

Topic: Exploring the use of Virtual Reality applications in patients with a diagnosis of motor neurone disease

BACKGROUND:

The potential benefit from using technology to improve health has been an area of growing interest within healthcare workers and researchers. This study aims to explore the use of virtual reality technology in improving health and wellbeing in people with a diagnosis of motor neurone disease (MND).

MND is a chronic progressive neurological condition which affects 1-5 people per 100,000 of population. It affects people generally in adulthood and more specifically within the 50-70 years of age. Motor Neurone disease is no longer considered to be a condition that affects the motor system alone. Extra motor clinical pathology, routinely observed in histopathological examinations, has been found with a preference for prefrontal, frontal and temporal cortices (Baumer et al, 2014). This is consequently associated with dysexecutive syndrome, behavioural impairment and, in up to 15% of cases, with overt frontotemporal dementia (Abrahams et al, 2014).

Due to the progressive nature of the condition, an individual with MND has to continue to adapt to the losses brought about by the condition. A study by Soofi et al., (2018) describes how people with MND perceive having a choice of rehabilitation interventions as important for them to have a sense of control over their life. It is believed that psychological, spiritual and social wellbeing is important for people with MND rather than a focus on physical functioning alone. Studies examining the role of psychological interventions in MND have found benefits from interventions such as meditation for promoting wellbeing in patients and their carers. Foley., (2007) highlighted the need for palliative care interventions to improve wellbeing in people with MND. Additionally, a study by Marconi et al., (2016), found that meditation helped promote a better acceptance of the condition. Furthermore, Pagnini et al., (2017) found that meditation training improved quality of life in people with MND.

More recently, the use of virtual reality (VR) technology is being recognised in the field of health management. Virtual reality refers to a technology that uses interactions between an individual and a computer generated environment which stimulates different sensory modalities such as visual and auditory (Dascal et al., 2017). This is accessed most commonly via the use of head mounted- goggles or headsets. Most of the studies published till date, have targeted the areas of pain management, eating disorders and cognitive or motor rehabilitation (Dascal et al, 2017). Schmitt et al., (2011) and Patterson et al., (2010) have suggested that the entertaining or stimulating effect of VR is useful in redirecting the

patient's attention away from distressing experiences such as those of anxiety and pain. The potential benefit of VR technology to enhance recovery after central nervous system injury continues to be an area of growing interest and one that has room for further exploration.

The use of VR has not been explored in motor neurone disease, a terminal condition, where individuals experience severe distressing symptoms from anxiety, respiratory distress or positional discomfort. Additionally, there remains limited evidence for its use in other long term conditions such as Multiple System Atrophy, Parkinson's disease or Multiple Sclerosis. Although there have been studies that look at interventions that support quality of life in motor neurone disease (Soofi et al., 2018; Pagnini et al., 2017; Marconi et al, 2016), these have not involved the use of VR technology. This study will try to explore the use of VR in this client group with a view to documenting what clients find useful, whether it affects their care needs, whether it helps with enhancing wellbeing and reducing anxiety.

Care of individuals with a diagnosis of motor neurone disease, is based on supportive interventions that help to improve quality of life. This study examines the role of VR and its impact on the quality of life in this client group. It is hoped that if this intervention is found beneficial in this client group then it may pave the way for its use in other similar long term conditions where supportive interventions are beneficial.

METHOD:

30 patients with a diagnosis of MND, who consent to taking part, will be included in the study based on a set of Inclusion/Exclusion criteria.

Inclusion Criteria:

- 1) Diagnosis of MND
- 2) Sufficient cognitive ability to understand instructions with regards using the VR kit
- 3) Has sufficient motor ability/dexterity to use the kit or a carer who will be able to assist with the use of the kit.
- 4) Can tolerate light and have sufficient head control to wear the head set.
- 5) Can understand English

Exclusion Criteria:

- 1) Poor cognition – inability to understand instructions regarding the use of VR.
- 2) Unable to tolerate light/unable to wear the head set
- 3) Light sensitive epilepsy, severe vertigo or dizziness.
- 4) Does not understand English

Patients will be referred to the study by members of the MND Care team. Patients meeting the Inclusion criteria and those who consent to participating will be recruited into the study.

Each of these patients will be assessed on a set of tests before and after the intervention period of 4 weeks. At the end of the intervention period, there will be a short interview to document the usage and perceived benefits (or not) of the device.

1. A test of cognition- ECAS
2. PHQ-9 for depression
3. GAD-7 for Anxiety
4. Edinburgh Mental Wellbeing scale
5. ALS-FRS
6. A daily diary for the client/carer to document the time for which the VR device was used.

The intervention period will be for 4 weeks where patients will be required to use the VR set for 2 hours in the day. During the implementation phase, support will be provided with regards any distressing symptoms or intolerance to the sensory stimulation some patients may potentially develop, due to the introduction of this technology. If the individual continues to be unhappy, the VR set use will be discontinued and the patient will be excluded from the study. Those patients who successfully complete the 4 week intervention will be reassessed on the questionnaires and will have an interview to document the impact of VR use on them and their quality of life.

RESULTS:

The data from the study will be analysed using a combination of qualitative analysis and statistical testing. The outcome of the research will be disseminated to patients and their carers and to the wider public using other methods of dissemination such as research journal publication and research reports.

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