



Education with Video and Flyer Improving Pregnant Women's Behavior of Sleep Hygiene: Which Is More Effective?

Fransisca Retno Asih^{1✉}, Mytha Febriany Pondaang², and Fauzah Cholashotul Panah³

¹Department of Midwifery, STIKES Banyuwangi, Banyuwangi, Indonesia

²Department of Midwifery, STIKES Griya Husada, Surabaya, Indonesia

³Department of Midwifery, Faculty of Health, Universitas Ibrahimy, Situbondo, Indonesia

Article Info

Article History:

Submitted July 2023

Accepted December 2023

Published January 2024

Keywords:

behavior;
education;
insomnia; pregnancy;
sleep hygiene

DOI

<https://doi.org/10.15294/kemas.v19i3.45813>

Abstract

No study related to sleep hygiene education with digital technology for pregnant women in Indonesia has been conducted. This study aims to determine the differences in the effect of education with animated videos and digital flyers on increasing pregnant women's sleep hygiene behavior. This quasi-experimental study was conducted on 108 who pregnant women were selected and assigned consecutively to the animation video and flyer groups and received education on sleep hygiene for 18 days. The validated behavior questionnaires were completed by both groups. Mann-Whitney U and Wilcoxon tests were used for the analysis. The mean (SD) behavior score was 69 (13.3) and 86.2 (11) in the video group and 68 (8.7) and 76.8 (10.5) in the flyer group on the first and 19th days, so there was a significant difference in terms of sleep hygiene behavior between the animation video and flyer group on the 18th day ($p < 0.000$). Pregnant women who had sleep hygiene education with an animation video had more behavioral enhancement than flyers ($20.5 > 11.5$). Sleep hygiene education with an animation video as a first-line strategy is important and more effective in preventing insomnia.

Introduction

Pregnancy is a special condition characterized by anatomical, physiological, biochemical, and psychological changes in a woman's body (Cunningham *et al.*, 2018). One of the basic needs of pregnant women to be able to adapt to changes in pregnancy is rest and sleep. Sleep is one of the important biorhythms that helps optimize recovery for many functions at the level of systems, organs, and even cells in the human body (Warland *et al.*, 2018). Every woman of reproductive age needs about 7-9 hours of sleep, and so do pregnant women. Pregnancy is often associated with problems such as difficulty falling asleep, waking up frequently during the night, not falling asleep easily when waking up, and feeling unrefreshed and lethargic in the morning (Sedov *et al.*, 2021).

Insomnia is dissatisfaction and discrepancy in terms of quantity and quality of sleep that occurs at least three times a week for at least three months and is not related to a specific condition or under the influence of other substances (Mindell *et al.*, 2015). The results of a meta-analysis by Sedov *et al.* showed that 38.2% of pregnant women experienced insomnia which increased with increasing gestational age, namely 25.3% in the first trimester, 27.2% in the second trimester, and 39.7% in the third trimester. Insomnia in pregnancy is associated with back pain, increased frequency of micturition, fetal growth and movement, inadequate breathing, incorrect body position during sleep, stress, psychological disorders, and decreased quality of life (Tsai *et al.*, 2012). Slow handling of insomnia increases the risk of preeclampsia, sectio caesarean delivery,

✉ Correspondence Address:
Jl. Letkol Istiqlah No.109 East Java, 68400 Indonesia
Email: davisaputra90@gmail.com

prematurity, gestational diabetes mellitus, postpartum depression, obesity in children, and hyperglycemia in children, which ultimately affects family welfare (Sedov *et al.*, 2021; Li *et al.*, 2017; Emamian *et al.*, 2019; Letourneau *et al.*, 2013). The non-pharmacological treatment of insomnia is behavioral therapy (relaxation, sleep restriction, cognitive therapy, cognitive behavioral therapy) and sleep hygiene (Hashmi *et al.*, 2016).

Sleep hygiene is a first-line strategy to prevent insomnia. Sleep hygiene is the practice of establishing healthy sleep habits. The concept of sleep hygiene, which was developed to address sleep problems, was first used by Peter Hauri (Hashmi *et al.*, 2016). Sleep hygiene education has been widely studied for its benefits in children and adolescents to working women (Chung *et al.*, 2017; Chung *et al.*, 2018; Shriane *et al.*, 2020), but it was limited to pregnant women in Indonesia. In addition, providing education in traditional ways, such as during antenatal care or using media flyers or pamphlets, requires larger resources and previous studies showed that video intervention can modify health behaviors (Tuong *et al.*, 2014). Therefore, this study aims to develop an animation video of sleep hygiene education that describes the importance of practicing sleep hygiene to prevent insomnia in pregnancy and the steps of sleep hygiene to

enhance the behavior of pregnant women. In a quasi-experimental study, we compare the efficacy of an animation video of sleep hygiene education to that of a flyer.

Method

This study was a quasi-experimental design with a non-equivalent control group design approach in three locations. That's Primary Health Care of Mojopanggung Banyuwangi, Primary Health Care of Tanjungsari Surabaya, and Primary Health Care of Banyuputih Situbondo. This study began with a literature review on sleep hygiene. The results of the literature review were used as the basis for preparing scripts for sleep hygiene education. The contents of the video and flyer were the same, but the explanation in the video was more detailed. The duration of the sleep hygiene animation video was five minutes.

In this study, Cronbach's alpha of the sleep hygiene behavior questionnaire was found to be 0.822. 21 of 26 questions that were valid and reliable were used to measure the behavior of pregnant women before and after providing education. The sleep hygiene behavior questionnaire was about sleep duration, nap time, fluid consumption at night, caffeine consumption, cell phone use habits, and others. The animation videos and flyers for sleep hygiene education have received creation

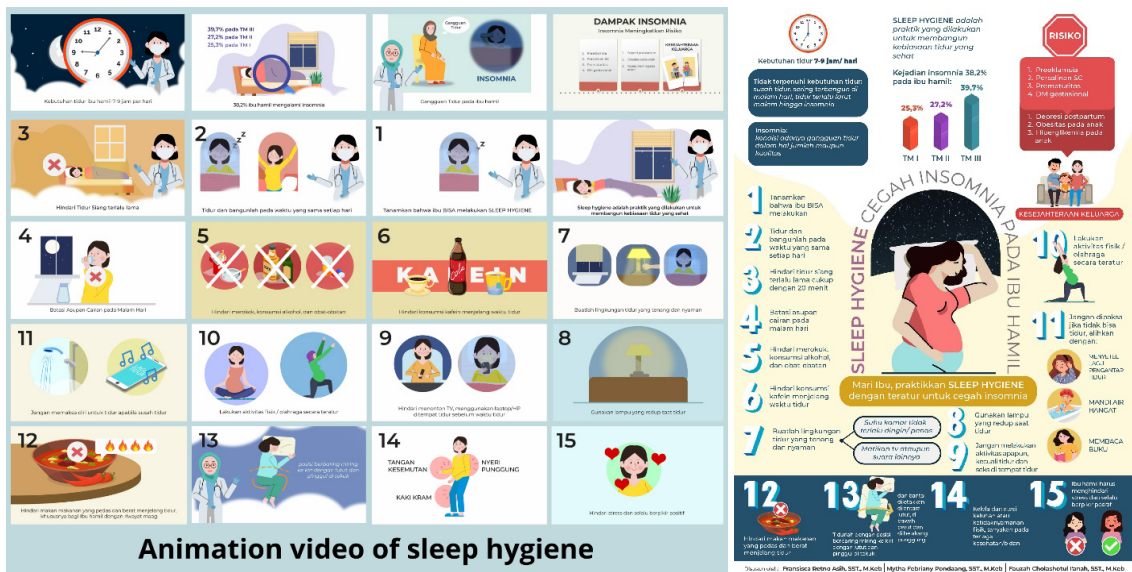


Figure 1. Figure, Animation Video, and Digital Flyer on Sleep Hygiene. (a) Capture of an Animation Video of Sleep Hygiene. (b) The Digital Flyer on Sleep Hygiene

registration from the Directorate General of Intellectual Property of the Ministry of Law and Human Rights of Indonesia.

The target population of this study was pregnant women who lived in Banyuwangi, Surabaya, and Situbondo. The affordable population of this study was all of the pregnant women who lived in Banyuwangi, Surabaya, and Situbondo and met the inclusion and exclusion criteria. The sample size was determined using a table based on a 95% confidence level ($Z\alpha = 1.96$), a power test of 90% ($Z\beta = 1.282$), and the effect size was determined at 0.60, plus 10% in anticipation of dropout, so the number of subjects was 49 in each group. Pregnant women who have come consecutively from one of the primary health care centers in Banyuwangi, Surabaya, and Situbondo during September-December 2021 and have smartphones that access WhatsApp and Zoom meetings were assigned to the study. Pregnant women who worked at night took medication for sleep, had mental disorders, had intimate partner violence experience, and blind women were excluded from this study. Also, the subjects who withdrew dropped out of this study.

A total of 108 subjects were divided into two groups without randomization, resulting in 54 subjects in the video group and 54 subjects in the flyer group. Both groups underwent a pretest in the form of a sleep hygiene behavior questionnaire using the Google form. After that, the video group was given sleep hygiene education using animated video media, while the flyer group was given sleep hygiene education using flyers through Zoom meetings, and then the animated videos and flyers were distributed via the WhatsApp group. We monitored and reminded subjects in each group to watch videos and read flyers about sleep hygiene for 18th days through WhatsApp groups. All subjects in both groups were given a posttest in the form of a sleep hygiene behavior questionnaire on the 19th day. In this study, the independent variable was sleep hygiene education (categorical data), it was an education given to pregnant women in the form of animated videos and flyers. The dependent variable was sleep hygiene behavior (numeric data), which was the behavior of pregnant women in carrying out sleep hygiene using a sleep hygiene behaviors

questionnaire measurement tool. In addition to behavior, researchers also collected data on the characteristics of research subjects, namely age, gestational age, gravida, education, and occupation.

Categorical data on subject characteristics were displayed in the form of frequency and percentage distributions and analyzed using chi-square for the 2x2 table and the Mann-Whitney test for the 2x3 table so that it was known whether the two groups were feasible to be compared. The research data was numerical, so before being analyzed, it was necessary to test the normality of the data using the Shapiro-Wilk test. The data is normally distributed if $p > 0.05$. The results of behavioral data measurements in the form of scores before and after the intervention in each group were analyzed using the Wilcoxon test, while to find out the comparison of the two groups at each stage, both the pretest and posttest used the Mann-Whitney test. To find out which intervention was most effective, the percentage increase in behavior scores in the animated video and flyer groups was analyzed using the Mann-Whitney test. Data analysis using the SPSS 25 application. The Ethics Committee of the Institute of Health Science Banyuwangi has carefully reviewed and approved this study no. 579/KEPK/STIKES-BWI/IX/2021.

Result and Discussion

The subjects of this study were 54 pregnant women who were assigned the video animation group (18 pregnant women from the Primary Health Center of Mojopanggung Banyuwangi, 18 pregnant women from Primary Health Center Tanjungsari Surabaya, and 18 pregnant women from Primary Health Center Banyuputih Situbondo) and 54 pregnant women were assigned the flyer group (18 pregnant women from the Primary Health Center of Mojopanggung Banyuwangi, 18 pregnant women from Primary Health Center Tanjungsari Surabaya, and 18 pregnant women from Primary Health Center Banyuputih Situbondo). There were no subjects who dropped out of this study. The characteristics of the study subjects are shown in Table 1. Pregnant women who participated in this study had an age range from 19-38 years. Most

of the pregnant women in both groups were multigravidas. The occupational groups of the study subjects were teachers, health workers, private company employees, and traders. The results of the analysis showed that there were no differences in characteristics between the animated video and flyer groups ($p > 0.05$).

Table 1. Characteristics of the Study Subject

Characteristics	Animation video (n=54) n (%)	Flyer (n=54) n (%)	p
Age during the intervention (years)			0.661 ^a
<20	2 (3.7)	1 (1.9)	
20-35	50 (92.6)	53 (98.1)	
>35	2 (3.7)	0 (0)	
Age of pregnancy (weeks)			0.915 ^b
<16	9 (16.7)	9 (16.7)	
16-28	25 (46.3)	23 (42.6)	
>28	20 (37)	22 (40.7)	
Gravid			0.820 ^b
Primigravida	12 (22.2)	13 (24.1)	
Multigravida	42 (77.8)	41 (75.9)	
Education			0.089 ^b
Elementary school to junior high school	17 (31.5)	22 (40.7)	
High school	10 (18.5)	16 (29.6)	
College	27 (50)	16 (29.6)	
Occupational status			0.174 ^b
Employed	27 (50)	20 (37)	
Unemployed	27 (50)	34 (63)	

Source: author's calculating using SPSS, 2022

Notes: ^aMann *Whitney test*; ^bChi *Square test*

The result of this study indicates that an animation video about sleep hygiene education for 18 days increased the behavior of pregnant women ($p < 0.001$) (table 2). The result of this study also indicates that education about sleep hygiene with a flyer for 18 days increased the

behavior of pregnant women ($p < 0.001$) (table 2). Based on Table 2, the percentage increase in behavior in pregnant women who were given sleep hygiene education with animated videos was higher than education with flyers, and it was statistically different.

Our findings showed that sleep hygiene education using animation videos and flyers for 18 days had a positive effect on increasing pregnant women's behavior of sleep hygiene practices. This statement is known from the enhancement of behavior scores before and after education (table 2). The subjects of the animation video group had significantly higher behavior of sleep hygiene than the subjects of the flyer groups, and there are statistically significant differences in behavior after sleep hygiene education. This result agrees with the study conducted by Armstrong *et al* (Armstrong *et al.*, 2011), that video-based learning is a more effective educational tool for teaching and encouraging behavior than written materials. Our results were also consistent with the study by Chen *et al* (Chen *et al.*, 2010), which found that a sleep hygiene education program was effective in improving sleep quality in working women with sleeping problems. But, a systematic review by Tuong *et al* (Tuong *et al.*, 2014) showed that video interventions were variably effective in modifying health behaviors depending on the target behaviors to be influenced (Tuong *et al.*, 2014).

Some reasons can explain this outcome. Firstly, we provided sleep hygiene education for pregnant women with technology that can be shared on social media. In this era, pregnant women and mothers seek information in the social media (Zhu *et al.*, 2019). The internet is a reliable source of information about health and pregnancy. Pregnancy-related information is especially easy to find on the internet (Sinclair *et al.*, 2018). Secondly, videos use more senses,

Table 2. The Effect of Animation Video and Flyer on Sleep Hygiene in 18 Days

Sleep hygiene education	Behavior (before) mean (SD)	Behavior (after) mean (SD)	P	Enhancement (median %)
Animation video (n=54)	69 (13.3)	86.2 (11)	<0.001**	20.5
Flyer (n=54)	68 (8.7)	76.8 (10.5)	<0.001**	11.5
p	0.443*	0.000*		0.014*

Source: author's calculating using SPSS, 2022

Notes: SD=Standard Deviation; *Mann *Whitney*; **Wilcoxon

namely the senses of sight and hearing, compared to flyers, which only involve the senses of sight, thus increasing the absorption and memory of as much as 50% of the information conveyed because it is influenced by the intensity of attention and perception of objects. In addition, audio-visual media has several advantages, namely that the message conveyed is packaged attractively so that it will be easily remembered by the audience, is not limited by distance and time, and can be repeated (Maramis, 2013). In the era of the industrial revolution 4.0 towards industrial society 5.0, providing education is an easy thing to do with technology. The limited time for health workers to provide education can be helped by the existence of technology-based educational media such as animated videos and digital flyers. Even though the existence of the media does not mean that it can replace the role of health workers when providing health services, it can be a complement to health services. In addition, these educational media can be accessed by pregnant women wherever they are (Javanmardi *et al.*, 2019).

According to Phillipia, *et al.*, a person needs 18-254 days to be able to adapt to new behaviors (Lally *et al.*, 2010). Therefore, in this study, the intervention of sleep hygiene education was given for 18 days, so it is expected that pregnant women can practice sleep hygiene. This educational intervention also indirectly provides knowledge for pregnant women about insomnia, its effects, and how to prevent it. Education on sleep hygiene given early in pregnancy is expected to reduce complaints of insomnia when contacting antenatal care and to avoid and reduce unnecessary interventions so that the WHO principles of perinatal care are met, namely care for women with a normal pregnancy and birth should promote normal reproductive processes and women's inherent capabilities (Chalmers *et al.*, 2001).

This research has several limitations. During the COVID-19 pandemic, all research activities were carried out online, starting from filling out the behavior pretest questionnaire, sending animated videos and flyers, following up, and filling out the posttest behavior questionnaire. Therefore, there was a possibility of bias when filling out the pretest and posttest.

In addition, the behavior studied in this study was the result of the research subject's answers, not direct observation. During follow-up, we sometimes experienced some difficulties because some subjects were unresponsive, even though all subjects had completed well. In this study, it was not known whether the research subjects experienced sleep disturbances or insomnia because the data was not collected by the researchers. Future recommendations are necessary; likely, further studies should be conducted to learn about the effect of sleep hygiene on preventing insomnia and its impact on pregnant women. Also, another more likely method is a randomized controlled trial.

Conclusion

To prevent the adverse effects of insomnia in pregnancy, feasible preventive methods were needed for various backgrounds of pregnant women. The findings of this study showed that an animation video of sleep hygiene education enhanced the positive behavior of pregnant women to practice sleep hygiene. Sleep hygiene education is important and needed for pregnancy to prevent insomnia. Sleep hygiene education with animation video at the beginning of pregnancy is recommended and can be a complement to midwifery services during antenatal care.

Acknowledgements

We would like to thank Mr. Immanuel N. Tumore, who was willing to work together on making an animated video and sleep hygiene flyer so that this study could be carried out. We also thank all of the pregnant women who participated in this study.

References

- Armstrong, A.W., Idriss, N.Z., & Kim, R.H., 2011. Effects of Video-Based, Online Education on Behavioral and Knowledge Outcomes in Sunscreen Use: A Randomized Controlled Trial. *Patient Educ Couns*, 83, pp.273-277.
- Chalmers, B., Mangiaterra, V., & Porter, R., 2001. WHO Principles of Perinatal Care: the Essential Antenatal, Perinatal, and Postpartum Care Course. *Birth*, 28, pp.202-207.
- Chen, P.-H., Kuo, H.-Y., & Chueh, K.-H., 2010. Sleep Hygiene Education: Efficacy on Sleep

- Quality in Working Women. *Journal of Nursing Research*, 18.
- Chung, K., Lee, C., Yeung, W., & Chan, M., 2017. Sleep Hygiene Education as a Treatment of Insomnia: A Systematic Review and Meta Analysis. *Family Practice*, 35(4), pp.365–375
- Chung, K.-F., Lee, C.-T., Yeung, W.-F., Chan, M.-S., Chung, E.W.-Y., & Lin, W.-L., 2018. Sleep Hygiene Education as a Treatment of Insomnia: A Systematic Review and Meta-Analysis. *Fam Pract*, 35, pp.365–375.
- Cunningham, F.G., Leveno, K.J., Bloom, S.L., Spong, C.Y., Dashe, J.S., Hoffman, B.L., Casey, B.M., & Sheffield, J.S., 2018. *Williams Obstetrics*, 24th edition. ed. New York: McGraw-Hill Education/Medical, United States.
- Emamian, F., Khazaie, H., Okun, M.L., Tahmasian, M., & Sepehry, A.A., 2019. Link Between Insomnia and Perinatal Depressive Symptoms: A Meta-Analysis. *J Sleep Res*, 28, pp.1–11.
- Hashmi, A.M., Bhatia, Shashi K., Bhatia, Subhash K., & Khawaja, I.S., 2016. Insomnia During Pregnancy: Diagnosis and Rational Interventions. *Pak J Med Sci*, 32, pp.1030–1037.
- Javanmardi, M., Noroozi, M., Mostafavi, F., & Ashrafi-Rizi, H., 2019. Challenges to Access Health Information During Pregnancy in Iran: A Qualitative Study from the Perspective of Pregnant Women, Midwives, and Obstetricians. *Reprod Health*, 16, pp.3–9.
- Lally, P., Van Jaarsveld, C.H.M., Potts, H.W.W., Wardle, J., 2010. How are Habits Formed: Modelling Habit Formation in the Real World. *Eur J Soc Psychol*, 40, pp.998–1009.
- Letourneau, N.L., Tramonte, L., & Willms, J.D., 2013. Maternal Depression, Family Functioning and Children's Longitudinal Development. *J Pediatr Nurs*, 28, pp.223–234.
- Li, R., Zhang, J., Zhou, R., Liu, J., Dai, Z., Liu, D., Wang, Y., Zhang, H., Li, Y., & Zeng, G., 2017. Sleep Disturbances During Pregnancy are Associated with Cesarean Delivery and Preterm Birth. *Journal of Maternal-Fetal and Neonatal Medicine*, 30, pp.733–738.
- Maramis, W., 2013. *Ilmu Perilaku dalam Pelayanan Kesehatan*. Airlangga University Press, Surabaya.
- Mindell, J.A., Cook, R.A., & Nikolovski, J., 2015. Sleep Patterns and Sleep Disturbances Across Pregnancy. *Sleep Med*, 16, pp.483–488.
- Sedov, I.D., Anderson, N.J., Dhillon, A.K., & Tomfohr-Madsen, L.M., 2021. Insomnia Symptoms During Pregnancy: A Meta-Analysis. *J Sleep Res*, 30, pp.1–10.
- Shriane, A.E., Ferguson, S.A., Jay, S.M., & Vincent, G.E., 2020. Sleep Hygiene in Shift Workers: A Systematic Literature Review. *Sleep Med Rev*, 53, pp.101336.
- Sinclair, M., Lagan, B.M., Dolk, H., & McCullough, J.E.M., 2018. An Assessment of Pregnant Women's Knowledge and Use of the Internet for Medication Safety Information and Purchase. *J Adv Nurs*, 74, pp.137–147.
- Tsai, S.Y., Lin, J.W., Kuo, L.T., & Thomas, K.A., 2012. Daily Sleep and Fatigue Characteristics in Nulliparous Women During the Third Trimester of Pregnancy. *Sleep*, 35, pp.257–262.
- Tuong, W., Larsen, E.R., & Armstrong, A.W., 2014. Videos to Influence: A Systematic Review of Effectiveness of Video-Based Education in Modifying Health Behaviors. *J Behav Med*, 37, pp.218–233.
- Warland, J., Dorrian, J., Morrison, J.L., & O'Brien, L.M., 2018. Maternal Sleep During Pregnancy and Poor Fetal Outcomes: A Scoping Review of the Literature with Meta-Analysis. *Sleep Med Rev*, 41, pp.197–219.
- Zhu, C., Zeng, R., Zhang, W., Evans, R., & He, R., 2019. Pregnancy-Related Information Seeking and Sharing in the Social Media Era Among Expectant Mothers: Qualitative Study. *J Med Internet Res*, 21, pp.e13694.