

Literacy in Digital Reproductive Health: Analysis of Sexual Violence Prevention Among Adolescents in Padangsidempuan City, Indonesia

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ABSTRACT

Adolescents in Indonesia increasingly navigate a digitized environment where online and offline risks to sexual and reproductive health intersect. Padangsidempuan City in North Sumatra has a predominantly young population, yet little evidence exists on how digital reproductive health literacy can be leveraged to prevent sexual violence. This qualitative study adopts a narrative review and document-based content analysis to synthesize empirical and conceptual literature on digital health literacy, adolescent reproductive health education, and sexual and technology-facilitated gender-based violence in Indonesia, with a specific focus on implications for Padangsidempuan. Data sources include peer-reviewed journals, government statistics, and policy and NGO reports. The analysis identifies four major themes: (1) rapid digitalization and youth demographics as a double-edged sword, (2) persistent gaps in reproductive health literacy and taboo-laden communication, (3) the high and evolving burden of sexual and online gender-based violence among adolescents, and (4) digital reproductive health literacy as a promising but underutilized strategy for primary prevention. A multi-level framework is proposed, emphasizing the roles of schools, families, health services—especially midwives—and local government in strengthening adolescents' critical, safe, and rights-based engagement with digital reproductive health information. The findings inform context-sensitive strategies for Padangsidempuan and highlight priorities for future local qualitative research.

Keywords: digital health literacy, reproductive health, adolescents, sexual violence, technology-facilitated violence.

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INTRODUCTION

Adolescence is a critical developmental period during which individuals establish health-related behaviors, gender norms, and relational patterns that shape their trajectories into adulthood. In the domain of sexual and reproductive health (SRH), adolescents are confronted with heightened biological vulnerability, limited experience, and complex social expectations. In many low income and middle income countries,

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including Indonesia, these vulnerabilities are compounded by insufficient access to accurate SRH information, restrictive social norms, and weak protection systems that leave young people at risk of sexual violence and exploitation

Indonesia is undergoing rapid demographic and digital transitions. A substantial proportion of the population is under 25 years of age, and Internet penetration has risen sharply in the last decade, with mobile devices serving as the primary gateway for youth access to information, entertainment, and social interaction. The Internet offers unprecedented opportunities for adolescents to obtain SRH information, access counselling, and mobilize for their rights. At the same time, it introduces new risks such as exposure to pornography, sexual solicitation, cyberbullying, non consensual sharing of intimate images, and other forms of technology facilitated gender-based violence (TFGBV) (Sørensen et al., 2025).

The burden of sexual violence against children and adolescents is substantial in Indonesia. A national survey led by the Ministry of Social Affairs estimated that physical, emotional, and sexual violence is relatively common in the lives of Indonesian boys and girls, often perpetrated by adults or peers known to the victim. An assessment of national transparency on child sexual abuse reported that the 2021 National Children and Youth Survey found that 3.7% of boys and 8.4% of girls had experienced sexual violence during their childhood. Complaints to the Indonesian Commission for Child Protection (KPAI) regarding child sexual abuse—including “sexual violence,” “pornography,” “sodomy or pedophilia,” and “online sexual crime”—increased by approximately 36.8% between 2017 and 2020, potentially reflecting both worsening patterns and improved reporting.

Recent analyses of sexual harassment and online gender-based violence among Indonesian adolescents further underscore the magnitude and evolving nature of the problem. One study reported high levels of sexual harassment among teenagers nationally, placing sexual violence among adolescents in the category of serious concern. A descriptive quantitative study in Kediri City documented that 28% of adolescents aged 10–19 years had experienced online gender-based violence, with common forms including sexual threats, disparaging remarks, and non-consensual sharing of content. Beyond school-based and community settings, TFGBV has been documented as a growing phenomenon in Indonesia, with 11% of women aged 15–49 years reporting such experiences since the age of 15 and students representing a prominent group of victims in publicly reported cases (Saan, 2025).

In parallel, evidence indicates that Indonesian adolescents face substantial gaps in their reproductive health knowledge despite high levels of Internet use. A mixed-methods study designed an online reproductive health module for sexually transmitted infections (STIs) in Indonesian high school students and found that only 56.6% and 65.1% of respondents achieved acceptable scores in knowledge and health-related behavior, respectively, with nearly a quarter deemed at risk for STIs. Systematic reviews of digital or mobile health interventions for adolescent reproductive health have found that digital platforms such as mobile applications, websites, and social media-based programs can significantly improve knowledge, attitudes, self efficacy, and preventive behaviors, and even reduce the incidence of physical and sexual violence. Nonetheless, their implementation remains uneven and questions persist regarding accessibility, quality, privacy, and cultural adaptation.

Digital health literacy, often referred to as eHealth literacy, offers a useful lens for understanding how adolescents engage with online SRH information. Norman and Skinner originally defined eHealth literacy as the ability to seek, find, understand, and appraise health information from electronic sources and apply it to address health problems. Subsequent work has expanded this concept to encompass broader competencies in safely and effectively using digital technologies to achieve health goals, including the critical appraisal of content, protection of privacy, and management of online risks. Digital health literacy thus sits at the intersection of traditional literacy, health literacy, media literacy, and computer literacy, all of which are essential for navigating the complex digital ecosystems that adolescents inhabit.

Empirical studies in Indonesia corroborate the centrality of digital health literacy for adolescents' health information-seeking behavior. Recent research on digital health literacy among Indonesian youth indicates that higher levels of digital health literacy are associated with more proactive and discerning health information seeking as well as more appropriate use of online health resources. Another study on digital literacy among Indonesian youth (aged 17–24 years) found that digital literacy skills were positively associated with taking advantage of online opportunities and negatively associated with exposure to some forms of online risk, including misinformation and harmful content. These findings suggest that strengthening digital health literacy could simultaneously serve as a health promotion strategy and as a protective factor against multiple online harms (Sutha et al., 2026).

Simultaneously, children and adolescents in Indonesia do not access the digital world in isolation. Their online experiences were nested within families, schools, communities, and political structures. A large national survey of over 25,000 children and more than 14,000 parents found that while children's gadget use increased dramatically during the COVID-19 pandemic, parental supervision—in both quantity and quality—remained limited, exposing children to cyberbullying, harmful content, and technology addiction. UNICEF's study on digital citizenship and safety among Indonesian children and adolescents (10–19 yearsold) similarly highlighted that the majority are Internet users, primarily for information seeking, social networking, and entertainment, and that they face a spectrum of online risks related to violence, abuse, and exploitation.

Padangsidempuan City in North Sumatra provides a pertinent local context to situate these broader dynamics. According to population statistics, Padangsidempuan had 225,105 inhabitants in the 2020 census, with an age structure dominated by younger cohorts: approximately 61,772 residents were aged 0–14 years, 40,773 were 10–19 years old, and over 40,600 were 20–29 years old. More recent data from 2024 indicate that children (0–14 years) account for approximately 24.22% of the city's population, while those in the productive age group (15–59 years) constitute 65.68%, reflecting a significant concentration of youth and young adults. These demographic characteristics, combined with national trends in digitalization, imply that a large proportion of Padangsidempuan residents are immersed in digital environments during their formative years in relation to sexuality, relationships, and health (Takeda et al., 2025).

Despite this, there is limited locality-specific evidence on adolescents' digital reproductive health literacy and its relationship with sexual violence risk in

Padangsidempuan. Local health systems, including community health centers (puskesmas), schools, and midwives, are increasingly involved in adolescent SRH programs however, digital literacy dimensions and online violence are not always systematically integrated into program designs. Indonesia has advanced its legal framework for child protection and sexual violence prevention, including the Child Protection Laws and the 2022 Law on Sexual Violence (UU TPKS), which explicitly addresses online sexual abuse. However, gaps remain in implementation, community awareness, and alignment of legal protections with practical preventive and educational interventions at the city level.

Within this context, conceptualizing and operationalizing “digital reproductive health literacy” among adolescents in Padangsidempuan may provide a strategic entry point for strengthening the primary prevention of sexual violence. In this article, digital reproductive health literacy refers to adolescents’ ability to access, critically evaluate, and safely use online information and digital tools related to reproductive health, relationships, consent, and protection from sexual violence, and to apply such knowledge in ways that uphold bodily autonomy and rights (Meherali et al., 2024).

Therefore, the present study aims to: (1) synthesize existing evidence on digital health literacy, adolescent reproductive health education, and sexual and online gender-based violence in Indonesia; (2) analyze how digital reproductive health literacy can function as a preventive mechanism against sexual violence among adolescents, with particular relevance for Padangsidempuan; and (3) propose a multi level framework for integrating digital reproductive health literacy into local adolescent health and violence prevention strategies. Rather than presenting new primary field data, this study adopted a qualitative, literature-based approach to provide a comprehensive conceptual and contextual foundation for future empirical work and program development in Padangsidempuan City.

METODE

This study employed a qualitative research design using a narrative review and document-based content analysis approach. This study aimed to generate a comprehensive, contextually grounded understanding of how digital reproductive health literacy can contribute to the prevention of sexual violence among adolescents in Padangsidempuan, Indonesia. Rather than producing new primary field data, this study synthesizes existing empirical and conceptual literature, policy documents, and statistical reports. This design is appropriate for complex, multi level phenomena where empirical work is emergent and dispersed across disciplines (Creswell, 2021).

The narrative review allowed for the flexible yet systematic integration of evidence from public health, midwifery, education, legal studies, and social sciences. Qualitative content analysis was applied to identify and interpret recurring patterns, concepts, and relationships across documents related to digital health literacy, adolescent reproductive health, and sexual or technology-facilitated violence in Indonesia. The analysis focuses on the implications and transferability of the socio-demographic and institutional context of Padangsidempuan.

Data sources included (1) peer-reviewed journal articles in Indonesian and international journals; (2) national and local government reports, particularly from Statistics Indonesia (Badan Pusat Statistik, BPS) and relevant ministries; (3) reports and briefs from international organizations (e.g., UNICEF, UNFPA); and (4) legal and policy documents and scholarly analyses of Indonesian laws on child protection and sexual violence.

A multi step search strategy was employed. First, electronic searches were conducted on databases and platforms commonly used in Indonesian and global health and social science research, including Google Scholar, PubMed, ScienceDirect, and selected Indonesian journal portals. Search terms combined concepts of “digital health literacy,” “eHealth literacy,” “digital literacy,” “reproductive health,” “adolescents,” “sexual violence,” “technology-facilitated violence,” “online gender-based violence,” and “Indonesia.” Additional searches targeted “Padangsidempuan,” “North Sumatra,” and “youth demographics” youth demographics to retrieve local and contextual information.

Second, targeted searches were conducted on institutional websites, including the Indonesian Ministry of Social Affairs, Statistics Indonesia, UNICEF Indonesia, and UNFPA Indonesia for national survey reports and thematic briefs on violence against children, digital citizenship, and TFGBV. Third, reference lists of key articles and reports were scanned (snowballing) to identify additional relevant documents, such as foundational conceptual works on eHealth literacy and recent updates to digital health literacy frameworks (Sugiyono, 2019).

Documents were included if they met the following criteria:

1. Focus: Addressing at least one of the following topics: (a) digital health or digital literacy, especially among adolescents; (b) adolescent sexual and reproductive health education or interventions using digital media; (c) sexual violence or online gender-based violence involving children or adolescents; and (d) legal and policy frameworks relevant to sexual violence or digital safety in Indonesia.
2. Population and setting: Involved children, adolescents, or youth in Indonesia or provided conceptual frameworks or global evidence with clear applicability to the Indonesian context. Documents providing demographic data or contextual characteristics of Padangsidempuan City and North Sumatra were also eligible.
3. Type of document: peer-reviewed journal articles (empirical or review), official reports, policy briefs, and legal analyses. Opinion pieces and news articles were included only if they synthesized empirical or policy evidence in a structured manner.
4. Time frame: Published between 2010 and early 2026 to capture the period corresponding to the rapid expansion of digital technologies and recent legal advances.

Documents were excluded if they lacked relevance to adolescent populations, focused solely on clinical health services without a digital or literacy component, or did not provide sufficient methodological or contextual details to support qualitative interpretation.

For each included document, key characteristics were extracted and recorded in a structured matrix: authors, year of publication, study location, population,

methodology, digital components (if applicable), main outcomes or themes, and specific relevance to (1) digital health or reproductive health literacy, (2) adolescent reproductive health, and (3) sexual or online gender-based violence or legal protections. Demographic and statistical reports for Padangsidempuan have been summarized in terms of age structure, population growth, and potential implications for youth-focused interventions (Miles, M. B., & Huberman, 2014).

The extracted information was then organized according to preliminary analytic categories derived from the research questions and initial reading of the literature: (1) definitions and measurement of digital (health) literacy; (2) digital SRH education interventions for adolescents; (3) prevalence, forms, and determinants of sexual and online gender-based violence among adolescents; (4) legal and policy frameworks for protection and prevention; and (5) contextual attributes of Padangsidempuan relevant to digital and SRH interventions.

Qualitative content analysis was conducted in the following stages. First, inductive reading of the extracted data was performed to identify recurring patterns, conceptual linkages, and notable contradictions. Codes were generated to capture key ideas, such as “critical appraisal of online SRH information,” “parental digital supervision,” “online grooming,” “image-based sexual abuse,” “rights-based SRH education,” “midwives’ digital roles,” and “legal recognition of TFGBV.” These codes were iteratively refined, merged, or split as the analyses progressed.

Second, the codes were clustered into higher-order categories and themes reflecting broader constructs and relationships. For example, codes related to adolescents’ information-seeking practices, trust in online sources, and struggles to evaluate credibility were grouped under “digital reproductive health literacy practices.” Codes on exposure to harmful online content, TFGBV, and weak legal enforcement were grouped under “digital risks and structural vulnerabilities.” Themes were also mapped against a social-ecological framework (individual, interpersonal/family, institutional/school/health system, community/societal, and policy/legal levels) to facilitate an understanding of where digital reproductive health literacy interventions might be most impactful.

Third, the interpretive analysis focused on how these themes intersected in ways that could inform sexual violence prevention in Padangsidempuan. Demographic and contextual data for the city were integrated to examine the relevance and potential adaptation of the national-level evidence to the local setting. Throughout this process, attention was paid to midwifery and maternal-child health systems, given the central role of midwives in Indonesian reproductive health services and their potential to mediate digital innovations.

Several strategies were employed to enhance the trustworthiness of this qualitative synthesis. First, data triangulation was achieved by drawing on diverse sources (empirical research, systematic reviews, government statistics, legal analyses, and international reports), allowing cross validation of key patterns. For example, the high prevalence of sexual and online gender-based violence among adolescents has been corroborated by social surveys, NGO assessments, and academic studies. Similarly, evidence of the effectiveness of digital SRH educational interventions was triangulated through multiple systematic reviews and intervention studies.

Second, conceptual triangulation was applied by engaging with multiple theoretical lenses, including digital health literacy frameworks, social-ecological models of violence, and rights-based approaches to adolescent SRH. This facilitates a nuanced interpretation beyond simple cause-and-effect relationships.

However, this study has inherent limitations. It relies entirely on secondary data and documents, without primary fieldwork in Padangsidempuan. As such, the lived experiences of adolescents in Padangsidempuan, their specific digital practices, and the functioning of local institutions are inferred from broader Indonesian evidence and demographic data rather than directly observed. Furthermore, the available literature tends to be concentrated in urban centers such as Jakarta and Java-based cities, and may not fully capture regional variations in digital access, cultural norms, or service provision. These limitations are revisited in the Discussion section, where implications for future empirical research are identified.

RESULTS AND DISCUSSION

The qualitative synthesis generated four major themes relevant to digital reproductive health literacy and the prevention of sexual violence among adolescents in Padangsidempuan: (1) demographic youthfulness and rapid digitalization as a double-edged sword (2) persistent gaps in reproductive health literacy and taboo-laden communication (3) high and evolving burdens of sexual and online gender-based violence and (4) digital reproductive health literacy as an underutilized but promising preventive strategy. These themes are summarized in Tables 1 and 2 and elaborated below, followed by a multi level framework of strategies relevant to Padangsidempuan (Table 3).

Theme 1: Youthful demography and digitalization as a double-edged sword

Demographic and statistical reports highlight Padangsidempuan as a city with a markedly young age. In 2020, over 40,000 residents were aged 10–19 years, and nearly 40,600 were 20–29 years, while children (0–14) comprised more than a quarter of the population in the earlier census periods. More recent 2024 estimates indicate that 24.22% of the population are children (0–14 years) and 65.68% are within the productive age group (15–59 years). This demographic profile signifies a “youth bulge” in Padangsidempuan, implying both a concentration of SRH needs and opportunities for preventive interventions that target adolescents.

National studies on digital citizenship and safety suggest that Internet use is widespread among Indonesian adolescents, with most reporting the frequent use of digital technologies for information, communication, and entertainment. Although city-specific data for Padangsidempuan are limited, it is reasonable to infer that adolescents in the city are active digital users, given the broader national trends and increasing smartphone penetration even in secondary urban areas. For adolescents in Padangsidempuan, digital platforms likely played a central role in learning, socializing, and identity exploration.

At the same time, evidence from digital literacy and online risk studies indicates that digitalization is a double edged sword. On one hand, it provides unprecedented access to information, peer support, and health resources. On the other hand, it exposes

adolescents to online risks such as misinformation, pornography, cyberbullying, and online sexual harassment, especially when digital literacy is limited. From a social ecological perspective, Padangsidempuan's youthful and increasingly connected population renders digital spaces indispensable sites for both risk and prevention efforts regarding sexual violence.

Theme 2: Gaps in reproductive health literacy and taboo-laden communication

Multiple sources have confirmed that Indonesian adolescents, including high school students in urban settings, have substantial gaps in SRH knowledge and skills. In a mixed-methods study of an online STI-focused reproductive health module for Indonesian students, nearly half of the participants scored below acceptable threshold levels for knowledge and behaviors related to reproductive health, with a significant proportion assessed as being at risk for STIs. Systematic reviews indicate that limited literacy and constrained access to adolescent-friendly SRH information are consistent determinants of risky sexual behaviors, including unprotected sex, multiple partnerships, and the late utilization of services.

Sociocultural taboos surrounding sexuality and reproductive health are repeatedly cited as barriers to open communication between adolescents and their parents, teachers, and health providers in Indonesia. In many communities, discussions of sexuality are framed in moralistic or prohibitive terms, with a focus on abstinence and fear-based messaging rather than comprehensive rights-based education. This contributes to adolescents' reliance on their peers and the Internet for SRH information, which may be of variable quality and accuracy.

Parental digital literacy and engagement further complicates this picture. National survey data suggest that parents' awareness and supervision of their children's digital activities remain limited; only around 59% of fathers and 68% of mothers reported consistently providing digital literacy education to their children, leaving many adolescents to navigate online spaces independently. In Padangsidempuan, similar dynamics are likely to be present, though potentially shaped by local culture, religious norms, and variations in parental education levels.

These gaps and taboos collectively undermine adolescents' reproductive health literacy and their capacity to recognize, resist, and report sexual violence, including in digital environments. Digital reproductive health literacy—encompassing critical appraisal of online SRH information, understanding of consent and bodily autonomy, recognition of online grooming and harassment, and knowledge of help-seeking channels—has emerged as an essential but currently underdeveloped competency.

Theme 3: High and evolving burden of sexual and online gender-based violence

National and subnational data have confirmed the significant prevalence of sexual violence against children and adolescents in Indonesia. Large-scale surveys by the Ministry of Social Affairs documented a high lifetime and recent prevalence of sexual, physical, and emotional violence among young people, with perpetrators often known to the victims and located within families, schools, or communities. The National Children and Youth Survey reported that several percent of boys and a substantially higher proportion of girls experienced sexual violence during childhood. NGO and human rights reports further suggest that many cases remain underreported due to stigma, fear, and a lack of trust in institutions.

In the digital sphere, studies increasingly document how TFGBV affects adolescents and young adults. The UNFPA indicates that 11% of women aged 15–49 years have experienced technology-facilitated violence since the age of 15, and TFGBV has become one of the most commonly reported forms of public-space violence in recent years, with numerous cases involving students and young women. Empirical research in Kediri City reveals that 28% of adolescents have been exposed to online gender-based violence, frequently perpetrated by friends or acquaintances involving sexual threats, derogatory comments, or non-consensual sharing of intimate content.

Legal scholarship emphasizes that digital sexual violence, including image based abuse, cyberstalking, and sexually explicit harassment via social media, is prosecutable under Indonesian laws such as the UU TPKS, UU ITE, and relevant Penal Code provisions. However, studies have also noted persistent implementation gaps, including uneven law enforcement, cultural victim-blaming, and limited awareness among adolescents of their rights and available legal remedies.

Although specific prevalence data for Padangsidempuan are lacking, the city's demographic structure and integration into national digital and media ecosystems suggests that adolescents face similar patterns of risk. Given the city's size and regional position in North Sumatra, adolescents may also be exposed to intersecting vulnerabilities related to socioeconomic disparities, educational opportunities, and local gender norms. Without targeted interventions, Padangsidempuan youth are likely to remain vulnerable to both offline and online sexual violence.

Theme 4: Digital reproductive health literacy as a preventive strategy

Evidence from systematic reviews and intervention studies indicates that digital SRH education can improve adolescents' knowledge, attitudes, and health behaviors and in some cases reduce the incidence of physical and sexual violence. Digital interventions that are interactive, youth friendly, and culturally resonant—embedding multimedia content, anonymous question-and-answer functions, and peer support elements—appear particularly effective in enhancing engagement and retention.

Digital health literacy frameworks emphasize competencies directly relevant to sexual violence prevention, such as the ability to critically evaluate online messages about relationships and sexuality, recognize coercive or exploitative patterns in digital communication, and manage privacy and security settings on social media platforms. Studies on digital literacy among Indonesian youth suggest that stronger digital literacy skills are associated with a more strategic use of online opportunities and better management of online risks. When these skills are explicitly aligned with SRH topics such as consent, healthy relationships, and legal protections they constitute what this article refers to as digital reproductive health literacy.

In practical terms, digital reproductive health literacy may contribute to sexual violence prevention in several ways. At the individual level, adolescents who can access and trust accurate SRH information, understand the meaning of consent, and recognize red flags in online and offline interactions are better equipped to protect themselves and others. At the interpersonal level, digital literacy interventions that involve parents and peers can foster supportive environments for discussing and addressing risky situations, including TFGBV. At the institutional level, schools and health services that integrate digital tools into SRH curricula and counselling can extend their reach and responsiveness. At the policy and community levels, digital campaigns and reporting

platforms can amplify awareness, facilitate access to services, and challenge the harmful norms surrounding sexuality and violence.

For Padangsidempuan, these multi level potentials were particularly salient. The presence of numerous adolescents, increasing digital connectivity, and existing health and education infrastructure (including midwives, teachers, and local government agencies) provides fertile ground for tailored interventions. However, current evidence suggests that digital reproductive health literacy has not yet been systematically mobilized as a central pillar in local sexual violence prevention strategies.

Table 1 summarizes the representative documents included in the qualitative analysis, illustrating the diversity of sources in the synthesis.

Table 1. the integrative nature of the analysis, combining conceptual, empirical, legal, and demographic sources

No.	Source (Author/Year)	Type of Study/Document	Population/Context	Key Relevance
1	Norman & Skinner, 2006	Scale development, conceptual paper	General consumers, eHealth	Defines eHealth literacy and its six constituent literacies
2	Milanti et al., 2025	Conceptual update (eHealth Literacy 3.0)	Global digital health	Updates digital health literacy definition; emphasizes safety and engagement
3	Indonesian Journal of Global Health Research, 2025	Systematic review	Adolescents in multiple settings	Digital-supported education improves SRH knowledge and reduces physical/sexual violence
4	Online reproductive health module study, 2025	Mixed-methods intervention study	Indonesian high school students	Identifies low baseline SRH literacy; develops online module
5	Media Penelitian dan Pengembangan Kesehatan, 2024	Systematic review	Global and Indonesian adolescents	Shows effectiveness of digital media for adolescent reproductive health education
6	UNICEF digital citizenship study, 2014	Policy research	Indonesian children 10–19	Describes internet use patterns and online safety risks
7	Ministry of Social Affairs violence survey, 2017	National survey	Indonesian youth 13–24	Estimates prevalence of physical, emotional, and sexual violence

No.	Source (Author/Year)	Type of Study/Document	Population/Context	Key Relevance
8	Safeguarding Childhood, 2021– 2022	Policy and data synthesis	Indonesia	Summarizes sexual violence data and legal frameworks
9	Online gender- based violence in Kediri, 2025	Quantitative descriptive study	Adolescents 10–19	Measures prevalence and forms of online GBV
10	Digital literacy and online risks in youth, 2021	Quantitative survey	Indonesian youth 17– 24	Examines links between digital literacy, opportunities, and risks
11	Children’s digital literacy and parental role, 2025	Quantitative study	Children and parents across Indonesia	Highlights limited parental supervision and digital literacy education
12	Legal analysis of digital sexual violence, 2025	Normative legal study	Indonesian legal system	Analyzes legal protection for adolescent girls from online sexual violence
13	BPS & city population data, 2020–2024	Official statistics	Padangsidempuan	Provides demographic context and age structure

Table 1 illustrates the integrative nature of the analysis, combining conceptual, empirical, legal, and demographic sources to construct a comprehensive picture of digital reproductive health literacy and sexual violence prevention relevant to Padangsidempuan.

Table 2 presents the main themes and subthemes identified with illustrative evidence from the literature

Theme	Description	Illustrative Evidence
Youthful demography and digitalization	Padangsidempuan has a youthful population; Indonesian adolescents are heavily engaged in digital environments, creating both opportunities and risks	BPS data show a high proportion of residents aged 0–29 in Padangsidempuan. citypopulation+1 UNICEF documents widespread internet use among adolescents for information and social networking.
Gaps in SRH literacy and taboo communication	Adolescents have limited SRH knowledge; discussions of sexuality are taboo; parents and teachers	Mixed-methods and review studies report low SRH knowledge and behavior scores among Indonesian adolescents. mji.ui+3 Parental digital literacy and supervision are inconsistent.

Theme	Description	Illustrative Evidence
	often provide limited guidance	
High burden of sexual and online violence	Physical, emotional, sexual, and online gender-based violence against adolescents are prevalent, often underreported and normalized	National surveys document significant prevalence of violence against children. Sexual violence complaints and online sexual crimes are rising. Localized research in Kediri reveals high rates of online GBV.
Digital reproductive health literacy as prevention	Digital literacy and SRH education via digital media can improve knowledge, attitudes, behaviors, and reduce violence; legal frameworks recognize TFGBV but implementation lags	Systematic reviews show digital SRH interventions improve outcomes and can reduce violence. jurnal.globalhealthsciencegroup+1 Digital literacy moderates online risks among youth. Legal analyses highlight new protections under UU TPKS.

Table 2 underscores how these themes intersect: Demographic and digital trends amplify the urgency of addressing SRH literacy and violence, while emerging legal frameworks and digital interventions provide foundations for prevention.

Multi-level strategies for Padangsidimpuan

Based on the synthesized evidence, a multi level framework of strategies was proposed to leverage digital reproductive health literacy for sexual violence prevention among adolescents in Padangsidimpuan (Table 3).

Table 3 demonstrates how digital reproductive health literacy can be operationalized across social-ecological levels

Level	Proposed Strategy	Role of Health/Midwifery Sector
Individual adolescent	Integrate digital SRH literacy modules into school curricula and youth programs; develop localized online platforms (apps, social media channels) with accurate SRH and violence-prevention content	Midwives and public health nurses co-design content, appear in videos/webinars, and respond to adolescents' questions through moderated digital forums
Family and peers	Implement parent-focused digital literacy workshops; create peer educator programs that train adolescents as digital SRH ambassadors	Midwives facilitate parent sessions on SRH communication and digital safety; provide guidance to peer educators and refer identified at-risk cases
School and health institutions	Institutionalize comprehensive SRH and digital safety education; establish school-puskesmas partnerships for	Midwives deliver school-based sessions, manage confidential online counselling channels, and ensure

Level	Proposed Strategy	Role of Health/Midwifery Sector
	online counselling and referral mechanisms	protocols for responding to disclosures of violence
Community and religious organizations	Engage community and faith leaders in promoting safe digital behaviors and condemning sexual violence, including TFGBV; utilize community digital platforms for awareness campaigns	Midwives collaborate with community leaders to ensure messages are accurate and rights-based, and to disseminate information about services
Policy and governance	Strengthen implementation of UU TPKS and child protection laws; develop city-level guidelines on digital SRH education and online GBV prevention; monitor indicators related to adolescent digital and SRH outcomes	Health offices and professional midwifery associations advocate for inclusion of digital SRH literacy in local health plans, support data collection, and participate in multi-sectoral coordination bodies

Table 3 demonstrates how digital reproductive health literacy can be operationalized across social-ecological levels, emphasizing the central role of the health and midwifery sectors in both content expertise and service provision. These strategies are further elaborated in the Discussion section.

Discussion

The qualitative synthesis presented in this article highlights the interplay between demographic, digital, educational, and legal factors that shape adolescents' vulnerability to sexual violence and the potential of digital reproductive health literacy as a preventive strategy in Padangsidempuan. The findings underscore that while Indonesian adolescents including those in Padangsidempuan are deeply embedded in digital environments, their ability to navigate these spaces safely and access, evaluate, and apply reproductive health information is constrained by gaps in literacy, taboo-laden communication, and structural weaknesses in protection systems.

The results suggest that digital reproductive health literacy should be conceived not merely as an individual cognitive skill, but as a socially and institutionally mediated capability. Theories of eHealth and digital health literacy portray literacy as an amalgam of reading and comprehension, the critical appraisal of content, awareness of health systems, and technical abilities. When these competencies are applied to the domain of adolescent SRH and sexual violence prevention, they encompass understanding bodily changes, contraception, consent, and gender norms; recognizing misinformation and harmful online content; and knowing how to seek help from trusted adults, services, or reporting mechanisms—both online and offline (Hasan et al., 2025).

In Padangsidempuan, where a large share of the population comprises adolescents or young adults, digital reproductive health literacy is particularly salient. The intersection of youthfulness and digitalization amplifies both opportunities and risks: adolescents may more readily adopt digital tools for learning and sociality, but they may also be more susceptible to persuasive, sensational, or exploitative content. The socialecological

model highlights that individual-level literacy must be supported by enabling environments families that communicate openly, schools that provide comprehensive SRH education, health services that are youth-friendly and digitally responsive, and communities that challenge harmful gender norms and violence.

The multi level strategies proposed in Table 3 illustrate how digital reproductive health literacy can be embedded across ecological levels. At the individual level, integrating digital SRH literacy modules into school curricula can ensure that every adolescent acquires foundational knowledge and skills; at the interpersonal levels, equipping parents and peers strengthens immediate social support; and at the institutional and policy levels, explicit inclusion of digital SRH literacy in health and education plans can institutionalize these efforts (Purnamasari & Rosa, 2024).

Implications for midwifery and adolescent health practice in Padangsidempuan

Midwives occupy a strategic position in Indonesia's health system, traditionally focusing on maternal health, antenatal care, safe delivery, and postnatal services but are increasingly involved in broader reproductive health, including adolescent SRH. In Padangsidempuan, midwives working in puskesmas, private practices, and schools can play a pivotal role in implementing literacy-based digital reproductive health interventions.

First, midwives can contribute to the content development of digital SRH platforms tailored to local adolescents. Their clinical expertise and understanding of local cultural and religious contexts can ensure that messages are accurate, non stigmatizing, and sensitive to normative concerns while upholding adolescents' rights. Evidence indicates that adolescents prefer content that is interactive, accessible, and non judgmental, suggesting that midwives' roles may extend beyond traditional didactic education to more dialogical online engagement, such as live Q&A sessions, webinars, or moderated chat functions.

Second, midwives can help bridge the gaps between digital information and service utilization. For instance, a digitally literate adolescent who recognizes the symptoms of an STI or experiences online sexual harassment may need guidance on where to seek testing, counselling, or legal advice. By establishing clear referral pathways between digital platforms and on site services at puskesmas or hospitals, midwives can convert digital knowledge into tangible protective behaviors, thus strengthening primary and secondary prevention of sexual violence and SRH problems (Abdul Hamid Alhassan et al., 2025).

Third, midwives can support parents and caregivers who often feel ill-equipped to discuss sexuality and digital risks with their children. Parent-focused workshops or digital "parent literacy" campaigns led by midwives could improve adult understanding of adolescent SRH, digital platforms, and early warning signs of online exploitation or offline abuse. Enhancing parents health literacy indirectly protects adolescents by promoting home environments that are more communicative, vigilant, and supportive.

Sociocultural norms and taboos represent significant barriers to both reproductive health literacy and sexual violence prevention in Indonesia. The literature highlights that discussions of sexuality are often framed in moralistic or prohibitive terms; comprehensive rights-based approaches remain controversial in some communities. This normative environment not only limits adolescents' access to accurate information

but also contributes to victim-blaming and underreporting of sexual violence, particularly when incidents involve romantic relationships, digital intimacy, or perceived “misbehavior” by girls.

As in other Indonesian cities with strong religious and cultural traditions, interventions in Padangsidempuan must carefully navigate these sensitivities. Digital reproductive health literacy initiatives should frame SRH and violence prevention within widely accepted values such as the protection of dignity, family well-being, and mutual respect, while clearly asserting adolescents’ rights to bodily autonomy and freedom from violence. Collaborations with religious leaders and community figures who support child protection and gender equity can enhance the legitimacy and acceptance of digital SRH programs (Titisari et al., 2025).

Moreover, digital interventions must explicitly challenge harmful gender norms that normalize male dominance, sexual entitlement, or control over girls’ bodies and online presence. This can be achieved through narratives, role models, and peer-led campaigns that model equitable relationships, mutual consent, and shared responsibilities for digital safety. Evidence from studies of social media activism around sexual violence in Indonesian Islamic schools suggests that digital spaces can also serve as arenas for contesting patriarchal power and mobilizing support for survivors. Harnessing this transformative potential requires careful design and safeguarding measures to protect adolescents who participate in online advocacy or disclosure.

Indonesia’s legal advances, particularly the enactment of the UU TPKS, represent important milestones in recognizing and criminalizing a broad range of sexual offences, including those facilitated by technology. However, as noted in legal analyses and rights-based assessments, the translation of legal provisions into effective protection remains incomplete. Law enforcement may lack training or resources to investigate digital crimes survivors may face secondary victimization during reporting processes and communities may continue to interpret sexual violence through moralistic rather than rights-based lenses.

Digital reproductive health literacy interventions in Padangsidempuan should therefore incorporate components that inform adolescents about their legal rights and the available reporting channels. This includes practical guidance on documenting the evidence of online harassment or image-based abuse, understanding confidentiality and privacy implications, and accessing legal aid or victim support services. Simultaneously, capacity-building for law enforcement, social workers, and health professionals including midwives on handling digital sexual violence sensitively and in compliance with the UU TPKS is essential (Cahyani et al., 2025).

At the municipal level, local regulations or guidelines can be developed to operationalize national laws in the specific context of Padangsidempuan, clarifying institutional responsibilities, coordination mechanisms, and standard operating procedures for responding to reports of sexual and online violence involving adolescents. Such governance frameworks should be informed by youth voices and by data collected through digital reporting systems where feasible.

While the evidence reviewed supports the potential of digital reproductive health literacy initiatives, several challenges and risks warrant attention. First, digital divides persist in Indonesia, with variations in access to devices, Internet connectivity, and digital skills by socioeconomic status, gender, and geography. In Padangsidempuan,

adolescents from low income families or rural peripheries may have limited or intermittent access to the Internet and rely on shared devices that complicate privacy and confidentiality, particularly in relation to SRH topics. Digital interventions must therefore be complemented with offline components (e.g., printed materials, face-to-face sessions) and accessible through low-bandwidth formats such as SMS or basic web pages where necessary.

Second, increased digital engagement can inadvertently expose adolescents to new risks, including targeted advertising of harmful products, excessive screen time, and over reliance on online peers for validation. Programs that promote digital reproductive health literacy must also encourage balanced and reflective use of technology, including skills for self-regulation and time management, and awareness of the mental health impacts associated with online interactions.

Third, privacy and data protection are critical issues. Collecting sensitive information from adolescents through digital platforms such as their sexual behaviors, experiences of violence, or mental health status requires robust safeguards, including encryption, informed assent/consent procedures adapted to minors, secure data storage, and limited access protocols. Collaboration with reputable technology partners and adherence to ethical guidelines are necessary to prevent misuse or breaches that could further victimize adolescents.

Finally, cultural and political resistance may arise from stakeholders who view digital SRH content as promoting sexual activity or undermining traditional values. Transparent communication about program objectives, emphasis on health and safety benefits, and the active involvement of parents, teachers, and religious leaders in program design can help mitigate resistance. Evidence from systematic reviews that digital SRH interventions can reduce rather than increase risky behaviors including physical and sexual violence can be leveraged to persuade skeptical audiences.

CONCLUSION

This qualitative narrative review and document-based content analysis demonstrate that digital reproductive health literacy holds considerable promise as a strategy for preventing sexual violence among adolescents in Padangsidempuan City, Indonesia. The analysis revealed a confluence of factors: a youthful and increasingly connected population persistent gaps in reproductive health literacy and taboo-laden communication a high and evolving burden of sexual and online gender-based violence and a strengthening yet incompletely implemented legal framework for protection. Evidence from Indonesian and international studies indicates that digital health literacy and digital SRH education can enhance adolescents' knowledge, attitudes, and behaviors and can contribute to reductions in physical and sexual violence when thoughtfully designed and implemented. To capitalize on this potential, digital reproductive health literacy must be embedded within a multi-level, social-ecological framework that engages adolescents, families, schools, health services, communities, and policy structures. Midwives and other health professionals in Padangsidempuan are particularly well placed to co create and deliver digital SRH content, bridge online information with offline services, and support parents and peers in fostering safer

digital and relational environments. Concurrently, the robust implementation of legal protections, ethical governance of digital interventions, and empirical research tailored to the local context are crucial. In sum, strengthening digital reproductive health literacy is not a panacea, but it is a vital and feasible component of a comprehensive strategy to safeguard adolescents from sexual violence and promote their sexual and reproductive well being in Padangsidempuan's increasingly digital society.

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Ethical Compliance

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of Interest declaration

The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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