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Preventing peri-operative maternal and neonatal hypothermia after skin-to-skin contact

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Abstract This small Randomised Controlled Trial (RCT) study aims to investigate whether there is any connection between maternal and infant hypothermia for babies delivered by caesarean section while the baby undergoes skin-to-skin contact (SSC). 20 pregnant women booked for elective caesarean section (singleton pregnancy) and their newborn babies were consented and randomly allocated into two groups, care as usual and intervention group. The care as usual — received room temperature IV fluids (approximately 25 °C), with the intervention group receiving pre-warmed fluids (39 °C) via a fluid warmer device (Hotline Fluid Warmer, Level 1).

Maternal temperature in the intervention group who received the pre-warmed IV fluids was maintained within normal levels when compared to the care as usual group. While no statistical significant differences were identified in neonatal temperatures, reduced temperatures were identified in babies resulting in mild neonatal hypothermia especially the neonates of the control group.

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Introduction

Skin-to-skin contact (SSC) is a widely recognised technique, used over the past 20 years, in which the new-born is positioned between its mother's breasts, wearing only a hat and a nappy (Nirmala et al., 2006; Gabriel et al., 2009; Takahashi et al., 2011). SSC among its many properties, can be used for managing neonatal heat loss (WHO, 1997; UNISEF, 2004). Recent research suggests that SSC after vaginal delivery can not only maintain the normal temperature of the new-born but may also treat mild hypothermia (Holtzclaw, 2008; Moore et al., 2012). Neonatal hypothermia, according to WHO, is divided into three categories which are: Mild hypothermia: with ranges between 36.4 °C and 36 °C, moderate hypothermia: ranging between 35.9 °C and 32 °C, and severe hypothermia: with any temperature below 32 °C (WHO, 1997).

Although SSC has many other benefits for both the mother and her baby, the effects of SSC on the heat loss of infants born by caesarean section has not as yet been adequately investigated (Horn et al., 2014). Moreover, the effect of maternal temperature on the infant's temperature during SSC after the caesarean section (CS) has not been sufficiently researched (Vilinsky and Sheridan, 2014). The majority of studies reviewing this topic concentrate primarily on maternal findings. In the majority of cases neonatal temperatures are measured on a single occasion following delivery, no further recordings of neonatal temperature either in the delivery room, the recovery room and/or postnatal ward (Sultan et al., 2015; Munday et al., 2014). Furthermore, previous studies have not reported instituting SSC (Vilinsky and Sheridan, 2014), resulting in the absence of a clear connection between maternal and neonatal hypothermia. The aim of this study is to establish the feasibility of a future RCT and to determine the sample size of the study population. The objective of the study is to identify if active peri-operative warming of the mothers (administration of 39 °C IV fluids), compared to the current practice of administering room temperature IV fluids (25 °C), contributes to preventing peri-operative neonatal temperature drop during/after skin-to-skin contact up to 2 h post-delivery.

Methods

This is a randomised, single-blinded, interventional study which took place in the operating theatres of a large maternity hospital in Ireland between January and February 2015.

Sample

As this was a small scale study to test feasibility, a sample size of 20 participants, 10 allocated to each group was considered adequate to identify temperature variations in women undergoing elective caesarean section and to determine if a larger study was warranted. Both the inclusion and exclusion criteria are outlined in Table 1 below.

Participants were randomly assigned by the principal investigator, by tossing a coin, to either the intervention group (IV fluids warmed to 39 °C) or the control/usual care group (IV fluids at room

Table 1 Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
All women with an uncomplicated elective caesarean section. The elective caesarean sections will take place Monday to Friday between 08:00 and 16:00.	Women and babies involved with emergency caesarean sections. Any elective caesarean sections undergone outside the accepted hours mentioned above.
All participants should have a clear medical history (i.e. no diabetes, hypertension, cardiac disorders, IUGR, genetic syndromes etc).	Any participants with any health problems (i.e. diabetes, hypertension, cardiac disorders, IUGR, genetic syndromes etc) were considered unhealthy and excluded.
Should be able to provide consent for themselves and their unborn babies.	Any participants who haven't consented to participate in this project (equally mothers/babies).
All candidates should receive SSC before being transferred back to their postnatal bed.	Any women who have a general anaesthesia.
All women who had spinal or combined spinal anaesthesia. New-borns need to stay with the parents after the operation until their transfer to the postnatal ward.	Babies who need resuscitation after birth and/or need admission to the NICU.