

The Impact of COVID-19 Pandemic on Nursing Education among Nursing Students: A Systematic Review

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ABSTRACT

Introduction: Globally, the COVID-19 pandemic has had a significant impact on educational sections and is required to close down due to the transmission of the coronavirus. The newly developed online learning is the most reliable option to resume the education process by preventing the academic calendar from accumulating and minimizing learning loss. **Objective:** This systematic review aimed to search the available literature on the impact of the COVID-19 pandemic on nursing education. **Methods:** Searching the literature was systematically done using the PRISMA flow diagram, and the inclusion and exclusion criteria of the study were followed by the PICO/S framework. The quality assessment was conducted by using the CASP. **Results & Discussion:** 30 articles included in this systematic review. Three themes emerged in this review. Those are knowledge and perception of the nursing students towards COVID-19, experience and readiness of the nursing students towards E-learning, and the attitude and psychological impact on the nursing students towards COVID-19.

Keywords: COVID-19, nursing education, nursing students, health care education, university students

ABSTRAK

Pendahuluan: Secara global, pandemi COVID-19 telah berdampak signifikan pada pendidikan dan diminta ditutup karena penularan virus corona. Pembelajaran online yang baru dikembangkan adalah pilihan yang paling dapat diandalkan untuk melanjutkan proses pendidikan dengan mencegah masa akademik terakumulasi dan meminimalkan kehilangan pembelajaran. **Tujuan:** Tinjauan sistematis ini bertujuan untuk mencari literatur yang tersedia tentang dampak pandemi COVID-19 pada pendidikan keperawatan. **Metode:** Penelusuran literatur dilakukan secara sistematis menggunakan diagram alir PRISMA, dan kriteria inklusi dan eksklusi penelitian diikuti dengan kerangka PICO/S. Penilaian kualitas dilakukan dengan menggunakan CASP. **Hasil & Diskusi:** 30 artikel didapatkan setelah proses pencarian. Tiga tema muncul dalam ulasan ini yaitu pengetahuan dan persepsi mahasiswa keperawatan terhadap COVID-19, pengalaman dan kesiapan mahasiswa keperawatan terhadap E-learning, serta sikap dan dampak psikologis mahasiswa keperawatan terhadap COVID-19.

Kata kunci: COVID-19, pendidikan keperawatan, mahasiswa keperawatan, mahasiswa universitas

INTRODUCTION

A newly discovered disease, COVID-19, subsequently named SARS-CoV-2 emerged in Wuhan City, Hubei Province, China on 12th December 2019 (Aida et. al, 2020). Since the first emersion of the disease, it has progressed to become a world pandemic. As reported by the World Health Organization (WHO), cases of COVID-19 have remained at approximately 4 million new cases, while new deaths have continued to increase to over 69 000. This brings the cumulative numbers to over 61.8 million reported cases and 1.4 million deaths globally since the start of the pandemic.

The worsening case happens when the disease affects the students' learning process, especially for critical courses such as medical students, pharmacy students, dentistry students, and nursing students. The face-to-face teaching and learning process is changed to the mode of virtual teaching and learning, which is new to the students. Even though studies have suggested that online learning is effective and that wisely using the internet can improve a person's career, there is a rising number of issues about the students' well-being that should be considered (Jamaludin et al., 2017; Jamaludin et al., 2018).

Moreover, some measures taken to combat the virus have disrupted the daily lives of many (Qiu et al., 2020; O'Sullivan et al., 2020). Based on a previous study, a few factors are identified that are related to the challenges faced by the students, such as technical problems, the home environment, and many more (Elsalem et.al., 2020). This COVID-19 pandemic can be described as a significant and life-changing experience, both a direct and an indirect threat to health and may have long-term implications at both local and global levels (Qiu et al., 2020). Nursing students have reported feeling more stressed during such crises, as the remote learning arrangements have compromised their learning (Aslan and Pekince, 2020).

According to Mirna and Ali (2021), students feel moderate anxiety and depression because of the heavy workload of assignments.

Besides, the period of confinement during the pandemic might affect their progress in study. (Li et.al., 2020). Students also have difficulty focusing on online learning compared to face-to-face classes (Elsalem et al., 2020). Furthermore, financial and family support during COVID-19 affects the mental well-being of the students (Aslan, 2020). Even with the daily challenges of nursing, nurses make a difference in the lives of the many people they touch (Hasan, Nurumal, Firdaus & Jamaludin, 2021). Hence, it is recommended to have some solutions to solve it by helping the nursing student by addressing the issue that they face and helping them to learn through virtual learning effectively. Thus, this review focused on the common difficulties faced by university students, especially healthcare students, specifically nursing students, during this pandemic crisis.

METHOD

This study aimed to look for the available literature on psychosocial well-being as measured by the differences in levels and the outcome (sense of coherence, confidence level, knowledge and experience of the COVID-19 outbreak), stress, and coping mechanism of nursing students during the crisis. In this study, we used a systematic review approach. The reason for using this method was to maximize the inclusion of studies and to preserve the integrity of the findings of the different types of study findings (Harden, 2010; Jamaludin & Chan, 2019).

Search Strategies and Data sources

The search from databases Google Scholar, PubMed, and ScienceDirect by using the Boolean operators "AND" to find the articles with keywords of "COVID-19 pandemic" AND "nursing education" AND "undergraduates" from the first search on the 12th November 2020 until the last search on 12th December 2020. The keywords were searched in the titles and abstracts of the article.

The total articles found are 2799 from the described databases. The search was narrowed

down by selecting the full text, peer-review, and published between 2019 and 2020, and it resulted in 100 articles. Seventy articles were excluded due to not being related to nursing education or related to the same field of study, and some of the articles did not have access to the full text.

Selection criteria of the studies

In this study, the inclusion and exclusion criteria were used to specify and narrow down the search and ensure its relevance to the objective. Moreover, this study included all articles related to COVID-19, nursing education, or other healthcare students within the same field. The study also included the participants of undergraduates in nursing or healthcare related to the same area. The articles must be in English, and the search excluded the grey literature, unpublished articles, and articles that cannot be assessed for full text. The article selection was made systematically using the PRISMA framework, as shown in figure 1. A total of 30 articles were included in this review.

Furthermore, the review of clinical questions for this study was defined using the framework PICO for quantitative analyses and PICOS for qualitative studies, as shown in tables 1 and 2 (Miller, 2001; Amir-Behghadami & Janati, 2020).

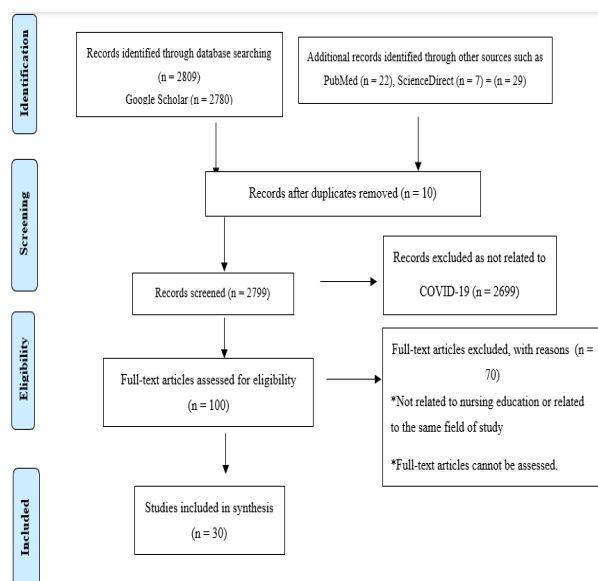


Figure 1. Systematic Literature Search Flow

Table 1. PICO framework for the quantitative studies

PICO element	Inclusion Criteria for review
P (population)	Nursing and healthcare-related students.
I (Intervention)	The study examines students' psychosocial well-being, stress, and coping mechanisms during the COVID-19 crisis.
C (comparison):	The study compares students' psychosocial well-being, stress, and coping mechanisms.
O (outcome):	The study measures a sense of coherence, confidence level, knowledge, and experience of the COVID-19 outbreak.

Table 2. PICOS framework for the qualitative study

PICOS element	Inclusion Criteria for review
P (population)	Nursing and healthcare-related students
I (Intervention)	The study examines students' psycho-social well-being, stress, and coping mechanisms during the COVID-19 crisis.
C (comparison)	The study examines students' psychosocial well-being, stress, and coping mechanisms.
O (outcome)	The study measures a sense of coherence, confidence level, knowledge, and experience of the COVID-19 outbreak.
S (study design)	The study used focus groups through semi-structured, in-depth, and observation interviews.

Quality appraisal

Quality critical appraisal for the included studies has been carried out with the guideline from the critical appraisal skill program (CASP) tools according to the type of studies of articles selected (Critical Appraisal Skills Program, 2021). The rating score is represented by 1 point (strong), 2 points (moderate), and 3 points (weak). Additionally, the global rating for this paper is strong (no weak ratings), moderate (one weak rating), and weak (two or more weak ratings). Therefore, by assessing quantitative articles included in this review by eight criteria below:

- The selection bias is likely to the individual as representative of the target population.
- The randomized study design.
- Relevant confounders that were controlled.
- Participant blinding or not.
- The validity and reliability of data collection methods.
- Withdrawals and drop-outs.
- Consistency of Intervention integrity.
- The appropriate analysis.

For the qualitative studies, the following nine criteria were used in this review:

- a) The structured abstract and title.
- b) The introduction and aims were clear.
- c) Clear method and data.
- d) Appropriate sampling targeted.
- e) Sufficient data analysis.
- f) Gained ethical approval and bias.
- g) Clear results.
- h) Transferability or generalizability to a wider population.
- i) Implications to policy and practice.

After accessing the quality of the selected articles, the following information from the articles was extracted, and the result is shown in table 3.

FINDINGS

Data Synthesis and overall findings

From the process of analyzing the included studies, three themes were synthesized in this study. Those were knowledge and perceptions of the nursing students towards COVID-19, experience and readiness of the nursing students towards E-learning, and the attitude and psychological impact on the nursing students towards COVID-19. Finally, 30 articles were included in this review. There were two articles on a qualitative study, 25 articles on a quantitative study, and three articles on a mixed-method study. Among the 25 quantitative articles, there are 22 cross-sectional studies, two cohort studies, and one Quasi-experimental study. The following session explains the detailed findings of this study.

Table 3. Summary of Article Search Results for Systematic Review

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
1	Savitsky et al. (2020)	Anxiety and coping strategies among nursing students during the covid-19 pandemic	To assess levels of anxiety and ways of coping among nursing students in the Ashkelon Academic College, Southern District, Israel.	Cross-sectional study	244 students in the nursing department	The Generalized Anxiety Disorder 7-Item Scale SPSS statistical software version 25.0 Mann-Whitney and Kruskal-Wallis non-parametric tests chi-square test t-test or ANOVA test	The prevalence of moderate and severe anxiety was 42.8% and 13.1% respectively. Gender, lack of PPE, and fear of infection were significantly associated with a higher anxiety score. Stronger resilience and usage of humor were associated with significantly lower anxiety levels, while mental disengagement with higher anxiety levels.
2	Elsalem et al (2020)	Stress and behavioral changes with remote E-exams during the Covid-19 pandemic: A cross-sectional study among undergraduates of medical sciences	To evaluate the students' experience of remote E-exams during the COVID-19 pandemic among Medical Sciences students in Jordan.	Cross-sectional study	1019 students	Survey Chi-square test	Among 1019 respondents, 32% reported more stress with remote E-exams. This was associated with academic major and gender. Among students with more stress during remote E-exams, the exam duration, mode of questions navigation and technical problems (exam platform and internet connectivity) appeared as the main factors related to stress in 78%, 76% and >60%, respectively. Other factors include concern regarding the teaching methods, exam environment and students' dishonesty. Remote E-exams had negative impact on students' dietary habits (increase consumption of caffeine and high energy drinks, high sugar food, fast food), sleep (reduction in sleeping hours, more consumption of insomnia medications), physical activity (less exercises) and smoking habits (increase)
3	Gehan et al (2020)	E-learning During COVID-19 Pandemic: Obstacles Faced Nursing Students and Its Effect on Their Attitudes While Applying It	To investigate the effect of obstacles faced nursing students on their attitudes towards e-learning while applying it during COVID-19 pandemic	Cross-sectional study A descriptive correlational research design Stratified random sample technique	627 student	Interviewing questionnaire, attitude towards e-learning scale, and obstacles of e-learning questionnaires	The results revealed that overall, 61.6% of students had negative attitudes towards e-learning. There was the highest level of total obstacles present among academic students in the first year were (67.6%) and the lowest level of total obstacles present among academic students in the fourth year was (55.7%) that faced nursing students during using e-learning. the most common dimensions of obstacles to e-learning were infrastructure and technology, technical and management support, and instructors' characteristics (87.1%, 85.2%, and 82.9%, respectively).

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
4	Gaur et al (2020)	Undergraduate nursing students' attitude towards online classes during lockdown period in India: imposed or interested?	To ascertain the attitude towards online classes among undergraduate nursing students during lockdown period	Cross-sectional descriptive survey Convenient sampling technique	394 undergraduate nursing students	Valid and reliable self-structured questionnaire based on 5 point Likert scale SPSS version 23	More than two-third (76%) participants showed unfavourable attitude towards online classes. There was a significant difference between age, residence, father and mother education with participants' year of study ($p < 0.05$)
5	Li, et al (2020)	Investigation on Knowledge Awareness, Self-Protective Behaviors and SAS Anxiety of Nursing Students during the Epidemic of COVID-19	To investigate the knowledge awareness, self-protective behaviors of nursing students and their effects on SAS anxiety during the epidemic of COVID-19	Cross-sectional study Convenient sampling method	362 nursing students	Questionnaire, knowledge of new coronavirus knowledge, self-protective behaviours and SAS anxiety scale	A total of 362 nursing students were surveyed. The anxiety state detection rate was 14.09%. The SAS anxiety score was (33.64 ± 6.17) , which was higher than the norm of anxiety symptoms in Chinese normal people $(29.78 \pm 10.07, n = 1158)$. It is statistically significant ($P < 0.01$). Knowledge awareness was positively correlated with self-preventive behaviours ($r = 0.126, P < 0.05$), knowledge awareness was negatively correlated with SAS anxiety ($r = -0.196, P < 0.01$)
6	Lovric, et al(2020)	Studying During the COVID-19 Pandemic: A Qualitative Inductive Content Analysis of Nursing Students' Perceptions and Experiences	To explore how students perceive the COVID-19 crisis and what their personal experiences were while studying during the global pandemic.	The inductive thematic saturation method	33 undergraduate nursing students	Online form	All students described the spread of misinformation on social networks and the risky behavior of the population. Most are afraid of infection and worried about the well-being of their family, so they constantly apply protective measures. Students recognize their responsibility to the community and the importance and risks of the nursing profession. They also describe negative experiences with public transportation and residence in the student dorm. The fear of possible infection in the classroom is not significant, however, students are afraid of the clinical settings. Thirteen students reported difficulty in concentrating and learning, while all students praised teacher support and faculty work in this crisis.
7	Sallam, et al (2020)	Conspiracy Beliefs Are Associated with Lower Knowledge and Higher Anxiety Levels Regarding COVID-19 among Students at the University of Jordan	To evaluate the mutual effects of belief that the pandemic was the result of a conspiracy on knowledge and anxiety levels among students at the University of Jordan (UJ).	Cross-sectional study	1540 students	Electronic-based survey	The majority of participants perceived the disease as moderately dangerous ($n = 1079, 70.1\%$). Males, Jordanians and participants with lower income were more inclined to feel that COVID-19 is very dangerous. A lower level of knowledge and a higher level of anxiety about COVID-19 were associated with the belief that the disease is part of a conspiracy. Females and participants with lower income were more likely to believe that the disease is related to conspiracy. Belief in conspiracy regarding the origin of COVID-19 was associated with misinformation about the availability of a vaccine and the therapeutic use of antibiotics for COVID-19 treatment. The Ministry of Health in Jordan was the most common source of information about COVID-19 reported by the participants ($n = 1018$). The false belief that COVID-19 was the result of a global conspiracy could be the consequence of a lower level of knowledge about the virus and could lead to a higher level of anxiety, which should be considered in the awareness tools of various media platforms about the current pandemic

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
8	Chuan, et al (2020)	Experiential Learning Program to Strengthen Self-Reflection and Critical Thinking in Freshmen Nursing Students during COVID-19: A Quasi-Experimental Study	To develop and evaluate an experiential learning program (ELP) for nursing education	Quasi-Experimental Study Pre-test–post-test design	103 nursing students	Insight scale (SRIS) Taiwan Critical Thinking Disposition Inventory (TCTDI)	The study intervention was the experiential learning program (ELP), including bodily experiences and nursing activities with babies, pregnant women, and the elderly. After the intervention, the students completed the self-reflection and insight scale (SRIS) and Taiwan Critical Thinking Disposition Inventory (TCTDI) as outcome measures. An independent t-test showed that there was a significant difference between pre-test and post-test in both SRIS and TCTDI ($p < 0.01$). The Pearson product–moment correlation analysis showed that SRIS and TCTDI were significantly positively correlated ($p < 0.01$). ELP has a significant impact on the self-reflection and critical thinking of first-year nursing students, which can be used as a reference for the education of nursing students. During these turbulent times, it is especially vital for faculties to provide experiential learning instead of the traditional teaching concept.
9	Sheroun, et al (2020)	A Study to Assess the Perceived Stress and Coping Strategies among B.Sc. Nursing Students of Selected Colleges in Pune during COVID-19 Pandemic Lockdown	To assess the perceived stress and coping strategies of the bsc Nursing students of all batches in regard to COVID 19 lockdown, and to determine the association of stress and coping with selected demographic variables.	Cross-sectional online study	427 nursing students completed the questionnaire	Section A, Perceived Stress Scale as Section B, and Coping Strategies Scale as section C	Male students had more perceived stress score (22.73) than female students (21.86). Majority of participants were between 21-25 years. The maximum mean perceived stress score (22.56) was observed in 4 th year students, and least mean perceived stress score (20.20) was found in 2 nd year students. On the whole the maximum mean coping score (78.45) was found among 1st years and least coping score (71.23) was found among 4 th year BSc Nursing students
10	Kalok, et al (2020)	The Psychological Impact of Movement Restriction during the COVID-19 Outbreak on Clinical Undergraduates: A Cross-Sectional Study	To examine the psychological impact of the MCO among clinical undergraduates.	A Cross-Sectional Study	Seven hundred seventy-two students	Depression, Anxiety and Stress Scale-21 (DASS 21), Short Warwick Edinburgh Mental Well-Being Scale (SWEMWBS), and the newly designed MCO effect questionnaire	The prevalence of psychological distress was 52.8%, with around 60% of respondents reporting disruption to their daily lives. Older ($p = 0.015$) and more senior students ($p < 0.001$) were less likely to be anxious than their younger and junior counterparts, respectively. A greater number of social support (three or more) was linked to a lower score of depression ($p = 0.005$) and stress ($p = 0.045$). Undergraduates who received family support demonstrated lower depression scores ($p = 0.037$) and higher mental wellbeing ($p = 0.020$) compared to those without. Government support was independently associated with a lesser risk of depressive symptoms (Adjusted odds ratio, AOR 0.68; 95% confidence interval, CI 0.47–0.99) and a greater sense of mental wellbeing (AOR 1.54; 95% CI 1.06–2.22). The present finding provides evidence of a high prevalence of psychological distress among clinical undergraduates during the COVID-19 pandemic. Appropriate social support is important in alleviating anxiety and stress and promoting greater mental wellbeing amongst students during the nationwide quarantine.

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
11	Monday, et al(2020)	Outcomes of an Online Virtual Boot Camp to Prepare Fourth-Year Medical Students for a Successful Transition to Internship	To determine the effectiveness of the Internship Boot Camp on three measures: (1) level of confidence about entering their internship, (2) ability to develop a framework for responding to common challenges, and (3) ability to demonstrate an appropriate gain in clinical knowledge using a comprehensive post-course assessment	Cohort study	89 students	elective non-surgical boot camp	A total of 89 students participated in the course. Pre-session confidence was lowest for transfusion medicine, handling pages from nursing while on call, and knowledge of the role of a chief resident. A statistically significant increase in median scores for self-reported knowledge or confidence was seen in all sessions. The percentage of students reporting that they were either confident or extremely confident also increased significantly after each session ($p < 0.001$ for all) All sessions analyzed were rated as useful or extremely useful by more than half of the students, and 94% of the students scored 70% or higher on the comprehensive course assessment.
12	Aleksandar Kecojevic, Corey H. Basch, Marianne Sullivan, Nicole K. (2020)	The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study	To assess the factors associated with the increased levels of mental health burden among a sample of undergraduate college students in Northern New Jersey, the region of the U.S. severely impacted by the outbreak of COVID-19.	Cross-sectional study	162 college students	Cross-sectional survey	Descriptive findings indicate that students have a fundamental knowledge of COVID-19 transmission and common symptoms. Students tend to use and trust the official sources and have changed their behaviors in accordance with public health recommendations (i.e., increased hand washing, wearing mask). However, students reported a number of academic and everyday difficulties and high levels of mental health distress. High levels of depression were associated with difficulties in focusing on academic work and with employment losses, while higher levels of anxiety were more likely to be reported by students other than freshmen and those who spend more than one hour per day looking for information on COVID-19. Inability to focus on academic work and an elevated concern with COVID-19 were more likely to be associated with higher levels of somatization, while trusting news sources was associated with lower levels of somatization. Those with higher levels of perceived stress were more likely to be females, unable to focus on academic work, and report difficulties in obtaining medications and cleaning supplies.
13	Mirna fawaz, ali samaha (2020)	E-learning: depression, anxiety, and stress symptomatology among Lebanese university students during covid-19 quarantine	To evaluate the prevalence of depression, anxiety, and stress symptomatology among Lebanese university students during the covid-19 quarantine.	A quantitative cross sectional research design	520 undergraduate university students	The prevalence of depression, anxiety, and stress symptomatology using depression, anxiety, and stress scale-21 elements	Learning through online platforms have given rise to depression and anxiety disorders among undergraduate university students, where there was a significant correlation between student satisfaction and prevalence of depression, anxiety, and stress.
14	Hong Yan Li, Hui Cao, Doris Y. P. Leung and Yim Wah Mak (2020)	The Psychological Impacts of a COVID-19 Outbreak on College Students in China: A Longitudinal Study	To observe the sleep habits and mental health status (affects, anxiety, and depression) of college students for two years	Longitudinal study	Five hundred and fifty-five undergraduate students	Two online surveys—on anxiety and depression Positive and negative affect schedule (PANAS) and the 4-item patient health questionnaire (PHQ-4) PANAS contains two scales measuring mood: positive affect (PANAS-PA) and negative affect (PANAS-NA)	One survey was conducted before the confinement and the other was conducted 15–17 days after the start of the confinement. Increases in negative affect and symptoms of anxiety and depression (p -values < 0.001) were observed after 2 weeks of confinement. Inadequate supplies of hand sanitizers, a higher year of study, and higher scores on anxiety and depression were common predictors of increased negative affect, anxiety, and depression across the confinement period. The results suggest that healthcare policymakers should carefully consider the appropriate confinement duration, and ensure adequate supplies of basic infection-control materials

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
15	Sindiani, et al (2020)	Distance education during the COVID-19 outbreak: A cross-sectional study among medical students in North of Jordan	To assess (1) Class Experience (2) Students and Lecturers' Interaction (3) Online Learning Advantages & Disadvantages (4) Students' Preference	Cross-sectional study	3700 undergraduate medical students	Survey composed of 18 questions on Google Forms platform SPSS V 23	2212 out of 3700 students responded, (55.8%) of them were in the basic years and (44.2%) of them were in the clinical years. (55.8%) of students started to take online lectures after 3 weeks. (45.7%) used the hybrid teaching method (asynchronous and synchronous), (31.4%) used live classes, and 22.8% recorded classes. Zoom was the most used platform. (48.7%) and (57%) of clinical students and basic students express their interaction as bad, while the others had good and excellent interaction. Maintaining social distance was the most advantage of online teaching, while poor technical setup and no direct contact were the most disadvantage, furthermore inability to have real clinical access was a significant problem for clinical students ($p < .001$). With reference to students' preferences 75% of students were not pleased with their experience and 42% of students prefer to integrate online learning with traditional learning
16	Olum, et l(2020)	Medical Education and E-Learning During COVID-19 Pandemic: Awareness, Attitudes, Preferences, and Barriers Among Undergraduate Medicine and Nursing Students at Makerere University, Uganda	To assess the awareness, attitudes, preferences, and challenges to e-learning among Bachelor of Medicine and Bachelor of Surgery (mbchb) and Bachelor of Nursing (B.NUR) students at Makerere University, Uganda	Cross-sectional study	360 students	Google forms, a web-based questionnaire	About half ($n = 104$, 49%) of the students believed that e-learning reduces the quality of knowledge attained and is not an efficient method of teaching. Monthly income ($P = .006$), internet connectivity quality ($P < .001$), computer ownership ($P = .015$) and frequency of usage of academic websites or applications ($P = .006$) significantly affected attitudes towards e-learning. Moreover, internet costs and poor internet connectivity were the most important barriers to e-learning reported by 199 (93%) and 179 (84%) students, respectively. Sensitization and training of students and faculty on e-learning and use of existing learning platforms are important to improve the attitude and use of e-learning. Blended online and use of offline downloadable learning materials would overcome the challenges related to the variable quality of internet access in the country.
17	Puljak, et al (2020)	Attitudes and concerns of undergraduate university health sciences students in Croatia regarding complete switch to eLearning during COVID-19 pandemic: a survey	To explore attitudes and concerns of health sciences students in Croatia regarding the complete switch to e-learning during the COVID-19 pandemic.	Cross-sectional study	2520 students	Questionnaire distributed via email	A total of 2520 students (aged 25.7 ± 7.7 years) responded to the questionnaire (70.3% response rate). General satisfaction with exclusive e-learning was rated with average grade of 3.7 out of 5. Compared with previous education, exclusive e-learning was rated with average grade of 3.2 out of 5. Compared to classroom learning, equal or higher motivation to attend exclusive e-learning was reported by 64.4% of participants. With a longer duration of exclusive e-learning, equal or higher motivation was reported by 65.5% of participants. Less than half of the students indicated they felt deprived or concerned due to the lack of practical lessons. Most participants indicated that in the future, they would prefer to combine classic classroom and e-learning ($N = 1403$; 55.7%).

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
18	Diana Jiménez-Rodríguez and Oscar Arrogante (2020)	Simulated Video Consultations as a Learning Tool in Undergraduate Nursing: Students' Perceptions	To explore the undergraduate nursing students' satisfaction and perceptions about simulated video consultations using the high-fidelity simulation methodology	A mixed-method	113 students	Validated satisfaction questionnaire (quantitative data) Observations section (qualitative data)	Total sample, 97.8% of the students expressed a high overall satisfaction with simulated video consultations, highlighting their practical utility and positive learning outcomes. From the students' comments, two main themes and their related categories emerged: advantages (satisfaction and enjoyment, learning, and calmness during simulated scenarios), and disadvantages (technical issues and technical skills development). Simulated video consultations may be considered as one more high-fidelity simulation teaching option. Nursing students should be trained in this modality of healthcare to face the challenge brought on by its increased use in healthcare services, beyond the specific adaptation of clinical simulation sessions due to the closure of universities during this pandemic.
19	Hamza Mohammad Abdulghani Kamran Sattar Tauseef Ahmad Ashfaq Akram (2020)	Association of COVID-19 Pandemic with undergraduate Medical Students' Perceived Stress and Coping	To determine the effect of the current pandemic on undergraduate medical students' learning	Cross-sectional design study	352 participants	Kessler 10 Psychological Distress questionnaire (10 items)	The prevalence of overall stress was significantly higher ($\chi^2 = 16.3$; $P=0.000$) in female medical students, ie, (40%) as compared to the male students (16.6%), and was highest (48.8%) during the 3rd medical year. It was also noted that the most effective strategy, embraced by students to cope with the severe stress, was "indulging in religious activities" (OR= 1.08; $P=0.81$). Furthermore, 22.3% of students had perceived severe stress as they did not prefer online learning. Similarly, those students who have not believed or refused the online learning or disagree in "there is pleasure in the study due to COVID" they have significantly higher stress ($\chi^2 = 39.7$; $P=0.000$) 21.5% mild, 17.8% of moderate, and 21.2% severe.
20	Amir, et al (2020)	Student perspective of classroom and distance learning during COVID-19 pandemic in the undergraduate dental study program Universitas Indonesia	To evaluate the student perspective of DL compared to classroom learning (CL) in the undergraduate dentistry study program at the Faculty of Dentistry Universitas Indonesia.	Cross sectional study	301 students	Online questionnaire	Duration of study influenced student preference. Higher number of first-year students preferred DL compared to their seniors ($p < 0.001$). Students preferred CL for group discussion, as DL resulted in more difficult communication and gave less learning satisfaction. Only 44.2% students preferred DL over CL, although they agreed that DL gave a more efficient learning method (52.6%), it provided more time to study (87.9%) and to review study materials (87.3%). Challenges during DL included external factors such as unstable internet connection, extra financial burden for the internet quota and internal factors such as time management and difficulty to focus while learning online for a longer period of time.
21	Wang, et al (2020)	COVID-19 outbreak-related psychological distress among healthcare trainees: a cross-sectional study in China	To assess the psychological distress experienced by healthcare trainees during the COVID-19 outbreak.	Cross-sectional study	4184 healthcare trainees	Kessler 6-item Psychological Distress Scale and the Impact of Event Scale-Revised	Significant psychological distress was found in 1150 (30.90%) participants and probable ASR in 403 (10.74%). Compared with the nursing trainees, the medical trainees (OR 1.54, 95%CI 1.22 to 1.95) reported a higher burden of psychological distress during the outbreak, while the medical technology trainees (OR 1.25, 95%CI 0.97 to 1.62) reported similar symptom scores. Postgraduates (OR 1.55, 95%CI 1.16 to 2.08) in medicine had higher levels of distress than their undergraduate counterparts did, whereas the nursing residents (OR 0.38, 95%CI 0.20 to 0.71) reported a lower burden than did nursing undergraduates. A positive association was found between having active clinical duties during the outbreak and distress (OR 1.17, 95%CI 0.98 to 1.39), particularly among the medical trainees (OR 1.85, 95%CI 1.47 to 2.33) and undergraduates (OR 4.20, 95%CI 1.61 to 11.70). No clear risk patterns of ASR symptoms were observed.

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
22	Jiménez-Rodríguez, et al, (2020)	Simulated Nursing Video Consultations: An Innovative Proposal During Covid-19 Confinement	To focus on a solution for adapting simulation-based education to this situation.	A mixed study	48 nursing student	Simulated nursing video consultations	Nursing students expressed a high level of satisfaction and positive perceptions about this innovative proposal.
23	Deirdre Jackman, Jill Konkin, Olive Yonge, Florence Myrick, Jim Cockell (2020)	Crisis and continuity: Rural health care students respond to the COVID-19 outbreak	1) to give nursing and medical students co-equal status with the researchers in collection, analysis and dissemination of data pertaining to rural preceptorship; 2) to supplement the experiential learning of health care preceptorships, by giving these students an opportunity to translate their clinical experiences into knowledge through digital media; 3) to give nursing and medical students, placed side-by-side, opportunities for interprofessional learning and democratic dialogue; and 4) to produce research output accessible to educators, students, clinicians and policymakers, as a means of advocating for rural health care careers and policy reform.	Qualitative study Participatory action modalities	Four nursing and eight medical students (n = 12)	Photovoice and digital storytelling Group discussion forum on voicet hread.com	Collaborative, thematic analysis revealed continuities between pre- and post-outbreak life, both for the students and their rural hosts. Social determinants of health such as seclusion, environmental hazards, and health-seeking behaviors carried over and compounded the effects of the outbreak on the placement communities and clinical sites. Other continuities included the reliance on technology for clinical and social connectivity, and capitalizing on natural settings to cope with isolation and confinement. Prolonged liminality, lack of closure, and the loss of team identity were the greatest stressors brought on by the suspension of clinical activities. However, the participants felt well equipped to deal with these circumstances through the resilience, adaptability, and community ethos acquired during their placements.
24	R. Higgins, F. Murphy, P. Hogg (2020)	The impact of teaching experimental research on-line: Research-informed teaching and COVID-19	Development as first post radiographers (dose optimisation and image quality) within the Research-Informed Teaching experience (rite).	Cohort study	44 students	An online survey	A 73% (32/44) response rate was achieved. Students found the online version of RiTe to be a positive learning and development experience. There was strong agreement that they not only found it relevant to their area of practice (task-value), but also strongly agreed that they understood and could master the skills taught (self-efficacy).
25	Islam, et al (2020)	Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey	To investigate the prevalence of depression and anxiety among Bangladeshi university students during the COVID-19 pandemic	Cross-sectional web-based survey	476 university students	E-questionnaire was generated using the google form	Students were experiencing heightened depression and anxiety. Around 15% of the students reportedly had moderately severe depression, whereas 18.1% were severely suffering from anxiety. The binary logistic regression suggests that older students have greater depression (or = 2.886, 95% ci = 0.961– 8.669). It is also evident that students who provided private tuition in the pre-pandemic period had depression (or = 1.199, 95% ci = 0.736–1.952)

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
26	Tuladhar, et al (2020)	Study on the effectiveness of online classes for undergraduate medical and dental students of Gandaki Medical College during COVID 19 pandemic period in Nepal	To find out the effectiveness of online classes for medical and dental students of Gandaki Medical College (GMC) during COVID 19 pandemic period in Nepal with questionnaire based survey distributed to the students attending the online classes.	Descriptive cross sectional	209 students	Questionnaire based online survey	Amongst the students who responded, majority 205(98.1%) were attending online classes. The device used by most of the student to attend the classes was smart phone 156(74.6%). The strength of internet of the students was good in 41 (19.6%) and satisfactory in 99 (47.40%). The internet was disturbed by electricity cut down as responded by 66(31.6%) students. Almost 140(67%) of the respondents rated the online classes were interactive and 124(59.33%) rated the classes were not disturbing. Despite the classes being interactive and non-disturbing, 162(77.51%) of respondents rated that the online classes were not effective. The online classes with one to 51 number of students showed good interactions as compared to classes with 51 to 100 number of students (p<0.01). There was no differences seen in the effectiveness in online classes between these medical and dental students (p=0.414).
27	Sharma, et al (2020)	Online Learning in the Face of COVID-19 Pandemic: Assessment of Students' Satisfaction at Chitwan Medical College of Nepal	To assess satisfaction towards online learning and its predictors among students at Chitwan Medical College, Bharatpur.	Cross-sectional survey	434 undergraduate and postgraduate students	Structured questionnaire	More than half (53.5%) of the students were satisfied with the online learning, while 29.7% gave neutral views. Bivariate analyses found that all four domains scores were positively correlated with each other as well as with the students' overall satisfaction towards learning. In multivariate analysis, female gender [aOR: 2.72, p = 0.013], WiFi as internet modality for learning [aOR: 3.36, p = 0.001] and learners' dimension score [aOR: 1.27, p<0.001] were the significant predictors of students' satisfaction.
28	Shawaqfeh(2020)	Pharmacy Students Perceptions of Their Distance Online Learning Experience During the COVID-19 Pandemic: A Cross-Sectional Survey Study	To evaluate the pharmacy student distance online learning experience during the COVID-19 pandemic.	Cross-sectional survey	309 participants	Survey questionnaire	The response rate was about 75% (n=309). The results' analysis revealed no gender differences in any of these domains. However, there were some variable responses among different educational levels. The average preparedness score was 32.8 ± 7.2 (Max 45), the average attitude score was 66.8 ± 16.6 (Max 105), and the average barrier score was 43.6 ± 12.0 (Max 75). There was statistical significance difference in both preparedness score and attitude scores between different professional years (P-value<0.5). However, there was no difference in barrier scores among all professional years. The results indicated that about 61.4% of the students agreed on that college of pharmacy was well-prepared and ready for the online education during the emerging COVID-19 pandemic with complete transition into online education. The results also indicated that 49.2% of the students showed positive attitude toward the provided online learning. The results indicated that about 34% of the students identify some barriers toward the provided online learning. Finally, there were strong association between the need for training on how to receive online courses and preparedness and barriers scores.

Table 3. (Continued)

No	Author/Year	Title	Objective	Method	Participant	Tool/Instrument	Finding
29	Li, et al (2020)	Combined Mode of Courses on Dental Virtual Clerkship During COVID-19 Pandemic for Final-year Undergraduates in Wuhan	To explore the dental virtual clerkship so as to continue the education of nal-year dental undergraduate interns, combined mode of courses including small private online course, problem-based learning, online dental practice broadcasting and dental practice based on relatives' or friends' oral health management were applied for clerkship education for year interns.	Cross sectional study	18 females and 6 males, group 1	Questionnaire	Students' engagement was higher in final-year students, especially the emotion and participation categories (P<0.01). In the emotion category, 80.95% identified with putting forth effort on lecture and applying knowledge to life. Study approaches on deep motive and strategy were dominated in final-year interns (P<0.01). Teacher' sense of efficacy also reflected the positive influence on student virtual clerkship. There was no significant difference among three categories including the sense of student engagement, instructional strategies and classroom management (P>0.05).
30	Son, et al., (2020)	Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study	To conduct a timely assessment of the effects of the COVID-19 pandemic on the mental health of college students.	Mixed method Interview Survey Study	195 students at a large public university in the United States	Interview surveys	Of the 195 students, 138 (71%) indicated increased stress and anxiety due to the COVID-19 outbreak. Multiple stressors were identified that contributed to the increased levels of stress, anxiety, and depressive thoughts among students. These included fear and worry about their own health and of their loved ones (177/195, 91% reported negative impacts of the pandemic), difficulty in concentrating (173/195, 89%), disruptions to sleeping patterns (168/195, 86%), decreased social interactions due to physical distancing (167/195, 86%), and increased concerns on academic performance (159/195, 82%). To cope with stress and anxiety, participants have sought support from others and helped themselves by adopting either negative or positive coping mechanisms.

Knowledge and perception of the nursing students toward COVID-19

According to Li et al., (2020), in a study from five nursing colleges with 362 students in China, “the SAS anxiety score was (33.64 ± 6.17) higher than the norm of anxiety symptoms in Chinese normal people (29.78 ± 10.07, n = 1158)”. They concluded that the awareness knowledge was significantly associated with self-preventive behaviours, while there was no association with the SAS anxiety of the nursing students (Li et al., 2020). Another study also found that “students described the spread of misinformation on social networks and the risky behaviour of the population” (Lovrić et al., 2020). There are 19 participants worried about the well-being of family members, especially the elderly. Five participants

reported the spread of diseases through an aeroplane and disinfection cell phones. The author concluded the 23 participants realised their responsibility and importance to the community in the nursing profession (Fawaz et al., 2020).

A study done in Almeria, Spain, found that the participant's feedback supported the simulated video consultation as they enjoy the practice and can adapt well during clinical simulation sessions (Diana et al., 2020). From simulated videos, the students will have chances to learn from their mistakes and apply them in a real situation. Students claimed to be calm when staying at home by feeling safe when conducting the simulated scenario.

To acquire the same goals as face-to-face consultations, the skills in simulated scenarios

need to be increased to acquire the same goals as face-to-face consultations. The students felt the technical problems and skills were an obstacle in their study as they could not carry out the physical exams and clinical procedures (Diana et al., 2020).

A study done in Universitas Indonesia found that in year one, students preferred distance learning over other years as the majority of the students chose the synchronized learning sessions (Elsalem et al., 2020). The challenges during distance learning were external factors, for example, unstable internet coverage and financial burden for the internet costs. The advantages of distance classrooms were providing more time for students and flexibility. Meanwhile, the disadvantages were: distraction during online class, the complicated technology, limited interaction with instructors, unable to stay focused during the course, unstable internet coverage, and a financial burden (Kecojevic et al., 2020).

Diana et al. (2020) found that nursing students expressed high satisfaction and positive perceptions as they were pleased with the simulated experience to transfer it to clinical practice. The improvement in communication, active learning, and teamwork skills through the simulated video consultation and prevention of anxiety from face-to-face class. A study done in Nepal found that more than half of the students were satisfied with online learning (Sharma et al., 2020). Among the healthcare students, such as medicine, dentistry, pharmacy, and allied medical sciences reported having a lower level of satisfaction as they preferred traditional learning. The satisfaction of the students was affected by the lack of a technology system as they needed to learn the usage of it.

Experience and readiness of the nursing students towards E-learning

According to Lovrić et al., (2020), “negative experiences” with public transportation and residence in the student dorm. The fear of possible infection in the classroom is not significant. However, students fear the clinical settings. Some students reported difficulty concentrating and

learning, while all praised teacher support and faculty work in this crisis. For safeguard measures, the participants avoided using public transport. The participants felt unsafe in the dormitory, as they felt afraid during classroom lectures and clinical settings. Some participants faced difficulty in learning as they lacked motivation and disturbed concentration and memory. Self-reflection and critical thinking would affect each other. However, their study sample was a group of nursing students carrying out a nursing practicum just before their graduation among first-year students nursing students in Taiwan (Cheng et al., 2020).

A cross-sectional study among medical students in North Jordan started to join online lectures consisting of a hybrid teaching method, live classes, and recorded classes using the Zoom platform. 48.7% and 57% of clinical and basic students express their interaction as bad, while the others had good and excellent interaction (Elsalem et al., 2020). According to the authors, the main obstruction of online lectures was a poor internet connection, and timing from joining the classes, as one-third of the students assumed that attendance was unimportant. The clinical students portrayed the interaction with lecturers were poor because they were unable to access the natural clinical setting compared to the basic students who expressed their satisfaction with their interaction with the lecturers directly during live classes and discussion forums.

The study on the radiology program by Higgins, Murphy & Hogg (2020) found that students claimed the learning experience through the online version to be positive. The advantages of using an online learning platform outnumbered the barriers as the majority of them preferred online presentation to face-to-face presentation. The students show high self-efficacy to experience the potential failure as a motivation for their future attitudes in practice. The students claimed social interaction was decreased with student-student interaction and student-instructor interaction. The barriers to online learning were practice in interacting with the technology and time spent constructing material for online learning.

Despite the classes being interactive and non-disturbing, 162 (77.51%) of respondents rated that the online classes were ineffective (Tuladhar et al., 2020). The majority of the students claimed the level of understanding to be moderate and pointed out the training to be taken by the teachers in online classes. The participants pointed out that they needed to recap the online classes once the physical classes started but to continue with the online learning during the pandemic. Some students cannot attend the classes because the location at outskirts area has internet problems and also been affected by the electricity problem.

According to Shawaqfeh et al et al. (2020), in their study among pharmacy students, half of them revealed that they had experienced online learning before the pandemic. The second-year students showed the lowest readiness and attitude due to increased work assignments in the year of study compared to the fourth-year who showed the highest level. The students proposed the need for training on online courses, but the majority rejected the proposal as they assumed it was unnecessary. Through online learning, the students experience a lack of motivation and boredom during the online classes, and some of them need time to adjust to online learning tools.

The attitude and psychological impact on the nursing students toward COVID-19

A study conducted by Savitsky et al. (2020) among the nursing students in the Ashkelon Academic College, Southern District, Israel, found that moderate and severe anxiety levels were 42.8% and 13.1%. Higher anxiety level was significantly associated with gender, lack of PPE, and fear of infection, and at the same time, the study's continuation will be affected.

Elsalem et al. (2020) conducted a cross-sectional study among Medical Sciences students in Jordan and reported that students were more stressed with remote E-exams. The stress factors were associated with exam duration, navigation mode, and technical problems in 78%, 76%, and >60%. The author concluded in the study that the E-exam is more stressful than the on-campus exam.

A study from Egypt found that negative attitudes toward e-learning as a high obstacle, especially in the first year (67.6%) and the fourth year (55.7%) of nursing students (Gehan et al., 2020). The most obstacles to e-learning were infrastructure and technology, technical and management support, and instructors' characteristics in 87.1%, 85.2%, and 82.9%. Besides, a study from India found that female students showed a positive attitude towards online classes compared to male students, even more than 76% of the participants (Gaur et al., 2020).

According to Sallam et al. (2020), anxiety levels among students at the University of Jordan, higher anxiety levels among participants who felt the pandemic was very dangerous. Most of the participants portrayed a positive attitude towards quarantine as the minority. They broke the quarantine in need to buy groceries or emergency cases. Higher anxiety levels of female students for being worried and overthinking. As the lower monthly income has higher anxiety level.

Another study discovered that male students had more perceived stress scores (22.73) than female students (21.86). The majority of participants were between 21-25 years. The maximum mean perceived stress score (22.56) was observed in the fourth-year students, and the least mean perceived stress score (20.20) was found in the second-year students. On the whole, the maximum mean coping score (78.45) was found among first-year and the least coping score (71.23) was found among fourth-year BSc Nursing students (Sheroun et al., 2020). The way they cope with the stress of staying with relatives rather than family or dormitory, the students' behavior with frequent hand washing or disinfecting and avoiding crowded places such as events, public transportations, and grouping.

According to Lea et al. (2020) found that the prevalence of psychological distress was 52.8%, with around 60% of respondents reporting disruption to their daily lives. The author concluded the MCO was associated with the incline level of psychological distress among students as it affects the mental well-being of the

students. Social support was not associated with stress and anxiety experienced by the students. High anxiety is affected by the clinical posting in the hospital for nursing and medical students. As for the nursing students, the DASS-21 higher mean score as they interact by giving direct care to the patient frequently. As reported, the stress score is higher in Malay students than Chinese students.

Lea et al. (2020) conducted a study on confidence scores of fourth-year medical students throughout the United States. The pre-session confidence scores show less than 10% of students feeling confident about self-reported knowledge. The scores were the highest in teaching medical students; 55% of students felt confident and comfortable. Most students prefer the virtual format to the in-person session, but in the clinical setting, the students choose the in-person session.

A study conducted among undergraduate students in New Jersey stated students with a high level of mental distress were affected by their academic and everyday difficulties during COVID-19 (Sheroun et al., 2020). The graduation students showed a high level of anxiety as they worried about the impact of the pandemic compared to first-year students as they might lose employment. Students with a high level of anxiety correlated with a significant amount of time spent searching for COVID-19 information. Searching for information for COVID-19 is an adaptive coping strategy for students with high anxiety.

According to Mirna and Ali (2021), "learning through online platforms has given rise to depression and anxiety disorders among undergraduate university students, where there was a significant correlation between student satisfaction and prevalence of depression, anxiety, and stress." Learning experience affected with technological difficulties proven to have low average and connection of telecommunication infrastructure during class where students faced the loss of data, re-log into sessions and power outage as students unable to join their classes or exam. Symptoms of moderate anxiety and depression among students shown through the dissatisfaction with online learning and stress on students who

needed to submit their work on time due to system crash contributed to more stress.

Li et al. (2020), in his study in China, mental health was observed before quarantine and after 15-17 days after the start of quarantine. The students' mental health after two weeks showed more severe results of anxiety and depression. Some of the students assumed e-learning reduces the quality of knowledge and is an ineffective way of teaching. A study among undergraduate medicine and nursing students at Makerere University, Uganda, stated that 60% of the participants required extra training to utilize e-learning effectively and up to 75% preferred blended method of teaching delivery; moreover majority of the students agreed that e-learning could be used for sharing learning material, lectures, revisions, and discussions (Olum et al., 2020). Most students revealed bad behaviour towards e-learning, while students who received money and owned a laptop showed good behaviours towards e-learning because the internet charge and poor coverage were the major problems. Students who are deficient in technology such as cell phones and laptops face difficulties in e-learning.

According to Puljak et al. (2020) found that the percentage of e-learning revealed by the participants was good at 39.6% while worse with 24.9%, and the other results were neutral. Students were worried about being unable to complete their work and academic year for their final with the current pandemic affecting their graduation time. There was the majority of students preferred to blend e-learning and classic classroom learning, while the remaining students of them preferred only classic classroom learning and only e-learning after the pandemic.

A study from King Saud University (KSU), Riyadh, Saudi Arabia has shown that the frequency of high stress in female medical students than in male students, and the highest was in 3rd-year medical students. The most effective coping during mild stress by students were "regular exercise, watching an online movie, playing online games, online fun with family and

friends, religious activities and learning to the line in current COVID situation and accept it. (Abdulghani et al., 2020).

Another study conducted in China by Wang et al., (2020) found that a higher risk for psychological distress was the active clinical duties. Furthermore, the negative mental impacts from the academic pressure, workload, and financial burden added to the mental weakness of the trainees in addition to high exposure to COVID-19.

Social determinants of health such as seclusion, environmental hazards, and health-seeking behaviours carried over and compounded the effects of the outbreak on the placement communities and clinical sites (Tuladhar et al., 2020). The stressors for most Canadians were deficient, increased prices supply chains, and panic buying.

According Islam et al., (2020) in their study among Bangladeshi university students found that students were to have mild to severe depression and anxiety symptoms. Male students had high depression symptoms compared to female students. No physical exercise and academic lag were current depressive symptoms while living with family reported having high depressive symptoms. The majority of the students found they are getting depressed as the academics lagged behind and the closure of universities even online learning cannot counteract.

A study by Li et al., (2020) in Wuhan stated the students were adjusting to online learning progressively. The sense of self-efficacy of lecturers was high and coherent signifying the positive ability to teach students. The correct teaching methods for the students to learn efficiently throughout the online classes. The student reported the low score for item 15 and item 16 was because of the quizzes. The confidence level of the students was affected as they are unable to concentrate on online learning. The anxiety and depressive symptoms were shown through eating and sleeping habits as a major concern. Social stigma is an obstacle for the students to attending counselling sessions or other support.

DISCUSSION

Based on this review's findings, a few aspects can be taken into consideration as critical indicators to reduce the stress and increase the coping mechanism of nursing students during the pandemic crisis. The following sessions will describe further discussion on the impact of the COVID-19 pandemic on nursing education among nursing students:

Knowledge and perception of the nursing students towards COVID-19

There are six articles related to this theme. The findings regarding the knowledge and perception of the students towards COVID-19 are different in their conclusions. Firstly, the majority perception of the studied participants towards COVID-19 is the concern of the older family members who are the most vulnerable to the disease because of the age factor (Daoust, 2020). Age is the most important factor in diminishing one's chances of surviving COVID-19, especially after 65 years. This finding is supported by the results in the article, "all participants indicate a sense of concern for older members of their family" (Deepika et al., 2020) and "19 participants are suffering from an intense fear of infection, with great concern for older members of their families" (Gehan et al., 2020) Both of the articles agreed that the participants show concern for elderly.

Secondly, the satisfaction of the participants with the simulated consultation video. They show a high level of satisfaction in the study, supported by the results in the article, "high satisfaction with simulated video consultations (97.8%) supported by the students' comments" (Diana et al., 2020) and "high level of satisfaction and the positive perceptions expressed by nursing students about simulated nursing video consultations were also congruent with different studies that employed face-to-face clinical simulation methodologies" (Diana et al., 2020) The positive aspects of the simulated consultation video.

Third, the authors agreed with the technical problems related to internet connectivity during

online classes. As supported by the articles, “technical problems during simulated video consultations, and these problems were aggravated by the internet connection overload during the COVID-19 confinement, as both teleworking and online classrooms were widespread” and “the majority of the problems were categorized as external factors such as unstable internet connection and extra financial burden for internet quota” and “two negative categories were identified (ordered by frequency of mention): technical issues and technical skills development” The problem might affect the effectiveness and smoothness of the online class (Diana et al., 2020 & Gehan et al., 2020).

The attitude and psychological impact on the nursing students toward COVID

There is a total of four articles under this theme. The first discussion on the findings is the disagreement on online learning based on the participant's experience. The two different opinions and results supported the article, which gives positive feedback and negative feedback on online learning. There are two articles with positive feedback. The first article “total scores of self-reflection and critical thinking had a significantly positive correlation ($p < 0.001$)” and “the participants’ self-reflection and critical thinking improved after taking the ELP” (Cheng et al., 2020).

While the article with negative feedback, “lack of the motivation, feeling board during an online class, and that some of them took them a long time to adapt to online learning tools” (Jamaludin et al., 2018) This is affected by the preparedness of the study toward online learning, according to Jackman et al., (2020) “students were not prepared for a complete online experience while social issues and lecturer issues affect students’ intentions to study online.” The poor technical problems faced by the students are supported by two articles “bad internet connection and inappropriate timing to be the main obstacle, that prevents them from attending (Elsalem et al., 2020 & Tuladhar et al., 2020)

The interaction in the online class between the student and student or student and lecturer. According to Elsalem et al. (2020), “Student lecturer interaction revealed that the majority interacted directly during live lectures, while the E-Mail and university E-learning messages were used less frequently. Student-instructor interaction for asynchronous classes was through E-learning messages, University E-mail, or discussion forums on e-learning platforms in an equal manner. These findings showed an interaction between the student and their lecturers. According to Higgins, Murphy & Hogg (2020), “online platforms such as Blackboard Collaborate Ultra and Microsoft Teams also helped to facilitate and encourage discussions, which allowed the students to ask questions and receive support (student-instructor interaction).”

Experience and readiness of the nursing students towards E-learning

There are 20 articles related to this theme. The first discussion on findings of high anxiety levels related to different causes. Some articles agreed on the high anxiety level of fear of getting infected because of insufficient medical supplies during the pandemic (Savitsky et al., 2020) and supported by the other article about medical supplies, according to Sallam et al., (2020), “The shortage of sanitizers, medical supply, the overwhelming and sensational news headlines, and erroneous news reports have also added to anxiety and fear.” In contrast, the other findings claimed the high anxiety level because of financial burden, “Participants with a lower monthly income had a higher anxiety level” (Sallam et al., 2020). In addition, the anxiety level affects the clinical undergraduates who need practice in the hospital, but with the current pandemic, their concern is on direct contact with the patient. (Aida et al., 2020). The impact of Covid-19 on their study plan might increase the level of anxiety in participants, “higher levels of anxiety explanation for this could be that students in upper classes may be more concerned about the impact of the pandemic on their post-graduation plans and the economy” (Kecojevic et

al., 2020). The E-exam is more stressful than the in-campus exam, as stated in the articles by Elsalem et al., (2020) As the students preferred the in-campus exam rather than the E-exam.

As for the other articles which stated on the issues of psychological impact on students such as the psychological distress on the participants, “the author hypothesized that the MCO is associated with an increased level of psychological distress among our students and is linked to poorer mental wellbeing” (Aida et al., 2020) Poorer mental wellbeing as inadequately received support from the family, friend and others.

The obstacle faced by the participants during the online learning on the technical problem can lead to stress. According to Elsalem et al., (2020), the main factors of stress are exam duration, navigation mode, and technical problems. This statement is supported by the other author. In his study, he stated, “the most obstacle faced by nursing students were infrastructure and technology, technical and management support, and instructors’ characteristics” (Gehan et al., 2020) Both authors agreed that technical problems faced by the students can lead to stress.

Moreover, some of the authors reported the coping strategies or mechanisms the participants perform when they were stressed or anxious. According to Bella et al., (2020), “the coping strategies resilience has the lowest anxiety level, mental disengagement is associated with a higher level of anxiety as the coping strategies might affect or worsen the student's conditions.

A recent study also found that nursing students faced psychological roadblocks to online education and developing resilience despite adversities, and online education: what worked and what did not for them during the pandemic crisis (Kunaviktikul et al, 2022). Another study also found that although most students felt that their education was compromised, they have positive levels of psychosocial well-being (Shorey et al, 2022). The nursing students' sense of coherence was positively correlated with their psychosocial well-being and negatively correlated with stress levels.

LIMITATION AND RECOMMENDATION

This review has several limitations. This study only focuses on the result that measures the level of the student's anxiety, knowledge and perception. The study reported the overall findings on the student's well-being without observing the students as a whole. The finding of this study strongly proposed conducting a research study by using qualitative or quantitative methods with a bigger sample size to get the generalization of the result.

CONCLUSION

The global pandemic, COVID-19 growing concern among university students including nursing students. The teaching process throughout the quarantine via virtual mode affects the student's behaviours, well-being and health. Despite everything that happened throughout the pandemic, a limited number of studies had been identified to address the problems faced by the students. For future studies, the study should explore the student’s adoption of virtual teaching.

CONFLICT OF INTEREST

The authors declared that there is no conflict of interest in this study.

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