护理杂志
Journal of Nursing
Volume 71 Number 01
ISSN: 0047-262X
DOI: 10.5281/zenodo.10531683

Systematic Review of Preparedness of Nursing Graduates to Practice in Clinical Setting during COVID-19 Pandemic

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Abstract

This systematic review is the product of 28 top published journals. The search engines adopted in this study were PubMed, Medline, CINHAL, Cochrane Library, Google Scholar, and Research gate. The inclusion criteria were: 1. Papers published between 2019-2023, 2. Top tier journal articles (High quality), 3. Term COVID-19 4. Preparedness of nursing graduates to practice in clinical setting. The key searching words were COVID-19, Nursing Graduates, Preparedness, Clinical Setting. The present paper highlights that Role of nurses during COVID-19 or any other pandemic commences from the initial assessment and triaging, sample collection and diagnostic testing, assessing the severity of patients, following which providing necessary care to patients with mild-to-moderate symptoms, catering to intensive care of critically ill patient, and are also involved in care of the dead bodies. Despite the resource constraint working conditions in Indian hospitals and concerns regarding personal and family safety, nursing professionals have maintained their sense of duty and are dedicated to patient care. Further, personal sacrifice and professional collegiality of nursing fraternity have increased due to increased burden on the health system during the COVID-19 pandemic. This paper shows the research gaps from different studies in the review of the literature. In this present study of systematic review, 28 recent multiple studies based on exploratory, descriptive, survey and phenomenological studies between 2019 to 2023 were systematically reviewed using the keywords search method. The findings are discussed and research gaps are listed accordingly.

Keywords: *Preparedness, Nursing Graduates, Clinical Setting, COVID-19, Pandemic*

INTRODUCTION

The rapid spread of the COVID-19 pandemic has become a major cause of concern for the healthcare profession. The pandemic is on-going and actively developing and countries around the world are taking drastic measures to reduce the spread of disease by measures like initiating social distancing, closing of schools and nonessential businesses. The transition from nursing student to registered nurse is known to be difficult. However, the experiences gained from clinical practicums help graduating nursing students to prepare for practice and can influence the intensity of the transition process. Nevertheless, little is known about how the upcoming transition process can be best facilitated by a final clinical practicum.

Student nurses must be prepared professionally to provide nursing care, especially during a critical time such as COVID-19. Regardless of undergraduate nursing programmes focusing on preparedness for practice, the concept of preparedness for nursing practice is not well understood.

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ISSN: 0047-262X
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Begam & Devi, 2020 carried out a study of 244 students in India reported moderate stress in 61.4% of respondents and put pressure on nursing resources. Stress was not only relating to the shift to online academic work but also attributed to challenges relating to acquisition of necessary skills and competencies for safe transition to registration (Swift et al., 2020). Findings from a survey conducted by Cervera-Gasch et al. (2020) with Spanish nursing (n= 58) and medical students (n=44) during the COVID-19 pandemic revealed that 65.3% of the total sample believed they were not prepared or barely prepared to provide care to COVID-19 patients. Insufficient preparation and the lack of personal protective equipment (PPE) was an additional and significant stressor for students during this pandemic (Aslan & Pekince, 2021; Deo et al., 2020; Fitzgerald & Konrad, 2021). Given the learning from the COVID-19 pandemic is ongoing, many knowledge gaps exist on the implications for future pre-registration nursing student. A robust and in-depth analysis of their experiences during the pandemic provide a valuable insight into the impact of the crisis on their learning, contribute to building a resilient nursing curriculum, and organizing resources and human infrastructure in clinical practice (Ulenaers et al., 2021)[1].

According to Mirza N et al readiness for nursing practice is conceptualised as a mix of cognitive, clinical, and professional capabilities. The overlap of these capabilities positively impacts students' perceived self-efficacy in assuming the role of a nurse. Successful transition from nursing student to graduate nurse is related to factors at both the individual and educational level. Individual-level factors, include students' background in terms of previous education, working experience, and feelings and participate[2].

Kochuvilayil T et al. study showed unprecedented coronavirus disease 2019 (COVID-19) has disrupted not only the health care system but educational institutions across the world. To prevent the spread of COVID-19, many universities were forced to temporarily cancel their activities and shift from traditional face-to-face to online education[3]. In this context, nursing schools have been challenged to quickly adapt to new educational modes. Emerging research from both high-income as well as low- and middle-income countries (LMICs) demonstrates that nursing students have experienced many educational challenges related to the COVID-19 pandemic, including adapting to online courses, concerns about insufficient clinical training, conflicting emotions during clinical experiences, and fear of contracting COVID-19 or infecting their loved ones[4]. These challenges, in turn, have had a significant impact on nursing students' psychological and physical wellbeing. Several recent studies have identified increased levels of stress, anxiety, and negative coping behaviours among nursing students[5].

Yiwen Koh et al. study indicated that during the first wave of the COVID-19 pandemic in Singapore, clinical attachments for medical and nursing students were temporarily suspended and replaced with online learning. It is unclear how the lack of clinical exposure and the switch to online learning has affected them[6].

As per Saqlain M the social crises induced by the coronavirus disease (COVID-19) pandemic have had adverse effects on the global healthcare system. Public healthcare centers have restructured their services to address clinical needs at the forefront of the pandemic. This led to nursing students immersing themselves in clinical experience while practicing at public healthcare centers during the COVID-19 pandemic[7].

It is important that the health-care professionals, especially the nurses are updated about the current advances in knowledge about prevention, diagnosis, treatment, and management of COVID-19. Previous studies have reported poor knowledge, and awareness about the disease results in inefficient management and unexpected outcome in the patients as well as the care provider. Moreover, knowledge has shown to affect the attitudes and practices of the individuals. In addition

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to this, it also creates a certain reticence to work among health-care professionals and may also result in contracting the infection themselves in the absence of correct Information[8].

Healthcare workers (HCWs) of all levels and groups are involved in caring for patients with this highly transmittable pathogen. COVID-19 has posed serious occupational health risks to HCWs due to their frequent exposure to infected individuals. The literature suggests that lack of knowledge and misunderstandings among HCWs lead to delayed diagnosis, spread of disease and poor infection control practice. Several thousand HCWs have already been infected, mainly in China[9]. Preventing intrahospital transmission of this communicable disease is therefore a priority. Amidst the current pandemic, WHO has issued several guidelines, and started online courses and training sessions to raise awareness and preparedness regarding prevention and control of COVID-19 among HCWs. A knowledge, attitude and practice survey is a suitable way to evaluate existing programmes and to identify effective strategies for behavioural change in society. Currently, there is scarce information regarding the level of awareness of HCWs in Pakistan[10].

HCWs play a critical role in the prevention and control of COVID-19 [16]. Their counselling practices are of vital importance to improve the awareness of patients and the community about COVID-19 preventive measures such as social distancing, use of face masks and washing hands. Also, their knowledge and preparedness in the management of COVID-19 are important to prevent and control the spread of this infectious disease[11]. In Yemen, good knowledge and adequate preparedness of HCWs are extra important because these skills need to compensate, even partially, for the already inefficient healthcare system[12].

KAB emphasizes that the knowledge of a person can directly affect attitude and indirectly affect behavior through attitude[13]. In the present study, knowledge and information received by student nurses about COVID-19 may affect their attitudes to it, and attitude may affect their behavior or actions. Providing students with health information and knowledge through various sources and means is intended to enhance the health related behavior, attitudes, and practices of student nurses with regard to the prevention and control of COVID-19. However, the negative perception of COVID-19 information and misinformation can lead to poor knowledge and practice behavior (10). Thus, the most essential method to stop the spread of the COVID-19 pandemic is to develop and adopt appropriate preventive behavior, which can be achieved by becoming well-versed in this disease[14].

Despite of a universal consensus of scientific community on existence, virulence and ultimate impact of corona virus on human health, there is still a gap in right perception towards myths and facts about COVID-19.

HCPs are frontline defenders in ongoing COVID-19 pandemic therefore, misleading perception and inappropriate attitudes among HCPs is a serious concern. As it can directly influence malpractices while dealing COVID-19 patients leading to delayed diagnosis, poor infection control, and disease transmission within and outside healthcare facilities.[9]As of March 2020, up to 4% of total COVID-19 cases were reported to have occurred in HCPs[10] With the advent of COVID-19 in Pakistan, medical workers have been under physicl and psychological stress including high risk of infection.[11] Early evidence suggests that HCPs in Pakistan make up to 20% of the infected population. Major factors included lack of understanding, inadequate use and availability of personal protective equipment (PPE), and psychological stress[15]. Clinical placement can be a challenging part of training, even without the additional challenges of a pandemic. Students struggle to integrate into the team, to define their professional self, and feel insecure about their competence. As a result, most students experience some form of anxiety. Ineffective coping can negativley affect students' self-concept, learning skills, and competence. Research on sources of anxiety among health professionals during the COVID-19

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pandemic illustrates the need to be heard, prepared, and supported. However, the increased workload might restrict the available time of hospital staff to supervise students. Additionally, the nursing school's clinical placement supervisors are often denied access to clinical sites, making face-to-face supervision and coaching impossible. The combination of an uncertain and stressful environment and impaired support for students is a recipe that could jeopardise the students' learning outcomes[16].

For patients to survive serious COVID-19 disease with respiratory failure, intensive care treatment with optimal oxygenation, assisted ventilation and eventually ventilator treatment is crucial[17]. Although the COVID-19-ICU patients basically have a simple single organ failure, that is, the lungs, the ICU treatment is complicated and very demanding in terms of resources. The personnel have to protect themselves extensively from being infected through droplets or aerosols generated by the patients. Also, it has been shown that the need for ventilator support may be very prolonged, that is, many weeks in some cases, and demanding in terms of secondary organ complications[18]. In selected younger patients, the extensive treatment with extracorporeal membrane oxygenation may be an option. Also, as serious COVID-19 airway disease was a completely new disease at the start of 2020, discussions concerning evidence for the optimal treatment methods[9] were significant sources of frustration among ICU workers at that time[19].

A recent study from China reported the challenges facing frontline healthcare workers during the COVID-19 pandemic which includes high risk of infection, insufficient PPE, heavy workloads and manpower shortages, confusion, discrimination, isolation, separation from families, and burnout. Studies also show that many HCPs are highly worried about being infected by coronavirus, and are most concerned about spreading the virus to their family and loved ones, or to the vulnerable clients in the hospital or the community. Under these stressful conditions, HCPs have been challenged to be effectively engaged in the fight against COVID-19. Furthermore, studies conducted during the early stages of the pandemic have suggested that perceived personal risk of infection, worry about COVID-19 and the detrimental health effects are linked to improved protective behaviors[20]. Since the first case of COVID-19 was reported in Ethiopia on 13 March 2020, the Ministry of Health in collaboration with its partners, conducted different trainings on preventive measures for HCPs at several hospitals and health centers, with supplies of PPE materials. The HCPs in Ethiopia have worked tirelessly and played a crucial role in the management of COVID-19 cases, despite high personal risks and worries about the current pandemic crisis. However, no study has been undertaken in the country on risk perception and preventive practices of HCPs during the current COVID-19 pandemic. In addition, emotional reactions and feelings of healthcare workers such as worries about COVID-19 crisis have not been studied[21].

The coronavirus disease 2019 (COVID-19) pandemic has reportedly affected the mental health and quality of life of the general population patients and health care professionals. During the COVID-19 pandemic, nursing students could be vulnerable to stress due to their young age and exposure to clinical postings. This idea is supported by a few studies that report poor quality of life among nursing students during the COVID-19 pandemic[22]. While the COVID-19 pandemic made a significant impact on nursing students, most of the studies on COVID-19 in India have focused on examining knowledge and academic concerns and impact on nursing education have reported on the quality of life of nursing students from India, there is a paucity of information on impact of resilience on Quality of Life (QOL) during the COVID-19 pandemic among nursing students. Additionally, failing to recognize the negative impact of the COVID-19 pandemic on the QOL of nursing students may result in negative consequences. Thus, the aim of the study was to explore whether nursing students' resilience and quality of life correlated during the COVID-19 pandemic[23].

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The specific stressors related to the impact of COVID-19 among nursing students are stress from COVID-19 infection and a lack of preventive measures in clinical training [**1**]. This period has been undoubtedly stressful for learners; with classes moving online, nursing students face difficulties, such as being unable to concentrate and having difficulties participating, writing assignments, taking exams, and meeting the deadlines of academic assignments.Coping strategies are stabilizing methods for helping individuals maintain psychological adaption during stressful events[24]. Coping strategies are classified as problem-based or emotion-based coping. The problem-solving approach is the most common coping strategy employed by nursing students to adjust to stressors, while an avoidance approach is the coping behavior least used by nursing students. Nursing students use strong resilience, as one of the coping strategies during COVID-19 has been strong resilience. The learners have used humor, which studies associate with lower to moderate anxiety levels. Additionally, other coping strategies, such as mental disengagement, have led to high levels of anxiety[25].

Consequently, in response to an increase in the number of hospitalized patients in Oman, health organizations invited nursing students willing to assist the medical team by volunteering their time and skills. Globally, the shortage in the workforce in all healthcare settings has encouraged nursing students to come to the force to deliver services[26]. Moreover, healthcare students worldwide manned volunteer ships, visiting communities to bring awareness and educate about COVID-19[27]. With such novel approaches taken to enhance any institutional contribution to the healthcare workforce, it is incumbent on the organizations to ensure that changes are effective and do not cause harm. Student nurses are the pillars and backbone of healthcare services and collaborate with healthcare workers in managing any pandemic situation. Also, they contribute to health service care provision during their nursing education, in their capacity as “learners” where they work under direct supervision[28].

Literature has revealed different coping strategies that nursing students are using in the wake of Covid-19 pandemic. The latest research in China has shown that professional nurses used problem-focused coping methods more than college nursing students who chose immature or negative coping strategies. Moreover, staying optimistic has been reported as another active coping behaviour which involves a set of actions aimed at having a positive attitude in dealing with everything in life including during the Covid-19 pandemic[29]. Similarly, religion has also been reported as helpful in promoting adaptation amidst the pandemic. Spiritual beliefs assist in attaching meaning to events which protect individuals against worsening the stressful experience, and adoption of health promotive behaviour during the Covid-19 pandemic. Furthermore, some students use avoidance coping mechanisms, such as eating and spending time on the internet during pandemics. Although these represent coping strategies among nursing students elsewhere, paucity of literature for Malawi’s nursing students necessitated this study. It is argued that exploration of nursing students’ experiences of coping with clinical stressors increases students’ awareness of their coping mechanisms[30].

Providing students with health information and knowledge through various sources and means is intended to enhance the health related behaviour, attitudes and practices of student nurses with regard to the prevention and control of COVID-19. However, the negative perception ofCOVID-19 information and misinformation can lead to poor knowledge and practice behaviour (10). Thus, the most essential method to stop the spread of the COVID-19 pandemic is to develop and adopt appropriate preventive behavior, which can be achieved by becoming well-versed in this disease.

eHealth literacy has been defined as the essential ability to ex-plore, understand, evaluate and utilize internet health information (Norman & Skinner, 2006). In recent years, health care providers and researchers have become substantially more interested in eHealth literacy and its influence on the health status and behaviours of users of online information. Although online communication has been a primary source of health and preventative information during the COVID-19 pandemic, the

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influence of eHealth literacy on pre-ventive behaviours during the COVID-19 pandemic has not been identified. College students need the ability to access information about COVID-19 and related preventive behaviours as this ability may affect rates of COVID-19 infection and related health outcomes in their college setting as well as potentially impacting their families and communities[31].

In resource-limited settings, where the incidence of infectious disease is high and the environmental conditions of hospitals are often poor, hospitals may rely heavily on a face mask to protect medical staff against COVID-19 and to prevent cross-contamination among patients and HCWs. The use of a face mask among HCWs is strongly recommended by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) as a standard for transmission-based precaution[32]. Moreover, the correct use of these masks is particularly important especially during this time when its use is becoming highly prevalent. The WHO states that incorrect use and disposal of this mask may actually increase the rate of transmission. If you wear a mask, then you must know how to use it and discard it properly. There is evidence that the HCWs have inadequate knowledge and poor practice regarding the use of surgical mask. The purpose of this study was to investigate the knowledge, attitude, and practices of HCWs in wearing a face mask particularly a standard surgical face mask to limit the spread of COVID-19[33].

LITERATURE ANALYSIS AND DISCUSSIONS

Table 1 provides a relevant literature survey of the present topic from India and Global locations. The papers were selected based on keywords as given in Table 1.

Table 1: Keywords search strategy with several papers

Keywords	Number of Papers
COVID 19	18
Pandemic	8
Nursing Students	8
Knowledge	7
Perception	2
Practice	4
Preventive Behaviour	4
Readiness	2

This table provides a set of papers extracted from scholarly Archives such as; PubMed, CINHAL, Cochrane, Google Scholar, Research gate, Cross Reference. A total of 50 papers were located based on the inclusion criteria as given below:

1. Period of published research (2019 – 2023)
2. Top tier journal articles (High quality)
3. Term COVID-19
4. Knowledge and practice of Nursing graduates regarding COVID-19.
5. Perceptions of Nursing graduates regarding COVID-19
6. Experience of Nursing graduates in a clinical setting
7. Nursing graduates' preventive practices of COVID-19.

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RESULTS

A total of 25 papers were qualified as secondary data for the systematic review. Table 2 presents the systematic review of different elements of Preparedness of nursing graduates to practice in clinical setting during COVID-19 pandemic.

Melisa Fernandes et al (2021). Conducted a study to assess the knowledge regarding COVID 19 pandemic diseases among the 421 nursing students by using Non probability Convenience sampling method. Pre designed and pre tested questionnaire was used in this study. Questions were related to knowledge and awareness about COVID-19. The participants were directed to complete the self-report survey by online mode. The data was statistically analyzed. Result revealed that majority of sample had average knowledge of COVID -19. Conclusion: The study participants showed adequate basic knowledge. There is need to implement periodic educational interventions and training programmes on infection control and other updates of COVID-19 across all health care professions including nursing students[34].

Sai Ravi Teja Kamineni et al (2020) done a cross sectional study on knowledge of COVID-19 among nursing and allied health care professionals working in tertiary care hospital. A structured questionnaire comprised of 25 questions developed by investigators was administered to 177 health care professionals that includes nursing and allied health professionals working in a tertiary care hospital. Among the 177 nursing and allied health care professionals, majority 92.1% of them has adequate knowledge regarding the present global pandemic and 7.9% had moderate knowledge. This study concludes that nursing and allied health care services professionals in tertiary centre has adequate knowledge regarding COVID-19 pandemic[35].

Rastogi A et al (2021) conducted a cross-sectional study was conducted from April 22 to May 22, 2020 using a pretested 37-item-self-reported e-questionnaire on the knowledge, attitude, and practices (KAP) related to COVID-19 among nursing professionals above 18 years of age, working in health-care setting across 25 states of India. The questionnaire consisted of four sections: demographic details, knowledge (26 items), attitude (6 items), and practice (5-itmes). KAP questionnaire was shared through e-mail, SMS, and WhatsApp groups. Results revealed a total of 1182 participants responded to the online survey with 94% completion rate. The study analyzed the data for 1110 nurses with a mean age of 30 ± 6.7 years and 68% being females. Good knowledge related to COVID-19 was significantly affected by age, gender, location, and type of facility (<0.01). The study raised concerns regarding poor knowledge, anxiety, and fear from COVID-19 duty affects the health-care workers (HCWs) performance and provides resistance in working. A comprehensive training program for HCWs focuses more in terms of infection, prevention, control, and management and maintaining good mental health is required[36].

Muhmmad Saqlain et al. conducted a descriptive study to assess knowledge, attitude and practice among HCPs in Pakistan regarding COVID-19. An online survey-based study was conducted among 414 healthcare professionals including physicians, pharmacists and nurses. A self-administered validated questionnaire comprised of five sections (Demographics, Knowledge, attitude, practice and perceived barriers) were used for data collection. Most commonly utilized information source was social media. Findings showed HCPs have good knowledge (93.2%, n=386), positive attitude (8.43±1.78) and good practice (88.7%, n=367) regarding COVID-19. HCPs perceived that overcrowding in emergency room (52.9%, n=219), limited infection control material (50.7%, n=210) and poor knowledge regarding transmission (40.6%, n=168) of COVID-19 are the major barriers in infection control practice. Binary logistic regression analysis demonstrated that HCPs of age group 40-49 years have higher odds of good knowledge. Similarly, age group of 31-39 years, experience of more than 5 years, and pharmacist job were the substantial determinants of good

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ISSN: 0047-262X
DOI: 10.5281/zenodo.10531683

practice regarding COVID-19. HCPs in Pakistan have good knowledge, yet, there are areas where gaps in knowledge and practice was observed. To effectively control infection spread, well-structured training programs must be launched by government targeting all kinds of HCPs to raise their existed knowledge[7].

Fahmi Y et al. done a cross sectional study to evaluate the knowledge, preparedness, counselling practices of healthcare workers regarding COVID-19, and the perceived barriers to adequately prevent and control COVID-19 in Yemen. A self-administered questionnaire comprising of five main domains (demographics, knowledge, self-preparedness, counselling practice, perceived barriers) was distributed among HCWs after obtaining informed consent. A convenient sampling technique was used. A total of 1000 participants were initially targeted to participate in the study with 514 (51.4%) responding, of which 55.3% were female. Physicians and nurses constituted the largest proportion of participants, with 39.5% and 33.3%, respectively. The physician group showed a statistically significant association with better knowledge compared to the nurse group only. Males had higher preparedness scores than females[37].

Carol Della Ratta et al (2022). conducted an exploratory study for undergraduate and graduate nursing students' academic and employment experiences as they faced the first surge of the COVID-19 pandemic in New York using an electronic survey with an open-ended question was distributed to a convenience sample of students enrolled in a large public university; 194 responded. A thematic analysis was used to analyze the responses of 194 students. Results indicated five themes illuminating students' academic and practice experiences were revealed: battling the unknown, filling the void, education interrupted, experiencing moral distress, and taking an emotional toll. Severe mental anguish and emotional distress resulted from providing care during the pandemic. These perceptions may have long-term effects on professional role development, especially in novices and new graduates. The study concluded a need for significant modifications in both academic and practice arenas. Faculty and clinical leaders must implement changes that will support student and staff preparedness during times of both normalcy and crisis[38].

Allan Mark Vista et al (2023) conducted a descriptive quantitative study to determine the extent of the nursing practice preparedness of graduating student nurses amid COVID-19 as perceived by these nurses and nurse educators and the possible interventions to enhance the preparedness for practice of these nurses. In the study, Nursing Practice Readiness Tool, employed the complete enumeration survey method were used and analysed through frequency, percentages and weighted means. A total of 118 student nurses and 51 nurse educators from a selected university completed the questionnaire. The findings revealed that the scales, which ranked from greatest to lowest preparedness for practice, were: professionalism (4.83), communication (4.65), management of responsibilities (4.61), critical thinking (4.36), clinical knowledge (4.26), and technical skills (4.02). Study concluded that the students' performance in the nursing competency items under clinical knowledge, critical thinking, and especially technical skills, demand increased attention to be better equipped as they transition into nursing practice. Specifically, of the 36 competency items, they were least prepared in using clinical and information technologies, and performing clinical procedures. Finally, as the top intervention, we proposed the development of contingency plans for unusual situations such as a pandemic (75.74%) to enhance the student nurses' preparedness for practice[39].

Hamdan Mohammad Albaqawi et al. (2020) carried out a quantitative, descriptive, and cross-sectional study using convenience sampling of 1,226 student nurses from seven universities in Saudi Arabia was surveyed from March 22 to April 4, 2020. A four-part online survey on demographic characteristics, perceptions, knowledge, and preventive behaviour of Saudi student nurses was carried out. Nearly all students were aware of the outbreak (99.2%), and most of them received information

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ISSN: 0047-262X
DOI: 10.5281/zenodo.10531683

on COVID-19 primarily from social media (71.0%). Over three-fourths of the students were confident that the government (89.1%) and Ministry of Health (MOH) (86.5%) were doing a good job responding to the COVID-19 outbreak in the country. The majority of the students always performed most of the preventive behaviour identified in the survey, except "washing hands with soap and water for at least 20 s after blowing my nose, coughing, or sneezing" (39.2%) and "daily cleaning and disinfecting frequently touched surfaces" (41.6%). Being female, being in the fourth year, and gaining good perceived knowledge were associated with high actual COVID-19 knowledge. University, gender, age, academic level, and perceived COVID-19 knowledge were the associated factors[40].

I Basso et al conducted a cross-sectional study to explore whether and to what extent the third year undergraduate nursing students perceived that their readiness for practice was impacted by changes to clinical placement and classroom learning implemented in response to the COVID-19 pandemic at a university of North-western Italy that provides nursing education across five sites. All 228 third-year nursing students who completed their degree by June 2020 were invited to participate. Data were collected via online questionnaire, which included the question "What impact do you think that COVID-19 safety measures employed by your nursing programme had on your readiness for practice?" Answers were given on a 5-point Likert scale (none, minimal, moderate, major, and severe). Explanatory variables were collected at the individual, nursing programme, and university site levels. Results indicated total of 126 nursing students completed the questionnaire. Overall, 84 (66.7%) perceived that COVID-19 safety measures had a moderate to severe impact on their readiness for practice. These students often had lower grade point averages (p=0.037) and received no clinical placement during the pandemic (72.6% vs 90.5% of students who reported no or minimal impact, p=0.022). Average duration of third-year clinical placement was also lower among these students, though it was not statistically significant. No differences emerged at the university site level. The study concluded that despite important advances in technology-based educational activities, clinical placement remains the best educational strategy to allow nursing students to feel prepared to work effectively during a pandemic[41].

M.F. Khan et al. (2021) conducted a cross sectional interview based study was carried to assess the state of knowledge, perception, preparedness and satisfaction level of 302 HCPs from 7 major district headquarter hospitals in Azad Jammu & Kashmir (AJK) towards COVID-19. The questionnaire included 29 questions about demography, perception, training, preparedness, knowledge and awareness of HCPs about COVID-19. Majority of the respondents (78.5%) believed that corona-virus is a serious health threat. However, 10.6% perceived it as a bio-weapon and 4.3% as not dangerous. About 10% of doctors were not considering it very dangerous compared to 1% of paramedics and 2.5% of the supporting staff (P = 0.003). About 55% of the respondents showed confidence of the steps taken by government for prevention of COVID-19 while 45% had an opposite view. More than 70% of the participants had no formal training and the ratio of trained personals was significantly higher (0.018) in paramedical staff (33%) than doctors (15%). About 53% of the respondents were not satisfied with the provision of PPEs and 64% were not satisfied with their work and wages situation. Majority of the respondents (97%) were observed to follow the protocols for personal protection[42].

Yiwen Koh et al. (2022) conducted a cross-sectional study among undergraduate and graduate medical and nursing students from three local universities, using an online self-administered survey evaluating the following: (1) demographics; (2) attitudes towards online learning; (3) anxieties; (4) coping strategies; (5) perceived pandemic preparedness; and (6) knowledge about COVID-19 to explore their perceptions of online learning and their preparedness to COVID-19 as clinical postings resumed. Results revealed that a total of 316 responses were analysed. 81% agreed with the transition to online learning, most citing the need to finish academic requirements and the perceived safety of

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ISSN: 0047-262X
DOI: 10.5281/zenodo.10531683

studying at home. More nursing students than medical students (75.2% vs 67.5% p=0.019) perceived they had received sufficient infection control training. Both groups had good knowledge and coping mechanisms towards COVID-19. Conclusions: This study demonstrated that medical and nursing students were generally receptive to this unprecedented shift to online learning. They appear pandemic ready and can be trained to play an active part in future outbreaks[43].

Margaret W Bultas and Kristine M. L'Ecuyer (2022) conducted a longitudinal, observational, descriptive study to explore the effects of the pandemic on the first-year experience of new nurses. One hundred eighteen survey links were sent to new Bachelor of Science in nursing graduates from June 2020 to May 2021, with 56 responses to the first survey. Results indicated the COVID-19 pandemic negatively affected the new graduate experience, resulted in concern for personal health and safety, and negatively altered preparation for the first year in practice. However, desire to be a nurse and view of nursing remained positive. Conclusion The first year in practice is stressful and challenging. The pandemic posed additional challenges to employers and new graduates. Future research should explore the long-term impact of the pandemic on an already strained nursing workforce[44].

Dorien Ulenaers et al. (2021) conducted a cross-sectional survey to study nursing students' experiences during clinical placement during the COVID-19 pandemic in the clinical placements during the COVID-19 pandemic from nine Belgian nursing schools. All students enrolled in nursing education are eligible to participate. The survey consists of five dimensions: demographics, risk perception, self-efficacy, support and communication, and resilience. The result indicated the gaps that were identified by students focused on the need for more psychosocial support, establishing (regular) contact with their clinical placement supervisor, recognition of the difficult work situation, and the need for more space to unwind[45].

A prospective survey with open-ended questions was administered to new graduate nurses' working in a tertiary level teaching hospital in Sydney, Australia. Nurses were surveyed at baseline (8–10 weeks) and follow-up (10–12 months) between May 2012 and August 2013. In addition to socio-demographic data, single –item measures were used to rate new graduate nurses' confidence, clinical capability and support received. Free-text responses to the open-ended questions were initially reviewed for emergent themes, then coded as either positive or negative aspects of these preliminary themes. No change was seen in new graduate nurses' satisfaction with clinical supervision, satisfaction with the clinical practice environment, overall satisfaction with the transitional support program, satisfaction with the number of study days received, orientation days received, unit orientation, confidence levels and not practising beyond personal clinical capability (mean: 3.9 versus 4.0, p = 0.629). Negative responses to the open-ended questions were associated with increasing workload, mismatch in the level of support against clinical demands and expectations. Emergent themes from qualitative data included i) orientation and Transitional Support Program as a foundation for success; and ii) developing clinical competence[37].

Lie I. et al. (2021) conducted an observational cohort study to assess the healthcare professionals' background and experiences from work with patients with COVID-19 in intensive care units (ICUs) during the first wave of the COVID-19 COVID-ICUs in 27 hospitals across Norway. Participants Healthcare professionals (n=484): nurses (81%), medical doctors (9%) and leaders (10%), who responded to a secured, web-based questionnaire from 6 May 2020 to 15 July 2020. Primary and secondary measures Healthcare professionals': (1) professional and psychological preparedness to start working in COVID-ICUs, (2) factors associated with high degree of preparedness and (3) experience of working conditions. Results the age of the respondents was 44.8±10 year (mean±SD), 78% were females, 92% had previous ICU working experience. A majority

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DOI: 10.5281/zenodo.10531683

of the respondents reported professional (81%) and psychological (74%) preparedness for working in COVID-ICU. Factors significantly associated with high professional preparedness for working in COVID-19-ICU in a multivariate logistic model were previous ICU work experience[46].

Leon PC et al (2023) conducted a descriptive qualitative study to explore the impacts of the COVID-19 pandemic on nursing student education in one public university in Medellin, Colombia. The study used content analysis to address the following questions: (1) How has the COVID-19 pandemic impacted nursing education at the University of Antioquia? (2) What were the most important challenges experienced by nursing students? (3) What was most supportive for the students during the pandemic? And (4) What were the potential opportunities and lessons learned related to nursing education? Data were collected virtually through individual online interviews with 14 undergraduate nursing students and analysed using qualitative content analysis with constant comparisons. Results identified Four main categories of findings related to the experience of undergraduate nursing students during the COVID-19 pandemic i.e. : (1) transitioning to online learning, (2) managing the digital world, (3) impacts on clinical training, and (4) work-related stressors. Key challenges included home environments that were not conducive to learning, reduced social interactions with peers and faculty, accessing technology required for online education and insufficient preparation for clinical practice. Family members and university-provided resources were important sources of student support. Whereas the pandemic limited opportunities for hands-on clinical training, the shift to online learning allowed for the development of skills related to informational technologies and telehealth[47].

Kris Amor N. Calica, Ruth E. Paterson (2022) conducted a qualitative study to explore the experiences and perceptions of pre-registered nurses in relation to their university education during the COVID-19 pandemic. Lizzio's (2006) five senses of student success model, a novel qualitative approach using peer-to-peer discussion was utilized. Students who were on their second and final year in the nursing program were invited to participate. Interviews were conducted and transcribed using an online meeting platform. Data were analysed using the five main stages of framework analysis. Results showed eleven peer-to-peer discussion with 22 students were conducted. The five themes were linked with the five senses student success model: capability, connectedness, purpose, resourcefulness, and culture. Six sub-themes emerged in the data: confidence and learning process, building relationships, communication, student as health professional and mental health consequences of COVID-19 pandemic. The study concluded while there was strength in university provision, the pandemic was an opportunity for students and academics to reflect and learn about how to further programme resilience and enhance student support processes[48].

Yun-Jung Choi and Youn-Joo Um (2022) conducted a qualitative study to explore and understand the experiences of 20 nursing students practicing in public healthcare centers in response to the COVID-19 pandemic at a public healthcare center in Korea. Results indicated that 3 categories emerged. Students immersed themselves in a practicum experience in public healthcare in response to COVID-19. Students recognized the challenges associated with providing healthcare services during the pandemic. The students expanded their field of interest to community nursing. Study concluded that in the context of COVID-19, supplementing academic education and training for nursing students with experience in clinical practice at public healthcare centers enhanced the capabilities of future nurses. It increased confidence in their work and responsibilities[49].

Wakgari Deressa et al. (2021) conducted a cross-sectional study to assess preventive practices, perceived risk and worry about COVID-19 crisis among healthcare professionals at six public hospitals in Addis Ababa, Ethiopia. A systematic random sampling technique was used to select 1,134 respondents (52.6% females) and data were collected using self-administered questionnaires. The

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result indicated that highest percentage of respondents were nurses (39.3%) and physicians (22.2%), followed by interns (10.8%) and midwives (10.3%). Wearing facemask (93%) and frequent hand washing (93%) were the commonly reported preventive practices. Perceived risk of becoming infected with coronavirus (88%) and the potential risk of infection to their family (91%) were very high. The majority worried a lot about the health system being overwhelmed by COVID-19 patients (92%), the health of their loved ones (90%) and losing someone due to COVID-19 (89%). Respondents who had previously provided clinical care to Ebola, SARS and cholera patients had significantly lower levels of worry about COVID-19 crisis than participants who had not ($\beta = -1.38$, $P<0.001$). Findings revealed respondents' widespread practice of preventive measures, highest levels of perceived risk and worry about the COVID-19 crisis[50].

P. Vijayalakshmi et al (2023) conducted a cross-sectional study to determine how resilience influenced the quality of life among two hundred sixty-eight nursing students from three universities, South India responded in the web-based survey during the COVID-19 pandemic. Data was collected using self-reported questionnaires in June 2021.

The findings revealed that the participants' resilience was normal, which had a moderate impact on the quality of life of nursing students during the COVID-19 pandemic. The COVID-19 impact on QoL significantly differed with year of education ($F = 3.087$; $p < 0.02$) and university ($F = 6.697$, $p < 0.001$). The study concluded that resilience had a moderate impact on the quality of life of nursing students during the COVID-19 pandemic. Therefore, it is important to promote students' resilience and improve their quality of life during stressful situations[51].

Al-Dossary R et al (2020) carried out a cross-sectional descriptive study on 500 nurses working at government and non-governmental hospitals in five regions in Saudi Arabia using convenience sampling. The Kruskal–Wallis test was applied and the Mann–Whitney test was utilized as a post hoc test. The results showed that the majority of nurses in this study, 96.85%, had excellent knowledge of COVID-19. Some (83.2%) of nurses reported significant prevention knowledge and treatment skills about COVID-19, while 7.6% had little knowledge about prevention. More than half of the nurses (60.4%) had high positive attitudes toward caring for COVID-19 patients. In conclusion, female nurses, married nurses, and bachelor's degree nurses had greater awareness, better attitude, and prevention clinical experience towards COVID-19. Meanwhile, non-Saudi nurses had higher self-reported awareness, positive attitudes, optimal prevention, and positive perceptions compared to Saudi nurses. This study provides baseline information immediately needed to enable health authorities to prioritize training programs that support nurses during the COVID-19 pandemic52.

Majrashi, A et al (2021) conducted a scoping review aimed to explore the relevant evidence related to stressors and coping strategies among nursing students during the COVID-19 pandemic. The scoping review methodology was used to map the relevant evidence and synthesize the findings by framing the research question using PICOT, determining the keywords, eligibility criteria, searching the CINAHL, MEDLINE, and PubMed databases for the relevant studies. The review further involved study selection based on the PRISMA flow diagram, charting the data, collecting, and summarizing the findings. The critical analysis of findings from the 13 journal articles showed that the COVID-19 period has been stressful for nursing students with classes moving online. The nursing students feared the COVID-19 virus along with experiencing anxiety and stressful situations due to distance learning, clinical training, assignments, and educational workloads. Nursing students applied coping strategies of seeking information and consultation, staying optimistic, and transference. The pandemic affected the psychological health of learners as they adjusted to the new learning structure. Future studies should deliberate on mental issues and solutions facing nursing students during the COVID-19 pandemic53

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Masaaod Sultan Hamood Al Rawahi et al. (2022) conducted a quantitative cross-sectional online survey of sixty-four undergraduate nursing students to identify the factors influencing COVID-19 practice among undergraduate nursing students at the University of Nizwa, Sultanate of Oman and students took part from July 30 to August 5, 2021. Results revealed Participants' average age was 22.27 ± 1.04, and the male-to-female ratio was 31.8% (n=64). Nursing students had adequate knowledge (13.67 ± 3.46), a positive attitude (48.14 ± 12.29), and good practices (32.6 ± 6.12), according to the results of a survey. Female students, compared to males (0.006, $p<0.05$), were more likely to follow better practices. Significant positive associations were found between age (0.025, $p<0.05$), gender (0.006, $P<0.05$), living areas (0.031, $p<0.05$), grade (0.000, $p<0.05$), Clinical practice experienced (0.016, $p<0.05$) and practice on COVID -19. The study findings exhibited the essential elements that affected COVID-19 precautionary practices, knowledge, and a positive attitude, which were the most critical variables to consider. Male students and students who reside in rural regions should be targeted for further health education, and efforts should be made to ensure these groups have access to reliable and effective online tools to assist them54.

Masumbuko Albert Baluwa et al. (2021) conducted a study based on qualitative approach employing a descriptive phenomenological design. Four focus group discussions (FGDs) were conducted on students who had completed a clinical rotation during the first wave of the Covid-19 pandemic. Results indicated four themes emerged from the data analysis, and these were staying positive amidst the Covid-19 pandemic; applying the Covid-19 preventive measures; the role of religion and use of avoidance strategies. The study concluded that students should be encouraged to use coping strategies that have been proven to promote psychological well-being in times of crisis such as the Covid-19 pandemic55.

Hamdan Mohammad Albaqawi et al conducted a quantitative, descriptive, and cross-sectional study to assess knowledge, perceptions, and preventive behavior toward the COVID-19 infection among 1,226 student nurses from seven universities in Saudi Arabia using convenience sampling technique. Results showed that nearly all students were aware of the outbreak (99.2%), and most of them received information on COVID-19 primarily from social media (71.0%). Over three-fourths of the students were confident that the government (89.1%) and Ministry of Health (MOH) (86.5%) were doing a good job responding to the COVID-19 outbreak in the country. The majority of the students always performed most of the preventive behavior identified in the survey, except "washing hands with soap and water for at least 20 s after blowing my nose, coughing, or sneezing" (39.2%) and "daily cleaning and disinfecting frequently touched surfaces" (41.6%). Being female, being in the fourth year, and gaining good perceived knowledge were associated with high actual COVID-19 knowledge. University, gender, age, academic level, and perceived COVID-19 knowledge were the associated factors. The study concluded that some areas should be focused on by nursing education, as well as health agencies, to ensure that the students have adequate knowledge and correct preventive behavior[56].

Kim et al (2023) conducted a cross-sectional comparative correlational study to explore nursing students' eHealth literacy, lifestyle behaviours and COVID-19- related preventive behaviours and associated factors of 358 nursing from a metropolitan area of South Korea were recruited for an online survey. The online questionnaire included: The eHealth Literacy Scale, the Health Promoting Lifestyle Profile-II and the COVID-19- related preventive behaviour scale. Results showed that COVID-19-related preventive behaviours were positively correlated with satisfaction with one's major, time spent seeking health information online, eHealth literacy and lifestyle behaviours. Significant factors affecting COVID-19- related preventive behaviours were: being female, time spent seeking health information online, eHealth literacy and lifestyle behaviours. The study highlighted the need to strengthen searching behaviours to access accurate health information online

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and reinforce eHealth literacy and health- promoting lifestyle behaviours to improve COVID-19 preventive behaviours among nursing students57.

Elhadi M et al. (2020) conducted a cross-sectional study to determine the extent of knowledge, self-reported preventive behavior, and risk perception of the COVID-19 outbreak among college students of medical and non-medical subjects from Libyan educational institutes. Data on participants' characteristics, knowledge, preventive behavior, and risk perception were collected. Approximately 3669 participants completed the questionnaire, of which 2547 (69.4) were medical students and 1122 (30.6%) were non-medical students. The study indicated a significant difference was observed between medical and non-medical students in terms of knowledge ($p < 0.001$). Overall, the knowledge score of the students differed significantly with respect to age, current year of study, and financial source ($p < 0.05$). The mean score of preventive behavioral measures toward COVID-19 (out of 8) was 7.42 (SD: 0.95, range: 0-8), and the overall preventive measure score was estimated to be approximately 7.42/8*100, which corresponds to 92.7% for both medical and non-medical students. The study concluded that government programs should aim to educate individuals from other sectors of the society to ensure the proper dissemination of knowledge on preventive safety measures, as this will help restrict and control the pandemic58.

Kumar J et al (2020) conducted a study to investigate the knowledge, attitude, and practices of 392 healthcare workers (HCWs) in wearing a surgical face mask to limit the spread of the new coronavirus disease 2019 (COVID-19). Survey was conducted by interviewing HCWs using a questionnaire consisting of the basic demographic characteristics, and the knowledge, attitude, and practices regarding the use of surgical face mask to limit the new COVID-19 exposure. The overall final results were good in 138 (35.2%), moderate in 178 (45.4%), and poor in 76 (19.3%). Around 43.6% of participants knew about the correct method of wearing the masks, 68.9% knew that there are three layers, 53% stated that the middle layer act as a filter media barrier, and 75.5% knew the recommended maximum duration of wearing it. The majority (88.2%) of participants knew that a cloth face mask is not much effective, around 79.8% knew that used face mask cannot be re-used, and 44.8% knew about the yellow-coded bag for disposal. The study concluded that HCWs and general public awareness campaigns regarding the proper use of face mask by utilizing all social media available resources would be helpful during this pandemic59.

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