

# BMJ Open School nurse-led educational interventions for sexual and reproductive health promotion in adolescents in high-income countries: a mixed-methods systematic review protocol

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## ABSTRACT

**Introduction** As educators and health professionals, school nurses are in an optimal position to improve and advocate for adolescent reproductive and sexual health. This report outlines a protocol for a systematic review to synthesise evidence on the effects of school nurse-led education interventions and barriers and facilitators to implementing the interventions to improve students' knowledge, attitudes and behaviours related to sexual and reproductive health in high-income countries.

**Methods and analysis** We will develop a protocol to systematically review school nurse-led education interventions aimed at promoting adolescent sexual and reproductive health. This protocol will be based on the methodology of the *Cochrane Handbook for Systematic Reviews of Interventions*. The search will be conducted in Ovid-MEDLINE, CINAHL, Cochrane Library, Ovid-Embase, PsycINFO, Koreamed and ScienceON using relevant Medical Subject Headings and text words to identify the literature on different types of studies examining school nurse-led sexual and reproductive health education interventions in April 2024. Two independent reviewers will select relevant studies and extract data using a predefined template. We will assess methodological quality using the risk-of-bias tools appropriate for study designs and will resolve discrepancies through discussion with the review team. Where appropriate, we will conduct meta-analyses to estimate the effectiveness of school nurse-led sexual and reproductive health education interventions. Additionally, a qualitative evidence synthesis will be performed for the qualitative research included in the review. Finally, both a quantitative synthesis and a qualitative synthesis will be combined into a secondary synthesis addressing the facilitators and barriers of sexual and reproductive health educational interventions provided by school nurses to adolescents.

**Ethics and dissemination** This review will synthesise publicly available resources and does not require ethical approval. The findings will provide insights into how school nurses can improve students' sexual and reproductive health. The results will be disseminated through peer-reviewed publications, reports and academic conferences.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This mixed-methods systematic review will adhere to the Joanna Briggs Institute (JBI) mixed-methods systematic review manual.
- ⇒ Methodological quality assessment will be conducted using the Cochrane Risk of Bias V.2 for randomised controlled trials and cluster-randomised trials, the Risk of Bias Assessment Tool for Nonrandomized Studies V.2 for nonrandomised studies and the JBI critical appraisal checklist for qualitative research.
- ⇒ Applying a mixed-methods systematic review to identify the effects of school nurse-led sexual and reproductive health interventions, along with information on facilitators and barriers to implementing these interventions in schools, will help maximise the review's findings to inform practice and policy.
- ⇒ Because this review focuses on studies conducted in high-income countries, the findings may not be generalised to low-income and middle-income countries with different school health systems and sociocultural contexts.

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## INTRODUCTION

Adolescence aged 10–19 years is a unique and critical period in an individual's life.<sup>1</sup> Moreover, it is characterised by rapid physical, cognitive and psychosocial changes, which might be exposed to a variety of sexual and reproductive risks.<sup>2</sup> Reproductive health is not simply the absence of disease or infirmity in all matters related to the reproductive system but a state of complete physical, mental and social well-being, which is very important in adolescence and has implications for the next generation's health.<sup>3</sup>

According to the literature, adolescents might face problems such as early pregnancy

and birth, abortion, violence, unintended pregnancy, genital tract infections (RTIs) and sexually transmitted infections (STIs).<sup>2</sup> Therefore, age-specific sexual and reproductive health interventions are important to improve the knowledge and skills necessary for healthy sexual health across the lifespan.<sup>4</sup> It is also an important time for young people to learn how to think critically about sex, make informed decisions and maintain healthy sexual relationships.<sup>5</sup>

Based on the 2020 report by the Centers for Disease Control and Prevention,<sup>6</sup> only a small percentage of secondary schools across the USA provide services related to sexual health. While most schools provide medication administration for students with chronic diseases (86.1%), emergency management and medication provision (75.0%) and case management for students with chronic diseases (74.5%), the percentage of schools providing services related to HIV (2.2%), sexually transmitted diseases (STDs) (2.9%) and pregnancy management (2.7%) is notably low. Similarly, since September 2020, the UK has required all schools to implement relationships and sex education, addressing topics like puberty, STIs, healthy relationships and consent, tailored to students' age and maturity.<sup>7,8</sup> However, limited resources, teachers' expertise and parental opposition hindered the effective implementation of sexual and reproductive health education in schools.<sup>9</sup> A safe and healthy school environment improves students' quality of life and learning effectiveness.<sup>10</sup> Health education is important in school as it greatly influences students' future habits and attitudes.<sup>10</sup> Given the school environment, school nurses can provide crucial support for accessible gender and reproductive health education interventions and counselling for adolescents.<sup>11,12</sup>

School nurses can work with other experts to develop and implement programmes to provide appropriate information based on sexual health, contraception, STIs, safe sex relationships and adolescents' age.<sup>13,14</sup> According to prior works, when students perceived high closeness to their teachers (in the context of HIV and pregnancy prevention), they valued what they learnt.<sup>15</sup> Also, effective sexual health education in schools largely depends on the abilities of the teachers responsible for delivering it.<sup>16</sup> In addition, the attitudes and expertise of educators play a significant role in the effectiveness of this education.<sup>16</sup> Research showed that most teachers do not feel ready to manage and teach adolescent sexual issues and, in most cases, consider sexuality only from a biological point of view and not in a social context.<sup>17</sup> School nurses could play a crucial role in providing sexual and reproductive health education as health professionals with clinical expertise.<sup>18,19</sup>

Previous systematic literature reviews focused on parental and family-based adolescent sexual health interventions<sup>20</sup>; the effectiveness of comprehensive sex education<sup>21</sup>; sexual health issues and mental health<sup>22</sup>; pregnancy and STDs<sup>23</sup>; contraception<sup>24</sup> and substance abuse and sexual violence.<sup>25</sup> The effects and implementing factors

of sexual and reproductive health education interventions led by school nurses, including health education and nursing services, are currently unknown.

Low-income and middle-income countries often lack the resources and infrastructure necessary to provide adequate sexual and reproductive health services, which leads to poor SRH outcomes and limited access to these services.<sup>26</sup> Meanwhile, the increasing incidence of sexual and reproductive health problems such as RTIs and STIs has become prevalent public health problems in high-income countries (HICs).<sup>27</sup> Because the contexts of implementing interventions in HICs are different from those in low-income and middle-income countries, we will focus on school nurse-led education interventions targeted at adolescents in HICs.

Therefore, this systematic literature review and meta-analysis seek to examine the effects of sexual and reproductive health education led by school nurses in promoting adolescent sexual and reproductive health in HICs. Additionally, it aims to explore the facilitators and barriers associated with conducting educational interventions by school nurses.

## METHOD AND ANALYSIS

### Protocol and registration

This review will be conducted with guidance from the *Cochrane Handbook for Systematic Reviews of Interventions* (V.6.2)<sup>28</sup> and Joanna Briggs Institute (JBI).<sup>29</sup> This protocol is reported in line with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Protocols guidelines.<sup>30</sup> This study has been registered at PROSPERO with registration number PROSPERO CRD42022347625.

### Eligibility criteria

Two independent researchers (YMC and SN) will conduct study screening and selection based on the eligibility criteria.

### Participants

We will only include studies that involve students between the ages of 10 and 19 years who attend elementary, middle or high school. Out-of-school youth will be excluded to focus on evaluating the effectiveness of programmes implemented within school-based educational settings.

### Interventions

We will focus on sexual and reproductive health-related education interventions delivered by school nurses or teams with school nurses, excluding interventions delivered by school staff and teachers. Based on previous studies,<sup>21,31</sup> the interventions include the following: education on contraception and STI prevention, education on human papillomavirus (HPV) vaccination, prevention of sexual violence and abuse, pregnancy prevention education and gender equality education. However, studies on intervention based on school-based health centres focused

on providing clinical health services<sup>32</sup> were excluded, as they do not align with the study's objective of evaluating educational interventions provided by school nurses.

### Comparisons

The comparison is defined as groups receiving sexual and reproductive health education provided by research nurses or teachers instead of school nurses or groups that did not receive any educational intervention.

### Outcomes of interest

#### Primary outcomes

*Sexual and reproductive health knowledge:* the impact of sexual and reproductive health education interventions provided by school nurses on adolescents' knowledge (eg, STIs and AIDS/HIV; contraceptive methods; comprehensive knowledge of condom use, abstinence, pregnancy, unsafe abortion, sexual violence and sexual abuse; gender; sexual orientation and gender identity/expression; gender equality and adult rights).

*Attitudes towards sexual and reproductive health:* whether students' sexual attitudes change after receiving an educational intervention from school nurses to improve knowledge about sexual and reproductive health (eg, perceptions and practices related to contraception, attitudes towards condoms, abstinence, delaying sexual intercourse, attitudes and intentions towards HPV vaccination).

*Sexual and reproductive health behaviours:* these include contraceptive use (eg, condom use), age at sexual initiation, abstinence, number of sexual partners and sexual risk behaviours (eg, unprotected sexual activity).<sup>33</sup>

*Health and social outcomes:* these refer to the consequences of such sexual behaviours, including pregnancy rates, incidence of STIs and other related indicators.<sup>34</sup>

#### Secondary outcomes

Facilitators and obstacles to implementing sexual and reproductive health education interventions led by school nurses.

### Study design

This review will include all primary research study designs, including quantitative, qualitative and mixed-methods research. Only studies published in English or Korean will be included.

### Setting

To include the studies conducted in HICs, we will adhere to HICs' lists based on the World Bank per capita Gross National Income in 2024.<sup>35</sup>

### Search strategy

The following databases will be searched to identify relevant studies: the Cochrane Library, Ovid-Embase, PsycINFO, CINAHL, Ovid-Medline, Koreamed and ScienceON. Medical Subject Headings and text words related to school nurse-led sexual and reproductive health will be used in the search process. We will also

use the search filters to exclude articles published in low-income and middle-income countries.<sup>36</sup> The search will cover studies from each database's inception to April 2024. The Ovid-MEDLINE search strategies are demonstrated online supplemental appendix 1.

### Study selection

After performing the initial search, the search results go through a two-step screening process. Two independent reviewers (YMC and SN) evaluate the title and abstract of the study separately to determine whether they meet the predefined inclusion criteria and excludes studies that do not meet these criteria. Disagreement will be resolved through discussion or consultation with a third reviewer. The study selection process will be visualised using the PRISMA 2020 flowchart.<sup>37</sup> The screening and selection will be carried out using Covidence, a systematic review software developed by Veritas Health Innovation in Melbourne, Australia (<http://www.covidence.org>).

### Risk-of-bias assessment

After screening their full text, two reviewers will independently evaluate the risk of bias included in the review. The risk of bias in the included studies will be applied according to study designs.<sup>38</sup> The Cochrane Collaboration Risk-of-Bias 2 (RoB 2.0) tool for randomised controlled trials (RCTs) will be used to assess the risk of bias in the included studies.<sup>39</sup> The tool is structured into five domains through which bias can be introduced. The domains cover all types of trends that may affect the results of randomised trials, namely: (1) bias arising from the randomisation process, (2) bias due to deviations from intended interventions, (3) bias due to missing outcome data, (4) bias in measurement of the outcome and (5) bias in selection of the reported result. The answer options for the questions are 'yes' (Y), 'probably yes' (PY), 'probably no' (PN), 'no' (N) and 'no information' (NI). Responses to questions provide the basis for domain-level judgments about the risk of bias, and then, these domain-level judgments provide the basis for a general risk-of-bias judgement for the outcome of the study being evaluated. The possible judgments of overall risk of bias are (1) low risk of bias, (2) some concerns and (3) high risk of bias.

For the risk-of-bias assessment in cluster RCTs, the RoB 2.0 tool for cluster-randomised trials (RoB 2.0 CRTs) developed by the Cochrane Collaboration will be applied.<sup>40</sup> The RoB 2.0 CRT tool evaluates six domains of potential bias arising during the randomisation process as follows: (1) bias arising from the randomization process (domain 1a: risk of bias arising from the randomisation process), (2) bias arising from the timing of identification or recruitment of participants in a CRT (domain 1b: risk of bias arising from the timing of identification or recruitment of

participants), (3) bias due to deviations from intended intervention (effect of assignment to intervention/effect of adhering to intervention), (4) risk of bias due to missing outcome data, (5) risk of bias in measurement of the outcome and (6) risk of bias in selection of the reported result. The answer options for the questions are 'yes' (Y), 'probably yes' (PY), 'probably no' (PN), 'no' (N) and 'no information' (NI). The overall risk of bias for each domain will be decided as (1) low risk of bias, (2) some concerns and (3) high risk of bias.

For non-random studies (cohort studies, case-control studies and before-and-after studies), a Revised Risk of Bias Assessment Tool for Nonrandomized Studies of Interventions V.2 (RoBANS 2) will be used.<sup>41</sup> The RoBANS 2 tool includes comparability of the target group, target group selection, confounders, measurement of intervention/exposure, binding of assessors, outcome assessment, incomplete outcome data and selective outcome reporting. Based on the RoBANS 2 guidance, we will judge the overall risk of bias in each study as 'high', 'unclear' or 'low'.

For qualitative studies, the JBI critical appraisal checklist for qualitative research will be used.<sup>42</sup> The JBI tool consists of ten questions with possible answers of yes, no, unclear or not applicable. A comprehensive evaluation will be conducted based on the JBI assessment guide to determine whether the study meets adequate methodological quality standards.<sup>42</sup>

### Data extraction

Two independent reviewers (YMC and SN) will be conducted to extract data using a prespecified template form after pilot testing. The data extracted will include specific details about the participants, intervention, context, study methods, outcome data and study findings relevant to the review questions.<sup>43</sup> Cross-checking will be conducted for the accuracy and completeness of the extracted data, and the discrepancy will be resolved through discussion and consultation with a third reviewer.

### Statistical analysis

For quantitative data, meta-analysis will be employed to generate pooled estimates to assess the effects of school nurse-led sexual and reproductive health education. Relevant indicators will use the standardised mean difference for continuous variables and relative risk or OR for categorical variables.<sup>44</sup> We will use a random-effects model as the interventions and populations are likely to be heterogeneous across included studies. The heterogeneity of intervention effects across studies using the  $I^2$  and the  $Q$ -statistic will be assessed.<sup>45</sup> A funnel plot will be used to detect any publication bias if more than 10 studies are included in this analysis.<sup>46</sup> Additionally, subgroup analyses will be performed according to study designs, such as randomised or cluster-controlled trials versus

non-randomised studies or outcomes of interest, such as knowledge, attitudes and behaviours, or the cultural context of countries such as Asian HICs versus Western HICs. If a meta-analysis is inadequate to conduct because of the heterogeneity of studies included in the review, we will summarise and synthesise the results using a Synthesis Without Meta-analysis methodology, such as harvest or albatross plots.<sup>47</sup>

Regarding qualitative evidence synthesis, we will adopt thematic synthesis using 'best fit' framework approach.<sup>48</sup> Qualitative studies will be coded sentence by sentence based on units of meaning, applied to both first-order and second-order constructs demonstrated in the results and discussion sections of articles, to capture both primary participants' opinions and authors' interpretations.<sup>49</sup> Finally, we will combine both quantitative evidence synthesis and qualitative evidence synthesis using convergent segregated approaches from qualitative evidence synthesis to inform the findings of quantitative evidence synthesis.<sup>50 51</sup>

### Patient and public involvement

Patients and/or the public were not involved in this research's design, conduct, or dissemination plans.

### Ethics and dissemination

This review will synthesize publicly available resources and does not require ethical approval. The findings will provide insights into how school nurses can improve students' sexual and reproductive health. The results will be disseminated through peer-reviewed publications, reports and academic conferences.

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