A survey of university students' preferences for midwifery care and community birth options in eight high-income countries.

Precis A survey of young people in 8 high-income countries shows preferences for midwifery care and community birth options are lowest among students in the United States.

Quick points

-Across the 8 high-income countries included in the stud 1 in 2 young people preferred midwifery care and 15% preferred community birth options over hospital birth.
-Interest in midwifery care and community birth were lowest among US students.
-Preferences for midwifery care and community birth options were more common among students with low childbirth fear, those who felt confident about their knowledge of pregnancy and birth, and students who learned about pregnancy and birth from family and friends.

ABSTRACT
Background: Midwifery care is associated with positive birth outcomes, access to community birth options, and judicious use of interventions. The aim of this study was to characterize and compare maternity care preferences of university students across a range of maternity care systems and to explore whether preferences align with evidence- based recommendations and options available.
Methods: A cross-sectional, web-based survey was completed in 2014-2015 by a convenience sample of university students in 8 high-income countries across 4 continents (n=4,569). In addition to describing preferences for midwifery care and community birth options across countries, socio-demographic characteristics, psychological factors, knowledge about pregnancy and birth, and sources of information that shaped students' attitudes towards birth were examined in relation to preferences for midwifery care and community birth options.

Results: Approximately half of the student respondents (48. 2%) preferred midwifery-led care for a healthy pregnancy, 9.5% would choose to birth in a birthing center, and 4.5% preferred a home birth. Preference for midwifery care varied from 10.3% among women in the United States to 78.6% among women in England. Preferences for home birth varied from 0.3% among US women to 18.3% among Canadian women. Women, health science students, those with low childbirth fear, who learned about pregnancy and birth from friends (compared to other sources, e.g. the media) and those who responded from Europe were significantly more likely to prefer midwifery care and community birth. High confidence in knowledge of pregnancy and birth was linked to significantly higher odds of community birth preferences and midwifery care preferences
Conclusions: It would be beneficial to integrate childbirth education into high school curricula, to promote knowledge of midwifery care, pregnancy and childbirth and reduce fear among prospective parents. Community birth options need to be expanded, to meet demand among the next generation of maternity service users.

Keywords: home, birthing center, midwifery care, university students, survey, OECD, childbirth, education

INTRODUCTION

High-quality, evidence-based, and respectful maternity care is a global priority [1] and scaling up access to and uptake of midwifery care is an important part of achieving this goal.2 Maternity care that is provided by educated, regulated, and licensed midwives who are integrated into the health care system is associated with reduced maternal and newborn mortality and morbidity, lower rates of interventions, higher rates of breastfeeding, shorter hospitals stays, lower costs and increased satisfaction with care among women, compared to physician-led care. [1-3] Variations in access to midwifery care and community birth options between high-income countries are linked to differences in the way maternity care is organized, funded and delivered. [2,3] Uptake of these birth provider and setting options depend to some degree upon preferences of maternity care users, which are affected by culture, access to information about the benefits of physiologic birth, and fear of birth. [4] Access to midwives and community birth options may also be limited by geography (i.e. country of residence and/or urban versus rural residence) and ability to pay, in countries where midwifery care across birth settings is not publicly funded.

Several studies have investigated maternity care preferences and attitudes of young women and men who plan to have children in the future. [5-13] These studies typically focus on attitudes of young people in a single country or region. For example, Stoll et al. surveyed Western Canadian university students about their attitudes towards birth in 2006. Canadian university students who reported that their attitudes towards birth were shaped by the media were significantly more like to be fearful of birth, compared to students who reported other sources (such as family and friends). [11] Students who were more fearful were also more likely to prefer obstetric interventions [13] whereas those who had witnessed a birth first-hand reported significantly less childbirth fear and were less likely to prefer childbirth interventions. [12] The current study expands on the Canadian study by including university students from [7] additional countries across 4 continents, to better understand how maternity systems intersect with attitudes towards birth among young people who plan to have children.

This article presents the last in a series, based on data collection and analysis in 8 Organisation for Economic Co-operation and Development (OECD) countries. [14-16] The first

article described the development of the online survey tool, the forward-backward translation process and the psychometric properties of a 10-item scale that measures childbirth fear prior to pregnancy. [14] The second article focused on preferences for cesarean birth without medical indications and reasons for this preference. [15] Preferences for cesarean birth ranged from 8% in Iceland to 18% in Australia, with an average of 10 % across samples. The main reasons why students preferred cesarean without medical indications were fear of labor pain and to avoid physical damage/to maintain vaginal integrity. A dose-response relationship between childbirth fear scores and preferences for cesarean were observed, i.e. 3% of students who scored in the bottom quartile of the scale preferred a cesarean compared to 23% who scored in the top quartile (i.e. reported the highest fear levels). [15] In the third publication, attitudes towards obstetric technology were more closely examined. [16] More than half of students agreed that technology makes birth easier (56%), and half felt that birth technology protects babies from harm (49%) and that a woman has the right to choose a medically unnecessary cesarean (51%). Acceptance of childbirth technology was higher in countries with higher national cesarean rates, and among students with higher levels of fear, those who learned about birth via the media and at school, those with less confidence in their knowledge of pregnancy and birth and younger students. Young men were more likely to support childbirth technologies, compared to young women. When rank-ordering the 8 participating countries for each of the six items that measured attitudes towards childbirth technologies (with possible scores ranging from 8-48, with higher scores indicating more positive attitudes towards obstetric technology), students from New Zealand scored the lowest (16 points) and US students the highest (43 points). [16]

In this article, the focus is on analysis of preferences for midwifery care and community birth options among young people included in the parent cross-country study. These preferences are discussed in the context of the maternity care systems in each country where data were collected. Countries from 4 continents and with different maternity care systems and different degrees of birth medicalization were included in the study.

The following research questions were formulated: In the included countries (Australia, Canada, Chile, England, Germany, Iceland, New Zealand and Untied States) what proportion of university students prefer midwifery care, and community birth options? Are

socio-demographic characteristics, country of residence, psychological profile (i.e., childbirth fear, depression, stress and anxiety), knowledge about pregnancy and birth, and sources of information that shaped students' attitudes towards birth related to preferences for type of provider and place of birth?

BACKGROUND

To better understand how differences and similarities in maternity care preferences might relate to the organization of maternity care, the maternity care systems of countries where data were collected are briefly described.

Australia:

In Australia 39 % of childbearing women have a midwife as their lead maternity care provider. [17] Most midwives practice in public hospitals and a small minority attend birth at home or in birthing centers. In 2013, 97.0% of women gave birth in hospitals, 2.0% birthed in a birth center, 0.3% at home and 0.3% in other settings including birth before arrival at hospital. [18] There is increasing demand for continuity of care models and a priority within the National Maternity Services Plan in 2011 was to increase access by expanding the range of care models available. [19] Maternity care is either government or privately funded. Women with private health insurance usually give birth in private hospitals where interventions rates are higher. [20]

Canada:

Approximately 1700 midwives across Canada provide autonomous, primary care maternity services through the prenatal, intrapartum and postpartum period to six weeks following birth. [21,22] Midwives are lead providers for 11% of all births in the country. [22] The Canadian midwifery model of care emphasizes continuity of care, informed choice, and choice of birth place, including home birth. [23] The national home birth rate is 1.2%. [3] Some provinces where midwifery is regulated (e.g. Quebec and Ontario) also offer the option to give birth in birthing centers. Maternity care is government funded.

Chile:

Professional midwives provide the majority of gynecologic and obstetric primary care, and provide care during labor and vaginal births in the public system where they work in collaboration with obstetricians. [24] In private hospitals, obstetricians are the lead care

providers during pregnancy and birth, although midwives also care for women throughout labor. Despite midwives being present at all births in the country, they were lead providers for only 38% of births in 2015 [25] ; this is so because they are not the main caregivers during cesarean birth - which account for 50% of all births in 2015 and midwives are not the lead providers for women who give birth in private hospitals.25 Home birth is not supported by the health care system; nonetheless demand for midwife-attended home birth is rising. [26] There are no birth centers external to hospitals or clinics, but there are recent examples of midwifery-led units within maternity hospitals. Maternity care is either government or privately funded.

England:

In England, almost all women receive midwifery care (98%) [27] throughout the maternity care episode (from first booking through pregnancy, labor and birth and up to 6 weeks postnatal). Women had midwives as their lead maternity care provider for more than half of births (55.6%) in 2014. [28] United Kingdom (UK) government policy stipulates that a range of birth places should be available to women, including home, freestanding midwife-led unit, alongside midwife led unit, and hospital. In 2015, 2.3 % of women gave birth at home. [29] The majority of maternity care in the UK is government funded via the National Health Service.

Germany:

In Germany, midwives´ attendance at every birth in the country, including cesarean birth, is mandated by federal law. [30] Many German midwives work in a combination of hospital employment and independent (community-based) practice. [30] The majority of women are cared for by obstetricians during pregnancy and obstetricians typically oversee most maternity units. Less than 2% of newborns were born at home or in freestanding birthing centers in 2014. [31] Reimbursements through the woman's public or private insurance cover the cost of birth; women who give birth at home or in a freestanding birth center usually have some out-of- pocket expenses.

Iceland:

All pregnant, laboring and postpartum women in Iceland receive midwifery care, in collaboration with obstetricians when complications arise. Almost all women are attended by midwives during birth. [32] Home birth is presented as on option for healthy women and

just over 2% of newborns in Iceland were born at home in 2012 – which is the highest rate in the Scandinavian countries. [33] Maternity care is government funded.

New Zealand:

In New Zealand women receive care from both community-based and hospital midwives and a midwife is present at every birth. Every woman in New Zealand has to have a Lead Maternity Carer (LMC) and the majority of LMCs are midwives (93%), with the rest being obstetricians or general practitioners. [34] LMC midwives provide continuity of care throughout pregnancy, labor, birth and up to six weeks postnatally for woman who have booked with them. Women can choose to birth at home, in freestanding maternity units or in hospital; 3.3% of women delivered at home and 9.1% in birthing centers in 2012. [3] Primary, secondary and tertiary services are integrated to meet the individual needs of each woman and her family through a woman-centred midwife-led model. [35] Women who develop complications and require specialist care are referred to these services by their LMC. Maternity care is government funded.

United States

In the United States midwives serve as maternity care providers during pregnancy, labor, birth and the postpartum period to a small but growing number of women who reside in the United States. The vast majority of midwives in the United States are certified nurse-midwives (CNMs) who attend hospital births although some CNMs and other types of midwives (certified professional midwives and direct-entry midwives) attend births in homes or freestanding birth centers. In 2014, 98.5% of all births in the United States were in hospitals and 1.5% were in out-of-hospital settings. [36] Certified nurse midwives attended 8.1% of births in 2015. [37] Maternity care is primarily paid through private commercial insurance (often requiring out-of-pocket expenses), and by state government- based Medicaid programs.

In summary, midwives' attendance at birth is highest in Germany and New Zealand and lowest in the United States and Canada. Availability of community birth options vary from no official option to give birth at home (in Chile) to good access in countries where midwives offer community birth options to eligible women and maternity care is publicly funded (England, Iceland, Canada and New Zealand). Cesarean birth rates also varied

greatly across included countries, from 16 % in Iceland in 2015 [38] to 50 % in Chile in 2015. [25]

METHODS

Setting

Data were collected at 10 universities in 8 OECD countries using a combination of convenience and purposive sampling. The Canadian team initiated the study and worked with existing international partners and recruited new partners. For example, the first author travelled to a conference in Brazil, with the purpose of identifying a South American partner. In Germany and Canada, data were collected at 2 universities, and at one university each in Australia, England, Chile, Iceland, New Zealand, and the United States. Three participating universities served large urban centers (Santiago in Chile, Perth in Australia, Auckland in New Zealand), 3 were located in larger cities (Hannover in Germany, Boston in the US and Hamilton in Canada) and 4 in smaller cities (Prince George in Canada, Preston in England, Reykjavik in Iceland and Bamberg in Germany). Countries (rather than universities) were chosen, to represent a variety of maternity care systems and geographic regions.

Recruitment

A link to the online survey was distributed in different ways at participating universities, depending on the institutions' protocols for student surveys. At some institutions the survey was sent to all enrolled students (e.g to 9,805 students at University of Iceland and to 12,800 students at University of Bamberg, Germany), or a portion of students (e.g. 8,000 domestic students at Curtin University, Australia, comprising 15% of the student body and to a sample of 3,600 undergraduate female students at Boston College, United States.) An overall repose rate could not be established as 2 universities (one in Canada and one in England) did not have central mechanisms for distributing the online survey link, and recruitment occurred through university websites and individual departments. The recruitment of students is described in more detail elsewhere. [14]

Survey Instrument

The online survey instrument was adapted from a 2006 survey of attitudes towards pregnancy and birth that was completed by 3680 men and women at the University of

British Columbia, Canada. [11-13] An updated version of the English survey was pilot tested and then forward-backward translated into Icelandic, German and Spanish. The survey was called '*A study of childbirth attitudes among university students'* and an accompanying information sheet informed the participants that the purpose of the study was to assess university students' attitudes towards pregnancy and birth.

The survey included 3 eligibility questions, 8 demographic questions (e.g. age, country of birth, marital status), 10 items about birth preferences (e.g. preferred type of provider, and preferred place and mode of birth in a healthy pregnancy), 25 items assessing attitudes towards birth, including 10 items that comprised the Childbirth Fear-Prior to Pregnancy (CFPP) Scale and a visual analog scale that measures childbirth fear and was adapted for university students by the team. The next 12 questions assessed students' confidence in their knowledge of pregnancy and birth, questions about sources of information (e.g. media, books, family, friends) that shaped their attitudes towards birth and questions about reproductive health topics they would like to learn more about. Finally, respondents were asked to complete the short form of the Depression Anxiety Stress Scale (21 items). [39] The DASS-21 was included, to assess if maternity care preferences were linked to general depression, anxiety or stress.

Women and men were eligible to participate in the survey if they had never had children, were 40 years or younger, and were not pregnant (or had a partner who was pregnant) at the time of data collection, but planned to have children in the future. The study was approved by the Behavioral Research Ethics Board at the University of British Columbia, Canada and at each participating institution. Students reviewed the study consent form on page 1 of the online survey; submitting a response implied consent to participate in the study.

Definitions and description of key indicators

Preference for midwifery-led care: Respondents were asked to choose which care provider they would want to provide care during pregnancy and birth, assuming that they (their partner) have no health problems and will not experience complications during pregnancy. Options included: Midwife, General Practitioner (GP), Obstetrician/Gynecologist, I don't know and Other. The GP option was only included in countries where GPs routinely offer intrapartum care (e.g. Canada and Australia). Each type

of care provider was briefly defined, and definitions reflected the scope of practice for each care provider within each country. For instance, in countries where midwives attend births in different settings, this was included in the definition.

Preference for community birth options: Respondents were asked to choose where they would prefer to give birth. Response options for place of birth preferences varied by country, depending on the organization of maternity care in the country. For instance, two options for hospital birth were included - either with a midwife or a physician in the Canadian and Australian surveys. In Germany, the survey included two hospital options: a) with a midwife and doctor or b) on a midwifery-led hospital ward. All countries included the options 'at home, with a midwife', 'a birthing center' (defined as an out-of-hospital birthing facility, staffed by midwives; a more home like environment than a hospital ward), Home and birthing centers were included as options in each country, to assess consumer demand for community birth, regardless of whether these options were available in the country at the time of data collection.

Psychological profile of students

Childbirth fear among students was measured with the 10-item CFPP scale. Responses can be summed into a total score or into three subscale scores (measuring fear of pain, fear of complications and fear of physical changes as a result of labor and birth). The CFPP scale has good psychometric properties, i.e. internal consistency reliability (as measured with Cronbach's alpha) exceeded 0.86 across country samples. A detailed description of the survey development, and CFPP psychometric testing has been published elsewhere. [14] Depression, anxiety and stress were measured using the short form of the DASS. [39] Each domain is measured with 7 items and clinically relevant cut-off scores were developed for the DASS as reported in this article. Specifically, scores were categorized into moderate, severe and extremely severe depression, anxiety and stress versus normal or mild depression, anxiety and stress, according to scoring instructions developed by the scale authors.

Knowledge of birth and sources of information that shaped attitudes towards birth

Students were asked to rate the statement 'I feel confident about my level of knowledge around pregnancy and birth' on a 6-point Likert scale (strongly disagree to strongly agree). Response options were dichotomized as follows: strongly disagree,

disagree, somewhat disagree and somewhat agree were assigned a score of 0 and students who agreed or strongly agreed received a score of 1. Finally, students were asked whether their attitudes towards pregnancy/birth were shaped by the following: visual media (TV, YouTube, movies etc.), written media (books, internet etc.), the experiences/stories of friends, the experiences/stories of family members, school-based health/sex education and other. Respondents checked each source of information that shaped their attitudes towards pregnancy/birth.

Data analysis

The proportion of students who preferred midwifery care, and community birth options were reported for women and men and stratified by country of residence. Gender differences were tested, using the Chi Square test. Next, multivariate logistic regression analysis was performed to identify socio-demographic, psychological and other factors that might be linked to increased odds of preferring 1) midwifery care, and 2) community birth options (home and birthing center). Age, immigration status, gender and the proportion of health sciences students were included in the models because these socio-demographic variables differed across countries. The survey country was entered as a dummy variable with five levels: Australia, NZ, US, Canada and Chile. Respondents from Europe (Germany, UK and Iceland) constituted the reference group. All variables (i.e. sociodemographic variables, psychological profile indicators, and knowledge of birth variables) were entered into multivariate logistic regression models.

RESULTS

Demographic characteristics of the respondents are presented in Table 1. Responses from 4569 students were analyzed, after ineligible responses were removed. Most respondents were women (79.3%) and one in five were men (20.7%). The average age of respondents was 23.3 years (range: 17-40). The majority were born in the country from which they responded (83.4%) and 16.6% immigrated to their site of residence. The largest proportion of responses came from Europe (41.6%), followed by Australia (17.2%), South or Central America (16.5%) and North America (14.6%). Age, immigration status, gender and the proportion of health sciences students differed significantly across countries ($p < .001$ for all comparisons). For instance, 1 in 3 students from Australia were born outside the country compared to only a handful of Icelandic students. A large

proportion of men responded to the survey in Chile whereas only 35 men participated in England. The proportion of health sciences students ranged from 56.0% in England to 20.2% in the United States.

Approximately 1 in 5 students reported moderate to severe anxiety, depression and stress and 1 in 3 reported fear of birth complications, fear of physical changes or fear of pain. Close to a third of students had confidence in their level of knowledge of pregnancy and birth. In terms of the sources of information that shaped their attitudes towards pregnancy and birth, the experiences and stories of family and friends were the most commonly reported sources (71.7% and 57.5% respectively), followed by visual media (55.5%) (Table 1). Preference for midwifery-led care and community birth options Overall, 48.2 % of students preferred midwifery care, with significantly more women than men preferring this option (51.5 % versus 35.8 %, χ^2 =74.33, df=1, p < .001). (Table 2). Preference for midwifery care varied from 10.3% among US women to 78.6% among women in England. Overall, 86.0% preferred a hospital birth, 9.5% a birth in a birthing center and 4.5% a home birth. Women were significantly more likely to prefer community birth options, compared to men (5.0% versus 2.6% for home births and 11.0% versus 3.7% for births in birthing centers, χ^2 =58.65, df=2, p < .001). Preferences for home birth varied from 0.3% among US women to 18.3% among Canadian women. Preferences for birthing centers were highest among women in New Zealand (25.2%) and lowest among women in the United States (4.3%).

Multivariate modelling

Results of the multivariate analysis are shown in Table 3. The odds of preferring a midwife (compared to other types of providers) were significantly higher among students who were born in the country from which they responded versus students who immigrated there (aOR,1.83;95% CI, 1.49-2.24), health sciences students versus students studying other subjects (aOR, 1.46; 95% CI, 1.25-1.70), and women versus men (aOR, 1.58; 95% CI, 1.30-1.92). Age was not linked to preferences for midwifery care but country of residence showed some significant effects. Odds of preferring midwifery care were significantly lower among students who responded from Australia (aOR, 0.50; 95% CI, 0.40-0.61), the United States (aOR, 0.08; 95% CI, 0.06-0.12) and Canada (aOR, 0.29; 95% CI, 0.21-0.40) (compared to students from European countries). Students who reported that their

attitudes towards birth were shaped by the stories and experiences of family and friends compared to other sources were also significantly more likely to prefer midwifery care (aOR, 1.31; 95% CI, 1.09-1.57 and aOR, 1.36; 95% CI, 1.17-1.59). The only psychological factor associated with preferences for midwifery care was fear of physical changes following childbirth (compared to low/moderate fear), which was associated with significantly reduced odds of preferring a midwife (aOR, 0.69; 95% CI, 0.59-0.81).

Preferences for community birth were strongest among women (aOR, 3.28; 95% CI, 2.29-4.70) and students who lived in New Zealand (compared to Europe) (aOR, 3.69; 95% CI, 2.70-5.04). Other factors that were linked to significantly increased odds of community birth preferences were: studying health sciences (aOR, 1.26; 95% CI, 1.03-1.55), living in Canada or Chile, compared to Europe (aOR, 2.42; 95% CI, 1.65-3.54; aOR, 1.46; 95% CI, 1.09-1.97), high confidence in knowledge of pregnancy and birth versus low/moderate confidence (aOR, 1.52; 95% CI, 1.23-1.87); and reporting that written media and the experiences and stories of friends shaped their attitudes towards birth (aOR,1.50; 95% CI, 1.22-1.84 and aOR,1.46; 95% CI, 1.16-1.84 respectively). Factors that were linked to significantly reduced odds of preferring a community birth were: fear of birth complications (aOR, 0.73; 95% CI, 0.56-0.94), fear of pain (aOR, 0.76; 95% CI, 0.58-0.98), living in the United States (compared to Europe) (aOR, 0.45; 95% CI, 0.25-0.81) and reporting that health and sex education in high school was a source of information that shaped students' attitudes towards birth (aOR, 0.61; 95% CI, 0.48-0.76). Depression, anxiety and stress scores were neither linked to preferences for midwifery care nor preferences for community birth options.

DISCUSSION

Examining the degree of commonalities and differences in university students ' childbirth preferences between countries can help to lay the foundation for developing strategies that increase demand for midwifery-led care across birth settings and can inform educational programs designed to achieve this aim.

Overall, half of the students in this study preferred midwifery care during a healthy pregnancy, one in 10 would choose to give birth in a birthing center, and 5% would prefer a home birth. Men across the countries studied were significantly less likely to prefer midwifery care, and community birth options. Reasons for these gender-differences should

be explored in future studies. One literature review of paternal fears of childbirth identified that men are most concerned with the safety of mother and baby 40 and they might see a physician-attended hospital birth as the safest option.

This study identified a large gap between demand for community birth options among young people who plan to have children and the actual proportion of women accessing these options. [3] Free-standing birth centers were especially popular among students, and inclusion of this option would meet the needs and preferences of the next generation of childbearing families. Preferences for home birth in our sample far exceeded actual home birth rates across countries, with the exception of the United States. In this sample, 0.3% of US women preferred a home birth; the national home birth rate was 0.9% in 2014. [3]

The large differences in preferences for home birth between the United States and Canadian students (0.3 % versus 18.3 %), despite similarly low rates of midwifery coverage and home births in these countries were notable. In a comparison of attitudes towards home birth among Canadian registered midwives (RMs) (n=451) and US CNMs (n=1893), the authors found significantly less favorable attitudes towards planned home birth among CNMs versus RMs. These differences could be explained by differential exposure to home birth during education and practice. [41] Canadian RMs are trained to provide care across birth settings and must offer choice of birthplace to eligible women, where CNMs had more limited exposure to home birth. When attitudinal differences towards planned home birth can be demonstrated at the (prospective) service user and provider level between two countries, it is likely that system-level issues factor into these differences. The International Confederation of Midwives (ICM) states that women ought to have 'the right to a home birth attended by midwives as a valid and safe option' but recognizes that not all countries have legislation and health care systems that support home birth. [42] ICM urges these countries to work towards inclusion of home birth as an option.

Rates of preferences for midwifery care and community birth options were markedly lower among US students (Table 2) and living in the United States was linked to significantly lower odds of preferring midwifery care and community birth options compared to living in European countries (Table 3). These findings reflect current

maternity norms in the United States, i.e. most women give birth at hospitals, under the care of obstetricians. [3] Cost of maternity care in the United States is much higher than in other OECD countries, and maternal and newborn care is the largest payout category for public and private insurers in the United States. Fee for service is the most common payment system and incentivises high use of procedures and services. [3] The United States stands out among OECD countries in the way maternity care is funded, high cost of healthcare per capita and the relatively high rate of maternal mortality, especially among women of colour and those living in rural areas. Experts point out that there is much room to improve maternal outcomes and experiences in the United States, especially for healthy women. 3 Expansion and integration of the midwifery workforce in the United States would address this problem and in turn, improved integration of midwives into the healthcare system appears to make a difference in terms of attitudes of young people towards midwives.

There are several other potential explanations for the low demand for midwifery care and community birth among US students, including limited access to midwifery care, fragmented midwifery regulation and place of birth options across states [43] and press coverage of adverse outcomes at midwife-attended home births. [44] There is also a lack of understanding of the training and scope of practice of different types of US midwives. In a study by DeJoy 45, thematic analysis of responses from 459 US college students about childbirth and midwifery care revealed that most students could not differentiate between the different types of midwives that practice in the United States. Further, many doubted the quality of midwifery education and the safety of midwifery practice. Dejoy recommended that educational strategies focus on the safety of midwifery care and the training and certification requirements of midwives. [45] Further, young women in the United States are less likely to be surrounded by family and friends who have experienced a midwifery model of care compared to young women from Europe, since most women in the United States see obstetricians during pregnancy and birth. [3] In other words, the confluence of a highly medicalized birth culture, predominance of obstetricians, lack of universal health care coverage and diverse licensure of midwives may all contribute to the attitudes of US students towards birth.

In the current study, anxiety and depression were not linked to preferences for midwifery care and community birth options. These findings align with results from a previous analysis of socio-demographic and psychological factors that relate to preferences for cesarean without medical indications among young women from 8 OECD countries. [15] Fear of physical changes following birth and fear of pain were significantly associated with increased odds of preferring a cesarean but not depression, general anxiety and stress. These results indicate that addressing childbirth fears through education might promote interest in, and comfort with, midwifery care and community birth options, and has the potential to decrease rates of unnecessary cesareans.

The experiences and stories of friends were linked to significantly increased odds of preferring midwives and giving birth in community settings, indicating the strong influence that the peer network has on preferences of young adults. School-based health and sex education are likely to focus on the anatomy and physiology of reproductive systems and prevention of pregnancy. Further research ought to examine school-based education sessions that normalize birth and provide students with opportunities to learn more about midwifery care and different birth options, and that enable students to discuss their fears and concerns. The importance of education is further emphasized by the finding that students with high confidence in their knowledge of pregnancy and birth were significantly more likely to prefer community birth options. Other authors have demonstrated that lack of exposure to and lack of knowledge about birth is linked to increased fear. For example, confidence in knowledge about birth and access to childbirth information were independently and significantly associated with a lower risk of reporting childbirth fear among US students (n=752). [13]

In country-specific analyses from England and Canada, the authors found that young adults who learned about birth through the media (compared to other sources) exhibited higher levels of fear. Negative impressions of birth conveyed by family and friends were also linked to higher fear scores whereas witnessing a birth first-hand was associated with lower fear. [7,12]

These findings point to the importance of re-evaluating how young people learn about birth to counteract negative or exaggerated media portrayals and negative birth stories. Children and youths should be given opportunities to learn about and ask questions

about pregnancy and birth early on. Midwives are in an ideal position to deliver evidence-based education, in close collaboration with teachers and parents. A unique, 4-hour midwife-led education program for grade 3-6 children in Germany has been shown to both increase knowledge of birth and to decrease childbirth worries of elementary school children. 46 Plans are underway to translate and adapt the German curriculum to the Canadian context, and to deliver and evaluate the workshops at 5 elementary schools in Vancouver. The key aim of this work is to learn how students rate the content of the education modules, and whether sessions increase knowledge about pregnancy and birth, and reduce childbirth-related fears.

Limitations

There are several limitations to this study including self-report bias and that participants were more educated than the general population of 18-40 year olds. Because of the convenience sampling frame the findings cannot be generalized to students at the educational institutions where data were collected or to the larger population of women and men who plan to have children. Significant resources would be required to survey a representative sample. While the response rates were low, they were similar to other online student surveys. [8,10,13]

CONCLUSIONS

Results from this analysis highlight connections between health care structures, cultural norms, and preferences for care. In countries like England and Iceland where midwifery care is well integrated into the healthcare system, midwives provide the majority of care to pregnant women, healthcare is government funded and women have options for place of birth, rates of preferences for midwife-led care were highest. Preferences for midwives were also higher among students from Chile and New Zealand, where midwives provide the majority of pregnancy and birth care compared to countries like Canada and the United States, where access to midwifery care is limited. Notably in Canada and the US the midwifery coverages are similarly low, yet more than three times as many Canadian students preferred midwives compared to US students. These findings indicate that government funded midwifery care across birth settings in a country where

midwives are well-integrated and generally enjoy strong public support likely affects the attitudes of young people towards midwives.

The findings also highlighted a sizeable discrepancy between the proportion of students who preferred community birth options and the current prevalence of community births in the countries included in the study. Finally, our findings emphasize the importance of addressing fears about labor pain, potential complications and physical changes following childbirth through education prior to pregnancy, in order to promote consumer demand for midwifery care and community birth options. Maternity care systems that make midwifery and community birth options more widely available can expect to see a reduction in childbirth interventions and healthcare costs, while meeting the needs of the next generation of maternity service users.

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Table 1: Sample characteristics (n = 4569)

Demographic Characteristics	n (%)
Country where data were collected	
Australia	744 (16.3)
Canada	262 (5.7)
Chile	772 (16.9)
England	348 (7.6)
Germany	981 (21.5)
Iceland	560 (12.3)
New Zealand	411 (9.0)
United States	491 (10.7)
Region of birth	
Europe	1902 (41.6)
Australia/Oceania	786 (17.2)
South or Central America	752 (16.5)
North America	665 (14.6)
Asia	189 (4.1)
Africa	55 (1.2)
West Central Asia or the Middle East	36 (0.8)
Other	184 (4.0)
Field of study	
Arts/humanities	2034 (44.5)
Science or engineering	597 (13.1)
Health sciences	1351 (29.6)
Other	258 (5.6)

Missing	329 (7.2)*
Highest level of education completed	
High school	1206 (26.4)
Some college or university courses	1317 (28.8)
College diploma	231 (5.1)
Completed a university degree	1149 (25.1)
Graduate degree	661 (14.6)
Missing	5 (0.1)
Psychological profile	
Moderate/severe depression	748 (18.6)
Moderate/severe anxiety	815 (20.3)
Moderate/severe stress	723 (18.0)
Moderate/severe fear of birth complications	1171 (27.6)
Moderate/severe fear of physical changes following childbirth	1354 (32.3)
Moderate/severe fear of pain	1285 (30.4)
Knowledge of birth and sources of information that shaped attitudes towards birth	
High confidence in level of knowledge of pregnancy and birth	1195 (28.6)
Do you feel that your attitudes towards pregnancy/birth were/are shaped by:	
Visual media	2534 (55.5)
Written media (books, internet etc.)	1743 (38.1)
The experiences/stories of friends	2627 (57.5)
The experiences/stories of family members	3275 (71.7)
School-based health/sex education	1472 (32.2)

*Missing values are all from Iceland, where this question was optional.

Table 2: Preferences for midwifery-led care across settings, by country

	Total n (%)	Australia n (%)	Canada n (%)	Chile n (%)	England n (%)	Germany n (%)	Iceland n (%)	New Zealand n (%)	United States n (%)
Preference for midwifery led care									
Women	1863 (51.5)	224 (39.9)	72 (35.6)	292 (60.3)	246 (78.6)	427 (50.2)	356 (74.6)	207 (59.1)	39 (10.3)
Men	337 (35.8)	42 (23.6)	5 (8.3)	139 (48.3)	26 (74.3)	49 (37.7)	46 (57.5)	24 (40.0)	6 (5.4)
Preference for home birth									
Women	177 (5.0)	10 (1.8)	36 (18.3)	47 (9.9)	18 (5.9)	30 (3.6)	18 (3.9)	17 (5.0)	1 (0.3)
Men	24 (2.6)	4 (2.3)	0	7 (2.5)	2 (6.1)	0	5 (6.3)	4 (7.0)	2 (1.8)
Preference for birthing center									
Women	388 (11.0)	65 (11.8)	18 (9.1)	48 (10.1)	51 (16.8)	61 (7.3)	43 (9.2)	86 (25.2)	16 (4.3)
Men	34 (3.7)	10 (5.7)	1 (1.8)	8 (2.8)	2 (6.1)	5 (3.8)	2 (2.5)	6 (10.5)	0

Table 3: Factors linked to preferences for midwifery care (n=3659) and community birth preferences (n=3592) among students from 8 countries

	Preference for midwifery care		Preference for community birth options	
	SE	aOR (95% CI)	SE	aOR (95% CI)
Socio-demographic profile				
Born in country (reference category: immigrated to country)	0.10	1.83 (1.49- 2.24	0.14	1.16 (0.88-1.53)
Health sciences student (reference category: other fields of study)	.078	1.46 (1.25- 1.70)	0.11	1.26 (1.03-1.55)
Women (reference category: men)	0.10	1.58 (1.30- 1.92)	0.18	3.28 (2.29-4.70)
Age ≤ 23 years (reference category: > 23)	0.09	1.09 (0.93- 1.29)	0.12	0.88 (0.70-1.10)
Country: (reference: European countries) Australia	0.11	0.50 (0.40-0.61)	0.16	1.25 (0.92-1.71)
New Zealand	0.13	1.22 (0.94-1.58)	0.16	3.69 (2.70-5.04)

United States	0.19	0.08 (0.06-0.12)	0.30	0.45 (0.25-0.81)
Canada	0.16	0.29 (0.21-0.40)	0.20	2.42 (1.65-3.54)
Chile	0.11	1.18 (0.96-1.46)	0.15	1.46 (1.09- 1.97)
Psychological profile				
Moderate/severe/extremely severe depression (reference category: normal/mild depression)	0.12	1.15 (0.91-1.45)	0.16	1.20 (0.88-1.65)
Moderate/severe/extremely severe anxiety (reference category: normal/mild anxiety	0.12	0.85 (0.68- 1.06)	0.16	1.12 (0.83-1.52)
Moderate/severe/extremely severe stress (reference category: normal/mild stress)	0.12	1.07 (0.84- 1.35)	0.16	0.92 (0.67-1.27)
Moderate/severe fear of birth complications (reference category: low fear)	0.09	0.86 (0.73- 1.03)	0.13	0.73 (0.56-0.94)
Moderate/severe fear of physical changes following childbirth (reference category: low fear)	0.08	0.69 (0.59- 0.81)	0.12	0.87 (0.69-1.10)
Moderate/severe fear of pain (reference category: low fear)	0.09	0.91 (0.77- 1.08)	0.13	0.76 (0.58-0.98)

Knowledge of birth and sources of information that shaped attitudes towards birth				
High confidence in level of knowledge of pregnancy and birth (reference category: low/moderate confidence)	0.08	1.10 (0.94-1.29)	0.11	1.52 (1.23- 1.87)
Do you feel that your attitudes towards pregnancy/birth were/are shaped by:				
Visual media (yes/no)	0.08	1.15 (0.99-1.35)	0.11	0.93 (0.75-1.15)
Written media (books, internet etc.) (yes/no)	0.08	1.08 (0.93-1.25)	0.10	1.50 (1.22-1.84)
The experiences/stories of friends (yes/no)	0.08	1.36 (1.17-1.59)	0.12	1.46 (1.16-1.84)
The experiences/stories of family members (yes/no)	0.09	1.31 (1.09-1.57)	0.13	1.03 (0.79-1.34)
School-based health/sex education (yes/no)	0.08	0.92 (0.79- 1.08)	0.12	0.61 (0.48-0.76)

Note: all variables listed in Table 3 were simultaneously entered into the logistic regression models.
SE= standard error
aOR =adjusted odds ratio; CI= confidence interval

Abbreviations

OECD - Organisation for Economic Co-operation and Development

ICM - International Confederation of Midwives

AOR- Adjusted odds ratio

CI - confidence interval