

Public summary

The development of a

Visual tool for the behavioural sleep stage classification for preterm infants

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In the thesis report, you will find the development of a visual tool that supports the determination and classification of sleep stages from preterm infants. The healthy development of these infants is sustained by enough sleep. This tool supports ongoing research on how to maintain an optimal sleep pattern for these infants born preterm.

Too little is known about the irregular sleep rhythm of preterm infants. However, maintaining an optimal sleep pattern, also between the walls of the neonatology department of the hospital, is of major importance for the brain development of these infants. Premature children are admitted to the Neonatology Intensive Care Unit (NICU) when born <32 weeks of gestation, where care and examinations take place. These necessary treatments often disturb the sleep rhythm of these vulnerable infants. There is a need for more research into the sleep patterns of preterm infants to see to which extent abnormal sleep contributes to the high risks of neurodevelopmental disabilities seen in this patient group. The overall aim is to find out how to diminish the disturbance of the infant's natural development, including the natural sleep cycle.

To facilitate more research, a team from UMC Utrecht has developed a behavioural sleep stage classification for preterm infants (BeSSPI). There is a need for a visual tool that supports the use and implementation of this classification scale. It aims to support the ongoing research on how to maintain an optimal sleep pattern for infants born preterm within the NICU (Neonatology Intensive Care Unit).

Project aim

This project aims to enable easy use and stimulate evidence-based classification of the sleep pattern of preterm infants. This will be realized by visualizing the BeSSPI and providing a tool that provides easy and efficient use. It is based on the question of how this behavioural sleep classification scale can be visualised in a tool to make sure the preterm babies' sleep patterns can be determined.

Methodology

In this report, a full description of the iterative design process can be found. Research on sleep, stakeholders, innovation diffusion, context and user interfaces offer design implications. These design implications are gathered in a list of requirements which is used for the selection, validation and detailing of concepts and the final product.

Final product

The final product offers a concise, step-by-step guide to reach the correct sleep stage classification. It helps to lower the threshold to implement evidence-based decision making. The tool is developed and can be used as both a static figure, possibly printed on a so-called 'pocket card', and an interactive digital tool. The digital tool takes the user by hand in all important parameters that are of importance by making the classification. The static figure lowers the threshold to implement evidence-based decision-making while scoring the sleep pattern of the preterm infants. The combination of these two variants helps with enabling more research into maintaining the optimal sleep rhythm for babies admitted to the NICU.

Recommendations

The report offers recommendations for further research. A digital tool that will facilitate 'live scoring' can result in (i) more reliable classifications and (ii) fewer actions needed to be performed by the observer.