The Use of Virtual Reality to Provide Stress Reduction for Healthcare Workers:
An Evidence-Based Practice Project

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DNP Scholarly Practice Project Presentation

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Background

- Stress: "experiences in which the environmental demands of a situation outweigh the individual's perceived psychological and physiological ability to cope with it effectively" (Crosswell & Lockwood, 2020)

- CDC (2023) – Job Demands > Resources Available = Workplace stress

- HCW stress significant prior to COVID, remains high after pandemic (Rink et al., 2023)

Significance

- HCW burnout: "Prolonged response to chronic emotional and interpersonal stressors on the job... defined by three dimensions of exhaustion, cynicism, and professional inefficacy." (Maslach & Leiter, 2016)

- Burnout is expensive (Khullar, 2023) and cyclical (Salyers et al., 2016)

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Virtual Reality

- Virtual reality (VR) (Matamala-Gomez et al., 2021)

- Immersive VR (Pallavicini et al., 2022)

- Strengths of VR devices (Matamala-Gomez et al., 2021)

- Therapeutic benefits of VR (Pallavicini et al., 2022)

- VR and stress (Soyka et al., 2016)

EBP Framework: Iowa Model

Step 1: Identify an issue

Step 2: Form a question

Step 3: Form a team

Step 4: Assemble, appraise, and synthesize the evidence

Step 5: Design and pilot the practice change

Step 6: Integrate and sustain the practice change

Step 7: Disseminate results

(Iowa Model Collaborative, 2017)

Step 1: Identify an Issue

- Stress among healthcare workers has increased & remained high after the COVID-19 pandemic

- High stress → Burnout → Turnover → Worsened Pt Outcomes

  - Cycle repeats

- Virtual reality has shown promise in providing stress reduction

Step 2: Form a Question

"In healthcare workers experiencing stress, can immersive virtual reality provide stress reduction and reduce burnout?"

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Step 3: Form a Team

Advisor: Dr. Bethany Coyne

Second Reviewer: Dr. Julie Haizlip

Practice Mentor: Kathy Davis (PICU lead APP)

PICU Division Chief: Dr. Duane Williams

Institution's Research Team: Sabrina Minter, Megan Scott

Unit Support: Clinical Coordinators, Nurse Manager, PICU R&R Committee

Step 4: Assemble, Appraise, and Synthesize the Evidence

- Databases:
  - PubMed, PsycINFO, Embase, and Scopus
- Search terms:
  - *Virtual reality* OR *VR* AND *stress* OR *stress reduction* OR *stress management* OR *stress relief* AND *healthcare* OR *healthy* OR *workplace*
- Limitations:
  - English-only
  - Published within the last 5 years (2019-2024)

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Step 4: Assemble, Appraise, and Synthesize the Evidence (cont)

- **Systematic Review of the Literature**
- **Articles Reviewed**: 11 articles included
- **Stress Reduction**: VR significantly reduced stress levels
- **VR Usage**:
  - Duration: 3min - 1 hr
  - Avg time: 16 minutes (Median: 10 min, SD: 19.7 min)
  - Significant stress reduction in as little as 3 minutes
- **Effective Environments**: Nature-based

Is there sufficient evidence?

- Literature supports VR as effective & feasible stress reducer in HCWs
- Nature Walk – most common stress reduction method
- Significant stress reduction in as few as 3 minutes
- Gaps in the literature present

Step 5: Design and Pilot the Practice Change

Project Purpose:

- Address gap in literature by implementing nature-based VR in a PICU by developing a structured, sustainable workflow tailored to environment

- Identify barriers to effective VR integration

- Provide recommendations for VR usage

Step 5: Design and Pilot the Practice Change (cont)

Setting and Sample:

- 24-bed medical & surgical PICU
- Healthcare workers at increased risk for stress

Inclusion Criteria:

- Frontline HCWs in PICU (RN, Provider Team, RTs, CNAs/PCTs, LCSW)

Exclusion Criteria:

- Non-frontline HCWs (EVS workers, meal service members)

Step 5: Design and Pilot the Practice Change (cont)

- Professional Quality of Life (ProQOL) Survey
- Protection of Human Subjects
  - IRB Application
    - Determination of Non-Human Subjects Research
  - Ethical considerations:
    - Confidentiality
    - Beneficence
    - Non-maleficence

Step 5: Design and Pilot the Practice Change (cont)

- VR Device:
  - MetaQuest 3
- VR App:
  - Nature Treks VR
- Diversity/Equity/Inclusion

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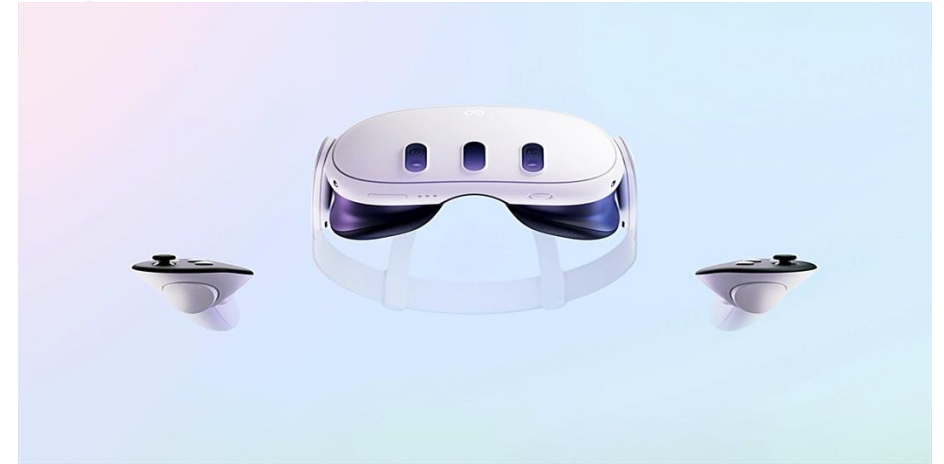
Step 5: Design and Pilot the Practice Change (cont)

August 2024:
- Meetings with key stakeholders to:
  - Promote VR
  - Build capacity
  - Work VR into workflow

September-November 2024:
- VR device on unit
- Device instructions & warnings
- Workflow widely available

Step 5: Design and Pilot the Practice Change (cont)

Workflow:
- Usage Guidelines:
  - Session Duration
  - Timer
  - Frequency
- Scheduling & Managing Multiple Users:
  - Sign-up Sheet with Time Slots
  - Priority System + Wait List

- Record Keeping:
  - Usage Log (Role, Date/Time, Duration, Stressors, Cyber Sickness)
  - Unavailable Times
- Device Sanitation:
  - Before & After Use
  - Sanitation Supplies

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Step 5: Design and Pilot the Practice Change (cont)

November- December 2024:
- Data analysis:
  - Frequency
  - Duration of use
  - Usage by discipline
  - Stress trigger
- Workflow evaluation based on metrics above

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Step 5: Design and Pilot the Practice Change (cont)

Limitations:

- Requires upkeep & safe storage of VR device

- Only one VR device on the unit

- Dynamic nature of PICU

Strengths:

- Implementation of current evidence for stress reduction

- Minimal adjustment to clinical workflow

- Decreased stress has the potential to prevent burnout, reduce turnover, & improve patient care outcomes
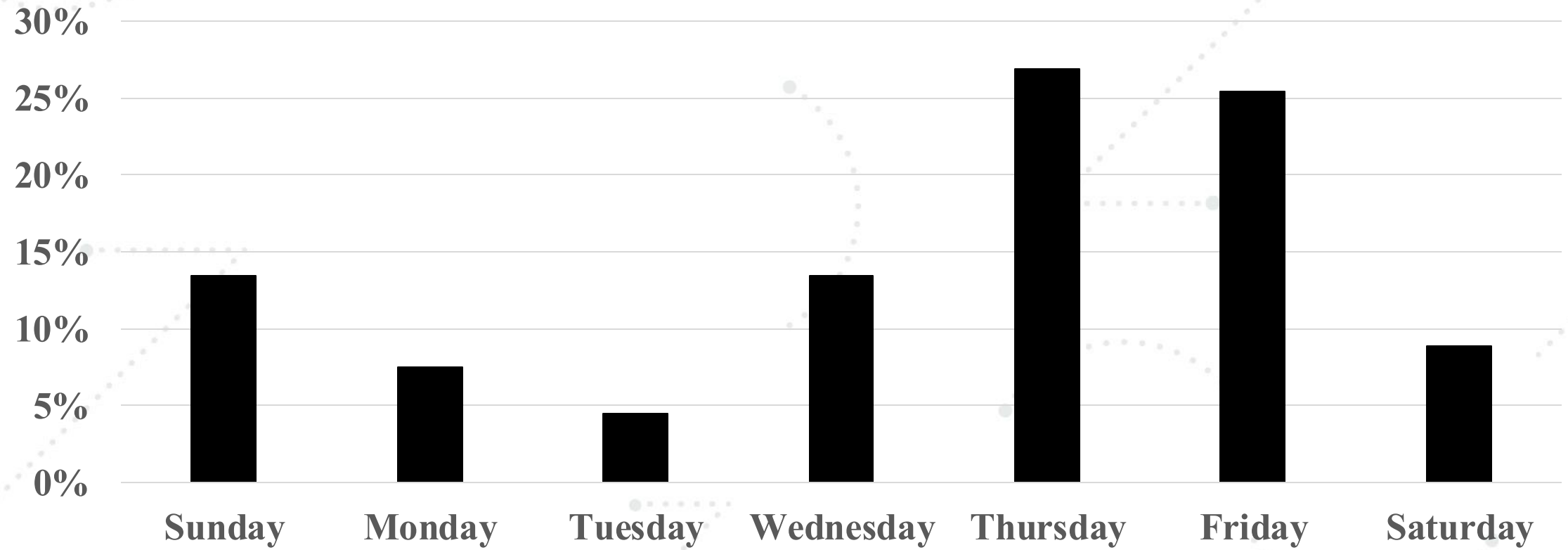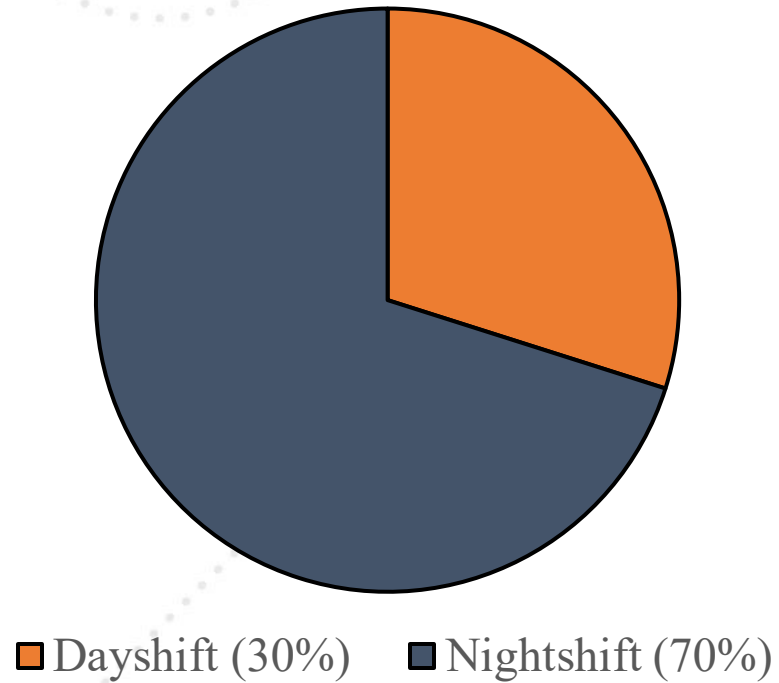
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Results

Number of Uses by Staff
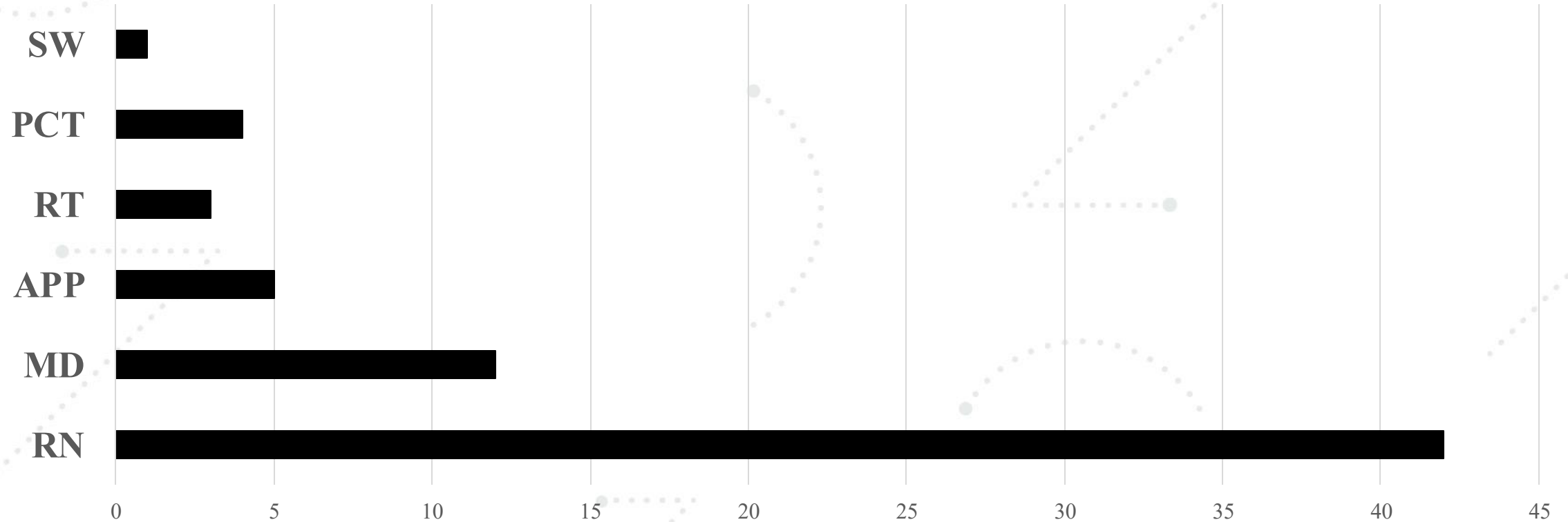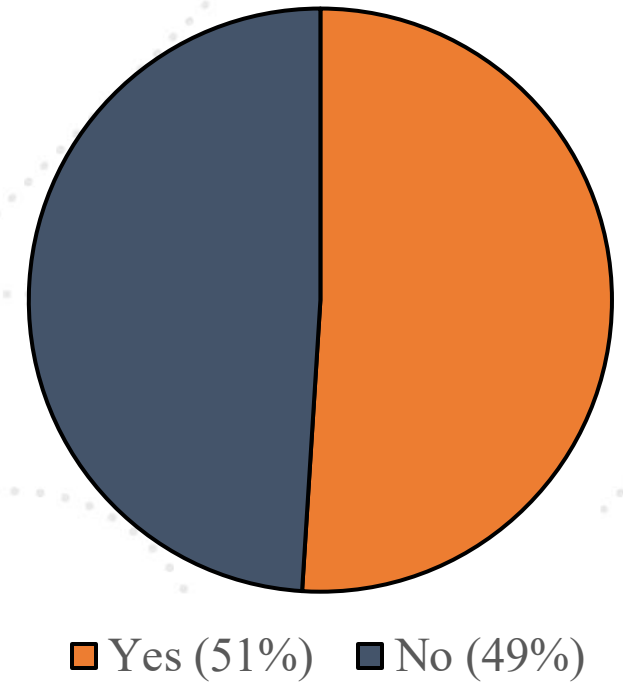
Results

VR Use by Day

Results (cont)

Use by Shift

Dayshift (30%) Nightshift (70%)

Dayshift Stress Prior to Use

Yes (30%) No (70%)

Nightshift Stress Prior to Use

Yes (51%) No (49%)

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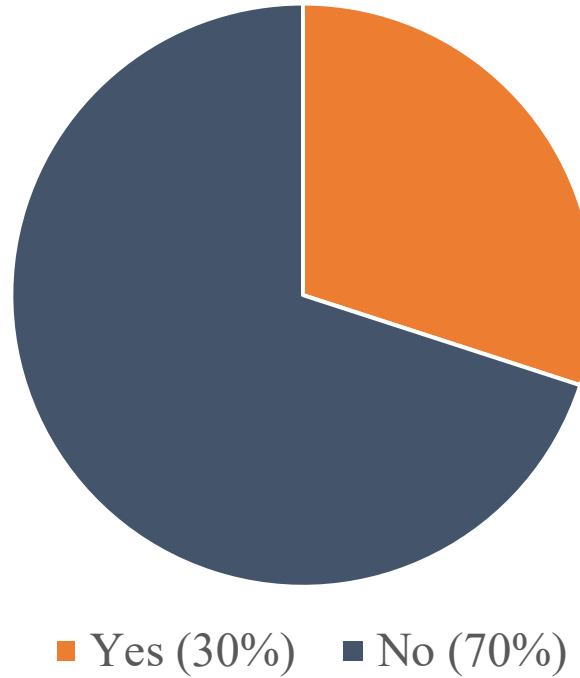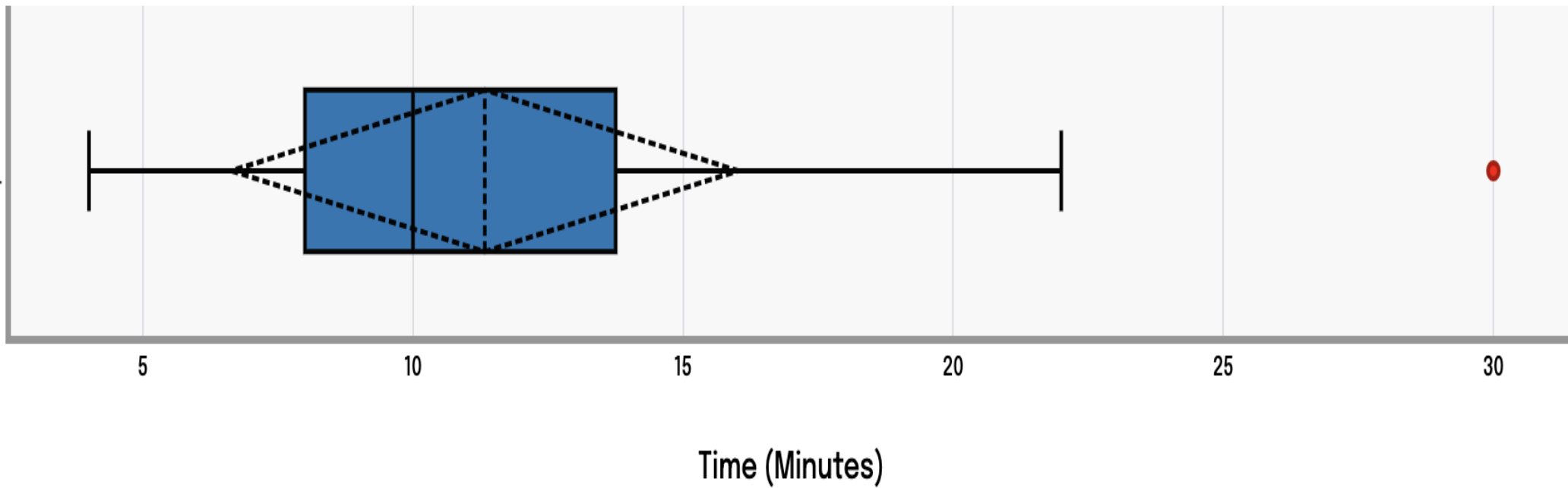
Results (cont)

Distribution of VR Session Duration

Subjective Feedback on Experience

"This has my full attention for stress relief now. Wow!" - MD

"I have tried everything from massage chairs to sensory rooms, and nothing has ever given me more relief than this experience." - RT

"I fully expected to get dizzy or experience cyber sickness, but this was just like walking in the forest!"- RN

"I can't believe how much I felt like I was really in nature. That was incredible."- APP

"I won't lie to you. For the first time in months, I wasn't thinking about work. This completely stole my attention, and I could only think about where I was in the VR world." - MD

Barriers to Effective VR Implementation

- Time constraints
- Workflow disruptions
- User acceptance
- Technical issues
- Space & environment

Recommendations for Effective VR Implementation

- Proactive stakeholder engagement

- Accessibility

- Role-specific barriers

- Integration into broader burnout prevention programs

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Step 6: Integrate and Sustain Practice Change

Sustained practice change occurring

- PICU-owned device purchased

Considerations for further sustainability:

- More devices
- Software and device upkeep
- Continued culture change
  - Dayshift utilization

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Step 6: Integrate and Sustain Practice Change

Nursing implications:

- ~10-minute, in-the-moment stress reduction
- Burnout prevention via stress reduction
- Potential cost savings

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Step 7: Disseminate Results

LIBRA

- Abstract, Poster, Presentation

Manuscript for publication:

- Target Journal: Virtual Reality

Poster presentation:

- GNSA Annual Conference (August 2024)
  - 1st Place AACN GNSA Excellence in Scholarship Award
- PAS Annual Conference (April 2025)
  - Abstract Accepted

Further scholarship:

- VR for stress reduction/distraction for pediatric patients undergoing painful procedures or procedural sedation

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Questions?

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