https://nmsjournal.kaums.ac.ir/
Nursing and Midwifery Studies. 2023; 12(3): 130-134
https://doi.org/10.48307/nms.2023.404149.1199

Research Article Open Access

The impact of a 360° virtual tour of the college environment on the anxiety of newly arrived students during the COVID-19 pandemic

Aygineh Hayrabedian [1], **Ahmad Ghadami** [1], **Saeid Amini Rarani** [1*]

[1] Nursing and Midwifery Care Research Center, Department of Operating Room, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

[*] **Corresponding author:** Saeid Amini Rarani, Nursing and Midwifery Care Research Center, Department of Operating Room, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran. **Email:** aminior20@gmail.com

Received: 16 January 2023 **Revised:** 30 July 2023 **Accepted:** 30 July 2023 **e-Published:** 22 September 2023

Abstract

Background: University education has been held virtually during the COVID-19 pandemic. However, students were confused and anxious while attending college, both because they were exposed to a new environment and fearful of coronavirus infection.

Objectives: The purpose of this study was to investigate the effect of a 360° virtual tour of the college physical environment on the anxiety of newly arrived students during the COVID-19 pandemic.

Methods: This single-blind, randomized, controlled trial was conducted between January and February 2021, with 80 nursing, midwifery, and surgical technology students from the Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran. Students were randomly allocated into an intervention group and a control group, each with 40 students. Students in the intervention group received a 360° virtual tour of the college physical environment to be familiarized with the college environment. Students in the control group, on the other hand, were personally familiarized with the physical environment of the college. Students' anxiety levels were measured before and after the intervention using the Spielberger State-Trait Anxiety Inventory (STAI). Independent samples t-test, paired t-test, and chi-square test were used to analyze the data.

Results: The mean anxiety score in the intervention group decreased from 48.2±2.66 to 37.7±3.03 after the intervention (P<0.001). However, the mean anxiety score did not change significantly in the control group (P=0.59).

Conclusion: A 360° virtual tour can reduce the anxiety of newly arrived students before entering the college environment.

Keywords: COVID-19, 360° virtual tour, Anxiety, Students.

Introduction

According to the World Health Organization (WHO), approximately 600 million people worldwide are affected by the COVID-19 pandemic, which has resulted in more than 6 million deaths by September 2022.[1] The COVID-19 pandemic affects not only the physical health but also the mental health of vulnerable populations due to the risks associated with infection and the restrictions on social interaction.[2]

The COVID-19 pandemic has also brought significant and sudden changes in the lives of university students. During the peaks of the pandemic, universities were closed and classes were held online to protect people and prevent disease transmission.[3]

Students were deprived of attending the university due to virtual education, and were confused and anxious while attending, both because they were exposed to a new environment and fearful of coronavirus infection.[4,5]

It has been shown that 44% of university students experienced severe to moderate anxiety during the COVID-19 pandemic.[6] This high level of anxiety can weaken the body`s immune system and make people vulnerable to COVID-19.[7] Using a 360° virtual tour is one of the ways to familiarize students with the physical environment of the college during virtual education.[8] A 360° virtual tour provides a virtual view of a physical environment that resembles the real one, reduces anxiety,[9] allows people feel like they are in a real setting, and makes virtual reality enjoyable for them.[10]

Some studies have shown that virtual tours can reduce anxiety during the COVID-19 pandemic.[11,12] However, a number of studies have reported that such tours did not

significantly reduce anxiety.[13]

Objectives

The purpose of this study was to investigate the effect of a 360° virtual tour of the college physical environment on the anxiety of newly arrived students during the COVID-19 pandemic.

Methods

Study design and participants

This single-blind, randomized, controlled trial was conducted with 80 nursing, midwifery, and surgical technology students of the Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences.

The study was carried out between January and February 2021. All data were gathered by a trained research assistant, and researchers were blind to baseline anxiety scores.

The sample size was calculated using the formula for the comparison of two means and based on the results of a previous study[14] investigating the effect of an orientation tour on preoperative anxiety in candidates for coronary artery bypass graft. The mean posttest scores for anxiety in the intervention and control groups were 34.83 ± 11.15 and 47.69 ± 11.30 respectively.

Accordingly, with a type I error of 0.05, a power of 0.90, a μ1 of 34.83, a μ2 of 47.69, a *S1* of 11.15, *S2* of 11.30, the needed sample size was 17 subjects per group. However, given the limited subjects available, we recruited all eligible ones and allocated 40 ones to each group [Formula 1].

$$\frac{\left(z_{1-\alpha/2}+z_{1-\beta}\right)^2 2s^2}{d^2}$$

Formula 1. Sample size calculation formula

Newly arrived nursing, midwifery, and surgical technology students who were unfamiliar with the nursing and midwifery faculty environment and had no history of taking anxiolytic and sedative drugs were included to the study. The only exclusion criterion was unwillingness to continue participation in the study for any reason. After listing and numbering the names of 80 eligible incoming students and using a table of random numbers, 40 students were assigned to the intervention group and 40 to the control group [Figure 1].

Intervention

Using special 3D glasses, students in the intervention group were familiarized with the college environment and officials through a 360° virtual tour created by a researcher [Figure 2].

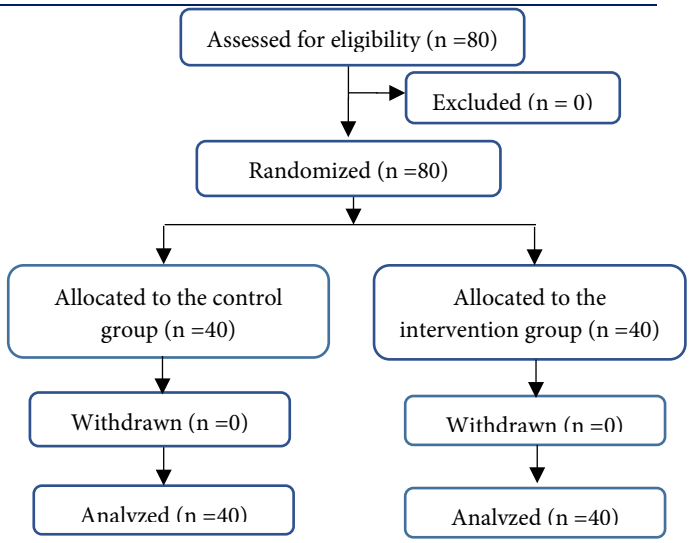

Figure 1. The study flow diagram

Through this tour, students were familiarized with the physical environment and faculty officials, including the Vice Chancellors for Education, Culture, and Research and the Dean of the Faculty, the Information Technology (IT) unit, the Library, the Clinical Skills Center (Skill Lab), the Chapel, the Copy and Print Department, the Research Center, the Audio-Visual Department, the location of student closets, and the offices of head of departments and faculty members. Since none of the new students were familiar with the college environment, this video was displayed separately for each of them in one of the college classes, and then they entered the college environment. Students in the control group got acquainted with the physical college environment during a face-to-face group meeting, without using a 360° virtual tour and following health protocols. The intervention was carried out between 8:00 AM and 12:00 MD. Anxiety was measured immediately before and after the intervention.

Data collection instruments

The instrument used consisted of two parts. The first part included questions on demographic information including age, gender, marital status, COVID-19 vaccination history, and field of study. The second part included Spielberger's State-Trait Anxiety Inventory (STAI). The STAI includes two parts of state and trait anxiety. In this study, the State scale was used to check the anxiety levels in the "same moment". This scale contains 20 items on state anxiety; each scored using a four-point Likert scale, from 1 to 4. Possible scores range from 20 to 80, with higher scores indicating higher anxiety. Scores 20-40, 41-60, and 61-80 indicate mild, moderate, and severe anxiety, respectively. The validity and reliability of the Persian translation of the STAI have been previously

confirmed, and its Cronbach's alpha was reported to be 0.94.[15] In the present study, the Cronbach's alpha for this scale was 0.87.

Data analysis

Data analysis was done using SPSS software version 16 (SPSS Inc., Chicago, IL, USA). Data normality was checked using the Kolmogorov–Smirnov and Shapiro–Wilk tests and were normally distributed. Demographic characteristics of the study groups were compared using the Chi-square test. The paired t-test was used to compare anxiety scores before and after the intervention. The independent samples t-test was also used to compare mean anxiety scores between the two groups. The significance level was set at <0.05.

Figure 2. A view of the 360-degree virtual tour of the faculty

Ethical considerations

Subjects were informed of the research objectives and procedures. Written informed consent was obtained from all participants, and they were assured of the confidentiality of their information. The study protocol was reviewed and approved by the Ethics Committee of Isfahan University of Medical Sciences, Isfahan, Iran (approval code: IR.MUI.NUREMA.REC.1400.045), and was also registered in the American Economic Association's Registry for Randomized Controlled Trials with the registration number of AEARCTR-0009096. The study was conducted in accordance with the Helsinki Declaration about the Ethical Standards for Medical Research Involving Human Subjects.[16]

Results

Of the 80 participants, 62.5% were female and 87.5% had been vaccinated against COVID-19. There was no significant difference between the intervention and control groups in terms of demographic characteristics [Table 1]. The intervention and control groups did not differ significantly in their mean baseline anxiety scores (P=0.837), and the mean scores of both groups were at a moderate level. However, the mean anxiety score in the intervention group decreased significantly after the intervention (P<0.001), but did not change significantly in the control group (P=0.59) [Table 2].

Table 1. Demographic characteristics of the students participated in the intervention and control groups[a]

Demographic characteristics		Intervention group	Control group	P-value
Age (years)		18.95 ± 0.95	18.77 ± 0.99	0.835[b]
Gender				
	Male	15 (37.5)	14 (35)	0.648[c]
	Female	25 (62.5)	26 (65)	
Marital status				
	Single	35 (87.5)	34 (85)	0.522[c]
	Married	5 (12.5)	6 (15)	
COVID-19 vaccination				
	Yes	35 (87.5)	32 (80)	0.071[c]
	No	5 (12.5)	8 (20)	
Fields of study				
	Nursing	13 (32.5)	12 (30)	0.89[c]
	Midwifery	14 (35)	15 (37.5)	
	Surgical Technology	13 (32.5)	13 (32.5)	

[a] Data presented as n (%) or mean±SD, [b] t-test, [c] Chi squared test

Table 2. Comparison of anxiety score in intervention and control groups

Group	Before intervention	After intervention	P-value [b]
Intervention	48.2 ± 2.66	37.7 ± 3.03	<0.001
Control	48.7 ± 3.1	48.42 ± 4.46	0.59
P-value [c]	0.837	<0.001	

[a] Data presented as n (%) or mean±SD, [b] t- test, [c] paired t-test

Discussion

The present study showed that a 360° virtual tour reduces anxiety in newly arrived students. Few studies are available on the effects of 360° virtual tours on anxiety in college students. Consistent with our findings, a study of university students conducted before COVID-19 demonstrated that anxiety and stress levels were significantly reduced through the use of virtual reality technology.[17] Some studies in children undergoing surgery[18] and in patients undergoing coronary artery bypass graft surgery[14] have also reported that virtual tours of the operating room environment could significantly reduce preoperative anxiety in patients. Contrary to our findings, a study has reported that a virtual reality tour could not significantly affect perioperative anxiety in an operating setting, although patients were positive regarding the use of virtual reality. The authors attributed the insignificant effect of the virtual tour to the beneficial effect of preoperative patient education.[19] Nevertheless, by immersing a person in a real environment, a virtual tour seems to help an individual experience being in a real environment and thus feel less anxiety when attending the real environment.[20]

This study has some limitations. First, students' individual characteristics might affect both their anxiety and their experience with a virtual tour. Furthermore, it was impossible to blind the intervention group to the intervention. Further studies with a more delicate design are recommended to understand the effects of individual differences on anxiety and virtual tour experiences. The current study was conducted in a nursing and midwifery faculty and can also be replicated in other educational settings.

Conclusions

A virtual tour could reduce the anxiety of incoming students. This method can be used as an alternative to visiting the real physical environment during an infectious disease outbreak to familiarize new students with the physical environment of the university and colleges and reduce the students' anxiety.

Acknowledgment

All the authors would like to express their gratitude to all the students for their participation in this study.

Competing interests

None.

Abbreviations

State-Trait Anxiety Inventory: STAI
World Health Organization: WHO
Information Technology: IT
the Library, the Clinical Skills Center: Skill Lab

Authors' contributions

All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

Funding

The Research Administration of Isfahan University of Medical Sciences, Isfahan, Iran, granted this study.

Role of the funding source

None.

Availability of data and materials

The data used in this study are available from the corresponding author on request.

Ethics approval and consent to participate

The Subjects were informed of the research objectives and procedures. Written informed consent was obtained from all participants, and they were assured of the confidentiality of their information. The study protocol was reviewed and approved by the Ethics Committee of Isfahan University of Medical Sciences, Isfahan, Iran (approval code: IR.MUI.NUREMA.REC.1400.045), and was also registered in the American Economic Association's Registry for Randomized Controlled Trials with the registration number of AEARCTR-0009096. The study was conducted in accordance with the Helsinki Declaration about the Ethical Standards for Medical Research Involving Human Subjects.

Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

References

1. World Health Organization. Weekly epidemiological update on COVID-19 - 20 July 2022, edition 101, 20 July 2022. Available from: https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---20-july-2022. [Last access date Feb 1, 2023]
2. Hamedchaman N, Riahy S, Delpisheh A, Najafzadeh Y. Exercise during coronavirus pandemic: two sides of the same coin-intensity-specific effect of physical training on innate and acquired immune system of human. Novel Clin Med 2023;2:102-108. doi:10.22034/ncm.2023.381369.1066
3. Atout M, Alrimawi I, Mohammed Ali A, Dreidi M, Abu Khader I, Jaghama M. Challenges to online education during the time of COVID-19: A focus group study. Nurs Forum 2022:57:1120-1128. doi:10.1111/nuf.12800 PMid:36106944
4. Anderson AP, Mayer MD, Fellows AM, Cowan DR, Hegel MT, Buckey JC. Relaxation with immersive natural scenes presented using virtual reality. Aerosp Med Hum Perform 2017;88:520-526. doi:10.3357/AMHP.4747.2017 PMid:28539139
5. Jafari Nodoushan Z, Mirhosseini H, Yamola M, Bidaki R, Hasibi E, Jafari A, *et al.* Effect of neurofeedback on anxiety, dyslexia, and dysgraphia in elementary students afflicted with attention deficit hyperactivity disorder- a pilot study. Novel Clin Med 2022;1: 81-88. doi:10.22034/ncm.2022.327848.1018
6. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, *et al.* The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res 2020;287:112934. doi:10.1016/j.psychres.2020.112934 PMid:32229390 PMCid:PMC7102633
7. Nami M, Mehrabi S, Kamali AM, Kazemiha M, Carvalho J, Derman S, *et al.* A new hypothesis on anxiety, sleep insufficiency, and viral infections; reciprocal links to consider in today's "world vs. COVID-19" endeavors. Front Psychiatry 2020;11:585893. doi:10.3389/fpsyt.2020.585893 PMid:33250794 PMCid:PMC7674554
8. Levonis SM, Tauber AL, Schweiker SS. 360° virtual laboratory tour with embedded skills videos. J Chem Educ 2021;98:651-654. doi:10.1021/acs.jchemed.0c00622
9. Reinders IM, Cremers GR, van Rooijen SJ, Leemans JC, Perquin CW, Geomini PM, *et al.* The effect of an informative 360-degree virtual reality video on anxiety for women visiting the one-stop clinic for abnormal uterine bleeding: A randomized controlled trial (VISION-trial). Eur J Obstet Gynecol Reprod Biol 2022; 272: 96-103. doi:10.1016/j.ejogrb.2022.02.179 PMid:35299013
10. Yang T, Lai IKW, Fan ZB, Mo QM. The impact of a 360 virtual tour on the reduction of psychological stress caused by COVID-19. Technol Soc 2021;64:101514. doi:10.1016/j.techsoc.2020.101514 PMid:33424061 PMCid:PMC7775825
11. Putri DAP, Kusumaningtyas R, Aldi T, Haiqal FZ. Virtual reality simulation to help decrease stress and anxiety feeling for children during COVID-19 pandemic. Int J Adv Comput Sci Appl 2021;12: 566-573. doi:10.14569/IJACSA.2021.0121272
12. Camara DR, Hicks RE. Using virtual reality to reduce state anxiety and stress in university students: An experiment. GSTF J Psychol 2020; 4:1-15.
13. Çakır SK, Evirgen S. The effect of virtual reality on pain and anxiety during colonoscopy: a randomized controlled trial. Turk J Gastroenterol 2021;32:451-457. doi:10.5152/tjg.2021.191081 PMid:34231475 PMCid:PMC8975482
14. Niknejad R, Mirmohammad-Sadeghi M, Akbari M, Ghadami A. Effects of an orientation tour on preoperative anxiety in candidates for coronary artery bypass grafting: A randomized clinical trial. ARYA atheroscler 2019;15:154-160.
15. Khodayarifard M, Spielberger CD, Lavasani MG, Zardkhaneh SA. Psychometric properties of Farsi version of the Spielberger's state-trait anger expression inventory-2 (FSTAXI-2). Procedia Soc 2013;82:325-329. doi:10.1016/j.sbspro.2013.06.269
16. Shrestha B, Dunn L. The declaration of Helsinki on medical research involving human subjects: a review of seventh revision. J Nepal Health Res Counc 2020;17:548-552. doi:10.33314/jnhrc.v17i4.1042 PMid:32001865
17. Concannon BJ, Esmail S, Roduta Roberts M. Immersive virtual reality for the reduction of state anxiety in clinical interview exams: Prospective cohort study. JMIR Serious Games 2020;8:e18313. doi:10.2196/18313 PMid:32673223 PMCid:PMC7381040
18. Liguori S, Stacchini M, Ciofi D, Olivini N, Bisogni S, Festini F. Effectiveness of an app for reducing preoperative anxiety in children: a randomized clinical trial. JAMA pediatr 2016;170: e160533. doi:10.1001/jamapediatrics.2016.0533 PMid:27294708
19. Vogt L, Klasen M, Rossaint R, Goeretz U, Ebus P, Sopka S. Virtual reality tour to reduce perioperative anxiety in an operating setting before anesthesia: randomized clinical trial. J Med Internet Res 2021;23:e28018. doi:10.2196/28018 PMid:34252034 PMCid:PMC8444035
20. Riva G, Serino S. Virtual reality in the assessment, understanding and treatment of mental health disorders. J Clin Med 2020;9:3434. doi:10.3390/jcm9113434 PMid:33114623 PMCid:PMC7693021

How to Cite this Article:
Hayrabedian A, Ghadami A, Amini Rarani S. The impact of a 360° virtual tour of the college environment on the anxiety of newly arrived students during the COVID-19 pandemic. Nurs Midwifery Stud 2023;12(3):130-134. doi: 10.48307/nms.2023.404149.1199