Appendix 1

Appendix 1: JBI quality assessment Checklist for RCTs

Question

Was true randomization used for assignment of participants to treatment groups?

Was allocation to treatment groups concealed?

Were treatment groups similar at the baseline?

Were participants blind to treatment assignment?

Were those delivering and assessing the treatment blind to treatment assignment?

Were treatment groups treated identically other than the intervention of interest?

Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?

Were outcomes measured in the same way for treatment groups?

Were outcomes measured in a reliable way?

Was appropriate statistical analysis used?

Reprinted with permission: JBI Critical Appraisal Tool for Randomized Control Trials Barker TH, Stone JC, Sears K, Klugar M, Tufanaru C, Leonardi-Bee J, Aromataris E, Munn Z. The revised JBI critical appraisal tool for the assessment of risk of bias for randomized controlled trials. JBI Evidence Synthesis. 2023;21(3):494-506 URL: https://jbi.global/sites/default/files/2023-10/ Revised%20Checklist%20for%20RCTs_updated_1.docx

Appendix 2

Author	Year	Country	Journal	Aim	Sample Size	Gender	Age	Setting	Patients	Design	VR- intervention	Description of the VR	Measure	Instrument	Control	Method of data
																collection and Analysis
Kang	2021	Korea	Asian Journal of Nursing	To develop a novel mouth contactless breathing exercise solution based on virtual reality, and to test its feasibility	50	M:23 F:27	42.52 ± 15.76 years	Inpatients	NR	Randomized Crossover trial	VR-based breathing exercise system	A self- regulating biofeedback breathing exercise with gaming characteristics and a soft stretch sensor	Respiratory parameter [Forced vital capacity, forced expiratory volume in one second & peak expiratory flow and Evaluation	Portable spirometry, Pony FX (COSMED, USA	Conventional deep breathing exercise [CDB]	Survey questionnaire

Blum 2	2020	Germany	Journal of applied psychophysiology and Biofeedback	The present study explored the feasibility and efficacy of a novel VR-based diaphragmatic breathing biofeedback algorithm.	72	M:16 F:56	21.6 (Average)	Outpatient	Undergraduates	Randomized, controlled, between- subjects, Lab experiments with Written informed consents	VR-based breathing exercise system	A self- regulating biofeedback breathing exercise with gaming characteristics and a soft stretch sensor	User experience (post-exercise), subjective breath awareness (post- exercise), respiratory induced abdominal movements (during the exercise) and heart rate variability (during the exercise)	Oculus rift CV1	Focused Breathing exercise(FBE)	User experience Questionnaire
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Sophie	2021	Switzerland	NR	We investigated the effects of visual-respiratory feedback, on persistent dyspnea in patients recovering from COVID-19 pneumonia.	26	M=19 F=7	55(Median)	Inpatients	COVID-19 Pneumonia patients and patients with persistent dyspnea	controlled, randomized, single-blind, cross-over clinical study	Immersive virtual reality (iVR)-based digital therapeutics (DTx)	NR	Respiratory rate(RR) and Respiratory rate variability(RRV)	Go Direct® Respiration belt, Vernier, Beaverton (OR), USA	Asynchronous feedback	Questionnaires and breathing recordings
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Cruz	2019	Brazil	Journal of physical medicine and rehabilitation	To analyze the acute hemodynamic effects of adding virtual reality ebased therapy (VRBT) using exergames for patients undergoing cardiac rehabilitation (CR).	27	NR	63.4±12.7	Outpatient rehabilitation center	NR	cluster randomized crossover trial	VR-based Therapy	NR	Blood pressure, heart rate, respiratory rate (RR), peripheral oxygen saturation (SpO2), and rating of perceived exertion (RPE)15	Epson PowerLite H309A, Xbox One Kinect, VBRT extergames	NR	Descriptive statistics, 2-ways analysis variance
Rutkowski	2022	Poland	International journal of Environmental research and public health	The purpose of this study was to investigate and compare an innovative in- hospital pulmonary rehabilitation programs augmented with training elements performed in virtual reality.	32	M=12 F=20	57.8	Inpatients	COVID-19 patients	Randomized controlled study	VR-based Pulmonary rehabilitation program	Was developed with the aim of providing calmess and mood improvement as well as motivation and cognitive activation to the patients.	Exercise tolerance	A VR TierOne device (Stolgraf®, Stanowice, Poland), bicycyle ergrometer	Hospital Anxiety and Depression Scale(HADS)	WHO- Quality of life questionnaire
Rodrigues	2022	Brazil	Journal of Personalized Medicine	This study aimed to investigate whether VR contributes to the control of pain symptoms, the sensation of dyspnea, perception of well-being, anxiety, and depression in patients	44	Male=22 F=22	Experimental(48.9 <u>+</u> 13.9) Control (48.5 <u>+</u> 16.9)	Inpatients	COVID-19 patients	Multicenter, andomized, double-blind clinical trial	VR-assisted treatment	A self- regulating biofeedback breadthing excercise with gaming characteristics and a lens	As a primary outcome measure, we evaluated the perception of pain, dyspnea, anxiety, stress, depression, and well-being. As a secondary outcome, we evaluated arterial hypertension,	Oculos Realidade Virtual 3D GamerWarrior JS080 (MULTILASER INDUSTRIAL SA, São Paulo, Brazil).	Borg scale and HADS	Statical analysis Non-parametric Wilcoxon test

				hospitalized with COVID-19.									heart rate, respiratory rate, and SpO2.			
Russell	2014	USA	Journal of applied psychophysiology and Biofeedback	The current study examines the use of paced diaphragmatic breathing (DB) training to quell motion sickness symptoms.	60	M=12 F=48	NR	Outpatients	Motion sickness susceptible male and females college aged students	NR	VR-assisted treatment	NR	Heart rate variability, breathing rate (RPM), and motion sickness ratings	3D head mounted goggle set with over the ear headphones	Verbal prompt from experimeter	XX
Shiban	2017	USA	Journal of BMC Psychiatry	The aim of the study was to investigate the role of a relaxation technique, diaphragmatic breathing, as a coping mechanism during VR exposure therapy of aviophobia.	29	M=5 F=24	NR	NR	Patients with Aviophobia	Randomised trial	VR- Exposure treatment	NR	Heart rate, Respiration rate,	Chair on a 6° of freedom motion platform (Micro-Motion- System, hydraulic, Krauss-Maffei Wegmann GmbH & Co, Munich, Germany), a Head Mounted Display (HMD; Virtual Research HMD V6, Aptos, USA), and a personal computer. A tracking sensor (Fastrak, Polhemus, Vermont, USA)		ASI and FFS questionnaires, ANOVA

Appendix 2.