Journal of Public Health Sciences (JPHS)
Vol. 5, No. 01, pp. 121-138
journal.iistr.org/index.php/JPHS
DOI: 10.56741/IISTR.jphs.001138

Current Mobile Applications for The Prevention of Child Sexual Abuse: A Scoping Review

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ARTICLE INFO

Article history
Received 21 June 2025
Revised 20 January 2026
Accepted 28 February 2026

ABSTRACT

The use of mobile applications in child protection has increased in recent years, including their potential role in preventing child sexual abuse (CSA). However, the extent and nature of evidence supporting mobile application–based interventions for CSA prevention remain unclear. This scoping review aimed to identify, synthesize, and map existing evidence on the development and use of mobile applications for the prevention of child sexual abuse. Following the Arksey and O'Malley framework, a scoping review was conducted using systematic searches in ScienceDirect, CINAHL (EBSCO), and Scopus. Search terms included variations of mobile applications (including mobile and smartphone apps), prevention, and child sexual abuse. Eligible studies were quantitative intervention or mixed-methods studies that evaluated mobile application–based interventions targeting CSA prevention, were available in full text, published in English, and released between 2017 and 2024. Data were extracted manually and synthesized descriptively using thematic analysis. From 3,896 records, four studies met the inclusion criteria. Thematic analysis identified four key themes: (1) improved children's awareness and protective skills; (2) promotion of self-protective behaviours; (3) enhanced parental knowledge; and (4) usability and accessibility of mobile applications. The available evidence on mobile applications for CSA prevention remains limited and heterogeneous. While existing studies suggest that mobile applications may support awareness-building and short-term preventive outcomes, the current evidence is insufficient to establish effectiveness. Further

theory-informed and methodologically rigorous research is needed to evaluate sustained behavioural change, long-term outcomes, and equitable implementation across diverse contexts.

Keywords
Child Sexual Abuse
Digital Health
Mobile Applications
Prevention

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Introduction

Child abuse remains a global concern, encompassing physical, sexual, psychological, and economic forms of maltreatment directed at individuals under the age of 18 [1]. Among these forms, child sexual abuse (CSA) is particularly challenging to quantify accurately. The prevalence of CSA is often unclear, as many cases are reported retrospectively when individuals reach adulthood [2]. Moreover, objective assessments of CSA are difficult to obtain because incidents are frequently concealed and not consistently observable [2],[3]. Data from various countries show that many cases of CSA go unreported because victims feel threatened or do not know how to report it. The prevalence is likely higher because it is not reported by families [4] due to the stigma and its implications for children's safety, as well as because it often remains undetected [5].

CSA is one of the most damaging forms of violence and has both short-term and long-term negative impacts on victims [6] and a negative impact on biopsychosocial-economic development and health and the future of the victim, family, and society [6]-[8]. Given the severity and persistence of these harms, the prevention of CSA represents a critical priority in child protection and public health efforts.

Effective CSA prevention requires comprehensive strategies that promote awareness, education, and protective skills among children, parents, and the wider community. Educational interventions aimed at children are particularly important, as they can enhance understanding of personal boundaries, recognize risky situations, and support self-protective behaviours. However, conventional approaches to education and training are often limited by issues of accessibility, reach, and sustainability, especially in remote or resource-constrained settings. In this context, digital technologies, particularly mobile phones, offer new opportunities to deliver accessible and scalable prevention interventions. Mobile devices are widely used and increasingly familiar to children and adolescents, making them a potentially effective medium for delivering prevention-oriented information and skills training.

The use of mobile applications for educational and health-related purposes has expanded rapidly in recent years, including applications designed to address sexual violence

prevention. Numerous digital tools have been developed to support violence prevention, response, and reporting [9]. Previous studies suggest that mobile applications may enhance awareness and skills related to avoiding CSA [10], and and improve the quality and timeliness of information delivery and reporting processes [11]. Applications that incorporate interactive and scenario-based learning may help children feel more prepared to recognize and respond to potential threats. As such, mobile app–based interventions represent a promising avenue for supporting CSA prevention efforts Systematic examination of the existing literature is therefore essential to identify what types of applications have been developed, how they are used, and what evidence exists regarding their potential benefits [12].

App users should receive more attention in risk assessment, risk stratification, and sexual abuse prevention programs [13]. Although numerous digital tools address child safety more broadly, empirical research examining mobile applications explicitly designed as *primary prevention interventions* for child sexual abuse remains scarce [14]. While mobile applications have been widely used for mental health promotion and the prevention of other risk behaviors [15],[16], their application within the context of CSA prevention has received comparatively little attention. Importantly, prior reviews have not systematically mapped the characteristics, target users, and prevention mechanisms of mobile applications that are specifically developed and evaluated for CSA prevention. Existing digital interventions tend to focus primarily on the detection of abuse-related material or perpetrators and are often framed as tertiary responses rather than primary prevention strategies [17],[18]. Moreover, many interventions lack an explicit theoretical basis in behavior change and involve minimal participation of children and parents in the development process.

CSA is a pressing global issue, yet the use of digital technology, particularly mobile apps, in its prevention efforts remains underdeveloped [19]. Although digital interventions to prevent online child sexual abuse are increasingly acknowledged as important, they remain understudied and inadequately evaluated. Previous reviews have not systematically mapped the characteristics, target populations, and outcomes of mobile application–based interventions explicitly designed for the primary prevention of CSA. As a result, there is limited clarity regarding how such interventions have been conceptualized, implemented, and evaluated across different contexts.

Therefore, a scoping review is warranted not only to map existing evidence, but also to critically examine how mobile applications for CSA prevention have been conceptualized, whom they target, and what outcomes they report. By focusing exclusively on mobile app–based interventions for CSA prevention, this review addresses a critical gap in the digital public health literature. Although several reviews have addressed child safety or digital health

interventions, these reviews often adopt a broad focus on online risks, abuse detection, reporting mechanisms, or tertiary prevention strategies. Few have specifically examined mobile application–based interventions designed for the primary prevention of child sexual abuse. By concentrating on mobile applications as preventive tools and mapping their target populations, intervention characteristics, and contextual settings, this scoping review differentiates itself from adjacent domains and addresses a distinct gap in the existing literature.

Recent peer-reviewed literature was prioritized to reflect current developments in digital health and child sexual abuse prevention, while seminal references were retained where conceptually relevant. This study aims to identify, synthesize, and map the existing evidence on the development and utilization of mobile applications for the prevention of child sexual abuse.

Material and Methods

A. Design

This study utilizes a scoping review as its methodological approach to literature review. Scoping reviews are systematic methods used to map the existing evidence and synthesize key concepts, theories, and findings related to a specific research area [20]. The five-step methodological framework for scoping review was conducted according to the Arksey and O'Malley framework, which aims to identify eligible research studies. Each stage of the framework was operationalized through predefined procedures for screening, study selection, and data extraction, as described in the following sections. These steps were as follows

- defining the research question,
- identifying relevant studies,
- study selection,
- data extraction, and
- collating, summarizing, and reporting the results.

The reporting of this scoping review adheres to the Preferred Reporting Items for Systematic Reviews checklist guidelines and the Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) [21] (see Fig. 1).

B. Defining the Research Questions

Following an initial examination of the relevant literature and team discussions, the review was guided by the following research questions:

- What mobile application–based interventions have been developed to support the prevention of child sexual abuse? and
- How are these mobile applications described and evaluated in the literature as tools for CSA prevention?

C. Identifying Relevant Studies

A comprehensive literature search was conducted using the internet databases ScienceDirect, CINAHL (via EBSCO), and Scopus. These databases were selected to ensure broad coverage of health, nursing, social science, and technology-related literature relevant to CSA prevention and mobile health interventions. To develop a comprehensive search strategy, the titles, abstracts, and index terms of all retrieved articles will be analyzed. Based on this initial analysis, the databases will be searched again using all identified keywords and index terms. The search strategy incorporated a combination of relevant keywords, database-specific subject headings, and Boolean operators to ensure broad and inclusive coverage of the literature related to mobile applications, prevention, and child sexual abuse. Keywords included variations of "mobile application,"OR "mobile app," OR"smartphone app,"AND "prevention," AND "child sexual abuse." The search was limited to articles published in English between 2017 and 2024. All identified records were imported into EndNote reference management software for organization and duplicate removal. Multiple synonyms and variations were applied for each concept to maximize sensitivity across databases. The Scopus and ScienceDirect searches yielded 2,465 and 1,426 records, respectively, while the CINAHL search yielded five records. In total, 3,896 records were identified across the three databases (Fig. 1).

D. Study Selection

1. Inclusion and Exclusion Criteria

This study adhered to the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines to conduct a literature review on current mobile application-based interventions for the prevention of child sexual abuse. Table 1 outlines the predefined inclusion and exclusion criteria used to select studies in accordance with PRISMA-ScR guidelines, focusing specifically on empirically evaluated mobile application–based interventions for the prevention of child sexual abuse.

Table 1. Inclusion and Exclusion Criteria

Criteria Type	Inclusion Criteria	Exclusion Criteria
Study Design	Quantitative studies (e.g., quasi-experimental, randomized controlled trials, mixed-methods)	Editorials, commentaries, opinion pieces, conference abstracts, and review articles
Accessibility	Full-text articles available	Articles not available in full text
Intervention Focus	Studies evaluating mobile application–based interventions for the prevention of child sexual abuse	Studies not focused on mobile applications (e.g., web-based only without mobile app component)
Type of Study	Original research articles	Non-original studies
Publication Year	Published between 2017–2024	Published outside 2017–2024
Language	Published in English	Articles not written in English

A detailed list of excluded studies with reasons for exclusion at the full-text screening stage is presented in Supplementary File 2.

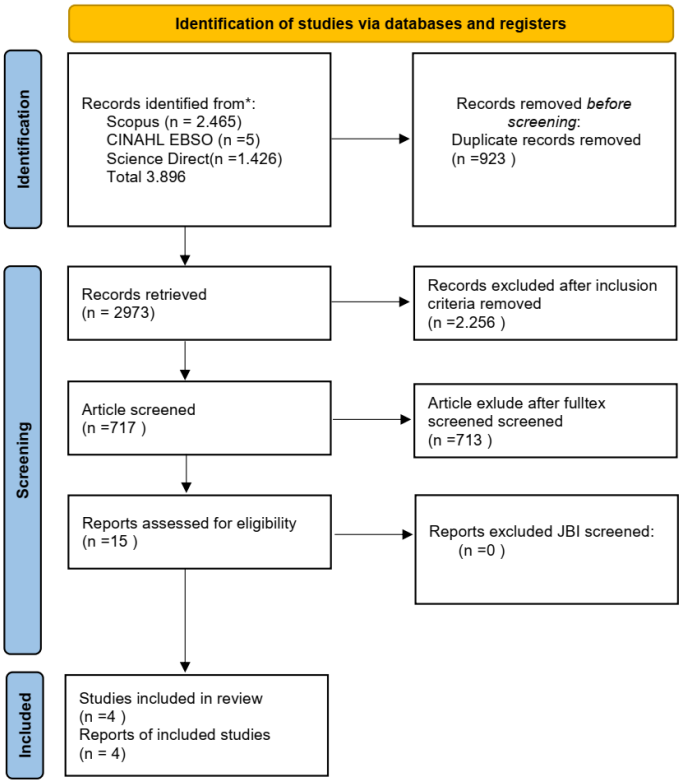


Fig. 1. PRISMA Flow Diagram.

2. Quality Appraisal

The methodological rigor of the included studies was assessed using the Joanna Briggs Institute (JBI) critical appraisal tool [22] for quasi-experimental studies and the Mixed Methods Appraisal Tool (MMAT) version 2018 [23] for mixed-methods studies. Each study was assessed based on standardized criteria, with responses categorized as "yes," "no," "unclear," or "not applicable." A score of one point was assigned for each "yes" response, while all other responses received zero points.

The proportion of fulfilled appraisal criteria was calculated to provide an overall indication of methodological rigor for each study. Consistent with approaches reported in previous scoping reviews, studies achieving scores above 75% were considered to demonstrate adequate methodological rigor for inclusion. This threshold was applied to enhance transparency in reporting and was not intended as a formal JBI-recommended cut-off.

Overall, the included studies demonstrated adequate to moderate methodological rigor, with appraisal scores ranging from 77.8% to 88.9% for quasi-experimental studies and 80.0% for the mixed-methods study. Common methodological strengths included clearly defined interventions, appropriate outcome measurements, and suitable analytical

approaches. Methodological limitations observed across some studies included the absence of randomization, small sample sizes, and incomplete reporting of follow-up procedures. A descriptive summary of appraisal results is presented in Table 2.

Table 2. Summary of Methodological Quality of Included Studies

Code	Author	Published Year	JBI / MMAT Critical Appraisal Tool	Study Design
P1	Moon et al.	2017	88.9 % (8/9)	Quasi Eksperimental
P2	Kim and Kang	2023	88.9 % (8/9)	Quasi Eksperimental
P3	Pangesti and Wahidin	2023	77.8 % (7/9)	Quasi Eksperimental
P4	Luo and Botash	2020	80.0% (8/10)	Mixed method

Note: Percentages represent the proportion of JBI/MMAT criteria fulfilled. A threshold of >75% was used to indicate adequate methodological rigor, following practices reported in previous scoping reviews, and was applied for descriptive purposes only.

3. Data Extraction and Analysis

The research team collaborated to select the variables to be extracted and create the data visualization. The author, publication years, country, app names, research objectives, designs, samples, and results were among the extracted data. An overview of the data obtained from the full-text analysis of every eligible manuscript is shown in Table 3.

Descriptive analysis was employed to examine the selected articles. Relevant data from each study were extracted and organized according to predefined columns in a data extraction table. The findings from the reviewed articles were then described and analysed in relation to existing literature, allowing for a comparison with previous research. Mobile application interventions were categorized based on their reported outcomes to facilitate thematic synthesis and highlight patterns across studies.

E. Data Collection

All researchers participated in the selection process for the study. All authors selected articles by following the PRISMA flow chart, which consisted of the following steps: screening for duplicates, screening titles and abstracts, and assessing full-text availability. Data were extracted manually from the study using the tabulation method. T.S. designed the study and provided the concept, selection, study design, methods, original draft, data extraction, data analysis, review, editing, and manuscript writing. C.E.K., and RNI extracted the data and wrote the manuscript. Y.H. and M.T. collected and analysed the data. T.S., and C.E.K. revised the manuscript for important intellectual content.

Results

A. Characteristics of the Included Studies

Of the 3,896 records identified through database searching, only four studies met the inclusion criteria, reflecting the limited availability of empirically evaluated mobile

applications specifically targeting CSA prevention. The four included studies were published between 2017 and 2023 and conducted in South Korea, Indonesia, and the United States. Among the four reported studies, three employed a quasi-experimental design [10],[24],[25], and one used a mixed-methods approach. A summary of study characteristics is presented in Table 3. Study screening and selection were conducted independently by at least two reviewers. Any discrepancies in study inclusion or appraisal were resolved through discussion until consensus was reached.

B. Finding

The results of the study showed that four themes emerged in this study, including the use of mobile applications increases awareness and skills to avoid CSA in children; improves children's self-protection behaviour to avoid CSA; enhances parental knowledge about CSA prevention; and eases the use of the application.

Table 3. Selection Results of Current Mobile Applications for The Prevention of Child Sexual Abuse

Code	Name of the app	Objectives	Study design	Sample	Results
P1	Sexual Abuse Prevention Mobile Application (SAP_MobAPP) for Primary School Children in Korea	Develop and evaluate the effects of a sexual abuse prevention mobile application (SAP_MobAPP) of primary school children.	Quasi Experiment	Second-grade children (10 years old) from two primary schools with similar numbers of students (122–140 children)	The SAP_MobAPP program improved recognition (awareness) and the child's skills to avoid child sexual abuse situations, and the effects were long-lasting. However, differences between groups were not statistically significant. This study developed a sexual abuse prevention application and verified its effectiveness. Awareness and skills to avoid child sexual abuse after app education increased immediately after training and four weeks later. The SAP_MobAPP could be used for sexual abuse prevention education in schools.
P2	Effects of Child Sexual Abuse Prevention Education Program Using Hybrid Application (CSAPE-H) on Fifth-Grade Students in South Korea	Test the effects of a child sexual abuse prevention education program using a hybrid application (CSAPE-H) by examining fifth-grade students.	Quasi Experiment	The intervention group consisted of 48 students, and the control group consisted of 55 students.	The intervention group received six sessions in CSA prevention education using the hybrid app, whereas the control group was taught using a lecture in a classroom environment. Between the two groups, there were significant differences in self-protective behaviours against CSA ($t = 2.26$, $p=0.027$). In addition, educational satisfaction was significantly higher in the experimental group than the control group ($t = 2.41$, $p = .019$). A CSAPE-H may be effective for elementary school students, especially for self-protective behaviors.
P3	Sex Education Parenting (SETTING) Application in Improving Parents'	Evaluate the effectiveness of using the sex education parenting (SETTING)	Quasi Experiment	A total of 91 parents at the Sempor I Health Center, Kebumen Regency,	The results showed that the majority of parents' knowledge increased from sufficient (73.6%) to a good level (82.4%), and there were statistically significant improvements in parents' level of knowledge about the prevention of sexual violence after

Code	Name of the app	Objectives	Study design	Sample	Results
	Knowledge about the Prevention of Sexual Violence among Children	application to improve the level of knowledge during the Covid-19 pandemic.		Central Java, Indonesia	being given sex education through the SETTING application with p= 0.000 (p<0.05).
P4	Testing a mobile app for child abuse (sexual assault care algorithm, SACA); treatment: A mixed methods study	A preliminary evaluation of the usability and acceptability of a mobile application (sexual assault care algorithm, SACA).	Mixed method	The participants were all paediatric - trained Sexual Assault Nurse Examiners (SANE).	The value of using a mixed-methods research design to conduct a usability and acceptability test. Nurses are more likely to adopt a new technology for their evidence-based practice when the technology is easy to use and useful and requires less time to find the right piece of guideline evidence. Individualized training needs to be designed based on users' characteristics.

Discussion

This scoping review synthesized existing evidence on the use of mobile applications for the prevention of child sexual abuse. Rather than reiterating study-specific findings, the discussion focuses on interpreting the identified themes, examining their interrelationships, and critically reflecting on contextual, methodological, and conceptual considerations that shape the current evidence base.

The review identified a limited number of studies evaluating mobile applications for CSA prevention, underscoring the early and underdeveloped state of evidence in this field rather than limitations in the search strategy. Despite the widespread adoption of digital health technologies, most existing digital interventions continue to prioritize detection, reporting, or tertiary responses rather than primary prevention. This imbalance likely contributes to the narrow evidence base observed and highlights a substantial gap in the development and evaluation of mobile applications specifically designed for CSA prevention.

A. Mobile App Increases Awareness and Skills to Avoid CSA in Children

Nowadays, children are highly dependent on mobile devices to interact with the outside world. With the increasingly massive use of technology, mobile applications can be the right channel to provide education that can increase awareness and protection of children from sexual crimes. Therefore, application-based education programs can help find perspectives for sexual violence education for elementary school children. Thus, schools have more opportunities to organize application-based CSA prevention education and improve existing programs [10]. Findings across child-focused interventions suggest that mobile applications

may support short-term gains in awareness and protective skills, particularly when interactive and age-appropriate content is used.

Implementing CSA prevention programs through e-learning, such as mobile applications, offers several conveniences for program accessibility and reach, flexibility in implementation, and opportunities for broader content exposure, as well as multiple ways to demonstrate practical skills and engage children in the cycle of practice and feedback [26]. Mobile application technology provides easy and interactive access, as well as support that facilitates children to understand their body's limits, recognize risky behaviours, and prepare them to take appropriate preventive measures.

B. Mobile Apps Enhance Children's Self-Protective Behaviors to Avoid CSA

Mobile Apps Enhance Children's Self-Protective Behaviors to Avoid CSA. Building on increased awareness, several interventions also aimed to translate knowledge into self-protective behaviors. Mobile applications can improve children's self-protection from sexual crimes. The child sexual abuse prevention education program using a hybrid application (CSAPE-H) conducted by Kim & Kang [24] on sixty-eight students, consisting of an intervention group receiving CSAPE-H and a control group receiving lectures in a classroom environment, showed that CSAPE-H was significant in self-protection behavior against CSA ($t = 2.26$, $p = 0.027$). This is because CSAPE-H is a hybrid mobile application. Hybrid applications refer to operating systems (OS) that allow simultaneous cross-platform access between web-based and smartphone-based applications [27]. Hybrid applications are convenient to use due to their multi-platform production and accessibility beyond time and space, and they are adapted to high-speed mobile communications [27]. They also have the advantage of being able to run on any smartphone platform [28].

According to Moon et al. [10], elementary school children who received CSA prevention education through an application were able to connect their reality with virtual experiences. Mobile-based applications will enable children to acquire knowledge and skills without any time or place constraints [29]. By providing education to children and their parents, learning does not end at school but continues at home, allowing education to continue through the exchange of ideas [10]. By increasing knowledge and skills in protecting themselves from sexual crimes against children, their behavior to protect themselves from sexual crimes will improve.

C. Mobile Apps Increase Parental Knowledge About CSA Prevention

Mobile Apps Increase Parental Knowledge About CSA. Prevention.Beyond child-focused outcomes, parental involvement emerged as another important dimension of CSA prevention. Parents may be aware of the importance of sexual abuse prevention education in schools and at home [30]. They may think that sex is a complex topic to discuss with their children due to

lack of interest, knowledge, resources, terminology, and so on [31], or because of taboos, considering the topic vulgar and inappropriate where parents feel uncomfortable or unprepared to teach sex education [6]. Apart from that, parents do not educate their children using methods that are based on current developments [32].

Several CSA prevention efforts are being implemented for parents, either through traditional approaches (such as educational campaigns, parent training, or school programs) or digital means that can reach children directly and consistently. Mobile applications offer great potential to bridge this gap. Parents can use SAP_MobAPP, which has been proven to be significantly linked to the home environment [33], or utilize the sex education parenting (SETTING) application. Pangesti's [25] research, conducted with 91 parents at Sempor I Health Center, Kebumen Regency, Central Java, Indonesia, demonstrated that SETTING was effective in increasing parental knowledge about CSA prevention. The SETTING application utilizes audiovisual media to ensure its easy acceptance by users. According to Notoatmodjo [34], delivering material only with words is less effective. The use of teaching aids is one of the principles of the educational process; the use of audiovisual media is more easily accepted. Therefore, parents need to understand social media in order to provide effective CSA prevention education to their children. Parental involvement in CSA prevention education is an important component of program success [35].

D. Ease of Use of Mobile Applications

Ease of Use of Mobile Applications. The effectiveness of these interventions is closely linked to their usability and accessibility across different user groups. The use of mobile applications helps improve service provider compliance with guidelines [36]. Luo & Botash's [37] study developed a mobile application called the Sexual Assault Care Algorithm (SACA) to assist rapid decision-making and provide guidance for child sexual abuse healthcare providers, especially those working in emergency rooms. The quantitative results suggested that SACA has high usability and acceptability. Mobile apps can be used to support testing and treatment for vulnerable populations who have experienced sexual harassment and assault.

Mobile applications have the advantage of being easy to use in this modern era. Healthcare professionals find mobile applications easy to access, acceptable, and usable [38]. Therefore, the CSA prevention program, developed by health professionals, is very appropriate if it incorporates mobile applications into its media. Mobile applications offer various features that enhance the effectiveness of detection, intervention, and support provided by health professionals, as well as facilitate collaboration between related institutions. Health professionals can carry out early detection, provide education, monitor health conditions,

access psychological services, and report and collaborate with related institutions more efficiently.

With the increasing attention to children's rights and global awareness of the dangers of CSA, many international organizations and governments have begun to promote child protection through technological approaches. It can create more space for research and development of mobile applications that can support CSA prevention efforts. However, it is also necessary to evaluate the impact of mobile applications on reducing CSA cases and to determine whether children use these applications in their daily lives. Further research is recommended to measure the extent to which changes in children's knowledge of self-protection are associated with their responses to threats of sexual abuse.

In this study, no mobile applications were found that provide tools and support to victims. Therefore, further research is needed on mobile applications that provide features to allow children to report sexual violence safely and efficiently, as well as the development of applications that combine reporting mechanisms, psychological support, and real-time emergency services. In this study, unfortunately, there has been no research on mobile applications to increase motivation for preventing CSA, despite motivation being an important factor in shaping behaviour. Additionally, collaborative efforts are necessary among parents, teachers, caregivers, and other professionals to prevent CSA. Additional research is needed that focuses on motivation and the design and development of mobile applications for children, parents, and professionals. Mobile application technology accelerates intervention, improves the quality of treatment, and ensures that child victims receive maximum protection

E. Analytical Considerations Across Themes and Contexts

While the four themes identified in this review, awareness, self-protective behaviors, parental knowledge, and usability are conceptually distinct, they are also closely interconnected. Increased awareness among children may serve as a foundational mechanism that supports the development of self-protective behaviours, while parental knowledge can indirectly reinforce both awareness and protective skills through guidance and supervision. This overlap suggests that mobile application–based interventions may operate through multiple, mutually reinforcing pathways rather than isolated mechanisms.

Across the included studies, outcome measures varied substantially. Some studies assessed short-term knowledge acquisition or self-reported protective skills, whereas others focused on behavioral intentions, usability, or user satisfaction. This heterogeneity limits direct comparison across studies and indicates the absence of standardized outcome measures for evaluating mobile application–based interventions in CSA prevention. Consequently, the identified themes should be interpreted as indicative patterns rather than directly comparable effects.

The included interventions also differed in terms of target populations and contextual settings. Most child-focused applications targeted elementary school–aged children, while parental interventions were designed for caregivers within specific cultural and healthcare contexts. Studies conducted in South Korea and Indonesia reflect differences in educational systems, cultural norms surrounding sexual education, and access to digital technology, all of which may influence intervention implementation and outcomes.

Taken together, these analytical considerations highlight that the contribution of this scoping review lies not in establishing definitive effectiveness but in mapping how mobile application–based interventions address interconnected domains across developmental stages and cultural contexts. This perspective provides a more nuanced understanding of current evidence and helps identify priorities for future research.

The interpretation of findings in this review is further shaped by substantial heterogeneity across the included studies. Interventions targeted different user groups, including children, parents, and healthcare professionals, each with distinct informational needs, ethical considerations, and implementation settings. In addition, variations in country context, intervention intensity, delivery format, and outcome measures limited the feasibility of direct comparison across studies.

Rather than representing a limitation alone, this heterogeneity reflects the fragmented and emergent nature of mobile application–based interventions for CSA prevention. It suggests that existing applications are being developed in response to localized needs rather than within a unified prevention framework. Consequently, the identified themes should be understood as flexible domains of intervention rather than standardized components, underscoring the need for future research to adopt more theoretically grounded and context-sensitive approaches.

Despite generally positive short-term findings across the included studies, none reported standardized effect sizes, assessed sustained behavioral change, or evaluated long-term outcomes. Most outcomes were measured immediately or shortly after intervention delivery and primarily relied on self-reported knowledge, skills, or usability indicators. As a result, it remains unclear whether observed improvements translate into durable protective behaviors or meaningful reductions in the risk of child sexual abuse. This limitation underscores the need for caution when interpreting the preventive potential of mobile application–based interventions. Accordingly, this review should be understood as mapping emerging intervention approaches rather than establishing evidence of effectiveness.

The applicability and impact of mobile application–based interventions for CSA prevention are also influenced by the digital divide. In the included studies, certain terms were used inconsistently across technological and educational contexts. For example, the term “hybrid

application" referred in some studies to applications combining digital and face-to-face educational delivery, rather than to hybrid software architectures. To avoid ambiguity, this review uses the term "hybrid application" to denote interventions that integrate mobile app–based content with offline or in-person educational components, rather than a specific technical classification of the application itself.

Although a formal taxonomy of application features was beyond the scope of this scoping review, several descriptive patterns emerged across the included studies. These included educational features (e.g., multimedia content, animations, scenario-based learning), pedagogical design elements (e.g., age-appropriate language, repetition, interactive quizzes), and engagement strategies (e.g., gamification, character-based narratives, user feedback). These elements were variably combined across interventions and appeared to support short-term engagement and knowledge acquisition, although comparative effectiveness could not be determined.

Importantly, the presence of specific features or design elements should not be interpreted as evidence of superior effectiveness, as none of the included studies systematically compared feature-level outcomes or engagement strategies. Rather, these descriptive categories provide an initial foundation for future research to develop more explicit taxonomies and to examine how specific design components may influence engagement, learning, and sustained protective behaviors.

Access to smartphones, reliable internet connectivity, and digital literacy varies across rural and urban settings, socioeconomic groups, and gender, potentially limiting equitable reach. Moreover, the use of digital technologies in CSA prevention raises important concerns regarding data privacy, confidentiality, and child safeguarding, particularly when applications involve sensitive information or reporting functions. Age-appropriateness of digital content is also critical, as interventions must align with children's cognitive and emotional development to ensure comprehension without causing distress. These factors highlight the necessity of inclusive, ethically grounded, and context-sensitive design in future digital CSA prevention initiatives.

The limited attention to victim-centered applications and reporting mechanisms observed in this review further reflects systemic and ethical challenges in the development of digital interventions for child sexual abuse. Designing applications for victims requires careful consideration of safeguarding responsibilities, risks of re-traumatization, confidentiality, and legal obligations related to mandatory reporting. These complexities may discourage the development and evaluation of such applications, particularly in settings with limited regulatory guidance or ethical frameworks. Addressing these gaps will require participatory approaches, including co-design with children, caregivers, and professionals, alongside

trauma-informed and ethically grounded design principles that prioritize safety, consent, and psychological well-being.

Implications for Future Research

The findings of this scoping review highlight important opportunities for future research, application development, and policy in the field of child sexual abuse prevention. Rather than providing evidence for immediate large-scale implementation, this review identifies key domains where mobile application–based interventions may be further explored and rigorously evaluated.

From a research perspective, future studies should prioritize theory-informed intervention design, standardized outcome measures, and longer follow-up periods to assess sustained behavioral change and contextual effectiveness. For application development, the findings underscore the importance of age-appropriate content, ethical safeguards, data privacy, and participatory approaches such as co-design with children, caregivers, and professionals. From a policy standpoint, these results suggest the need for supportive frameworks that enable pilot testing, ethical oversight, and systematic evaluation of digital interventions before broader adoption across diverse sociocultural contexts.

Study Limitations

This scoping review has several limitations that should be considered when interpreting the findings. The number of eligible studies was small, reflecting the early and fragmented nature of research on mobile application–based interventions for the prevention of child sexual abuse. In addition, the included studies were heterogeneous in terms of target populations, intervention designs, outcome measures, and contextual settings, which limited direct comparison across studies. Most studies focused on short-term outcomes and relied on self-reported measures, with limited assessment of sustained behavioral change or long-term impact. As a result, the findings of this review should be interpreted as mapping emerging approaches and gaps in the evidence rather than establishing effectiveness.

Conclusion

This scoping review highlights the emerging but still limited evidence on the use of mobile applications for the primary prevention of child sexual abuse. Although existing studies suggest potential short-term benefits in awareness, self-protective skills, parental knowledge, and usability, the current evidence base remains small, heterogeneous, and largely confined to immediate outcomes. Rather than supporting large-scale implementation, these findings point to several priorities for future work. From a research perspective, there is a need for theory-informed studies with standardized outcome measures, longer follow-up periods, and

attention to sustained behavioral change and contextual variation. In terms of application design, future development should prioritize age-appropriate content, ethical safeguards, data privacy, and participatory approaches such as co-design with children, caregivers, and professionals, particularly when addressing sensitive functions such as reporting or victim support. From a policy perspective, investment in pilot programs and evaluation frameworks is needed to support rigorous testing of mobile applications before broader adoption.

Acknowledgement

The researchers would like to express their gratitude to the Director of Research and Community Services at Universitas Padjadjaran and the Library of Universitas Padjadjaran, Bandung, Indonesia, for providing access to their research databases. We appreciate the contributions of Rachma Noer Fadhilah, Mariana Dwi Utami, Shifa Leviyanti Azzahra, Gina Ummul Mutia, Dea Sephia Putri, and Nonna Putri Joanna Rahmadini, who assisted with the numerator.

Conflict of Interest

The authors declare that they have no conflict of interest.

Funding

The Riset Kompetensi Dosen Unpad (RKDU) grant 2024 provided financial assistance for the research reported in this paper.

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