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Review Article

A systematic review on voiceless patients' willingness to adopt high-technology augmentative and alternative communication in intensive care units

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Abstract

Objective

To systematically evaluate the acceptability of high-technology augmentative and alternative communication (high-tech AAC) among ICU patients who are voiceless guided by the technology acceptance model (TAM).

Methods

We searched the Cochrane Library, EMBASE, PubMed, CINAHL, PsycINFO, Web of Science, SinoMed, China National Knowledge Infrastructure (CNKI), China Science and Technology Journal Database and Wanfang Database from database inception to September 2019. Studies that examined conscious nonverbal ICU patients with high-tech AAC intervention were included. Two reviewers independently collected and evaluated all the studies. The methodological quality was assessed by using the Joanna Briggs Institute critical appraisal tool.

Results

Eighteen studies with a total of 914 patients met the inclusion criteria, and the quality of the studies varied from low to moderate. Based on the TAM, ICU voiceless patients perceived that high-tech AAC was useful, was easy to use, decreased communication difficulties, reduced negative emotions, and improved symptom identification and management. Patients maintained a positive attitude and were willing to continue to use high-tech AAC.

Conclusions

Although the existing evidence is limited, voiceless patients regard high-tech AAC devices as a useful, reliable, and acceptable alternative communication choice in the ICU. Multicenter, large-sample, and high-quality studies are highly recommended in the future.

Introduction

The intensive care unit (ICU) is an organised system for the provision of care to critically ill patients to sustain life during a period of acute organ system insufficiency (Marshall et al., 2017). Effective communication is a crucial component of patient-centered care and can improve critical ill patient outcomes and safety (Handberg and Voss, 2018, Williams et al., 2010). Currently, minimal sedatives and maximal humane care are becoming the ICU's primary sedation strategy (Vincent et al., 2016), the longer ICU patients are keep alert and aware, the more potential ability they have to communicate (Tolotti et al., 2018). However, several studies (Freeman-Sanderson et al., 2018, Khalaila et al., 2011) have already shown that 49%~82% of ICU patients reported that communication was extremely hard or even wholly impossible. The Coronavirus 2019 (COVID-19) pandemic will amplify the challenges that healthcare providers face when communicating with critically ill patients. 30%~100% of critically ill patients with COVID-19 require mechanical ventilation, resulting in the inability to speak. Moreover, healthcare providers find it difficult to communicate with patients through the protective masks (Anesi, 2020, Bajwah et al., 2020). The inability to communicate has been shown to be associated with overwhelming negative psychological problems (Salem and Ahmad, 2018), unmet needs (Wang et al., 2015), a lack of information received (Alasad et al., 2015), an increased risk of adverse events (Bartlett et al., 2008), dissatisfaction with care (Guttormson et al., 2015) and may impact long-term health outcomes (Carruthers et al., 2017).

The most prevalentappropraite method to help voiceless patients in ICU, is to use augmentative and alternative communication (AAC). AAC encompasses all forms of communication methods (other than verbal) used to supplement or replace speech for those with impairments in communication (ASHA, 2019). AAC allowed ICU voiceless patients to use various types of communication tools or devices to ease communication difficulties between patients and healthcare providers in the ICU setting (Carruthers et al., 2017). AAC is divided into two types: low-tech and high-tech AAC (ASHA, 2019). Low-tech AAC (e.g., alphabet, picture, writing boards) is limited in its messaging options and is rarely tailored to meet individual needs (Guttormson, 2017). The rapid development of mobile technology has brought high-tech AAC (e.g., VOCAs, specific software, tablets) into the mainstream due to its relatively low cost, high accessibility, and individualised complex communication needs (Guttormson, 2017, Light and McNaughton, 2011). High-tech AAC has already been used in patients with impaired communication (e.g., dementia, strokes, autistic spectrum disorders) (Elsahar et al., 2019) and proved to be feasible in voiceless patients in the ICU (Carruthers et al., 2017, ten Hoorn et al., 2016, Zaga et al., 2019). User acceptance is the primary factor to consider when applying technology in healthcare services (Khalifa and Liu, 2004). High-tech AAC is a newly developed and novel technology in an ICU setting, the benefits of high-tech AAC can only be attained if patients accept and intend to fully use them; ICU voiceless patients also as the major users are quite different from others due to their sudden speechlessness, cognitive changes, critical illness, sensory alteration and functional limitations. Therefore, it is indispensable for researchers to understand the intention to use high-tech AAC of ICU voiceless patients.

The technology acceptance model (TAM), developed by Davis in 1989 (Davis, 1989), is known as a reliable, robust and widespread model (Rahimi et al., 2018, Yarbrough and Smith, 2007) (shown in Fig. 1). According to TAM, the perceived ease of use (PEOU) and the perceived usefulness (PU) are the main determinants that predict attitudes (ATT) toward and the behavioral intention to use (BI) the technology, which in turn predicts its actual use. TAM is the most famous model for information technology adoption and has been used in numerous fields (Shemesh and Barnoy, 2020). To date, there has been no systematic research about voiceless patients' willingness to adopt high-tech AAC. Therefore, this systematic review used the TAM to examine ICU voiceless patients' acceptance toward high-tech AAC.

Section snippets

Methods

This is a systematic review guided by Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guideline (Liberati et al., 2009).…

Results

We obtained 1972 records through database searching. After removing duplicates and strictly securitized titles and abstracts, the full text of 50 studies needed to be read. Finally, 18 studies fulfilled the inclusion criteria, with a total of 914 patients (shown in Fig. 2). Table 2 summarised the characteristics of the included studies, which were published between 2003 and 2019, and all were performed in the ICU. The country includes the United States (Duffy et al., 2018, Garry et al., 2016, …

Discussion

This review used the TAM to systematically examine voiceless patients' willingness to adopt high-tech AAC in the ICU. Our review identified 18 studies describing four portable computer software programs, five dedicated AAC devices, six software applications, and three eye-tracking devices. Overall, the current studies indicated that high-tech AAC has broad acceptance and high value for the outcomes and experience of voiceless patients in the ICU.

The accessibility and portability of mobile…

Limitations

Due to the variety of high-tech AAC and outcome measures used, we only have provided a narrative review for the acceptance of high-tech AAC based on the components of the TAM. We only examined studies in English and Chinese, which may have caused selective bias. The quality of the included studies was not high, which mainly indicates an absolute risk of bias in the outcome. Due to a lack of qualitative research on high-tech AAC acceptance, we could not explain the profound reason for ICU…

Conclusion

As mobile technology continues to develop, high-tech AAC becomes increasingly prevalent in the ICU setting, providing a new way to address the complex communication needs of ICU voiceless patients. The results of this review indicate that high-tech AAC is an acceptable communication tool for voiceless patients in an ICU setting. Patients perceived high-tech AAC as useful and easy to use, and they had an optimistic willingness to adopt it. Future studies need to further explore the acceptance of …

Conflict of interest

None.…

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Ethical statement

This study was approved by permission from the Shanghai chest hospital (No. KS2041).…

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2022, Australian Critical Care

> *Citation Excerpt :*
> …Evidence shows that communication tools can help patients communicate. However, some patients are unable to use the tools owing to the severity of their illness, their level of consciousness, and impaired physical and cognitive status.34–36 Thus, ICU nurses will inevitably meet patients who are unable to use communication tools.…

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