incidence of cervical cancer was rising in Singapore and that a family history of cervical cancer or personal history of vaginal yeast infection were risk factors for cervical cancer (Fig. 1). Of 1558 responders providing relevant information, 1217 (78.1%) ranked cervical cancer among the top five most common cancers among women in Singapore. The mean knowledge score was 4.70 ± 1.76 (range 0–9). The score distribution was not affected by age, years of nursing experience, ethnic origin, or category of sexual relationship (data not shown).

Perceived risk of cervical cancer was reported by 1593 respondents. Of these respondents, 97 (6.1%) reported high risk, 675 (42.4%) reported low risk, and 821 (51.5%) reported uncertainty. For the analysis of perceived risk of cancer, data on age was available in 1582 respondents. More respondents aged younger than 40 years (82 [6.7%] of 1227) than aged 40 years or older (15 [4.2%] of 355) reported high personal risk of developing cervical cancer ($P = 0.089$). Self-perception of high risk of cancer was more common among respondents involved in casual sexual relationships (6 [9.2%] of 65) and those who had previously engaged in sexual intercourse (4 [8.2%] of 49) than among respondents in stable marital relationship (42 [5.0%] of 838. The difference, however, did not reach statistical significance.

Individuals with low knowledge scores of cancer were more likely to report uncertainty in their perceived risk of cervical cancer than were those with high scores ($P < 0.001$) (Fig. 2). The proportion of respondents reporting uncertain risk of cervical cancer decreased with increasing knowledge score. Conversely, the proportion of respondents reporting low risk of cervical cancer rose with increasing knowledge score.

Of the 821 women eligible for screening, 815 reported on history of screening. There were 368 (45.2%) who had never undergone cervical screening and 103 (12.6%) had undergone opportunistic screening more than 3 years previously. Only 344 (42.2%) had undergone regular screening, with the most recent test within 3 years from the date of the survey.

Table 2 summarizes factors influencing screening behavior. Regular screening was more frequent among women aged 35–49 years than among those aged younger than 35 years or 50 years and older ($P < 0.001$). Experience of medical screening, specialist consultation, and consultation with a gynecologist within the past 3 years also influenced the distribution of screening behavior ($P < 0.001$). By contrast, no significant differences were observed with regard to screening behavior for knowledge score, self-perceived risk of cervical cancer, and consultation with a general practitioner (Table 2). No differences were observed among respondents of different ethnic origins and nationalities (data not shown).

Fig. 3 shows the reasons for decisions about cervical cancer screening among the nurses who reported on their history of screening. Major reasons given for regular participation were the belief that screening reduced cervical cancer risk (276 [80.0%] of 344 participants), screening was recommended by a doctor (116 [33.7%]) or spouse (69 [20.1%]), and familiarity with the test through personal contacts (98 [28.5%]). Lack of time was the main reason reported by women in the opportunistic group for not undergoing screening (100 [97.1%] of 103 women). Other reasons for non-participation were a negative perception of pain, embarrassment, the belief that screening was not necessary, and cessation of sexual intercourse.

4. Discussion

The present study examined factors influencing uptake of cervical cancer screening among a group of 1622 female nurses working in a large tertiary general hospital in Singapore. The participants represented a homogeneous population with respect to socioeconomic status,