ORIGINAL ARTICLE

# Effectiveness of an educational program on nurses' knowledge toward massage therapy of infant with colic pain

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**ABSTRACT**

**Aim**: This study aims at evaluating the effect of a structured instructional program on improving nurses' knowledge regarding the use of massage therapy as a non-drug approach in managing colic-related discomfort in infants.

**Materials and Methods:** A quasi-experimental study was performed. Work was done at Al-Hussein Teaching Hospital, which works under the Directorate of Health in Diwaniyah. All nurses who participated in the study n=72 were divided into two groups: an experimental group consisting of 36 nurses who received the educational intervention and a control group consisting of the remaining 36 nurses who did not receive any intervention. The researcher created an inclusive training program that emphasized on increasing the knowledge of nurses about the nature, causes, and symptoms of infant colic, normal crying versus colic episodes, diagnosis of colic, pain physiology, mechanism of massage therapy, practical advice for dealing with colicky infants, and both pharmacological and non-pharmacological treatment options.

**Results:** The findings improved the knowledge of nurses in the intervention group about infant massage therapy in a statistically significant way following the program. This group attained a higher average score than the control group 1.78 vs. 1.34 with standard deviations of 0.09 and 0.14, respectively; p=0.000, effect difference was meaningful.

**Conclusions:** This study identified the real improving effect of educational intervention by demonstrating a significant enhancement in the knowledge and practices of nurses after they underwent the training program. Nurses with high education responded more positively to the program.

**KEY WORDS:** knowledge, colic pain, massage therapy, educational program

## INTRODUCTION

Infant colic pain is a very popular physiologic digestive disorder that normally disturbs babies in their first months of life. The major symptoms of it include frequent and long periods of crying, fussiness, or irritability of the baby without any obvious cause and not easily comforted or managed by caregivers [1]. Colic episodes refer to otherwise healthy babies less than three months old with uncontrollable crying for at least three hours per day on at least three days per week for three weeks in a month [2]. The word 'excessive crying' is used interchangeably with infant colic and thus represents this most typical behavioral problem of early infancy characterized by persistent crying spells [3]. Management strategies for colicky pain are usually classified into the following: drug therapies (dicyclomine hydrochloride, cafetorium bromide, and simethicone), probiotics, herbal preparations and sucrose as complementary remedies, manual techniques like acupuncture, dietary modifications, and behavioral interventions directed at parents [2-4]. Non-drug treatments for colic include tactile techniques which initiate reflex pathways in the body and serve to achieve physical as well as emotional relaxation. Such methods have evolved potential in the reduction of discomfort with positive effects on vital signs—heart rate and oxygen saturation of infants [5]. Massage therapy means manipulation of soft tissues by hands in a manner that promotes health and emotional well-being. It is an old practice with a keen interest in its development for thousands of years. Records indicate that massage was integrated into the healing systems of ancient civilizations as early as 2000 BC and this includes the Chinese, Egyptians, Greeks, Hindus, Japanese, and Romans; it was then considered to be a therapeutic practice [6]. Present-day massage therapy falls under complementary and alternative treatment and has surfaced as popular within the trend toward holistic health care. Infant abdominal massage can be seen as one complementary intervention whereby healthy development of both physical and emotional

systems in infants is plausible through the comforting tactile stimulation provided [3]. Massage for infants is the methodical use of touch on the skin of a baby. This practice is started in many cultures soon after the birth of a child and it varies around the globe with different aspects like duration, pressure, oils, and parents' involvement. NICUs are generally places associated with high stress and low physical contact; infant massage has been introduced there as a supportive therapy. It has been better to result in improved weight gain, shorter stays in hospitals, and fewer postnatal health issues [7]. In spite that the evidence on massage therapy for colicky infants is promising, much aspects remain unknown. Specifically, large-scale studies have yet to focus on the long-term effects of infant massage as well as the role of related nursing education programs [8]. Further research is needed to develop standard protocols for clinical use of the therapy and assess the impact of an educational program on a nurse's practice and patient outcomes.

## AIM

This study was designed to investigate the impact of a structured educational program on improving nurses' knowledge about the use of massage therapy as a non-pharmacological therapy for infants suffering from colic pain.

## MATERIALS AND METHODS

### STUDY DESIGN AND PROGRAM IMPLEMENTATION

The study followed a quasi-experimental design, implementing an educational program to assess its effect on improving nurses' knowledge about infant massage therapy for colic pain. It was carried out from 1/3/2024 to 10/5/2025 at the Al-Hussein Teaching Hospital in Diwaniyah, Iraq. A purposive sample of 72 nurses was recruited based on predetermined inclusion criteria, having at least one year of experience in the pediatric ward and a pre-test knowledge score below 60%. Participants were equally divided into two groups; study group n=36 and control group n=36, data Collection and Instrumentation.

### DATA COLLECTION AND INSTRUMENTATION

The data were collected through a questionnaire by self-administration. The questionnaire comprised two parts: Demographic data (education level, years of experience, gender, age, etc.) and Knowledge assessment,

developed to assess the nurses' knowledge of infantile colic and massage interventions. The knowledge section was formatted into four domains: Domain 1: Knowledge about infant colic pain (10 MCQs) Domain 2: Symptoms of colic pain (10 questions) Domain 3: Warning signs and red flags (10 questions) Domain 4: Massage techniques for Colic Relief (10 questions) A study was done with eight pediatric nurses to see if the questions were clear, useful, and took an appropriate amount of time. These participants did not take part in the main study. This pilot helped us confirm face and content validity for the tool, and based on it, we made revisions.

## EDUCATIONAL PROGRAM STRUCTURE

The educational program is four structured theoretical lectures given in two weeks. The content covers: Causes and signs of infantile colic, Ways to manage without using medicine Evidence-based massage techniques for the relief of symptoms, Nursing' roles in educating and encouraging caregivers. Pre-intervention (pre-test) assessments were carried out before implementation. After the program, a post-intervention (post-test) assessment was done with the same tool to measure knowledge gains.

## SCORING AND KNOWLEDGE LEVELS

Each multiple-choice question was scored as follows: Correct response: 2 points incorrect response: 1 point Mean scores (MS) were used to categorize knowledge levels: Poor: 1.00–1.33 MS Moderate: 1.34–1.67 MS Participants were given 45 to 60 minutes for questionnaire completion. Expert review proved adequate content validity CVI=0.88, and reliability was supported by the pilot study.

## LIMITATIONS

Major weaknesses of the study are the relatively small sample size and the fact that most participants were diploma nurses, which limits generalizability. Further studies with more varied and bigger samples should be undertaken to validate these findings and bring new insights.

## ETHICAL CONSIDERATION

Before collecting data, the basic ethical requirement was met by making sure the participants' rights, dignity, and personal values were protected. The study got approval from the Scientific Research Ethics Committee at the

**Table 1.** General Characteristics of study and control groups

| Demographic data | | Control Group | | Study Group | | X² P value |
|---|---|---|---|---|---|---|
| | | Freq. (N=36) | Percent. | Freq. (N=36) | Percent. | |
| Age / Years | 24-32 | 23 | 63.9 | 23 | 63.9 | 2.48 0.28 NS |
| | 33-41 | 5 | 13.9 | 9 | 25.0 | |
| | 42-50 | 8 | 22.2 | 4 | 11.1 | |
| Gender | Male | 11 | 30.6 | 8 | 22.2 | 0.64 0.42 NS |
| | Female | 25 | 69.4 | 28 | 77.8 | |
| Educational Status | School of Nursing | 9 | 25.0 | 6 | 16.7 | 3.87 0.27 NS |
| | Institute of Nursing | 15 | 41.7 | 18 | 50.0 | |
| | College of Nursing | 10 | 27.8 | 6 | 16.7 | |
| | Postgraduate | 2 | 5.6 | 6 | 16.7 | |
| Years of Experience | < 10 | 22 | 61.1 | 22 | 61.1 | 1.47 0.47 NS |
| | 10-20 | 8 | 22.2 | 11 | 30.6 | |
| | > 20 | 6 | 16.7 | 3 | 8.3 | |
| Years of experience in the pediatric ward | 1-6 | 23 | 63.9 | 26 | 72.2 | 1.33 0.51 NS |
| | 7-12 | 10 | 27.8 | 6 | 16.7 | |
| | ≥ 13 | 3 | 8.3 | 4 | 11.1 | |
| No. of Training Sessions | 0 | 7 | 19.4 | 9 | 25.0 | 3.0 0.22 NS |
| | 1-4 | 24 | 66.7 | 26 | 72.2 | |
| | ≥ 5 | 5 | 13.9 | 1 | 2.8 | |

NS: Non-Significant at P>0.05

*Source: Own material*

Faculty of Nursing, University of Kufa (135# in 27\2\2024). Also, informed consent was obtained from all nurses who took part in the research before their participation.

## STATISTICAL ANALYSIS

SPSS Version 26.0 (IBM Corp., SPSS Inc.) was utilized for statistical analysis of the current data. The normality of scale measurements was assessed by the Kolmogorov-Smirnov test. Variables that exhibited normal distribution were reported in mean ± standard deviation and analyzed by paired t-test to compare pre- and post-assessments. Significance was set at p<0.05.

## RESULTS

Table (1) shows descriptive statistics on demographic characteristics for both the study and control groups. Variables include age, sex, level of education, overall work experience, years in pediatric wards, and attended training sessions. Results from a chi-square test indicate no significant differences between the two groups with respect to all measured variables P>0.05. Age distribution is fairly consistent; most respondents fall into the 24-32 age bracket 63.9%. The female percentage

is higher in both groups—69.4% in the control group and 77.8% in the study group. More than half of them have a diploma from a nursing institute (41.7% in the control group and 50.0 %in the study group). Most nurses indicated that they have practiced for less than ten years and that their experience specific to pediatrics most commonly fell within one to six years. Most of the participants attended between two to four training sessions. The non-significant P-values confirm the demographic comparability between both groups that would inherently minimize bias in later comparisons.

Table 2 presents the mean scores of nurses' baseline knowledge of massage therapy as a non-pharmacological intervention in managing pain due to infant colic, comparing the study and control groups at pre-test. The study group's score was 1.32(SD=0.12), and the control group's was 1.33(SD=0.13). An independent samples t-test value of 0.32 with 78 degrees of freedom; P-value = 0.75, indicates no statistically significant difference between the two groups at the levels of knowledge before intervention, emphasizing further educational programs on massage therapy for infant colic.

The differences in the mean scores of nurses' knowledge regarding massage therapy for infants with colic pain in the control group, pretest and post-test, are illustrated

**Table 2.** Paired t test for the overall nurses' knowledge about massage therapy of infant with colic pain between study and control groups at pre-test assessment

| | Pre-Test Comparison | Mean | SD | Independent T-Test | df | P-value |
|---|---|---|---|---|---|---|
| Overall Knowledge | Study | 1.32 | 0.12 | 0.32 | 78 | 0.75 NS |
| | Control | 1.33 | 0.13 | | | |

SD: standard deviation, df: degree of freedom, NS: Non-Significant at P>0.05
*Source: Own material*

**Table 3.** Paired t test for the overall nurses' knowledge about massage therapy of infant with colic pain between (pre-test and post-test) assessments for the control group

| | Control Group Tests | Mean | SD | Paired  T-Test | df | P-value |
|---|---|---|---|---|---|---|
| Overall Knowledge | Pre-test | 1.33 | 0.13 | 0.47 | 39 | 0.64 NS |
| | Post-test | 1.34 | 0.14 | | | |

SD: standard deviation, df: degree of freedom, NS: Non-Significant at P>0.05
*Source: Own material*

in table 3. From pre-test to post-test, there was a slight increase in knowledge (Mean for Pre-test=1.33, SD=0.13; Mean for Post-test=1.34, SD=0.14). The paired t-test value of 0.47 with 39 degrees of freedom indicates no statistically significant difference P=0.64, which confirms non-significance (NS) at P>0.05. These findings imply that unlike the study group, the control group did not attain significant knowledge gains, thereby underlining the effectiveness of the intervention applied to the study group.

The (pre-test and post-test) comparisons for nurses' knowledge (study group) about massage therapy on infants with colic pain deduced that there was a highly significant increase in knowledge, moving from the pre-test (Mean = 1.32, SD = 0.13) to the post-test (Mean = 1.78, SD = 0.09). The paired t-test value of 25.82 with 39 degrees of freedom denotes a statistically significant improvement (P = 0.000), indicating high significance (HS) at P < 0.01. This confirms that the training intervention impacted positively on increasing nurses' knowledge about massage therapy for infant colic pain (Table 4).

The differences in mean scores of overall nurses' knowledge about massage therapy for infants with colic pain between the study and control groups at post-test is illustrated in table 5. The study group showed a greater improvement, with a mean score of 1.78(SD=0.09), compared to the control group's mean score of 1.34(SD=0.14). The value of t computed was 16.33 with a degree of freedom (df) of 78 and a P-value of 0.000 which proves that a difference, what-so-ever, is highly significant P<0.01. These outcomes demonstrate that the educational intervention successfully improved nurses' knowledge in the study group, whereas the control group experienced only slight changes.

The regression model was statistically significant $F_{(6, 65)}=3.66$, p=0.003; it explained about 27.3% of the variance in nurses' post-test knowledge scores with an adjusted $R^2$ of 0.198, which is the explanatory power in a moderate degree after considering the number of predictors. Of the demographic variables that were tested, educational status was a significant predictor; this implies that nurses who had higher academic qualifications performed better in terms of what they learned from the intervention. In this study, other factors such as training, years of experience, gender, age did not make a significant contribution to predicting knowledge levels; thus formal education proves to be most important in evidence-based nursing practice (Table 6).

## DISCUSSION

This demographic and social research sample comprises 72 male and female nurses from Al-Hussein Children's Hospital in Diwaniyah, between the ages of 24 and 50 years. Thirty-six nurses constitute the experimental group, while an equal number makes up the nurses' group with no intervention. The chi-square $\chi^2$ test indicates that there are no statistically significant differences P>0.05 between both groups; therefore, statistically, no significant difference existed between the study and nurses' group with no interventions. This concurs with earlier findings [8-9], which indicated non-significant differences in demographic data between groups at a p-value greater than 0.05. The researcher would attribute this finding to the fact that all participants were drawn from the same hospital and worked within the same units, hence applying to variables such as age, gender, educational status, years of experience, pediatric ward experience, and number of training sessions. According to the age groups, therefore, the greater percentage of both groups of participants fell within the 24-32 range; 63.9% in both control and study groups. This finding is consistent with other studies [8, 10] where they reported a similar age distribution. Results may indicate that

**Table 4.** Paired t test for the overall nurses' knowledge about massage therapy of infant with colic pain between (pre-test and post-test) assessments for the study group

| | Study Group Tests | Mean | SD | Paired T-Test | df | P-value |
|---|---|---|---|---|---|---|
| Overall Knowledge | Pre-test | 1.32 | 0.13 | 25.82 | 39 | 0.000 |
| | Post-test | 1.78 | 0.09 | | | HS |

SD: standard deviation, df: degree of freedom, HS: high significance at P<0.01
*Source: Own material*

**Table 5.** Paired t test for the overall nurses' knowledge about massage therapy of infant with colic pain between study and control groups at post-test assessment

| | Post -Test Comparison | Mean | SD | Independent T-Test | df | P-value |
|---|---|---|---|---|---|---|
| Overall Knowledge | Study | 1.78 | 0.09 | 16.33 | 78 | 0.000 |
| | Control | 1.34 | 0.14 | | | HS |

SD: standard deviation, df: degree of freedom, HS: high significance at P<0.01
*Source: Own material*

**Table 6.** Multiple linear regression analysis predicting nurses' post-test knowledge scores from demographic variables

| Variable | B | SE B | β | t | p-value |
|---|---|---|---|---|---|
| Age (years) | -0.003 | 0.007 | -0.056 | -0.421 | 0.675 |
| Gender (Male = 1, Female = 0) | 0.012 | 0.034 | 0.045 | 0.353 | 0.725 |
| Educational Status (ref = secondary) | 0.094 | 0.031 | 0.342 | 3.032 | 0.004 |
| Years of Experience | 0.006 | 0.009 | 0.073 | 0.667 | 0.507 |
| Pediatric Ward Experience (years) | 0.008 | 0.010 | 0.083 | 0.800 | 0.427 |
| No. of Training Sessions | 0.019 | 0.014 | 0.123 | 1.379 | 0.173 |

B: The unstandardized coefficient, SE B: The standard error of that coefficient, β: (beta) coefficient
*Source: Own material*

younger nurses have more desire to participate in educational courses to gain more experience than older nurses who may rely more on their accumulated knowledge. In addition children's units require high degree of activities skill performance speed and concentration which is found more among youngsters or newly appointed nurses. Females formed the majority in both groups. In the nurses' group with no intervention, they were 69.4%, and in the study group, 77.8%. This finding is consistent with previous studies [11-12], where they also found a high female representation among the nursing staff. Concerning education, more than half of the participants graduated from nursing institutes - 41.7% in the nurses' group with no intervention and 50.0% in the study group - which confirms previous findings [13] that a considerable portion of nursing staff had similar educational backgrounds. In those terms, most of the participants were in fact individuals who had less than 10 years of work history, which has been previously reported in other studies. Related to training sessions, it appears that most of the participants attended 2 to 4 sessions-72.2% in the study group and 66.7% in the control group which is also previously reported. Nurses' participation in training sessions was reported at a rate of 84% in the study group and 68% in the nurses' group with no intervention. The results indicate a very significant increase in the knowledge of nurses regarding massage therapy for infants with colic pain in the study group. The mean pre-test score was 1.32(SD=0.13), and it raised to 1.78(SD=0.09) in the post-test. The paired t-test value of 25.82 at 39 degrees of freedom, P=0.000, is an indication of extremely statistically significant improvement; that is, at the level P<0.01. In the nurses' group with no intervention, knowledge increased slightly from a pre-test mean of 1.33(SD=0.13) to a post-test mean of 1.34(SD=0.14). The paired t-test value was 0.47 at df=39 with P=0 .64 which is non-significant. During the pre-test, both groups had almost equal levels of knowledge (mean of study group=1.32, SD=0.12; mean of nurses' group with no intervention=1.33, SD=0.13). The value of the independent t-test was 0.32 (df=78, P=0.75), indicating no significant difference P>0.05, however the posttest comparisons showed a very marked improvement in the study group as compared to the nurses' group with no intervention (mean=1.78, SD=0.09 vs. mean=1.34, SD=0.14). The t-value was 16.33 with df=78 and P=0 .000 which confirms a highly significant difference P<0.01. This therefore implies that the educational program had a strong positive impact on knowledge mean of scores. This is supported by studies that showed similar results in their experimental groups after educational interventions [10, 13, 16]. For example, the study indicated that the experimental

group's mean post-test score was increased significantly more than that of the nurses' group with no intervention [16]. Another study showed statistically significant differences in nurses' knowledge before and after an educational intervention [13]. Similarly, improved patient knowledge was reported following a lifestyle education program [17]. The researcher is of the opinion that the educational program helped in upgrading the nurses' knowledge by providing them with a theoretical and practical foundation, which in turn enhanced their skills, built confidence, created awareness regarding non-pharmacological interventions, and encouraged continuous learning and engagement. The findings suggest that educational programs for nurses on therapeutic infant massage will positively change their knowledge and practice towards better outcomes for infants. This is also the case in previous studies [6, 8, 18] that proved effective behavioral methods such as massage compared to other methods in relieving colic in infants. The present study indicated that formal education is most paramount to evidence-based nursing practice. Research on pain management in pediatric nursing shows that educational interventions can successfully fill the knowledge gaps. Therefore, the tremendous increase in the use of non-pharmacological strategies of pain relief after the intervention proves that education plays a key role in improving nursing practices in emergency and intensive care

units [19-20]. In other words, this indicates how systemic structures need to support nurses to effectively apply newly acquired knowledge. This study further reinforces the notion that nurses with higher educational qualifications are more likely to implement learned techniques, thereby improving patient care outcomes. That systematic review on interventions aimed at multiple risk behaviors with young people further lends itself to educational status as a predictor of success intervention. It revealed well-structured educational delivered by competent educators interventions that significantly improved students' knowledge and behavior change [21]. This puts forward the fact that it is not only important that the educators have an educational background but also that effective teaching strategies elicit engagement levels. Therefore, for pediatric nurses who engage in educational interventions, these findings imply that healthier educational qualifications will translate into more effective health education for children.

## CONCLUSIONS

Based on the current results, it was concluded that following the intervention, the study group demonstrated a very high key and practical improvement in the aspect of knowledge, thus verifying the effect of the training program.

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## CONFLICT OF INTEREST
The Authors declare no conflict of interest

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