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ORIGINAL PAPER

Fetal Alcohol Spectrum Disorder Prevention Approaches among Canadian Physicians by Proportion of Native/Aboriginal Patients: Practices during the Preconception and Prenatal Periods

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Abstract *Objective*: To examine if physician knowledge and practices related to fetal alcohol spectrum disorders (FASD) and its prevention vary based on the proportion of Native/Aboriginal patients served. *Methods*: A questionnaire was mailed to a national random sample of Canadian physicians between October 2001 and May 2002. The main outcome measure was responses regarding knowledge about and prevention of FASD. Bivariate analysis was used to compare practice patterns and knowledge between those who cared for a higher proportion ($\geq$10%) and a lower proportion ($<$10%) of Native/Aboriginal patients. *Results*: The overall response rate was 39.4% (1,700/4,313), and 21.4% of physicians reported that $\geq$10% of their clinical practice was comprised of Native/Aboriginal patients. Those caring for a greater proportion of Native/Aboriginal patients were significantly ($p < 0.05$) more likely to discuss sexual and emotional abuse (approximately 20% vs. 10%) and a history of addictions (52% vs. 44%) with women of childbearing age. In prenatal interviews, they were also significantly ($p < 0.05$) more likely to routinely include a history of addictions treatment (70% vs. 62%) and drinking prior to pregnancy awareness (91% vs. 85%), as well as more likely to ask about evidence of alcohol related defects in other children (50% vs. 37%), and discuss the drinking pattern of the patient's partner (25% vs. 18%). *Conclusions*: Physicians who had a higher proportion of Native/Aboriginal patients appeared to be more attuned to the issues of FASD and to assess risk in a more comprehensive manner. However, support for improved identification of women at risk and referral opportunities is warranted.

Keywords Preconception care · Prenatal care · Fetal alcohol spectrum disorders · Physician practice patterns · Native/Aboriginal women

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Background

Health care providers who attend to the needs of Native/Aboriginal patients often face challenges providing care in rural and remote settings, including the higher prevalence of issues which occur as a result of service isolation, addiction and poverty. Indeed, clinical consultations within Aboriginal communities have been described as more complex and broader in scope than general practice [1, 2]. It is unknown if health care providers adjust their practice with respect to prevention and health promotion and consequently, this paper examines physician practices to prevent fetal alcohol spectrum disorders (FASD).

FASD is a classification that describes the range of physical, mental, behavioural, and/or learning disabilities that can occur as a consequence of prenatal alcohol exposure. FASD is the leading non-genetic cause of mental retardation in the Western world, affecting approximately one per cent of North Americans [3]. The cost of FASD in Canada is estimated at $344.2 million (Canadian) annually for affected individuals between 1 to 21 years of age [4]. As important are the lifelong social and health challenges experienced by those with FASD, their families and society. Although FASD is neither a racial nor a cultural problem, data from a few small studies suggest that FASD may occur at higher rates in Native/Aboriginal populations in Canada [5–8] and in the United States [9, 10]. However, neuropsychological tests used in diagnosis have not been validated for use in populations other than English-speaking Caucasians, and this may affect diagnosis among populations like Aboriginal groups with an oral tradition and different language. Also, in rural and remote areas where many Aboriginal groups live, diagnosis may be limited by the lack of access to a multidisciplinary team.

In Canada, Native/Aboriginal people include First Nations/North American Indians, Inuit, and Métis people and they comprise 3.3% of the Canadian population. Inuit people are the Aboriginal people of Arctic Canada, and Métis people are of mixed First Nations and European ancestry. In 2001, 29% of Aboriginals in Canada lived on a reserve and 20% lived in rural areas but not on a reserve [11]. In 2001, over 31% of Aboriginals compared to 12% of non-Aboriginals were classified as low income, and almost half of Aboriginals over 15 years of age (48%) had not completed high school compared to 31% of non-Aboriginals [12, 13]. The combined impact of poverty, isolation and lower educational attainment provides a different context for care provision for many practitioners who serve higher proportions of Native/Aboriginal patients.

To our knowledge there is no data that provides insight into gaps in knowledge and preventative practice of physicians by patient profile. This analysis was undertaken to examine if knowledge about and practice patterns to prevent FASD varied among physicians based on the proportion of Native/Aboriginal patients cared for. Such information can be used to identify areas where education and support to physicians may be needed with respect to the management and prevention of FASD. Currently, physician training as relates to FASD is offered as part of continuing medical education in Canada and is introduced during pediatric residency. However, Canadian health care providers have reported that they require more education and training to appropriately identify and care for FASD-affected individuals and their families [14].

Methods

Participants

Potential participants were randomly selected from membership lists obtained from the College of Family Physicians of Canada ($N = 11{,}258$), the Society for Obstetricians and Gynaecologists of Canada ($N = 1{,}728$), and the Canadian Pediatric Society ($N = 2{,}374$). Given the large population of family physicians and original underestimates of the number of obstetricians, random sampling was based on the number of active members in each province to gather sufficient data for regional representation. For family physicians and obstetricians and gynaecologists, 20% were randomly sampled from provincial populations where physicians numbered greater than 500, 25% were chosen from populations of 101 to 500, and 50% were chosen from populations less than 100. Paediatricians were selected based on simple random sampling of 60% of the total sample. The final sample included physicians from family practice ($n = 2{,}378$), obstetrics/gynaecology ($n = 539$), and paediatrics ($n = 1{,}396$).

Instrument

The questionnaire was based on a survey published in 1995 [15] and was modified to increase its scope based on consultation with a National Advisory Committee on Fetal Alcohol Syndrome and professional groups in Canada (obstetricians and gynaecologists, family physicians and paediatricians). The questionnaire was piloted among a convenience sample of approximately 30 health professionals (primarily physicians) who attended a Continuing Medical Education workshop to assess completion time and evaluate the level of complexity, readability, and interest. Feedback from both the pilot survey and professional organization reviews was incorporated into the final questionnaire.

The questionnaire consisted of 4 parts: General Knowledge (10 questions); Prevention Issues (13 questions); Diagnostic Issues (15 questions); and Demographic and Practice Information (10 questions). Family physicians were sent all sections of the questionnaire, obstetricians and gynaecologists were not sent questions about diagnosis, and paediatricians were not sent questions about prevention issues (i.e. preconception and prenatal care practice). All questions related to the outcomes in this analysis were a forced-choice format with response options varying depending on question content (e.g. yes/no, Likert-type scales, select all that apply).

The questionnaire could be completed on paper or electronically on the web and in either English or French. The final questionnaire was formatted into a Teleform data management program for electronic data entry. The web-based version was programmed with HTML for secure

completion at an independently created web page on the University of Calgary web site. Participants were required to enter an individually assigned code at the web site, serialized to ensure participants completed the questionnaire by one method only (paper or web), to avoid duplication during follow up, and to allow participants to continue the questionnaire on multiple occasions without the loss of previously entered responses. To increase the accuracy of the French translation, two translators were involved in the process, one of whom had specialized training in medical translation.

Procedures

The questionnaire was sent out in a package containing:

1. A cover letter describing the relevance of the study, printed on letterhead of the participant's professional organization, hand-signed by a co-principal investigator, and copy-signed by the president of the professional organization. The exception was family physicians who received the cover letter hand-signed by each of the co-principal investigators and on University of Calgary letterhead;
2. A preamble and instruction sheet describing the contents of the questionnaire and instructions for completing the paper or web-based version of the questionnaire;
3. The questionnaire; and
4. Notice of eligibility for a random draw for a Palm Pilot if the questionnaire was completed and returned within 3 weeks of mail out.

The packages were mailed to paediatricians beginning October 2001, and data collection for paediatricians was completed approximately 12 weeks later after follow-up. The packages were mailed to family physicians and obstetricians between March and May 2002, and data collection for family physicians and obstetricians was completed in October 2002 after follow-up.

A reminder post card was sent to non-respondents approximately three weeks after the initial mailing. Three weeks later, a reminder letter and second copy of the questionnaire was sent to non-respondents. Approximately three weeks after that, a second reminder post card was mailed with the instruction to contact the study team if the non-respondent had actively chosen not to participate. Finally, approximately 12 weeks after the initial mailing a telephone call was made inviting non-respondents to complete the questionnaire. Those contacted were offered the opportunity to participate by completing the questionnaire through telephone interview, completing it on-line, or having the paper version mailed or faxed to them. Interviewers fluent in the preferred language of the respondent conducted the telephone follow-up.

Attempts were also made to locate eligible participants whose questionnaire packages were returned due to incorrect mailing addresses or who had incorrect telephone numbers. This included cross-referencing contact information with publicly available physician directories and telephone directory assistance. The mail out survey methods used in this study have been shown to result in response rates in excess of 70%, and we anticipated achieving a 60% response rate [16].

Ethics

The study was approved for scientific and administrative merit by the Calgary Health Region Child Health Scientific Review Committee. Ethical approval was granted by the Conjoint Health Research Ethics Board (CHREB) of the Faculties of Medicine, Nursing and Kinesiology, University of Calgary, and the Affiliated Teaching Institutions. Completion of the questionnaire was taken to signify consent to participate.

Statistical analysis

The completed questionnaires were scanned into a Teleform data management system, and entries were manually verified for accuracy and appropriate coding. Data were analyzed using SPSS/PC version 13.0. Data were screened prior to analysis for the likelihood that applicable statistical assumptions could reasonably be made. Descriptive analysis and bivariate comparisons were used to understand how physicians' knowledge about and practice patterns to prevent FASD varied according to the proportion of Native/Aboriginal patients in a practice. A p value less than 0.05 was considered significant.

Physicians were grouped by the proportion of Native/Aboriginal patients ($\geq 10\%$) they had in their practice. Those with fewer than 10% were compared to those with 10% or greater. The cut point was established based on clinical factors which recognized that Native/Aboriginal peoples represent a small proportion of the Canadian population (3.3%, including Métis) and consequently, those with a patient load of 10% or greater would represent those with a substantial number of Native/Aboriginal patients [11]. Physicians ($n = 90$) who did not answer this question, but who did indicate the proportion of children and women in their practice, were assumed not to care for Native/Aboriginal patients.

Results

The overall response rate (1,700/4,313) was 39.4%. The response rate was 31.1% among family physicians

Table 1 Physician preparedness to care for patients in the area of alcohol abuse or dependency

	Overall *n*(%)	< 10% Practice Native/Aboriginal	≥ 10% Practice Native/Aboriginal	Chi Square $p \leq$
In the area of alcohol abuse or dependency, prepared to care for				
Pregnant women[a]	613(53.2)	459(51.1)	154(60.9)	0.006
Birth mothers[a]	664(55.5)	501(53.5)	163(62.7)	0.008
Foster parents[a]	613(51.2)	460(49.3)	153(57.7)	0.015
Affected individuals[a]	767(55.7)	585(54.5)	182(59.9)	0.094
In the area of alcohol abuse or dependency, prepared to access resources for				
Pregnant women[a]	818(67.0)	622(65.7)	196(71.5)	0.070
Birth mothers[a]	852(67.1)	645(65.3)	207(73.7)	0.008
Foster parents[a]	799(63.0)	599(60.9)	200(70.4)	0.003
Affected individuals[a]	963(67.7)	724(65.6)	239(75.2)	0.001

[a] Among physicians who cared for.

($n = 740/2,378$), 41.7% among obstetricians and gynaecologist ($n = 225/539$), and 52.7% among paediatricians ($n = 735/1,396$). Compared to the distribution of providers across Canada, there were more responses from family physicians in the Prairies and fewer from those in Quebec, and there were more responses from obstetricians and gynaecologists in the West and Prairies and fewer from those in the Eastern provinces [17]. Responses from paediatricians were similar to the distribution of paediatricians across Canada [17].

Of 1,700 responses, 21.4% of physicians reported that 10% or more of their clinical practice was comprised of Native/Aboriginal patients. Those who cared for a greater proportion of Native/Aboriginal patients, compared to those with a lower proportion, were significantly more likely to be under 40 years of age (40% vs. 34%), have graduated since 1990 (37% vs. 30%), have a rural practice (36% vs. 17%) and speak English (as opposed to French) (96% vs. 85%) (all $p < 0.05$).

The majority of physicians (94%) agreed that prenatal alcohol exposure is a risk factor for permanent brain damage. Physicians caring for a greater proportion of Native/Aboriginal patients were significantly more likely than those with a lower proportion of Native/Aboriginal patients to know that prenatal alcohol exposure can be associated with delayed development (99% vs. 97%), learning disabilities (100% vs. 97%), vision problems (44% vs. 38%), and structural brain damage (73% vs. 65%) (all $p < 0.05$).

Compared to those with a lower proportion of Native/Aboriginal patients, those with a greater proportion were significantly ($p < 0.05$) more likely to indicate that discussion of alcohol would not deter patients from treatment (89% vs. 84%). As well, physicians with a greater proportion of Native/Aboriginal patients felt more prepared to care for pregnant women, birth mothers, and foster parents who were alcohol dependent and felt more prepared to access resources for birth parents, foster parents and affected individuals (all $p < 0.05$) (Table 1).

Prevention practices with women of childbearing age

About 90% of physicians frequently discussed Pap testing and birth control with all women of childbearing age, but most other preconception health and lifestyle issues were frequently discussed by less than 50% of all physicians (Table 2). For many topics, there were no differences between physicians according to the proportion of Native/Aboriginal patients. However, those caring for a greater proportion of Native/Aboriginal patients were significantly more likely to discuss sexual and emotional abuse (approximately 20% vs. 10%) and a history of addictions (52% vs. 44%), but were significantly less likely to discuss folic acid as it relates to neural tube defects (41% vs. 52%) (Table 2). As well, fewer than 50% of all physicians defined 'moderate' alcohol consumption for patients (Table 2). Physicians noted that time (60%) and poorly formatted information (49%) were barriers to discussing prenatal alcohol use before a women became pregnant.

Prevention practices with pregnant women

Almost all (93%) physicians asked pregnant women if they were consuming alcohol, and the majority (89%) recommended alcohol abstinence during pregnancy. Those caring for a greater proportion of Native/Aboriginal patients were significantly ($p < 0.05$) more likely to routinely inquire about past addictions treatment (70% vs. 62%), drinking prior to pregnancy awareness (91% vs. 85%), evidence of alcohol related defects in other children (50% vs. 37%), and the drinking pattern of the patient's partner (25% vs. 18%) (Table 3). Overall, 67% of physicians used one of the many available standard tools to screen pregnant women for alcohol use, with no overall difference according to the proportion of Native/Aboriginal patients. For specific tools, physicians with a higher proportion of Native/Aboriginal patients were significantly more likely to use the T-ACE (20.9% vs. 11.6%, $p = 0.001$).

Table 2 Physician prevention practices with women of childbearing age (preconception)

	Overall *n*(%)	< 10% Practice Native/Aboriginal	≥ 10% Practice Native/Aboriginal	Chi Square $p \leq$
Frequently discuss the following with all women of childbearing age				
Folic acid in decreasing neural tube defects	442(49.5)	365(51.8)	77(41.0)	0.008
Risk of smoking during pregnancy	430(48.2)	345(49.0)	85(45.2)	0.355
Risks of alcohol during pregnancy	348(39.0)	273(38.8)	75(39.7)	0.821
Risks of drug use during pregnancy	339(38.0)	264(37.6)	75(39.7)	0.592
Nutrition	461(51.7)	367(52.1)	94(50.0)	0.604
Workplace stress	246(27.6)	197(28.1)	49(25.9)	0.560
Mental health	341(38.3)	264(37.6)	77(40.7)	0.431
Weight management	393(44.1)	307(43.7)	86(45.5)	0.663
Partner's use of drugs and alcohol	90(10.1)	66(9.4)	24(12.7)	0.178
Depression	369(41.2)	283(40.0)	86(45.5)	0.174
Birth control	769(86.0)	608(86.2)	161(85.2)	0.710
Pap testing	820(91.5)	651(92.1)	169(89.4)	0.243
Sexual history	557(62.6)	450(64.1)	107(56.9)	0.070
Frequently obtain a detailed history about the following from all women of childbearing age				
Sexual abuse	111(12.4)	74(10.5)	37(19.6)	0.001
Emotional abuse	109(12.2)	76(10.8)	33(17.5)	0.013
Alcohol use	509(57.3)	394(56.2)	115(61.2)	0.222
Personal history of addictions	406(45.5)	308(43.8)	98(51.9)	0.047
Family history of alcohol misuse	209(23.5)	162(23.0)	47(25.1)	0.549
Frequently provide all women of childbearing age with written information on prenatal alcohol exposure	29(3.3)	22(3.1)	7(3.7)	0.002
Frequently discuss what patient thinks "in moderation" means	467(49.6)	368(49.9)	99(48.8)	0.918
Define moderate as ≤ 2 drinks per occasion	793(88.3)	622(89.2)	171(85.1)	0.105
Define moderate as ≤ 3 occasions per week	598(67.0)	464(67.0)	134(67.0)	0.991

Note. Answered by family physicians and obstetricians & gynaecologists only.

Physicians caring for a greater proportion of Native/Aboriginal patients were significantly more likely to refer pregnant women consuming moderate amounts of alcohol to treatment (17% vs. 8%) (Table 3). These physicians were more likely to identify extrinsic barriers such as poverty (90% vs. 83%) and lack of addiction services (73% vs. 64%) as barriers to women seeking treatment (all $p < 0.05$). In general, physicians identified the following as barriers to seeking treatment: fear of public shame (90%), fear of losing children (91%), co-dependence (92%), and current violence in the home (87%).

Supports for clinical practice

Among numerous potential supports available to physicians, those caring for a greater proportion of Native/Aboriginal patients were significantly more likely to indicate that Telemedicine would be very helpful for accessing information (29% vs. 24%) and for assistance with the diagnosis of FASD (26% vs. 23%) (all $p < 0.05$). Supports favoured by 60% or more of physicians included clinical practice guidelines for diagnosis, referral resources for women of childbearing age with alcohol problems, and a registry of specialists for consultation.

Discussion

Health care providers who reported caring for a higher proportion of Native/Aboriginal patients ($\geq 10\%$) had greater knowledge of the specific effects of prenatal alcohol exposure. They also felt more prepared, and likely more confident in their ability, to provide care for birth mothers and pregnant women with alcohol addictions. In addition, these physicians felt more prepared to access resources for most patients with alcohol addictions although notably this was not the case for pregnant women. It may be that a greater knowledge of FASD contributed to confidence in treating most patients with alcohol addictions.

Prevention among women of childbearing age

Since 1989 expert panels on prenatal care have identified that the most important prenatal visit may be the one that

Table 3 Physician prevention practices with pregnant women (prenatal)

	Overall *n*(%)	<10% Practice Native/Aboriginal	≥10% Practice Native/Aboriginal	Chi Square $p \leq$
Routinely included in patient interviews regarding alcohol use during pregnancy				
Ask all pregnant women if they are currently drinking alcohol	877(92.9)	685(92.7)	192(93.7)	0.634
Drinking pattern of partner	180(19.2)	130(17.6)	50(24.8)	0.023
Family history of alcohol abuse or dependency	490(52.2)	379(51.5)	111(54.7)	0.421
Personal history of sexual abuse	269(28.8)	203(27.7)	66(32.7)	0.166
History of addictions treatment	596(63.9)	455(62.2)	141(70.1)	0.039
Quantity of alcohol intake (during pregnancy)	918(97.5)	716(97.0)	202(99.0)	0.108
Frequency of alcohol intake (during pregnancy)	916(97.4)	714(97.0)	202(99.0)	0.108
Personal history of binge drinking	702(74.7)	543(73.8)	159(77.9)	0.226
Type of alcohol consumed	738(78.2)	584(79.2)	152(74.5)	0.147
History of drinking prior to knowing about pregnancy	809(86.2)	624(85.0)	185(90.7)	0.037
Evidence of alcohol related birth defects in other children	369(39.5)	267(36.5)	102(50.5)	0.001
Other practices				
Recommend no alcohol during pregnancy	817(88.6)	640(88.5)	177(88.9)	0.547
Use any standard tool (ie.TACE, CAGE) to screen prenatal patients for alcohol use	609(67.2)	464(66.0)	145(71.4)	0.147
When women report moderate alcohol use during pregnancy				
Always discuss adverse effects of alcohol use	428(62.8)	308(61.7)	120(65.9)	0.093
Always advise to abstain from alcohol	492(71.6)	362(71.4)	130(72.2)	0.589
Always advise to reduce consumption	394(59.6)	283(58.8)	111(61.7)	0.917
Always refer to treatment	73(10.9)	43(8.7)	30(16.7)	0.017
Always refer to social services	60(9.0)	38(7.8)	22(12.4)	0.186
When women report binge drinking during pregnancy				
Always discuss adverse effects of alcohol use	457(88.2)	316(87.5)	141(89.8)	0.438
Always advise to abstain from alcohol	439(85.4)	302(84.1)	137(88.4)	0.473
Always advise to reduce consumption	367(73.5)	253(72.9)	114(75.0)	0.856
Always refer to treatment	267(52.0)	186(52.0)	81(52.3)	0.959
Always refer to social services	193(38.1)	134(38.1)	59(38.1)	0.213
Order toxicology screening	68(13.5)	51(14.6)	17(11.0)	0.552

Note. Answered by family physicians and obstetricians & gynaecologists only.

occurs prior to pregnancy because pregnancy outcomes are likely a complex interaction between biology, lifestyle and life circumstances that precede the pregnancy [18–20]. In this sample, less than half of all physicians discussed the risks of lifestyle habits such as alcohol, drugs, and smoking with women of childbearing age and for the majority of topics, there were no differences according to the proportion of Native/Aboriginal patients. However, physicians who reported caring for a higher proportion of Native/Aboriginal patients were more likely to discuss sensitive topics associated with alcohol use during pregnancy, such as addiction history, sexual abuse, and emotional abuse.

Even so, no more than 20% of physicians obtained a history of sexual and emotional abuse, which is an important determinant of alcohol use in general and a risk factor for gynaecologic problems [21, 22]. It is estimated that less than 10% of abused women have spoken to their physician about their experiences of abuse, yet some studies suggest that 95% of mothers who give birth to an alcohol affected child report a history of physical or sexual abuse [23, 24]. Methods to identify women experiencing intimate partner violence have been successful in a university clinic where implementation of a screening tool resulted in 72% of women with chart documented screening [25].

Less than 45% of physicians discussed depression or mental health even though poor mental health and heavy alcohol consumption are positively correlated [26, 27]. One study indicated that women with a history of depression have more than 2.5 times the risk of heavy drinking compared to women with good mental health [28]. Given that up to two-thirds of problem drinkers have medical visits, and about one-third have mental health visits, physicians who do not inquire about mental health miss opportunities to identify those who would most benefit from preconception care and support [29].

In this survey, physicians indicated that the most common barriers to discussing alcohol use before women became pregnant were time and poorly formatted information. Thus, there are opportunities to support providers by considering alternate mechanisms (e.g. support from nurses, educators or community leaders) for developing culturally appropriate

community capacity in health promotion and preconception care.

Prevention among pregnant women

In North America it is recommended that pregnant women and those who are trying to conceive abstain from alcohol [30–32]. The majority of physicians in this survey appropriately recommended no alcohol consumption during pregnancy. Although most physicians asked about alcohol consumption during pregnancy, those who reported caring for a higher proportion of Native/Aboriginal patients were more likely to review a broader set of factors in their history taking with respect to alcohol use, including previous addictions treatment, drinking patterns prior to pregnancy recognition, drinking history of the patient's partner, and evidence of FASD in other children. The findings from this study suggest that physicians caring for a greater number of Native/Aboriginal patients were more likely to have a heightened awareness around FASD and ask about risk factors for alcohol use during pregnancy.

Characteristics of providers with a greater proportion of Native/Aboriginal patients

Canadian physicians caring for a higher proportion of Native/Aboriginal patients were more likely to practice in rural settings. Challenges associated with a rural practice include a broader scope of practice that requires training in a full range of procedures and inpatient care, more time in patient care, more time on call, and a greater likelihood of practicing obstetrics [34]. Others have noted that rural compared to urban providers engage in more pregnancy and family planning issues and less frequently in preventive procedures [35]. However, this analysis suggests that physicians with a greater proportion of Native/Aboriginal patients were more likely to have a rural practice and were more likely to engage in preventative care by asking about risk factors associated with alcohol use before and during pregnancy. Also, physicians caring for a higher proportion of Native/Aboriginal patients were more likely to be recent graduates which may explain their use of the T-ACE as a screening tool as it is currently considered one of the best screening tools [36–38].

Limitations

The mail out survey methods implemented in this study have been shown to result in response rates in excess of 70% [16]. However, despite the comprehensive and detailed process, our response rates ranged from 31.1% to 52.7%, which was lower than anticipated [16, 39, 40]. Although all organizations participated in discussions related to content and distribution of the questionnaire, the College of Family Physicians of Canada had guidelines which prevented them from offering a signature on the cover letter included in the questionnaire package. It is possible that the lower than anticipated response rate among family physicians was related to having the cover letters signed by a less well known physician, rather than the president of the organization. However, it is also possible that family physicians are the focus of numerous information gathering strategies and were less inclined to participate. Regardless, the response rate was less than anticipated.

The challenge associated with lower response rates relates to the generalizability of the findings to the surveyed population. If responders differ substantially from non-responders, the generalizability of the findings is questionable. However, if non-responders were similar to responders, the response rate will not affect the generalizability to the surveyed populations and there is no reason to assume a bias [41–43]. Studies of physician responses to surveys suggest that questionnaires with relatively low response rates (e.g. 40%) and for which systematic differences between responders and non-responders are limited could be considered valid [44]. Indeed, comparisons of late responders (as a proxy for non-responders) to early responders in physician surveys have revealed few differences with respect to demographics and practice characteristics; subsequently, non-response bias may be less of a concern in physician surveys than in surveys of the general public [16, 41, 44]. Of note, our sampling methods identified all those registered with the physician organizations but could not distinguish between those with active patient care practices, those who may have held academic or administrative positions, and those who had retired but retained organizational membership. Our response rate would have been higher had we been able to exclude from the denominator respondents who were no longer seeing patients but maintained membership in their professional organization.

The regional distribution of responses across Canada suggests that the results are likely generalizable [17, 41, 44]. However, one could hypothesize that those who responded to the survey were most interested in the topic area and could potentially represent those most committed to or interested in FASD prevention and the topic of alcohol use during pregnancy. If this were so, these results could overestimate the current estimates of FASD prevention practices, such as preconception counselling, indicating an even greater need to educate, train and provide support to physicians.

Of the total, 90 physicians ($< 5\%$ of total sample) did not report the proportion of Aboriginal clients in their practice and were considered to have $< 10\%$ of their practice as Aboriginal. This decision was made to allow for inclusion of the data gathered from these physicians. Because Aboriginal Canadians represent less than 4% of the total population, it was probable that those who did not respond were not aware

of Aboriginal clients in their practice and/or did not serve a high proportion of Aboriginal clients. If this was not the case, including these providers with providers who indicated less than 10% of their practice was Aboriginal would have biased our findings towards no difference between groups.

It is also important to note that numerous pair wise comparisons were undertaken for this descriptive analysis, so it is possible that some of the significant findings were obtained by chance. To address this issue, we have reported the number and proportion of providers in each response category and included the exact *p*-value. This allows the reader to make assessments on the clinical relevance of the data as well as on the statistically significant differences between groups.

Conclusions

In this survey, Canadian physicians with a higher proportion of Native/Aboriginal patients were more attuned to the issues of FASD, more confident in their ability to care for patients with alcohol use issues, and were more likely to assess risk of an alcohol exposed pregnancy in a comprehensive manner during the preconception and prenatal periods. This may be partly due to substantial national and provincial efforts over the last decade in Native/Aboriginal communities in Canada to more effectively address the problem of FASD prevention, diagnosis and treatment through training programs and participation in research (e.g. National Advisory Committee on Fetal Alcohol Syndrome). Many of these initiatives have targeted health care providers, recognizing their pivotal role as important agents of change. These findings may also be partly explained by the increased visibility of problems such as alcohol abuse in smaller communities. A survey of American rural practitioners suggested that this increased visibility and the frequency of alcohol use during pregnancy in rural communities leads to improved knowledge and practices regarding prevention of FASD [45].

Although physicians who reported caring for a higher proportion of Native/Aboriginal patients were more likely to engage in preventative practices, they were also more likely identify a lack of addiction treatment services and poverty as barriers to treatment for pregnant women with alcohol related problems. For the preventative efforts of these physicians to have optimal effect, additional support including access to treatment services for pregnant women and programs to address poverty are required.

Among all physicians, the proportion discussing important risk factors for alcohol use—particularly during the preconception period—remains relatively low. Thus, physician education and support for identifying problem alcohol use continues to be a high priority. Research suggests that targeted efforts toward FASD prevention and education are most effective among high risk women, and health care providers are often the first point of contact [46–48]. Thus, provider knowledge about and preventative practices for prenatal alcohol use can have a significant impact on risk behaviours and potentially alter the pregnancy outcome of high risk women. Physicians require education, support and remuneration for engaging in preventative care and additional referral resources for women of childbearing age with alcohol problems are necessary. These survey findings provide baseline data that can be used in assessing the effectiveness of educational initiatives and policy in the area of health care professional practice.

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