Reproductive Health Practices Among Indian, Indo-Canadian, Canadian East Asian, and Euro-Canadian Women: The Role of Acculturation

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Abstract

Objective: Lower rates of cervical cancer screening in Indian women have been consistently reported, and this has been attributed to cultural barriers. In Canada, the fastest-growing and largest immigrant groups are South Asian and East Asian. Since traditional values are largely retained in Indo-Canadian immigrants and their children, identifying reproductive health behaviours among these ethnic minority groups is important. Our goal was to compare reproductive health knowledge and behaviours of Indian women living in India and in Canada, East Asian women in Canada, and Euro-Canadian women. We also explored the level of acculturation in the two immigrant groups in order to understand the extent to which affiliation with Western culture may improve reproductive health knowledge.

Methods: We recruited 663 women of reproductive age from India and from a Canadian university for assessment. These women completed the Health Beliefs Questionnaire, which measures reproductive health behaviours and knowledge, and the Vancouver Index of Acculturation, which measures the level of mainstream and heritage acculturation.

Results: Euro-Canadian women were most likely to have ever had a Papanicolaou (Pap) test and to perform breast self-examination (BSE). There was no difference between the two Indian groups in the proportion who had ever had a Pap test, but Indo-Canadian women were more likely to have performed BSE. All women showed knowledge of reproductive health, but the three Canadian groups consistently had more accurate knowledge than the Indian group. Among the two immigrant groups, the level of acculturation was associated with reproductive health knowledge.

Conclusion: Canadian women show reproductive health behaviours and knowledge that is superior to Indian women. Moving to a western culture did not influence Indian women's Pap testing behaviour; however, the fact that the reproductive health knowledge of Indian women who moved to Canada was better than that of women in India suggests that there may be a knowledge-behaviour desynchrony in this group of women. Efforts targeted at ethnic minority groups that aim to improve reproductive health knowledge and behaviours are greatly needed.

Key Words: Reproductive health behaviour, health knowledge, cancer, women, acculturation, culture, sexuality

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Résumé

Objectif : Les taux signalés de cancer du col utérin sont systématiquement faibles chez les Indiennes, cette situation étant attribuée à des obstacles culturels. Au Canada, les Sud-asiatiques et les Est-asiatiques sont les groupes d'immigrants les plus importants et connaissant la croissance la plus rapide. Puisque les immigrants indo-canadiens et leurs enfants tiennent particulièrement à conserver leurs valeurs traditionnelles, il s'avère important d'identifier les comportements de santé génésique qu'adoptent ces groupes ethniques minoritaires. Notre objectif était de comparer les comportements et les connaissances, en matière de santé génésique, des Indiennes vivant en Inde et de celles qui vivent au Canada, des femmes est-asiatiques vivant au Canada et des Euro-Canadiennes. Nous avons également exploré le degré d'acculturation chez ces deux groupes d'immigrantes, de façon à comprendre la mesure dans laquelle l'affiliation à la culture occidentale pouvait améliorer le niveau des connaissances en matière de santé génésique.

Méthodes : Nous avons recruté, en Inde et au sein d'une université canadienne, 663 femmes en âge de procréer. Ces femmes ont rempli le *Health Beliefs Questionnaire*, lequel mesure les comportements et les connaissances en matière de santé génésique, et le *Vancouver Index of Acculturation*, lequel mesure le degré d'acculturation ordinaire et patrimonial.

Résultats : Les Euro-Canadiennes étaient les plus susceptibles d'avoir déjà subi un test de Papanicolaou (Pap) et d'avoir déjà procédé à l'auto-examen des seins (AES). Aucune différence n'a été constatée entre les deux groupes d'Indiennes en ce qui concerne la proportion d'entre elles ayant déjà subi un test de Pap; cependant, les Indo-Canadiennes étaient plus susceptibles d'avoir déjà procédé à l'AES. Bien que toutes les femmes aient détenu certaines connaissances en matière de santé génésique, les trois groupes de Canadiennes détenaient systématiquement des connaissances plus précises que celles que détenaient les participantes du groupe d'Indiennes. Au sein des deux groupes d'immigrantes, le degré d'acculturation était associé aux connaissances en matière de santé génésique.

Conclusion : Les comportements et les connaissances des Canadiennes en matière de santé génésique sont supérieurs à ceux des Indiennes. Le fait de s'établir dans un pays de culture occidentale n'a pas influencé le comportement des Indiennes en ce qui concerne le test de Pap; cependant, le fait que les

connaissances en matière de santé génésique des Indiennes ayant immigré au Canada étaient supérieures à celles des Indiennes vivant en Inde semble indiquer la présence possible d'une désynchronie connaissances-comportements chez ce groupe de femmes. La mise en œuvre d'efforts ciblant les groupes ethniques minoritaires et visant à en améliorer les comportements et les connaissances en matière de santé génésique est grandement souhaitable.

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INTRODUCTION

Cancer of the cervix is a preventable disease, as it is preceded by a long, treatable pre-invasive stage that can be detected with routine cervical screening, of which the Pap smear remains the primary tool.[1] The Pap smear is an effective screening tool for cervical cancer because it enables early detection of abnormal cells. Developed countries have seen a dramatic decrease in the incidence of, and mortality from, invasive cervical cancer in the last 50 years because of mass routine screening with the Pap smear.[2]

In contrast to this striking result, the rate of cervical cancer remains high in developing countries such as India, despite efforts to begin screening programs.[2] National Indian cancer registries in cities and rural areas show a slight decline in the incidence of cervical cancer from 1982 to 1994, especially in areas where women have higher education and empowerment.[2,3] However, when intercontinental comparisons are made, these age-adjusted cervical cancer rates do not mirror the sharp decrease observed in more developed countries.[4,5] India, for example, currently has some of the highest rates of cervical cancer in the world,[6] especially in its rural regions.[7] It is the most common cancer among women in many parts of India,[5] being diagnosed in almost 140 000 Indian women per year[8] and claiming the lives of almost 100 000 per year.[2] Data from national Indian cancer registries show that in the years 1994 to 1998, only a small proportion of cases were diagnosed at the localized stage, and most presented with regional spread.[3,9] Women in whom cervical cancer is detected at more advanced stages have a five-year survival rate of 40%.[10,11]

ABBREVIATIONS

BSE	breast self-examination
C-EA	Canadian East Asian
Euro-C	Euro-Canadian
HBQ	Health Beliefs Questionnaire
HPV	human papillomavirus
Indo-Can	Indo-Canadian
Pap	Papanicolaou
VIA	Vancouver Index of Acculturation

To investigate the high prevalence of cervical cancer amongst Indian women despite screening efforts, Basu et al.[12] offered Indian women free cervical screening with free transportation. Only 62.7% of women underwent testing, a compliance rate similar to the previously reported rate of 63.4%.[13] To examine social barriers to screening, Basu et al.[12] then interviewed a sample of the non-compliant women and categorized them into three groups: (1) women who declined attending of their own accord, (2) women who were willing but unable to attend, and (3) women who attended, but declined the test upon arrival. The study showed that the most common reasons for non-attendance were reluctance to undergo a test in the absence of symptoms and fear of a test that detects cancer, which Indians see as being synonymous with death. The reasons most commonly cited by women who were willing but unable to attend were the inability to leave household chores and the lack of approval from their husbands. Finally, the most common reasons for women to leave the clinic without undergoing the test were apprehension at the sight of the instruments and the presence of male doctors. There were no differences in the age distribution, marital status, or socioeconomic status between compliant and non-compliant women; however, the non-compliant group had a significantly lower literacy rate.[12]

Vallikad[3] and Priya[14] attributed the high incidence of cervical cancer to under-reporting of symptoms because of Indian women's socialization into an attitude of self-denial and the culture's prioritization of the male gender. Other factors may include lack of knowledge,[15,16] insufficient contact with the health care system,[17] fear of disease,[18] personal modesty,[19] and lack of time, social support, and transportation.[18,20,21]

In addition to the lack of cervical screening resulting in a higher incidence of cervical cancer, older women living in India are at greater risk of this disease than Canadian women because the pattern of HPV prevalence in India (16.9% across all age groups[22]) differs from that in Canada (24.0% in women aged 20–24, progressively decreasing to 3.4% in women 45–49 years old[23]). HPV, a widespread sexually transmitted virus, is strongly associated with cervical cancer. While most HPV infections are transient, persistence of the cancer-causing forms of HPV occurs in 3% to 10% of women in Canada, who then carry a high risk of progression to cervical cancer.[24] The rate of persistence in Indian women, especially older women, is higher than that in Canadian women, thus increasing their risk of progression to cervical cancer.[22]

McCaffery et al.[25] investigated the attitudes of four ethnic groups in the United Kingdom to HPV testing as a screen for cervical cancer. In all four groups (white British, African

Caribbean, Pakistani, and Indian), the thought of testing positive provoked concerns about trust, blame, fidelity, and the potential of communicating messages of infidelity and promiscuity to partners, families, and communities. These concerns were especially pertinent for the Indian and Pakistani groups, as HPV infection would imply sexual contact outside the marriage. Consequently, these implications could affect the family and the wider community by conveying messages of suspicion and unfaithfulness, implying a woman's promiscuity, or endorsing non-traditional practices concerning sexuality.[25]

Despite the shared attitude about the negative consequences of HPV testing, the white British and African-Caribbean women were more positive about the protection from cervical cancer it would offer, whereas Indian and Pakistani women were more likely to emphasize the psychological fears of questioning their relationships. In some cases, the Indian and Pakistani groups expressed concern that they may be blamed for having an HPV infection.[25] In addition, the Indian and Pakistani groups perceived the testing as a non-traditional practice that should be prohibited, akin to their belief that women visiting male doctors and vaginal examinations will affect an unmarried woman's virginity.[25]

It is clear that the reproductive health behaviours of women living in India are greatly influenced by social and cultural barriers,[12,13,25] and their cervical cancer screening rates are very different from Caucasian women in developed countries like Canada.[4,5] Increasing intercontinental migration makes having an understanding of reproductive health practices among Indian women who move to Canada of growing importance.

Canada is a multicultural country that has seen a steady stream of immigrants in the last few decades. Currently, East Asian (e.g., those from China, Korea, and Japan) and South Asian (e.g., those from India) immigrants are the fastest growing and largest minority groups in this country.[26,27] Although many of the published reports in Canada have focused on the reproductive health of East Asian women, both East and South Asian women have a large presence in Canada. Since 1949, the province of British Columbia has had an organized cervical screening program free of cost to all resident women. As a result, the incidence of cervical cancer in BC has decreased by over 70% since 1949.[28] This decline is not reflected, however, in the East Asian population in BC, because of the low screening participation rates of this group.[29,30] Speculation about the cause of such low rates involves consideration of their more conservative attitudes and behaviours towards sexuality,[31] a characteristic shared with the Indian population.[30]

Immigration to another country involves a process of "acculturation," in which the values of the new culture are amalgamated with one's personality and self-identity. Tajfel[32] defines "ethnic identity" as a self-concept that binds a person to a particular ethnic group and provides a sense of belonging in return for a commitment to the group's beliefs, values, and customs.

Migration of Indian people to North America creates a new population of people: second-generation Indian immigrants with individualized degrees of "mainstream acculturation" (i.e., acculturation to Western values and traditions) combined with some retention of traditional values ("heritage acculturation").[33,34] In a study of the children of Indian immigrants raised with Indian values but living within a Western culture, Saroop[35] found that young women held views more compatible with Western attitudes and less compatible with Indian attitudes towards dating than those from older age groups. First-generation Indian immigrants in Canada hold stronger traditional views of male domination, female subordination, and strict sex roles in the family if they are also more religious. In the Indian culture, dating is associated with physical relationships and thus is not permissible because of the importance of chastity.[34] Although some degree of adaptation to the new culture occurs with most immigrants, many retain traditional preferences, including views on family, religion, and dating.[34] Despite the fact that most first-generation women support gender equality, their daughters continue to feel restricted in the gender roles imposed on them, especially as they near marriageable age.[36] Although they are encouraged as strongly as their male siblings to have a good education and career, these second-generation women feel they have less freedom to socialize than Indian males or their female Euro-Canadian counterparts.[33]

Although only speculative, preliminary data suggest that conservative attitudes toward sexuality may underlie barriers to Pap test screening.[31] In studies of sexual beliefs and behaviours among East Asian men and women, East Asian Canadian students have been found to be less sexually experienced and to have less sexual knowledge than their Euro-Canadian peers but to have more sexual knowledge than students in their home country.[37–39] Given the similarities in sexual conservatism between Indian and East Asian women, one may speculate that reproductive health practices are similar between these two cultures.

The well-studied lower participation rates in preventive cancer screening in India, combined with the preservation of traditional values in Indo-Canadian immigrants denote the need for a comparative study of reproductive health behaviours in Indian women living in India and in Canada.

This study was designed to explore reproductive health knowledge and behaviours among women from four distinct cultural groups, to achieve a better understanding of barriers to cervical cancer screening in the context of culture. We compared reproductive health beliefs and behaviours in the following groups of women: (1) Indian women, (2) Indian women living in Canada, (3) East Asian women living in Canada, and (4) Euro-Canadian women. In order to explore whether acculturation was associated with reproductive health measures, both mainstream and heritage acculturation were compared to reproductive health knowledge in the two Canadian immigrant groups.

METHODS

Participants

Participants in this study were recruited from Canada and India. The Canadian sample included eligible female undergraduate students at the University of British Columbia who were enrolled in Psychology courses offering extra credit for research participation. Of the total sample, 222 self-identified as Euro-Canadian, 267 self-identified as East Asian, and 29 self-identified as Indian, while the remaining women identified themselves as belonging to another ethnocultural group and were therefore not included in the present analyses.

For the non-Canadian Indian sample, women were recruited from a general outpatient clinic in the city of New Delhi, India, where patients presented at the referral of their general physicians for gynaecologic care and for antenatal care. One author (TS) distributed questionnaires during a two-month period to patients seen in this clinic. Most of the women in this sample were of reproductive age (mid-20s to mid-40s).

Procedure

The Canadian women received information about the study through the university's online research participation management system. Students who were interested in participating collected a 90-minute questionnaire package, completed it at home, and returned it to the research laboratory in a sealed envelope. All participants gave written informed consent and received extra course credit for their participation. All procedures were approved by the University of British Columbia's Behavioural Research Ethics Board.

The women in New Delhi were each provided with a questionnaire to complete. If the questionnaire was returned complete, consent to participate in the study was then obtained. Ethical approval for this part of the study was provided by the All India Institute of Medical Sciences Department of Obstetrics and Gynaecology.

Measures

We used the HBQ and the VIA.[40] The HBQ is an unpublished questionnaire developed by the researchers and used to assess participants' cancer screening practices and beliefs about cancer. It consists of six questions assessing reproductive health behaviours (including Pap testing and BSE), eight questions assessing reproductive health knowledge (including accuracy of knowledge about the importance of Pap screening), and four free-response items to allow participants to describe their beliefs about reproductive health behaviours. The VIA was used in the Indo-Canadian and Canadian East Asian samples to assess the mainstream and heritage dimensions of acculturation separately in keeping with a bidimensional model of acculturation. A greater degree of Westernization is reflected in higher scores on the mainstream dimension. A greater affiliation with one's heritage culture is reflected in higher scores on the heritage dimension. The VIA consists of 20 items with 10 domains. One heritage and one mainstream item is keyed to each domain: cultural traditions, marriage partner, social activities, comfort in professional relationships, entertainment, behaviour, maintenance or development of cultural practices, values, humour, and social relationships. The VIA has very good reliability, concurrent validity, and factorial validity.[40]

RESULTS

Data collected from 663 women were analyzed for this study; 145 Indian women, 29 Indo-Canadian women, 267 Canadian East Asian women, and 222 Euro-Canadian women participated. The Euro-C women had lived in Canada significantly longer than the C-EA and Indo-Can women ($F[3,511] = 53.59$; $P < 0.001$). The three Canadian groups did not differ in the highest level of education achieved, with over 90% of women in these three groups having completed some university study. Findings are presented separately according to items from the HBQ that corresponded to health behaviours and health knowledge. Whereas most respondents answered each item on the HBQ, the Indian women answered the fewest questions.

Reproductive Health Behaviours Among Women of Different Ethnic Groups

Items 1 to 6 from the HBQ were analyzed using either the chi-square test (for categorical data) or univariate analyses of variance (for continuous data). Data on reproductive health behaviours are presented in Table 1. There was a significant difference between the ethnic groups in the proportion of women who had ever had a Pap test ($\chi^2[3] = 165.95$; $P < 0.001$); the Euro-C group were most likely to have ever had a Pap test, and the majority of women in each of the other three groups were less likely to have ever had a Pap

Table 1 . Reproductive health behaviours in female Indian, Indo-Canadian, East Asian-Canadian, and Euro-Canadian ethnocultural groups, as measured by items from the Health Beliefs Questionnaire

	Indian (n = 145)	Indo-Can (n = 29)	C-EA (n = 267)	Euro-C (n = 222)
Ever had Pap test**	25.2%[a]	27.67%	39.7%	86.0%
Time since last Pap test[b] *	1.6	2.0	1.8	1.4
Frequency of Pap test[c] **	2.9	2.4	2.2	1.7
Ever performed BSE**	32.6%[a]	58.6%	57.3%	75.2%
Time since last BSE[d] *	1.9	1.9	2.5	2.5
Frequency of BSE[e] **	1.8	2.4	2.9	3.0

[a]Percentage not based on full sample.

[b]Data are coded such that 1 = in the last 12 months, 2 = in the last 18 months, 3 = in the last 2 years, 4 = more than 2 years ago.

[c]Data are coded such that 1 = every 12 months, 2 = every 18 months, 3 = every 2 years, 4 = less frequent than every 2 years

[d]Data are coded such that 1 = in the month, 2 = in the last 2 months, 3 = in the last 3 months, 4 = more than 3 months ago.

[e]Data are coded such that 1 = every month, 2 = every 2 months, 3 = every 3 months, 4 = less frequently than every 3 months.

Significant group differences at *$P < 0.01$; **$P < 0.001$

test. Comparison between the two Indian groups (Indian vs. Indo-Can) showed no significant difference in the proportion of women who had ever had a Pap test (χ^2 [1] = 0.05; $P > 0.05$).

Of the women who answered "yes" to having ever had a Pap test, there was a significant difference between the four groups with respect to the amount of time elapsed since the last Pap test; a higher proportion of the Indo-Can group had had the test in the last 12 months, and all other groups had had the test at some time in the last 12 to 18 months (F[3, 339] = 4.70; $P = 0.003$). The Euro-C women had a mean time closer to 12 months, while the Indian and C-EA groups had mean times closer to 18 months. When asked about the frequency of Pap tests, Euro-C women reported a mean of every 12 to 18 months, which was significantly more frequent than the other three groups, all of whom reported a mean equal to or greater than every 18 months (F[3, 329] = 12.72; $P < 0.001$). The Indian women had a mean Pap frequency closer to every two years.

There was a significant difference among the four ethnocultural groups in the proportion of women who had ever performed BSE (χ^2 [3] = 63.31; $P < 0.001$); the majority of Euro-C women had previously performed BSE and the majority of Indian women responded that they had never performed BSE. Just over half of the women in each of the two immigrant groups, Indo-Can and C-EA, reported having ever performed BSE. Women in the Indo-Can group were significantly more likely than the Indian women to have ever performed BSE (χ^2 [1] = 6.70; $P = 0.009$). Pairwise comparisons of the Euro-C women to each of the other three groups showed that the Euro-C women were more likely to have ever performed BSE than the Indo-Can ($P = 0.05$), C-EA ($P < 0.001$) and Indian ($P < 0.001$) women.

Of the women who had ever performed BSE, significantly more Indian women than women in the other three groups had done so in the past month (F[3, 379] = 4.62; $P = 0.003$), and Indian women were more likely to perform BSE more frequently (F[3, 377] = 14.11; $P < 0.001$). All three Canadian groups had a mean "time since last BSE" of two to three months, and a frequency of BSE of approximately every three months. Although Indian women were the least likely of the four ethnic groups to have ever had a Pap test or perform BSE, those Indian women who had performed BSE in the past were the most likely to perform BSE monthly.

Reproductive Health Knowledge Among Women of Different Ethnic Groups

Items 7 to 14 from the HBQ examined the reproductive health knowledge of the four ethnocultural groups. These were analyzed using the chi-square test for significant differences in the proportion of correct responses. The results of these analyses are presented in Table 2. Overall, all four ethnic groups showed some reproductive health knowledge; however, with the exception of one question, the three Canadian groups consistently and significantly held more accurate and up-to-date knowledge on reproductive health than the Indian group. The majority of women in each group agreed with the statement "All healthy adult women should have Pap tests every 2 years" (χ^2 [3] = 0.541; $P > 0.05$). When asked whether Pap smears were important for a woman of the participant's age, the majority of women responded correctly, but Indian women were more

Table 2. Reproductive health knowledge in female Indian, Indo-Canadian, East Asian-Canadian, and Euro-Canadian ethnocultural groups, as measured by items from the Health Beliefs Questionnaire. Data represent the percentage of women responding correctly

	Indian (n = 145)	Indo-Can (n = 29)	C-EA (n = 267)	Euro-C (n = 222)
Healthy adult women should have Pap tests every two years	84.9[a]	86.2	83.1[a]	82.0
Pap tests are not important for a woman at my age*	68.0[a]	75.8	80.5	95.9
Only women who have had many sex partners need to have Pap tests*	77.0[a]	93.1	86.1	98.2
The purpose of Pap tests is to detect early signs of cervical cancer*	82.8[a]	93.1	95.1[a]	97.7
Pap tests are necessary even if there is no family history of cancer*	84.1[a]	96.6	94.8	96.8
The purpose of regular breast self-examinations is to detect potentially cancerous breast lumps*	89.2[a]	100.0	96.6	100.0
Healthy breasts should have no lumps in them at all*	11.9[a]	58.6	47.6	82.0
Breast examinations by a doctor are unnecessary if I am performing breast self-exams regularly*	68.2[a]	89.7	88.0	95.9[a]

[a]Percentage not based on full sample due to missing data.

Significant group differences at *$P < 0.001$

likely than women of the other groups to respond incorrectly (χ^2 [3] = 48.895; $P < 0.001$). In response to the statement "Only women who have had many sex partners need Pap tests," most participants responded correctly that this statement was untrue, but more Indian women answered incorrectly than women in the other groups (χ^2 [3] = 39.551: $P < 0$ .001). In response to the statement "Pap tests are for detecting cervical cancer," Indian women were more likely to indicate that this was false than the Canadian women (χ^2 [3] = 30.766; $P < 0$ .001). The participants were asked whether Pap tests were necessary in the absence of a family history of cancer," and although most women responded correctly that they were, Indian women were more likely to answer incorrectly than women in the other groups (χ^2 [3] = 23.063, $P = 0.001$).

Most of the participants replied correctly that regular BSE is used to detect potentially cancerous breast lumps, but a significantly greater number of Indian women responded incorrectly (χ^2 [3] = 28.799, $P < 0.001$). The statement "Healthy breasts should have no lumps in them at all" yielded different responses among the ethnic groups. The Indo-Can and Euro-C groups were more likely to respond correctly that this statement was not true, while both the Indian group and the C-EA group were more likely to answer incorrectly (χ^2 [3] = 169.820; $P < 0.001$). Pairwise comparisons revealed significant group differences between the two Indian groups ($P < 0$ .001) and between the Euro-C and C-EA group ($P < 0.001$). Finally, although most participants correctly replied that breast examinations by are necessary despite regular BSE, more Indian women replied incorrectly that they were not (χ^2 [3] = 55.720; $P < 0$ .001).

The final section of the HBQ invited respondents to write their answers in response to three open-ended questions. When asked how cervical cancer was detected, participants' diverse answers included "Pap test," "breast self-examination," "general test," "cervical biopsy," "tissue culture," "testing of uterine fluid," "blood tests," "CT scans," "MRI," "X-ray," "ultrasound," "testing mucus from cervix," and "findings of cancerous cells on the cervix." They described warning symptoms such as "swelling," "lumps," "abnormal bleeding," "pain," "pain with intercourse," "smelly discharge," and "headache." When asked how cancer of the uterus was detected, participants' answers included "pain in uterus," "bleeding," "Pap test," "general test," "ultrasound," "irregular menstrual cycle," "smelly discharge," "bleeding," "testing of uterine fluid," "routine check-up," "MRI," "uterine bleeding," and "biopsy." Finally, when asked how breast cancer was detected, participants included answers such as "lumps in breast," "breast self-exam," "X-ray," "breast problems," "mammography," "general test," "core biopsy," "breast bleeding," "hardness in breast," "pain in breast," "MRI," "breast swelling," and "Pap test." Many questions were left unanswered.

Association of Reproductive Health Knowledge and Acculturation

To examine the relationship between women's level of both mainstream (VIA-M) and heritage (VIA-H) acculturation and their reproductive health, we established a composite score on the HBQ that was the sum of correct items

endorsed on the HBQ (HBQ-total). We then calculated a Pearson product-moment correlation coefficient between this HBQ-total score and the VIA-M and VIA-H scores. Because acculturation scores apply only to ethnic minority individuals in a new culture, these analyses were based only on the Indo-Can and C-EA groups. There was a significant positive correlation between VIA-M scores and HBQ-total (r[289] = 0.206; $P < 0$ .001), indicating that higher levels of mainstream acculturation were associated with more accurate reproductive health knowledge. There was a significant negative correlation between VIA-H scores and HBQ-total (r[290] = -0.177; P = 0.002), indicating that women with higher levels of affiliation to their heritage culture also had more incorrect answers on the HBQ.

DISCUSSION

We found that Canadians from all three ethnocultural groups possessed significantly more accurate reproductive health knowledge than women living in India. Although the majority of women in each of the four groups responded correctly to statements about reproductive health, the proportion of those in the Indian group responding accurately was significantly lower than in the other three groups. More Indian women failed to respond to all the questions than women in the other groups, a finding that may potentially be due to their lack of knowledge of how to respond to the questions, and fear of providing an incorrect answer.

With respect to reproductive health behaviours, both the Indian women and the Indo-Canadians were less likely to have ever had a Pap test than the Euro-Canadians. We found that the Euro-Canadian women were more likely to have undergone a Pap test than women in the other three ethnic groups. The Indian group was less likely ever to have had a Pap test than women in the Euro-Canadian and East Asian groups, and they had a Pap test less frequently than women in the other groups, suggesting that this group engages in fewer reproductive health behaviours. Interestingly, low rates of Pap testing in the Indian, Indo-Canadian, and Canadian East Asian women persisted despite the fact that the majority of these women agreed with the statement "Healthy women should have a Pap test every 2 years."

One factor that may account for the ethnic group differences in Pap testing rates is the availability of such services in Canada compared to India. In Canada, cervical cancer screening began in 1960 with the introduction of a provincial cervical cancer screening program in British Columbia.[41] Since then, programs have been introduced in other provinces, and although the availability of these programs and the extent of their target population coverage still differ between the provinces and territories, national efforts have resulted in the formation of a Cervical Cancer Prevention Network of federal, provincial, and territorial representatives.[41] National screening recommendations related to screening frequency, follow-up, and laboratory quality control have been made and implemented,[41] whereas in India such established programs do not exist. Pap tests are not offered uniformly to all women in India, few women have a family physician, and follow-up care for women is extremely poor. Instead, Pap tests are offered usually in situations where there is a gynaecological complaint.

We also found in this study that although women from the Indian group were less likely to have ever performed BSE than each of the other ethnic groups, those women who did perform BSE did so more frequently than women in each of the other groups. Breast self-examination is a private examination that does not require a physician, suggesting that a potential barrier to instituting reproductive health behaviour in women relates to the ability to find and establish a comfortable relationship with a physician.

An exploration into cultural aspects of health-seeking behaviour may help to explain these findings. Findings from previous studies have shown the cultural importance of the traditional Indian family; unfortunately, it is a hierarchy of age and gender inequality that ultimately interferes with help-seeking and health-promoting behaviours.[42] The social position of the Indian woman has risen over the years, but most remain subservient to their male relatives, with a relative lack of freedom and decision-making power.[43] These cultural roles assign numerous unshared household chores and family responsibilities to the woman; such duties hinder her access to health information and services in her new country, including cancer screening.[44,45] In addition, a job outside the home and issues of adjustment to a new country result in insufficient time for self or professional care. From her compelling interview with Sukhdev Grewal, an Indian immigrant and influential Canadian nurse, Sibbald[46] wrote that the Indian woman's modesty, and her belief that she should not act unless there are symptoms, restrict her access to health care. Cultural factors may also lead women to ignore or deny any symptoms they may have.[26] Indian women feel that their symptoms are not important enough to need treatment unless they are affecting their family's well-being, and they will postpone seeking medical advice until this is the case. They feel that they have too many responsibilities within the home that cannot be delegated to other individuals to allow them to seek help whenever they wish.

In addition to cultural barriers, language limitations hamper Indian and East Asian immigrants' communication with health care professionals.[1,26] Indian immigrants agree that there is a vast amount of health information available to

them in Canada, much more so than in their home country, and it is accessible in more credible forms; however, they perceive obtaining health information to be easier in their country of origin.[26] Loss of an extended social network after moving to a new country results in a decrease in health information. Indian families rely on one another for health information, as evidenced by the practice of home births in rural areas being attended often only by female family members. After moving to a new country, accepting health advice from individuals outside the family is a new and difficult concept.[47] Acculturation and becoming familiar with the language in Canada contribute to growing satisfaction with the Canadian health care system.[26]

Similarly, in the East Asian population the topic of sexuality is considered a private issue and is rarely discussed, either in public or in the home.[48–50] Youn[49] found that parents strongly disapprove of their children engaging in sexual activities before marriage, and even of meeting members of the opposite sex for fear that they would distract their children from their education. As a result, East Asian women differ significantly from their Euro-Canadian counterparts in sexual knowledge, sexual experience, and sexual behaviour.[39]

Because acculturation scores correlated significantly with reproductive health knowledge (more acculturated women had more accurate knowledge, and women who retained more of the values and customs of their previous culture had less accurate knowledge), the process of acculturation is important to consider when studying reproductive health behaviours among ethnic minority women in Canada. The correlation suggests that the significant differences found between Indian and Indo-Canadian women may have been largely due to the process of acculturation. Thus, attitudes and behaviours are amenable to change over time. The challenge in Canada, however, will be to encourage accurate knowledge and improve health practices in immigrant women who continue to hold strongly to their heritage culture, given that VIA-H scores were associated with poorer reproductive health knowledge in this study.

To respect modesty and traditional and cultural values, alternatives to the Pap smear have been considered and explored.[24,51] In a Canadian study, the sensitivity in detecting carcinogenic types of HPV from self-collected vaginal samples (86.2%), vulvar samples (62.1%), and urine samples (44.8%) were compared with the cervical sample (98.3%) collected by the physician.[51] Specificity ranged from 53.5% to 69.7%, compared with the physician's specificity of 52.1%.[51] These self-sampling methods were acceptable to most participants, and the associated high sensitivity rates and comparable specificity rates warrant further exploration into these methods.[51] Self-collected samples for HPV testing would improve screening in various cases where cultural barriers may limit access to standard gynaecological examinations.[24] It is possible that by educating and empowering women from ethnic minority groups to take control of their own health screening, unnecessarily high rates of gynaecologic malignancies may be reduced.

CONCLUSION

The usefulness of the Pap test in cervical cancer prevention has undeniably changed the morbidity and mortality associated with this disease. However, despite routine mass screening efforts, a woman's decision to undergo the testing or not appears to be influenced by a myriad of factors, including cultural barriers. The challenge for Canadian researchers is to explore the traditional values that influence this decision, the degree of cultural preservation with immigration to a new country, and the effects of acculturation on reproductive health knowledge and behaviours. In this study, Indo-Canadian women had levels of reproductive health knowledge that were between those of Euro-Canadian and Indian women, demonstrating the effect of acculturation on reproductive health knowledge. With respect to reproductive health practices, the likelihood of having ever had a Pap test was similar between the Indian and the Indo-Canadian groups, implying some preservation of traditional values; however, the likelihood of having ever performed BSE was significantly higher in the Indo-Canadian group, implying more positive reproductive health behaviours. Similarly, Canadian East Asian women have reproductive health behaviours and knowledge that are not significantly different from those of the Indo-Canadian women. Acculturation has a direct positive effect on reproductive health knowledge, which in turn influences an individual's decision to take preventative reproductive health measures. However, because in some cases the Indo-Canadian women had health knowledge greater than that of the Indian women, despite there being no significant difference in behaviour between these groups, it is evident that there is a gap between knowledge and behaviour.

Thus, there may be a delay between having accurate reproductive health knowledge and acting upon it. By providing more reproductive health knowledge, and by addressing certain cultural barriers that may prevent an immigrant from practising reproductive health behaviours, health care professionals may be able to increase the participation rates of immigrant women in cancer screening practices such as the Pap test and BSE, thereby reducing the incidence of gynaecologic and other malignancies. Furthermore, this study illustrates the poor reproductive health knowledge and behaviours among women living in India, and suggests that international efforts to improve reproductive health are needed.

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