

Cycled lighting in the Neonatal Intensive Care Unit: A translational research study

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1 Background

This research study investigated the implementation of a lighting protocol to maintain developmentally appropriate lighting in the Neonatal Intensive Care Unit (NICU) at The Johns Hopkins Children's Center. Through the use of a quasi-experimental, mixed methods design, research team members interviewed and measured NICU staff understanding, attitude, and organizational factors related to the lighting protocol, as well as NICU parents' understanding of lighting and their infants' development. From these findings, an intervention will be developed to guide implementation of the protocol and evaluate the success of protocol implementation through repeated future interviews and measures.

In order to implement a new lighting protocol, staff's ideas on cycled lighting were assessed through the use of a survey based on the Theoretical Domains Framework (TDF) (Michie et al., 2005) and the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg et al. 2014). The information gathered through this survey will be used to develop relevant methods to increase acceptance and adoption of a cycled lighting protocol in the NICU.

2 Objectives

Primary Objective: Acceptance and adoption of a developmentally appropriate lighting protocol in the NICU.

3 Methods

Following IRB approval, a Qualtrics survey was created to assess NICU team members' potential determinants to the implementation of a lighting protocol. The survey was adapted from the DIBQ to fit the aims of the study. The final survey consisted of 7 demographic questions followed by 82 questionnaire items, that were scored on a 7-point Likert scale (1 = strongly disagree, 2 = somewhat disagree, 3 = disagree, 4 = neither agree nor disagree, 5 = agree, 6 = somewhat agree, 7 = strongly agree). The 82 items were representative of the 18 domains of behavioral determinants.

The survey was distributed electronically and in paper format to 207 NICU team members across all disciplines including CCSR staff, environmental support staff, physical therapy, respiratory therapy, nursing staff, and medical staff, however, not all disciplines responded. Survey data were exported into an Excel spreadsheet for item analysis. Demographic data were analyzed to describe the sample. The mean and standard deviation were calculated for all 82 questionnaire items.

4 Results

Of the 207 distributed surveys, 67 surveys were started and 32 were completed (15% response rate) and included in the data analysis.

Demographic Variable	Respondents (n=32)	n%
Age		
18-25yo	3	(9.38%)
26-35yo	9	(28.13%)
36-45yo	5	(15.63%)
46-55yo	8	(25%)
56-65yo	7	(21.88%)
Racial/Ethnic Group		
Hispanic/Latino	1	(3.13%)
Non Hispanic White	31	(96.88%)
Employment Status		
Part time	5	(15.62%)
Full time	27	(84.38%)
Years employed at JHH		
0-2 years	5	(15.63%)
3-5 years	3	(9.38%)
6-10 years	11	(34.38%)
>15 years	13	(40.63%)
Years employed at JHH NICU		
0-2 years	9	(28.23%)
3-5 years	1	(3.13%)
6-10 years	9	(28.13%)
>15 years	13	(40.63%)
Educational Level		
Some college	1	(3.13%)
Associate's Degree	4	(12.5%)
Bachelor's Degree	22	(68.75%)
Master's Degree	4	(12.5%)
Doctorate degree	1	(3.13%)
Job Category		
CCSR	1	(3.13%)
Registered Nurse	28	(87.5%)
Respiratory Therapist	3	(9.38%)
Domain Data:	Mean (SD)	
Domain 1 Knowledge	2.78 (0.18)	
Domain 2 Skills	3.00 (0.85)	
Domain 3 Social/professional role and identity	4.23 (0.51)	
Domain 4 Beliefs about capabilities	4.60 (0.41)	
Domain 5 Optimism	5.54 (0.23)	
Domain 6 Beliefs about consequences	4.65 (0.53)	
Domain 7 Intentions	5.49 (0.07)	
Domain 8 Goals	4.73 (0.20)	
Domain 9 Innovation	5.14 (0.23)	
Domain 10 Socio-political content	4.72 (1.11)	
Domain 11 Organization	4.64 (0.20)	
Domain 12 Patient	4.53 (0.88)	
Domain 13 Innovation Strategy	3.70 (0.23)	
Domain 14 Social influences	4.05 (0.36)	
Domain 15 Positive emotions	4.46 (0.18)	
Domain 16 Negative emotions	3.14 (0.07)	
Domain 17 Behavioral regulation	3.04 (0.16)	
Domain 18 Nature of the behaviors	3.80 (0.40)	

References

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5 Conclusions

As the respondents of this survey are predominantly registered nurses (87.5%), this data is more representative of the nursing view than that of the CCSR or respiratory therapist. Additionally, since the respondents of this survey are mostly nurses who have worked in the NICU for greater than six years (68.76%), the views reflect those of the more experienced nurses who may find it difficult to change ingrained lighting practices for their patients.

The survey respondents have lower scores for the knowledge and skills domains. This is understandable, as the protocol has not yet been started and is not yet part of the staff's education. The respondents have higher scores for the domains of optimism, innovation, and intentions. They see a cycled lighting protocol as feasible and helpful to their unit, and they can see themselves following such a protocol successfully.

For behavioral regulation, the respondents scored the lowest, which makes sense because this domain asks about having a clear plan for the cycled lighting protocol. These staff members are not yet aware of the protocol, so it would be difficult for them to have a clear plan developed. There were also low scores for the domain of negative emotions, which reveals that the staff members do not have any ill feelings towards cycled lighting.

6 Future Directions

This survey data highlights some important future directions for this translational study. Although not all disciplines responded to the survey, we were able to contact these other disciplines and complete interviews, which will be included in informing the implementation of the lighting protocol. To increase the response rate of the follow-up survey, additional methods of circulation of surveys will be implemented. The implementation of the cycled lighting protocol should focus on addressing the lack of education and build upon the enthusiasm of the unit to make lasting changes. Additionally, based on survey results the culture of the unit may not need to be changed in order to roll out this protocol, and the staff is open to this change in the future.

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