The occurrence of specific environmental factors and stimuli affecting the experience of a newborn in the first period after birth

Introduction and purpose of the study

The first hour after birth is a critical period in the adaptation of a newborn to extrauterine conditions. He experiences stimuli that are radically different for him compared to those he knew from the prenatal period (light, noise, low ambient temperature, cold touch, wet underclothes, no contact with the mother, a large number of staff). So far, little attention has been paid to the ecology of the newborn's surroundings in the care provided to him immediately after birth. However, this topic remains very important, as an optimal environment is an important factor in ensuring the comfort and safety of the patient.

The aim of the study was to analyse the factors that may stress the neonate and to evaluate the provision of optimal environmental conditions for the neonate immediately after birth.

Material and methods

The method used in the study was direct observation. The research material was collected by means of observation sheets designed by the authors. Certified measuring devices of environmental factors were used to record the sound level, light intensity, ambient temperature and humidity for the purposes of the observation. There were 500 randomly selected observations made in 11 maternity facilities in Warsaw, comprising 304 observations of vaginal labours and 196 by caesarean section. The studies were conducted in the period from January 2016 to December 2017.

Results

Analysis of the research material showed that the mean intensity of light emitted with the diagnostic lamp switched on at the infant care station in the operating room was 904.74 \Box 288.36 lx, whereas the mean reduced light intensity was 374.29 \Box 223.14 lx. Average light intensity during the second period of vaginal labour was 579.56 \Box 443.73 lx, whereas average light intensity during "skin to skin" contact was 367.61 \Box 275.09 lx. The use of a treatment lamp had a statistically significant effect on the increase of light intensity in the delivery room (p < 0.001). Diagnostic lighting was used in 56.44% of the cases after preliminary assessment and enrollment of neonates born by caesarean section in the group of children born in good condition.

The average sound level in the delivery room was $58.0 \Box 27.77$ dB. At the time when a newborn baby born by caesarean section was undergoing standard procedures in the infant care station, it reached $46.98 \Box 10.28$ dB. There were noise peaks of up to 85.00 dB in delivery rooms and 78.50 dB in operating rooms. The most frequent source of noise both after vaginal labour and caesarean section were staff conversations. It was shown that there is a positive correlation between the level of sound intensity and the number of people in both the delivery room (R = 0.520, p < 0.001) and the operating room (R = 0.339, p < 0.001).

The average ambient temperature in both the delivery room and the caesarean section room was around 23°C, while the average relative humidity reached 37.07% (delivery room) and 39.27% (caesarean section room). A statistically significant negative correlation between air temperature and relative humidity was observed in the caesarean section room (R = -0.156, p = 0.029).

The temperature at the infant care station at the level of the mattress ranged from 22 to 29.2°C and differed depending on the time the station was set up. There was a statistically significant correlation between the air temperature in the caesarean section room and that at the infant care station at mattress level (p < 0.001). Lower air temperature correlated with lower temperature at the station (R = 0.361). It was observed that 85.71% of neonates born by caesarean section and 75.99% of naturally born neonates were dried with warm cloths. Their underwear was most often warmed at the infant care station (52.81% at natural childbirth, 93.45% by caesarean section). The majority (93.42%) of newborns delivered naturally were placed on the mother's chest after birth (including 7.89% after cutting the umbilical cord).

Conclusions

The environment in which newborns were delivered was often not beneficial for them. They were exposed to bright light for longer than required by medical procedures. Staff activity was the main source of noise and a greater number of people in the newborn's environment significantly contributed to higher sound levels. Lower ambient temperature had a significant effect on the temperature at the infant care station. Research and dissemination of knowledge is necessary to reduce the occurrence of adverse factors and promote a safe environment.