JPPIPA 11(3) (2025)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Effectiveness of Providing Complex Food and Formula Milk on the Growth and Development of Children Aged 12-24 Months in 2024

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Received: November 12, 2024
Revised: January 29, 2025
Accepted: March 25, 2025
Published: March 31, 2025

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DOI: 10.29303/jppipa.v11i3.10524

Abstract: World health organization predicts there is around 149.2 million children under 5 year old who experienced disturbance growth and development consequence lack intake nutrition during transition between exclusive breastfeeding , so need adequate understanding and intake moment giving food breast milk companion. This study aims to analyze the effectiveness of complementary feeding (MPASI) and formula milk on the growth and development of children aged 12-24 months. A quasi-experimental design was employed with 208 respondents divided into intervention and control groups. Data were collected using structured questionnaires, observation sheets, and the Pre-Screening Developmental Questionnaire (KPSP) to assess child development. Statistical analysis was conducted using chi-square tests and logistic regression with SPSS software. The results indicated a significant relationship between the type of complementary feeding provided and weight gain as well as developmental score improvement ($p<0.05$). Respondents who received high-protein and micronutrient-rich MPASI exhibited better weight gain compared to the control group. Additionally, children in the intervention group demonstrated a significant increase in KPSP scores, reflecting better developmental progress. In conclusion, providing varied complementary feeding along with formula milk significantly contributes to enhancing the growth and development of children aged 12-24 months. Therefore, parents and healthcare providers should ensure appropriate complementary feeding practices to prevent nutritional deficiencies and stunting in children.

Keywords: Child development; Child growth; Complementary feeding; Formula milk; 12-24 months

Introduction

The growth and development of children during the growth and development of children during infancy and toddlerhood are critical periods that determine their future health, cognitive abilities, and overall well-being. Adequate nutrition during this stage plays a fundamental role in ensuring optimal physical, mental, and behavioral development. However, malnutrition and stunting remain significant global challenges, particularly in developing countries like Indonesia, where socioeconomic disparities, limited access to nutritious food, and inadequate parental knowledge about proper infant feeding practices contribute to the problem (World Health Organization, 2021).

According to the WHO (2021), approximately 149.2 million children under the age of five suffered from growth and developmental disturbances due to

How to Cite:
Anita, N., Lestari, R. I., Suryana, R., Sobah, N., Munasaroh, S., Anis, S., … Kurniati, R. (2025). Effectiveness of Providing Complex Food and Formula Milk on the Growth and Development of Children Aged 12-24 Months in 2024. *Jurnal Penelitian Pendidikan IPA*, *11*(3), 777-786. https://doi.org/10.29303/jppipa.v11i3.10524

inadequate nutritional intake. Stunting, characterized by impaired linear growth due to chronic malnutrition, is a key indicator of nutritional deficiencies and is associated with increased risks of morbidity, mortality, cognitive impairment, and reduced economic productivity in adulthood (Lind et al., 2018). Children who experience stunting in early c hildhood are more likely to have lower school performance, reduced learning capacity, and a higher likelihood of chronic diseases later in life, making early nutritional interventions critical (Rossen et al., 2016).

In Indonesia, despite ongoing efforts to reduce stunting prevalence, it remains a major public health concern. The Indonesian Nutritional Status Survey (SSGI) reported a decline in stunting prevalence from 24.4% in 2021 to 21.6% in 2022 (Dahrianti et al., 2024). However, this progress has not been uniform across regions. For instance, in Banten Province, stunting prevalence initially decreased from 24.5% in 2022 to 20.0%, but it increased again to 24.0% in 2023 (Dewi et al., 2022). This fluctuation suggests that current interventions may be insufficient or inconsistently implemented, necessitating a more comprehensive approach to improving child nutrition.

One of the primary causes of stunting and malnutrition is the suboptimal introduction of complementary feeding (MPASI). Many parents, particularly in rural and low-income areas, lack awareness of the importance of providing nutritionally balanced, safe, and varied complementary feeding after the exclusive breastfeeding period. WHO (2024) emphasizes that proper MPASI practices, including dietary diversity and appropriate nutrient intake, are essential for optimal child growth and development. Studies indicate that children who receive high-protein and micronutrient-rich MPASI exhibit better physical growth and cognitive development compared to those with inadequate complementary feeding practices (Mirania et al., 2021). Additionally, for children who do not receive sufficient breast milk, formula milk can serve as an alternative or supplementary nutritional source, ensuring they receive essential nutrients necessary for growth and development (Chong et al., 2022).

Given the persistent high prevalence of stunting and malnutrition, there is an urgent need to evaluate the effectiveness of MPASI and formula milk in supporting child growth and development. This study aims to analyze the impact of varied MPASI and formula milk on weight gain and developmental progress in children aged 12-24 months. By identifying which feeding practices contribute most significantly to improved growth outcomes, this research will provide valuable evidence-based recommendations for healthcare providers, policymakers, and parents. Strengthening nutritional strategies through better MPASI and formula milk interventions can play a crucial role in reducing childhood malnutrition, supporting early childhood development, and ultimately enhancing Indonesia's human capital in the long term (Hidayah et al., 2022; Ishak et al., 2024).

Method

Research Design

Design study this is quasi experimental that is method research conductedwithout randomization, but involving placement participants to in group. Research This used for test hypothesis or evaluate effect provision of complementary feeding and formula milk on variables dependent. Research design this is a two group pre-posttest design. In design This Respondent shared become two group, namely group intervention and group control in the form of giving baby biscuits.

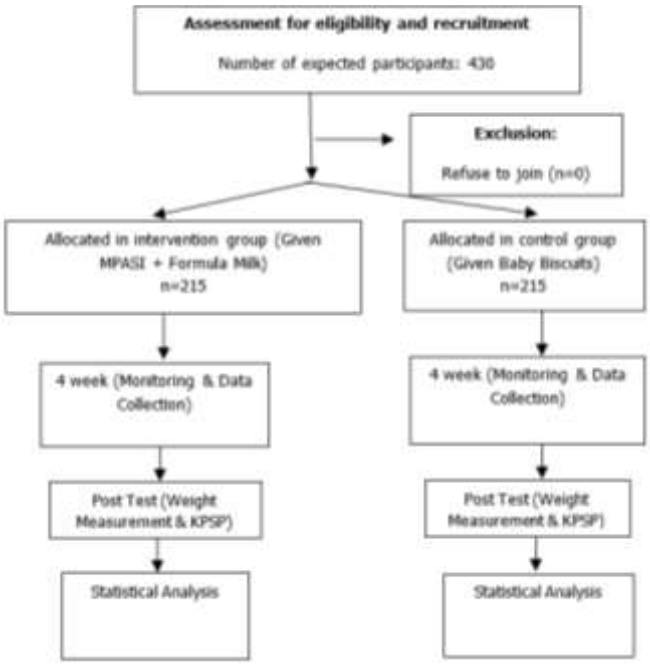

Figure 1. Flow chart

Population and Sample

Population in the study This is All mothers who have 12-24 month old babies in 8 locations research in Banten Province as many as 430. Research location among others: Clinic Mother Aya Lebak, Banten. PMB Midwife Fathiyah, BPM Bd. Putri Sulistyoningrum, UPT Health Center Thank you Regency Serang, Clinic akmarjaya Azmi Medika Serang City, PMB Renna Anthika Nuraena, PMB Resti Hanriati S.Keb, Bdn, and BPM Yeni Yunengsih, S.Tr.Keb, bd. research this conducted on November 11 to December 15 , 2024.

Instrument Study

Instruments can in the form of questionnaires, interviews, observations, or combination from several data collection methods (Sarie, 2024). Questionnaire structured used for get demographic data respondents. Development child rated use Questionnaire Development Pre-Screening (KPSP), tool screening development common standards used in Indonesia for child age 12-24 months. Growth data rated with weigh child's weight and enter in the master data table.

Result and Discussion

Based on the table, it can be seen that as many as 35 (100%) respondents at SMPN Usilimo, the majority were female students, namely 18 (51.4%) respondents and male students, namely 17 (48.6%) respondents with the highest quality of student sleep, namely Rather Bad, namely 23 (65.7%) respondents and 12 (34.3%) respondents, Quite Good. As many as 33 (100%) respondents at SMP Yapis Wamena, the most were male students, namely 17 (51.5%) respondents and female students as many as 16 (48.5%) respondents with the most students' sleep quality being Rather Bad as many as 21 (63.6%) respondents and 12 (36.4%) respondents Quite Good. Meanwhile, as many as 33 (100%) respondents at Sogokmo Adventist Middle School, the majority were male students, namely 21 (63.6%) respondents and female students, namely 12 (36.4%) respondents, with the most students' sleep quality being Fairly Good, namely 20 (60.6%) respondents and 13 (39.4%) respondents being Rather Bad.

Based on the table, it can be seen that of the 18 (100%) respondents at SMPN Usilimo, before being given SEFT therapy, the majority of students' sleep quality was Rather Poor, namely 12 (66.7%) respondents, and after being given SEFT therapy, 11 (61.1%) respondents had Fairly Good sleep quality. As many as 16 (100%) at SMP Yapis Wamena, before being given SEFT therapy, the most had rather poor sleep quality, namely 10 (62.5%) respondents and after being given SEFT therapy, there were 11 (68.8%) respondents with fairly good sleep quality. Meanwhile, as many as 16 (100%) at Sogokmo Adventist Middle School , before being given SEFT therapy, the most had Fairly Good sleep quality, namely 10 (62.5%) respondents and after being given SEFT therapy, as many as 13 (81.3%) respondents had Fairly Good sleep quality.

Based on the table, it can be seen that as many as 17 (100%) respondents from SMPN Usilimo, before being given 3Hz frequency therapy Most students had rather poor sleep quality, namely 11 (64.7%) respondents, and after being given 3Hz frequency therapy, 16 (94.1%) respondents had very good sleep quality.

A total of 17 (100%) respondents at Yapis Middle School, Wamena, before being given 3Hz frequency therapy Most students had rather poor sleep quality, namely 11 (64.7%) respondents, and after being given 3Hz frequency therapy, 15 (88.2%) respondents had very good sleep quality. Meanwhile, as many as 17 (100%) at Sogokmo Adventist Middle School , before being given 3Hz frequency therapy Most students had fairly good sleep quality, namely 10 (58.8%) respondents and after being given 3Hz frequency therapy, 16 (94.1%) respondents had very good sleep quality

Table 1. Crosstab Test of Provision of MPASI on Growth

				Category_BB Gain		Total
				No There is BB increase	There is a BB Increase	
MPASI	Carrots and Milk	Control	Count	6	7	13
			% of Total	2.8 %	3.45 %	6.25 %
		Intervention	Count	5	8	13
			% of Total	2.4 %	3.84 %	6.25 %
	Fish or Shrimp and Milk	Control	Count	2	11	13
			% of Total	0.96 %	5.29 %	6.25 %
		Intervention	Count	0	13	13
			% of Total	0%	6.25 %	6.25 %
	Spinach and Milk	Control	Count	2	11	13
			% of Total	0.96%	5.29%	6.25 %
		Intervention	Count	2	11	13
			% of Total	0.96%	5.29%	6.25 %
	Meat (Chicken) and Milk	Control	Count	4	9	13
			% of Total	1.92%	4.33%	6.25 %
		Intervention	Count	8	5	13
			% of Total	3.85 %	2.4 %	6.25 %
	Soybeans (Tempeh) and Milk	Control	Count	9	4	13
			% of Total	4.33 %	1.92 %	6.25 %
		Intervention	Count	0	13	13

				Category_BB Gain	Total
			No There is BB increase	There is a BB Increase	
	Broccoli and Milk	Control	% of Total	0%	6.25 %	6.25 %
			Count	2	11	13
		Intervention	% of Total	0.96%	5.29%	6.25 %
			Count	2	11	13
	Chayote and Milk	Control	% of Total	0.96%	5.29%	6.25 %
			Count	0	13	13
		Intervention	% of Total	0%	6.25 %	6.25 %
			Count	2	11	13
	Pumpkin and Milk	Control	% of Total	0.96%	5.29%	6.25 %
			Count	0	13	13
		Intervention	% of Total	0%	6.25 %	6.25 %
			Count	2	11	13
Total		Control	% of Total	0.96%	5.29%	6.25 %
			Count	25	79	104
		Intervention	% of Total	12.01%	37.99%	50%
			Count	21	83	104
			% of Total	10.1%	39.9 %	50%

Results from Table 2 shows data on provision of MPASI (Food) breast milk substitute with various combination food, seen variation in improvement child's weight. Of the 26 infants in the group given milk carrot and its control, 15 children (7.2% of the total) showed improvement weight, while 11 infants (5.3% of the total) did not experience improvement weight. In the group combination of milk fish and its control, from 26 children, almost all over child experience increase weight, namely 24 children (11.5%) and only 2 children (1.0%) who did not experience increase weight . This result was also the same in the control group pumpkin milk siam and its control.

In the group combination pumpkin yellow and its control, of 26 children, the majority child experience increase weight, namely 22 children (10.6% of the total) and only 4 children (1.9%) were not experience increase weight, same results were also shown by the milk broccoli MPASI group and the control, as well group Spinach and milk. Combination soybeans (tempeh), milk and its control show that Of the 26 children, 9 children (4.3% of the total) did not experience improvement weight and 17 children (8.2% of the total) had experience improvement minimum weight 10 grams from previously. Research results show group with amount the child who did not gain the most weight found in the group meat, milk and its control namely 12 children or 5.8%.

From results this, looks that certain types of MPASI, such as fish And milk as well as pumpkin Siam And milk tend more Lots associated with improvement heavy body child, while types of MPASI such as meat And milk as well as carrot And milk more Lots associated with child Which No experience improvement heavy body.

Table 3 shows that the Pearson Chi-Square and Likelihood Ratio tests produce mark statistics that are almost the same, namely around 24.7, with degrees freedom as many as 7. These two tests also showed mark significance asymptotic (2- sided) or p value of 0.001 < 0.05 consecutively. Significance value This show that there is significant relationship between giving various types of MPASI and milk for growth child age 12-24 months.

Table 2. Chi-Square Test of Provision of MPASI for Growth

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24,700 [a]	7	.001
Likelihood Ratio	24,690	7	.001
Linear-by-Linear Association	3.471	1	.062
N of Valid Cases	208		

Table 3. Distribution Average Development (KPSP Score) between Group Control and Intervention

Group		Statistics	Std. Error
Control	Mean	8.36	.151
	Median	9.00	
	Std. Deviation	1,545	
	Minimum	6	
	Maximum	10	
Intervention	Mean	8.51	.116
	Median	8.50	
	Std. Deviation	1.182	
	Minimum	6	
	Maximum	10	

Research result show almost all over respondent experiencing appropriate development with his age. However own different KPSP scores. Linear regression test will show association between providing complementary feeding to Child Development. Through analysis this, can understood how variation in food

breast milk supplement can influence score development child.

Based on results analysis can see difference average score development where group intervention 8.51 a little more tall compared to group control 8.36 however thus mark maximum score development and minimum between second group still The same that is minimum 6 and maximum 10 (table 3).

Based on results analysis obtained mark standard coefficient regression is 0.63 which interprets that giving various MP ASI and milk variants are capable increase score development 0.6 points compared to with group control . The p value (sig) results show p value < 0.001. So that can withdraw conclusion that giving various MP ASI and milk variants are capable increase development child age 12-24 months in a way significant.

Table 4. Analysis Linear Regression Relationship Providing Complementary Feeding and Milk to Development

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8,564	.174		49,198	.000
	Group intervention	.038	.042	.630	.902	

Discussion

The Effect of SEFT Therapy on Improving Sleep Quality in Adolescents with Insomnia

The results of this study showed that adolescents who underwent SEFT therapy demonstrated significant improvement in their sleep quality. Based on statistical analysis, the p-value < 0.05 indicates that SEFT therapy has a positive effect on improving the sleep quality of adolescents with insomnia. SEFT is a technique that combines emotional management with the stimulation of energy points on the body (Ningtyas et al., 2022). This therapy is grounded in the theory that emotional disturbances, such as stress, anxiety, or trauma, can disrupt the body's energy balance, which is directly related to sleep quality. Through the process of tapping on certain points (such as meridian points in acupuncture), SEFT aims to reduce emotional tension, which often leads to sleep disturbances (Anggraini et al., 2021).

In the context of adolescents, stress and anxiety are often the primary contributors to insomnia. SEFT therapy targets emotional and psychological stress management and has been shown to be effective in reducing anxiety levels, which allows the body to enter a deeper state of relaxation, facilitating better sleep quality (Sahu et al., 2022). A study by Siregar et al. (2023) indicated that adolescents who underwent SEFT therapy showed significant reductions in anxiety and improved sleep patterns. These findings support the notion that by alleviating emotional stress, SEFT promotes calmer and more restorative sleep.

Prior research has also highlighted the impact of stress and anxiety on insomnia in adolescents. SEFT therapy addresses these underlying emotional issues, which often contribute to insomnia, by identifying and processing distressing thoughts or feelings and stimulating body relaxation. Studies have demonstrated that by reducing anxiety and emotional tension, adolescents can fall asleep more easily and maintain better sleep quality (Anggraini et al., 2021). This aligns with findings from Ramadina et al. (2022), which showed that SEFT therapy significantly improved the quality of sleep in adolescents, with p = 0.000.

Research by Sari et al. (2021) using the Wilcoxon test also supports this, revealing a significant difference in sleep quality before and after the SEFT intervention (p = 0.002). These results align with Fitriana (2021), whose study used a T-test and found a significant reduction in insomnia after SEFT therapy (p = 0.000), while the control group did not show significant changes (p = 0.188). This further underscores SEFT's effectiveness in improving sleep quality by addressing emotional disturbances.

In line with the findings of Komlasari (2023) and Siregar et al. (2023), the researchers hypothesized that insomnia in adolescents in the Papua Mountains Junior High Schools might be influenced by various psychological and social factors, such as academic stress, anxiety related to personal development, and limited access to adequate mental health services. SEFT therapy, which combines tapping techniques on meridian points to relieve emotional stress, was assumed to be effective in helping adolescents overcome anxiety and tension, which disrupt their sleep patterns. In addition, the researchers assumed that adolescents in the Papua Mountains would be receptive to SEFT because it can be adapted to local, holistic, and spiritual values and does not require complex medical equipment, making it more acceptable in communities with limited healthcare infrastructure.

Furthermore, social support plays a crucial role in the success of SEFT therapy. Family and community support are vital in enhancing the effectiveness of SEFT, as social factors significantly influence adolescents' emotional well-being. Studies such as Anggraini et al. (2021) have highlighted the importance of environmental factors in the effectiveness of therapeutic interventions, showing that strong family support increases the likelihood of better emotional and

psychological outcomes for adolescents undergoing SEFT therapy.

These findings are also corroborated by research conducted by Komlasari (2023), who found that adolescents who received emotional support from their families and communities showed greater improvements in stress management and sleep quality following SEFT therapy. This suggests that, in regions like Papua Pegunungan, where access to medical resources is limited, SEFT therapy, supported by the community's involvement, could serve as an accessible and culturally appropriate method for improving adolescent well-being and sleep quality.

In conclusion, the integration of findings from previous studies supports the effectiveness of SEFT therapy in improving the sleep quality of adolescents with insomnia, especially in areas with limited healthcare infrastructure. It demonstrates the importance of emotional well-being, stress management, and community support in addressing adolescent sleep disorders. This therapy presents a viable, holistic approach to improving sleep quality, particularly in regions with unique cultural and social dynamics.

The Effect of 3 Hz Frequency Therapy on Improving Sleep Quality in Adolescents with Insomnia

The results of this study showed that after being given 3 Hz frequency therapy, the sleep quality of adolescents with insomnia significantly improved. Most adolescents reported feeling fresher and more energetic upon waking up, indicating an overall improvement in sleep quality. Additionally, statistical analysis showed that 3 Hz frequency therapy had a significant impact on adolescents' sleep quality, with a p-value < 0.05, indicating that the observed changes were not accidental. This suggests that 3 Hz frequency therapy has a strong positive effect on sleep disorders in adolescents.

3 Hz frequency therapy is a type of therapy that uses brain wave stimulation with delta frequencies, which are typically associated with deep and restorative sleep stages. Delta waves (0.5-4 Hz) are the dominant brain waves during deep sleep, a phase essential for physical and mental recovery (Siregar et al., 2023). By stimulating delta wave activity, 3 Hz frequency therapy can promote deeper, more relaxing sleep, improve sleep patterns, speed up the sleep process, reduce sleep disorders such as insomnia, and increase feelings of freshness upon waking up (Wirastri et al., 2022).

In this study, a frequency of 3 Hz was used to regulate the brain waves of adolescents who tend to experience instability due to anxiety or stress. This therapy works by stimulating neurons in the brain to produce delta waves, which help to increase relaxation and reduce anxiety, thus assisting adolescents in falling asleep faster and sleeping more soundly (Fitriana, 2021). This finding underscores that 3 Hz frequency therapy can be an effective solution for adolescents experiencing insomnia caused by emotional disturbances or anxiety.

Previous studies have shown that brainwave stimulation with certain frequencies can influence sleep quality, improve sleep regulation, and reduce sleep disorders like insomnia. For example, a study by Setyawan et al. (2022) titled "The Effect of Reading the Qur'an on Sleep Quality in Adolescents" demonstrated how therapy using Qur'anic recitation (Surah Al-Mulk), which involves sound frequencies similar to 3 Hz, positively affected sleep quality. The results, measured using the Pittsburgh Sleep Quality Index (PSQI), showed a significant improvement in sleep with a p-value < 0.001.

Another relevant study by Wahyuni et al. (2020) used the Wilcoxon Signed Rank Test and Paired t-Test with a significance level of $p \leq 0.05$. The results showed that binaural beats sound therapy improved sleep needs in terms of both quality ($p = 0.002$) and quantity ($p = 0.000$). It was concluded that binaural beats had a significant effect on sleep quality through mechanisms such as increasing alpha brain waves, serotonin, endorphins, and melatonin, thus improving relaxation and the overall quality of sleep. Similarly, Hilalliyah et al. (2021) demonstrated the effectiveness of natural sound music therapy, with p-value = 0.000, in improving sleep quality among adolescents with insomnia.

Based on these findings, 3 Hz frequency therapy is believed to stimulate the brain to enter a deeper and more restorative sleep phase, which is crucial for physical and mental recovery in adolescents. Researchers also assume that this therapy is non-invasive and does not require complex medical equipment, making it an easily accessible and effective solution, especially in communities with limited healthcare infrastructure. With consistent application, adolescents experiencing insomnia may experience improved sleep duration, higher sleep quality, and a reduction in sleep disturbances, such as waking up in the middle of the night.

Moreover, Siregar et al. (2023) emphasized that 3 Hz frequency therapy can effectively reduce anxiety in adolescents, particularly those experiencing insomnia due to stress and emotional disturbances. This strengthens the argument that this therapy has a dual impact on both mental well-being and sleep quality. 3 Hz frequency therapy is highly beneficial for adolescents with sleep disorders induced by psychological factors, as it provides fast and clear results in improving sleep patterns and reducing anxiety.

This study supports the hypothesis that 3 Hz frequency therapy has a more direct and immediate impact on improving sleep quality in adolescents with insomnia and reducing sleep disturbances caused by anxiety or stress. As a simple, non-invasive therapy, it presents a promising solution for addressing sleep issues in adolescents, particularly in regions with limited access to medical facilities.

Comparison of the Effectiveness of SEFT Therapy with 3 Hz Frequency Therapy on Improving Sleep Quality in Adolescents with Insomnia at Papua Pegunungan Junior High School in 2024

The problem of insomnia in adolescents at junior high schools in Papua Pegunungan is a significant concern as it impacts physical, emotional, and academic health. Sleep disorders, often caused by anxiety, stress, and emotional issues, hinder adolescents' ability to sleep well, which negatively affects their productivity and well-being. In the Papua Pegunungan region, limited access to adequate medical facilities makes it crucial to find simple, safe, and accessible solutions for adolescents. SEFT (Spiritual Emotional Freedom Technique) therapy and 3 Hz frequency therapy are two interesting alternative approaches for treating insomnia. This study aims to compare the effectiveness of both therapies in improving the sleep quality of adolescents with sleep disorders (Susanti et al., 2022).

This study compared the effectiveness of the two therapies in improving the sleep quality of adolescents with insomnia at SMP Papua Pegunungan. SEFT therapy focuses more on emotional and spiritual approaches by manipulating the body's meridian points to relieve stress and anxiety, while 3 Hz frequency therapy works by stimulating the brain to produce delta waves, which are associated with deep sleep and body recovery. These two therapies use different mechanisms, but both aim to achieve similar results—improving sleep quality (Siregar et al., 2023).

Based on existing theories, SEFT therapy may be more suitable for adolescents who experience insomnia due to severe emotional or psychological factors, such as deep anxiety, as SEFT helps lead to emotional healing. In contrast, 3 Hz frequency therapy has a more physiological approach, directly affecting the brain to improve sleep patterns by increasing the duration and quality of deep sleep, which is crucial for the recovery of the adolescent body (Fitriana, 2021). This aligns with findings by Wirastri et al. (2022), who reported that 3 Hz therapy significantly enhanced the relaxation response and deep sleep phases, improving overall sleep quality in adolescents.

Both therapies had a positive impact on improving the sleep quality of adolescents with insomnia, although they operated through different mechanisms. Adolescents who received SEFT therapy showed significant improvements in reducing anxiety and stress, which in turn led to better sleep. However, some adolescents required more time to feel significant changes due to SEFT's focus on deeper emotional processing. Sari et al. (2021) reported that while SEFT improved sleep quality, the effect was gradual, as the therapy works to address deep emotional issues, making the process slower. Meanwhile, adolescents who underwent 3 Hz frequency therapy showed rapid and clear improvements in sleep quality, especially in sleep duration and the time it took to fall asleep. They reported feeling more refreshed after sleep, indicating that this therapy was successful in improving sleep quality in a relatively short time. This finding is consistent with Siregar et al. (2023), who observed that 3 Hz therapy significantly shortened sleep onset latency and improved sleep efficiency.

Both SEFT therapy and 3 Hz frequency therapy are effective in improving the sleep quality of adolescents with insomnia at SMP Papua Pegunungan. SEFT therapy may be more effective for adolescents dealing with deep emotional issues and requiring a more holistic approach, whereas 3 Hz frequency therapy provides faster results in terms of better sleep duration and quality. This study suggests that both therapies can be complementary, depending on the individual needs of adolescents with insomnia, as well as the psychological and physiological factors underlying their sleep disorders.

Previous studies also support the hypothesis that 3 Hz frequency therapy can provide more immediate results compared to SEFT. Setyawan et al. (2022) found that binaural beats, which are similar to the effects of 3 Hz frequency therapy, were highly effective in improving sleep in adolescents by enhancing the delta wave activity in the brain. Similarly, Wahyuni et al. (2020) reported that binaural beats increased deep sleep and overall sleep satisfaction ($p = 0.002$ for quality, $p = 0.000$ for quantity). These findings highlight that therapies utilizing brain wave stimulation such as 3 Hz therapy provide quick and effective improvements in sleep, as opposed to therapies like SEFT, which may require more time due to their focus on emotional processing and stress management.

Researchers assume that 3 Hz frequency therapy is more dominant in providing faster and more significant results because it directly stimulates delta brain waves, which play a central role in regulating sleep cycles and enhancing sleep depth. This therapy is expected to be more effective in improving the quality of sleep by increasing sleep duration and reducing sleep disturbances, such as waking up in the middle of the night. While SEFT therapy can address emotional factors

such as anxiety and stress, which also affect sleep, 3 Hz frequency therapy is considered more direct and faster in providing a positive impact on sleep quality in adolescents with insomnia.

Factors Influencing the Success of Both Therapies in Improving Sleep Quality in Adolescents with Insomnia

This study aims to evaluate the success of SEFT therapy and 3 Hz frequency therapy in improving the sleep quality of adolescents with insomnia at SMP Papua Pegunungan. The success of both therapies is influenced by various factors, including individual characteristics of the adolescents, the therapy methods themselves, and the social environment.

Psychological factors, such as anxiety levels, stress, and other emotional issues, play a major role in determining the effectiveness of therapy, especially for SEFT therapy. Adolescents who have high levels of anxiety or stress are more likely to respond positively to SEFT therapy, which is specifically designed to address emotional and psychological disorders. SEFT focuses on emotional healing through tapping techniques on the body's meridian points, which can help relieve anxiety and tension. Research by Siregar et al. (2023) confirmed that SEFT is particularly effective in addressing anxiety, as it helps to balance the emotional state of adolescents, which in turn improves their sleep quality. In contrast, 3 Hz frequency therapy may be more effective for adolescents who experience insomnia due to physiological disorders or poor sleep patterns because this therapy works directly by stimulating delta brain waves, which physically influence sleep quality (Sari et al., 2021). Fitriana (2021) further explained that 3 Hz frequency therapy stimulates the brain's deeper sleep phases, enhancing sleep quality by regulating the natural sleep cycles and improving the depth of sleep.

Gadget use is another crucial factor influencing the success of both therapies in improving sleep quality in adolescents. The use of gadgets, especially smartphones, can disrupt sleep patterns by emitting blue light from the screen, which suppresses melatonin production—a hormone responsible for regulating sleep. Dianah et al. (2024) found that excessive use of digital devices before bed increases anxiety and mental tension, exacerbating insomnia symptoms. As Komlasari (2023) noted, the overuse of gadgets can significantly reduce the effectiveness of sleep therapies, making it essential to incorporate strategies to reduce dependency on gadgets, such as limiting screen time before bed and encouraging more relaxing activities, such as reading or meditation. Anggraini et al. (2021) also highlighted the importance of managing gadget usage to improve the overall therapeutic process.

Duration and consistency in undergoingtherapy are also very important to achieve optimal results. Both therapies require time to show their effects. 3 Hz frequency therapy can provide faster results in terms of sleep quality because delta brain waves work directly to increase sleep depth. However, its long-term effectiveness also depends on consistent application. Pratiwi et al. (2023) found that consistency in applying therapies like 3 Hz is critical for adolescents to see sustained improvements in sleep patterns. Similarly, SEFT requires consistent sessions to help adolescents overcome their emotional problems gradually. Adolescents who follow therapy regularly and are disciplined are more likely to experience significant improvements in sleep quality. Research by Sari et al. (2021) supports this, noting that while SEFT therapy requires time to show full benefits, adolescents who maintain consistency in the therapy sessions tend to see more substantial, long-term improvements.

Motivation and acceptance of therapy are critical to its success. Adolescents who are open and motivated to participate in therapy tend to experience greater benefits than those who are less interested or skeptical of the methods used. Luneta et al. (2022) found that motivation is a key factor in therapy success, especially when adolescents are more engaged and believe in the efficacy of the therapy. 3 Hz frequency therapy, which is more technical and involves the use of binaural sounds, may be more acceptable to adolescents who prefer simple, non-invasive methods. On the other hand, SEFT, which involves body tapping techniques and emotional processing, requires psychological readiness and openness from adolescents to respond effectively (Komalasari et al., 2024).

Social and environmental factors also play a major role in the success of both therapies. In areas like Papua Pegunungan, where access to medical facilities and health education may be limited, support from family and the surrounding environment is crucial. Adolescents who are supported by their families in undergoing therapy—whether SEFT or 3 Hz frequency—are more likely to experience significant progress. A quiet, distraction-free environment can also enhance therapy effectiveness, particularly for 3 Hz frequency therapy, which requires concentration and calmness during binaural sound sessions (Anggraini et al., 2021). Furthermore, Siregar et al. (2023) noted that social support enhances the therapeutic outcomes for adolescents, particularly in remote areas, where emotional resilience is critical for overcoming insomnia.

Individual response to therapy also plays a significant role in therapy success. Each adolescent has unique physical, psychological, and emotional characteristics, which affect how they respond to therapy. For example, adolescents with emotional stress as the primary cause of their insomnia may benefit more

from SEFT therapy, while those with insomnia related to an inability to enter deep sleep may see better results from 3 Hz frequency therapy. Wahyuni et al. (2020) suggested that personalized therapeutic interventions are essential, as adolescents with different underlying causes of insomnia respond better to therapies tailored to their specific needs.

Finally, the evaluation and continuation of therapy after the initial intervention period are also vital for success. Research shows that SEFT therapy takes time to show significant results in addressing long-term emotional problems, while 3 Hz frequency therapy can provide faster results in improving sleep quality. Continuous monitoring and periodic evaluations are necessary to assess the effectiveness of each therapy and determine whether adjustments need to be made in the approach or duration of the therapy (Fitriana, 2021).

Researchers assume that the success of SEFT therapy and 3 Hz frequency therapy in improving sleep quality in adolescents with insomnia is highly influenced by psychological, social factors, individual motivation, and consistency in undergoing therapy. While 3 Hz frequency therapy may have a faster impact on sleep quality physiologically, SEFT therapy is more effective in treating insomnia rooted in emotional and psychological factors. The key to successful therapy lies in selecting the method that best fits the adolescent's individual condition and the support provided throughout the therapy process.

Conclusion

The study found that both SEFT therapy and 3Hz frequency therapy significantly improved sleep quality in adolescents with insomnia, but 3Hz frequency therapy demonstrated higher effectiveness. Before intervention, a substantial proportion of students in all three schools had poor sleep quality, with the majority categorized as "Rather Bad" or "Fairly Poor." After intervention, those receiving SEFT therapy showed improvement, but the effect was more pronounced in the group receiving 3Hz frequency therapy, with over 90% of participants achieving "Very Good" sleep quality. Statistical analysis using the Wilcoxon test confirmed that 3Hz frequency therapy consistently produced lower p-values (<0.001) compared to SEFT therapy, indicating a stronger impact. The results suggest that while both methods can enhance sleep quality, 3Hz frequency therapy offers a more efficient solution for addressing adolescent insomnia. These findings provide valuable insights for educational and healthcare institutions in Papua Pegunungan, highlighting the importance of non-pharmacological interventions in improving adolescent well-being.

Acknowledgments
Thank you to STIKes Abdi Nusantara for funding.

Author Contributions
A.N, contributed in conceptualizing the research idea, developing the product, I., contributed in analyzing data and writing the article. R.S., contributed in writing, reviewing, and editing the article. K.A., contributed in collecting data.

Funding
This research was funded by STIKes Abdi Nusantara.

Conflicts of Interest
The authors declare that there is no conflict of interest regarding the publication of this article.

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