

## Digital Menstrual Health Education for Adolescent Girls with Intellectual Disabilities: Evidence from the KESMENS Digital Media Intervention

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**Abstract:** Adolescent female with intellectual disabilities often encounter substantial barriers in managing menstrual hygiene, which may negatively impact their physical health, social integration, and personal autonomy. These challenges are largely attributed to the absence of concrete and developmentally appropriate educational tools, along with limited support from families and educators during menstruation. This study evaluates the effectiveness of the KESMENS Digital Book, a family assisted multimedia learning resource, in improving menstrual hygiene management skills among adolescents with intellectual disabilities. Using a Single Subject Research method with an A B design, the intervention was implemented for a junior high school student at SLBN Cileunyi, Bandung. The KESMENS media contains visual and video-based content tailored to the participant's cognitive development level. Results indicated notable improvements in all targeted skills: identifying hygiene tools (47%), opening sanitary pads (100%), wearing pads (67%), removing pads (100%), cleaning used pads (80%), and maintaining genital hygiene (50%). These findings suggest that family supported digital interventions such as KESMENS can significantly enhance menstrual self-care abilities in adolescents with intellectual disabilities. The study highlights the importance of inclusive and accessible digital media in advancing reproductive health education and promoting independence within special education settings.

**Keywords:** intellectual disabilities; menstrual hygiene management; digital learning media; family involvement; special education.

### INTRODUCTION

Menstrual hygiene is a fundamental component of health, dignity, and human rights for all women and girls. Proper menstrual hygiene practices are essential not only for preventing infections and ensuring physical well-being but also for promoting emotional resilience, social inclusion, and autonomy (UNFPA, 2018; Sommer et al., 2016). However, adolescent girls with intellectual disabilities often encounter significant challenges in managing menstruation. These challenges arise from cognitive limitations, limited health literacy, and a lack of accessible and developmentally appropriate educational support from both home and school environments (Wilbur et al., 2019). Inadequate support not only places these girls at risk of infections and emotional distress but also reinforces cycles of exclusion and dependency.

In Indonesia and many low- and middle-income countries, menstrual hygiene remains a neglected topic in the education of children with special needs. Instructional materials tend to be generalized, abstract, and text-heavy, posing serious limitations for girls with intellectual disabilities, who typically function at the concrete operational stage of cognitive development (UNICEF, 2019; Chothe et al., 2014). These adolescent girls often lack the ability to interpret abstract concepts, making it difficult for them to internalize hygiene routines taught through conventional means. Poor menstrual hygiene has been linked to urinary and reproductive tract infections, increased risk of cervical cancer due to HPV, emotional distress, and social isolation (Wardiyah et al., 2022; WHO, 2022).

Parental involvement is a crucial element in developing life skills among adolescents with disabilities. Studies have demonstrated that when families are actively engaged in health-related education, children are more likely to achieve better outcomes (Kholil, 2021; Astuti, 2023). When families are actively engaged in reproductive health education, outcomes significantly improve. As Fatimatuzzahra (2023) emphasizes, empowering parents to act as educators can reinforce children's understanding of bodily autonomy, personal boundaries, and hygiene. Additionally, Collaborative interventions involving both parents and teachers are particularly valuable for sensitive and stigmatized topics such as reproductive health, where mutual support systems ensure consistent and reinforcing learning environments.

Global frameworks such as the UNESCO guidelines on disability-inclusive comprehensive sexuality education emphasize the international obligation to provide accessible, rights-based education for individuals with disabilities (UNESCO Office Bangkok & Leonard Cheshire, 2022). However, scalable and contextually grounded educational models tailored to learners with cognitive disabilities remain limited, particularly in Southeast Asia. This study addresses that gap by introducing a family-centered, context-sensitive intervention grounded in the lived experiences of Indonesian families, while aligning with global commitments to inclusive education.

Simultaneously, digital learning tools have emerged as promising interventions in inclusive education. When designed using multimedia learning principles and Universal Design for Learning (UDL), digital tools offer concrete, visual, and interactive experiences that support comprehension and retention among learners with intellectual disabilities (Yunus in Sapriyah, 2019). The visual structure of such media, combined with repeated and self-paced access, is particularly advantageous for children requiring structured repetition and routine. Delivered within the home under parental guidance, digital learning can reduce emotional resistance and support personalized, supportive instruction.

To strengthen the pedagogical foundation, this study applies task analysis, breaking down complex hygiene routines into manageable steps, and family learning design, which positions caregivers as active facilitators of learning. These approaches respond to both cognitive needs and cultural contexts, supporting transfer of learning through modelling, repetition, and daily reinforcement. This study introduces and evaluates KESMENS (Kesehatan Menstruasi or Menstrual Health), an interactive digital book designed to teach menstrual hygiene to adolescent girls with intellectual disabilities through family-assisted instruction. The content of KESMENS includes video demonstrations, culturally relevant illustrations, simplified language, and step by step guidance for menstrual routines. Implemented through a structured family learning design, KESMENS enables caregivers to guide, model, and reinforce hygiene practices in the home environment.

Moreover, a study on an integrated SRH learning model across West Java, East Java, and North Sumatra demonstrates that inclusive education frameworks can be successfully implemented in special schools when teachers incorporate SRH topics into core subjects (Fatimatuzzahra et al., 2024). Further, perspectives collected from stakeholders in West Java highlight widespread support, over 90%, for reproductive health education, though cultural hesitancy persists regarding broader sexuality topics (Gunawan et al., 2025).

Guided by these insights, this study assesses whether a structured, multimedia based digital intervention such as KESMENS, delivered through parental support at home, can enhance menstrual self-care and contribute to a more inclusive reproductive health education program. By embedding the intervention in families' daily routines and aligning with local values, this study offers a culturally sensitive, developmentally appropriate, and globally

relevant framework for menstrual education for girls with intellectual disabilities in Indonesia and beyond.

## METHOD

This study used a single-subject A–B design to evaluate the impact of the KESMENS digital book on menstrual hygiene management skills among adolescent girls with intellectual disabilities. Phase A served as the baseline, while Phase B involved the implementation of six structured sessions supported by parental involvement. The participant was a 14-year-old junior high school student diagnosed with moderate intellectual disability (IQ 40–55), attending SLBN Cileunyi, Bandung. She was verbal but had limited reading comprehension and adaptive functioning, requiring concrete instruction for daily routines.

Data collection included structured observations and interviews with the participant, her mother, and teacher. Observations focused on six target behaviors: identifying menstrual tools, opening and wearing pads, pad removal, pad disposal, and genital hygiene. A 3-point task analysis rubric was used (1 = not performed, 2 = assisted, 3 = independent). Two trained observers conducted scoring with inter-rater reliability at 92%. Interview data were analyzed thematically through manual open and axial coding. Triangulation was used to cross-validate observational and narrative data, and member checking was conducted with the mother and teacher.

Fidelity was tracked through parental checklists and logs, supplemented by weekly follow-up calls from the researcher. The study was exploratory and proof-of-concept in nature, reflecting both feasibility and ethical considerations. Informed consent was obtained from the participant’s mother and teacher, with verbal assent from the participant. Data anonymity and participant well-being were prioritized throughout.

As outlined in the Introduction section, KESMENS features simplified language, visual cues, short narrated videos (2–3 minutes), and culturally relevant illustrations covering topics such as menstruation, hygiene routines, pad usage, disposal, and genital cleaning. The content was accessed via a tablet and used at home through family-assisted instruction. Designed through a collaborative partnership between Universitas Pendidikan Indonesia (UPI) and SLBN Cileunyi in 2024, the digital book emphasizes accessible, user-centered, and culturally contextualized content. The following table 1 summarizes its main components:

**Table 1. Components Description on KESMENS**

<b>Component</b>	<b>Description</b>
<b>Title</b>	KESMENS (Kesehatan Menstruasi)
<b>Target User</b>	Adolescent girls with intellectual disabilities
<b>Design Principle</b>	Multimedia-based, simplified language, and culturally contextualized visuals
<b>Main Menus</b>	1) Menstrual tools identification; 2) Step-by-step hygiene routines; 3) Educational videos; 4) Evaluation quizzes
<b>Media Types</b>	Text, illustrations, embedded video links, gamified quizzes
<b>Video Access</b>	Six YouTube Shorts embedded directly in the book
<b>Learning Aids</b>	Visual modeling and icon-based navigation (e.g., “Back,” “Next,” “Home”)
<b>Implementation Setting</b>	Home-based instruction guided by parents

Component	Description
Sample Tasks Covered	Opening pads, attaching pads, cleaning used pads, genital hygiene
Evaluation Tools	Interactive Wordwall games
Developer	Collaboration between UPI and SLBN Cileunyi (2024)

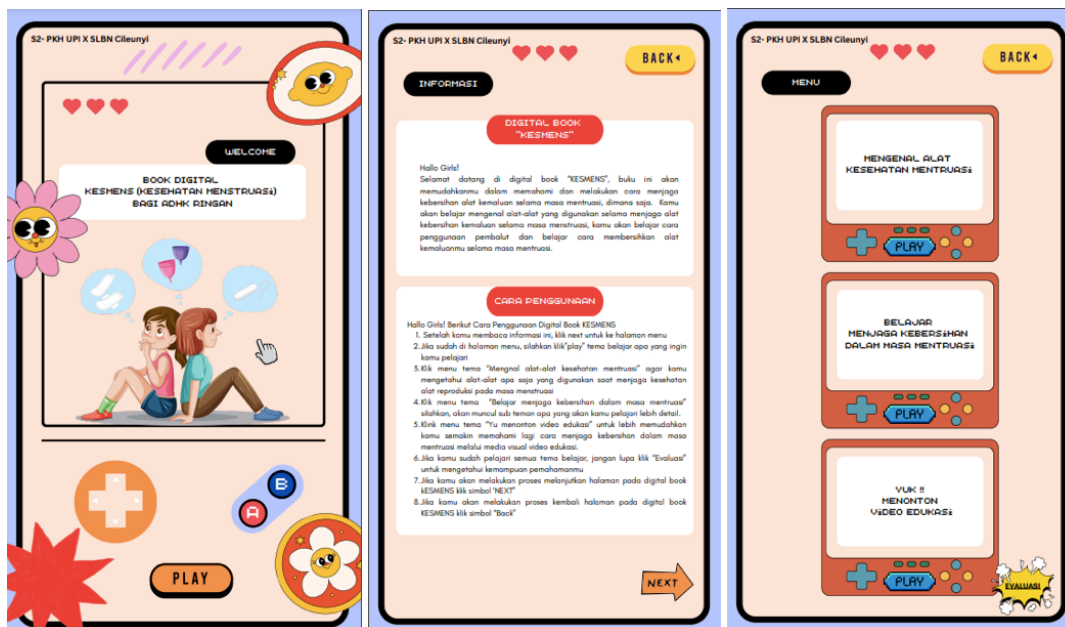


Figure 1. KESMENS Interface and Content Samples

Figure 1 illustrates screenshots from the KESMENS digital book, showing the multimedia interface, visual step-by-step menstrual hygiene guides, and culturally adapted illustrations. These were designed to support learners at the concrete operational stage. Meanwhile, the assessment of participants’ menstrual hygiene skills was conducted using a structured observation rubric developed specifically for this study. The rubric covered six core hygiene-related tasks, each rated on a 3-point scale:

Table 2. Observation Rubric for Menstrual Hygiene Skills

Target Skill	Score 1 (Not Performed)	Score 2 (Assisted)	Score 3 (Independent)
Recognizing menstrual tools	Did not attempt or refused the task	Completed with full or partial assistance	Completed independently without help
Opening sanitary pad packaging	Did not attempt or refused the task	Completed with full or partial assistance	Completed independently without help
Wearing sanitary pad	Did not attempt or refused the task	Completed with full or partial assistance	Completed independently without help
Removing used pad	Did not attempt or refused the task	Completed with full or partial assistance	Completed independently without help
Cleaning genital area	Did not attempt or refused the task	Completed with full or partial assistance	Completed independently without help

Target Skill	Score 1 (Not Performed)	Score 2 (Assisted)	Score 3 (Independent)
Disposing used pad	Did not attempt or refused the task	Completed with full or partial assistance	Completed independently without help

This rubric allowed for a clear evaluation of the participant’s progress throughout the intervention, emphasizing the degree of independence achieved in performing each task. Scoring was conducted collaboratively by the researcher and the parent, with interrater reliability confirmed through joint observation and discussion.

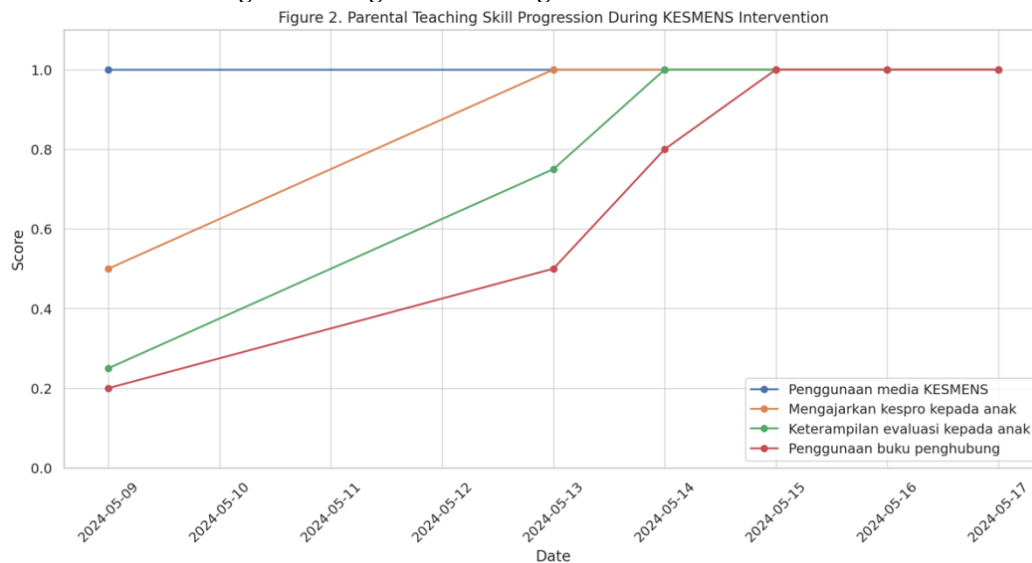
**FINDING AND DISCUSSION**

**Finding(s)**

The implementation of the KESMENS digital book was conducted over six structured sessions as part of a family-assisted intervention to improve menstrual hygiene management among adolescent girls with intellectual disabilities. The intervention was designed to be collaborative, involving coordinated actions between parents, teachers, and the adolescent participant. For parents, the implementation process included co-developing a timeline with teachers, aligning educational goals, analyzing tasks necessary for teaching hygiene, familiarizing themselves with the digital book, and receiving training in instructional strategies grounded in adult learning theory (andragogy), brainstorming methods, and behaviorist approaches such as direct instruction and task analysis. Concurrently, the adolescent received guided instruction aimed at enhancing both conceptual understanding and practical menstrual hygiene skills. Interviews conducted before and after the intervention demonstrated a clear improvement in the parent's knowledge regarding menstrual hygiene. Initially, the parent offered generalized responses, expressing that hygiene was important simply because "cleanliness is necessary." However, following the intervention, the parent articulated a deeper understanding of the connection between reproductive health and disease prevention, noting specific risks such as reproductive tract infections if hygiene is not properly maintained.

The parent also expressed a more informed awareness of the importance of their role in supporting their daughter’s self-care abilities, and was able to identify correct hygiene practices such as regular pad changes, genital cleaning, and handwashing. These findings indicate that the intervention successfully enhanced parental knowledge across all measured indicators. In terms of teaching ability, the parent showed marked improvement over the six-session intervention. Initially unfamiliar with the content and tools, the parent became increasingly competent in using the KESMENS digital book, modeling hygiene routines, and guiding the adolescent through step-by-step tasks. With each session, the parent demonstrated greater independence in delivering instruction, prompting the child, and recording observations in the communication book. The combination of digital media, direct modeling, and guided practice appeared to be effective in fostering parental confidence and competence in teaching menstrual hygiene skills. Throughout the six sessions, four key indicators were used to evaluate parental teaching skill development: the ability to use the KESMENS media, the ability to deliver reproductive health instruction, the ability to conduct evaluation of the child’s hygiene behaviors, and the use of a communication book to record and reflect on the learning process. As depicted in chart 1, parental performance across all indicators showed a clear and steady upward trend, the data across is illustrated in the chart below:

**Chart 1. Parental Teaching Skills Progression During KESMENS Intervention**



This visual illustrates the progression of the parent's instructional skills across four key indicators, use of KESMENS media, ability to teach menstrual hygiene to their child, skill in evaluating the child's performance, and consistency in using the communication book that measured over six sessions between May 9 and May 17, 2024. As seen in the graph, while the parent's ability to use the KESMENS media remained consistently high from the outset, other competencies such as evaluation skills and use of the communication book showed steady improvement over time. This suggests that guided practice, modeling, and continuous mentoring enabled the parent to build confidence and mastery in delivering menstrual hygiene education independently and effectively.

Meanwhile, the adolescent's knowledge of menstrual hygiene also showed marked improvement. In the pre-intervention phase, she demonstrated limited understanding of menstruation and its hygiene requirements, often responding with "I don't know" when asked about the purpose of cleanliness or how to care for herself during her period. However, post-intervention interviews revealed a clear cognitive shift. The participant was able to explain that cleanliness helps prevent illness, could identify key hygiene tools, and described routines such as changing pads and washing after using the toilet. This development suggests that the integration of visual aids and video modeling combined with guided instruction from her parent supported deeper comprehension.

In terms of behavioral outcomes, the participant demonstrated significant progress across all six targeted menstrual hygiene tasks. These tasks were scored using a 3-point observation rubric (see table 2), where a score of 1 indicated "not performed," 2 indicated "performed with assistance," and 3 indicated "performed independently." The percentages reported below reflect the proportion of steps within each task that were completed independently (score of 3) based on multiple observation sessions.

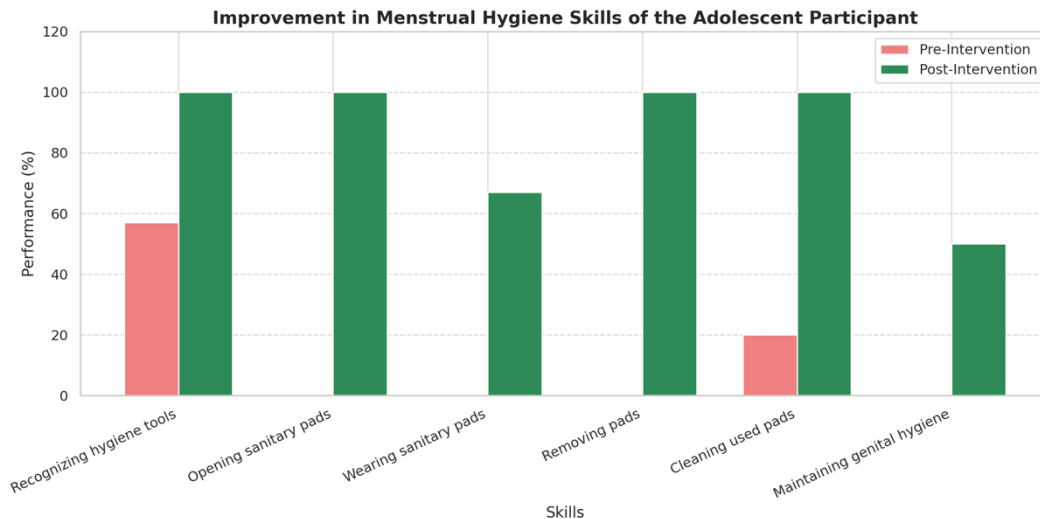
**Table 3. Observation Outcomes and Notes**

Target Skill	Score 1 (Not Performed)
Recognizing menstrual tools	Improved from 57 percent (4 out of 7 items independently identified) to 100 percent by the end of the intervention
Opening sanitary pad packaging	Increased from 0 percent to 100 percent.
Wearing sanitary pad	progressed from 0 percent to 100 percent.
Removing used pad	improved from 20 percent (1 out of 5 steps) to 100 percent.
Cleaning genital area	Rose from 0 percent to 67 percent, indicating 4 out of 6 steps completed independently. Although not fully mastered, this skill involved fine motor and spatial coordination challenges.
Disposing used pad	Increased from 0 percent to 50 percent, showing partial success in 3 out of 6 hygiene steps

These gains were the result of repeated modeling, parental scaffolding, and consistent exposure to structured visual content in the KESMENS digital book. A visual summary of these behavioral improvements is presented in chart 2 below:

**Chart 2. Improvement in Menstrual Hygiene Skills**

Before and After KESMENS Intervention of the adolescent with intellectual disability



As shown in the chart, the most dramatic improvements were observed in tasks that involved object manipulation and routine sequences, such as opening and removing sanitary pads. Tasks requiring more precision and motor planning, such as pad placement and genital hygiene, showed more gradual progress, emphasizing the importance of continuous support and long-term reinforcement. These outcomes underscore the practical value of KESMENS as a cognitively accessible, family-integrated intervention that not only facilitates comprehension but also nurtures real-life independence skills among adolescents with intellectual disabilities.

Overall, the intervention demonstrated the effectiveness of KESMENS as a digital media tool to promote menstrual hygiene education. The combined strategy of family involvement, teacher collaboration, and developmentally appropriate visual instruction resulted in clear improvements in both parental teaching capacity and adolescent learning outcomes. While some skills, such as pad placement and genital cleaning, may require longer-term support, the overall trajectory suggests that consistent, guided exposure to accessible media can meaningfully enhance self-care abilities in adolescents with intellectual disabilities. These findings underscore the potential of inclusive digital tools, particularly when paired with family-based implementation, in advancing reproductive health education in special education contexts.

## **Discussion(s)**

The implementation of the KESMENS digital book, as part of a family-centered intervention, demonstrated a significant impact on enhancing menstrual hygiene management among adolescent girls with intellectual disabilities. Over the course of six structured sessions, the program facilitated collaborative actions between parents, teachers, and the adolescent participant, resulting in measurable improvements in both parental teaching capacity and adolescent learning outcomes. From the parental side, the structured training incorporated andragogy, behavioral approaches such as task analysis, and modeling techniques. This comprehensive approach empowered the parent to gradually shift from passive recipient to active facilitator. As shown in Chart 1. Parental Teaching Skill Progression During KESMENS Intervention, there was consistent growth across four measured indicators: mastery in using the KESMENS media, ability to teach menstrual hygiene, evaluation of the adolescent's performance, and the use of the communication book. While the use of the KESMENS media began at a high level and remained consistent, the other three indicators showed a steady increase, suggesting that the intervention was successful in scaffolding parental teaching skills through guided practice and reinforcement.

This aligns with Syafutri and Afriza (2022), who emphasize that once parents fully accept their child's condition, they can become active agents of change. Acceptance enables consistent and ongoing physical, psychological, and social monitoring, which is crucial in supporting a child with special needs. The KESMENS intervention effectively operationalized this model by involving parents not only as caregivers but as direct educators in a critical aspect of self-care.

Qualitative interviews further confirmed this shift. Initially, the parent offered vague notions such as "cleanliness is necessary." Post-intervention, the parent demonstrated more nuanced knowledge about menstrual hygiene, articulating its relation to reproductive tract infection prevention and recognizing essential practices such as pad changing and genital washing. This reflects not only an improvement in knowledge but a stronger internalization of the importance of parental roles in reproductive health education. Qualitative data showed that parents gained a deeper understanding of menstrual hygiene, shifting from simple awareness to articulating its role in infection prevention and self-care—a transition echoed in the literature on sexual stigma and self-actualization among persons with disabilities (Santoso et al., 2025), which highlights the role of knowledge and agency in reducing stigma and supporting self-confidence.

In tandem, the adolescent participant exhibited significant cognitive and behavioral gains. At baseline, she was unable to explain the importance of hygiene during menstruation and failed to identify proper tools and routines. Post-intervention, she was able to name hygiene items, describe their purpose, and demonstrate essential routines. As visualized in figure 1, the improvements were observed in all six targeted behaviors, notably, recognition

of hygiene tools increased from 57% to 100%, and the ability to open and dispose of sanitary pads rose from 0% to 100%. Skills requiring fine motor coordination, such as independently wearing a pad and maintaining genital hygiene, improved from 0% to 67% and 50%, respectively. These results support the idea that repeated modeling and accessible visual materials can overcome motor and conceptual barriers in learners with intellectual disabilities.

However, several limitations must be acknowledged. First, the use of a single-subject design restricts the generalizability of the findings. While appropriate for proof-of-concept purposes, this design does not allow for cross-group comparisons or statistical inferences across varying severity levels of intellectual disability. Replication across broader populations—including adolescents with different functional profiles, comorbid conditions, or in inclusive school settings—is essential to validate and expand the model's applicability. Additionally, the intervention's dependence on digital media introduces potential barriers in geographically remote or underserved areas, where families may lack reliable internet access, device ownership, or sufficient digital literacy—a concern amplified by the growing awareness of the digital divide in global education discourse (UNESCO, 2022). These limitations underscore the importance of designing future interventions that are both scalable and adaptable to diverse sociotechnical contexts. As a next step, researchers should consider expanding the participant base to include adolescent with other disabilities (e.g., autism, deaf), conducting comparative trials in urban and rural areas, and developing parallel modules covering broader sexual and reproductive health (SRH) topics such as puberty, emotional self-regulation, and self-protection. Moreover, integrating this digital approach into national SRH curricula and inclusive education policies could institutionalize access, especially when paired with teacher training and formalized parent engagement strategies.

Furthermore, this trajectory is consistent with Fatimatu Zahra et al. (2024), who found that young women with disabilities—particularly those who are blind—often express a range of emotional and psychological responses to romantic or intimate situations but lack the educational foundation to navigate them safely. That study highlighted the interplay between sexuality, self-awareness, and emotional literacy, underscoring the need for structured, emotionally safe, and developmentally appropriate instruction. The KESMENS intervention similarly responded to this need by delivering clear, repetitive, and visually rich content, paired with emotional scaffolding through parental involvement which part of an approach that supports not only hygiene behaviors but broader aspects of sexual health and mental well-being. By acknowledging menstrual education as both a cognitive and emotional process, KESMENS positions hygiene not simply as a functional skill but as a critical element of self-advocacy and dignity. Therefore, while this pilot illustrates what is possible, its greatest contribution may lie in paving the way for systemic innovations that democratize reproductive health education for all learners—regardless of ability, geography, or gender. Furthermore, this research resonates with feminist disability studies, which emphasize bodily autonomy, relational pedagogy, and the dismantling of stigma surrounding the sexuality of individuals with disabilities.

The design of the KESMENS digital book, which integrates interactivity, video, and visual instructions, contributed significantly to the intervention's success. As Jannah (2017, in Hanikah et al., 2022) explained, students who utilize interactive digital books demonstrate increased motivation and academic performance compared to those using conventional textbooks. Similarly, Azhar Arsyad (2013, in Fadjarajani, 2020) noted that media-based instruction fosters unique cognitive stimuli and enhances both memory retention and learner motivation. These assertions are validated by the observed learning trajectory in this study.

In addition, the intervention promoted collaborative engagement between teachers and parents. Educators were encouraged to align instructional plans with families by developing joint timelines, establishing shared learning goals, breaking down hygiene routines through task analysis, and collaboratively monitoring student progress. This joint effort led to greater confidence and consistency among parents in teaching menstrual hygiene, while teachers observed more cohesive and unified educational practices. Such collaboration helped build a supportive learning environment that transcended the school setting, emphasizing the vital role of family involvement in special education. Nevertheless, the development of certain complex skills—such as correctly positioning sanitary pads and performing proper genital hygiene—may still require ongoing assistance. Although notable progress was achieved during the intervention, the inherent characteristics of intellectual disability suggest that sustained reinforcement, practice, and positive feedback are necessary for long-term independence. Therefore, continuous parental participation is crucial. As parents advance in their knowledge and teaching abilities, they evolve from passive caregivers into proactive agents of their child’s reproductive health education and self-worth.

## CONCLUSION

The KESMENS digital book, implemented through a structured and family-supported intervention, successfully improved menstrual hygiene skills in an adolescent girl with intellectual disability by promoting autonomy in self-care through interactive and accessible content. The active involvement of parents, combined with the use of developmentally appropriate media tailored to the needs of adolescents with intellectual disabilities, significantly influenced the participant’s ability to manage reproductive health during menstruation. Through consistent monitoring and guidance, the intervention enabled the adolescent to progressively master essential hygiene tasks, including recognizing menstrual hygiene tools, opening, wearing, and removing sanitary pads, cleaning used pads, and maintaining genital hygiene. These outcomes underscore the importance of accessible media and collaborative support systems in fostering both competence and dignity in reproductive health management. Looking ahead, future efforts should focus on scaling the intervention to include participants with diverse disability profiles, testing its applicability in varied educational and geographic contexts, and integrating KESMENS into broader inclusive sexuality and reproductive health curricula across special schools.

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