

Perceived knowledge gained from school-based sexuality education – results from a national population-based survey among young people in Sweden

Anna ChuChu Schindele^{A,B,*} , Henrik Källberg^C, Kristina Areskoug Josefsson^{D,E} and Malin Lindroth^{A,E}

For full list of author affiliations and declarations see end of paper

***Correspondence to:**

Anna ChuChu Schindele
Malmö University, Nordenskiöldsgatan 1,
211 19 Malmö, Sweden
Email: anna-chuchu.schindele@mau.se

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ABSTRACT

Background. School-based sexuality education is a core component of securing young people's right to attain health equity regarding sexual and reproductive health and rights. This paper aims to explore how perceived knowledge (sufficient or insufficient) of taking care of one's sexual health is associated with knowledge gained from school-based sexuality education and social determinants.

Methods. The data material is drawn from a population-based survey conducted in Sweden in 2015. The survey had 7755 respondents and a response rate of 26%. To explore the aim descriptive statistics and logistic regression models were used. **Results.** Our results show that perceived insufficient knowledge from school-based sexuality education was associated with higher odds of reporting not being able to take care of one's sexual health. The highest significant excess risk for insufficient knowledge was found among young people from sexual minorities. **Conclusions.** Young people in Sweden do not have equal abilities to receive knowledge needed to take care of their sexual health and thus attain sexual health literacy. There is an unequal distribution of perceived knowledge, and LGBTQI+ youth particularly face barriers in using school-based sexuality education as a resource for sexual health literacy.

Keywords: Agenda 2030, health equity, health promotion, intersections, public health, school-based sexuality education, sexual and reproductive health and rights (SRHR), sexual health literacy.

Introduction

Sexuality education is a core component of realising young people's right to attain health equity within sexual and reproductive health and rights (SRHR).^{1–3} To realise these rights, young people need curriculum-based sexuality education that is comprehensive, knowledge-based and inclusive, which means including the full diversity of gender and sexual identities among young people.⁴ Inclusive teaching in school-based sexuality education is part of the third sustainable development goal (SDG3), which urges all states to ensure inclusive and equitable quality education that promote lifelong learning opportunities for all.⁵ Inclusive teaching is also part of the Committee on the Rights of the Child, which states that all young people should be provided with, and not denied, accurate information on how to attain highest possible sexual and reproductive health and general health.^{6,7} Moreover, school-based sexuality education should include both fact- and value-based areas. Fact-based knowledge includes topics such as the body and knowledge about sexually transmitted infections (STIs) while value-based topics includes topics such as relationships, gender equality, norms and power structures as well as LGBTQI+ perspectives.^{8–10}

Health literacy is the process by which people transform factual information, through value-based discussions, into the ability to make informed and reflective choices. The process of health literacy can strengthen resources for health.^{11–13} Thus, health literacy can be seen as a modifiable resource that affects health outcomes.¹⁴ Sexual health literacy encompasses a dimension of health literacy with a specific focus on SRHR.¹⁵ Studies on school-based sexuality education have pointed out that knowledge is a core component for reaching the goals in preventing negative health outcomes.^{16,17} Based on this, our

study is interested in how young people in Sweden perceive knowledge gained from school-based sex education and how this relates to and interacts with their ability to take care of their sexual health.

Sexual health literacy

Reinisch and Beasley¹⁸ coined the concept ‘sexual health literacy’, which refers to the process of how factual information and value-based discussions are transformed into abilities related to sexuality. Both researchers contended that values as well as correct information about sexual and reproductive health, are essential building blocks that give young people a foundation on which to build the abilities necessary to support their sexual and reproductive health.¹⁸ Sexual health literacy also recognises the specific social situations of sexuality that sexual behaviour is often experienced with a partner and involves the interaction of at least two people’s experiences and values. This means that individual knowledge is needed as well as the ability to reflect and discuss with partner(s).¹⁵ Sexual health literacy encompasses how aspects of sexuality, social life and health relate to sexual decision-making processes that guide and govern behaviour.^{19–21} Prior research have demonstrated that since teacher-led learning can provide both factual information and value-based discussions on social life and health, schools are important settings for young people to gain knowledge needed to achieve sexual health literacy.^{19,21}

School-based sexuality education relevant for all?

Sweden has had school-based sexuality education for over 60 years and the topics and quality have varied over time.^{22–24} In a review of 24 European countries’ school-based sexuality education, only eight countries including Sweden, reached the goal of comprehensive sexuality education.²⁵ Although Sweden has had school-based sexuality education for more than 60 years, there are still parts that need to be developed in order to achieve equal conditions for health. Previous studies on school-based sexuality education in Sweden have been concerned with what topics are included and how teachers and students reflect on these topics. Areas that usually have been included have been risk-oriented, and a focus on sexual pleasure and wellbeing has been lacking.^{22,26,27} In 2022, a new curriculum was introduced that aims to strengthen both fact- and value-based understandings of identity, health, gender equality, power structures, sexuality and relationships. The new curriculum states that Swedish school-based sexuality education must help students develop an understanding of both their own rights, and the rights of others.^{28,29} However, it does not explicitly talk about sexual minorities and young people with transgender experiences’ right to be included.

International research similarly shows that topics in school-based sexuality education that frequently go unmet

include pleasure and well-being as well as the value-based topics based on human rights and social life.^{9,30} Moreover, school-based sexuality education tends to be non-inclusive towards non-binary youth as the curriculum mostly uses, or reinforces, binary gender identities.³¹ There is also a lack of comprehensive school-based sexuality education that encompasses both fact- and value-based dimensions.^{8,32} Moreover, gay and bisexual youth report that school-based sexuality education tends to reflect a hetero- and cis-normative lifestyle and sexuality, forcing them to seek knowledge and information elsewhere.³³ Overall, a non-inclusive approach may increase individuals’ risk for negative SRHR-related outcomes such as STIs and unwanted pregnancies as well as experiences of stigma and discrimination.^{1,33–35}

Intersections

Intersectionality as a method and theory highlights how people belonging to different social groups may have multiple vulnerabilities or privileges.^{36,37} Intersectionality seeks to critically examine equity in social life by exploring the effects of power structures based on, for example, gender, class, race, and sexual identity, as they are intertwined and produce health disparities.^{38,39} Thus, intersectionality is a useful perspective and tool for explaining how power structures in social life create various positions (e.g. vulnerable or resourceful positions) related to SRHR,^{40–42} and when examining how young people perceive knowledge gained from school-based sex education.

Aim

This paper aims to explore how perceived knowledge (sufficient or insufficient) of taking care of one’s sexual health is associated with interactions between knowledge gained from school-based sexuality education and social determinants, and in relation to intersectional effects. More specifically we use the variable sufficient perceived knowledge in the five following areas: the body, STIs, sexuality, relationships and gender equality, and norms and LGBTQI+ perspectives to explore how categories within social determinants, defined by: gender, transgender experience, sexual identity, economic situation and being foreign-born, can gain resources for taking care of one’s sexual health.

Material and methods

Design and sampling

The data are drawn from a population-based, stratified, and randomised survey on sexuality and health conducted in 2015. The target group was young people aged 16–29 years and the 7755 respondents equals a response rate of 26%. To reduce the influence of the non-responses, the information about

the non-respondents (young men, foreign-born youth, and youth with low education level) was used to calibrate design weights.⁴³ Thus, the data mirror the total youth population in Sweden. The study was approved by the Regional Ethical Review Board in Stockholm (ref. no.: 2015/5:4).

Data collection

The 64 items in the questionnaire addressed a range of factors in social life that relates to SRHR. Prior to data collection, the questionnaire was tested in individual interviews with young people. To be inclusive in terms of gender identities and in order to avoid limiting gender to a binary male–female conceptualisation the questionnaire had the response alternative ‘I do not want to categorise myself’. The questionnaire also included whether the respondents identified as transgender at the time of the survey or in the past. The questionnaire was responsive, with a maximum of 135 questions. Given that respondents were able to omit questions that were not relevant to them, those with no sexual onset with a partner answered a total of 43 questions. Prior to data collection a letter of introduction describing the purpose, how to maintain confidentiality, and the Public Health Agency of Sweden’s intended use of the results was sent before the first questionnaire was sent. A letter including contact information for the Swedish Public Health Agency of Sweden was also distributed at the same time to the parents and legal guardians of respondents under 18 years old. The respondent’s home address received the postal delivery of the questionnaires. However, the questionnaire was available for completion online or on paper by the respondents. Each responder was given a log in so they could access the form on Statistics Sweden’s website. In total 33% chose to respond online, while 67% by paper.

Measures

In this paper sexual health literacy is defined as the knowledge gained from school-based sexuality education that gives an ability to take care of one’s sexual health. To explore the aim, we used the outcome variable ‘Did you, in school, get the knowledge you need to take care of your sexual health?’ with the response alternatives ‘No, nothing’ or ‘Yes, but too little’ labelled as ‘Insufficient’ and the response option ‘Yes, sufficient’ was labelled as ‘Sufficient’. We used the following survey items as exposure variables: ‘You can learn about sexuality and relationships in several different subjects in school. How much did you learn about’: (1) the body; (2) sexually STIs; (3) sexuality; (4) relationships and gender equality; and (5) norms and LGBTQI+ perspectives. These topics include a balance of biological and fact-based topics (i.e. knowledge about the body and knowledge about STIs), and also human rights- and value-based topics (i.e. relationships and gender equality and norms and LGBT+ perspectives). In the survey, the acronym LGBTQI+ perspectives was used. In

this paper, we will continue to use the LGBTQI+ since the Swedish acronym has developed further. The exposure variables had the response alternatives: ‘Nothing’, ‘Too little’ or ‘Sufficient’ and was labelled as ‘Insufficient’ (including response options ‘Nothing’ and ‘Too little’) and ‘Sufficient’. To perform the statistical analysis with large enough groups of respondents, the variable sexual identity was divided into ‘Heterosexual’ and ‘Sexual minority’.

The social groups; i.e. determinants in the survey were: (1) gender, based on the survey item ‘What is your sex?’ with the alternatives ‘female’, ‘male’, or ‘non-binary gender’; (2) transgender experience, based on the survey item ‘Are you or have you been a transgender person?’ with the alternatives ‘yes’ or ‘no’; (3) sexual identity, based on the survey item: ‘Do you consider yourself currently to be: ...’ with the alternatives ‘bisexual’, ‘heterosexual’, ‘homosexual’, ‘I do not usually categorise myself sexually’ or ‘other’; (4) economy, based on the survey item ‘How would you describe your household finances?’ with the alternatives ‘very good’, ‘quite good’, ‘not particularly good’, ‘not good at all’ or ‘I don’t know’; and (5) foreign-born, based on a register variable from Statistic Sweden on country of birth aggregated into regions.

What should be included as measures in an intersectional analysis have been vividly discussed over the years.^{36,44–47} The measurement of knowledge in this paper is based on the fact that knowledge constitutes a power structure that is viewed as a determinant of health.⁴⁸ Knowledge production in a society (e.g. school-based sexuality education), is a root cause for health and wellbeing.⁴⁹ To study knowledge in relation to health equity is to study the root causes of health disparities. Since knowledge is a determinant that can change it is of interest as a tool that can influence resource distribution and lead to health equity.⁴⁹ Even though some studies claim that discrimination is the best way of studying intersectionality and power structures^{50,51} we decided to study knowledge as a root cause that can be related to conditions for health equity.

Statistical analysis

Descriptive statistics are presented as numbers and proportions with corresponding confidence intervals, and the chi-squared test (χ^2) was used to identify group differences. Thereafter logistic regression estimated associations (odds ratios) for having the knowledge needed to take care of one’s sexual health by ‘Sufficient’ (coded as 0) or ‘Insufficient’ (coded as 1). In order to investigate if intersections between social determinants and perceived knowledge are associated with perceived knowledge to take care of one’s sexual health, we applied an additive interaction approach. This approach permits to investigate if the combination of a certain social determinant and perceived insufficient knowledge is associated with a larger effect than would be expected by sum of the sole effect of the social determinant and insufficient knowledge.

This approach has earlier been described to match the intentions of intersectional theory.⁵² In our analysis, we interpret a presence of an additive interaction that we interpret as presence of an intersectional effect. Further, to explore and measure interactions, the relative excess risk due to interaction (RERI) was examined, a measure that is compatible with intersectional theory.⁴⁴ Based on the odds ratios in the logistic regression models, RERI displays how perceived knowledge (sufficient or insufficient) in five different school-based sexuality areas intersect with gender, transgender experience, sexual identity, economic situation and being foreign-born. In total, 25 interactions (regression models) were explored. The statistical analysis was conducted in STATA, ver. 16 (StataCorp LLC, College Station, TX, USA) and R (ver. 4.1.2).

Ethics approval and consent to participate

Informed consent has been obtained from all study participants, who were provided with written information about the study and given the opportunity to participate or to decline from participating in the survey. The survey design and questionnaire were examined and approved by the Regional Ethical Review Board in Stockholm (ref. no.: 2015/5:4).

Results

Descriptive statistics stratified by gender

Non-binary youth had the highest shares with no perceived knowledge from school-based sexuality education in the following topics: 'the body' (3%); 'sexuality' (16%); 'relationships and gender equality' (45%); and 'norms and LGBTQI+ perspectives' (58%). Boys reported to have the highest shares of perceived sufficient knowledge in all five topics in comparison to girls and non-binary youth. The highest shares of perceived sufficient knowledge gained from school-based sexuality education was found among boys in the topic 'the body' (68%) (Table 1).

Interaction of social determinants and perceived knowledge.

In all five knowledge areas, the regression models show that perceived insufficient knowledge from school-based sexuality education was associated with higher odds of reporting not being able to care for one's sexual health (Tables 2–6). The positions with the highest significant odds ratio (OR >1), and significant excess risk due to interaction (RERI) among the social determinants explored were found in the following interactions: (1) belonging to a sexual minority and having insufficient knowledge about the body, RERI 7.58 (CI: 2.52–12.64); (2) belonging to a sexual minority and having insufficient knowledge about norms and LGBTQI+ perspectives

Table 1. Descriptive statistics on perceived knowledge gained from school-based sexuality education stratified by gender.

	Sufficient knowledge % [95% CI]	Insufficient knowledge % [95% CI]	No knowledge % [95% CI]
Knowledge about the body, $P = 0.00$			
Girls ($n = 4714$)	59.9 [58.3–61.6]	37.7 [36.1–39.4]	2.3 [1.8–3.0]
Boys ($n = 2691$)	68.6 [66.6–70.5]	28.4 [26.5–30.3]	3.0 [2.3–4.0]
Non-binary gender ($n = 84$)	53.9 [41.7–65.7]	42.3 [30.9–54.6]	3.8 [1.1–11.8]
Knowledge about sexuality, $P < 0.001$			
Girls ($n = 4706$)	37.6 [36.0–39.3]	50.0 [51.3–54.7]	9.3 [8.3–10.5]
Boys ($n = 2683$)	56.6 [54.6–58.6]	37.2 [35.2–39.2]	6.2 [5.2–7.4]
Non-binary gender ($n = 83$)	23.4 [14.2–36.0]	60.6 [48.1–71.9]	16.0 [9.3–26.1]
Knowledge about sexually transmitted infections (STIs), $P < 0.001$			
Girls ($n = 4708$)	32.5 [30.9–34.1]	56.0 [54.3–57.7]	11.5 [10.4–12.8]
Boys ($n = 2674$)	48.8 [46.8–50.8]	45.7 [43.6–47.7]	5.5 [4.5–6.7]
Non-binary gender ($n = 82$)	39.5 [27.9–52.3]	49.0 [36.9–61.3]	11.5 [5.5–22.6]
Knowledge about relationships and gender equality, $P < 0.001$			
Girls ($n = 4702$)	26.6 [25.2–28.2]	47.3 [45.6–49.0]	26.0 [24.6–27.6]
Boys ($n = 2667$)	44.7 [42.7–46.7]	35.8 [33.8–37.7]	19.5 [17.9–21.3]
Non-binary gender ($n = 83$)	18.8 [10.4–31.5]	36.2 [25.5–48.4]	45.0 [33.3–57.2]
Knowledge about norms and LGBTQI+ perspectives, $P < 0.001$			
Girls ($n = 4700$)	15.7 [14.5–17.0]	44.1 [42.5–45.8]	40.2 [38.5–41.8]
Boys ($n = 2658$)	34.1 [32.2–36.1]	35.6 [33.7–37.6]	30.3 [28.4–32.2]
Non-binary gender ($n = 83$)	9.3 [3.8–21.0]	32.3 [22.0–44.4]	58.4 [46.0–69.9]

RERI 6.46 (CI: 4.23–8.69); (3) belonging to a sexual minority and having insufficient knowledge of STIs, RERI 4.76 (CI: 1.88–7.64); (4) belonging to a sexual minority and having insufficient knowledge about sexuality RERI 4.75 (CI: 1.71–7.78); and (5) belonging to a sexual minority and having insufficient knowledge about gender equality RERI 4.51 (CI: 2.67–6.36). Consequently, in all five knowledge areas, the highest excess risk of having insufficient knowledge was associated with belonging to a sexual minority. Gender did not generate a significant excess risk due to interaction in any of the five knowledge areas.

Due to few individuals with transgender experience, the result for this group is uncertain. Yet, the highest excess risk among youth with transgender experience was found in the knowledge areas 'the body' and 'norms and LGBTQI+ perspectives'. Due to the variations of smaller and larger groups in the analysis, the logistic regression model showed few significant results in smaller groups. However, there is a pattern showing that young people with transgender experience perceive their knowledge gained from school-based sexuality education as insufficient.

Table 2. Intersecting associations of perceived knowledge about the body related to the ability to take care of one's sexual health.

Perceived knowledge about the body	n Sufficient knowledge/ insufficient knowledge	OR >1 = less ability to take care of one's sexual health	CI (95% CI)	P-value
Gender, RERI: – ^A				
Girl and sufficient knowledge about the body	1659/1215	1 (ref)		–
Boy and sufficient knowledge about the body	1414/488	0.47	(0.41–0.53)	<0.005
Girl and insufficient knowledge about the body	292/1527	7.14	(6.18–8.27)	<0.005
Boy and insufficient knowledge about the body	190/576	4.14	(3.46–4.97)	<0.005
Transgender experience, RERI: 14.15 (–21.07–49.37), <i>P</i> > 0.05				
Cisgender and sufficient knowledge about the body	3101/1709	1 (ref)		–
Transgender and sufficient knowledge about the body	14/27	3.5	(1.86–6.88)	<0.005
Cisgender and insufficient knowledge about the body	490/2119	7.85	(7–8.81)	<0.005
Transgender and insufficient knowledge about the body	2/27	24.5	(7.34–152)	<0.005
Sexual identity, RERI: 7.58 (2.52–12.64), <i>P</i> < 0.05				
Heterosexual and sufficient knowledge about the body	2774/1382	1 (ref)		–
Sexual minority and sufficient knowledge about the body	292/298	2.05	(1.72–2.44)	<0.005
Heterosexual and insufficient knowledge about the body	431/1703	7.93	(7.01–8.98)	<0.005
Sexual minority and insufficient knowledge about the body	48/396	16.56	(12.32–22.77)	<0.005
Economy, RERI: 0.87 (–1.58–3.32), <i>P</i> > 0.05				
Good economy and sufficient knowledge about the body	2708/1461	1 (ref)		–
Poor economy and sufficient knowledge about the body	329/231	1.3	(1.09–1.56)	<0.005
Good economy and insufficient knowledge about the body	410/1740	7.87	(6.95–8.92)	<0.005
Poor economy and insufficient knowledge about the body	72/351	9.04	(7–11.82)	<0.005
Foreign born, RERI: 3.26 (–0.81–7.33), <i>P</i> > 0.05				
Born in Sweden and sufficient knowledge about the body	2857/1574	1 (ref)		–
Foreign-born and sufficient knowledge about the body	291/174	1.09	(0.89–1.32)	0.42
Born in Sweden and insufficient knowledge about the body	466/1964	7.65	(6.8–8.62)	<0.005
Foreign-born and insufficient knowledge about the body	34/206	11	(7.72–16.15)	<0.005

^ANot plausible to calculate relative excess risk due to interaction (RERI) when OR < 1.

Discussion

This paper has explored how perceived knowledge (sufficient or insufficient) of taking care of one's sexual health is associated with knowledge gained from school-based sexuality education and social determinants. Our results show that in the Swedish context, insufficient knowledge from school-based sexuality education, in all five knowledge areas, was associated with higher odds of reporting not being able to take care of one's sexual health. This indicates that knowledge gained from sexuality education could be seen as a resource for sexual health literacy. While school is an important arena where young people can develop sexual health literacy,²¹ this ability is not equally distributed among young people since the highest excess risk for having insufficient knowledge in all the five knowledge areas were found among young people from sexual and gender minorities. We see these

results as an additive interaction resulting in an excess risk of not getting the resources one need from school-based sexuality education. The excess risk shows how heteronormative and cis-normative power structures can affect young people's resources for health equity. Our findings are thereby in line with previous studies, from other countries, stating that sexual minorities report school-based sexuality education to reflect a gender based binary thinking as well as a hetero- and cis-normative lifestyle and sexuality, forcing young LGBTQI+ persons to seek relevant knowledge and information elsewhere.^{31,33} However, these results are new in the Swedish context. The results point to that hetero- and cis-normative school-based sexuality education in Sweden may not provide transgender, non-binary or sexual minority youths with relevant information on how to take care of their sexual health. This might lead to that equally distributed resources for highest attainable health among young people

Table 3. Intersecting associations of perceived knowledge on sexually transmitted infections (STI) related to the ability to take care of one's sexual health.

Perceived knowledge on sexually transmitted infections (STI)	n Sufficient knowledge/ insufficient knowledge	OR > 1 = less ability to take care of one's sexual health	CI (95% CI)	P-value
Gender, RERI: – ^A				
Girl and sufficient knowledge about STIs	1138/468	1 (ref)	–	–
Boy and sufficient knowledge about STIs	1099/248	0.55	(0.46–0.65)	<0.005
Girl and insufficient knowledge about STIs	809/2272	6.83	(5.98–7.82)	<0.005
Boy and insufficient knowledge about STIs	500/806	3.92	(3.36–4.58)	<0.005
Transgender experience, RERI: – ^A				
Cisgender and sufficient knowledge about STIs	2254/718	1 (ref)	–	–
Transgender and sufficient knowledge about STIs	13/14	0.07	(0–0.42)	0.02
Cisgender and insufficient knowledge about STIs	1329/3096	7.3	(6.57–8.12)	<0.005
Transgender and insufficient knowledge about STIs	6/52	145.53	(31.28–2594.61)	<0.005
Sexual identity, RERI: 4.76 (1.88–7.64), <i>P</i> < 0.05				
Heterosexual and sufficient knowledge about STIs	2022/552	1 (ref)	–	–
Sexual minority and sufficient knowledge about STIs	207/160	2.83	(2.26–3.55)	<0.005
Heterosexual and insufficient knowledge about STIs	1175/2524	7.87	(7.01–8.85)	<0.005
Sexual minority and insufficient knowledge about STIs	134/529	14.46	(11.74–17.93)	<0.005
Economy, RERI: 2.25 (0.29–4.2), <i>P</i> < 0.05				
Good economy and sufficient knowledge about STIs	1955/600	1 (ref)	–	–
Poor economy and sufficient knowledge about STIs	248/115	1.51	(1.19–1.92)	<0.005
Good economy and insufficient knowledge about STIs	1156/2590	7.3	(6.51–8.19)	<0.005
Poor economy and insufficient knowledge about STIs	150/463	10.06	(8.21–12.39)	<0.005
Foreign born, RERI: – ^A				
Born in Sweden and sufficient knowledge about STIs	2090/683	1 (ref)	–	–
Foreign-born and sufficient knowledge about STIs	207/57	0.84	(0.62–1.14)	0.27
Born in Sweden and insufficient knowledge about STIs	1228/2849	7.1	(6.37–7.92)	<0.005
Foreign-born and insufficient knowledge about STIs	115/314	8.36	(6.66–10.56)	<0.005

^ANot plausible to calculate relative excess risk due to interaction (RERI) when OR < 1.

from sexual minorities and young people with transgender experience, might not be reached.^{6,7} For Sweden, which was the first nation in the world to start with a curriculum-based school-based sexuality education more than 60 years ago, this is a novel and important finding. The highest excess risk for insufficient knowledge was found among young people with transgender experience. Due to small groups, these results are not significant and thus more uncertain. They are nonetheless of clinical and practical relevance and in line with previous surveys showing that school-based sexuality education is not inclusive in relation to young people with transgender experience.⁵³ In total, our results point to that young LGBTQI+ persons in Sweden face barriers in attaining resources needed for sexual health literacy from their school-based sexuality education. These findings are in line with previous research on school-based sexuality education indicating that LGBTQI+ youth do not receive knowledge that is relevant to them.⁵⁴

Implications for policy and practice

As was mentioned in the beginning of the article, a new national curriculum was introduced in Sweden in 2022. However, it does not explicitly mention the need to address a compensatory perspective in which sexual minorities and young people with transgender experiences not only need to be included but also receive useful knowledge that aligns with their lifestyle. Drawing on our results there might be a need to complement the new curriculum with writings about this. Such a statement would help to realise the inclusive intentions of Agenda 2030 and the Convention on the Rights of the Child.^{5–7} More specifically the teaching needs to be inclusive and less hetero- and cis-normative. This means that more fact-based sessions, discussions and examples should include perspectives that relates to transgender, non-binary and sexual minority youths' right to health.

To promote inclusive teaching, universities need to further examine their teacher training programs to incorporate more

Table 4. Intersecting associations of perceived knowledge about sexuality related to the ability to take care of one's sexual health.

Perceived knowledge about sexuality	<i>n</i> Sufficient knowledge/ insufficient knowledge	OR > 1 = less ability to take care of one's sexual health	CI (95% CI)	P-value
Gender, RERI: – ^A				
Girl and sufficient knowledge about sexuality	1318/452	1 (ref)	–	–
Boy and sufficient knowledge about sexuality	1271/297	0.68	(0.58–0.8)	<0.005
Girl and insufficient knowledge about sexuality	631/2284	10.55	(9.2–12.13)	<0.005
Boy and insufficient knowledge about sexuality	331/761	6.7	(5.68–7.94)	<0.005
Transgender experience, RERI: – ^A				
Cisgender and sufficient knowledge about sexuality	2606/754	1 (ref)	–	–
Transgender and sufficient knowledge about sexuality	11/2	0.63	(0.1–2.35)	0.55
Cisgender and insufficient knowledge about sexuality	979/3062	10.81	(9.7–12.05)	<0.005
Transgender and insufficient knowledge about sexuality	6/52	29.95	(13.88–78.18)	<0.005
Sexual identity, RERI: 4.75 (1.71–7.78), <i>P</i> < 0.05				
Heterosexual and sufficient knowledge about sexuality	2380/658	1 (ref)	–	–
Sexual minority and sufficient knowledge about sexuality	200/74	1.34	(1.01–1.76)	0.04
Heterosexual and insufficient knowledge about sexuality	818/2416	10.68	(9.51–12.02)	<0.005
Sexual minority and insufficient knowledge about sexuality	142/619	15.77	(12.92–19.35)	<0.005
Economy, RERI: – ^A				
Good economy and sufficient knowledge about sexuality	2282/624	1 (ref)	–	–
Poor economy and sufficient knowledge about sexuality	266/100	0.53	(0.4–0.71)	<0.005
Good economy and insufficient knowledge about sexuality	831/2569	7.26	(6.52–8.08)	<0.005
Poor economy and insufficient knowledge about sexuality	187/151	2.54	(1.95–3.31)	<0.005
Foreign born, RERI: 3.88 (0.04–7.72), <i>P</i> < 0.05				
Born in Sweden and sufficient knowledge about sexuality	2396/691	1 (ref)	–	–
Foreign-born and sufficient knowledge about sexuality	251/73	1.01	(0.76–1.32)	0.95
Born in Sweden and insufficient knowledge about sexuality	924/2840	10.66	(9.53–11.93)	<0.005
Foreign-born and insufficient knowledge about sexuality	72/302	14.54	(11.16–19.19)	<0.005

^ANot plausible to calculate relative excess risk due to interaction (RERI) when OR < 1.

in-depth information regarding SRHR. The lack of SRHR perspective in the teachers' training program has been known for a long time and needs to be changed.⁵⁵ For teachers that have already graduated, further education in the field of SRHR needs to be implemented. Moreover, school-based sexuality education can benefit, if not only teachers but school nurses, social workers and psychologists also get further education on SRHR included in their university education programs.⁵⁶ In the next quality review of European school-based sexuality education,²⁵ there should also be a review of university education in the SRHR-area. By strengthening the training of professionals who meet young people, inclusive teaching can be achieved.

Methodological strengths and limitations

This study has explored young people's perceived knowledge, but their actual knowledge was not evaluated and there may

be a discrepancy between these two aspects. Therefore, it would be of interest to see future studies that compare perceived knowledge with actual knowledge to delve deeper into possible resources for sexual health literacy. According to our descriptive findings, boys are more likely than girls and non-binary youth in reporting that their school-based sexuality education has given them sufficient knowledge. This can be questioned, since previous studies on young people and SRHR show that boys have less actual knowledge about STIs and HIV than girls.⁵⁷ More in-depth analysis on the possible discrepancy between boys estimated knowledge and actual knowledge are needed. Also, what is sometimes lumped together as socioeconomics largely includes the factors of education and knowledge. With good education and knowledge, people can make healthier choices, get better jobs and live longer. In our article, we have focused on the fact that school-based sexuality education has the same function from a health equity perspective. To give young people equal opportunities for sexual health

Table 5. Intersecting associations of perceived knowledge on relationships and gender equality related to the ability to take care of one's sexual health.

Perceived knowledge on relationships and gender equality	<i>n</i> Sufficient knowledge/ insufficient knowledge	OR > 1 = less ability to take care of one's sexual health	CI (95% CI)	P-value
Gender, RERI: – ^A				
Girl and sufficient knowledge about relationships and gender equality	909/362	1 (ref)	–	–
Boy and sufficient knowledge about relationships and gender equality	996/243	0.61	(0.51–0.74)	<0.005
Girl and insufficient knowledge about relationships and gender equality	1041/2368	5.71	(4.96–6.59)	<0.005
Boy and insufficient knowledge about relationships and gender equality	599/809	3.39	(2.89–3.99)	<0.005
Transgender experience, RERI: 7.77 (–3.25–18.8) ^B , <i>P</i> > 0.05				
Cisgender and sufficient knowledge about relationships and gender equality	1921/607	1 (ref)	–	–
Transgender and sufficient knowledge about relationships and gender equality	6/5	2.64	(0.76–8.79)	0.11
Cisgender and insufficient knowledge about relationships and gender equality	1660/3197	6.09	(5.47–6.8)	<0.005
Transgender and insufficient knowledge about relationships and gender equality	10/49	15.51	(8.15–32.65)	<0.005
Sexual identity, RERI: 4.51 (2.67–6.36), <i>P</i> < 0.05				
Heterosexual and sufficient knowledge about relationships and gender equality	1750/532	1 (ref)	–	–
Sexual minority and sufficient knowledge about relationships and gender equality	150/63	1.38	(1.01–1.87)	0.04
Heterosexual and insufficient knowledge about relationships and gender equality	1445/2538	5.78	(5.15–6.5)	<0.005
Sexual minority and insufficient knowledge about relationships and gender equality	192/623	10.67	(8.85–12.92)	<0.005
Economy, RERI: 1.66 (0.28–3.04), <i>P</i> < 0.05				
Good economy and sufficient knowledge about relationships and gender equality	1684/519	1 (ref)	–	–
Poor economy and sufficient knowledge about relationships and gender equality	192/70	1.18	(0.88–1.57)	0.26
Good economy and insufficient knowledge about relationships and gender equality	1426/2667	6.07	(5.4–6.83)	<0.005
Poor economy and insufficient knowledge about relationships and gender equality	206/502	7.91	(6.55–9.57)	<0.005
Foreign born, RERI: – ^B				
Born in Sweden and sufficient knowledge about relationships and gender equality	1758/562	1 (ref)	–	–
Foreign-born and sufficient knowledge about relationships and gender equality	189/54	0.89	(0.65–1.22)	0.49
Born in Sweden and insufficient knowledge about relationships and gender equality	1561/2967	5.95	(5.31–6.66)	<0.005
Foreign-born and insufficient knowledge about relationships and gender equality	131/310	7.4	(5.92–9.3)	<0.005

^AA confidence interval that includes negative relative excess risk due to interaction (RERI) is not significant.^BNot plausible to calculate RERI when OR < 1.

literacy, they must receive equal knowledge from school. Our study does not deal with other factors which of course also contribute to complexity within sexual health literacy.

Moreover, this is a cross-sectional quantitative study that cannot reflect all complexities that can be found in qualitative study. To deepen the knowledge of the association between school-based sexuality education and sexual health literacy more studies with mixed methods design are needed.

In population-based surveys, smaller social groups are often excluded, as a result of their small numbers. This may lead to health disparities becoming less visible. We chose to include smaller groups in both descriptive statistics (non-binary youth in Table 1) and regression models (youth with transgender experience in Tables 2–6). Thus, the study has results that are of interest from an intersectional perspective even though they are not statistically significant. Using

non-significant results can be motivated if it is in accordance with the aim and analytical approach.⁴⁷

Moreover, in the transition from a qualitative research tradition to a quantitative, a series of discussions has arisen about how intersectionality should be measured and analysed in order to correspond adequately to the original theory.^{36,44,46,50,51} Our analysis does not seek to mimic how qualitative methods understand and use intersectionality, but rather to capture the main features of the intersectional theory to strengthen a quantitative analysis method that examines power structures and conditions for health equity.⁴⁷

The data set is from 2015, but based on a robust sample of the total population and thus has great value for analysis even today. As a quantitative cross-sectional population-based study, we measure health in large groups at a given time. The analysis is not as in-depth as, for example, in an interview

Table 6. Intersecting associations of perceived knowledge about norms and LGBTQI+ perspectives related to the ability to take care of one's sexual health.

Perceived knowledge about norms and LGBTQI+ perspectives	n Sufficient knowledge/ insufficient knowledge	OR >1 = less ability to take care of one's sexual health	CI (95% CI)	P-value
Gender, RERI: – ^A				
Girl and sufficient knowledge about norms and LGBTQI+ perspectives	589/154	1 (ref)	–	–
Boy and sufficient knowledge about norms and LGBTQI+ perspectives	788/155	0.75	(0.59–0.96)	0.02
Girl and insufficient knowledge about norms and LGBTQI+ perspectives	1355/2581	7.29	(6.05–8.83)	<0.005
Boy and insufficient knowledge about norms and LGBTQI+ perspectives	802/893	4.26	(3.49–5.22)	<0.005
Transgender experience, RERI: 8.06 (–5.37–21.5) ^A , $P > 0.05$				
Cisgender and sufficient knowledge about norms and LGBTQI+ perspectives	1386/307	1 (ref)	–	–
Transgender and sufficient knowledge about norms and LGBTQI+ perspectives	4/4	4.51	(1.06–19.19)	0.03
Cisgender and insufficient knowledge about norms and LGBTQI+ perspectives	2183/3497	7.23	(6.33–8.29)	<0.005
Transgender and insufficient knowledge about norms and LGBTQI+ perspectives	12/50	18.81	(10.24–37.4)	<0.005
Sexual identity, RERI: 6.46 (4.23–8.69), $P < 0.05$				
Heterosexual and sufficient knowledge about norms and LGBTQI+ perspectives	1254/274	1 (ref)	–	–
Sexual minority and sufficient knowledge about norms and LGBTQI+ perspectives	114/31	1.24	(0.81–1.87)	0.3
Heterosexual and insufficient knowledge about norms and LGBTQI+ perspectives	1932/2795	6.62	(5.75–7.65)	<0.005
Sexual minority and insufficient knowledge about norms and LGBTQI+ perspectives	226/658	13.32	(10.93–16.3)	<0.005
Economy, RERI: 2.79 (1.13–4.45), $P < 0.05$				
Good economy and sufficient knowledge about norms and LGBTQI+ perspectives	1207/263	1 (ref)	–	–
Poor economy and sufficient knowledge about norms and LGBTQI+ perspectives	152/41	1.24	(0.85–1.78)	0.26
Good economy and insufficient knowledge about norms and LGBTQI+ perspectives	1895/2921	7.07	(6.13–8.19)	<0.005
Poor economy and insufficient knowledge about norms and LGBTQI+ perspectives	243/535	10.1	(8.27–12.39)	<0.005
Foreign born, RERI: – ^B				
Born in Sweden and sufficient knowledge about norms and LGBTQI+ perspectives	1266/296	1 (ref)	–	–
Foreign-born and sufficient knowledge about norms and LGBTQI+ perspectives	140/18	0.55	(0.32–0.89)	0.02
Born in Sweden and insufficient knowledge about norms and LGBTQI+ perspectives	2045/3231	6.76	(5.89–7.77)	<0.005
Foreign-born and insufficient knowledge about norms and LGBTQI+ perspectives	176/349	8.48	(6.81–10.6)	<0.005

^ANot plausible to calculate relative excess risk due to interaction (RERI) when OR < 1.^BA confidence interval that includes negative RERI is not significant.

study. Therefore, we are careful that our research questions and analyses are guided by previous theories and studies. We see great value in the analyses the study makes and the results they highlight. Not least from a methodological perspective where possibilities and limitations of how cross-sectional national samples can be used.

Conclusion

Our findings show that young people in Sweden do not have equal abilities to receive knowledge they need to take care of their sexual health and thus attain sexual health literacy. There is an unequal distribution of perceived knowledge, and LGBTQI+ youth face barriers in using school-based sexuality education as a resource for sexual health literacy. When implementing the new curriculum on sexuality

education, inclusive teaching should be applied, teaching that helps LGBTQI+ youth access resources for sexual health literacy.

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Data availability. The data that support the findings of this study belongs to The Public Health Agency of Sweden, and restrictions apply to the availability of these data, which were used under license for the current study. The analyses are available from the authors upon reasonable request and with permission of The Public Health Agency of Sweden. For further questions on availability of data and materials, please contact the corresponding author.

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Author affiliations

^AFaculty of Health and Society, Institution for Social Work, Centre for Sexology and Sexuality Studies, Malmö University, Malmö, Sweden.

^BUnit for Sexual Health and HIV Prevention, Department of Communicable Disease Control and Health Protection, The Public Health Agency of Sweden, Stockholm, Sweden.

^CUnit for Analysis, Department of Public Health Analysis and Data Management, The Public Health Agency of Sweden, Stockholm, Sweden.

^DDepartment of Health Sciences, University West, Trollhättan, Sweden.

^EDepartment of Behavioural Science, Oslo Metropolitan University, Oslo, Norway.