2021

Assessing the Readiness of Using Virtual Reality in Mental Health Practice in Australia

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Full research paper

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Abstract

Virtual reality (VR) has been suggested as a cost-effective instrument for treating mental illness. However, such investigations have been confined to researchers' laboratories. This study, therefore, aimed to assess VR's readiness for therapeutic use through understanding Australian mental health practitioners' perceptions of VR's applicability in mental health. Responses were obtained from practitioners from different regions of Australia using an online survey designed based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Descriptive statistics and thematic analysis were employed to analyse the data. The findings reveal that although practitioners believed in the usefulness of VR for enhancing mental health treatment, issues such as maintaining therapeutic alliances, cost and accessibility of VR equipment, absence of research-based evidence, lack of safety guidelines, and privacy concerns, led to their reluctance to incorporate VR into clinical practice. We believe tackling these challenges will accelerate VR's adoption in clinical settings.

Keywords virtual reality, e-mental health, technology acceptance, user's perceptions, performance expectancy

1 Introduction

Technology has digitised most facets of life. Mental health (MH, adj.) is no exception. E-MH refers to leveraging information technology and communication (ICT) to deliver MH services (Riper et al. 2010). The incorporation of technology into MH has proven effective in overcoming geographical, financial, and social barriers, for example (Carlbring et al. 2018; Gega and Gilbody 2015; Reavley and Jorm 2015). One of the promising technologies for MH is Virtual Reality (VR) (Malbos 2015).

VR is a three-dimensional (3D) world integrating computer-generated graphics, sensory modalities (e.g., sound and scent), and other input devices (e.g., joystick) to create a virtual environment presented to the user via a head-mounted display (HMD) connected to motion tracking devices that enable the computer to adjust the field of view to the user's movements (i.e., rotating their head results in the virtual landscape rotating) (Freeman et al. 2017; Vince 2004). With this ability, VR guarantees the user a high level of immersion.

Since 1990, researchers have investigated the application of VR-based therapy as an alternative to in-vivo and imaginal exposures or as a complement to various therapeutic instruments (Zwiebach et al. 2018). These experiments covered different mental disorders, such as phobias (Wechsler et al. 2019), post-traumatic stress disorder (PTSD) (Deng et al. 2019), substance use disorders (Worley 2019), and eating disorders (Gutiérrez-Maldonado et al. 2016). The advantages of VR-based therapy include reducing the duration of treatment sessions, personalising treatment, and being a cost-effective tool in terms of monetary expenses, logistics, and risks, as patients are exposed to a more controlled environment than in traditional treatment (Zwiebach et al. 2018).

However, Freeman et al. (2017) report that these results are limited to researchers' laboratories and cannot be generalised until VR is utilised in a genuine clinical situation. To achieve a successful transition, it is critical to evaluate potential users' familiarity with and readiness to embrace VR in MH (Gursoy et al. 2019), and to understand their initial perceptions of adopting this technology. Davis (1993) and Moore and Benbasat (1991) state that the perceived attributes of any information system (IS) or information technology (IT) innovation influence the potential user's decision to adopt or reject it. Evaluating user's perceptions of using VR in MH has received less attention in the literature (Deborah et al. 2012; Lindner et al. 2019; Segal et al. 2011; Teresa L. Kramer et al. 2010). Moreover, given the rapid advancement of VR technology, most literature findings do not align with VR's current maturity.

This study takes place in the context of the Australian MH sector. The Australian government devotes recognisable attention to improving the quality of MH services in Australia. For example, the Department of Health and Aging commenced the e-MH Strategy (DoHA 2012) aimed at guiding the investment and growth in e-MH services. Since then, in collaboration with Australian universities and research institutes, many MH research-based applications have been developed (e.g., (Christensen et al. 2014)). However, the National MH Commission NMHC (2014) noted that the researchers' efforts were not strategically aligned with the stakeholders' demands and the absence of a clear structure for translating research findings into practice. To address such issues, the Fifth National MH and Suicide Prevention Plan (NMHC 2017) was developed, with one of its priorities being to ensure that the whole MH system's enablers collaborate on the constant development and exploration of new technologies. This plan calls for increased research efforts and adaptation to IS/IT (NMHC 2017, p. 47).

Considering the research opportunity noted above, and the fact that VR is still in its emerging phase of being wildly adopted in Australian MH clinics, this study aimed to evaluate the readiness of MH practitioners, as one of the enablers, to use VR in MH. Therefore, this study addresses the research main question (MQ): What are MH practitioners' perceptions of adopting VR in MH treatment? through the following research sub-questions (SQs):
SQ1: How familiar are MH practitioners with the use of VR in MH treatment?
SQ2: What do MH practitioners perceive as the potential opportunities and barriers influencing the adoption of VR in clinical practice?
SQ3: How do MH practitioners feel about integrating VR into their practice?

The remainder of this paper is structured as follows: Section 2 explains the research methodology, which includes procedures for sampling, data collection and analysis. Section 3 presents the research results. Section 4 discusses the research findings considering relevant literature. Finally, section 5 highlights the study's contributions and limitations and suggests directions for future research.

2 Research Method

2.1 Sampling

The 'information power' concept Figure 1 (Malterud et al. 2015) suggests the determination of sample size required to obtain sufficient information depends on the study's aim, sample specificity, established theory, quality of researcher-participant interaction, and analysis technique. According to this concept, having a small sample size is adequate if the study has a narrow aim and requires a sample that carries specific characteristics that are strongly associated with the study's aim. Given the narrow aim of this study – assessing the readiness of MH practitioners to use VR as a therapeutic tool in MH practice – and the data was collected from a specific group of people with relevant expertise – licenced MH practitioners from Australia – a small sample size is considered sufficient.

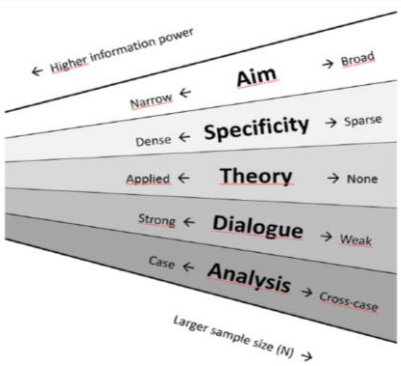


Figure 1. Information Power – Items and Dimensions (Malterud et al. 2015)

The selection criteria include 1) participants must be licenced MH practitioners 2) working in Australia. A purposive sampling technique, Criterion-i purposeful sampling, was employed. It selects the sample by identifying all instances that fulfill prespecified criteria (Palinkas et al. 2015). Therefore, search engines provided by official Australian MH, such as the Australian Psychological Society (APS) (https://www.psychology.org.au/), were used. All practitioners listed on these websites are licensed. These search engines, based on the query entered, allow users to retrieve a practitioners' detailed profile, including contact information and location. This procedure guarantees the inclusion criteria were met.

2.2 Materials

An on-line questionnaire was designed using the Qualtrics survey tool (2020 Qualtrics, Provo, UT). It consists of four sections. The first section sought participant demographic information. The second section evaluated technology literacy and familiarity with using VR in MH, addressing (SQ1). The questions in this section were designed as 'contingent questions' (Lazar et al. 2017b); only participants with prior experience with e-MH were asked specific questions regarding their experiences. Next, participants were informed that the following sections would require a basic understanding of VR in MH treatment and that some resources on this topic (a brief article and video) were provided. Then, participants were asked if they believed they understood VR's role in MH treatment. To advance in the survey, participants had to answer 'Yes'; otherwise, they were forwarded to the end of the survey. The third section addressed (SQ2) by assessing the participants' perceptions of VR in MH by using a set of 15 statements rated using a 5-point Likert scale ranging from "strongly agree" to "strongly disagree", and randomly ordered to avoid potential bias (e.g., unconscious perception of the statements' sequence (Müller et al. 2014, p. 246)). These statements were formed using the Unified Theory of Acceptance and Use of Technology (UTAUT) model's constructs (Venkatesh et al. 2003) (Figure 2) and relevant literature (van der Vaart et al. 2016), and were classified into four categories 'performance expectancy: an individual's belief that utilising the system will enable him/her to improve work performance', 'effort expectancy: the ease with which a system may be used', 'facilitating conditions: an individual's belief that a system's organisational and technological infrastructure exists to enable its use', 'social influence: an individual's social group (e.g., colleagues) feels that employing new technologies or systems is consistent with group attitudes'. The UTAUT model is a theoretical tool that enables researchers and stakeholders to explain and predict factors influencing potential users' willingness to adopt new systems/technologies in various contexts (Gursoy et al. 2019). Given that the purpose of this research was to understand how practitioners perceive VR being applied in Australian MH clinics, incorporating the UTAUT model into the design of the research instrument was sufficient. This section concluded with two open-ended questions asking participants to identify further advantages or barriers to VR adoption

in MH. The fourth section asked participants to estimate the time before VR is utilised in Australian MH clinics and to justify their responses. Responses to these questions provided insight into how to address (SQ3).

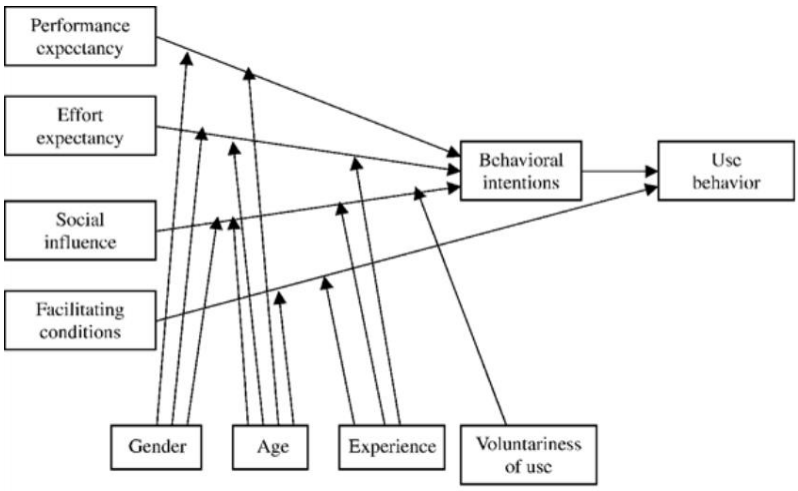


Figure 2. The UTAUT Model (Venkatesh et al. 2003)

2.3 Procedure

The study recruited participants by emailing 1,350 licenced practitioners/clinics across Australia. The invitation email informed potential participants of the study's purpose, the estimated duration to complete the questionnaire, and a $10 voucher as granted compensation. A Plain Language Statement was given on the first page of the questionnaire. The survey was inaccessible until consent was received by clicking 'Yes' on the participation agreement. Ethics approval was obtained from the University of Melbourne's ethics committee (2056165.1).

Data collection was undertaken between April and July 2020. By the end of the data collection period, the survey had elicited responses from 37 licenced professionals (response rate = 2.74%). This percentage may not be accurate as there is no way to verify the success of emails sent to potential participants (e.g., disregarded by the clinic receptionist, not of interest to participants, or the retrieved email was not updated). Two data types were collected: quantitative data from closed-ended questions and Likert-scale responses, and qualitative data from open-ended questions. As a result, two data analysis techniques were implemented: descriptive and inferential statistics using Excel tools (Lazar et al. 2017a) and a thematic analysis technique (Terry et al. 2017), in which the UTAUT model's constructs were used to identify and label themes.

3 Results

3.1 Demographic Results

Most responses were received from Victoria and New South Wales (29.7% each), then West Australia (13.5%), South Australia (9.8%), the Australian Capital Territory (8.1%), Queensland (4.9%), and Tasmania (2.7%). Most participants were psychologists, and a few held two positions, such as clinical psychologist and director. Most participants (90%) had worked in the MH profession for at least five years. Anxiety disorders and trauma- and stressor-related disorders were the most common offered treatments. The diagnostic and statistical manual of mental disorders (DSM-5) (Lurigio 2020) was used to classify responses about MH disorders. Table 1 lists further sample characteristics.

Characteristics	**Items**	**No. (%)**
The average number of patient treated/week		17.97 (13.6%)
The participant's current position (Multiple Responses)	Psychologist (Clinical Psychologist, Neuropsychologist)	31 (75.6%)
	Director	4 (9.8%)
	Counsellor	2 (4.9%)
	Therapist	2 (4.9%)
	Social Worker	1 (2.4%)

Years of practicing in the current position	Less than 5 Years	7 (18.9%)
	5 - 10 Years	11 (29.7%)
	10 - 15 Years	5 (13.5%)
	16 - 20 Years	3 (8.1%)
	More than 20 Years	11 (29.7%)
Years of practicing in the MH field	Less than 5 Years	4 (10.8%)
	5 - 10 Years	7 (18.9%)
	10 - 15 Years	5 (13.5%)
	16 - 20 Years	9 (24.3%)
	More than 20 Years	12 (32.5%)
Provides treatment *for* ..... MH disorders (Multiple Responses)	Anxiety Disorders (e.g., specific phobia, and panic disorders)	34 (23.5%)
	Trauma- and Stressor-Related Disorder (e.g., PTSD, Grief)	27 (18.6%)
	Depressive Disorders	26 (17.9%)
	Neurodevelopmental disorders (e.g., ASD, ADHD)	13 (9.0%)
	Personality Disorders	9 (6.2%)
	Substance-Related and Addictive Disorders	6 (4.1%)
	Neurocognitive Disorders	3 (2.1%)
	Somatic Symptom and Related Disorders	3 (2.1%)
	Feeding and Eating Disorders	2 (1.4%)
	Dissociative Disorders	2 (1.4%)
	Schizophrenia Spectrum and Other Psychotic Disorders	2 (1.4%)
	Disruptive, Impulse-Control, and Conduct Disorders	2 (1.4%)
	Bipolar and Related Disorders	1 (0.7%)
	Obsessive-Compulsive and Related Disorders	1 (0.7%)
	Other MH Conditions (e.g., Occupational Problems)	13 (9.0%)

Table 1. Sample Characteristics

3.2 Technological Literacy in MH Treatment

Most participants (89.19%) employed technology in their professions, with (82%) reporting positive experience, including helping in obtaining accurate results. Poor Internet connectivity was the primary issue for those who had negative encounters with technology. Most of the applications used were for providing treatment remotely (e.g., telehealth), assessment, mindfulness, and mood tracking.

3.3 Familiarity with Using VR in MH Treatment

As depicted in Table 2, most participants are familiar with using VR in MH. However, the knowledge levels varied, ranging from those who were completely aware to those who had never heard of it.

Characteristics	**Items**	**No. (%)**
Familiarity with VR applications in MH	Yes, I am aware of VR for MH treatment and have used it in my treatment.	1 (2.7%)
	Yes, I am aware of VR for MH treatment, but I have not used it myself.	20 (54.1%)
	Yes, I understand the concept of VR for MH treatment, but I do not know how it works.	8 (21.6%)
	Yes, I have heard about the use of VR for MH treatment, but I do not understand the concept or how it works.	4 (10.8%)
	No, before completing this survey, I had not heard about this at all.	4 (10.8%)

Table 2. Participant's Familiarity with Using VR in MH Treatment

As previously mentioned, after giving materials on the research topic, participants were asked if they had a basic grasp of VR in MH. Five 'No' replies reduced the participation count to 32.

3.4 Perceptions of Opportunities and Barriers to Adopting VR in Therapy

3.4.1 Performance Expectancy (PE)

The responses to PE1, PE2, PE3, PE4, and PE5 (Table 3) demonstrated a positive attitude towards using VR in therapy. However, most participants (83.8%) were concerned about the 'therapeutic alliance' (i.e.,

the therapist's perception of the consultant's attentiveness and supportiveness (Edmunds et al. 2013)), which was also voiced repeatedly in replies to open questions (Figure 3).

> '...This method cuts into the prof. relationship between clinician and client. The relationship is the most healing.'
>
> '...However, the loss of a therapeutic relationship might be something to be explored ...'
>
> '...You need to see someone's whole body...'
>
> 'Let's not replace face to face human contact'

3.4.2 Effort Expectancy (EE)

The responses to EE1 and EE2 (Table 3) exhibited perceptions of ease of use, which has a significant influence on a user's intention to embrace a new technology at its early stages (Venkatesh et al. 2003). Participants, however, raised the accessibility issue for people with disabilities (Figure 3).

> '...use with older people...'
>
> '...People with hearing and visual disabilities, along with difficulties for use with children...'
>
> '...hearing impaired people are at a significant disadvantage as are seriously mentally ill...'
>
> 'Difficult to use with people who wear glasses or have vision difficulties'

3.4.3 Facilitating Conditions (FC)

The responses to FC1, FC2, FC3, and FC4 (Table 3) identified several barriers to VR adoption, including financial costs, difficulty acquiring VR equipment in the workplace, a lack of safety guidelines and privacy regulations, and the demand for adequate training.

> '...difficult in rural and remote where money is very limited.'
>
> 'Those who rent spaces by the hour will not have a space to put this type of equipment'
>
> 'VR equipment is costly and most clinic managers are unlikely to be willing to pay for it.'
>
> '...further improvements in the technology to make it easier to set up and use across a range of clients (ease of cleaning, quickly adjustable for different heads/glasses, good battery life).'
>
> '...appropriate safety protocols and risk management...'
>
> '...the ability to access a trained mental health professional, then it would be very useful.'
>
> 'Training of psychologists on the technology and its application. The ability to complete a course and be supervised to build the capability of using VR with clients...'

3.4.4 Social Influence (SI)

Answers to SI1, SI2, and SI3 (Table 3) reflected the MH culture's reluctance to accept new technologies or treatment modalities in the absence of research-based evidence.

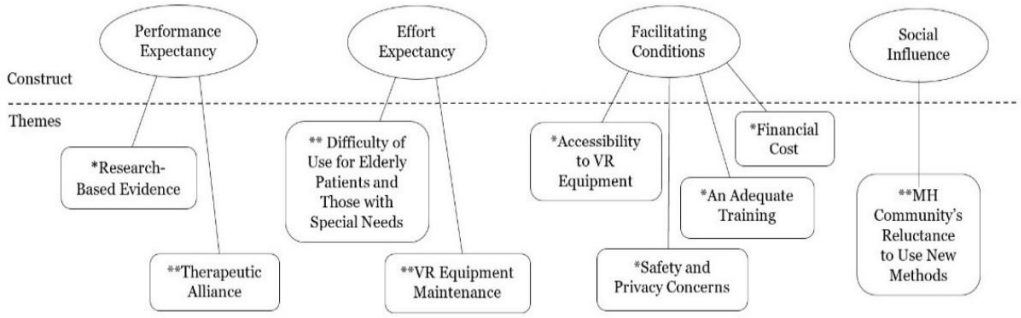
> 'I think the biggest will be general reluctance to try something new or relatively unproven.'
>
> '...but clinicians are slow to utilise new technologies'
>
> 'Psychologists are often conservative in their application of new treatment and technology...'

Construct	Items	Strongly agree No. (%)	Agree No. (%)	Neither agree nor disagree No. (%)	Disagree No. (%)	Strongly disagree No. (%)
Performance Expectancy (PE)	**PE1:** Using VR would be a viable alternative to in-person treatment	3(9.4%)	11(34.4%)	7(21.9%)	10 (31.3%)	1(3.1%)
	PE2: Using VR would be a cost-effective tool to be used in MH treatment.	4(12.9%)	11(35.5%)	11(35.5%)	4(12.9%)	2(6.3%)
	PE3: Using VR will enhance the quality of MH treatment.	5(15.6%)	17(53.1%)	8(25.0%)	2(6.3%)	0(0.0%)

	PE4: Using VR might be harmful to my patients.	0(0.0%)	4(12.5%)	7(21.9%)	17(53.1%)	4(12.5%)
	PE5: I think patients are unlikely to perceive the benefits of using VR in the treatment.	1(3.1%)	5(15.6%)	3(9.4%)	21(65.7%)	2(6.3%)
	PE6: I think patient might use VR as a self-therapizing without the need to consult a MH practitioner.	5(16.1%)	22(67.7%)	3(9.7%)	2(6.5%)	0(0.0%)
Effort Expectancy (EE)	**EE1:** I think it will be easy for me to learn how to use VR in MH treatment.	5(15.6%)	22(68.8%)	3(9.4%)	2(6.3%)	0(0.0%)
	EE2: I think it will be easy to teach my patients how to use VR as a part of their treatment.	3(9.4%)	22(68.8%)	5(15.6%)	1(3.1%)	1(3.1%)
Facilitating Conditions (FC)	**FC1:** I think my employers are unlikely to provide financial support to help us adopt this technology.	7(21.9%)	6(18.8%)	11(34.4%)	7(21.9%)	1(3.1%)
	FC2: I think it will be difficult to acquire resources/equipment in my workplace to support using VR in MH treatment (e.g., find VR developers to design suitable VR scenarios for different MH disorders).	8(25.0%)	18(56.3%)	4(12.5%)	2(6.3%)	0(0.0%)
	FC3: I think integrating VR into my workplace will be easy.	2(6.3%)	11(34.4%)	6(18.8%)	11(34.4%)	2(6.3%)
	FC4: I would be reluctant to use VR in MH treatment without guidelines and approved standards.	9(28.1%)	13(40.6%)	3(9.4%)	5(15.6%)	2(6.3%)
Social Influence (SI)	**SI1:** I expect clinicians in my organization may lack confidence in using VR for MH treatment.	16(50.0%)	14(43.8%)	1(3.1%)	1(3.1%)	0(0.0%)
	SI2: I expect clinicians in my organization are likely to fear that VR might cause harm to patients.	1(3.1%)	6(18.8%)	8(25.0%)	15(46.9%)	2(6.3%)
	SI3: I expect clinicians in my organization are fearful of using new technologies in MH treatment.	5(15.6%)	13(40.6%)	3(9.4%)	10(31.3%)	1(3.1%)

Note: the percentages were rounded to one decimal place

Table 3. Participants' Perceptions of Opportunities and Barriers to Adopting VR in Therapy



*The most frequent theme
**The second most frequent theme

Figure 3. Themes Extracted from Responses to Open Questions in the Survey's Third Section

3.5 Estimation of the Time Required to Adopt VR

Most participants (68.8%) estimated VR to be in clinical use over the next 5-10 years. The grounds for their responses varied depending on whether they thought this was a lengthy or short period of time to embrace technology in therapy. Common justifications for those who selected 5–10 years as a long period included the MH culture's reluctance to embrace new technologies, the time required for researchers to validate the safety and efficacy of VR in an MH context, and for official organisations to

govern this practise by establishing safety guidelines and privacy standards and to provide adequate training, and for barriers, such as financial costs, access to suitable infrastructure and expertise, to be solved. Those who anticipated that VR would take 11–15 years (6.3%), 16–20 years (6.3%), and over 20 years (3.1%) to embrace advanced similar justifications. Participants who selected 5–10 years as a short period justified their responses to the rapid technological advancement, which were similar to those who expected VR acceptance in fewer than five years.

3.6 The Link between Technology Literacy and Perceptions of VR Adoption

There appears to be a correlation between technological literacy and the user's perception of using VR. Two participants who faced issues with integrating technology into their practises highlighted them as potential barriers to VR adoption in MH. The following are excerpts from these answers.

Items	Previous experience with technology	Perceptions of using VR
Participant A	'..... some patients are able to maintain a therapeutic relationship but others can struggle with this and can really feel disturbed by the lack of person to person meeting .....'	'..... the loss of a therapeutic relationship might be something to be explored. Or how a VR treatment could be woven into a therapy session .....'
Participant B	'..... have issues with patients not understanding the technology or not wanting to use it .....'	'..... general reluctance to try something new .....'

Table 4. The Effect of Technological Literacy on the User's Perceptions of Adopting VR

4 Discussion

This study aimed to understand how MH practitioners perceived VR in clinical practice to facilitate moving VR from research labs to the market. To attain this objective, the (MQ) was addressed by answering the (SQs). Regarding (SQ1), practitioners' familiarity with using VR in MH and understanding of how it can be implemented in clinical settings is considerable. This might be attributed to technological advancements that increase people's knowledge of emerging technologies. Venkatesh et al. (2003) assert that technological literacy ultimately influences users' intentions of adopting new technology. Most participants (90%) stated that they had previously integrated technology into their practice, indicating their interest in and expertise with using technologies, including emerging ones.

Regarding (SQ2), this study found that perceived barriers to VR adoption outweighed potential benefits. While most participants recognised the usefulness of VR adoption in MH, many raised concerns about the 'therapeutic alliance', financial costs, equipment accessibility, and safety and privacy standards. Moreover, there was a strong demand for research-based evidence and adequate training prior to this technology's official acceptance.

VR may follow in the footsteps of many other digital-based therapies that effectively compete with traditional therapy. Carlbring et al. (2018) found no significant difference in the effect size between the traditional and Internet-based treatments, implying that the practitioner's involvement in treatment delivery is not critical. Similarly, Freeman et al. (2017) anticipated VR may eliminate or reduce the practitioner's participation in therapy sessions, and Lindner et al. (2017) thought VR self-help could be the next stage in the evolution of VR in MH. Consumer-VR platforms have emerged, offering more realistic virtual scenarios at an affordable price (see, for example, https://psious.com/). However, as the current VR applications in MH are still in their infancy stage in terms of technological maturity (Rus-Calafell et al. 2018) and need to be implemented under the supervision of practitioners, the influence of VR adoption on the therapeutic alliance is undetermined. Thus, further study in this area is required.

This study's findings echoed earlier studies (Deborah et al. 2012; Segal et al. 2011; Teresa L. Kramer et al. 2010) which found financial costs and equipment accessibility hindered VR adoption in MH. Meanwhile, a more recent study (Lindner et al. 2019) revealed an opposing finding as these were no longer obstacles to VR's adoption. The time interval between the most recent study and earlier ones is considered sufficient for VR technological advancement and equipment cost reduction. A similar conclusion has been confirmed by recent studies (Freeman et al. 2017; Grochowska et al. 2019; Zwiebach et al. 2018). In contrast, this study found the financial cost and equipment accessibility of VR remain concerns. This can be attributed to the lack of background knowledge of current VR market pricing, and the responses were based on assumptions that assigned the technology's complexity to its price. Therefore, it is critical to consider the possibility of bias in these responses, as we cannot be certain that participants knew the cost of VR equipment.

This study elicited participants' concerns about the safety and privacy of VR-based treatment. Safety concerns, such as motion sickness (e.g., dizziness, eye strain, and nausea), have been convincingly proven in the literature (Lin et al. 2002; Nichols and Patel 2002). Privacy concerns are attributed to the fact that VR-based treatment requires real-time information to enable the practitioner to tailor the virtual environment to the patient's condition (Rizzo and Koenig 2017). This process entails collecting biometric data through the HMD and sophisticated sensors such as eye movements, facial expressions, and heart rate (Madary and Metzinger 2016). As VR is an emerging technology in the MH sector, vulnerabilities in terms of information privacy are inevitable. Therefore, to alleviate reluctance to embrace VR, safety guidelines and privacy regulations must be considered during the VR design phase, then promoted commercially (Sobelman and Santopietro 2018, pp. 13-24).

Regarding (SQ3), the reluctance to adopt VR was evident among the participants. Along with the previously noted concerns about safety and privacy, participants strongly demanded research-based evidence to justify VR applications in MH. This evidenced the notion that the MH community's culture is characterised by resistance to adopting new treatment methods (Bell et al. 2020). As a growing body of research has proved VR to be effective as a therapeutic tool, this highlights a possible gap between the research and practical communities, resulting in a lack of awareness of recent research on VR use in MH. Thus, it suggested efforts be spent on publicising research results via social media channels (e.g., LinkedIn and Twitter) and organising on-site experiences for clinics and practitioners with the encouragement to promote these experiences within the MH communities. Addressing (SQs) revealed the answer to (MQ). Practitioners expressed an interest in using VR in clinical settings and were able to recognise its potential to improve the quality of MH treatment, but also identified barriers that, if not addressed, could impede VR's adoption.

5 Conclusion and Future Work

To the best of found knowledge, this is the first analysis of MH practitioners' perceptions of VR adoption in MH in Australia. Constructs from a popular technology acceptance model (UTAUT) were adapted to guide the systematic design of the research instrument, providing insight into developing a framework for transferring technology from labs to the market. The study's findings raised awareness of potential barriers to VR adoption among MH organisations and service providers, guiding their efforts to develop strategies to mitigate these barriers and to expand VR use beyond researchers' labs. Moreover, the findings confirmed the correlation between users' technological literacy (i.e., digital MH interventions) and their attitudes towards using emerging technologies (i.e., VR-based therapy).

This study is limited by the following: First, this study attempted to eliminate bias in participants' interpretations of the third section's questions by providing background information on the research topic prior commencing responding. However, there is no way to confirm that all participants engaged similarly with the materials, which may have influenced their responses. Thus, future research might investigate participants' perceptions once they embrace VR. Second, this study examined one of the potential stakeholders; MH practiconer's, and a few aspects affecting customers' readiness to adopt VR in MH. Future research could examine other potential stakeholders (e.g., patients) and other factors influencing the adoption of VR in MH might be added to the model's predictive capability. Third, the study was conducted in Australia, where the level of technological advancement and awareness differs from other countries. As a result, it might not be sufficient to extrapolate the issues raised in this study to other countries. Thus, a public sample should be considered for future work.

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Acknowledgements

I would like to express my appreciation to my supervisors, Dr Jenny Waycott and Dr Steven Baker, for their guidance and assistance over the course of my research project.