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Effect Of An Animated Prenatal Education Video On Intrauterine Father Attachment: A Pilot Pretest-Posttest Study

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ABSTRACT

Father-fetus attachment affects maternal and fetal health, yet few interventions enhance it. Although relaxation, music, and fetal visualitation based education is recommended, evidence remains limited. Structured three-segment animated prenatal education (maternal changes, fetal development, and attachment strategies) remains rarely implemented for expectant fathers. This study aimed to determine the effect of an animated video-based prenatal health education intervention on intrauterine father–fetus attachment among expectant fathers. A pre-experimental one-group pretest-posttest study was conducted among 41 expectant fathers recruited through consecutive sampling from two primary health centers. Attachment was measured using the Intrauterine Father Attachment Scale (Cronbach's α = 0.939). Normality was assessed using the Shapiro–Wilk test. Pre-post differences were analyzed using the Wilcoxon Signed Rank Test, and associations with participant characteristics were examined using correlation and group comparison tests as appropriate ($p<0.05$). Although the median intrauterine father attachment score increased from pretest to posttest [69.00 (IQR 61.50–74.00) vs 70.00 (IQR 64.00–78.50)], the difference was not statistically significant ($p = 0.069$). The animated video intervention did not significantly improve intrauterine father–fetus attachment. Further studies using more interactive or multi-component interventions are warranted.

Keyword: Intrauterine Father Attachment, Paternal Behavior. Health Education, Video-Audio Media, Pregnancy

1. Introduction

Father–fetus attachment influences pregnancy outcomes, child development, and paternal behaviors after birth (Svendsrud et al., 2023;Sun et al., 2025). Attachment is a strong emotional tie to a significant other. Paternal attachment is as essential as maternal and infant attachment (Kurtuluş et al., 2025). According to Cranley, fetal attachment is reflected through interaction with the fetus, differentiation of the self from the fetus, attributing characteristics to the fetus, self-sacrifice, and acceptance of the parental role (Nosrati et al., 2018).

Fathers do not perceive the fetus physically as mothers do, making it more challenging for them to internalize the pregnancy (Kurtuluş et al., 2025). Nevertheless, the father and child relationship can begin

before birth through the father's internal capacity to imagine and establish a connection with the unborn child (Svendsrud et al., 2023). Paternal attachment is influenced by demographic factors, whether the pregnancy is desired or planned, maternal attachment, social relationships, relationship quality, partner support, pregnancy conditions, psychological states, age, and parity (Svendsrud et al., 2023;Sun et al., 2025;Kurtuluş et al., 2025;Uğurlu et al., 2023).

Father and fetus attachment can be strengthened through several existing approaches, including paternal involvement in antenatal classes and check-ups, recognition of fetal movements, social support, anxiety reduction, opportunities to see or feel the fetus, father and fetus interaction, and involvement in pregnancy care (Kurtuluş et al., 2025;Uğurlu et al., 2023;de Waal et al., 2025). Previous studies have also reported that specific interventions such as fetal movements counting, exposure to ultrasound images, relaxation techniques, music, the Prenatal Video-Feedback Intervention to Promote Positive Parenting (VIPP-PRE), and joint ultrasound viewing can enhance paternal and fetal interaction (Coté et al., 2025;Buisman et al., 2023;Uğurlu et al., 2023). hese interventions may also improve marital satisfaction (Nosrati et al., 2018). Video-based education may facilitate fathers' understanding of fetal development and provide a sense of fetal presence.

Media that combines music, relaxation, and fetal visualization is recommended to support the formation of intrauterine father attachment; however, this area has not been extensively researched (Coté et al., 2025). The use of imagery in videos aids respondents in visualizing and comprehending information, reducing anxiety, bridging the communication of information, and providing accurate, culturally adaptable, and easily accessible information (Dejchaiyasak et al., 2025). Audiovisual media stimulate thoughts, feelings, attention, interest, motivation, and understanding regarding prenatal attachment and readiness for parenthood (Sariyani, 2019). Intrauterine father attachment is beneficial, and the use of structured videos supports its development. However, there has yet to be research that develops animated videos with a comprehensive structure encompassing pregnancy material, fetal development, and attachment to the fetus. Therefore, the researcher conducted a pilot study to determine the effect of health education on parental prenatal attachment through animated video media on the attachment between fathers and fetuses.

2. Methods

This study employed a pre-experimental one-group pretest-posttest design to examine the effect of an animated parental prenatal attachment video on father-fetus attachment. Data collection was conducted from February to March 2025. The reporting of this study followed the TREND Statement checklist for nonrandomized interventions. The study population consisted of expectant fathers accompanying their partners during antenatal visits at Depok I and Depok II Primary Health Centers in Sleman, Yogyakarta, Indonesia. The minimum sample size was determined using a paired mean difference formula (39 participants), with an additional 10% to account for potential drop-out, resulting in 43 participants. A total of 45 individuals underwent screening, met the criteria, and participated in the intervention. However, 4 participants were lost to follow-up because they did not respond to the scheduled posttest data collection. Ultimately, 41 participants were included in the analysis. Participants were recruited through consecutive sampling. Inclusion criteria were gestational age >20 weeks, antenatal care at the primary health center, living in the same household with the spouse, having a mobile phone to access the videos and online meeting, and willingness to participate. Exclusion criteria were fathers with communication or sensory impairments and mothers with high-risk pregnancies. Respondents who did not participate in the intervention series or whose questionnaire responses were incomplete were subjected to drop-out.

The animated video on parental prenatal attachment consists of three segments: (1) physical and psychological changes in pregnant women (8 minutes 45 seconds), (2) fetal growth and development (8 minutes 21 seconds), and (3) parent-fetus attachment (8 minutes 22 seconds). The videos were developed by the researcher based on several references (Alligood, 2014;Bhattacharya & Stubblefi, 2016; Piontelli, 2015; Larraín & Caradeux, 2024; Margherita et al., 2015; Raines, 2023; Jones, 2014; Leifer, 2019; Ricci, 2021). The researcher conducted content validity testing of the storyline and expert evaluation of the video media. The criteria for the experts who conducted the assessment were: holding a master's degree in maternity nursing specialization or a doctoral degree in nursing, having research and publication experience in the field of maternity nursing, and having prior experience in developing animated videos for health education. The analysis results for the Content Validity Index (CVI) of the storyline for the video on maternal changes and fetal development were relevance 1.00 and clarity 1.00. For the attachment video, the relevance was 0.84 and clarity was 0.92. All three videos had a CVI $\geq$ 0.70, indicating validity (Polit et al., 2007). The results of the media expert evaluation were 97.67% (very high).

A demographic questionnaire was utilized to assess the age of respondents and their partners, education, pregnancy planning, history of abortion and infertility, gravidity status, gestational age, presence of high-risk pregnancy, number of children, family income, and family structure. The second instrument was the Intrauterine Father Attachment Scale developed by Dönmez & Gümüşsoy (2019), which has been validated and tested for reliability by Fidra et al. (2023). The questionnaire includes 23 Likert scale questions (1-4) with a score range of 23-92. A higher total score indicates a stronger level of intrauterine father attachment. The original scale showed a Cronbach's alpha value of 0.73, and the results of the Kaiser-Meyer-Olkin and Bartlett's tests indicated that the data met the requirements for factor analysis. These findings support that the Intrauterine Father Attachment Scale is valid and reliable for assessing father-fetus attachment in pregnancies between 24 and 38 weeks (Dönmez & Gümüşsoy, 2019). While the Indonesian version that was used in this study showed that the results were r = 0.461 – 0.833 (> r table =0.444) and Cronbach's Alpha = 0.939 (Fidra et al., 2023).

The intervention was conducted after obtaining ethical clearance and permission. The researcher identified pregnant women in collaboration with community health center staff and health cadres. Then, the researcher conducted screening, explained the study, and requested consent and an appointment during antenatal visits. The second meeting was conducted online via Zoom, and the participants joined in small groups, with several couples attending each session. The procedure involved filling out a Google Form for the pretest (30-45 minutes) and viewing the videos one by one, followed by discussions. The respondents were asked to fill out a Google Form to record video access and other information within the 2-week intervention. The videos were uploaded to the YouTube channel of the institution. Further, the link was shared with the respondents. This monitoring strategy allowed tracking of self-reported engagement. It was expected that the information presented would be processed into transitional long-term memory through the 2-week intervention (Ingendahl et al., 2024; Radvansky et al., 2022). The researcher encouraged the respondents to access the videos every 3 days. After 2 weeks, they completed the posttest distributed via Google Form.

The analysis was conducted using IBM SPSS version 25.0. Categorical variables (nominal/ordinal) were summarized using frequencies and percentages. Continuous variables were summarized using mean ± standard deviation for normally distributed data and median with interquartile range (IQR) for non-normally distributed data. Normality was assessed using the Shapiro-Wilk test. Pre-post differences in intrauterine father attachment scores were analyzed using the Wilcoxon Signed Rank Test. Associations between attachment scores and continuous participant characteristics were examined using Pearson correlation for normally distributed variables and Spearman's rho for non-normally distributed variables. Comparisons of attachment scores across categorical variables were analyzed using independent t-test or one-way ANOVA for normally distributed data, and Mann-Whitney U or Kruskal-Wallis tests for non-normally distributed data. A p-value <0.05 was considered statistically significant. Given the exploratory nature of the study, no adjustment for multiple comparisons was applied. Therefore, bivariate findings should be interpreted as exploratory.

This study received ethical approval from the Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada-Dr. Sardjito General Hospital (Ref. No. KE/FK/0074/EC/2025, dated 17 January 2025). Each client has provided written informed consent to ensure that she joined the research voluntarily.

3. Results

3.1. Participant Characteristics

A total of 41 fathers participated in the study. The mean ages of the fathers and their partners were within the healthy reproductive range (fathers: 32.02 ± 7.076 years; partners: 30.10 ± 5.953 years). The mean gestational age was 27.24 weeks. First pregnancies accounted for 36.6% of cases, and 41.5% of participants had no living children. Most fathers had a high school education (51.2%) and a family income above the regional minimum wage (53.7%). More than half of the pregnancies were unplanned (53.7%), and 73.2% were not classified as high risk. Among the 4 participants lost to follow-up, ages ranged from 26-34 years, 3 participants had a family income above the regional minimum wage, and 2 had completed high education. The characteristics of the participants lost to follow-up were similar to those of the participants included in the analysis. Complete characteristics are presented in Table 1.

Table 1 Participants' characteristics (N = 41)

Characteristics	Mean ± SD[a] or n (%)
Age (years) (min – max = 20 – 55)	32.02 ± 7.076
Spouse's age (years) (min – max = 20- 43)	30.10 ± 5.953
Spouse's gestational age (week) (min – max = 20-35)	27.24 ± 4.346
Number of spouse's pregnancies (gravidity) (min – max = 0 – 4)	
1	15 (36.6)
2	15 (36.6)
3	9 (22.0)
4	2 (4.9)
Number of living children (min – max = 0 – 3)	
0	17 (41.5)
1	15 (36.6)
2	8 (19.5)
3	1 (2.4)
Number of spouse's previous abortions (min – max = 0–1)	
0	36 (87.8)
1	5 (12.2)
Education level	
Primary school	3 (7.3)
High school	21 (51.2)
University	17 (41.5)
Family income	
Family income below the regional minimum wage	19 (46.3)
Family income above the regional minimum wage	22 (53.7)
Pregnancy planning	
Planned pregnancy	19 (46.3)
Unplanned pregnancy	22 (53.7)
Infertility history	
Have an infertility history	9 (22.0)
No infertility history	32 (78.0)
Spouse's risk of pregnancy or complications	
High-risk pregnancy or complication	11 (26.8)
No high-risk pregnancy or complication	30 (73.2)
Family type	
Nuclear family	24 (58.5)
Dyad family	6 (14.6)
Extended family	11 (26.8)

3.2. Effect of the Parental Fetal Attachment Video on Intrauterine Father Attachment

The comparison between pretest and posttest intrauterine father attachment scores is presented in Table 2. The median score increased from 69.00 (IQR 61.50-74.00) to 70.00 (IQR 64.00-78.50) after the two-week intervention. However, the Wilcoxon Signed Rank Test indicated no significant difference (p = 0.069). The possible score range is 23-92, and both pretest and posttest medians were above the theoretical midpoint (57.5), suggesting that the fathers' attachment levels were already high at baseline, which may indicate a potential ceiling effect.

Table 2 Comparison of Intrauterine Father Attachment Scores Before and After Intervention (n = 41)

Variable	Pretest (n=41) Median and IQR[b]	Posttest (n=41) Median and IQR	p-value
Intrauterine Father Attachment	69.00 (61.50 – 74.00)	70.00 (64.00-78.50)	0.069[a]

[a]Wilcoxon Signed Rank Test; [b]Interquartile Range

3.3. Exploratory Factors Associated With Baseline and Changes in Intrauterine Father Attachment

Bivariate analyses (Tables 3 and 4) showed that partners' gravidity and the number of living children had significant negative correlations with baseline intrauterine father attachment scores ($p < 0.05$). Higher gravidity and a greater number of living children were associated with lower pre-intervention attachment scores, with

both correlations falling within the moderate range (r = -0.347 and r = -0.328) (Tingulstad et al., 2021). Other variables, including age, spouse's age, gestational age, history of abortion, education, income, pregnancy planning, infertility history, pregnancy complication history, and family type, were not significantly associated with either baseline scores or changes in intrauterine father attachment (p >0.05). These findings should be interpreted with caution due to multiple testing.

Table 3 Bivariate analysis of numerical variables associated with baseline and change of Intrauterine Father Attachment (IFA) scores (n = 41)

Characteristics	N	Baseline IFA score		Change in IFA score	
		r	p-value	r	p-value
Age*	41	-0.234	0.140[a]	0.010	0.953[a]
Spouse's age	41	-0.176	0.271[a]	0.034	0.835[b]
Spouse's gestational age	41	0.150	0.349[a]	0.031	0.846[b]
Number of spouse's pregnancies (gravidity)*	41	-0.347	**0.026a**[*]	0.007	0.965[a]
Number of living children*	41	-0.328	**0.036a**[*]	0.018	0.912[a]
Number of spouse's previous abortions*	41	-0.076	0.638[a]	-0.038	0.814[a]

[a]Spearman's rho; [b]Pearson Correlation;*indicate significance level<0.05

Table 4 Bivariate analysis of categorical variables associated with baseline and change of Intrauterine Father Attachment (IFA) scores

Characteristics	Category	N	Baseline IFA[a] score		Change in IFA score	
			Mean±SD[b]	p-value	Mean±SD	P-value
Education level	Primary school	3	67.00±11.790	0.763[d]	2.67±7.767	0.843[f]
	High school	21	67.57±7.332		3.71±8.205	
	University	17	69.29±7.889		1.24±8.258	
Family income	Family income below the regional minimum wage	19	67.16±6.817	0.463[c]	2.84±8.126	0.867[e]
	Family income above the regional minimum wage	22	69.18±8.759		2.41±8.238	
Pregnancy planning	Planned pregnancy	19	70.58±6.703	0.086[c]	0.53±7.105	0.127[e]
	Unplanned pregnancy	22	66.23±8.417		4.41±8.600	
Infertility history	Have an infertility history	9	65.78±7.155	0.343[c]	1.56±8.248	0.664[e]
	No infertility history	32	68.94±8.052		2.91±8.149	
Risk of pregnancy or complications	High-risk pregnancy or complication	11	71.18±5.582	0.174[c]	-0.55±6.4686	0.132[e]
	No high-risk pregnancy or complication	30	67.17±8.404		3.77±8.398	
Family type	Nuclear family	24	69.29±8.740	0.562[d]	1.04±8.333	0.536[f]
	Dyad family	6	66.83±6.882		4.67±6.055	
	Extended family	11	66.73±6.574		4.91±8.324	

4. Discussion

This study showed that the health education delivered through an animated video did not lead to a statistically significant improvement in intrauterine father attachment scores (p = 0.069), although the median increased from 69.00 (IQR 61.50-74.00) to 70.00 (IQR 64.00-78.50). Although no statistically significant effect was found, the results of this study carry clinical meaning. The increase in the median posttest score compared to the pretest shows a positive trend, indicating that the animated video on parental prenatal attachment can support the development of father–fetus bonding. Prenatal attachment in fathers tends to develop gradually because they do not have direct sensory experiences of the fetus's presence (Kurtuluş et al.,

2025). Therefore, visual understanding of fetal growth and ways to interact with the fetus may serve as a foundation for further improvement in father–fetus attachment.

The intervention was designed following the principles of online learning, which included joint video viewing and discussions via Zoom, self-access through a YouTube link, and periodic reminders. The researcher structured the video content into three small segments presented sequentially (changes in pregnant women, fetal growth and development, and the attachment between parents and the fetus). Further, the videos used simple and interactive language, complemented by animations, text narration, and music; they were arranged with an ideal duration. The video media was developed to support the attachment between parents and the fetus through online learning.

The pregnancy period refers to an opportune time aimed to foster paternal attachment (Buisman et al., 2023). The use of technology can improve learning efficiency and material access flexibility; it provides realistic simulations and structured content with an emphasis on key aspects, while also assisting in the presentation of material based on the characteristics of the audience. This facilitates information storage into long-term memory by new knowledge with prior knowledge and facilitating various learning styles (textual, visual, verbal) (Anderson, 2011).

Although the principles of online learning were implemented in the development of the videos, there was no significant increase in the attachment scores. Another possible explanation is a potential ceiling effect, as baseline attachment scores were already relatively high, limiting the measurable improvement during the two-week intervention period. These results are inconsistent with previous studies demonstrating that visual components, subtitles, and audience-centered material delivery can enhance understanding (Kaya et al., 2025). Animated videos must be presented in a specific, concise, and structured manner to support short-term memory, provide comprehensive information, capture attention, and reduce users' cognitive load (Hansen et al., 2024).

The results of this study may have been influenced by several factors. The first is the respondents' low intrinsic motivation. The data indicated that 97.56% of the respondents accessed the videos 1-5 times within the period of two weeks. As previous research indicates, learners with lower abilities made significant improvements in vocabulary development after seven repetitions (Zhang, 2022). According to (Guo et al., 2024), videos need to be replayed at normal speed with a one-week interval to achieve knowledge retention. Further, Lo (2024) asserts that immediate and spaced repetitions can improve vocabulary and retention; however, these depend on the ability of respondents. Respondents with prior lower abilities may require more repetitions of video playback. Furthermore, meaning comprehension may be achieved after a minimum of two repetitions.

Anderson (2011) explains that intrinsic and extrinsic learning motivation affects the learning process. In this study, extrinsic motivation was provided through joint video viewing, opportunities for independent video access, and periodic reminder messages. The videos were organized into three separate themes with short duration to capture the respondents' attention. Short-duration videos (6-10 minutes) enhance user engagement and understanding, as they can improve material depth and support audience retention, while also reducing cognitive load (Zhu et al., 2022; Kaya et al., 2025; Demir & Birgili, 2024). However, the intrinsic motivation of the respondents, such as fathers' satisfaction with the fetus's gender, was not examined. This may influence the results. According to Salehi et al. (2018), satisfaction with the fetus's gender is closely related to the attachment between a father and the fetus. Low intrinsic motivation may affect the access frequency and understanding of the intervention material.

During the intervention period, most respondents accessed the video only 1–5 times, indicating limited exposure to the educational content. In addition, 22 participants reported receiving similar prenatal attachment information from other sources, particularly social media and online articles. This potential contamination may have reduced the observable effect of the intervention and contributed to the non-significant pre–post findings.

The second factor is the presence of similar information from other sources. In this study, 22 participants reported receiving prenatal attachment information from other sources during the intervention period, which may have introduced contamination and reduced the observable effect of the video intervention. Among them, 13 respondents (59.09%) obtained the information from social media (Instagram, YouTube, TikTok, etc.), and 8 (36.36%) obtained information from online articles. This aligns with previous research revealing that a significant number of young adults obtain health information from social media to get inspiration and lifestyle insights from influencers. However, they evaluate the credibility of the material based on appearance and intuition (Lim et al., 2022). Young participants are more likely to access health videos on YouTube frequently

(Langford et al., 2022). Information sources other than the intervention may affect the respondents' understanding, as the validity of the material cannot be assessed adequately.

As Chen & Wang (2021) state, social media has been used in research, health practices, and community mobilization to complement offline services. However, the use requires strategies focused on user segmentation, evaluation of utility, and privacy protection. Dewi et al. (2021) also demonstrated that YouTube can be used as a health education medium when the material is designed based on user needs, provides enjoyable interaction, and is presented in online learning. According to Alruwaili (2025), videos must be structured and integrated; the use of short videos with scroll immersion increases users' cognitive load, which leads to attention disruption, working memory problems, and fatigue. While digital media can be used in adult health education, it requires the management of material.

The third factor is psychological conditions. According to Kurtuluş et al. (2025), increased responsibility affects fathers' attention focus during pregnancy, while anxiety impacts attachment. This aligns with the explanation by Sun et al. (2025) that anxiety, depression, and emotions influence the attachment between fathers and fetuses. In planned pregnancies, fathers can prepare psychologically, whereas those who are not yet expecting may focus on the pregnancy itself. Sayahi et al. (2017) also explain that paternal attachment is influenced by maternal attachment and marital satisfaction. Strong social support and low anxiety levels enhance attachment (Uğurlu et al., 2023). The researcher did not analyze the psychological conditions of fathers, family emotional dynamics, and the quality of relationships with partners that could affect intrauterine father attachment.

From the bivariate analysis, it was found that age, partner's age, gestational age, gravidity status, number of living children, history of abortion and infertility, education, income, pregnancy planning, high-risk pregnancy conditions, and family type did not significantly affect the increase in intrauterine father attachment scores (p value > 0.05). These results are inconsistent with previous studies that indicate that pregnancy planning and the father's age influence attachment (Sun et al., 2025;Ikiz & Solt Kirca, 2024). Attachment in couples undergoing assisted reproductive technology is higher compared to spontaneous pregnancies (Ranjbar et al., 2020). The bivariate analysis also revealed that gravidity status and the number of living children had a negative correlation with pretest intrauterine father attachment scores ($p < 0.05$), indicating that higher gravidity and a greater number of living children correspond to lower intrauterine father attachment scores. These findings are consistent with previous research, which suggests that prenatal attachment is higher in fathers who have waited longer for the arrival of their child due to emotional, relational, and psychological factors (Sun et al., 2025). Psychological factors significantly influence the attachment between fathers and fetuses.

The fourth factor that may have influenced the results is that the researcher did not facilitate or accompany the implementation of the parental prenatal attachment material by the fathers. The researcher only provided media and discussion opportunities, subsequently motivating respondents to practice independently. Direct experience in performing Leopold maneuvers and listening to fetal heartbeats enhances attachment and the achievement of paternal roles (Karataş Okyay & Güney, 2025). This aligns with the explanation by (Uğurlu et al., 2023) that attention to fetal movements and social support increases parental attachment to the fetus. Overall, the animated video media on prenatal attachment facilitates fathers in visualizing the fetus; however, it requires a combination with methods that provide opportunities for fathers to interact directly to experience the presence of the fetus.

Despite the non-significant findings, this pilot study adds preliminary evidence on the feasibility of digital prenatal health education to support paternal prenatal attachment in primary healthcare settings. Digital platforms have been widely used for health education and communication, providing scalable delivery opportunities (Chen & Wang, 2021).Further studies with more robust designs are required to confirm effectiveness.

These findings should be interpreted cautiously because the one-group pretest-posttest design lacked a comparison group. Therefore, changes in intrauterine father attachment scores cannot be attributed solely to the animated video intervention, as several uncontrolled external and psychological factors may have influenced attachment development during the study period (Kurtuluş et al., 2025; Sun et al., 2025). A major limitation of this study is the one-group pretest–posttest design without a control group, which limits internal validity and prevents causal inference due to potential external and psychological confounding factors. The use of self-reported instruments and self-reported adherence logs (instead of objective measures such as digital analytics) may have introduced reporting bias and affected intervention fidelity assessment. Furthermore,

multiple statistical tests were conducted without adjustment for multiple comparisons, which may increase the risk of Type I error; therefore, statistically significant findings should be interpreted as exploratory.

5. Conclusion

Health education on parental prenatal attachment delivered through animated videos increased the median intrauterine father attachment score. However, the intervention did not result in a statistically significant improvement. High baseline scores, limited video access frequency, and exposure to similar information from other sources may have influenced the intervention effects. Only gravidity status and the number of living children were negatively correlated with baseline intrauterine father attachment scores. Animated video-based prenatal education may serve as a supplementary educational medium to support intrauterine father-fetus attachment; however, its effectiveness may depend on integration with interactive, multi-component, and sensory-based approaches that provide fathers with direct experiences of fetal presence. Future studies should apply controlled or randomized designs with larger samples, incorporate objective monitoring of intervention adherence (e.g., digital usage logs or YouTube analytics) to strengthen intervention fidelity, and consider adjustment for multiple comparisons to improve the robustness of the findings.

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Conflict of Interests

Authors have no conflict of interests.

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