



Cervical cancer screening in Middle Eastern and Asian migrants to Australia: A record linkage study

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ABSTRACT

Background. Australia's organized cervical screening program recommends two-yearly screening for women aged 18–69 years and reminder letters are sent at 27 months. Cervical screening registers hold comprehensive information on screening, but not country of birth. A linkage study was performed in order to assess cervical screening behavior in migrants. **Methods.** To assess screening participation, we linked year 2000 records for 12,541 Middle Eastern/Asian-born women 20–54 years of age, and an age and area matched random sample of 12,143 Australian-born women in the New South Wales (NSW) Midwives Data Collection (MDC), which records country of birth, to screening register records. Screening behavior after 2000 was assessed in women without a recorded prior cervical abnormality. **Results.** The odds ratios for being screened at least once within a 3 year period, with reference to Australian-born women and adjusted for age, parity, socioeconomic status and smoking, were 0.88 (95% CI: 0.81–0.97) and 0.74 (95% CI: 0.70–0.79) in women born in the Middle East and Asia, respectively. Screening increased with increasing socioeconomic status (SES), absence of smoking and greater parity in Australian-born women but little, if at all, in migrant women. In a sensitivity analysis in which hospital admitted patients were the source of population samples, some patterns were sufficiently different to suggest that selection for illness can affect the strength and direction of associations in linked data. **Conclusion.** Migrant women from Asian and Middle-eastern countries are less likely than Australian-born women to participate in cervical screening at the recommended interval. Their likelihood of screening is also less related to socioeconomic status, smoking and parity than that in Australian-born women.

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1. Introduction

Health inequities are defined as “as differences in health that are unnecessary, avoidable, unfair and unjust” [1]. Maintaining the health of different ethnic groups is a principal element of health equity [2]. A number of studies in developed countries have observed reduced participation rates for cervical screening in migrant women [3–8]; these are probably due to a range of underlying factors, including socio-cultural influences [9]. However, research on screening behaviour in migrant groups is often limited by problems of sample size, difficulty in verifying country of birth, dependence on recall of behaviour, and cultural and linguistic barriers.

The Australian National Cervical Screening Program is an organized approach to cervical screening. It replaced a previous, opportunistic approach in 1991. It currently recommends that all sexually active women aged 18–69 years have 2-yearly screening, regardless of disability, sexual orientation, culture or ethnicity [10]. Screening is generally performed by primary care practitioners and each instance of screening, wherever done, and its result is registered in a state-based Pap test register, unless the woman opts off the register, which about 0.8% of women do [11]. In the state of New South Wales (NSW), if a woman does not attend for screening at the recommended interval, the register sends a reminder letter 27 months after the last screening test. Two-yearly participation in screening was 58.8% in women aged 20–69 in 2007–2008 [11]. Part or all of the cost of screening with conventional cytology is reimbursed by Medicare, Australia's universal health care system.

Our objective was to evaluate participation in cervical screening by Middle Eastern and Asian migrant women in Australia in comparison with that in Australian born women, taking into account potential confounding effects of socioeconomic status.

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These migrant groups constituted about 56% of women aged 20–69 years and non-English speaking background who were resident in Australia in 2006 [12].

2. Methods

Pap test registers do not collect information on country of birth because it is not collected by pathology laboratories, the sources of information for the registers. Thus, to obtain both birthplace and screening history of a sample of women, we needed to link data from a screening register to data from a different data collection that included country of birth. Because of uncertainty about how well results obtained in women sampled from a health data collection might represent associations with behaviour in all women, we linked screening register information to two different data collections that included country of birth.

We obtained de-identified data from the NSW Midwives Data Collection (MDC) for our primary analysis and from the NSW Admitted Patients Data Collection (APDC) for a sensitivity analysis; each of these data collections includes country of birth. Each was linked separately to the NSW Pap Test Register (PTR) through the NSW Centre for Health Record Linkage (CHeReL) [13]. The PTR, which has operated since 1996, contributed dates and results of cervical cytology and histopathology tests performed in NSW [14]. The MDC, which collects data for every woman who gives birth in NSW, contributed age, socioeconomic status, country of birth, parity, and smoking behaviour [13]. The APDC collects information on all inpatient separations from all public and private hospitals, day procedure centres and public nursing homes in NSW and contributed age, socioeconomic status and country of birth [13]. For both the MDC and APDC, country of birth is self-reported on contact with the health service. The CHeReL uses probabilistic record linkage to match personally identifying details – such as name, date of birth, gender and residential address – from different databases to create a unique linkage key, which links records for the same person in the databases [13,15]. Details of the linkage methods and their sensitivity and specificity are available [13]. The CHeReL sends coded dataset-specific and project-specific linkage keys to the relevant data custodians, who provide the required records and data items to the investigators identified only by the project specific linkage keys. These keys enable linkage of different datasets for analysis without use of or access to personally identifying details, in accordance with a best-practice privacy-preserving protocol [16].

For the primary analysis, two cohorts of women were selected from the MDC. One comprised all 12,541 women aged 20–54 years who gave birth between 1 January 2000 and 31 December 2000 and were born in one of 40 countries in Asia and the Middle East [17]. The other comprised a random sample of 12,143 Australian-born women who gave birth in the same period and were frequency-matched to the overseas-born women by 5-year age group and local government area of residence. There were fewer women in this sample because the numbers in some categories of age and local area were insufficient to match those of the migrant women. The two cohorts were then linked to the PTR for the calendar years 1996–2006. In parallel, they were linked to records of the state Death Register for the calendar period 2000–2006 to permit exclusion of women who had died after giving birth or during the follow-up period.

For an analysis to test the sensitivity of observed associations to the source of the samples of women, two cohorts of women 20–39 years of age and admitted to hospital between 1 July 2000 and 30 June 2001 (fiscal year 2000) were selected from the APDC (APDC records are compiled for fiscal years). This sample was confined to women <40 years of age because 96.5% of the MDC sample of women were <40 years. A total of 22,569 women selected from the

APDC were born in Asian/Middle Eastern countries and 22,266 were selected as matched Australian-born women using the same approach as for the MDC. The APDC cohorts were similarly linked to the PTR and Death Register; and to the MDC for the calendar years 1996–2006 to identify women in the APDC cohort who had a MDC record at the same age as their APDC record.

Country of birth was classified according to the Australian Bureau of Statistics (ABS) Standard Australian Classification of Countries (SACC) into one of three regions: Australia, the Middle East and Asia. Asian countries were further classified into three sub-regions: South-East Asia, North-East Asia, and South-Central Asia [17]. For the primary analysis using the MDC data, parity was classified as: 1, 2 and 3 or more births (including live births and stillbirths of at least 20 weeks or at least 400 grams birth weight), and included the birth in the year 2000 that led to inclusion in this analysis. Socioeconomic status (SES) was classified in five quintiles of the Australian Bureau of Statistics' index of relative socioeconomic disadvantage (IRSD) for areas based on the 2001 Australian Census [18]. The IRSD is classified according to the local government area of residence and is based on income, education, degree of unemployment and ownership of motor vehicles [18]. Women were classified as non-smokers (past or never smokers) or current smokers during the pregnancy as recorded in the MDC in 2000. Women who died after giving birth or during the follow-up period (calendar or fiscal years 2000–2006) were excluded from the analyses, as were women with an abnormal cervical screening test or unsatisfactory result in the 5 years preceding their first cervical screen in the follow up period. The latter two exclusions were made because a prior abnormal or unsatisfactory test could have led to a recommendation for more frequent Pap tests during the follow-up period, which, technically, would not be screening.

Women were considered to have been screened according to national recommendations if they had a Pap test register screening record in calendar (MDC) or fiscal year (APDC) 2001 or 2002; that is, they had been screened within 2–3 years of giving birth. Use of this broad period was necessitated by the fact that we did not have access to the day and month of participants' index MDC or APDC episode in 2000. As a sensitivity analysis on the period, the analysis was repeated for screening in 2001–2003 and 2001–2006, within 2–4 and 2–6 years of giving birth, respectively. Unconditional logistic regression was used to calculate odds ratios (ORs) for each variable as unadjusted, adjusted for age and SES and adjusted for age, socioeconomic status, region of birth, smoking and parity as relevant. We also examined the interactions between region of birth and SES, parity and smoking.

The Cancer Institute NSW Population and Health Services Research Ethics Committee approved the project.

3. Results

Table 1 shows the general characteristics of migrant and Australian-born women selected from the MDC (average ages 31.1 (SD = 5.2) years and 30.9 (SD = 5.0) years respectively). Compared with Asian-born women, Middle Eastern women were younger, had higher parity and were of lower SES. Migrant women were much less likely to have smoked in pregnancy (3.4%) than Australian-born women (14.1%). After the exclusion of 16 migrant women and 20 Australian-born women who had died and of 650 and 1759 women who had a history of any abnormal or unsatisfactory cervical screening test in the 5 years preceding their first cervical screen in the follow up period, there were 11,477 migrant women and 10,762 Australian-born women available for the primary analysis. Of these, 6879 migrant and 6834 Australian-born women had at least one cervical screening test from 2001 to 2002 (Fig. 1).

Women from the Middle East or Asia had fewer cervical screens in 2001–2002: crude ORs for any screen in this period, relative to

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