ISRCTN84511779 https://doi.org/10.1186/ISRCTN84511779

# Improving nurses' sleep quality during irregular night shifts: a pilot study testing personalized 'Shift your Sleep' tips

| | | |
|---|---|---|
| **Submission date**<br>24/11/2023 | **Recruitment status**<br>No longer recruiting | [X] Prospectively registered<br>[_] Protocol<br>[_] Statistical analysis plan<br>[_] Results<br>[_] Individual participant data<br>[_] Record updated in last year |
| **Registration date**<br>28/11/2023 | **Overall study status**<br>Completed | |
| **Last Edited**<br>04/08/2025 | **Condition category**<br>Other | |

## Plain English summary of protocol

Background and study aims
Working shifts, especially irregular night shifts, adversely affects sleep quality, as the circadian rhythm of shift workers, including nurses, is disrupted by nighttime work, impacting their overall sleep. While research has extensively explored the impact of shift work on sleep quality, there has been limited attention given to developing interventions for improving the sleep quality of shift nurses. The effectiveness of the few existing interventions is restricted either due to limited evidence or inconsistent results.
To address this gap and enhance nurses' sleep quality, sleep hygiene strategies could serve as a potential solution. However, it's crucial to recognize that the impact of these strategies may vary from person to person. Therefore, this study aims to personalize sleep hygiene strategies for nurses and assess their effectiveness in improving the sleep quality of nurses working irregular night shifts.

Who can participate?
Nurses who work irregular shifts, including night shifts. To be eligible for the study, the nurse should not have been treated in the past or be under current treatment for sleep problems or diagnosed with conditions such as insomnia. Additionally, the nurse must work night shifts and should not be employed in critical care, such as the intensive care unit. Lastly, the nurse must have an employment contract with the hospital.

What does the study involve?
The "Shift your Sleep!" study involves two phases, baseline and intervention. Each phase is about 30 days. In the baseline phase, the nurse's sleep will be monitored unobtrusively with the Emfit QS sleep monitor, a sleep-monitoring device that can be fastened under a mattress. By the end of the baseline phase, the nurse will be asked to fill out a sleep diary for the past month using Emfit’s data as well as a survey that includes general information and questions regarding sleep quality and sleep hygiene practices.
In the intervention phase, personalized sleep hygiene advice will be provided based on the individual nurse's data from the baseline phase. The advice includes recommendations tailored to the participant's sleep duration, general sleep hygiene practices, and targeted strategies for

managing challenges associated with irregular night shifts. The participant will be encouraged to actively experiment with integrating these recommendations into the routine. Further, the nurse will complete assessments, including sleep strategies diaries, weekly plans, and surveys measuring sleep quality and hygiene practices.

What are the possible benefits and risks of participating?
The possible benefits of participating in this study include improving sleep quality, which may improve health overall. Further, there are no possible harms or risks to health that are foreseen for this study. However, it should be noted that participation in this study requires significant commitment and effort from the nurse. The nurse will be reimbursed for the efforts with 100 euros.

Where is the study run from?
Maastricht University and Maastricht University Medical Center+ (Netherlands)

When is the study starting and how long is it expected to run for?
January 2023 to December 2025

Who is funding the study?
This research received no specific grant from any funding agency in the public, commercial or not forprofit sectors, but Al Baha University supported the executive researcher with a scholarship.

Who is the main contact?
Ree Meertens, r.meertens@maastrichtuniversity.nl

# Contact information

### Type(s)
Public, Principal investigator

### Contact name
Dr Ree Meertens

### ORCID ID
https://orcid.org/0000-0001-8424-9142

### Contact details
P. Debijeplein 1
Maastricht
Netherlands
6229 HA
+31 (0)43 3882407
r.meertens@maastrichtuniversity.nl

# Additional identifiers

# Study information

### Scientific Title

The effect of personalized ‘Shift your Sleep!’ sleep hygiene recommendations on sleep quality of nurses working irregular night shifts: an N-of-1 pilot study

## Acronym
‘Shift your Sleep!’

## Study objectives
1. Personalized ‘Shift your Sleep!’ sleep hygiene recommendations/advice are effective in improving the sleep quality of nurses working irregular night shifts compared to baseline.
2. It is feasible to implement the ‘Shift your Sleep!’ approach at an individual level for hospital nurses working irregular night shifts.

## Ethics approval required
Ethics approval required

## Ethics approval(s)
Approved 19/07/2023, Faculty of Health, Medicine & Life Sciences (FHML) Research Ethics Committee (Universiteitssingel 40, Maastricht, 6229 ER, Netherlands; +31 (0)43 388 5655; fhml-rec@maastrichtuniversity.nl), ref: FHML-REC/2023/065

## Primary study design
Interventional

## Study design
An N-of-1 study. The nurse participating in the study will be treated as a control (during the baseline measure) and as an experimental subject (during the advice period).

## Study type(s)
Prevention, Efficacy

## Health condition(s) or problem(s) studied
Promoting better sleep quality in hospital nurses working irregular night shifts

## Interventions
The participant will undergo a baseline measurement period (control period) and an intervention period. The participant will first enter the baseline/control/no treatment condition with 30 days of (unobtrusive) sleep quality measurements. After that, personalized sleep hygiene tips will be provided and the participant will make weekly personal plans for dealing with (night) shifts, also for 30 days. The participant is encouraged to actively experiment with integrating sleep tips into their personal routine.

## Intervention Type
Behavioural

## Primary outcome(s)
Sleep quality, assessed by data filled in a sleep diary obtained from the Emfit device. This data encompasses key factors such as the time of getting into bed, the number of nighttime awakenings, time of awakenings during the sleep period, final awakening time (sleep offset), and time of getting out of bed. These measures are collected both at the end of the baseline phase (30 days) and during the intervention phase (30 days).

### Key secondary outcome(s)
1. Sleep regularity is assessed using sleep diary data obtained from the Emfit, daily during the baseline period (but filled in after the 30 baseline days) and daily during the intervention period (30 days)
2. Sleep hygiene practices are measured daily during the intervention period (30 days) through a sleep hygiene questionnaire, partially based on the sleep hygiene index (SHI)
3. Weekly plan of sleep strategies is assessed using a self-developed questionnaire during the intervention period (every week during 30 days, so four times)
4. Adherence to the previous weekly plan is measured through a self-developed questionnaire regarding the strategies or behaviors implemented in the preceding week during the intervention period (every week during 30 days, so four times)

### Completion date
31/12/2025

## Eligibility

### Key inclusion criteria
Nurses who work irregular shifts, including night shifts

### Participant type(s)
Health professional

### Healthy volunteers allowed
No

### Age group
Adult

### Lower age limit
18 Years

### Upper age limit
67 Years

### Sex
All

### Total final enrolment
1

### Key exclusion criteria
Nurses will be excluded if they:
1. Have been treated in the past or are under treatment for sleep problems or diagnosed with such sleep problems as insomnia
2. Do not work night shifts
3. Are classified as a critical care nurse (e.g., work on the intensive care unit)
4. Work as an intern

**Date of first enrolment**
04/12/2023

**Date of final enrolment**
01/07/2025

# Locations

**Countries of recruitment**
Netherlands

**Study participating centre**
**Maastricht University Medical Center**
P. Debyelaan 25
Maastricht
Netherlands
6229 HX

# Sponsor information

**Organisation**
Al Baha University

**ROR**
https://ror.org/0403jak37

# Funder(s)

**Funder type**
University/education

**Funder Name**
Albaha University

**Alternative Name(s)**
Al-Baha University, , BU

**Funding Body Type**
Private sector organisation

**Funding Body Subtype**
Universities (academic only)

### Location
Saudi Arabia

## Results and Publications

### Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be available upon request from Ree Meertens, r.meertens@maastrichtuniversity.nl, but only when the participant gives formal permission.

### IPD sharing plan summary
Available on request, Other