

Virtual reality mediated deep breathing and relaxation training in pediatric and psychiatric care

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| Submission date 13/05/2025 | Recruitment status No longer recruiting | <input type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol |
| Registration date 23/05/2025 | Overall study status Completed | <input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results |
| Last Edited 14/10/2025 | Condition category Mental and Behavioural Disorders | <input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year |

Plain English summary of protocol

Background and study aims

Virtual reality techniques have been used for various purposes in healthcare to find novel ways to treat different medical conditions and to prepare patients for unpleasant procedures. The study aims to create virtual reality applications for children for learning deep breathing and relaxation, and to study their effectiveness, safety and usability in different child patient groups. The main goal is to learn if virtual reality-mediated deep breathing and relaxation training can reduce experiences of stress and anxiety via autonomic nervous system stimulation.

Who can participate?

The participants are child patients aged 8-17 years.

What does the study involve?

The participants perform either guided deep breathing or relaxation exercises using a virtual reality headset. The exercise is guided by a avatar character providing verbal instructions in a virtual nature environment.

What are the possible benefits and risks of participating?

The study patients receive the benefit of a learning experience of the guided deep breathing or relaxation exercise and the possible stress and anxiety reducing effects of these exercises. The possible risk is having nausea or vertigo, which are occasionally reported during the use of a virtual reality headset.

Where is the study run from?

Tampere University Hospital (Finland)

When is the study starting and how long is it expected to run for?

May 2022 to June 2024

Who is funding the study?

1. Tampere University (Finland)

2. The Finnish Foundation for Pediatric Research (Finland)
3. Finnish Brain Foundation (Finland)
4. Päivikki and Sakari Sohlberg Foundation (Finland)

Who is the main contact?

MD, PhD Sauli Palmu, sauli.palmu@tuni.fi

Contact information

Type(s)

Public, Scientific

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Additional identifiers

Study information

Scientific Title

The effect of virtual reality mediated deep breathing and relaxation training on stress and anxiety in child patients: a pilot trial

Acronym

VirNE

Study objectives

Deep breathing and relaxation training reduce stress and anxiety in child patients.

Ethics approval required

Ethics approval required

Ethics approval(s)

approved 15/06/2021, The Ethics Committee of the Wellbeing Services County of Pirkanmaa (PL 2000, Tampere, 33521, Finland; +358 50 347 0251, +358 50 329 5667; toimikunta.eettinen@pirha.fi), ref: RL21070L

Study design

Multicenter interventional non-randomized controlled pilot trial

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Reducing anxiety and stress in child patients

Interventions

Current interventions as of 14/10/2025:

The patients are allocated to either the intervention or the control group in numerical order. The intervention is virtual reality-mediated deep breathing or relaxation training. The study patients perform a 6-minute deep breathing or relaxation exercise with a virtual reality headset in the pediatric unit, observing a 360-degree virtual Finnish nature environment and an avatar character providing the patient with verbal guidance throughout the exercise. The study patients will perform the exercise once (in a distraction group) or four times (in a training group; one session per week in a 4-week period). During the exercise, heart rate variability is measured using a heart rate sensor belt (a chest strap). The control condition is treatment as usual.

Previous interventions:

The patients are allocated to either the intervention or the control group in numerical order. The intervention is virtual reality-mediated deep breathing or relaxation training. The study patients perform a 6-minute deep breathing or relaxation exercise with a virtual reality headset in the pediatric unit, observing a 360-degree virtual Finnish nature environment and a bot figure providing the patient with verbal guidance throughout the exercise. The study patients will perform the exercise once (in a distraction group) or four times (in a training group; one session

per week in a 4-week period). During the exercise, heart rate variability is measured using a heart rate sensor belt (a chest strap). The control intervention is no treatment.

Intervention Type

Device

Phase

Not Specified

Drug/device/biological/vaccine name(s)

Oculus Quest 2 - virtual reality headset

Primary outcome(s)

Heart rate variability measured using the virtual reality headset during the research situation

Key secondary outcome(s)

Heart rate and user feedback measured using the virtual reality headset during the research situation

Completion date

30/06/2024

Eligibility

Key inclusion criteria

1. Child patients aged 8-17 years
2. Literate
3. Fluent in Finnish

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Child

Lower age limit

8 years

Upper age limit

17 years

Sex

All

Key exclusion criteria

1. Unstable heart condition
2. Anatomical facial features preventing the use of the headset

3. Hearing impairment or cochlear implant
4. Vision impairment
5. Tendency for vertigo
6. Clinically unevaluated seizures
7. Epilepsy
8. Migraine
9. Bulimia nervosa
10. Relative exclusion criteria: motion sickness, underweight

Date of first enrolment

04/05/2022

Date of final enrolment

30/06/2024

Locations

Countries of recruitment

Finland

Study participating centre

Tampere University Hospital

Elämänaukio 2

Tampere

Finland

33520

Study participating centre

Päijät-Häme Central Hospital

Keskussairaalankatu 7

Lahti

Finland

15850

Sponsor information

Organisation

Tampere University

ROR

<https://ror.org/033003e23>

Funder(s)

Funder type

University/education

Funder Name

Tampere University

Funder Name

Finnish Foundation for Pediatric Research

Funder Name

Finnish Brain Foundation

Funder Name

Päivikki and Sakari Sohlberg Foundation

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated and/or analyzed during the current study are not publicly available due ethical and data privacy issues in healthcare, but are partly available from Elina Karppa (elina.karppa@tuni.fi) upon reasonable request. Consent from the participants was required and obtained; data is anonymised with ID codes.

IPD sharing plan summary

Not expected to be made available

Study outputs

| Output type | Details | Date created | Date added | Peer reviewed? | Patient-facing? |
|-------------------------------|-----------|--------------|------------|----------------|-----------------|
| Protocol file | version 3 | 14/05/2025 | 23/05/2025 | No | No |