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Delimiting the Proof-Of-Concept of Virtual Reality for Interprofessional Education in Simulating Obesity Case Management

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Abstract

This article delineates the proof-of-concept of virtual reality for interprofessional education in simulating obesity case management among healthcare profession students. Healthcare profession students, including dietetics, medical and nursing students in Universiti Putra Malaysia, will be recruited as a sample. This study starts with a workshop session on IP simulation-based obesity education and will be integrated into the virtual world (VW) online software. Students' knowledge and attitude will be assessed pre and post of the virtual IPE exposures. The developed obesity-simulated case would successfully lead to IPE implementation, and students who received virtual IPE would significantly have a better knowledge of obesity management and a positive attitude towards IPE. The virtual IPE would be a practical pedagogical approach to prepare the health profession students for a collaborative environment, improve technical skills, and strengthen soft skills such as communicating effectively.

Keywords: Interprofessional Education, Interprofessional Collaboration, Healthcare Professionals, Virtual Reality, Obesity

Introduction

In a healthcare setting, working in a collaborative environment involving various professionals is a nascent strategy that helps boost professional standards in delivering the highest quality of patient care and produce significant health outcomes (Gilbert et al., 2010; Reeves et al., 2013). Nowadays, there is an increasing need to provide students with interprofessional education (IPE) in meeting the demand for practice in a multidisciplinary healthcare system. IPE means "*learning together, from and with two or more professionals to facilitate effective teamwork and improve the health benefits and education*" (Gilbert et al., 2010).

IPE aims to educate clinical material in a relevant and interactive way (Levine & Wren, 2013).

For the students, the advantages of IPE are evident. Students exposed to IPE in the syllabus has cultivated interprofessional collaborations during their practices, enhanced team spirit to overcome healthcare providers' limitations, and encouraged competencies (Al-Qahtani & Guraya, 2016; Reeves et al., 2013; Cusack & O'Donoghue, 2012). Implementation of IPE strengthened their attitudes towards collaborative management and inquisitiveness for patients care (Nango & Tanaka, 2010).

Simulation-based education is a teaching strategy reflecting a real-world scenario for achieving educational objectives that have also been adopted when delivering IPE (Pai, 2018). Simulation in health education has been commonly used to mimic clinical procedures (Lateef, 2010). The World Health Organization (2013) supports the use of simulation-based education as a significant way to assist students to learn collaborative approaches as in IPE. This method provides students with appropriate circumstances for practising clinical theories and skills in a safe environment and supervised practice (Lamé & Dixon, 2018). Furthermore, the idea of learning-by-doing using simulation-based education brings more attention and lasting memory than other forms of learning (WHO, 2013).

IPE is well-known for its practical benefits, which have been established in Australia, Canada, the United Kingdom, the United States, and Saudi Arabia (Fallatah, 2016; Khan et al., 2016; Sunguya et al., 2014). Still, there is insufficient data on IPE applications in developing countries, including South-East Asia (Sunguya et al., 2014). In Malaysia, research about IPE is currently still in its infancy. One of the reasons could be related to the nature of the healthcare programs, generally conducted in isolation, whereby teaching and learning methods are within the same professional (Tong et al., 2016). In other words, students are rarely meet those in other programs. However, they are expected to work as a team in practice. This is particularly relevant in our setting as the IPE has not been in the class arrangement, highlighting the need to initiate IPE in our current teaching and learning without interfering with the curriculum system.

We use obesity as a model of care as it is the most significant health issue globally. Within the Southeast Asian region, Malaysia has the highest prevalence of obesity (Mohamad Nor et al., 2018), where almost 40% of Malaysian adults are obese (Mohamad Nor et al., 2018). Obesity is a complex disease requiring multidisciplinary approaches in understanding patient issues. Although obesity has been regularly taught throughout medicine and allied healthcare syllabus, it is being communicated at the uni-professional level. It has been shown that using interprofessional collaboration practice in adults with obesity resulted in a significant weight loss (Nagelkerk et al., 2018). This article aims to delineate the proof-of-concept of virtual reality for IPE in simulating obesity case management.

Materials and Methods

Study design and samples

This study is a pre-post intervention using a purposive sampling method and will be conducted at the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. This study will be carried out between October - December 2021. This study will be utilised a pre-post design, with a sample of healthcare profession students from different disciplines who are commonly engaged in obesity care such as dietetics, medical, and nursing program. The study was initiated with a workshop session on IPE education conducted in October 2019. The workshop's goal was to ensure students provided their input on the conduct of IPE and its

perceived benefits. During the workshop, they are given a basic introduction about obesity and the critical needs of having the team approach to manage obesity. Then, the information gathered has been integrated into the web-based 3D virtual reality, in which the development process is explained subsequently.

Sample Size

A total of 50 students would be required in acquiring 20% improvement after following the online IPE learning about clinical leadership (Tschannen et al., 2018). The sample size has also considered a 10% drop out at the alpha level of 0.05 and 90% power.

Development of Obesity Virtual Reality Clinic using Second Life® Platform

This study developed virtual reality with the obesity clinic as a model using the Second Life® platform to provide an engaging and immersive learning experience that reflects students' real-clinical scenarios. The Second Life® is a platform that provides an immersive experience of a virtual world featuring 3D-based user-generated content that supports highly interactive networking. The platform has been used in health education, such as mental health, patient safety and emergency medicine (Baker, Wentz & Woods, 2009; Davis, Hercelinskyj & Jackson 2016). However, the use of Second Life for obesity management in implementing IPE is still scarce.

In this Second Life® platform, we created an obese individual who attended the obesity clinic that a group of healthcare professions students would manage (Figure 1). The patient would undergo the nutrition care process that includes assessment and intervention. The healthy concept of the cafeteria is built to support dietary changes that provide real-life experience for the students. The developed VR is ready to be tested for its feasibility. It would allow students from various locations to come together for a real-time interactive training to manage obesity collaboratively. The IPE using a simulation-based obesity education is a practical pedagogical approach to prepare the students for a collaborative environment, develop technical skills and enhance soft skills, such as communication and teamwork, to prepare them as work-ready graduates.

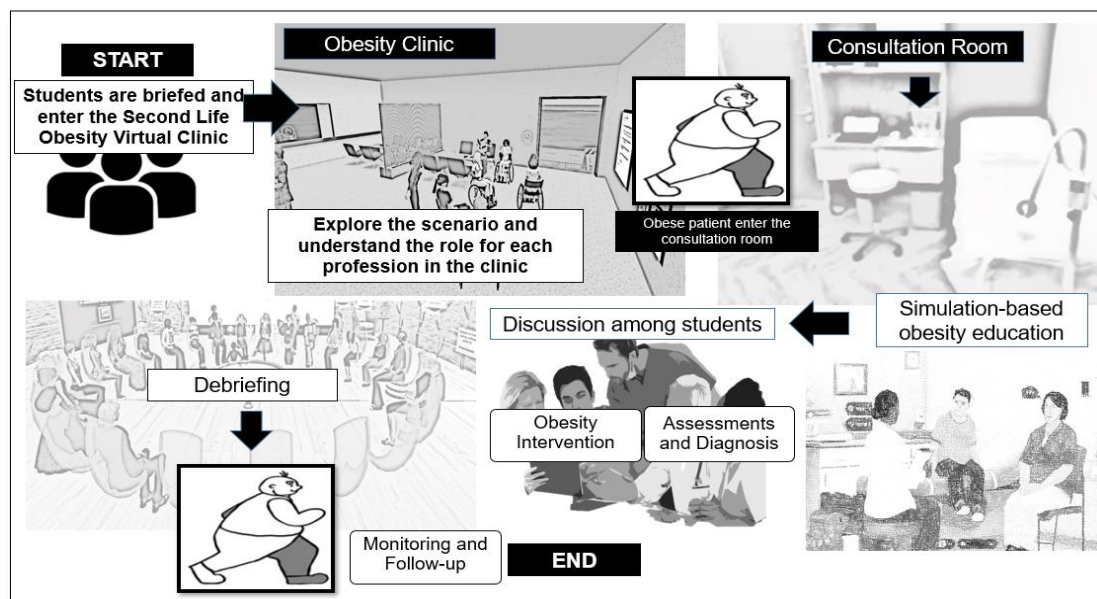


Figure 1: The map for Virtual Clinic for the interprofessional education using Second Life® Platform

Knowledge and Attitude

The knowledge about obesity management will be assessed using a set of questionnaires that have been developed based on our obesity model-of-care module. Students are required to answer ten multiple-choice questions about managing obesity, which will be asked before and after the IPE. This module will be later integrated into the virtual reality platform to be used as a teaching tool of IPE simulation-based in obesity cases.

The knowledge and attitudes towards IPE behaviours will also be assessed using validated questionnaires, namely the Interprofessional Socialization and Valuing Scale (ISVS) (King et al., 2016). ISVS evaluate the knowledge, attitudes, and behaviour towards collaborative care approaches in a healthcare setting. A total of nine questions ask about the role of IPE in preparing healthcare profession students to take part in interprofessional healthcare teams. The ISVS was available in two formats (ISVS-9A and ISVS-9B), and both are used before and after the study, respectively. Items are rated on a 7-point scale ranging from "not at all" (1) "to a very great extent" (7).

Values and Experiences

The value and experiences related to IPE activities will be assessed using the predetermined Self-Reflection Analysis (SRA) format on their perspectives related to working as a team in managing obesity. There are six open-ended questions for the SRA section.

Students are also asked to provide feedback on the usability of the virtual reality platform. There are ten simple questions for this purpose. The questions are scored on a 5-point scale ranging from "strongly disagree" (1) to "strongly agree" (5). All questions are asked online via a Google survey form.

Statistical Analysis

All the data will be analysed using SPSS, and the level of statistical significance will be set at $p < 0.05$. The demographic data and scores will be analysed and presented using means and standard deviations.

Discussion

This article delineates the proof-of-concept of virtual reality for IPE in the simulated obesity case management among healthcare profession students. Students from various health sciences programs, including dietetics, medical and nursing, will participate in the virtual reality simulation for obesity management. The improvement in knowledge of obesity and attitudes towards IPE will be assessed before and after the study.

Simulation-based education in IPE is not new. It has been used widely during rotations in hospitals, domiciliary care, community welfare programs, simulation-based program, workshops, and student-led lectures (Khan et al., 2016). Simulation-based education has also been imparted in IPE using standardised human models and mannequins (Lateef, 2010; Pai, 2018). In some studies, they have also combined the IPE at lab-based or using a real patient-based scenario (Lamé & Dixon, 2018). Students performed tasks in a small interprofessional team using a simulated clinical setting and impersonated their roles (Bolesta & Chmil, 2014).

The concept of interprofessional practice is essential among the healthcare team to ensure effective patient care. Hence, the proposed study will focus on developing the skills related to IPE among healthcare professional students. This study used obesity as a model as obesity is a complex disease requiring multidisciplinary team management (Baker et al., 2009;

Bolesta & Chmil, 2014; Pai, 2018). The use of IPE helps significantly improve their knowledge on obesity management and have a positive attitude towards IPE compared to before the exposure (Khan et al., 2016). Nonetheless, simulation-based IPE is less explored in our setting among our students. Although it can be applied in the current education system, we identified various challenges. These include time, space, and logistics (Table 1).

Table 1: Interprofessional Education Strategies and Its Reported Challenges

Interprofessional Strategies	Education	Reported Challenges
Simulated-patients		- Costly ¹ - Not easily reproducible without a proper training ¹
Standardised-patients		- Busy clinics ² - Patient safety ²
Case studies and seminar		- Logistic concern ³ - Scheduling and coordinating various disciplines ⁴

Besides, face-to-face IPE is always not feasible as the standard curriculum has been designed separately, whereby each medical, nursing, dietetic, and other health science program does not learn simultaneously and in the same class. Each program has its syllabus (Tong et al., 2016). Current practice manages patients at a single appointment under a single professional in the clinical setting, which may hinder the IPE approach. The patient follows the interventions to treat obesity and referrals to other health care providers when necessary. Hence, it does not support students to digest how to function as part of multidisciplinary teams.

The environment of crowded health centres limits the feasibility of actual patients to be used in IPE (Sunguya et al., 2014). As a result, students will have little thought about other professions and understand only their roles. The approach lacks patient-centred care, making patients find it difficult to clearly understand a healthcare provider's care plan (Khan et al., 2016), particularly in (Sunguya et al., 2014). Nonetheless, most studies used the conventional simulation method in the lab or clinical setting, with a limited study done in virtual reality. Therefore, using virtual reality technologies offers an excellent advantage for IPE simulation-based learning. There are many benefits to be gained with virtual IPE to help bridge the medical and healthcare education system gap. It provides ample incentives to support interprofessional collaboration.

This study delineates how the virtual reality platform can be used to complement the current education system with IPE, which offers a golden opportunity for our students. Using virtual reality-based simulation programs has been proved feasible (Davis A., 2015; Hu & Lee, 2017). The benefits of virtual IPE have been reported (Hall et al., 2011; Patel et al., 2013; Wiecha et al., 2010), and potential use for health-related benefits has also been proven (Kamel et al., 2008; Gorini et al., 2008), with positive feedback (Lee & Berge, 2011; Taylor et al., 2013; Davis et al., 2016). The teaching methods have been exciting and valuable for IPE implementation (Nagelkerk et al., 2018). Potential challenges related to virtual reality are also addressed, such as learning time, financial, sustainability issues, and technological concerns involved in using the platform. However, those problems can be dealt with by starting basic virtual reality activities (Baker et al., 2009).

Using IPE as illustrated in a virtual reality platform would foster and enhance their experiences (Baker et al., 2009; Bolesta & Chmil, 2014; Pai, 2018). A collaborative approach

in handling complex management, including obesity, would assist students to gain a better perspective towards holistic care approach and collaborative treatment (Khan et al., 2016). It is expected that students with prior IPE exposures would highly value the experiences and practice teamwork when they begin to work (Patel et al., 2013).

This study will benefit the healthcare professions students, where they will be able to learn the navigation, communication, and information-sharing skills of relevance to the online virtual environment and apply their discipline-specific patient assessment and care planning. Additionally, with the use of virtual reality in providing IPE simulation, students will be able to determine the overall process of the health journey of the obese patient. They can actively participate, discuss and develop a collaborative care plan from various treatment perspectives.

Students can experience virtual education depending on their ability to understand and repeat the assignment quickly. Also, students can readily meet each other in the virtual reality platform out of class time which can resolve the logistic issues such as scheduling in a real clinic time. Thereby, students can access information from all over the place and have sufficient time to revise their educational materials and practical experience (Hu & Lee, 2017). Simulated patient use would have been demanding (i.e., costly) and not easy to replicate (Nestel et al., 2011). This virtual simulation gives students a digital learning experience that demonstrates real clinical situations in hospitals or clinics.

Students may explore virtual environments in which in the real world is not easily accessible (Davis A., 2015). In the case of obesity assessment, students must conduct a physical examination of the composition of body fatness. The students can accurately identify the body fatness site by having a virtual education. Most importantly, it provides safe training of newly acquired clinical skills and protects patient confidentiality (Bolesta & Chmil, 2014). The students can also view and discuss a similar scenario using voice and text chat to identify the best care plan for the patients. This platform will help build up technical skills and strengthen students' soft skills (Davis et al., 2016).

Conclusions

Interprofessional collaborations are essential in healthcare practices, and thus, IPE is a crucial component to be added to the current curriculum. Although there are challenges in implementing the IPE in the existing healthcare curricula, there is a potential strategy to integrate IPE using pedagogical simulation approaches to the virtual reality platform environment that would help to close the gap in the current education system. Future studies should evaluate the developed virtual reality facility for other programs using different clinical case scenarios to enrich its usability and database.

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Author's Contribution

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