

Giving birth in rural Arctic *Greenland* results from an Eastern Greenlandic birth cohort

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ABSTRACT

Eastern Greenland is one of the most remote areas in the world. Approximately 3,500 people lives in two small towns and five villages. There is limited information on birth outcomes in Eastern Greenland. A cohort of all birthing women from Eastern Greenland from 2000 to 2017 was established and pregnancy, birth, and neonatal outcomes were described. A total of 1,344 women and 1,355 children were included in the cohort where 14.5% of the women were 18 years or younger, and 36.2% were single parents. Most women, 84.8% gave birth in East Greenland and 92.9%, experienced a vaginal, non-instrumental birth. The overall caesarean section rate was 6.5%. The rate of premature births was 10.1% and 2.2% of the children were born with malformations. The rate of premature births was high, preventive initiatives such as midwifery-led continuity of care including a stronger focus on the pregnant woman's social and mental life situation may be recommended. Organisation of maternity services in East Greenland may benefit from a strong focus on public health, culture, and setting specific challenges, including the birth traditions of the society.

ARTICLE HISTORY

Received 11 March 2022

Revised 14 June 2022

Accepted 15 June 2022

KEYWORDS

Rural health service; referral; arctic perinatal care; public health; inuit; greenland; midwifery

Introduction

Childbirth takes place all over the world and is the one thing that all societies have in common, irrespective of wealth and geographical location. The public health level and health care support vary between countries and communities similar to the rituals of birth and life conditions for the families [1]. World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) focus on lowering perinatal morbidity and mortality as well as providing good birth experiences as childbirth may have long-term consequences both physically and emotionally for both mother and child [2]. WHO emphasised, that childbirth should be not only be a safe but also a positive experience for women and their families. Moreover, it is highlighted that women-centred care may optimise the quality of labour and childbirth through a holistic and human rights-based approach [2]. Different ways of achieving these goals may be used, such as professional training of midwives, doctors, and nurses [1], as well as centralising birth in larger hospitals with available technology [3–5]. People living in remote areas may be in a more vulnerable situation when giving birth as they may have to travel far to receive healthcare and remote communities may lack availability of trained

health professionals [1,5,6]. However, centralisation of childbirth may challenge the way remote communities normally manage major social events such as childbirth, thus reducing the family involvement [5,7,8]. The social aspect of pregnancy and childbirth is of pivotal importance for remote communities [5,9] as being born where the family lives is essential to the survival of remote communities [10]. An example of this is in the remote area in Nunavik in Northern Canada, where the community has decided to support women to give birth in their own remote community and increase prevention in relation to public health and social services [5,11,12].

Organisation of birth services in remote areas such as Nunavik is characterised by being primarily community-based, midwifery-led, and focusing on health promotion [13,14]. There is a high proportion of spontaneous vaginal births and limited or no access to perform caesarean sections and emergency transfers during birth [4,14].

Greenland is the world's largest island with a population of 56,000 primarily indigenous people of Inuit origin representing the largest Inuit population in the world [15].

The central part of Greenland is covered by an ice cap, and the population lives only on the west and east coasts.

Greenland was previously a Danish colony but obtained Home-Rule in 1979 and Self-Government in 2009. There is still a close cooperation between Greenland and Denmark, also in relation to healthcare.

The 2,600 km long east coast of Greenland is one of the most remote areas in the world, with a very harsh climate and a population of approximately 3,500 people. Publications on birth outcomes in remote ARTIC areas are sparse and mainly from Alaska and Northern Canada [16,17]. Thus, we lack evidence on pregnancy, birth, and neonatal outcomes from Eastern Greenland which is one of the most remote areas in the world to give birth [17,18].

The aim of this study was to provide knowledge on pregnancy, birth, and neonatal outcomes in Eastern Greenland and thereby ensure novel evidence on births in remote areas in Greenland.

Method

Design

This study was designed as a populations-based cohort study including all women from Eastern Greenland giving birth from gestational week 22 during an 18-year period from 2000 to 2017. In Greenland, all citizens have a unique identification number (civil registration number) assigned to newborns at the time of birth. The number is personal and used whenever a person is in contact with the Greenlandic health care system.

Data source

Data for the cohort were established from data obtained from the Greenlandic Medical Birth Register (GMBR). The GMBR includes information on all attended births in Greenland. Data are collected systematically by the attending midwife and entered into the GMBR. Data are stored in the GMBR and accessible online after approval from the authorities.

From the GMBR, we obtained information on maternal age, marital status, municipality, rural level of living, and place of giving birth. Pregnancy and birth outcomes included number of previous pregnancies, antenatal visits at the doctor and midwife. Overall use of pain-relief during labour, including use of nitrous oxide, use of morphine, further induction and augmentation of labour, assisted birth (vacuum), episiotomy, caesarean section (elective and acute), and retained placenta was documented. Neonatal outcomes include sex of the child, birthweight, length of pregnancy, Apgar score at 5 minutes, congenital malformations,

and vital status at birth (alive, stillborn, or death during birth).

Setting

Tasiilaq is the largest town on the east coast of Greenland (Figure 1) with approximately 2,000 inhabitants. The town is surrounded by five small settlements with 70 to 200 inhabitants. A two-hour plane ride further up the coast is another town, Ittoqqortoormiit, with approximately 350 inhabitants. The Danish explorer Gustav Holm arrived in Eastern Greenland in 1884, which is approximately 200 years later than the Danish arrival to Western Greenland [19]. The main profession in Eastern Greenland used to be fishing and hunting of seals, whales, and polar bears. The east coast is difficult to reach by boat during several months of the year due to the frozen sea. Therefore, the population has lived relatively undisturbed by western civilisation and until the 1970s, the population has maintained a traditional way of living [20].

Today there are few full-time hunters in Eastern Greenland. The inhabitants mainly work in the service areas, unemployment is high and followed by major social challenges. Students can attend primary and lower secondary school in Tasiilaq, further education such as high school takes place in the capital Nuuk situated on the west coast.

Maternity care

Historically, women giving birth were served by traditional midwives trained by their mothers. In the eighteenth century, some of the local women were sent to Denmark to study midwifery and became authorised midwives. Others stayed in Greenland and were educated by local doctor to become birth helpers [21]. Today, maternity care is midwifery-led and women are supported during birth by midwives educated in Denmark of both Danish and Greenlandic ethnicity. Childbirth used to take place at home or in the small nursing stations in the small villages surrounding Tasiilaq. After 1985, all women were advised to give birth in the hospitals in Tasiilaq and Ittoqqortoormiit. Homebirth was not and is still not supported by the health care system.

The hospital in Tasiilaq has 19 beds, one birth suite, and one operating room. There is always a midwife, doctor, nurse, health-, and birth assistant as well as other relevant staff available. Some of the staff is of Danish ethnicity with limited or no knowledge of the Greenlandic language. Besides the midwife, a few of the health- and birth assistants can attend normal births and like most of the staff, they are of Greenlandic



Figure 1. Map over Greenland.

ethnicity. It is possible to perform an emergency caesarean section but transfer during birth is not possible. Health stations located in settlements around Tasiilaq are run by health care workers with very diverse professional backgrounds ranking from health assistants and nurses to health workers with limited formal education. The midwife from Tasiilaq is supposed to visit the settlements two-three times a year, which is not always possible. Women from the settlements arrive in Tasiilaq two-three weeks before their due date and usually stay with family in the town or in a guestroom at the hospital. Women from the settlements experiencing premature labour will, if possible, be evacuated to Tasiilaq and if necessary and possible, to Nuuk or Iceland, and in rare cases to Denmark. Even though some of the settlements are far away from Tasiilaq, weather conditions may challenge transportation and access. Most of the women in Eastern Greenland give birth in Tasiilaq. Transportation from the settlements to Tasiilaq is mainly by snowmobile, boat, or helicopter.

There is a doctor and nurses in Ittoqqortoormiit and until 2007 also a birth helper. The local birth helper worked in collaboration with the midwife in Tasiilaq. Since 2008, midwives from Nuuk occasionally provide shorter visits to Ittoqqortoormiit to provide antenatal care services.

Statistical analysis

Descriptive statistics in terms of frequencies were calculated for the maternal characteristics (Table 1), pregnancy and birth outcomes (Table 2), and for neonatal

Table 1. Maternal characteristics in the Eastern Greenland birth cohort from 2000 to 2017.

	All pregnant women (n = 1344)	
	n	%
Maternal age (mean 24.8 (SD 5.9))		
13–18 years	195	14.5
19–35 years	1075	80.0
36–45 years	74	5.5
Civil status		
Married	247	18.4
Single	487	36.2
Divorced	2	0.2
Co-habiting	597	44.4
Missing data	11	0.8
Municipality		
Tasiilaq	1168	86.9
Ittoqqortoormiit	176	13.1
Living in		
Town	913	68.0
Settlement	405	30.1
Missing data	26	1.9
Place of giving birth		
Hospital*	1307	97.2
Clinics in settlements	29	2.2
Home	3	0.2
Missing data	5	0.4

*204 (15.2%) gave birth in Nuuk

outcomes (Table 3). Tables 2 and 3 are further stratified into a term population (≥ 37 weeks of gestation). We used STATA Statistical Software, version 15 for data management and analysis.

Ethical approvals

The study was approved in January 2019 by the Committees on Research Ethics for Greenland (KVUG 2019–01). Approval to access data was given by regional health authorities in the Sermersooq region where Tasiilaq is situated and the national health authorities in Greenland in February 2021. No other approval was necessary according to Greenlandic law as the study was based on registry data.

Results

Between 2000 and 2017, 1,344 women from Eastern Greenland gave birth to 1,355 children (1,333 singletons and 11 pairs of twins). A total of 137 children (10.1%) were born preterm before 37 weeks of gestation. Table 1 presents characteristics of the women from Eastern Greenland. Most of the women (80.0%) were between 19 and 35 years of age when giving birth. However, 195 (14.5%) gave birth at the age of 13–18 years of age. The mean age for nulliparous women was 24.8 years. Most of the women, 844 (62.8%) were married or lived together with their partner at the time they gave birth; however, a high proportion 487 (36.2%) were single parents. A total of 912 (68.0%) women lived in one of the two towns (Tasiilaq or Ittoqqortoormiit) in Eastern Greenland while the remaining (32.0%) lived in one of the five settlements. Of the two municipalities in Eastern Greenland, most of the women, 1,168 (86.9%), lived in Tasiilaq. Most of the women, 1,140 (84.8%), gave birth in East Greenland, 1,108 (82.4%) in the hospitals in Tasiilaq or in Ittoqqortoormiit, 29 (2.2%) and three (0.2%) gave birth in health clinics in settlements and had an unplanned birth at home, respectively. Transfer before or after birth to the obstetric specialist unit at the hospital in Nuuk or in Reykjavik, Iceland, happened for 204 (15.2%) women.

Table 2 presents information on pregnancy and birth outcomes. More than half of the women (51.6%) have had more than three previous pregnancies and 14.6% of the women had not been pregnant before. A total of 5.2% did not attend antenatal visits at the midwife at any time during pregnancy and 23.0% did not visit the doctor before birth. The mean number of antenatal visits at the doctor and the midwife were 1.7 and 6.7, respectively.

The percentage of women experiencing vaginal, non-instrumental birth was 92.9% and induction and

Table 2. Pregnancy and birth outcomes in the Eastern Greenland birth cohort from 2000 to 2017.

	Total population (n=1344)		Term population* (n = 1213)	
	n	%	n	%
Number of previous pregnancies (mean 4.4)				
0	198	14.6	175	14.4
1	234	17.3	209	17.2
2	222	16.4	205	16.9
>3	699	51.6	622	51.3
Missing data	2	0.1	2	0.2
Antenatal visits – physician (mean 1.7)				
0	312	23.0	276	22.8
1–7	995	73.4	853	70.3
>7	26	1.9	64	5.3
Missing data	22	1.7	20	1.6
Antenatal visits – midwife (mean 6.7)				
0	71	5.2	61	5.0
1–7	726	53.6	638	52.6
>7	549	40.5	506	41.7
Missing data	9	0.7	8	0.7
Pain-relief during labour	248	18.3	206	17.0
Use of nitrous oxide during labour	25	1.8	21	1.7
Use of morphine during labour	65	4.8	54	4.5
Augmentation of labour	133	9.8	113	9.3
Assisted birth (vacuum)	7	0.5	5	2.3
Episiotomy	31	2.3	29	2.4
Caesarean section	88	6.5	66	5.4
Elective	23	1.7	20	1.6
Emergency	65	4.8	46	3.8
Retained placenta	18	1.3	15	1.2

* birth ≥ 37 gestational week

Table 3. Neonatal outcomes in the Eastern Greenland birth cohort from 2000 to 2017.

	All Children (n = 1355)		Children born at term* (n = 1218)	
	n	%	n	%
Sex of the child				
Girl	652	48.1	589	48.4
Boy	701	51.7	627	51.5
Missing data	2	0.2	2	0.1
Birthweight**				
0444–2500 grams	78	5.8	21	1.7
2500–4500 grams	1256	92.7	1178	96.7
4501–5255 grams	21	1.5	19	1.6
Preterm birth***	137	10.1	–	–
Apgar Score 5 minutes				
< 7	29	2.1	10	0.8
≥ 7	1307	96.5	1194	98.0
Missing data	19	1.4	14	1.2
Malformations				
Yes	30	2.2	24	1.9
No	1307	96.5	1180	96.9
Missing data	18	1.3	14	1.2
Vital status				
Born alive	1344	99.2	1215	99.8
Stillborn & died during birth	11	0.8	< 5	< 0.5

* term ≥ 37 gestational weeks

** mean birthweight for the total population = 3363 grams

*** preterm birth < 37 gestational weeks

augmentation of labour was experienced by 9.8% in total. Assisted birth (vacuum) was experienced by 0.5% of the women. Available medical pain-relief during labour in the form of morphine and nitrous oxide was given to 4.8% and 1.8%, respectively, of the labouring women and 248 (18.3%) women in total used pain relief (not further specified in the registry) during labour and birth. The episiotomy rate was 2.3% and the caesarean

section (CS) rate was 6.5%. Elective CS was performed in 1.7% and emergency CS in 4.8%. Retained placenta occurred in 1.3% of the women.

Table 3 shows that 99.8% of the children born at term were born alive overall, 99.2% were live births. Most of the children, 1,256 (92.7%) were born with a birthweight between 2500 and 4500 g and 137 (10.1%) of the children were born prematurely.

Overall, 5.8% had a birthweight of 2500 g or below and 1.7% of these were born a term. Malformations were found in 30 (2.2%) children. Overall, 2.1% of the children had an Apgar score below 8 at 5 minutes and for newborns at term it was 0.8%. Local birth reports showed that 3.6% of the newborns were given away for adoption during the period 2004–2019 in Eastern Greenland (data not shown).

Discussion

This birth cohort consisted of all women giving births ($n = 1,344$) during an 18-year period in Eastern Greenland amounting to 5–10% of all births in Greenland. Data were extracted from the National Greenlandic Birth Registry based on the individual civil registration number.

Overall, most women in Eastern Greenland gave birth spontaneously, and vaginally with a very low rate of interventions. Most of the women lived in Tasiilaq, the largest town in Eastern Greenland, and gave birth at the hospital in Tasiilaq. There was a relatively high proportion of very young women giving birth as well as being single parents. This may reflect cultural patterns and socio-economic circumstances and may further contribute to the increased rate of preterm births found in this Eastern Greenland birth cohort [8].

The majority, 68% of the women in Eastern Greenland, live in one of the two small towns, Tasiilaq or Ittoqqortoormiit, the remaining live in one of the five settlements. A total of 36.2% of the birthing women are single parents, and previous reports have shown that approximately a third of the population live in overcrowded houses with two or more persons in each room [22]. The women have experienced several previous pregnancies with a mean of 4.4. Half of the women in the cohort had three or more previous pregnancies and only 14.6% had not been pregnant before. A relatively high proportion, 14.5% of the women, was between 13 and 18 years of age when giving birth; in Denmark, this number is 4.2% [23]. The fertility rate in Greenland was 2.1 in 2019; in Denmark this rate was 1.7 [24,25].

The average number of antenatal midwifery visits during pregnancy was 6.7 times, which is close to the seven visits recommended in Denmark and an average of 1.7 times at the general practitioner equivalent to half of the three visits recommended in Denmark [26]. Antenatal visits are important to improve pregnancy and birth outcomes but also to the level of public health (28). However, 23% of the women had not visited a doctor and 5.2% had not visited a midwife during pregnancy. According to the Greenlandic health

authorities' guidelines for maternity care, all women should be offered a minimum of three and preferably up to ten antenatal consultations with a doctor, midwife, or health assistant [27]. At least eight antenatal visits are recommended by WHO [28].

The characteristics of the birthing population are similar to other remote areas concerning maternal age at time of birth and number of previous pregnancies but different compared to the Danish population [29]. Girls and young adults who become pregnant before the age of 18 years are more likely to experience violence in a marriage or partnership [30]. Approximately half (54%) of all women in Greenland have been sexually abused before the age of 15; in around six percent this happened before the age of seven [31]. The inhabitants in the settlements have half the income compared to citizens in Nuuk [32]. Lack of food has been reported, and socio-economic conditions have not yet reached those achieved in Western Greenland [33].

Exposure to poverty in childhood has an impact on health status including long-term health [34]. Initiatives with focus on improving the living condition in the community may not only improve the social situation for pregnant women but also have an impact on later development of chronic diseases in the offspring [34,35]. Referral to a centralised birth facility before the onset of labour has been used as a way to improve maternal and child health [5]. For some women, centralisation may improve a present medical challenge: However, referral does not change the influence of impaired social and living conditions being one of the primary conditions affecting maternal and child health [5]. Further, evidence has shown midwifery-led continuity of care in areas of high socio-economic disadvantaged populations may improve outcomes for both mother and child [36].

Most of the women living on the east coast give birth in Eastern Greenland whereas 15.2% give birth in the capital, Nuuk situated on the west coast. This contrasts with 38.3% of women from all coastal towns in Greenland being transferred to the specialised obstetric unit in the capital Nuuk in Western Greenland to give birth [37]. All women from the coastal towns in Greenland can choose to give birth in their hometown or in Nuuk also if there is no medical indication. However, women living on the east coast may face another challenge if transferred to Nuuk. The east coast is called Tunu by the west Greenlanders, which means "backside". Tunu can be perceived as a negative term, and people from the east coast have reported to experience stigmatisation when staying in Nuuk [38]. Further, the language used on the east coast also differs from the language on the west coast.

Many families from the settlements on the east coast have family in Tasiilaq. When pregnant women leave the small settlements to give birth in Tasiilaq, the partner and family can accompany them and live with family maintaining the birth as a family event. This may not always be possible if the woman gives birth in Nuuk unless the partner or family pays for their own travel, which is too expensive for most of the families [5,39]. It is common and very important that the whole family is close to or around the woman when she gives birth as childbirth is both a family and community event [5,7]. Previous research has found evacuation of the birthing woman away from her hometown and family may increase the woman's level of stressors including the experience of loneliness, missing family members, experience substance abuse, and child neglect as an unintended consequence of a centralisation of birth [7,10,40]. Further, being evacuated for birth has been found to be cultural disruptive [17] instead of cultural safe which is essential for remote area populations [8,41,42].

Many issues in addition to obstetrics risk play a role during decision-making on place of birth [43]. Professionals' perceptions of clinical risk are often privileged over social risk. Quality of care is traditionally only measured in relation to mortality and morbidity for the mother and the child.

However, the consequences of the organisation of maternity services in remote areas do not only have implications for the health of women and children but also for family members such as siblings. One example may be the health and social consequences for a sibling to be left alone or placed into care if the mother or the parents are transferred to Nuuk for a longer period prior to the birth. This situation may also increase the likelihood of sexual abuse of children [31].

Assessing individual obstetric risks is important but not the only important assessment in the decision-making process. The evacuation policy in remote areas has been experienced by the women as a no-choice policy [44]. Personal logic is one of eight forms of logic that Daviss [45] developed to describe what is at stake in decision-making. Personal logic is individual, and families make decisions on what they stand to lose or gain on a personal level from a birth plan and make compromises. Economic consequences, the situation of their children or other family members and community obligations may be considered when making decisions on place of birth [1]. The family may be an important resource during childbirth and transition to parenthood, but it may also be an issue of conflict and stressors [43].

In Eastern Greenland induction and augmentation of labour were experienced by 10% of the women. In

Denmark, 26.8% of the birthing women experience induced labour and 16.1% augmentation of labour [46]. For Danish nulliparous women the induction rate is 22.8% and the augmentation rate is 39% [47]. The use of medical pain relief during labour is also low. Only 18.3% of the women used pain relief during labour and birth. The pain relief data are specified for use of nitrous oxide, (1.8%), morphine (4.8%) the remaining includes anaesthesia during caesarean section, as well as pain relief for other interventions such as suturing of birth tears, but they are not further specified. Epidural analgesia is not available in Eastern Greenland, which may perhaps also explain the low rate of interventions. Assisted birth using vacuum extraction was used in 0.5% and use of episiotomies was used in 2.3% of the women. The caesarean section rate was 6.5% and of these 4.8% were emergency caesarean sections, and 1.7% were planned. At population level, WHO recommends caesarean section rates around 10–15%, as higher or lower rates may be associated with increased maternal and newborn morbidity and mortality [48]. Low intervention rates in labour and birth are also found in other remote settings [13]. Evidence from Canada demonstrated that rural maternity services may improve population health outcomes more than centralisation of maternity services [4,49,50]. Lower rates of preterm birth and low birth weight are found when women are provided with continuity of midwifery care in remote areas [8,51].

Caesarean sections are rarely performed in Eastern Greenland. However, the local emergency caesarean section service in Tasiilaq is important as transfer during birth is rarely possible. The overall, caesarean section rate in Greenland was 9.7% in 2018 [37]. The caesarean section rate in Greenland is very low compared to the rate of 20% in Denmark (36) and some places even higher internationally [52]. Women who need a planned caesarean section are referred to the hospital in Nuuk before birth where the caesarean section rate was 3.9% for planned and 8.8% for acute caesarean section [37].

The low intervention rate may be explained by factors inherent in the population or the cultural setting and in the way maternity care is practiced. In Tasiilaq, cardio-toco-graphy (CTG) is not used for foetal monitoring neither is epidural analgesia for pain-relief during birth. Both interventions may induce a cascade of interventions [53] and thereby increase the use of interventions in otherwise uncomplicated labour and birth. Watchful attendance [54] and one-to-one midwifery practice is the basic model of care during labour and birth in Tasiilaq. These models of care are known to contribute to low intervention rates and a better birth

experience [55,56]. Information on birth experience is not provided in the medical registry and it is therefore not possible to include the women's own experience of birth in this present study.

In the East Greenlandic cohort, most children were born at term (89.9%) and almost all children (99.8%) born at term were born alive. Despite the relatively high rate of premature births, only 5.8% had a birthweight of or below 2500 g.

A total of 2.1% of the babies were born with an Apgar score of less than eight in 5 min. Among the term babies, 0.8% experienced an Apgar score less than eight in 5 min which is comparable to Danish outcomes [57].

In a survey of 183 Greenlandic pregnant women, 43.3% has a pre-pregnancy body mass index of more than 25% and 46.3% smoked during pregnancy [58]. These high rates may perhaps be a part of the explanation of the higher rate of prematurity [59]. Globally prematurity is the leading cause of death of children under 5 years of age. Midwifery-led care is associated with a reduced risk of prematurity. However, the aetiology is still not fully understood but may be due to the holistic care often provided by midwives including not only obstetric but also psychosocial factors including the whole family situation [59,60]. Further, increasing indigenous governance in maternity services may also reduce the number of preterm births [8]. According to the Greenlandic Health Authorities (Landslægeembedet) only 1.6% (13 birth out of 823) of children born in Greenland in 2018 were born before 32 weeks of gestation and 9% (73 births) were born between 32 and 36 weeks of gestation [37]. Similar rates of premature births have been reported from Nunavik in Canada [61], although higher rates have been reported from other remote areas in Canada [62]. In lower income countries, an average of 12% of babies is born prematurely compared with 9% in high-income countries and economically deprived families are at higher risk of experiencing preterm birth regardless of geography [63].

The rate of stillbirth in the Eastern Greenlandic cohort was 0.8% which is comparable with birth outcomes in other remote areas [64]. Autopsies of babies are not systematically carried out in Greenland. However, visible congenital malformations were registered in 2.2% of the newborn babies. Most countries perform autopsies and may therefore report a higher rate of congenital malformations. An increase from 8 to 35 per 10,000 of Greenlandic newborn babies with gastroschisis have been registered with an average proportion of 10.7 per 10,000 [65]. Between 2005 and 2020, at least five babies out of 1,117 were born with gastroschisis by women from Eastern Greenland (information obtained from unpublished local birth reports).

Intrauterine exposure to environmental factors and lifestyle habits may influence foetal development and as a result gastroschisis [66].

Quantitative studies of childbirth outcomes in Inuit populations have been criticised for their small sample sizes and statistical uncertainty [16]. Remote areas are sparsely populated and larger sample sizes will thus never be achieved. As a strength, we used a population-based cohort to avoid selection bias and used standard systematically collected data from the medical birth registry providing a low number of missing data (<2%) which is not expected to challenge the validity of our study. The limitation of using the medical birth registry was the lack of selected demographic and medical data as well as social and mental health data. Further studies including physical, mental, and social factors for the whole family as well as the wider community may be valuable.

All authors of this study are non-indigenous. However, one of the authors (HCFS) live and work as a doctor in Tasiilaq and has done so for the last 32 years. Another author (SH) has lived and worked as a midwife in Tasiilaq over a period for 13 years and in Nunavik in Canada for 16 months, which has provided extensive setting specific knowledge and experience.

Organising maternity care in remote areas with a mainly indigenous population may benefit from using a public health perspective including cultural, social, mental, and medical aspects.

Conclusion

Women from Eastern Greenland are young and a high proportion is single parents when they give birth. Most of the women stay in Eastern Greenland and give birth at the hospital in Tasiilaq. The majority experiences a vaginal, non-instrumental birth. Birth intervention rates are low including the caesarean section rate, whereas the rate of premature births is relatively high but at the same level as in other remote areas.

Organisation of maternity services in Eastern Greenland may benefit from using a public health perspective with focus on mental, social, and medical conditions as well as being culturally safe including the birth traditions of the society. A more detailed registration of both medical, mental, and social information may provide a better evaluation of birth outcomes and improve future organisation of maternity care in Eastern Greenland.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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