Effect of Early Skin to Skin Contact on Salivary Cortisol as a Biomarker of Stress in Full Term Neonates

Thesis

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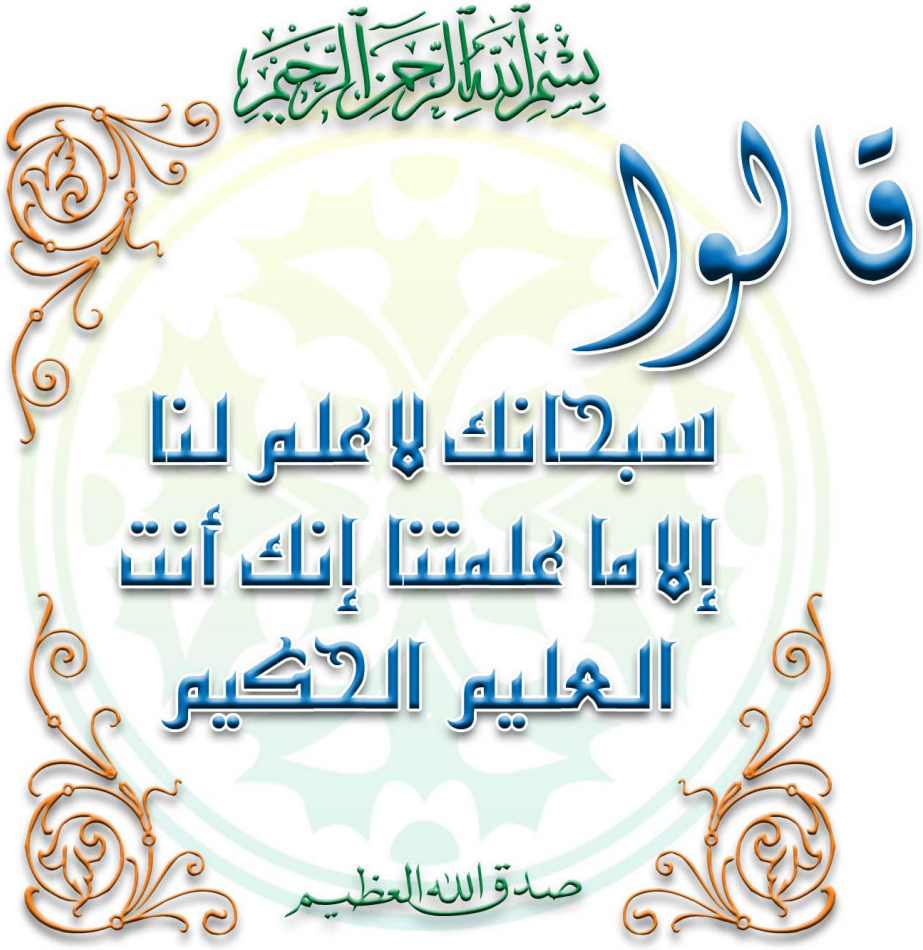

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Mohamed Abdallah Soliman

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List of Abbreviations

Abb.	Full term
11βHSD	*11β hydroxysteroid dehydrogenase*
3βHSD	*3β-hydroxysteroid dehydrogenase*
ACTH	*Adrenocorticotropic hormone*
AVP	*Arginine vasopressin*
CRH	*Corticotropin-releasing hormone*
DHEA	*Dehydroepiandrosterone*
DHEA-S	*Dehydroepiandrosterone sulfate*
ElISA	*Enzyme immunoassay*
GCs	*Glucocorticoids*
GRs	*Glucocorticoid receptors*
HPA	*Hypothalamic-pituitary-adrenal*
HPA axis	*Hypothalamic-Pituitary-Adrenocortical*
KP	*Kangaroo position*
MRs	*Mineralocorticoid receptors*
SPSS	*Statistical package for the social sciences*
SSC	*Skin to skin contact*
SUPC	*Sudden unexpected postnatal collapse*

INTRODUCTION

The transition from fetal to neonatal life and the separation between baby and his mother represents one of most important cause of emotional stress to the infant and may has permanent harmful effects on him ***(Takashi et al., 2011).***

Separation of mother from her newborn infant at birth has become standard practice, despite mounting evidence that this may have harmful effects, delivery room and postpartum hospital routines may significantly disrupt early maternal-infant interactions including breastfeeding ***(Anderson et al., 2016).***

Early skin to skin contact (SSC) between mother and her baby has shown to promote positive mental and emotional health in neonates and assist in bonding and attachment between mother and her neonate, Skin-to-skin contact after birth is known to promote the infants' regulation of temperature and metabolic adaptation and maintenance of glucose blood levels compared to infants not having skin-to-skin contact or those being separated from their parents. Thus, skin-to-skin causes a down regulation of stress reactivity ***(Bystrova et al., 2007).***

SSC is considered a component of the term KMC, which involves kangaroo position (KP); kangaroo nutrition, based on breast feeding; and mother–family involvement ***(Charpak, 2015***).

When the infant attempts to cope with a stressful situation, the developing hypothalamic-pituitary-adrenal axis is activated, culminating in alterations of cortisol level ***(Morelius et al., 2015)***.

Salivary cortisol has been reported as useful biomarker of psychological stress and related mental or physical disease as it is noninvasive method, in addition, sample collection is standardized and easy to handle, allowing reflection of direct response to stress since biomarkers are not bound to plasma transport proteins ***(Voegtline and Granger, 2014).***

Aim of the Work

Our aim is to evaluate the effect of early SSC between mother and her neonate on the salivary cortisol as biomarker of stress.

SKIN TO SKIN CONTACT (SSC) OR KANGAROO CARE

Introduction

During the neonatal life babies are as close to their moms as they can be getting warmth, nutrition, protection and oxygen from their mothers body. Then, labor occurs and babies suddenly find themselves without immediate access to those essential needs. This separation Leads to emotional stress of the infant and may has permanent dangerous effects ***(Crenshaw, 2014).***

Separation of human mothers and newborns is unique to the 20th century and is a complete break from natural human history. In the past, infant survival depended upon close and virtually continuous mother-newborn contact. The practice of routinely separating mothers and newborns started in the early 1900s, when birth first began to move from homes to hospitals. At the time, most birthing people received general anesthesia as pain relief during labor, and it made them and their babies incapable of interaction after birth. Because mothers could not care for their babies, hospitals created central nurseries to care for newborns, and infants were typically separated from their mothers for 24-48 hours ***(Anderson et al., 2003).***

In 1961, Dr. Brazelton published a classic study showing that general anesthesia was harmful to newborns ***(Brazelton,***

1961). As a result of his research, more people began to move away from using general anesthesia during birth, which resulted in mothers and infants being more alert—and capable of interaction—immediately after birth, so Most people who give birth by Cesarean today receive regional anesthesia (epidural or spinal) instead of general anesthesia, so these mothers, too, are usually alert after giving birth ***(Karlström et al., 2013).***

What is the standard of care today?

Although most mothers now are capable of taking care of their babies after birth, and despite the fact that research overwhelmingly supports couplet care, hospital practices have been very slow to change and in many hospitals, the routine standard of care after a Cesarean is for the baby to be taken to a warmer in the operating room, where he or she is examined, cleaned, labeled, weighed, measured, clothed, and swaddled before being shown briefly to the parents. The baby is then taken to a nursery for further assessment and observation in a warmer, while the mother is taken to a separate recovery room, with the separation typically lasting one to two hours ***(Moore et al., 2012 A).***

History

Kangaroo care was developed in Columbia in the 1970s to maintain infant body temperature. The position used in kangaroo care is similar to the position of baby kangaroos with

their mothers, where the human infant has skin-to-skin contact by being positioned between the mother's clothes and her skin ***(Samra et al., 2013).***

SSC is considered a component of the term KMC, which involves kangaroo position (KP); kangaroo nutrition, based on breast feeding; and mother–family involvement ***(Kymre & Bondas, 2013).***

Technique (HOW it is performed)

Early skin-to-skin care is a natural process that involves placing a naked newborn on the mother's bare chest and covering the infant with blankets to keep it dry and warm. The infant's ventral surface is in tactile contact with the mother, allowing both the mother and infant to sense the other's heartbeat and respiration. Close physical proximity may enable mothers to better co-regulate physiologically with the infant than with typical blanket holding in which the baby is dressed, wrapped in a blanket, and held in the mother's arms ***(Neu and Robinson, 2010).***

Ideally, skin-to-skin care starts immediately after birth or shortly after birth, with the baby remaining on the mother's chest until at least the end of the first breastfeeding session (fig. 1) ***(Moore et al., 2012B).***

Figure 1: Technique of skin to skin contact

Types of Skin to Skin Contact

Skin to Skin Contact for term or late preterm infants can be divided into:

a. **Birth SSC**: The infant is placed prone on the abdomen or chest of his mother at the first minute post birth. The infant is dried and covered across the back with a pre warmed blanket, suctioned while on his mother, to prevent heat loss, the infant's head may be covered with a dry cap that is replaced when it becomes damp. All other interventions are delayed until at least the end of the first hour post birth or the first successful breastfeeding.

b. **Very early SSC**: It starts 30 to 40 minutes post birth, the naked infant is placed prone on the mother's bare chest and a blanket is placed over the back of the infant.

c. **Early SSC:** It begin anytime between one and 24 hours post birth. The baby is naked (with or without a diaper and cap) and is placed prone on his mother's bare chest between the breasts. The mother may wear a blouse or shirt that opens in front, or a hospital gown worn backwards, and the baby is placed inside the gown so that only the head is exposed. The important thing is that the mother and baby are in direct ventral-to-ventral SSC and the infant is kept dry and warm ***(Widström et al., 2019A).***

Benefits of Early skin-to-skin contact

1. Stabilization of body temperature.

Mother maintains her baby's temperature during pregnancy by sweating when hot and shivering and moving around when cold. But after birth the maintenance of temperature is difficult because an infant is not able to generate heat due to lack of shivering mechanism, and so his temperature decline rapidly ***(Gouchon et al., 2010).***

Movement of his hands over the mother breasts leads to increased secretion of oxytocin, increasing breast milk secretion and breast heat. The heat is transferred to the baby because the mother's body temperature activates the baby's sensory nerves, resulting in baby's relaxation, reduction in the tone of the sympathetic nerves, dilation of the skin vessels, and increase in the baby's body temperature ***(Jonas et al., 2017).***