Effect of Video-assisted, Educational Programs on Mothers Knowledge, Practice and Attitude regarding Tearless Tummy Time

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Abstract

Background: Tummy time is crucial for an infant's development; it promotes the development of the visual, motor, and sensory systems. **Aim of the study:** was to evaluate the effect of video-assisted, educational programs on mothers' knowledge, practice and attitude regarding tearless tummy time. **Subjects and Method:** Quesi experimental research design was used at four maternity and child health centers. A purposive sampling of 74 mothers with their infants under 6 months. **Tools**: tools for data collection included a tummy time assessment questionnaire, a tummy time reported practice checklist, and a maternal attitude of a wake infant prone positioning questionnaire. **Results:** Significant improvements were observed in mothers' total mean scores after the intervention, knowledge, practice, and attitude regarding tearless tummy time in infants.**Conclusion:** Implementing a video-assisted, educational program improves mothers' Knowledge, practice and attitude regarding tearless tummy time for their infants. Recommendation: Implementation of Video-assisted, Educational Programs for parents about the importance of tummy time can improve their knowledge, practice and attitude regarding tummy time.

Keywords: Attitude, knowledge, practice Mothers', Tearless Tummy time, Video-assisted

1. Introduction

Three decades have passed since it was encouraged to put infants to sleep on their backs to hopefully decrease the risk of sudden unexpected infant death (SUID). The SUID prevention campaign, also known as "back to sleep" or "safe infant sleeping," is definitely away from being questioned. However, placing infants to sleep on the back was found to be related to, but not the definite cause of, positional plagiocephaly, also referred to as non-synostotic or deformational misshapen head. The World Health Organization has recommended 30 min of tummy time on a daily basis to improve motor development **(Hewitt et al., 2020a,b)**.

Tummy time (TT) is adequately known as an activity of placing infants on their abdomen while awake, as a non-evitable physical exercise for non- or weak loco motor infants **(Lee et al., 2021)**. The wakeful prone for play or TT, not surprisingly, has been known to be crucial in plagiocephaly prevention and promoting head and neck muscle control ***(Williams and Galea, 2023)***. TT has been positively linked to the total motor development of infants, including the ability to alternate be- tween the prone or supine positions, crawling or even rolling, and also assists in decreasing dramatically the body mass index-z **(Hewitt et al., 2020a,b)**.

Comfort is a transient and temporary situational-related feeling involving several dimensions, and as expressed by patients, it incorporates many concepts more than merely the absence of painful sensation **(Wensley et al., 2020)**. Families usually feel insecure about placing their babies on their tummies for fear of them being breathless, having vigorous bouts of crying, falling asleep, or, as mentioned, causing them harm in some way **(e Silva et al., 2023)**. Infants usually do not tolerate the prone position, and so mothers may be reluctant to place their infants in the prone position. Infant in- tolerance has become a significant barrier for mothers to perform a successful tummy time. The American Academy of Pediatrics (AAP)

recommends that mothers use toys while lying down chest to chest or havesome playful interaction with their infants during tummy time. Using videos placed in front of the infant also decreases negative vocalization **(Mendres-Smith et al., 2020; AAP, 2023)**.

The educational sector is a crucial domain directing healthcare efforts toward attaining a much broader conceptualization of knowledge, practice, and policy **(Vamos et al., 2020)**. With the consecutive advancement of technology, educational methods such as role plays, clinical scenarios, video-based demonstrations, and simulations are increasingly being utilized to cultivate psychomotor skills. Video-assisted health teaching has become a helpful technology for fostering skills and self-confidence **(İsmailoğlu et al., 2020)**. Video-assisted health teaching has proven to increase participation and effectiveness more than tradi- tional educational health programs **(Zhang et al., 2024)**.

The ongoing extreme growth in health science and technology has urged the need for modern and innovative methods for the educational process. Furthermore, using a suitable variety of teaching methods can definitely enrich the opportunity for learning. Another available substitute for traditional demonstration is video-assisted education. One of the advantages of video-assisted education is the ability to hear the broadcaster's voice clearly. Also, the appealing nature of figures, illustrations, pictures, and movements potentiates the optimal use for a better educational outcome **(Devi et al., 2019)**.

Significance of the Study:

In the first months of life, infants learn about the movement of their bodies and develop the physical skills required for rolling over, sitting, and crawling. Infants learn to respond and adapt to challenges. For this reason, they need the opportunity to play on their tummies during waking hours and to spend limited time in an infant seat or carrier, swing, or other restrictive devices that inhibit free movement **(Williams and Galea, 2023)**. The success of the “Back to Sleep” famous

campaign has led to a dramatic decline in the number of infants subjected to SUID. However, there was an unfortunate increase in the cases suffering from positional plagiocephaly (PP) in infants due to sleeping on their backs. The prevalence of PP has significantly increased from nearly 5% to upward of 46% at 7 months of age. Consequently, many infants were presented with abnormalities in their head shapes **(Santiago et al., 2023)**. Thus, tummy time is an important activity and should be part of the infant's daily routine. Hence, the mother's performance regarding tummy time must be considered and improved.

The Aim of the study:

The study aimed to evaluate the effect of a video-assisted, educational program on mothers' knowledge, practice and attitude regarding tearless tummy time

Research hypothesis:

H1. Implementing A video-assisted, educational program is expected to enhance mothers' knowledge and practice regarding tearless tummy time.

H2. Implementing A video-assisted, educational program is expected to positive attitude of mothers regarding tearless tummy time.

2. Subject and Method

Research design:

A quasi experimental research design was used

Setting of the study:

The study was conducted at four Maternity and Child Health (MCH) centers of Ismailia governorate in Egypt.

Sampling size and technique:

A purposive sampling of 74 mothers with their infants aged less than 6 months, excluding infants suffering from any type of physical, mental, or/and medical disabling condition. The required sample size was calculated according to the following equation (Dawson and Trapp, 2004): Where: n = sample size, Z $\alpha/2$ = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail), Zβ = 0.84 (The critical value that separates the lower 20% of the Z

Distribution from the upper 80%), p1 =

proportion post-intervention (0.17), p2 = proportion pre-intervention (0.03), q = 1-P. The initial sample size was calculated as n = 67; however, accounting for a 10% dropout rate, the required sample size increased to 74.

Tools of data collection:

Tree tools were used for data collection to carry out this study, which included:

Tool I: Participants datasheet. This sheet was used to collect the participants' socio-demographic data, including age, educational level, employment status, and place of residence.

Tool II: a tummy time assessment questionnaire. The researchers developed this tool based on Morea and Jessel (2020), AAP (2023), and e Silva et al. (2023) to assess mothers' knowledge regarding tummy time, covering key aspects such as the definition, timing, benefits, positions, steps, and ways to decrease discomfort during tummy time. It contained a set of 15 multiple-choice questions, scored as one for each correct answer and zero for the incorrect answer. The final score ranged from 0 to 15, with zero being the lowest and 15 being the highest.

Tool III: A tummy time reported practice checklist. This checklist, adapted from Moon et al., (2016) and the American Academy of Pediatrics (AAP, 2023), incorporates the latest updates on tummy time techniques and was used to evaluate mothers' reported practices in positioning their infants during tummy time. It consisted of 11 items, and the score ranged from one for done correctly, zero for done incorrectly or not done. The overall reported practice checklist score was 11 points.

Tool IV: M others attitudes of awake infant prone positioning questionnaire This tool was adopted from Ricard & Metz (2014) to assess maternal attitudes about tummy time in healthy infants. It is a ten-item Likert scale, with responses recorded on a 5-point scale where one indicates strongly disagree, five indicates strongly agree, and 3 indicates neutral. The scoring is reversed for items numbered 1 to 6.

Validity and reliability of tools:

A panel of five experts reviewed the study tool and the video- assisted educational program to evaluate their content validity. The questionnaire was assessed for relevance

and accuracy and was determined to be clear, relevant, and easy to comprehend. The maternal attitudes toward awake infant prone positioning questionnaire demonstrated good internal consistency, with a Cronbach's alpha of 0.835. Additionally, a panel of experts in pediatrics, community health, and medical-surgical nursing academic staff reviewed the video, and modifications were made based on their recommendations.

Data collection

After obtaining the needed approval from the ethics committee at the faculty and the MCH centers' managers, the researchers explained to the mothers the aim of the study, assured them that the participation was voluntary, and allowed them time to ask any questions or seek clar- ification. A copy of the consent letter was given to each participant inthe study. The researcher conducted a pilot study with eight mothers, representing 10% of the sample size, to test the validity and clarity of the tools. Necessary changes were made, and these mothers were excluded from the final sample to avoid duplication. Completing the tummy time assessment questionnaire took 4–6 min, the reported practice checklist 6–8 min, the illustrative video 25 min, and the maternal attitudes questionnaire about 5 min. The program was applied through the following phases.

Assessment phase

Data were collected from mid-May 2024 to late June 2024. First, the researchers performed a needs assessment to assess the mothers' knowledge of tummy time and practices to make it more comfortable for their infants. This data was of great importance during the program implementation. A tummy time assessment questionnaire, tummy time re- ported practice checklist, and the maternal attitudes of a wake infant prone positioning questionnaire (pre-test) were completed by all 74 mothers.

Implementation phase

This phase started from the early to the late of July 2024. The re- searchers designed, recorded, and photographed an illustrative video on tummy time, which included both theoretical and practical parts. The content was developed based on guidelines from the American Academy of Pediatrics, including

"Three Tummy Time Activities to Try with Your Baby" AAP (2022) and updated recommendations from "Back to Sleep, Tummy to Play" AAP (2023) as illustrated in (Table 1). The video aimed to provide infants' mothers with a comprehensive understanding of tummy time and practices to ensure tearless tummy time. The video was created using the following steps:

The first step involved defining the aim and objectives of the video- assisted program. The aim was to enhance mothers' performance in achieving tearless tummy time through objectives such as defining tummy time, identifying the right time to start, illustrating its benefits, explaining baby positions during tummy time, detailing the steps involved, and discussing methods to ensure a tearless experience.

The second step focused on gathering the necessary equipment, all of which were available in the faculty clinical lab. These included a baby doll/manikin, an adult female doll/manikin, a bed, bed sheets, rolled towels, chairs, blankets, rubber toys, and commercial pillows. The video was recorded using a handheld camera, chosen for its ease of use and portability.

The third step involved preparing scripts for the practical part of the video, which was done, written, and revised by the researchers before making the final video. This part included the preparations for tummy time (infant, mother, and environmental preparation), the positions assumed during tummy time, and examples of activities that can be used to decrease the infants' discomfort during tummy time.

The fourth step involved filming the video using a basic video- modeling type by recording one of the researchers demonstrating the practical part of targeting procedures or activities of tearless tummy time, with the video being available to view many times by the mothers (Abd Aziz et al., 2021). The theoretical part involved another re- searcher explaining the theoretical background related to tummy time to ensure that the cues of information were consistent when repeated. Voiceovers were added to the video, including the narration of the steps to enhance the mothers' comprehension. The video was edited 4 times to remove any errors or modify unclear scenes until it was

satisfactory in quality and accurately illustrated the required theoretical and practical parts.

Finally, arranging a quiet and suitable environment, such as a mother class in each MCH center, posed challenges, but the researchers successfully managed to complete this step.

The researchers met with mothers from 10:00 a.m. to 2:00 p.m. at four MCH centers. The video, shown to groups of 4–6 mothers, lasted 25 min: 8 min on the theory of tummy time and 17 min on demonstrating correct positions and discomfort-reducing strategies.

Evaluation phase

Just after the end of the training program sessions, mothers' knowledge, practice and attitudes regarding the tearless tummy time were assessed using the same tools of the pre-test. In addition, the researchers provided simplified Arabic handouts that they had developed regarding tearless tummy time, to enhance the mothers' performance and ensure the availability of another source of information to get back to when needed.

Administrative design:

An official approval letter was obtained from the Dean of the Faculty of Nursing, Suez Canal University, and sent to the Directorate of Education. From there, it was forwarded to the director of Maternity and Child Health (MCH) centers of Ismailia. The letter granted permission to conduct the study.

Statistical Analysis:

Data entry and data analysis were done using SPSS version 22 (Statistical Package for Social Science) and Excel 2016 program. Data were presented as number, percentage, mean, and standard deviation. Chi-square test was used to compare between qualitative variables. P-value considered highly statistically significant when $p < 0.01$ and statistically significant when $P < 0.05$.

3. Results

Table (2): illustrates that 36.5% of the mothers were between the age of 29 to less than 34 years old. The mean age was 31.16 years with a standard deviation of 5.72. Regarding employment, 60.8% of the

mothers were employed. In terms of educational level, 31.1% were university graduates and post-graduate candidates. Concerning the place of residence, 56.8% of the mothers lived in rural areas.

Table (3): shows that 47.3% of infants were aged from 3 to less than 5 months. The mean age was 4.04 months. Concerning the infants' sex, 60.8% of them were males. Regarding their ranking among siblings, 37.8% were the second child in order.

Table (4): shows a significant improvement in mothers' total knowledge regarding tearless tummy time after the intervention. The mean score for total knowledge increased from 6.17 ± 1.93 to
11.70 ± 1.38, with a t-value of 22.69 ($p < 0.001$) and a Cohen's d of 2.64, indicating a large effect.

Table (5): illustrates that there is a significant improvement in mothers' total practice regarding tearless tummy time in infants after the intervention. Total practice scores increased from 2.33 ± 1.23 to
8.68 ± 1.09, with a t-value of 29.47 ($p < 0.001$) and a Cohen's d of 3.42, indicating a very large effect.

Table (6): shows significant improvements in mothers' total attitude regarding tummy time in infants after the intervention. Total attitude scores improved from 25.12 ± 5.26 to 39.08 ± 4.37, with a t-value of 14.47 ($p < 0.001$) and a Cohen's d of 1.68, indicating a large effect.

4. Discussion

Tummy time involves placing infants on their stomachs to promote muscle strength and support developmental milestones like rolling over, crawling, creeping, and sitting up. Pediatricians encouraged care- givers to practice tummy time as it plays a crucial role in the infant's developmental milestones, such as rolling over, crawling, creeping, and sitting up straight. However, caregivers sometimes become reluctant to practice tummy time as their infants may express their feelings of dis- comfort through whining or crying when placed on their tummies **(Morea and Jessel, 2020)**.

The current study revealed low mean scores in mothers' knowledge regarding TT before

program implementation **(Table 4)**. This may be due to mothers' faulty understanding of the nature and importance of tummy time, which can be delayed later on. Also, limited access to health educational materials about comfortable tummy time may be a prominent cause.

This finding aligns with the research conducted by **(Nitsos et al., 2017)**, who noted that, before participating in the educational program, the majority of parents mentioned that they had never heard of the concept of "Tummy Time" as a well-known activity. In the same context, a study conducted by **(Huang et al., 2024)** showed that the caregivers' knowledge regarding tummy time was noticed to be suboptimal in relation to the Early childhood education (ECE) institutions in China.

Regarding the acquisition of knowledge, the present study showed a significant improvement in the mothers' total knowledge regarding tummy time in their infants after the video-assisted educational intervention **(Table 4)**. From the researchers' point of view, this noticeable improvement may be due to the fact that videos are well-known to be an appealing and effective method for education for most mothers regardless of their educational level or any other related personal characteristics.

On the contrary **(Hewitt et al., 2020a,b)**, found no significant difference between control and intervention groups concerning the maternal reported knowledge about many items assessing the tummy time theoretical background.

As for the maternal practices regarding the tearless tummy time, the present study revealed a decrease in the mean score of practices regarding tearless TT before program implementation **(table, 5)**. This may be due to mothers' belief that the discomfort, crying and negative vocalizations experienced by their infant during the TT have no solution but cessation or abandoning the practice of tummy time itself.

This result comes in congruence with research by **Felzer-Kim et al. (2020)** who found that negative infant effect as crying and wining was a barrier against performing tummy time by caregivers. Also, **Hesketh**

and Janssen (2022) reported the proportion of infants whose parents adhered to the tummy time recommendations was less than one-third of the study sample, indicating poor practice.

On the same line, in a study conducted by **Lee et al. (2021)**, it was evident that the desired dosage of the daily practice of tummy time was a very ambitious goal and possibly far from being realistic for infants, and that's why parents couldn't achieve it with their infants.

Concerning maternal practices of tearless TT post-intervention **(Table 5),** a significant increase in the total scores was observed after implementing the program. This was explained by the mothers them- selves who stated that the utilization of illustrative videos has played a role in providing a sufficient visual demonstration of the strategies to decrease the tears and discomfort during performing the tummy time.

This comes in congruence with research by **(Kanazawa et al., 2024)**, who stated that the negative vocalization and discomfort of infants during tummy time were significantly decreased, and parents' preference increased after teaching them to add items such as colorful books, non- glass mirrors, and fuzzy toys to their tummy time practices. Similarly, **Huang et al. (2024)** highlighted that parents' compliance with practicing tummy time following the guidelines of tummy time in infants receiving long-nurturing care was significantly higher than in those receiving short-nurturing care.

These results are inconsistent with **(Hewitt et al., 2020a,b)**, who illustrated that regarding tummy time practices, there were no overall differences between the control andintervention groups. However, there was a moderate effect size favoring the intervention group for practicing only tearless tummy time after implementing the intervention.

As observed during the present study, there was a decline in the mean score of maternal attitudes regarding tearless TT before the educational intervention **(Table 6)**. This may be strongly related to the mothers' belief that tummy time can lead to suffocation or vomiting and that, eventually, it is not that important to waste their time performing tummy time. Also, they prefer

to invest that time in other aspects of the infant's care.

This finding was opposite to the result of a study conducted by **Zhang et al. (2023)**; they observed that during the first 6 months of an infant's life, there was an increase in tummy time preference as well as tummy time bout frequency and length.

Concerning the maternal attitude toward practicing tearless tummy time, it was observed that their mean scores moderately increased after the program implementation **(Table 6)**. From the researcher's point of view, it is difficult to dramatically change mothers' attitudes regarding tummy time an early age. This is due to the beliefs and wrong traditions acquired from their surrounding environment, such as their mothers, mothers-in-law, friends, or even neighbors. Despite some mothers' elevated levels of education, most of them believe that these traditions are correct.

Moreover, a study by **Ricard and Metz (2014)** found that while one- third of parents felt discouraged when their infant was crying and feeling intolerant to tummy time eventually, they continued performing the tummy time because they understood its importance.

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5. Conclusion:

The present study supplements evidence on the effectiveness of the video based educational program as a useful educational tool for enhancing maternal knowledge, practice and attitude regarding tearless tummy time. The study findings are supported by theexisting literature on the efficacy of video-assisted education

6. Recommendations:

Based on the findings of the present study, the recommendation is suggested:

1- Further understanding of the effects of tummy time on infant health and development may assist to improve compliance with guidelines of American Academy of Pediatrics of 30 minutes per day.

2- Starting tummy time earlier and frequently was associated with more favorable movement and sleep of young children

3-Implementation of Video-assisted, Educational Programs for parents about the importance of tummy time can improve their knowledge, practices and attitude regarding tummy time.

4-Continuous training should be established in every health care center to enhance nurses' and parent's adherence to educational program to improve their knowledge, practice and attitude regarding tummy time.

Implications to practice

The results of the current study suggested various practical implications for healthcare settings and guidelines for nursing practice and health education. Firstly, hospitals should assisted education in their programs to improve the nurses' knowledge, practice and attitude regarding tearless tummy time and, in turn, increase caregivers' awareness of the importance and ideal practice of tummy time.

Also, hospitals could make in- formative brochures, posters, and videos regarding tearless tummy time available on any accessible platforms for caregivers. Concurrently, follow-up and evaluation of the educational program outcomes are important. Furthermore, education should be extended to include fathers or other family members to ensure that they become competent regarding the infants' care. Finally, the integration of video-assisted education into caregivers' educational programs is strongly recommended

Results

Table (1): Checklist of tummy time practices based on AAP recommendations (2023).

No.	AAP tummy time recommendations
1	Encourage them back to sleep and tummy to play.
2	Place yourself or a toy in reach for them to play with.
3	Perform tummy time 2 to 3 times each day for 3–5 min.
4	Alternate which end of the crib you place the infant's feet.
5	Position the infant on the mother's tummy or chest while being awake.
6	Talk in animated tones and use exaggerated expressions.
7	Encourage lots of eye contact with the infant.
8	position the baby's tummy down across the lap lengthwise while providing head support.
9	Place the infant on a blanket in the side-lying position, if needed.

10 Set up regular tummy time, such as after naps or baths.

11 Distract the infant with a funny toy or read an entertaining book.

Table (2): Percentage distribution of the studied mothers' according to their characteristics (n = 74)

Mothers' characteristics	Number	%
Age in years		
19: <24	6	8.1
24: <29	17	23.0
29: <34	27	36.5
34: <39	18	24.3
39: <	6	8.1
Mean ± SD	31.16 ± 5.72	
Occupational		
Worked	45	60.8
Housewives	29	39.2
Educational level		
Illiterate or Read and write	5	6.8
Primary	3	4.1
Secondary	14	18.9
University	23	31.1
Post-graduate	23	31.1
Diploma	6	8.0
Residence Urban Rural	 32 42	 43.2 56.8

Table (3): Frequency distribution of infants according to their characteristics (n = 74)

Infants' characteristics	Number	%
Age in months		
1: <3	7	9.5
3: <5	35	47.3
5: <6	32	43.2
Mean±SD	4.04 ± 1.28	
Sex		
Male	45	60.8
Female	29	39.2
Ranking		
First	23	31.1
Second	28	37.8
Third	15	20.3
Fourth	6	8.1
More than fourth	2	2.7

Table (4): The mean score of mothers' total knowledge about tummy time (n = 74)

Variable	Pre intervention (74)	Post intervention (74)	Test (Sig) &(d)
	Mean±SD	Mean±SD	
Total knowledge	6.17±1.93	11.70±1.38	22.69(<0.001) &2.64

*Test is paired sample test; P value is significant <.05. d is Cohen's d effect size

Table (5): The mean score of mothers' total practice regarding tummy time (n = 74)

Variables	Pre-intervention	Post-intervention	Test (Sig) &(d)
	Mean ± SD	Mean ± SD	
Total practice	2.33 ± 1.23	8.68 ± 1.09	29.47 (<0.001) &3.42

*Test is paired sample test; P value is significant <0.05. d is Cohen's d effect size.

Table (6): The mean score of mothers' total attitude regarding tummy time (n = 74)

Variables	Pre intervention (74)	Post intervention (74)	Test (Sig) &(d)
	Mean±SD	Mean±SD	
Total attitude	25.12±5.26	39.08±4.37	14.47(<0.001) &1.68

*The test is a paired sample test; the P value is significant <0.05. d is Cohen's d effect size.

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