International Journal of Nursing Studies 69 (2017) 119–136

Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns

The effects of massage therapy in hospitalized preterm neonates: A systematic review

María José Álvarez[a], Daniel Fernández[a,*], Juan Gómez-Salgado[b,c], Dolores Rodríguez-González[d], María Rosón[d], Santiago Lapeña[d]

[a] Department of Nursing and Physiotherapy, Faculty of Health Sciences, University of Leon, Spain
[b] University of Huelva, Spain
[c] Universidade Atlântica de Lisboa, Portugal
[d] University Hospital of Leon, Spain

ARTICLE INFO

Article history:
Received 26 February 2015
Received in revised form 6 February 2017
Accepted 7 February 2017

Keywords:
Massage
Massage therapy
Tactile-kinesthesic stimulation
Therapeutic touch
Tactile stimulation
Preterm infant
Premature infant
Premature birth
Preterm birth

ABSTRACT

Objective: The aim of this study was to perform a systematic review to identify, evaluate and summarise studies on the administration of therapeutic massage to preterm neonates during their stay in the NICU, and to assess their methodological quality.
Design: systematic review following PRISMA statements guidelines.
Data sources: A comprehensive search was performed including relevant articles between January 2004 and December 2013, using the following electronic databases: Medline, PEDro, Web of Science and Scopus.
Review methods: Two reviewers conducted a review of the selected articles: one evaluated the methodological quality of the studies and performed data extraction and the other performed a cross-check. Divergences of opinion were resolved by discussion with a third reviewer.
The studies reviewed implemented a wide variety of interventions and evaluation methods, and therefore it was not possible to perform a meta-analysis. The following data were extracted from each article: year of publication, study design, participants and main measurements of outcomes obtained through the intervention. A non-quantitative synthesis of the extracted data was performed. Level of evidence was graded using the Jadad Scale.
Results: A total of 23 articles met the inclusion criteria and were thus included in the review; these presented a methodological quality ranging from 1 to 5 points (with a mean of 3 points). Most studies reported that the administration of various forms of therapeutic massage exerted a beneficial effect on factors related to the growth of preterm infants. The causes indicated by the researchers for these anthropometric benefits included increased vagal activity, increased gastric activity and increased serum insulin levels. Other demonstrated benefits of massage therapy when administered to hospitalised preterm infants included better neurodevelopment, a positive effect on brain development, a reduced risk of neonatal sepsis, a reduction in length of hospital stay and reduced neonatal stress.
Conclusions: Although based on a qualitative analysis of heterogeneous data, the present review suggests that a clear benefit is obtained from the administration of massage therapy in hospitalised preterm infants, a finding which should encourage the more generalised use of massotherapy in NICU clinical practice.

What is already known about the topic?

- Prematurity is becoming a major public health problem worldwide.
- Preterm infants are prematurely deprived of the cutaneous stimulation provided during intrauterine development and of the continuous contact with their parents. It has and adverse effect on both psychological and biological development of the child.
- Knowledge of these factors has led many neonatal units to begin to introduce therapeutic massage protocols to facilitating

* Corresponding author at: University of Leon, Faculty of Health Sciences, Department of Nursing and Physiotherapy, Campus de Vegazana, 24071 León, Spain.
E-mail addresses: dferg@unileon.es, danifega@gmail.com (D. Fernández).

http://dx.doi.org/10.1016/j.ijnurstu.2017.02.009
0020-7489/

satisfactory neuromotor and emotional development of preterm infants.

What this paper adds

- This systematic review provides evidence to support that massage is a safe and low-cost intervention that contributes to development of hospitalised preterm infants, with no demonstrated adverse effects associated with their application.
- So that, neonatal intensive care nurses could apply massage into their daily routine care.

1. Introduction and purpose

According to World Health Organisation and other organisations data (March of Dimes et al., 2012), 15 million infants are born prematurely every year, and one million of these children die within the first year of life from complications associated with prematurity. Furthermore, the global incidence of preterm births is increasing (March of Dimes et al., 2012), with the result that prematurity is becoming a major public health problem worldwide (Sullivan et al., 2008)

Births before 37 weeks of gestation are responsible for 75% of perinatal mortality and more than 50% of morbidity during infancy (Goldenberg et al., 2008). Thus, the consequences of prematurity are not limited to the perinatal period but may extend throughout life in the form of disabilities with a significant impact on social well-being and health, such as cerebral palsy, chronic lung disorders, sensory impairments (mainly visual and auditory), learning difficulties, attention deficit and impaired coordination (Joseph, 2011; March of Dimes et al., 2012; Ralser et al., 2012).

Preterm infants are prematurely deprived of the cutaneous stimulation provided during intrauterine development through contact of the skin with amniotic fluid and the uterine walls. It has been shown that these sensations are involved in the correct growth and neurodevelopment of the infant (Mathai et al., 2001; Im and Kim, 2009).

Besides this early sensory deprivation, prematurity gives rise to other associated factors, such as the absence of continuous contact between parents and their newborn infants due to the need for these latter to remain in neonatal intensive care units (NICUs), which has an adverse effect on both the psychological and biological development (Flacking et al., 2012) of the child and the parents' well-being (Brett et al., 2011). Several studies have demonstrated increased levels of stress and anxiety in parents of premature infants, related to their lack of contact with their newborn infants and their feeling of being unable to protect their children from stressful and painful experiences (Wereszczak et al., 1997; Gale et al., 2004).

The practice of minimal touch, which is widespread in many neonatal units (Fallah et al., 2013; Smith, 2012; Leonard, 2008), also leads to greater deprivation of tactile stimulation.

In recent years, knowledge of these factors has led many neonatal units to begin to introduce a series of care actions based on somatic (stimulation of somatosensory system), kinaesthetic (stimulation by the movement) and sensory (stimulation of senses: visual, auditory, tactile, olfactory and gustatory) stimulation, with the aim of facilitating neuromotor and emotional development of preterm infants (Field et al., 2006; Pallás and Arriaga, 2008; Field et al., 2010). Nevertheless, the "minimal touch" approach when caring for preterm infants still prevails in some hospitals (Vaivre-Douret et al., 2009), based on the studies suggest that excessive touch during daily procedures (such as feeding, examinations, and diaper changes) is associated with hypoxemia. Almost all the evidence suggests that there are risks associated with the touch based on touch-related care in the NICU and not done with the touch through massage. (Long et al., 1980; Norris et al., 1982; Speidel, 1981)

A possible explanation of the effects of these two types of touch is that massage is a gentle and soothing touch to the premature child, while the touch associated with routine procedures is often inevitably uncomfortable and/or painful (administration of vaccines, placement of catheters and tubes, blood sampling, remove, . . .) In addition, the massage is applied once or twice a day, while medical and nurse touch occurs continuously throughout all day (Gorski et al., 1990; Leonard, 2008) These differences help explain why therapeutic massage touch has benefits that care touch does not.

One of the most commonly employed interventions in the NICU to provide preterm infants with somatic stimulation (stimulation of somatosensory system from several modalities to the sensory receptors that cover the skin, muscles, bones and joints) (Robles-De-La-Torre, 2003) is therapeutic massage.

Therapeutic massage can be defined as the "manual aplication of a technique to the superficial soft tissue of the skin, muscles, tendons, ligaments and fascia (and to the structures that lie within the superficial tissue) using the hand, foot, knee, arm, elbow and forearm. The manual techique involves systematic application of touch, stroking (effleurage), friction, vibration, percussion, kneading, stretching, compression or passive and active joint movements within the normal physiologic range of motion" (Fritz, 2013).

Sinha (2009) expands the definition of massage when considering the use of both manual and mechanical mediums: "any technique, be it manual or mechanical, wich imparts mechanical energy to the soft tissue of body through the skin (. . .) in order to elicit certain physiological or psychological effect (. . .) can be defined as massage" and classifies massage techniques into four basic groups (Fig. 1)

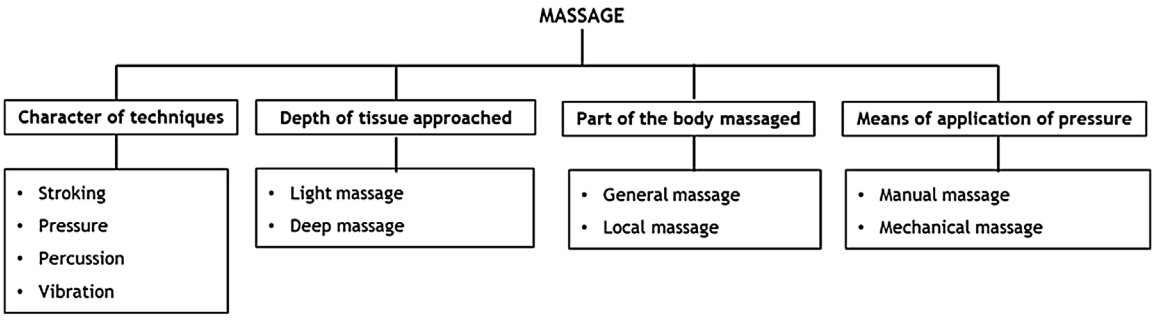

Fig. 1. Classification of massage (Sinha, 2009).