

# EFFECTIVENESS OF INTERACTIVE DIGITAL STORYTELLING EDUCATION ON MENARCHE KNOWLEDGE AMONG EARLY ADOLESCENT GIRLS AT MI AL IRSYAD, KEDIRI, INDONESIA

Devy Putri Nursanti<sup>1</sup>, Eri Puji Kumalasari<sup>2</sup>, Riza Tsalatsatul Mufida<sup>3</sup>, Gufron Wahyudi<sup>4</sup>

<sup>1,2,3</sup> Faculty of Midwifery, Strada Indonesia University, Kediri, Indonesia

<sup>4</sup> Faculty of Public Health, Bakti Indonesia University, Banyuwangi, Indonesia

Corresponding author: [devyputrinursanti@gmail.com](mailto:devyputrinursanti@gmail.com)

## ABSTRACT

Menarche that occurs early can increase the risk of breast cancer, obesity, cardiovascular disease, metabolic disorders and psychological disorders. The purpose of this study is to analyze the influence of interactive digital storytelling on the understanding of menarche in adolescent girls at MI Al Irsyad, Kediri City. The design of this study is an experimental quantitative research with a pre post test design approach with the focus of the research directed to analyze the influence of interactive digital storytelling on the understanding of menarche in adolescent girls at MI Al Irsyad, Kediri City. The total population was 70 respondents and a sample of 61 respondents was taken by Purposive Sampling technique. The findings were found that before being given intervention, most respondents had an understanding of menarche in the category of lack as many as 35 respondents (57.4%). After being given the intervention, almost all respondents had an understanding of menarche in the good category as many as 57 respondents (93.4%). Based on the results of cross-tabulation, it was found that before being educated with the interactive digital storytelling method, there was an understanding of menarche in the category lacking, while after being given education with the interactive digital storytelling method, 31 respondents (50.8%) had an understanding of menarche in the good category. Based on the results of the Paired t test analysis, it shows that the p-value is  $0.000 < 0.05$ , then H1 is accepted, so it is concluded that there is an influence of interactive digital storytelling on the understanding of menarche in adolescent girls at MI Al Irsyad, Kediri City. The advantage of digital storytelling lies in its ability to combine engaging narrative elements with interactive technology, creating a meaningful and non-intimidating learning experience for teenagers.

**Keywords:** Adolescent girls, Knowledge, Menarche, Interactive Digital Storytelling, Pre-post test

## 1. INTRODUCTION

Early menarche, defined as the onset of first menstruation before the age of 11 years, has emerged as an important public health concern because it is associated with higher estrogen exposure and an increased risk of breast cancer, obesity, cardiovascular disease, metabolic disorders, and psychological problems in later life. Globally, adolescents aged 10–19 years represent around 1.2 billion individuals, accounting for approximately 18% of the world's population, highlighting the need for targeted interventions to support their sexual and reproductive health. In Indonesia, national health surveys have reported that the mean age at menarche is around 12–13 years, with a trend

Survey have reported that the mean age at menarche is around 12-13 years, with a trend toward earlier onset over recent decades, and more than half of adolescent girls have already experienced menarche by early adolescence.

The timing of menarche is influenced by multiple factors, including nutritional status, genetic predisposition, dietary patterns, socioeconomic conditions, media exposure, and lifestyle. Early-menarche girls tend to have a higher body mass index compared with their peers, and socioeconomic disparities can affect dietary quality and, consequently, pubertal development. These biological and social determinants interact with cultural norms and taboos surrounding menstruation, which can shape girls' experiences and access to accurate information. As a result, many adolescents enter menarche with limited knowledge, negative emotions, and inadequate menstrual hygiene practices.

Previous studies have shown that a substantial proportion of schoolgirls are unable to perform basic menstrual hygiene management, such as regularly changing sanitary pads and washing hands due to limited knowledge and poor school sanitation facilities. Insufficient understanding of menstruation is associated with discomfort during menses, unsafe use of absorbents, and the persistence of myths and stigma that may affect school attendance and psychosocial well-being. Therefore, comprehensive and age-appropriate menstrual health education is essential to prepare girls before menarche and to promote healthy behaviors and positive attitudes.

In the digital era, information and communication technology offers promising

opportunities to improve the delivery of health education to adolescents. Interactive digital learning media, including videos, animations, games, and mobile applications, can provide visual, engaging, and learner-centered experiences that enhance motivation and knowledge retention. Storytelling has long been recognized as an effective pedagogical strategy because it conveys messages in an emotional and memorable way and helps create personal connections to the content. When combined with interactive digital platforms, storytelling may further increase adolescents' engagement and support deeper understanding of complex or sensitive topics such as menstruation.

Recent evidence suggests that digital and narrative-based interventions can significantly improve menstrual knowledge and hygiene practices among adolescent girls in low- and middle-income settings, indicating their potential scalability and cultural adaptability. However, studies that specifically examine the use of interactive digital storytelling to enhance understanding of menarche among younger adolescents in Islamic elementary school settings remain limited. In Indonesia, where sociocultural and religious values strongly influence discussions about reproductive health, context-sensitive and non-intimidating educational approaches are particularly needed.

MI Al Irsyad in Kediri City is an Islamic elementary school where many early adolescent girls are approaching or have recently experienced menarche, yet preliminary observations indicate that their knowledge and preparedness for menstruation are still suboptimal. Against this background, there is a need to evaluate innovative educational strategies that align with adolescents' digital habits while respecting their cultural and religious context. Therefore, this study aimed to analyze the effect of interactive digital storytelling education on menarche understanding among early adolescent girls at MI Al Irsyad, Kediri, Indonesia.

## 2. METHODS

This study employed a pre-experimental one-group pretest–posttest design to evaluate the effect of interactive digital storytelling education on menarche understanding among early adolescent girls. The study was conducted at MI Al Irsyad, an Islamic elementary school in Kediri City, Indonesia.

The target population consisted of all fourth-grade female students at MI Al Irsyad,

Kediri City, totaling 70 early adolescent girls. The study sample comprised 61 girls who met the inclusion criteria and were selected using purposive sampling. Inclusion criteria were: girls aged around 10 years, had not yet experienced menarche, and were willing to participate as respondents. Exclusion criteria were girls who

Penyuluhan, SAP) delivered twice within a single educational session. The digital storytelling video combined audio, visual, and narrative elements to explain key concepts about menarche in an engaging and age-appropriate way. The dependent variable was menarche understanding, defined as the respondent's knowledge about the first menstrual period,

3. RESULTS

Table 1. Distribution of Respondent Characteristics

Research result	Frequency	Percentage
<b>Age</b>		
9 years old	32	52,5 %
10 years old	29	47,5 %
<b>Total</b>	<b>61</b>	<b>100 %</b>
<b>Class</b>		
4A	13	21,3 %
4B	24	39,3 %
4C	10	16,4 %
4D	14	23,0 %
<b>Total</b>	<b>61</b>	<b>100 %</b>

Table 2. Menarche understanding before interactive digital storytelling

Category	Frequency	Percentage (%)
<b>Good</b>	3	4,9
<b>Fair</b>	23	37,7
<b>Poor</b>	35	57,4
<b>Total</b>	<b>61</b>	<b>100</b>

Before the intervention, most respondents had poor understanding of menarche (57.4%, n = 35), while 37.7% (n = 23) had fair understanding and only 4.9% (n = 3) had good understanding.

Paired t-test analysis showed a statistically significant improvement in menarche understanding scores after the intervention, with a mean difference of 4.557 (SD 1.460) and a p-value of 0.000 (p < 0.05). These findings indicate that interactive digital storytelling education had a significant positive effect on menarche

had already experienced menstruation or did not complete the study procedures.

The independent variable was interactive digital storytelling education, defined as a health education intervention using an interactive digital story in video format supported by a structured health education session (Satuan Acara

including basic concepts of menarche, physical and hormonal changes, and readiness for puberty. Menarche understanding was measured using a structured questionnaire developed from previous literature, with total scores categorized as good (71–100%), fair (41–70%), and poor (0–40%).

Table 3. Menarche understanding after interactive digital storytelling

Category	Frequency	Percentage (%)
<b>Good</b>	57	93,4
<b>Fair</b>	4	6,6
<b>Poor</b>	0	0
<b>Total</b>	<b>61</b>	<b>100</b>

After the intervention, almost all respondents achieved good understanding of menarche (93.4%, n = 57), and the remaining 6.6% (n = 4) had fair understanding, no respondent remained in the poor category

Effect of interactive digital storytelling on menarche understanding

Table 4. The results of the Paired t-test statistical test on the influence of interactive digital storytelling on understanding of menarche in adolescent girls at MI Al Irsyad, Kediri

No	Variabel	Amount
1	Sig	.000
2	Mean	4.557
3	Deviation	1.460

understanding among early adolescent girls at MI Al Irsyad, Kediri.

4. DISCUSSION

This study demonstrated a marked improvement in menarche understanding among early adolescent girls after receiving interactive digital storytelling education. Before the

intervention, more than half of the respondents had poor understanding of menarche, whereas after the intervention almost all participants achieved good understanding. These findings indicate that many girls in Islamic elementary schools enter early adolescence with limited knowledge about menstruation, consistent with previous research in Indonesia showing that menstruation is often considered a taboo topic and that girls commonly experience fear and anxiety at menarche due to inadequate information.

The low baseline level of understanding observed in this study may be related to age, grade level, lack of prior menstrual experience, and limited access to age appropriate reproductive health education. Earlier studies have reported that girls aged 10 - 13 years frequently feel anxious about the rapid physical and psychological changes during puberty, especially when they are not adequately prepared for menstruation. Family support, peer support, and accessible, accurate information have been identified as key determinants of girls' readiness for menarche, yet such support is often suboptimal in primary school and madrasah settings where discussions of reproductive health are sensitive.

After the intervention, interactive digital storytelling produced a substantial shift from poor to good menarche understanding across age groups and classes. Digital storytelling combines narrative, visual, and audio elements in a way that is engaging and easy to understand for digital-native adolescents, which can enhance attention, emotional connection, and retention of health information. Previous studies on digital and interactive media in adolescent reproductive health education have similarly reported significant gains in knowledge and reductions in anxiety when content is delivered through attractive videos, applications, or game-based formats.

The significant mean increase in knowledge scores and the very low p-value from the paired t-test in this study confirm that interactive digital storytelling has a strong educational effect in this context. Beyond cognitive gains, digital storytelling may also support emotional preparedness by normalizing menstruation, countering myths, and presenting relatable characters who experience menarche as a natural biological process. This aligns with evidence that narrative and story based interventions can

reduce anxiety and foster more positive attitudes toward sensitive health topics in children and adolescents.

From a cultural and religious perspective, the use of interactive digital storytelling in an Islamic elementary school such as MI Al Irsyad appears particularly promising. The method allows integration of religious values and local norms into the narrative while maintaining an engaging, technology based format that fits adolescents' daily digital habits. This context sensitive approach may help bridge the gap between the need for comprehensive menstrual health education and the reluctance to discuss reproductive issues openly in conservative communities, as reported in previous Indonesian studies.

However, this study has some limitations. The pre-experimental one group pretest posttest design without a control group limits the ability to attribute changes exclusively to the intervention, and the relatively small, single school sample reduces generalizability. In addition, outcomes were measured immediately after the intervention, so the long term retention of knowledge and the impact on menstrual practices and psychosocial outcomes could not be assessed. Future research using controlled or randomized designs, larger and more diverse samples, and longer follow up periods is needed to confirm and extend these findings, including exploring the effects of interactive digital storytelling on menstrual hygiene behaviors, anxiety, and school participation.

## 5. CONCLUSION

Before receiving the intervention, most early adolescent girls had poor understanding of menarche, with more than half of the participants categorized as having low knowledge levels. After interactive digital storytelling education, almost all respondents achieved good understanding of menarche, indicating a substantial improvement in menstrual health knowledge. The paired t-test confirmed a statistically significant effect of the interactive digital storytelling intervention on menarche understanding, demonstrating that this method is an effective educational strategy for early adolescent girls in an Islamic elementary school setting

## 6. REFERENCES

Amelia, D., & Putri, S. R. (2024). Pengaruh Digital Storytelling pada Channel Youtube terhadap Literasi Kesehatan Mental

- Generasi Z. *Jurnal Karimah Tauhid*, 3(5), 345-358.
- Amira. (2025). Edukasi Kesehatan Reproduksi Dalam Format Digital: Gaya Komunikasi @dokteramiraobgyn di Platform TikTok. *Jurnal Multidisiplin Indonesia*.
- Andayani, S. R. D., & Syarifah, A. S. (2024). Pendidikan Kesehatan Untuk Meningkatkan Pengetahuan dan Kesiapan Menghadapi Menarche pada Siswa di Sekolah Dasar. *DEDIKASI SAINTEK Jurnal Pengabdian Masyarakat*, 3(1).
- Andini, R., & Syahrial, S. (2025). Inovasi Kesehatan Reproduksi Remaja dalam Edukasi Digital. *Jurnal Peduli Masyarakat*, 6(2), 156-168.
- Anggraini. (2022). Pengaruh Video Edukasi Terhadap Pengetahuan dan Sikap Remaja Awal tentang Kesehatan Reproduksi. *Menara Medika*, 5(1), 45-56.
- Astuti, D. (2010). Hubungan Status Sosial Ekonomi dengan Usia Menarche pada Remaja Putri di SMP Negeri 2 Semarang. *Semarang: Fakultas Kedokteran Universitas Diponegoro*.
- Badan Penelitian dan Pengembangan Kesehatan. (2018). *Riset Kesehatan Dasar (Riskesdas) 2018*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Edward, D. (2007). Secular Trends in the Age at Menarche and Implications for Health. *American Journal of Human Biology*, 19(3), 453-457.
- Febrianto, D. (2017). Hubungan Usia Menarche dengan Risiko Penyakit Degeneratif pada Wanita Dewasa. *Jakarta: Fakultas Kesehatan Masyarakat Universitas Indonesia*.
- Firmansyah, D., Setiawan, A., & Kurnia, M. (2024). Pendidikan Kesehatan dengan Media Pembelajaran Interaktif untuk Meningkatkan Pengetahuan Kesehatan Reproduksi Remaja. *Jurnal Pemberdayaan Masyarakat Mandiri Indonesia (JPMMI)*, 5(3), 234-245.
- Hidayat, R., Nurhasanah, & Iskandar, T. (2024). Dampak Implementasi Teknologi dalam Pembelajaran Pendidikan Dasar: Studi Kasus pada Efektivitas Penggunaan Platform Pembelajaran Digital di Sekolah Dasar. *Jurnal Inovasi Pendidikan*, 12(4), 456-470.
- Kurniawan, A. (2024). Hubungan Pengetahuan, Dukungan Orang Tua dan Dukungan Teman Sebaya dengan Tingkat Kecemasan dalam Persiapan Menghadapi Menarche. *Innovative: Journal Of Social Science Research*.
- Lutfiya, I., Ibad, M., Kurniawan, A., Amalia, N., & Herowati, D. (2022). Analisis Kesiapan Siswi Sekolah Dasar dalam Menghadapi Menarche. *Jurnal Biometrika Dan Kependudukan*, 11(02).
- Maulana, R. (2024). Inovasi Kesehatan Reproduksi Remaja dalam Pembuatan Aplikasi Digital. *Jurnal Peduli Masyarakat*, 5(4), 289-301.
- Maulidah, F. (2011). Hubungan Faktor Genetik dengan Usia Menarche pada Remaja Putri di SMPN 1 Sleman. *Yogyakarta: Universitas Gadjah Mada*.
- Muslikah. (2024). Kesiapan Menghadapi Menarche Pada Remaja Putri di Sekolah Dasar. *Haura*.
- Nihaya. (2024). Edukasi Kesehatan Reproduksi dalam Pendidikan Islam: Pendekatan untuk Remaja. *Al Khidma: Jurnal Pengabdian Masyarakat*.
- Nursanti, D. P & Kumalasari, E. P (2023) Kesehatan Reproduksi Remaja, Wanita Dan Perimenopause. CV. Dewa Publishing
- Pratama, B., & Lestari, W. (2025). Inovasi Program Kesehatan Reproduksi Remaja: Edukasi dan Layanan untuk Menunjang Kesehatan Seksual. *Room of Civil Society Development*, 4(1), 78-92.
- Puspitasari, H. R. (2025). Digital Storytelling For Enjoyable and Effective Learning in the Technological Era (2020-2025). *Pedagogia: Jurnal Pendidikan*, 14(2), 234-

- 250.
- Putri, A., & Salsabila, N. (2025). Pengaruh Pendidikan Kesehatan melalui Media Sosial TikTok terhadap Pengetahuan Remaja tentang Bahaya Merokok. *Jurnal Keperawatan Indonesia Florence Nightingale*, 8(1), 78-90.
- Raharjo. (2024). Aplikasi Pembelajaran Interaktif untuk Meningkatkan Kesadaran Kesehatan Melalui Pendekatan Digital Game Based Learning. *Prosiding Seminar Nasional Pendidikan Jasmani Dan Kesehatan Mental Peserta Didik*.
- Rahmawati, D., & Kusuma, A. (2025). Analisis Efektivitas Metode Bercerita Digital dalam Meningkatkan Kemampuan Bahasa Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 9(3), 567-580.
- Rahmawati, S., & Hidayat, A. (2023). Pengaruh Pendidikan Kesehatan Reproduksi terhadap Sikap Remaja tentang Seksual Pranikah. *JIMPK: Jurnal Ilmiah Mahasiswa & Penelitian Keperawatan*, 4(2), 112-125.
- Saraswati. (2024). Menstruasi dan Kesiapan Menghadapi menarche pada Siswi Sekolah Dasar. *Jurnal Ilmiah Keperawatan Indonesia (JIKI)*, 7(1), 64-77.
- Sari, D. P., & Wijayanti, R. (2024). Pengaruh Pendidikan Kesehatan Reproduksi terhadap Pengetahuan Remaja. *Jurnal Penelitian Perawat Profesional*, 6(4), 1567-1574.
- Sari, M., & Pratiwi, N. (2025). Efektivitas Terapi Storytelling terhadap Penurunan Kecemasan Anak Prasekolah Selama Hospitalisasi. *Media Kesehatan Politeknik Kesehatan Makassar*, 18(2), 145-156.
- Segal, E., & Stohs, J. (2007). *Hygiene Management and Adolescent Girls' School Attendance: A Global Review*. New York: UNICEF.
- Soetjiningsih. (2007). *Tumbuh Kembang Remaja dan Permasalahannya*. Jakarta: EGC.
- Sommer, M., & Sahin, M. (2013). Overcoming the Taboo: Advancing the Global Agenda for Menstrual Hygiene Management for Schoolgirls. *American Journal of Public Health*, 103(9), 1556-1559.
- Wijaya, K., & Rahman, F. (2024). Peningkatan Pengetahuan tentang Gaya Hidup Sehat sebagai Upaya Pencegahan Infertilitas pada Remaja Putri. *Jurnal Pengabdian Dan Pemberdayaan Kesehatan*, 3(4), 201-215.
- Wijayanti. (2024). Hubungan dukungan orang tua dengan kesiapan remaja putri dalam menghadapi menarche. *Prosiding Seminar Nasional Penelitian Dan Pengabdian Kepada Masyarakat LPPM Universitas 'Aisyiyah Yogyakarta*.
- Wulandari, R., Nurmala, I., & Dewi, F. (2015). Perbedaan Usia Menarche Berdasarkan Status Gizi dan Aktivitas Fisik pada Remaja Putri SMP Negeri di Surabaya. *Jurnal Biometrika Dan Kependudukan*, 4(1), 59-67.