Effect of Immersive Virtual Reality During Arteriovenous Fistula Puncture on Pain Intensity among Children Undergoing Hemodialysis in El Beheira Governorate

**Protocol summary**

**Study aim**
Evaluate the effect of immersive virtual reality on pain intensity at arteriovenous fistula puncture site among children undergoing hemodialysis in El Behira Governorate.

**Design**
Quasi-experimental design (one group pre-posttest) (virtual reality experience controlled/compared versus traditional care on the same group)

**Settings and conduct**
It will be conducted at eight governmental hemodialysis units of the general hospitals affiliated to the Ministry of health in eight administrative districts of El Beheira Governorate – Egypt.

**Participants/inclusion and exclusion criteria**
- Children aged 7-18 years. - Both sexes. - Receiving hemodialysis therapy for more than 6 months through an arteriovenous fistula (AVF). - Not receiving any other pharmacological and/or non-pharmacological interventions for pain. - Not suffering from any other source of pain rather than the AVF. - Not suffering from any visual, auditory, or cognitive impairments. - Didn’t use the VR headset before.

**Intervention groups**
All children receiving hemodialysis through an arteriovenous fistula in the selected study settings. - Before the procedure, children will choose either to watch a 3D animated cartoon movie or to play a simple 3D game. - The baseline data will be recorded before the procedure. - children will start to watch the cartoon movies or games for about 10 minutes before the procedure and continue watching till the end via a mobile smartphone placed inside the VR headset. - post-test values will be recorded.

**Main outcome variables**
Pain intensity will be assessed through: - The subjective pain through a self-reported numerical rating scale of pain severity. - The physiological indicators of pain: heart rate, respiratory rate, blood pressure, and oxygen saturation. - Behavioral indicators of pain through direct observation of the children's pain behavior and distress during AVF puncture procedure.
**Expected recruitment end date**
2022-03-01, 1400/12/10

**Actual recruitment start date**
empty

**Actual recruitment end date**
empty

**Trial completion date**
empty

**Scientific title**
Effect of Immersive Virtual Reality During Arteriovenous Fistula Puncture on Pain Intensity among Children Undergoing Hemodialysis in El Beheira Governorate

**Public title**
Effect of Immersive Virtual Reality During Arteriovenous Fistula Puncture on Pain Intensity among Children Undergoing Hemodialysis in El Beheira Governorate

**Purpose**
Health service research

**Inclusion/Exclusion criteria**

**Inclusion criteria:**
Children aged between 7 and 18 years. Both sexes.
Receiving hemodialysis therapy for more than 6 months through an arteriovenous fistula (AVF). Not receiving any other pharmacological and/or non-pharmacological interventions for pain management. Not suffering from any other source of pain other than the AVF. Not suffering from any visual, auditory, or cognitive impairments.- Didn’t use the Virtual Reality headset before.

**Exclusion criteria:**

**Age**
From 7 years old to 18 years old

**Gender**
Both

**Phase**
N/A

**Groups that have been masked**
No information

**Sample size**
Target sample size: 50
More than 1 sample in each individual
Number of samples in each individual: 3
Pain intensity will be measured using pain rating scale and physiological parameters before and after the arteriovenous fistula puncture procedure. The behavioral pain response will be observed during the AVF procedure using a specified Likert scale

**Randomization (investigator's opinion)**
N/A

**Randomization description**

**Blinding (investigator's opinion)**
Not blinded

**Blinding description**

**Placebo**
Not used

**Assignment**
Single

**Other design features**
All the available children who meet the inclusion criteria will be included in the study as the target population is small, thus there is no randomization.

**Secondary Ids**
empty

**Ethics committees**

1. **Ethics committee**
   **Name of ethics committee**
   Ethic’s committee of the Faculty of Nursing-Damanhour University
   **Street address**
   Damanhour, Elbehira, Governorate, Egypt
   **City**
   Damahour
   **Postal code**
   22511
   **Approval date**
   2021-12-15, 1400/09/24
   **Ethics committee reference number**
   09-12-05-2021 EC

**Health conditions studied**

1. **Description of health condition studied**
   Hemodialysis arteriovenous fistula puncture procedure

**ICD-10 code**
I95.3

**ICD-10 code description**
Hypotension of hemodialysis

**Primary outcomes**

1. **Description**
   Pain intensity
   **Timepoint**
   before and immediately after intervention
   **Method of measurement**
   Subjective numerical pain scale

2. **Description**
   Physiological indicators of pain
   **Timepoint**
   before and immediately after intervention
   **Method of measurement**
   Physiological measurement of heart rate, blood pressure, respiratory rate, blood pressure and oxygen saturation

3. **Description**
   Objective assessment of the behavioral pain response during the procedure
Timepoint
During arteriovenous puncture procedure of routine care and virtual reality intervention

Method of measurement
Procedural Behavior Rating Scale

4
Description
Assess children's degree of immersion in the VR experience.

Timepoint
After the arteriovenous puncture procedure using VR headset for pain reduction

Method of measurement
The Gold-Rizzo Immersion and Presence (GRIP) Inventory

Secondary outcomes
empty

Intervention groups
1
Description
Intervention group: - Before the procedure, the researchers will explain the numerical pain rating scale to the children. The physiologic parameters and behavioral pain responses will be assessed as baseline data - During the AVF puncture, the researchers will observe the behavioral pain responses of the children. - Just after the procedure, the researchers will re-assess the physiologic parameters and the self-reported pain intensity as pre-test or control reference values. Second Day (Implementing the VR intervention): - Before the procedure, children will be informed about the VR headset and how to use it and choose either to watch a 3D animated cartoon movie or to play a simple 3D game. - The baseline data will be recorded before the procedure. - The VR headset will be placed on the child’s head. it consisted of special eyeglasses and headphones generating a 3D visual environment in a high definition (HD) quality video and audio to ensure complete immersion. - The children will start to watch the cartoon movies or games for about 10 minutes before the procedure and continue watching till the end via a mobile smart phone placed inside the VR headset. - Each child will be observed during the procedure to assess the behavioral pain responses. After the procedure, the physiologic parameters and self-reported pain intensity will be measured as post-test values. - At the end, the children will be asked about their opinion regarding the VR experience

Category
Rehabilitation

Recruitment centers
1
Recruitment center

Name of recruitment center
Governmental hemodialysis units affiliated to general hospitals in El Behira governorate

Full name of responsible person
Ebtsam Salah Yonis Mahrous

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Damanhour, Elbehira, Governorate, Egypt

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+20 45 6511656

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Sponsors / Funding sources
1
Sponsor

Name of organization / entity
Damanhour University- Faculty of Nursing

Full name of responsible person
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Damanhour, Elbehira, Governorate, Egypt

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22511

Phone
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Ebeed.saleh@yahoo.com

Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
No

Title of funding source
Damanhour University- Faculty of Nursing

Proportion provided by this source
100

Public or private sector
Public

Domestic or foreign origin
Domestic

Category of foreign source of funding
empty

Country of origin

Type of organization providing the funding
Academic

Person responsible for general inquiries
Contact

Name of organization / entity
Damanhour University- Faculty of Nursing

Full name of responsible person
Samiha Hamdi Sayed Ramadan

Position
Assistant professor

**Latest degree**
Ph.D.

**Other areas of specialty/work**
Public Health/Community Medicine

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Damanhour, Elbehira, Governorate, Egypt

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**Person responsible for scientific inquiries**

**Contact**

**Name of organization / entity**
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**Full name of responsible person**
Rodaina Ahmed Mokbel

**Position**
Lecturer

**Latest degree**
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**Other areas of specialty/work**
Pediatrics

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**Sharing plan**

**Deidentified Individual Participant Data Set (IPD)**
Yes - There is a plan to make this available

**Study Protocol**
Undecided - It is not yet known if there will be a plan to make this available

**Statistical Analysis Plan**
Undecided - It is not yet known if there will be a plan to make this available

**Informed Consent Form**
Undecided - It is not yet known if there will be a plan to make this available

**Clinical Study Report**
Yes - There is a plan to make this available

**Analytic Code**
Undecided - It is not yet known if there will be a plan to make this available

**Data Dictionary**
Undecided - It is not yet known if there will be a plan to make this available

**Title and more details about the data/document**
Published research report that contains all the findings of the study

**When the data will become available and for how long**
within one year and will be available long life

**To whom data/document is available**
for public

**Under which criteria data/document could be used**
for scientific use and public education

**From where data/document is obtainable**
none

**What processes are involved for a request to access data/document**
none

**Comments**
none