

Lower thriving among females with hearing impairment than males - a cross-sectional study of 185 primary and secondary students in Greenland

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ABSTRACT

The prevalence of ear infections and hearing impairment among Greenlandic children is a major public health problem, and studies investigating the association between hearing impairment and thriving among Greenlandic children are scarce. The aim of this study was to examine the association between hearing impairment and thriving in a sample of school-children in Sisimiut, Greenland. This cross-sectional study included children from 5th to 10th grade from two schools in Sisimiut and two schools located in nearby settlements. Participants filled out a questionnaire and underwent ear examination and audiometry. Binary logistic regression examined the associations of hearing impairment and thriving variables defined as self-rated health, headache and school satisfaction. 179 children participated from schools in Sisimiut, and 6 children were from schools in settlements. The prevalence of hearing impairment was 10% among school-children in Sisimiut. There was a tendency among girls with hearing impairment to have higher odds ratios for low self-rated health, often headache and low school-satisfaction. This study indicates that girls with hearing impairment are more susceptible to low thriving compared to girls with normal hearing. Interventions targeting the thriving of hearing impairment among children in Greenland should take gender differences into account.

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Introduction

Ear infection is the most common infection in the paediatric age group and one of the leading causes of hearing impairment among children worldwide [1–3]. The most severe form of ear infection is chronic suppurative otitis media (CSOM), which often develops in early life and can persist into adulthood [4,5]. CSOM is a chronic inflammation of the middle ear and is characterised by perforation of the tympanic membrane, otorrhoea and hearing impairment [4]. In more than 50% of the cases, CSOM produces mild to moderate conductive hearing impairment [6]. CSOM are found in all populations but with widely different prevalences [7]. Some of the highest prevalences of CSOM are found among the Inuit populations of the Arctic Regions [5] and reports published between 1986 and 2011 have revealed a prevalence of CSOM of 7–14% in these populations [8]. In comparison the prevalence in the UK and the US is less than 1% [6], in Tanzania it varies from 7% to 17% among 6 to 17 years olds [9],

and studies from Poland have found a prevalence of 10% to 15% among 11–12 year olds [10], but even presuming that every 5th child aged 8–18 years has hearing problems [11]. The World Health Organization has stated that a CSOM prevalence of $\geq 4\%$ is a massive public health problem that requires urgent attention [3,6].

It has been described that every 5th child in Greenland has had CSOM at some point in childhood, of which 91% will develop some degree of permanent hearing impairment [12]. The prevalence of hearing impairment among Greenlandic children has been investigated in several previous studies ranging from 13% to 17% [4,12].

The pathogenesis of CSOM is multifactorial and counts environmental, immunological and genetically determined factors along with anatomical and functional characteristics of the Eustachian tube [4,7,13]. Other factors that disposes to CSOM are social factors in the closed environment and structural factors as, for example, treatment and access to health care [13,14]. The high prevalence of CSOM in indigenous

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populations has been linked to several risk factors such as low educational level of the mother, ethnicity, anatomical variations, crowding, passive smoking, duration of breast feeding and poor access to health care [2,4,7].

Previous studies have shown that hearing impairment in childhood can lead to reduced cognitive function and affect psychosocial and emotional development if continuing for a longer period of time [8,12]. Also, hearing impairment in childhood has been associated with deterioration in speech and language development [12,15], compromised social development [4], compromised academic performance [8,16,17], feeling more pressured by school [8], low self-esteem [15,17], loneliness [18] and high stress level [19]. Both cognitive and emotional skills play a role in children's success in meeting future challenges in society, and thus, it is not only the acquisition of academic skills that is important to young people but also perseverance and thriving in learning [20]. Hearing impairment is likely to affect a child's thriving negatively.

When examining and measuring a child's thriving, several items can be used. Items on self-rated health, subjective health complains such as headache and school satisfaction are suitable measurements and are covering various aspects of thriving.

Self-rated health captures an overall perception of health, rather than a summation of specific domains [21,22]. It has been documented that self-rated health is a relatively stable construct throughout repeated observations during adolescence [21]. Previous studies have found that low self-rated health is associated with reduced general well-being and deterioration in health care attendance [22]. Having a high perception of a good health can therefore constitute as a recourse for the child to succeed in challenges and demands [22].

School satisfaction is an important part of a supportive school environment and has a large influence on a child's thriving, since a large proportion of children's life is spent at school. Earlier studies have found that a high school satisfaction is strongly linked to having a high life satisfaction and good health [22], and that a low school satisfaction is associated with compromising health behaviours, such as cigarette smoking, alcohol consumption and marijuana use [23,24]. Also, consistent associations between low school satisfaction, low self-rated health and somatic and psychological symptoms have been documented [25,26].

"Subjective health complains" is a general term describing a variety of symptoms experienced by the individual without a clear physical or psychological origin [27]. The term comprehends the view of personal experience and individual interpretation and can

therefore be considered noteworthy when measuring the impact of health complains on well-being and thriving of a child [22]. The presence of "subjective health complains" can be used as a non-clinical measure of mental and physical health, and have been found to negatively influence everyday functioning of the child [22]. Headache is a frequent "subjective health complain" among adolescence [28]. Previous studies have indicated that headache among students is associated with higher level of school pressure [22] and being a victim of bullying [29].

Studies investigating the associations between hearing impairment in childhood and well-being, development and thriving in Greenlandic populations are scarce. With the high prevalence of hearing impairment among Greenlandic children and the detrimental associations between hearing impairment and psychosocial well-being, development and conceivably low thriving, this topic constitutes a research area of high public health relevance.

The aim of this study was to examine the association between thriving and clinically measured hearing impairment among school-children in the city and settlements of Sisimiut.

Materials and methods

Data and study population

The present study was a part of Tusaasa, a cross-sectional survey from September 2020 collecting data on Greenlandic children's well-being, health and social context with a special focus on their hearing.

Sisimiut is the second largest city of Greenland, in terms of population. Data from 2020 report that the population of Greenland is 56,367 and the population of Sisimiut is 5582 [30]. Two schools are located in Sisimiut called Nalunnguarfiup Atuarfi and Minngortuunnguup Atuarfia. All children in 5th to 10th grade from Nalunnguarfiup Atuarfi and Minngortuunnguup Atuarfia were invited to participate in Tusaasa and the total number of children in the target population was 209 children and 208, respectively, [31,32].

Sarfannuit and Itilleq are two settlements located on islands approximately 50 km from Sisimiut with population sizes of approximately 95 and 120 citizens, respectively. One school is located in each of the two settlements Itilleq and Sarfannuit with 8 students in each. 2 and 4 children were enrolled in 5th to 10th grade at the schools in Itilleq and Sarfannuit, respectively.

A medical student (JSJ) and a Greenlandic research assistant spent 2 weeks at Nalunnguarfiup Atuarfi and a week at Minngortuunnguup Atuarfi recruiting

participants and performing ear examination and audiometry. The two schools in the settlements Itilleq and Sarfannguit were visited during 1 day. Written informed consent from respondents was obtained in accordance with national ethical permissions in Greenland. The study followed the guidelines of the Helsinki II declaration.

Participants were asked to fill out a questionnaire at home together with their parents prior to the ear examination. The questionnaires were handed out during a school lesson following information about the survey and a presentation of ear examination and audiometry. The questionnaires were available for the participants in Greenlandic and Danish. The questionnaire included 29 questions that were mainly from the Greenlandic part of the Health Behaviour in School-aged Children (HBSC) survey, which is a cross-national survey investigation of young people's well-being, health behaviours and their social context. Recently developed questions about hearing among children and new questions developed specifically for Tusaasa regarding risk factors in childhood for developing of otitis media (OM) were also a part of the questionnaires. Details about the recently developed questions on hearing among children have been described previously [8]. For more information on the HBSC survey, see Roberts et al. [33]. The questionnaire used in the present study is available in English, Danish and Greenlandic upon request from the corresponding author.

All participants were invited to have an ear examination and audiometry when they turned in the questionnaire. Ear examination and audiometric measures were made by the medical student (Jakob Schmidt Jensen) who received training in audiometry at the Department of Audiology, Bispebjerg Hospital, Copenhagen, Denmark. Audiometry was conducted in specially selected rooms at the schools to avoid background noise. Ear examination were performed with a Interacoustics VIOT™ video otoscope, and a Interacoustics Titan tympanometer prior to audiometry. For the audiometry an Interacoustics Callisto™ audiometer was used with a TDH39 headset. Air conduction (AC) thresholds were obtained at six frequencies: 250, 500, 1000, 2000, 4000, and 6000 Hertz (Hz). Thresholds were determined manually according to the American Speech-Language-Hearing Association (ASHA) guidelines [34].

Exposure variable

The exposure variable was hearing impairment measured by audiometry. Hearing impairment was categorised into with hearing impairment and without hearing impairment. The definition of hearing impairment has been

used in both Greenlandic and international studies [4,35,36]. The definition of hearing impairment was based on the pure-tone average (PTA) for the low frequencies (i.e., 500, 1000, and 2000 Hz) and for the high frequencies (i.e., 4000 and 6000 Hz) and graded according to the ASHA definition [34]. A child was considered to have a hearing impairment if the PTA for either the low or high frequencies were >25 decibel (dB) in any ear, corresponding to a mild or worse hearing loss.

Outcome variables

Three items on thriving, that were based on self-reports, were included as outcome variables.

School satisfaction was measured by asking the students; *How do you feel about school at present?* To which they could answer *I like it a lot, I like it a bit, I don't like it very much or I don't like it at all*. School satisfaction was dichotomised into 0 (I like it a lot) and 1 (I like it a bit/Don't very much/Don't like it at all). Self-rated health was measured by asking the students *Would you say your health is ... ?* to which they could answer *Excellent, Good, Fair or Poor*. Self-rated health was dichotomised into 0 (Excellent) and 1 (Good/Fair/Poor). To measure whether the student had experienced "headache" the student was asked; *During the past 6 months, how often have you had headache?* with five response categories; *Almost every day, More than once a week, Almost every week, Almost every month or Rarely or never*. Headache was dichotomised into 0 (Almost every week/Almost every month/Rarely or never) and 1 (Almost every day/More than once a week). The choice of the cut points for the dichotomisation of the three outcome variables was based on the distribution of responses.

Adjuvant variables

Adjuvant variables were recognised a priori based on review of the literature of social risk factors in the association between hearing impairment and thriving. The adjuvant variables included were:

- *School grade* was based on self-report and categorised as 0) 5th to 6th grade 1) 7th to 8th grade and 2) 9th to 10th grade.
- *Mother's highest education* was based on parent-report and was categorised into 0) \leq 9th grade 1) \geq 10th grade.
- *Breastfeeding* was based on parent-report and was categorised into 0) the participant had been breastfed less than 6 months 1) that the participant had been breastfed for more than 6 months.

For the regression analyses, we adjusted for the adjuvant variables in three models including a fully adjusted model incorporating mutual adjustment for thriving variables.

Statistical analyses

First, characteristics of the children with and without hearing impairment were performed by descriptive statistics. Second, frequency tables were produced to examine the distribution of hearing impairment and the three outcome variables stratified by gender. Third, binary logistic regression was used to analyse the statistical association between hearing impairment and the outcome variables on thriving. Odds-ratio (OR) and 95% confidential intervals were calculated. $p < 0,05$ was considered statistically significant. All analyses were stratified by gender and were performed using SPSS 27 for Mac.

Results

Study population

Data were collected from 185 school-children from two schools in Sisimiut and the two nearby settlements: Itilleq and Sarfannguit. 97% of the students were from the two schools in Sisimiut. The overall participation rate was 44%. The participation rate for Nalunnguarmiup Atuarfia was 56% and 30% for Minngortuunnguup Atuarfia. The participation rate for the two schools in the settlements was 100%. All the children who completed and turned in the questionnaire underwent ear examination and audiometry. There were no significant differences ($p < 0,05$) in distribution of age, school grade, gender, parent's birth country, mother's schooling and duration of breast feeding between the children without hearing impairment and with hearing impairment. There was a non-significant tendency towards a higher educational level of the mothers for the children without hearing impairment than for the children with hearing impairment.

Prevalence of hearing impairment

The prevalence of hearing impairment among children from the two schools in Sisimiut was 10% corresponding to 18 participants. Out of these 7 were boys and 11 were girls. None of the 6 participants from the two settlements nearby Sisimiut had clinically measured hearing impairment.

Associations of hearing-impairment and low thriving

Binary logistic regression indicated that girls with hearing impairment had a tendency of lower thriving compared to girls without hearing impairment. Girls with hearing impairment had higher odds ratios (OR) for low school satisfaction, low self-rated health and more reports of headache when adjusting for the adjuvant variables. The OR were varying from 1,33 (95% CI: 0.31–5.66) for low school satisfaction to 3,77 (95% CI: 0.95–14.93) for low self-rated health. None of the associations were statistically significant ($p > 0,05$). For the boys, there were no clear tendencies since the calculated OR were pointing in different directions nor any of the OR were statistically significant.

Table 2, Table 3 OR for low thriving for children “with” and “without” hearing impairment. Low thriving was measured by the variables: not liking school, low self-rated health and often headache. Analyses were stratified by gender and adjusted for school class and social risk factors in three models.

Discussion

Main results

The main finding of the current study was an indication of lower thriving among girls with hearing impairment, with a tendency of higher OR of low self-rated health, often headache and low school satisfaction, compared to girls without hearing impairment. For the boys, there was no tendency between hearing impairment and the chosen thriving variables. To our knowledge, only one other study has investigated gender differences in thriving among Greenlandic children with and without hearing impairment. Schnohr et al. based their study on self-reported data from the 2018 HBSC Greenland Survey including 2273 children (grade 5–10), and found that girls had significantly higher OR for low self-rated health (OR: 1,81; 95% CI: 1.13–2.89) and low school satisfaction (OR: 2.17; 95% CI: 1.44–3.27) when they reported hearing impairment. The study found no clear tendencies nor significant associations for the boys ($p > 0,05$) [8].

It could be speculated that indication of gender differences in thriving found in the present study and in the study by Schnohr et al. is driven by a general tendency of Greenlandic girls experiencing lower thriving compared to the boys. This hypothesis is supported by findings from the 2018 HBSC Greenland survey, describing that 28% of the boys relative to 21% of the girls reported a high school satisfaction. Furthermore,

40% of the boys relative to 29% of the girls reported a high self-rated health. Data on school satisfaction and self-rated health were dichotomised correspondingly to the present study. In regard to subjective health complaints, the 2018 HBSC Greenland Survey showed that 67% of the girls and 51% of the boys reported having one or more symptoms weekly [37].

Similar findings of gender differences in relation to thriving have been supported by studies from outside of Greenland [28,38–40]. For example, a cross-national study from 2006 including 160,000 children age 11, 13 and 15 years presented that girls had significantly lower self-rated health with respect to boys (girls OR for low self-rated health: 1.70; 95%CI: 1.66–1.76). The study was based on data from the 2001/2002 International HBSC survey which included 29 European countries, plus North America (Canada and USA) and Israel [38]. Also, a Canadian study from 2002 of 1493 participants age 12–19 years concluded that male sex is a powerful predictor for self-rated health. The study found that boys rated their health significantly higher than girls even when adjusting for age, structural factors and health-related measures (Girls OR for high self-rated health: –0,263; $p < 0,05$) [39]. Furthermore, a study from Northern Sweden including 1027 children age 16–18 years found that subjective health complaints are related to gender and documented that three-fold more girls (33%) reported headache than boys (11%). Moreover, they found that significantly more boys than girls had a “good” self-rated health [28].

Table 1 shows a tendency of higher educational level of the mothers of children without hearing impairment than of children with hearing impairment, however non-significant ($p > 0,05$). This tendency is in accordance with already existing literature, as a low educational level of the mother constitute a risk factor for developing CSOM and other types of otitis media. The association between CSOM and educational level of the mother has been supported in other studies based on Greenlandic populations (2; 7), but also studies from the rest of the world. As for example, a cross-sectional Korean study from 2016 including 25,147 individuals >4 years of age, found that CSOM was significantly associated with the educational level of the mother ($p < 0,05$) [41]. And a case–control study from the Netherlands found that low education level of the mother was an independent predictor for CSOM (OR: 14.1; 95% CI: 2.9–68.6) [42].

To our knowledge, this is the first study reporting data on health and hearing among children living in Greenlandic settlements. Important findings from this study are therefore, that 10% of the children in Sisimiut had hearing impairment, and that none of the children

from 5th to 10th grade in the nearby settlements of Sisimiut had clinically verified hearing impairment. The latter finding was surprising, as it had been hypothesised that the prevalence of hearing impairment among children in settlements could be higher than the prevalence in larger cities due to lack of healthcare. Sarfannguit and Itilleq have no official healthcare services. Access to ear specialist is generally limited in Greenland [43], and with no roads connecting cities or towns in Greenland and no inland waterways or railways [44], transportation from Sarfannguit and Itilleq to Sisimiut is either done by boat or helicopter, which means that the citizens of Sarfannguit and Itilleq generally have longer and more difficult transportations in order to get the healthcare needed [44]. The a priori hypothesis was therefore that if the school-children of the settlements had suffered from ear infections, they were likely to be untreated, which could result in a higher prevalence of hearing impairment.

Limitations of the present study

One strength of the present study is the cross-sectional study design including both clinical, self-reported and parent-reported data which enable validation between different sources of information. Furthermore, the study design allowed the data-collecting researcher to go through the questionnaire with the respondents upon health examination and completion in case of missing information. Finally, the registration of personal identification enables multiple approaches for future studies investigating hearing impairment and its impact on Greenlandic schoolchildren.

However, there are also some obvious limitations to acknowledge in regard to the present study. Even though the study population comprised 185 children, which is a large proportion of a population of the size of Greenland, a larger sample size would improve the statistical power allowing for stronger conclusions.

With an overall participation rate of approximately 44%, selection bias is a relevant weakness to recognise. It is conceivable to think, that the children with mental surplus and good thriving were more prone to participate in this study. Moreover, one could think that children who had experienced hearing impairment were more likely to participate, in order to get their hearing impairment clinically verified. Selection bias also needs to be considered in relation to the variance of participating rates for the two schools in Sisimiut, being 56% for Nalunnguuarfiup Atuarfia and 30% for Minngortuunnguup Atuarfia, which could be a reflection of the difference in the time spent at the

Table 1. Data on hearing impairment. P-value calculated by chi-square test.

		Without impaired hearing	Impaired hearing	p-value
		N = 167	N = 18	
Age mean ¹	Years (n)	11,8 (166) ²	11,5 [18]	
Sex	Male, % (n)	40 (67)	39 [7]	0,92
School class	5 th grade, % (n)	25 [42]	17 [3]	0,47
	6 th grade	19 [31]	39 [7]	
	7 th grade	19 [32]	17 [3]	
	8 th grade	13 [21]	6 [1]	
	9 th grade	11 [18]	11 [2]	
School	10 th grade	14 [23]	11 [2]	0,76
	Nalunnguarfiup Atuarfia, % (n)	62 (103)	72 [13]	
	Minngortuunnguup Atuarfia	35 (58)	28 [5]	
	Itilleq	1 [2]	0 (0)	
Parents' country of birth ³	Sarfannguit	2 [4]	0 (0)	0,50
	Both in Greenland, % (n)	80 (134)	72 [13]	
	One in Greenland and one outside of Greenland	7 [11]	11 [2]	
	Both outside of Greenland	4 [7]	0 (0)	
Mother's highest education	One in Greenland and one unknown	9 [15]	17 [3]	0,53
	≤ 9 th grade % (n)	12 [20]	6 [1]	
	≥ 9 th grade	30 (50)	44 [8]	
	11 to 13 years of schooling	24 [40]	28 [5]	
	over 14 years of schooling	32 (53)	22 [4]	
Duration of breast feeding	Missing	2 [4]	0 (0)	0,67
	Less than six months, % (n)	26 [43]	22 [4]	
	More than six months	62 (103)	67 [12]	
	We don't know	13 [21]	6 [1]	
	Missing	0 (0)	6 [1]	

1 The child's age when answering the questionnaire.

2 One participant did not report civil registration number and age could not be calculated.

3 Missing answers were classified as "unknown".

schools recruiting and enrolling participants: 2 weeks at Nalunnguarfiup Atuarfia in proportion to 4 days at Minngortuunnguup Atuarfia.

It is also relevant to point to an information bias, when the child is asked to fill out the questionnaire together with its parents about thriving. In order not to disappoint or worry the parents, the child may be more inclined to give more positive information regarding his or hers thriving, a phenomenon described as social desirability bias.

The cross-sectional study design poses challenges when examining causal associations between hearing impairment and low thriving, as the exposure and outcome variables were measured at the same point in time. Additionally, the found tendency of gender differences in relation to thriving could be driven by a general tendency for Greenlandic girls to experience lower thriving compared to boys, as described in section 4.1.

In the statistical analyses, we adjusted for social risk factors; mother's highest education, duration of breast-feeding, school class and a mutual adjustment for thriving variables, in order to minimise the potential bias. Yet, the possibility of residual confounding cannot be excluded, as, for example, risk factors such as passive smoking and crowding. Mother's level of schooling was used as a proxy for socioeconomic status in the

adjusting analyses. We considered this variable a strong proxy because it was parent-reported and because the descriptive analyses indicated a difference in mother's level of schooling (as described in section 4.1). A more accurate and objective measurement of socioeconomic status would include a combination of data on education, income and occupation which can be accessed from the Danish civil register.

All variables were dichotomised, in order to help data presentation and to construct categories suitable for statistical analyses. However, the downside of dichotomising is important to take into consideration, since there is a risk of underestimating the degree of variation and overseeing considerable variabilities, as participants close to the cut-off point but on opposite sides are categorised as being very different instead of very similar.

Implications for future research and clinical practice

The present study underlines a high prevalence of hearing impairment among Greenlandic children. In spite of this consistency across studies among Greenlandic children, few initiatives have been implemented. The results of the present study strengthen the evidence

Table 2. Data on dichotomised thriving variables across hearing impairment and gender in %.

		Without hearing impairment	With hearing impairment	Boys with hearing impairment	Girls with hearing impairment
		N = 167	N = 18	N = 7	N = 11
School satisfaction	I like it a lot	43	39	43	36
	I like it a bit/ I do not like it much/ I do not like it at all	56	61	57	64
	Missing	1	0	0	0
	Excellent	58	50	71	36
Self-rated health	Good/ Fair/ Poor	41	50	29	64
	Missing	1	0	0	0
	Almost every week/ Almost every month/ Rarely or never	92	89	86	91
Headache	Almost every day/ More than once a week	8	11	14	9

Table 3. OR for low thriving for children “with” and “without” hearing impairment. Low thriving was measured by the variables: not liking school, low self-rated health and often headache. Analyses were stratified by gender and adjusted for school class and social risk factors in three models.

		Model 0 ¹				Model 1 ²				Model 2 ³			
		OR	95% CI	p-value	N	OR	95% CI	p-value	N	OR	95% CI	p-value	N
Boys													
Low school satisfaction	With	0,84	0,16–4,38	0,84	74	0,41	0,06–2,95	0,38	64	0,57	0,08–4,25	0,58	63
	Without	1				1				1			
Low self-rated health	With	0,42	0,07–2,59	0,35	73	0,66	0,06–7,78	0,74	63	0,00	0,00–	1,00	63
	Without	1				1				1			
Often headache	With	1,95	0,18–21,16	0,58	74	12,67	0,53–303,60	0,12	64	8,52·10 ²¹	0,00–	1,00	63
	Without	1				1				1			
Girls													
Low school satisfaction	With	1,73	0,45–6,56	0,43	109	1,85	0,45–7,70	0,40	94	1,33	0,31–5,66	0,70	94
	Without	1				1				1			
Low self-rated health	With	3,13	0,82–11,94	0,09	111	3,77	0,95–14,93	0,06	96	3,42	0,81–14,40	0,09	94
	Without	1				1				1			
Often headache	With	1,67	0,17–16,68	0,66	111	1,44	0,14–14,92	0,76	96	1,63	0,15–18,22	0,69	94
	Without	1				1				1			

1 Adjusted for school class.

2 Adjusted for school class, mother's highest education and breast feeding.

3 Adjusted for school class, mother's highest education and breast feeding including mutual adjustment for thriving variables.

for that hearing impairment affects the thriving of Greenlandic school-children. Reducing the prevalence of hearing impairment, will result in improvements of the well-being and educational progress of children and will have significant public health impact. Future studies could continue investigating the dimensions and associations in this health problem to emphasise the severity, raise awareness and incite for initiatives. Additionally, we hope that future studies will explore hearing impairment among children in settlements of Greenland, as the present study seems to be the first to report data on this topic.

The design of the present study allows for a longitudinal follow-up study, as each participant was identified with civil registration number. Future studies therefore have the advantage of re-inviting the participants for re-examination, as it is considered

of high importance to follow these high-risk populations for appropriate treatment [10]. Monitoring hearing impairment in the same study groups facilitate the possibility of examining a life course perspective of the effects and pathways of hearing impairment in childhood.

The planning of health interventions is often taking gender differences into consideration, and the present study indicates that this should also be done with regards to hearing impairment. Since even “large” surveys in Greenland tend to have a low number of participants due to the size of the Greenlandic population, it is recommended to perform qualitative studies with children with known hearing impairment, to better tailor interventions to improve thriving and thereby support a positive youth development.

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