

Premature infants essay



**ASSIGN
BUSTER**

The survival rate of premature infants has dramatically improved as a result of increasing technological advances, and developments in newborn and infant care. Consequently, clinical practice needs to adapt to an increased demand for care of very premature babies (BAPM, 2003). Accountability rests health care providers to consider the developmental consequences of this progress, and optimise quality of life for this high-risk group. Under the NMC Code of Professional Conduct (2002) nurses should ensure no act or omission on their part is detrimental to the condition or safety of patients.

However, practice experience has highlighted difficulties in balancing the immediate needs of these infants with awareness of their long-term developmental requirements. Therefore, this assignment intends to focus on positioning of the premature infant as a possible intervention, with the aim of considering the consequences of premature birth, specifically its association with motor development. Research regarding positional and postural influences on developmental delay, and postural deformities will be presented and explored.

Clinical practice will be evaluated against this research, to consider how these infants are presently being protected from these risks (with regards to positioning strategies), and how nurses might enhance infant development, in partnership with the infant's family. Present influences on practice will be considered, and recommendations with regards to research and practice proposed. Premature infants are considered to be at increased risk for positional and skeletal deformities, atypical postures, motor gaps and developmental delays (Hack and Fanaroff, 2000; Kessenich, 2003).

Medical and technological advances strive to prevent or minimise the pathophysiological causes of developmental problems (i. e. extreme prematurity, intraventricular haemorrhage, chronic lung disease). An extensive literature review conducted by Turill (2002; 2002a) identified studies of both short and long term outcomes, acknowledging another aetiology of atypical development as iatrogenic and largely preventable. Traditionally, the focus of care has been on early recognition and treatment of these disorders.

A more effective approach would be an intervention to promote normal neuromuscular development and minimise the chances of developing abnormal movement patterns, such as positioning interventions proposed under the philosophy of developmental care (see appendix a). Premature infants tend to assume flattened postures because of the effects of illness, weakness, low tone, primitive reflexes, immature motor control, and gravity (Yeo, 1998).

Unless therapeutically positioned to promote flexed and midline postures during hospitalisation, iatrogenic positional deformities and abnormal movement patterns may occur. Although many of these problems improve or resolve within the first few years of life (Davis et al, 1998), it is hard to argue that any delay is acceptable if it can be prevented. The potential impact of hindering an infant's exploration during those critical early months of learning, and the anxiety generated in many parents by these problems, warrants professional attention for prevention.

Quality is the right of every patient (DOH, 1998) according to the new NHS, and the introduction of clinical governance makes this a statutory responsibility (Ruiz, 2001). Clinical governance is part of a new approach to ensure quality healthcare (Kings Fund, 1999), and aims to bring together existing methods for improving quality, one of which is putting research into practice. By considering the results of available research and questioning current practice, knowledge regarding positional and postural influences on developmental outcomes can be enhanced.

Such knowledge places nurses in the position to intervene at the earliest interaction with the family to promote infant development and subsequent quality of life. Motor development of the premature infant differs from that of the full term infant even in the absence of diagnosed abnormality, and when compared with children of their “corrected age” (Lenke, 2003). Term infants demonstrate a strong flexed posture due to remaining in the cramped, relatively well-defined boundaries of the intrauterine environment until 40 weeks gestation.

This physiologic flexion is believed to be vital for development of normal body movement and control. Active muscle tone begins to develop at 36 weeks gestation (Gardner & Lubchencho, 1998). Therefore, pre-term infants are predominantly in an extended posture due to maturation-related hypotonia, demonstrated by a tendency for neck hyperextension, and decreased anti-gravity and midline movements (Dubowitz, 1999). Foetal and Neonatal movements and postures contribute to the moulding and continued shaping of joints, skull and spinal curvatures in infants.

When positioned in a variety of postures they experience varying forces and pressures through the joints and muscles. If infants remain in restrictive body positions, not experiencing a variety of postures they are at risk of skeletal deformity; muscle shortening and contractures; and restricted joint movement (Harris, 1992). In practice, it has been observed that four hourly positional changes are incorporated into each infant's daily care plan.

This nursing action may therefore be seen as positively influencing joint and muscular development in preparation for coordinated movement. However, such frequent positional changes were often wavered in the cases of particular neonates, perhaps because of their physiological instability and more immediate needs. This possibly indicates position choice and attainment success might be more likely for special care rather than intensive care babies, since the above factors remain the main priority and focus of care for practitioners. Turill (2003) presents another possible explanation.

She explored neonatal nurses' attitudes towards their responsibility for a baby's future outcomes, finding the level of responsibility they professed to have, coupled with the perceived high risk of failure (with regards to intensive care babies' success in obtaining 'normal' outcomes), to pose an unrealistic challenge. Premature infants do demonstrate poorer outcomes than full term infants, however, it is important for health professionals to put these findings into perspective. This inaccurate and pessimistic outlook may affect their practice, and increase the stress' on both families and staff.

The Epicure study found that – of all babies born before 25 weeks gestation – half of these have no disabilities, 25% have some problems but will live independent lives and only 25% have serious disability. Babies born after 25 weeks gestation generally survive with even fewer problems (Wood, 2000). However, Turill's findings were based on interviews with only seven nurses, and cannot be generalised as a belief true of all neonatal nurses. Studies have shown that premature infants can present with an exaggerated cervical lordosis with neck hyperextension that has been reinforced by endotracheal tubing.

This can lead to over-stretching and weakening of the anterior neck flexor muscles, which may cause difficulty with head centring; downward visual gaze; hand coordination to midline/mouth; immature head control when prone; difficulty weight bearing on arms at 4 months (corrected gestational age) and a poorly developed lumbar lordosis at 8 months. (deGroot et al, 1997) Shoulder retraction may occur as part of a postural pattern of extension in the pre-term infant, effecting midline arm movement and reaching; and shoulder girdle stability, (causing subsequent interference with gross motor skills i. . delayed rolling, sitting, crawling, and transitional movements from sitting to standing). By default, these delays in fine and gross motor skills also interfere with exploration and play needed for optimal cognitive development (Hunter and Malloy, 2002). Excessive hip abduction, external rotation, knee flexion, and ankle eversion have been reported when an infant's legs continually rest in a frog leg posture; preterm infants are the most vulnerable (Davis et al, 1992; Downs et al, 1991; Lacey et al, 1990).

The consequences of these positional deformities may include: Gluteus muscles and latissimus dorsi (ms of lower back) shorten, decreasing the ability of these muscles to elongate in a sitting position; and delays during the first year in motor skills such as crawling and walking due to weight-bearing difficulties (Fay, 1988; Monterosso et al, 1995). There might be a possible association with toe walking for up to 18 months of age (Fay, 1988; Bottos and Stefani, 1982).

Excessive eversion of the feet with persistent and unresolved out-toeing gait at 3-4. years of age has also been found in 62% of children born preterm compared with 38% at term (Davis et al, 1993). Therefore postural support in all positions, with frequent changes is recommended due to the premature infants motor instability and failure to effectively maintain posture. Although such interventions were frequently noted in practice, by no means did all nursing staff consistently adopt this intervention. Highlighting either the lack of a common knowledge base or ineffective use of evidence-based unit guidelines to support practice.

Covering, swaddling, and placing blanket rolls around the infant helps maintain desirable posture and prevent loss of control of the flexed position (Short et al, 1996; Montfort, 1997; Monterosso et al, 2003). Positional supports offer: comfort, support, security, energy conservation, containment and boundaries. Jack (2000) found notable improvements in the motor stability of premature infants at follow-up clinic since the introduction of supported positioning on a Scottish NICU. However, this research only proves a short-term benefit for a small sample size of infants, making generalisations difficult to justify.

Deformational plagiocephaly refers to the development of an abnormal head shape in infants resulting from externally applied moulding forces. Gentle pressure, if applied persistently can cause deformity, particularly in the malleable skulls of infants. The skull of a preterm infant is thinner, softer and more vulnerable to postural deformation than the skull of a full-term infant. This has implications for infant attractiveness (Budreau, 1989; Cubby, 1991), which may negatively affect the attachment process. Elliman et al (1986) goes as far as suggesting this may increase the premature infants risk of child abuse and neglect.

However, as attachment begins prenatally and many other factors including infant behaviour and parental characteristics influence the process. Care must be taken before generalising these findings, although all health care staff have an extremely important role in recognising these problems.

Neonatal and paediatric nurses should aim to facilitate and support parents in their new role, and encouragement in practical caring tasks and decision-making can assist the ‘bonding’ process. Promoting parent-infant interactions by helping parents to understand and respond appropriately to their baby’s behaviours is also essential (Hummel, 2003).

Both pre-term and full-term infants show preferential head turning (usually to the right) when placed supine. This has been linked to asymmetrical skull deformation (flattened occiput on preferred side, with or without a corresponding bulging of the forehead), lateral trunk curvature, and asymmetrical gait patterns (Konishi et al, 1986; Dias et al, 1996; Boere-Boonekamp et al, 1997). These findings are more prevalent and prolonged in

premature infants, and have been accentuated by SIDS recommendations to place infants supine for sleeping (Chaddock et al, 1997).

Additionally, the absence of prone play activities, over utilisation of infant carriers, and neonatal medical problems resulting in relative immobility may contribute to posterior positional moulding. Potential interventions have included surgery, head shaping helmets, and physical therapy (Pollack et al, 1997; Kelly et al, 1999; O’Broin et al, 1999). Nurses can also implement, and educate parents on prevention in preparation for discharge, allowing ample time to advise and discuss any issues raised.

Recommendations on varying the direction of head turn for sleeping in supine, supported midline head positioning in car seats, limited use of infant seats and replace with prone play with positional support, opportunistically warning of the injury risk of using infant walkers and baby bouncers and the impact on development should be offered, and backed with written and/or visual materials. It is also important to consider risk of cot death, which is 9 times higher if babies are nursed prone rather than in the supine position (Fleming et al, 2000).

Yet, in published studies, the vast majority of babies examined were born at term and had no medical problems. However, no data was found to suggest strategies designed to reduce risk in full term infants should not be applied to premature infants. The supine position was previously viewed as accepted practice in many units and for individual nurses, due to the ease of observation (i. e. chest wall movement), and the accommodation of equipment (i. e. umbilical artery catheters and ventilator apparatus).

However, many recent studies have suggested supine positioning may not be optimal for the compromised infant.

Positioning has been studied in relation to physiologic variables such as arterial O₂ tensions, respiratory rate, lung compliance, oxygenation, physical activity, and energy expenditure and sleep states. To improve the mechanics of breathing (Antunes et al, 2003; Chang et al, 2002; Maynard et al, 1999), conserve energy, promote rest and assist extra uterine adaptation (Chang et al 2002a), these studies recommend the prone position for: very premature and LBW infant, the management of respiratory distress syndrome, weaning off mechanical ventilation and apnoea (Kurlak et al, 1994).

Although some studies, such as Keene et al (2000) discovered that cardiorespiratory stability of preterm infants with apnoea and bradycardia was not significantly compromised by supine positioning. However, there is an overall consensus in the literature to consider prone positioning of premature and sick neonates despite any inconvenience involved. Premature babies may be positioned prone for developmental and/or medical reasons; however, babies born prematurely are more vulnerable to SIDS.

Kenyon and Bacon (2003) refers to a study presently being undertaken to determine at what stage premature babies can be safely turned from prone to supine. In the Neonatal intensive care environment, it is therefore important to advise and stress to parents that premature babies with respiratory problems have different needs to term, healthy infants, and that whilst in hospital with monitoring in place, it is safe to nurse them prone. Neonatal nurses need to accustom both infants and their families to supine

lying as soon as the infant is medically stable, and well before discharge home (Young, 1996).

However, prone positioning has some additional disadvantages, which if unrecognised and untreated may also prove lethal such as delays in recognising upper airway obstruction, sternal and sub costal recession, abdominal distension, and blood leakage from umbilical artery catheters (Cole and Gavey, 2001). Studies indicating certain positions as more favourable for premature infants than others have been translated, in practice, into regimes to seek to place the neonate in standardised flexed postures for promoting muscle tone and midline movement, or to lay the infant prone to support efficient breathing.

The studies that underpin such protocols have undeniably shown advantages, but to suggest that their findings have universal application may be stretching the point. Nevertheless, the goals of many positioning protocols in practice appear to almost prescribe a range of correct positions, without considering the infants expressed preferences at any time. Warren (2002) asserts this opposes the philosophy behind developmental care, as interventions are not then provided based on infant cues, and therefore not individualised practice.

Positioning is about comfort and functional posture. Static posture fitted into a protocol that expects the infant to remain undisturbed for long periods (due to the minimal handling policies on the neonatal unit – designed to reduce the stresses associated with environment), is not necessarily conducive to developmental progress, or self-regulatory competence.

Positioning support that suits individual babies should allow them to: sleep best and when they want, communicate needs and interact with carers when ready, and to be most competent at regulating physiological functions.

Neonatal and paediatric nurses can have a major impact in the prevention of the discussed developmental problems, and have the opportunity to influence the shaping and alignment of the newborn infant's muscular-skeletal system during the first year of life when maximum plasticity occurs. Many parents will model their actions on those of staff; generally positioning their infants at home in similar ways to how they were placed in hospital (Willinger et al, 2000).

Therefore it is vital that nurses are able to utilise research-based information to enable them to provide infants with the best start, and to work in partnership with parents, teaching them how to continue good practices. Nurses (and other health professionals) have a profound responsibility to model, educate, monitor, and support families in providing the appropriate balance between safe sleeping recommendations, medical and developmental needs.

Correct positioning seems dependent on role modelling and how motivated each nurse is to keep their knowledge base up dated with suggested practices provided through recent, valid research. To help ensure success with this, responsibility lies with management to organise regular education and training sessions, and develop evidence-based standards, protocols, policy and procedures and care plans. Sleep positions with special clinical

exceptions, bedding materials, play positions during awake states, and parent education with preparation for discharge should all be addressed.

Nursing staff should be actively involved in their formation (which may assist with the practical implementation). Regular audit of practice should follow this. Individual staff members need to be aware of, and up date their knowledge of the impact correct positioning may have on long-term development of premature infants, and have an understanding of the principles of care, including the equipment required (suggested by current research), enabling successful implementation.

Positioning premature infants is a subject requiring further investigation from researchers, particularly from a UK perspective, since the majority of studies have been American. Additionally, much of the research dates back to the 1980's and early 1990's, not considering the impact on recent advances in neonatal care. A renewed interest does seem to have developed recently though, and this should continue. Efforts to implement developmental care strategies (including positioning intervention) seem often resisted, possibly due to insufficient available evidence from large, randomised controlled trials.

The inclusion of multiple interventions (under the umbrella of developmental care), in many studies makes determination of the effect of any single intervention difficult and the specific nursing contribution unclear. Although there is evidence of benefit for developmental care overall, with no major harmful effects reported, there are studies demonstrating little, no, or conflicting effects. The single trials that do show a significant effect of

positioning strategies on clinical and developmental outcomes are often based on small sample sizes, and short-term outcomes on which changes in practice would be difficult to validate.

However, these small studies are useful as they often emphasize potential problems, and if nurses identify this they can be addressed in practice, and potentially increase the quality of life of both the surviving infants and their families. Consequently, before a clear direction for care, and up to date focus on long-term outcomes can be fully integrated into practice, this gap in research needs to be tackled. In conclusion, this assignment has considered the potential positioning, and postural support strategies to protect and promote the motor development of premature infants.

It has brought to light the consequences of prematurity with regards to this area. Research evidence relating to positional and postural influences on developmental delay and positional deformities have been presented and analysed. Practice examples were used throughout to illustrate the factors influencing current positioning practices. How the nurse can protect and optimise preterm infant developmental outcomes through partnerships with the family was discussed.

Finally, recommendations were made regarding both research needs and practice development. Sustaining life will always be a priority, but with recommendations such as these enforced, nurses will be able to make evidence-based judgements as to which position best meets an individual babies needs at any particular time, influencing the infant's course of

hospital care, with outcomes that looks promising for the infant's evolving and future development.