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Article

Effectiveness of TUI NA Aromatherapy Massage on Weight Gain in Toddlers Aged 6-59 Months

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Abstract: Feeding difficulties and inadequate nutritional intake may contribute to suboptimal weight gain in toddlers. Tui Na aromatherapy massage has been proposed as a complementary intervention to support appetite and digestive function. This study aimed to examine the difference in weight gain between toddlers receiving Tui Na aromatherapy massage and those receiving standard care. A quasi-experimental pretest–posttest design with a control group was conducted among 36 toddlers aged 6–59 months, comprising an intervention group (n=18) and a control group (n=18). The intervention group received Tui Na aromatherapy massage for 30 minutes every morning for six consecutive days, while the control group received standard care. Body weight was measured at baseline and again four weeks after the initial measurement. Within-group changes were analyzed using the Wilcoxon test, while differences in weight gain between groups were analyzed using the Mann–Whitney test. The mean weight gain was 0.417 ± 0.23 kg in the intervention group and 0.061 ± 0.25 kg in the control group. The between-group comparison showed a statistically significant difference in weight gain ($p<0.001$). Although greater weight gain was observed in the intervention group, the findings should be interpreted cautiously because toddler growth may also be influenced by nutritional intake, feeding practices, illness history, and other factors. Tui Na aromatherapy massage may therefore be considered a potential complementary approach to support toddler weight gain. Further studies with longer intervention and follow-up periods and better control of potential confounding factors are warranted.

Keywords: Aromatherapy; Toddler; Weight Loss; Tui Na Massage; Complementary Therapies

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1. Introduction

Growth issues in toddlers remain a public health challenge, particularly related to weight gain, which is an early indicator of nutritional status. Toddlers, aged 0-59 months, are highly sensitive to malnutrition, so even small disruptions in food intake can have a direct impact on growth. Children under five years of age are in a critical period for growth and development, as this is the time when rapid development determines future physical and mental abilities [1]. Growth can be monitored through weight gain and head circumference. Development is assessed based on physical, emotional, language, and thinking abilities. Age-inappropriate weight gain not only reflects current nutritional status but also indicates the risk of more serious nutritional disorders [2].

National data shows that the prevalence of malnourished toddlers aged 0-59 months in Indonesia increased from 6.4% in 2023 to 6.6% in 2024 [3]. A similar increase also occurred in Central Java Province, namely from 8.5% to 9.53% [4]. The number of malnourished toddlers in Banyumas Regency decreased from 11.52% to 11.9% in the same period [5]. This trend shows that efforts to address malnutrition in

toddlers have not achieved optimal results, especially at the primary and community health service levels.

Inadequate weight gain in toddlers can be influenced by various factors, one of which is feeding difficulty. This condition may be associated with oral motor problems that interfere with chewing, sucking, and swallowing, potentially resulting in inadequate nutritional intake and affecting growth and development. This condition is generally associated with oral motor disorders that impede chewing, sucking, and swallowing, resulting in suboptimal nutritional intake and impacting the child's growth and development [6].

Malnutrition is influenced by both direct and indirect factors. Direct factors include low nutritional intake and infectious diseases, while indirect factors include family food security, parental knowledge about feeding, access to health services, and environmental sanitation. Deficiencies in these factors can lead to weight gain that is inappropriate for a child's age. In toddlers with feeding difficulties, digestive disorders can cause food to remain in the digestive tract for longer, leading to nausea, vomiting, early satiety, and decreased appetite. Persistently reduced food intake can stunt growth and increase the risk of being underweight, wasting, and stunting [7]. Inadequate nutritional intake and recurrent infections can reduce appetite, increase energy needs, and impair nutrient absorption. Furthermore, inappropriate feeding practices and poor parental nutritional knowledge also contribute to low birth weight in toddlers [8]. Growth monitoring is important to implement using WHO standards for early detection and prevention of nutritional problems.

Signs of feeding difficulties in toddlers include difficulty chewing, sucking, or swallowing, spitting up food, taking too long to eat, playing with food, refusing to eat, aversions to various foods, and exhibiting developmentally inappropriate eating behaviors. These behaviors reflect the child's interests, desires, responses to food, and willingness to try new foods. Treatment for feeding difficulties in toddlers is often limited to providing multivitamins without identifying the underlying cause. This approach is less effective in the long term because it doesn't address the root cause [9]. Therefore, comprehensive management of feeding difficulties requires identifying the causes, improving feeding practices, educating parents, and providing appropriate interventions to support the growth and nutritional status of toddlers.

Based on a preliminary study, there were 40 children under the age of five in the RW 11 area of Wangon Village, Banyumas Regency, in January 2026. Based on the calculation of Body Weight/Age, it was found that thenutritional status with the category of severe underweight was 3 (7.5%) toddlers, underweight was 4 (10%) toddlers, risk of overweight was 1 (2.5%) toddler, overweight was 1 (2.5%) toddler, and normal was 31 (77.5%) toddlers [10].

This situation highlights the need for more targeted non-pharmacological interventions, such as massage, acupressure, and aromatherapy. One approach with potential for development is the combination of Tui Na massage and aromatherapy. The combination of Tui Na massage and aromatherapy was chosen because they work through complementary mechanisms. Tui Na massage is a modified infant massage that focuses on stimulating points associated with digestive function and appetite regulation, while aromatherapy provides relaxation and physiological stimulation that support increased appetite and weight gain [11]. The effectiveness of Tui Na massage has been reported by Trianita (2025), who showed that giving therapy for 30 minutes eight times in four weeks to toddlers aged 1-3 years increased their weight by an average of 0.35 kg, higher than the control group which only experienced an increase of 0.19 kg. These findings support Tui Na massage as a complementary therapy for toddlers with low body weight [12]. Aromatherapy has

also been shown to potentially increase appetite by stimulating the parasympathetic nervous system and the digestive tract. The volatile compounds in essential oils inhaled activate the olfactory nerves, the limbic system, and the vagus nerve, thereby increasing intestinal motility, digestive enzyme secretion, and creating a calming environment that supports eating and growth.[13]Essential oils reported to have orexigenic effects include fennel, lemongrass, ginger, lemon, orange, peppermint, basil, and lavender [14]. Tiwery's (2024) research shows that using Pure Coconut Oil (VCO) as a massage medium for six consecutive days is more effective in increasing body weight than mineral oil because it is easily absorbed, has antibacterial properties, and is safe for children's skin [15],[16]Research by Nguyen (2023) reported that fennel essential oil containing trans-anetol, fenchone, estragol, limonene, and α-pinene has carminative and orexigenic effects that can increase appetite [16].

Tui Na massage provides mechanical stimulation that improves blood circulation and digestive function. Aromatherapy activates the limbic system through the sense of smell, thereby increasing parasympathetic nervous system activity and suppressing sympathetic responses [13]. The synergy of these two mechanisms contributes to increased appetite and growth in toddlers. Research by Yanti (2021) shows that a combination of Tui Na massage and aromatherapy can improve appetite and weight gain in toddlers [17]. This finding is supported by Wulandari (2025), who reported that aromatherapy massage using a combination of lemongrass, fennel, and anise oil for 15 minutes, three times a week for four weeks, was effective in increasing the weight of toddlers aged 24–48 months if accompanied by nutritional intake according to the Nutritional Adequacy Intake (AKG) [18].

Although previous studies have reported beneficial effects of Tui Na massage on appetite and weight gain in toddlers, and other studies have examined aromatherapy as a complementary approach to support appetite and growth, most of the available evidence has evaluated these interventions separately or used different aromatherapy formulations and intervention schedules. Evidence regarding the combined use of Tui Na massage with fennel–chamomile aromatherapy specifically in toddlers remains limited. In particular, it remains unclear whether the integration of mechanical stimulation through Tui Na massage and the potential appetite- and relaxation-related effects of fennel and chamomile aromatherapy is associated with greater weight gain than standard care. This gap is particularly relevant in community-based toddler care, where simple, non-pharmacological, and complementary interventions may be considered alongside nutritional monitoring and standard health services.

The novelty of this study lies in evaluating the combined application of Tui Na massage and fennel–chamomile aromatherapy for toddler weight gain, rather than examining either Tui Na massage or aromatherapy as a separate intervention. By comparing the combined intervention with standard care in a community-based setting, this study provides additional empirical evidence regarding the potential role of an integrated complementary approach in supporting toddler weight gain.

2. Materials and Methods

This study employed a quasi-experimental pretest–posttest control group design and was conducted among toddlers aged 6–59 months in Wangon Village, RW 011, Banyumas. A total of 36 eligible toddlers participated in the study and were allocated into an intervention group (n=18) and a control group (n=18). After eligible participants were identified and informed consent was obtained from their parents or guardians, participants were allocated to the two groups using a random allocation procedure. Random allocation was used to distribute eligible participants between the

intervention and control groups, whereas the study remained quasi-experimental because participants were recruited from a predetermined community population and were not selected through random sampling from the broader population.

Baseline body weight was measured before the intervention. The intervention group received Tui Na aromatherapy massage once daily for approximately 30 minutes every morning for six consecutive days. The control group received standard care consisting of growth monitoring, nutritional care, balanced-diet education, hygiene education, and health monitoring. The post-test body weight measurement was conducted four weeks after the initial baseline measurement rather than immediately after completion of the six-day intervention. The four-week follow-up interval was used to provide sufficient time to observe changes in body weight following the short six-day intervention and to reduce the possibility that the measured change would primarily reflect immediate or short-term fluctuations in body weight. Thus, the study schedule consisted of a baseline assessment, a six-day active intervention period, and a follow-up period until the post-test assessment four weeks after baseline.

The intervention consisted of Tui Na massage combined with fennel and chamomile aromatherapy. The aromatherapy preparation was formulated using fennel (Foeniculum vulgare) and chamomile (Matricaria chamomilla) essential oils diluted in virgin coconut oil (VCO). The formulation consisted of two drops of fennel essential oil and two drops of chamomile essential oil in 100 mL of VCO, with a total essential-oil concentration of approximately 0.5%. The preparation was applied to the skin as the massage medium. The Tui Na massage was administered for approximately 30 minutes each morning for six consecutive days using the predetermined massage protocol and designated points, including ST36, CV12, ST25, BL20, BL21, SP6, CV4, and BL23. The same intervention protocol was applied to all participants in the intervention group to maintain consistency of treatment.

Safety monitoring was performed before and during the intervention. Before the first massage session, a skin patch test was conducted for 15 minutes using a hypoallergenic medical plaster to assess possible skin sensitivity or local allergic reactions to the preparation. During each massage session, participants were observed for discomfort, skin irritation, or other unexpected responses. If an unacceptable reaction occurred, the intervention was discontinued and the participant was monitored appropriately.

Potential confounding factors that could influence toddler weight gain were also considered during participant assessment and data collection. These factors included dietary intake, feeding practices, illness history, medication use, and baseline nutritional status. Relevant information regarding participant characteristics, illness history, medication use, and feeding-related characteristics was collected during the baseline assessment. Baseline body weight was measured before the intervention, and the same measurement approach was used for the follow-up assessment. However, dietary intake and feeding practices were not subjected to a standardized controlled intervention throughout the follow-up period, and illness and other health-related factors could not be completely eliminated. Therefore, these factors were considered potential confounders and were acknowledged as limitations of the study. The findings were consequently interpreted cautiously, and the observed differences in weight gain were not attributed exclusively to the Tui Na aromatherapy intervention.

Data analysis included univariate and inferential analyses. Normality tests were performed using the Shapiro–Wilk test. Differences in body weight before and after the intervention were analyzed using the Wilcoxon, while differences between

groups were analyzed using the Mann-Whitney test with a significance level of α = 0.05. This study has obtained ethical approval KEPK/UMP/79/IV/2026, and all parents of respondents signed informed consent while guaranteeing the confidentiality of respondents' data.

3. Results

The results of this study are presented to describe the characteristics of the respondents, changes in body weight before and after the intervention, and differences in weight gain between the intervention and control groups. Univariate analysis was used to describe the distribution of the data, and bivariate analysis to test the effectiveness of Tui Na aromatherapy massage on weight gain in toddlers. The results are presented in the following table.

3.1 Respondent Characteristics

Presents the distribution of respondent characteristics based on age, gender, maternal occupation, health history, picky eating habits, and poor appetite.

Table 1. Respondent Characteristics

Characteristics	Intervention Group N (%)	Control Group N (%)	Total N (%)
Age			
6–24 months	6 (33.3%)	8 (44.4%)	14 (38.9%)
25–59 months	12 (66.7%)	10 (55.6%)	22 (61.1%)
Gender			
Man	7 (38.9%0	11 (61.1%)	18 (50%)
Woman	11 (61.1%)	7 (38.9%)	18 (50%)
Mother's Duties			
Housewife	12 (66.7%)	15 (83.3%)	27 (75%)
Laborer	3 (16.7%)	1 (5.6%)	4 (11.1%)
self-employed	2 (11.1%)	2 (11.1%)	4 (11.1%)
Civil Servants/Others	1 (5.6%)	0 (0%)	1 (5.6%)
History of illness in the last 1 month			
Yes	2 (11.1%)	3 (16.7%)	5 (13.9%)
NO	16 (88.9%)	15 (83.3%)	31 (86.1%)
Picky eater			
Yes	12 (66.7%)	15 (83.3%)	27 (75%)
NO	6 (33.3%)	3 (16.7%)	9 (25%)
Loss of appetite			
Yes	14 (77.8%)	16 (88.9%)	30 (83.3%)
NO	4 (22.2%)	2 (11.1%)	6 (16.7%)

Based on Table 1. A total of 36 toddlers participated in the study, comprising 18 participants in the intervention group and 18 participants in the control group. At baseline, the mean body weight was 11.51 ± 2.39 kg in the intervention group and 12.28 ± 4.10 kg in the control group. Baseline nutritional status was considered when interpreting the findings, as baseline body weight and nutritional status may influence subsequent weight changes.

3.2 Changes in Toddler Weight Before and After Intervention

Presents a comparison of the average weight of toddlers before and after the intervention in the intervention group and the control group.

Table 2. Toddler Body Weight Before and After in the Intervention Group and Control Group

Group	F	Before (Mean ± SD)	After (Mean ± SD)	Average Difference (Δ) kg	P value
Intervention	18	11.51 ± 2.39	11.93 ± 2.32	+0.42	0.000
Control	18	12.28 ± 4.10	12.32 ± 3.96	+0.04	0.295

Based on Table 2. mean body weight in the intervention group increased from 11.51 ± 2.39 kg at baseline to 11.93 ± 2.32 kg at the four-week post-test, representing a mean increase of 0.42 kg ($p<0.001$). In the control group, mean body weight increased from 12.28 ± 4.10 kg to 12.32 ± 3.96 kg, representing a mean increase of 0.04 kg, with no statistically significant within-group change ($p = 0.295$).

3.3 Differences in Toddler Weight Gain Between Groups

An analysis was conducted to compare the amount of weight gain between the intervention and control groups after the study period. This comparison was used to assess the effectiveness of Tui Na aromatherapy massage on weight gain in toddlers.

Table 3. Weight Gain in the Intervention Group and the Control Group

Category	Min	maximum	(Mean ± SD)	P value
Intervention	0.1	1	0.417 ± 0.23	0.000
Control	-0.6	0.5	0.061 ± 0.25	

Based on Table 3 shows that the mean individual weight change was 0.417 ± 0.23 kg in the intervention group and 0.061 ± 0.25 kg in the control group. The Mann–Whitney U test showed a statistically significant difference in weight change between the two groups ($p<0.001$). These findings indicate that the distribution of weight change differed between groups; however, the observed increase in body weight should not be interpreted as evidence of clinically meaningful improvement in nutritional status without an appropriate anthropometric assessment.

3.4 Distribution of Toddler Weight Change Categories

Presents the distribution of toddlers who experienced an increase, decrease, or no change in weight after the research period.

Table 4. Characteristics of Weight Gain After Tuina Aromatherapy Massage in the Intervention Group and Control Group

Group	Weight Category			Total
	In progress N (%)	Down N (%)	Still N (%)	
Intervention	16 (88.9%)	2 (11.1%)	0 (0%)	18
Control	7 (38.9%)	9 (50%)	2 (11.1%)	18
Total	23	11	2	36

Based on Table 4, most toddlers in the intervention group experienced weight gain, namely 16 toddlers (88.9%), while 2 toddlers (11.1%) experienced weight loss and no toddlers' weight remained the same. In contrast, in the control group, only 7 toddlers (38.9%) experienced weight gain, while 9 toddlers (50.0%) experienced weight loss and 2 toddlers (11.1%) experienced no change in weight. These results indicate that the proportion of toddlers who experienced weight gain was higher in the group receiving Tuina aromatherapy massage compared to the control group.

4. Discussion

This study found a greater increase in body weight in toddlers who received Tui Na aromatherapy massage than in those who received standard care. The mean weight change was 0.417 ± 0.23 kg in the intervention group and 0.061 ± 0.25 kg in the control group, with a statistically significant between-group difference ($p<0.001$). In addition, 88.9% of participants in the intervention group experiencedan increase in body weight compared with 38.9% in the control group. These findings indicate that the intervention group showed greater weight gain during the study observation period. In line with Li (2023) who stated that Tui Na massage for six consecutive days can increase the weight of premature babies in the intervention group by 0.4 kg and the control group by 0.1 kg, in addition to minimizing the incidence of gastrointestinal bleeding, necrotizing enterocolitis, and liver dysfunction [19]. The findings of this study are in line with the research of Trianita et al. (2025) who reported that Tui Na massage for four weeks significantly increased the weight of toddlers with an average increase of 0.35 kg, higher than the control group [12]. The similarity of these results suggests that Tui Na massage is an effective complementary intervention to enhance toddler growth by improving digestive function and appetite.

However, these findings should be interpreted cautiously in relation to the intervention and measurement schedule. The active intervention was administered for six consecutive days, whereas the post-test measurement was performed four weeks after the baseline assessment. Therefore, the mean increase of 0.417 kg represents the difference between baseline and the four-week post-test measurement and should not be interpreted as weight gained exclusively during the six-day massage intervention. Toddler growth is a dynamic process that may also be influenced by normal physiological growth, dietary intake, feeding practices, illness, medication use, and baseline nutritional condition. Consequently, the present findings demonstrate a greater observed change in body weight in the intervention group but do not establish that the intervention alone was responsible for the entire increase.

The intervention used in this study combined Tui Na massage with fennel and chamomile aromatherapy. Tui Na massage provides mechanical stimulation through a predefined sequence of massage and acupressure points, whereas

aromatherapy provides an additional olfactory exposure through the use of essential oils. Previous studies have reported potential benefits of Tui Na massage for appetite or weight-related outcomes, while aromatherapy has also been investigated as a complementary approach in relation to appetite and well-being. Nevertheless, the present study was designed to evaluate the combined intervention and did not include separate Tui Na-only, fennel-only, or chamomile-only groups. Therefore, the independent contribution of each component cannot be determined from the current results. The observed difference should be interpreted as the effect associated with the integrated intervention package rather than as evidence that Tui Na, fennel, or chamomile individually produced the observed weight gain. Similarly, the study does not provide sufficient evidence to conclude that the three components produced a synergistic effect. The results of this study are also consistent with the research of Intan et al. (2022) which showed that Tui Na massage was effective in increasing body weight in toddlers aged 1-5 years who experienced weight problems and were picky eaters [2].

Children with picky eating behavior generally have low eating frequency, feel full easily, and are less interested in trying various foods, so that energy and protein intake are insufficient to meet growth needs. The age of most respondents was 25–59 months, a phase where growth occurs rapidly, physical activity increases, and eating behavior begins to be influenced by psychological factors. In line with Sunarti (2025), in the age range of 1–5 years, children often show behavior of refusing food or only liking certain types of food, so they are more susceptible to weight gain disorders [20].

Factors such as appetite fluctuations, picky eating, medical history, and inappropriate feeding practices still contribute to a child's nutritional status. This suggests that tuina massage can address nutritional issues in toddlers, such as underweight and severely underweight, by helping to improve appetite and significantly increasing weight gain. This is in line with Alamsyah (2023) who reported that underweight toddlers aged 12-60 months experienced a weight gain of 0.75 kg after receiving tuina massage [21]. Research by Sari et al. (2022) also reported that Tui Na massage is effective in increasing the weight of toddlers aged 1-3 years with poor nutritional status (underweight, thin, stunted) [7]. Complementary therapies such as Tui Na massage and aromatherapy can be considered as supporting strategies in toddler nutrition improvement programs at the community level.

The distribution of weight gain showed that 88.9% of toddlers experienced greater weight gain in the intervention group, compared to 38.9% in the control group. 9 (50%) toddlers experienced weight loss in the control group, while 2 (11.1%) remained the same. The results of this study also showed that there were still toddlers in the control group who experienced weight loss. The findings of this study are in line with the research of Anggraini et al. (2025) which stated that Tuina massage is an effective non-pharmacological complementary therapy to increase appetite and food intake in underweight toddlers, with a percentage of 84.3% [22]. In line with this, it can be concluded that growth monitoring without additional intervention alone is not sufficient to address the problem of underweight in toddlers.

The mechanism of weight gain through Tui Na massage is thought to involve activation of the vagus nerve, a key component of the parasympathetic nervous system. Mechanical stimulation of meridian points such as Zusanli (ST36), Zhongwan (CV12), Tianshu (ST25), Pishu (BL20), and Weishu (BL21) increases vagal activity, thereby accelerating gastric emptying, enhancing intestinal motility, stimulating digestive enzyme secretion, and improving nutrient absorption. Vagus nerve activation also increases the release of gastrointestinal hormones, including gastrin and insulin, which play a role in regulating energy metabolism and growth [23]. This

is in line with research from Chen et al. (2024) which reported that massage therapy in children consistently increased body weight by 455.77 grams, increased body length, improved motor and sensory development, and helped overcome digestive disorders in children under five years of age by increasing vagal activity [24]. This study shows that massage stimulation can increase gastrointestinal activity, leading to increased feeding frequency and gradual weight gain. These consistent results reinforce the idea that Tui Na massage can be used as a complementary therapy for toddlers with eating disorders.

Use of fennel-based aromatherapy oil (*Foeniculum vulgare*) is known to have carminative and orexigenic effects, while chamomile (*Matricaria chamomilla).* Aromatherapy has calming properties that can help reduce digestive discomfort. The combination of both with VCO was chosen to ensure safety for toddlers' skin, given the more sensitive skin of infants and young children. Aromatherapy works through the olfactory pathway, which is closely linked to the limbic system and hypothalamus. This aligns with research by Tiwery et al. (2024), which reported that using VCO as a massage medium resulted in greater weight gain than mineral oil [15].

Volatile compounds in inhaled essential oils stimulate olfactory receptors, which then transmit their effects to the limbic system and hypothalamus, which play a role in regulating emotions, comfort, and the hunger center. Activation of these systems increases the dominance of the parasympathetic nervous system, resulting in a state of relaxation, increased production of saliva and digestive enzymes, and optimal digestion. This relaxing effect also has the potential to reduce children's anxiety and aversion to eating, indirectly increasing the amount of food consumed [14]. According to research Nguyen et al. (2023) reported that several essential oils, including fennel and lavender,has an orexigenic effect through modulation of sympathetic-parasympathetic nervous activity, regulation Neuropeptide Y (NPY) And *Agouti-related protein* (AgRP), and footpaths CART/ POMC in the hypothalamus which plays a role in regulating appetite [16]. This finding is in line with Yanti (2021) who reported that toddlers aged 7-60 years who were given tuina massage and fennel aromatherapy for body massage twice a day experienced an increase in appetite [17]. In line with Wulandari (2025) which showed that aromatherapy massage using a combination of lemongrass, fennel, and anise oils for 15 minutes, three times a week for four weeks, was effective in increasing the weight of toddlers aged 24-48 months. Similar to insulin Growth Factor-1 (IGF-1) In malnourished toddlers, the increase in IGF-1 indicates that aromatherapy massage intervention not only increases food intake but also has the potential to increase anabolic processes that play a role in body tissue growth [18].

The previous manuscript also described changes in appetite and eating behavior based partly on parental observations, including reports of changes in meal portions, meal frequency, food variety, eating enthusiasm, and bowel movements. However, these observations were not collected using a standardized quantitative instrument and were not defined as primary or secondary outcomes in the Methods. Therefore, they cannot be used as definitive evidence of improved appetite or eating behavior. In the revised interpretation, these observations are considered contextual information that may help describe the participants' experiences but should not be used to establish a mechanism for the observed weight change. Further studies should use validated instruments or structured dietary and feeding assessments to objectively evaluate changes in appetite, feeding behavior, and nutritional intake.

The findings are broadly consistent with previous research reporting potential benefits of Tui Na massage for toddler weight-related outcomes. However,

differences in participant characteristics, intervention protocols, duration, and outcome measurement should be considered when comparing studies. In the present study, the active massage intervention was provided for six consecutive days, while the outcome was assessed after a four-week observation period. Thus, the present findings provide evidence of an observed difference in weight change over the study period but should not be directly interpreted as evidence of the immediate effect of a six-day intervention.

Several limitations should also be considered. First, the sample size was relatively small, with only 36 toddlers divided equally between the two groups, which limits statistical precision and generalizability. Second, although participants were randomly allocated to the intervention and control groups, the study remained quasi-experimental and was conducted within a predetermined community population; therefore, random allocation should not be interpreted as random sampling from the wider population. Third, the four-week interval between baseline and post-test means that the observed weight change includes the period following completion of the six-day active intervention. Fourth, dietary intake, feeding practices, illness, medication use, and baseline nutritional status were not completely controlled throughout the follow-up period and may have contributed to weight changes. Fifth, because the intervention combined Tui Na, fennel, and chamomile, the independent effects of these components could not be separated.

Taken together, the findings suggest that the combined Tui Na aromatherapy intervention was associated with greater weight gain than standard care during the study observation period. Nevertheless, the findings should be interpreted as evidence of an observed between-group difference rather than definitive proof of a causal or synergistic effect of the individual intervention components. Future research should involve larger samples, longer and clearly defined intervention and follow-up periods, standardized monitoring of dietary intake and feeding practices, objective assessment of nutritional status, and separate intervention groups to determine the independent and combined contributions of Tui Na massage, fennel aromatherapy, and chamomile aromatherapy.

5. Conclusion

In conclusion, this study observed a statistically significant difference in short-term weight change between toddlers receiving daily Tui Na aromatherapy massage for six days and those receiving standard care over a four-week observation period (0.417 kg ±0.061 kg; $p<0.001$). While these findings suggest that Tui Na aromatherapy massage may serve as a promising supportive complementary strategy for toddlers presenting with feeding difficulties, these short-term weight changes should not be interpreted as evidence of overall improvement in toddler growth trajectories or long-term nutritional status. Given the absence of extended follow-up and comprehensive safety evaluations, this combined intervention cannot be presented as an established or definitive clinical therapy. Healthcare workers may consider it an optional supportive measure alongside standard nutritional counseling. Future multi-center studies with larger sample sizes, longer intervention and follow-up durations, single-component study arms, and rigorous control over dietary intake and other growth-related confounders are required to establish long-term efficacy and safety.

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