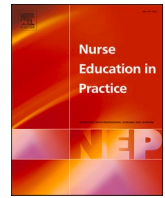




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Mental strain and changes in psychological health hub among intern-nursing students at pediatric and medical-surgical units amid ambience of COVID-19 pandemic: A comprehensive survey

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ABSTRACT

COVID-19 pandemic brings with it a new reality and changes in the context of traditional nursing clinical training. Intern-nursing students face challenges in providing care for suspected and confirmed patients with COVID-19. This cross-sectional descriptive study aimed to explore the mental strain and changes in the psychological health hub among the intern-nursing students during COVID-19 pandemic. A sample of 150 intern-nursing students from 13 pediatric and medical-surgical units at Alexandria University Hospitals completed the Middle East Respiratory Syndrome COVID-19 Staff Questionnaire and rated their psychological distress on the General Health Questionnaire. Study results revealed that the most stressful factors were related to possibility of getting COVID-19 infection (2.89 ± 0.39) and transmitting it to their families (2.72 ± 0.62). Moreover, the availability of cure or vaccine for the disease was the most important motivational factor to participate in future outbreaks (2.64 ± 0.77). Regarding intern-nursing students' psychological health hub, 77.3% of them felt under strain, worthless and depressed (64.7%, 62.7%) since the influx of COVID-19 pandemic. Binary logistic regression indicated that students' age (23–24), clinical experience (8 months) and clinical placement in adults' units served as risk factor for developing psychological distress while, male gender and training in pediatric units were protective factors. Designating an emergency psychiatric unit for ongoing monitoring and providing psychological first aids to the vulnerable health care providers is recommended.

1. Introduction

Nursing internship program stands as an orientation for the professional life, where it facilitates the transition from students' to staff nurse role. It provides a great opportunity for intern students to apply theory into practice and gain competencies in nursing skills before graduation. During this practicum course, the nurse students are trained in a variety of intensive care units (ICUs) (Abdulghani et al., 2014). Recently, the number of admitted cases with Corona Virus Disease-19 (COVID-19) to both pediatric and medical-surgical units has been increased. As COVID-19 has not affected the pediatric population in the same way as it has affected the adults, the number of intern-nursing students who

were infected with Coronavirus at medical-surgical units are correspondingly higher (Center of Disease Control and Prevention Aug. 19, 2020). According to statistics of Alexandria University Hospitals in 2020, student nurses who trained in medical-surgical units and got infected with COVID-19 represented 30 out of 120 intern-nursing students compared to 10 out of 70 of those in pediatric units.

Unlike experienced nurses, intern students in the developing countries had largely struggled with the perilous challenges of their condensed clinical training and they are plagued with crippling bouts of stress (Schwartz, 2020, Safan and Ebrahim, 2018). In COVID-19 situation, the sources of this stress extended beyond the clinical internship experience, to be swamped by the confirmed and suspected cases along

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with woefully depletion of the hospital's medical supplies. Additionally, the students developed feelings of emotional turmoil due to witness of their peers, who are getting infected, quarantined or even died in front of them. In a similar vein, they might have concerns and fear about the higher probability of contagion with the virus, and transmitting it to their families (Abdulghani et al., 2014; Gold, 2020). Unfortunately, working in such circumstances may trigger them to think seriously to quit the nursing job (Gold, 2020).

COVID-19 pandemic brings with it a new reality and changes in the context of traditional clinical training, where intern-nursing students may be challenged with different professional issues. For instance, they may be trapped with ethical dilemma of whether to give the priority for their own safety over their patients' one. Students struggled to choose between their commitment to their professional and ethical duty and the risk of being infected (Taylor et al., 2020).

Such confronted issues may lead the intern-nursing students to fall prey for mental strain and being more vulnerable to psychological distress. Lai et al. (2020) reported that nurses and frontline health care workers, who involved in the care of patients with COVID-19 in Wuhan and other regions of China, experienced psychological burden such as anxiety, depression, and insomnia. Therefore, investigating the nurse students' psychological health hub in the amidst of COVID-19 disaster is deemed the first step to provide the urgent psychological first aids. This will help them to cope with stressors, work productively and fruitfully as well as guarantee their participation in the upcoming waves. (Mental Health America, 2020). Eventually, taking care of the nursing students' overall mental wellbeing is a vital pillar for building a new generation of qualified nurses, who will be able to make a difference and move the nursing profession forward (Carolan et al., 2020).

1.1. Aim

This study mainly aimed to explore the mental strain and changes in the psychological health hub of intern-nursing students at pediatric and medical-surgical units amid the ambience of COVID-19 Pandemic. The study objectives are to analyze the associations between the participants' characteristics and the dimensions of mental strain during COVID-19 pandemic as well as to explore the potential influencing factors for developing psychological distress.

2. Materials and Method

2.1. Design

A cross-sectional descriptive research design was used.

2.2. Instruments

2.2.1. Middle east respiratory syndrome COVID-19 (MERS-CoV) staff questionnaire

The MERS-CoV staff questionnaire was developed by Khalid et al., 2016. The original questionnaire applied on the hospital staff who were continuously exposed to patients with MERS-CoV during the outbreak occurred in Jeddah, Saudi Arabia in 2014. In the current study, the same questionnaire was adapted to assess the dimensions of mental health status among the intern-nursing students during COVID-19 pandemic in 2020. It consists of 72 self-report items that encompasses five main sections rated on 4-point likert scales. The first section comprises 15 items that explore the interns' feelings during the COVID-19 outbreak. The second section includes 20 items that evaluate the possible factors causing stress among the interns. The third section encompasses 14 queries concerned with assessment of factors that could reduce stress among interns during COVID-19 outbreak. Moreover, section four involved 13 questions that explore the different personal coping strategies used by interns. Finally, the fifth section consisted of 10 items concerned with measuring possible incentives that could

promote nursing students' willingness to participate in any future epidemics. The questionnaire sections were reliable as Cronbach's alpha coefficients were; $\alpha_1 = 0.76$, $\alpha_2 = 0.83$, $\alpha_3 = 0.86$, $\alpha_4 = 0.78$, and $\alpha_5 = 0.81$. The socio-demographic characteristics such as age, gender, duration of internship clinical experience and clinical setting were attached to this tool. In order to ensure the content validity, the research tool was submitted to a jury of three experts in psychiatric, pediatric, and medical-surgical nursing specialties. The tool was proved to be valid ($r = 0.96$). Based on the panel of experts' comments, the word MERS-CoV was replaced by COVID-19. A pilot study was carried out on 15 intern-nursing students to test the feasibility, applicability and clarity of the research tool. Participants who were involved in the pilot study were excluded from the total study subjects.

2.2.2. General Health Questionnaire (GHQ-12)

This questionnaire was developed by Goldberg (1972). It comprised of 12 self-report items. In the present study, the questionnaire was adapted to assess the psychological health hub and severity of psychological distress related symptoms among the intern-nursing students during the influx of COVID-19 pandemic. The presence the symptoms was rated on 4 points likert-type scale; (0 = "not at all present", 1 = "same as usual present"; 2 = "rather more than usual present"; 3 = "much more than usual present"). The tool demonstrates high reliability as Cronbach's alpha coefficient was 0.87. The total score ranged from 0 to 36. The higher score representing higher level of psychological distress. The presence of psychological distress was considered among participants who obtained total scores ≥ 18 .

2.3. Participants

The Epi info program version 10 was used to estimate the sample size using the following parameters; population size of 220, confidence coefficient = 97%, expected frequency of 50%, and acceptable error of 5%. The minimum sample size was 150 intern-nursing students. The interns who were enrolled in the clinical training at both pediatric and medical-surgical units during the period of COVID-19 pandemic were invited to be included in the study. However, students who did not exposed to patients with COVID-19 during their internship period were excluded.

2.4. Ethical considerations

Online informed consent was obtained from the intern-nursing students after explaining the aim and objectives of the study. Confidentiality of the obtained data was assured and participants' anonymity was respected as well. Participation in the study was completely voluntary. The right to refuse to participate or to withdraw from the study was emphasized, after reassuring students that the collected data would be used only for the study purpose.

2.5. Method & Data Collection

Approval for conducting the study was obtained from the Ethical Research Committee, Faculty of Nursing, Alexandria University. Data collection was started from the end of January to the middle of April 2020. The study was carried out in 13 clinical set-up namely pediatric units included Pediatric Intensive Care Unit (ICU), Neonatal ICU, Pediatric Surgical ICU, Pediatric Dialysis Unit and Pediatric Open Heart ICU. In addition to, medical-surgical units included Burn, Neurology, Urology, Stroke, Orthopedic, Hematemesis, Dialysis Departments, and Operating Theater Department.

The researchers obtained a list of intern-nursing students, who were posted to the previously mentioned settings from Internship Affairs Office and their names were arranged in an alphabetic order. Then, the participants were randomly recruited using random number generator program. Fourteen students refused to participate and five students withdrawn from the study. Random number generator program was

used to find other nineteen students to complete the required sample size. The researchers developed an electronic form of the questionnaires and sent the relevant link to the pediatric and medical-surgical intern-nursing students via their academic emails. The study aim and objectives were clearly stated in the first section of the form, then followed by the online consent form. Once the students expressed their voluntary willingness to participate in the study, they clicked on the agree button and proceeded in filling out the questionnaires anonymously. Only one response per student was allowed. The senior investigators checked the collected replies responses daily and downloaded the final excel file of the participants' responses after the due date.

2.6. Data Analysis

The Statistical Package for Social Sciences (SPSS) version 20 was utilized for data analysis. **Descriptive statistics** included number, percentage, mean and standard deviation to describe demographic characteristics, dimensions of mental strain and psychological health hub of the intern-nursing students during COVID-19 pandemic. Kolmogorov-Smirnov test was used to check the normality of study variables and it showed that they were not normally distributed. **In Analytical statistics**, the dimensions of mental strain stratified by participants' demographic characteristics and Mann-Whitney (Z) tests and Kruskal-Wallis tests (χ^2) were used to compare the differences between them. Pearson's Correlation Coefficient was used to measure the direction of relationship between dimensions of mental strain. Binary logistic regression analysis was performed to predict the risk or protective factors for psychological distress and Odds ratios (ORs) with 95% confidence intervals were obtained. All of the statistical analyses were considered significant at $P < 0.05$.

3. Results

Regarding the intern-nursing students' feelings during COVID-19 outbreak, [Table 1](#) indicates that students felt nervous, scared and angry due to increased workload during COVID-19 outbreak (2.87 ± 0.34 and 2.83 ± 0.42 respectively). In addition, students expressed their desires to curtail their contact with the patient with COVID-19 infection (2.73 ± 0.50). Moreover, the mean score of those students who preferred to work in a unit, where they would not be exposed to COVID-19 infection was (2.59 ± 0.72). COVID-19 outbreak acted as a frustrating factor that made some intern-nursing students to think in quitting the nursing job or they thought to quit their career if COVID-19 outbreak recurred (2.29 ± 0.99 and 2.23 ± 0.92 respectively).

It is obvious that the possibility of getting COVID-19 infection from patients in the hospital and transmitting it to the families are the most stressful factor among the interns (2.89 ± 0.39 and 2.72 ± 0.62 respectively). Unavailability of COVID-19 treatment and exposure to the situations, where patients with COVID-19 died in front of them were considered as significant causes of stress among respondents (2.60 ± 0.67 and 2.59 ± 0.68 respectively). Transmission of COVID-19 infection among the health care staff is also found to be a cause of stress among the intern-nursing students. Additionally, they reported that witness of their infected colleagues being intubated was a major source of stress during the outbreak (2.16 ± 0.83).

The mean score of intern-nursing students, who reported that the use of protective equipment is extremely effective factor for reducing their stress (2.25 ± 0.81). Moreover, students who reported that the presence of clear guidelines for infection prevention was also a valuable factor that may reduce their stress during the outbreak (2.09 ± 0.81). From the intern-nursing students' point of view, the moderately effective factors that could reduce their stress include the improvement in patients' condition and decrease in COVID-19 reported cases (1.91 ± 0.70 and 1.95 ± 0.78 respectively).

Following strict personal protective measures and reading about the mechanism of COVID-19 transmission and prevention were the most

Table 1

Dimensions of Mental Strain among Intern-nursing students at Pediatric and Medical-Surgical Units during COVID-19 Pandemic.

		Mean	SD
Part 1: Feelings			
1	You felt nervous and scared.	2.87	0.34
2	You felt angry that your workload increased when compared to employees not exposed to COVID-19.	2.83	0.42
3	You tried curtailing your contact with the patient with COVID-19	2.73	0.50
4	If optional, you would have chosen to work in a unit where you would not be exposed to COVID-19.	2.59	0.72
5	You were unhappy to do overtime.	2.35	0.94
6	You felt that employees not directly exposed to COVID-19 avoided you.	2.34	1.08
7	You thought of quitting your job.	2.29	0.99
8	You would quit your job if COVID-19 outbreak recurred.	2.23	0.92
9	You noticed that employees outside your unit were avoiding COVID-19 patients.	2.21	0.93
10	You felt that you had to do your job as it was your professional and ethical duty.	2.19	0.96
11	You appreciated special recognition for your job by the hospital administration.	2.18	1.04
12	You appreciated financial compensation after the outbreak.	1.82	1.09
13	You expected financial compensation during the outbreak.	1.80	0.91
14	You called in sick at least once.	1.77	1.03
15	You thought of calling in sick.	1.68	0.95
Part 2: Factors Causing Stress			
1	You could get COVID-19 infection from a patient in the hospital.	2.89	0.39
2	You could transmit COVID-19 to your family or friends.	2.72	0.62
3	Small mistake or lapse in concentration could infect you or others.	2.69	0.73
4	Seeing your colleagues getting intubated.	2.61	0.83
5	Lack of treatment for COVID-19.	2.60	0.67
6	Seeing patients with COVID-19 dying in front of you.	2.59	0.68
7	News of new cases of COVID-19 reported in TV/newspaper.	2.58	0.75
8	You were emotionally exhausted.	2.56	0.82
9	Not knowing when the COVID-19 outbreak will be under control.	2.55	0.85
10	Conflict between your duty and your own safety.	2.52	0.81
11	Shortage of staff at times.	2.49	0.76
12	You had physical stress/fatigue.	2.46	0.89
13	Taking care of your own colleagues sick from COVID-19.	2.36	0.98
14	You felt there were not adequate protective measures	2.35	1.02
15	Every time you were exposed to a new COVID-19 patient.	2.27	0.96
16	Seeing your colleagues stressed or afraid.	2.25	1.13
17	You developed respiratory symptoms and feared that you had COVID-19.	2.19	1.06
18	You had to wear protective gear on a daily basis.	2.13	1.02
19	Getting screened for COVID-19 infection after exposure.	1.92	1.15
20	Colleagues displaying COVID-19 like symptoms.	1.90	1.00
Part 3: Factors Reducing Stress			
1	Protective equipment provided to you by hospital.	2.25	0.81
2	Clear guidelines from hospital for infection prevention.	2.09	0.81
3	Your colleagues who were infected getting better.	2.07	0.66
4	Decrease in COVID-19 cases reported in news.	1.95	0.78
5	Improvement in patients' condition.	1.91	0.70
6	Positive attitude from colleagues in your department.	1.81	0.74
7	Your family members or friends outside hospital did not get COVID-19.	1.81	0.75
8	Likelihood that you would get extra compensation for your exposure to COVID-19.	1.73	0.99
9	None of the staff getting COVID-19 after starting strict protective measures.	1.64	0.74
10	Sharing jokes or humor among colleagues.	1.59	0.73
11	Not to do overtime.	1.56	1.08
12	All healthcare professionals working together on front line.	1.55	0.82
13	Confidence in the hospital staff in case you got sick from COVID-19.	1.30	0.93
14	Getting free meals from the hospital in your unit.	0.86	0.95
Part 4: Personal Coping Strategies			
1	Followed strict personal protective measures (e.g., mask, gown, hand washing etc.).	2.55	0.72

(continued on next page)

Table 1 (continued)

		Mean	SD
2	Read about COVID-19, its prevention and mechanism of transmission.	2.39	0.77
3	Kept separate clothes for work/used disposable scrubs provided hospital to minimize transmission.	2.35	0.90
4	Considered every patient admitted to the hospital as having COVID-19 infection and using full protective gear even if patient was COVID-19 negative.	2.30	0.75
5	Avoided going out in public places to minimize exposure to COVID-19.	2.27	1.03
6	Did relaxation activities, e.g., involved in prayers, sports, exercise etc.	2.21	0.84
7	Chatted with family and friends to relieve stress and obtain support.	1.95	0.81
8	Talking to yourself and motivating to face the COVID-19 outbreak with positive attitude.	1.78	0.98
9	Got help from family physicians or other doctors to reduce your stress and get reassurance.	1.67	1.06
10	Avoided doing overtime to reduce exposure to patient with COVID-19 in hospital.	1.63	1.00
11	Tried to be busy at home in activities that would keep your mind away from COVID-19.	1.59	0.99
12	Vented emotions by crying, screaming etc.	1.51	1.10
13	Avoided media news about COVID-19 and related fatalities.	1.47	1.17
Part 5: Incentives for willingness to participate in future outbreaks			
1	Available cure or vaccine for the disease.	2.64	0.77
2	Similar adequate personal protective equipment supply by the hospital.	2.51	0.87
3	Psychiatric help and therapy made available in work place to help reduce stress and anxiety.	2.48	0.87
4	Recognition from management and supervisors for the extra efforts.	2.46	0.95
5	Compensation to family if disease related death at work.	2.43	0.90
6	Financial recognition of efforts.	2.32	0.97
7	Family support.	2.27	1.03
8	Disability benefits if disabled from the disease.	2.07	0.98
9	Reduced working hours during outbreaks.	1.70	1.21
10	Not forced to do overtime.	1.59	1.00

copied strategies used during the outbreak (2.55 ± 0.72 and 2.39 ± 0.77 respectively). However, the minority of the students avoided media news about COVID-19 or tried to be busy with home activities in order to cope with the outbreak (1.47 ± 1.17 and 1.59 ± 0.99).

The availability of cure or vaccine for the disease is the most important incentive for willingness of the intern-nursing students to participate in future outbreaks (2.64 ± 0.77). Furthermore, the availability of the adequate personal protective equipment and the availability of psychiatric help and therapy in the work place could promote their willingness to participate in any future outbreaks (2.51 ± 0.87 and 2.48 ± 0.87). From another perspective, the recognition from supervisors for the intern-nursing students' extra efforts and financial compensation were other important incentives (2.46 ± 0.95 and 2.32 ± 0.97). Moreover, the availability of compensation to their families in case of any work related disease or death was a great incentives (2.43 ± 0.90).

Fig. 1 demonstrates the psychological health hub among intern-nursing students' during COVID-19 outbreak. Most of the intern-nursing students felt under strain, worthless and depressed during COVID-19 outbreak (77.3%, 64.7% and 62.7% respectively). In addition, they reported that they did not enjoy their day-to-day activities (63.3%), lost their sense of confidence (60.0%), could not overcome difficulties (56.7%) and lost their sleep due to providing care for patients with COVID-19.

Regarding the intern-nursing students demographic characteristics, Table 2 illustrates that more than two third of them were females (68.67%). Participants, who aged 23 years old constituted 62.67% from the total respondents. In relation to duration of internship clinical experiences, it is observed that an equal percentage (40%) of intern-

nursing students in the study group had either 6 or 7 months experiences. A significant gender difference was observed, with females reporting higher score of stress causing factors during COVID-19 pandemic than males ($Z = -3.219$, $df = 1$, $p < 0.001$). However, the overall mean scores of students' feelings during COVID-19 pandemic, their perceived stressors and coping strategies did not show any significant statistical differences regarding their age, duration of internship clinical experience and clinical settings.

Table 3 indicates that the largest mean value was related to factors causing stress during COVID-19 pandemic at 2.43 ± 0.48 , followed by students' feelings (2.26 ± 0.29) and their incentives to participate in future outbreaks (2.25 ± 0.49). While, the lowest mean was in the factors reducing stress (1.72 ± 0.39) followed by students' coping strategies (1.97 ± 0.60). Table 3 also highlights the correlation between intern-nursing students' mental strain dimensions during COVID-19 pandemic. A significant negative correlation was found between students' feelings during COVID-19 pandemic and their coping strategies ($r = -0.272$, $p = 0.001$). Moreover, the factors causing stress among intern-nursing students showed negative correlation with their coping strategies (-0.229 , $p = 0.005$) as well as their incentives to participate in any future outbreaks ($r = -0.333$, $p = 0.000$). However, a significant positive correlation was observed between students' coping strategies and their incentives to participate in any future outbreaks ($r = 0.289$, $p = 0.000$).

Table 4 depreciates the association between the intern-nursing students' psychological distress during COVID-19 pandemic and their demographic characteristics. It is clear that male gender is a protective factor for developing COVID-19 pandemic related psychological distress, where female students expressed more psychological distress than males (OR = 0.17, 95% CI: 0.057–0.49, $p = 0.001$). Similarly, the longest clinical experience of the intern-nursing students (8 months) was also significantly associated with the degree of their psychological distress (OR = 3.78, 95% CI: 1.07–3.22, $p = 0.038$). Students, who had 23 years old showed greater distress than the other age groups (OR = 3.92, 95% CI: 1.714–8.95, $p = 0.001$). Clinical training at adults' units was another significant risk factor for developing psychological distress. While, working in pediatric and neonatal intensive care units was a significant protective factor for developing psychological distress among the intern-nursing students (OR = 6.07, 95% CI: 0.045–0.091), $p = 0.031$ and OR = 1.73, 95% CI: 0.17–0.74, $p = 0.044$, respectively).

The presence of psychological distress among participants, who obtained ≥ 18 in GHQ-12.

4. Discussion

Unlike any other academic programs, nursing clinical education faces the challenge of maintaining students' safety during COVID-19 era. As, the other educational institutions had shifted totally to virtual teaching, which is not applicable for clinical training specifically for intern-nursing students (Singh and Haynes, 2020). It is truly known that, public health emergencies such as COVID-19 pandemic had enormous psychological impacts on college students (Mei et al., 2011). In that sense, investigating this negative impact would pave the road for furnishing the intern-nursing students' psychological health to overcome the successive episodes of mental strain.

4.1. Feelings of the intern-nursing students amid COVID-19

Pandemics have various psychological ramifications on health care providers, particularly on the workplace (Ives et al., 2009 & Seale et al., 2009). Senior nurse students found themselves stand at the front lines with other health care providers in order to provide care for patients with COVID-19, where they encountered stressors more than ever before. This can be confirmed by the findings of the current study, where the majority of the intern-nursing students reported their feeling of nervousness, being scared, and angry. This may be related to the

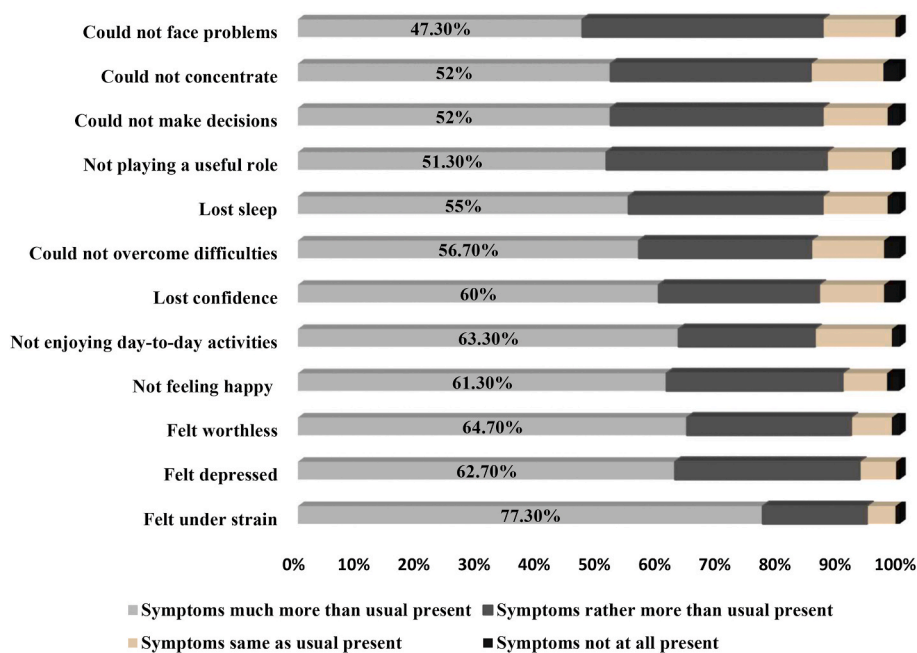


Fig. 1. Psychological Health Hub among Intern-nursing students' at Pediatric and Medical-Surgical Units during COVID-19 outbreak.

increased workload and tried to curtail their contact with COVID-19 infected patients. Acknowledging these findings, intern-nursing students may not be mentally prepared to deal with such critical circumstances. In parallel, Lam et al. (2020) in their study reported that lack of the adequate planning at the management level during the COVID-19 lockdown is one of the greatest challenges that face nurses. From another aspect, the limited clinical experience could impede students' abilities to maintain their psychological stability in such critical scenario. Hence, they could perceive themselves as incompetent and feel embarrassed regarding their restricted abilities (Rafati et al., 2017).

4.2. COVID-19 pandemic associated stressors among intern-nursing students

The findings of the present study also explored an array of factors that precipitated and alleviated the interns' feeling of stress amid the COVID-19 pandemic. The interns' mental strain in our study has been found to be influenced by the availability of protective equipment, and clear guidelines for infection control. Taylor et al. (2020) claimed that student nurses develop fears in the clinical settings, where they were exposed to the novel coronavirus disease along with deficiency in the personal protective equipment (PPE), and the possibility of transmitting the infection to their families. Therefore, activation of proactive policies is essential to overcome the state of financial austerity. These restricted financial resources have left hospitals overloaded, understaffed and deprived of stringent measures of isolation and quarantining protocols (Redden, 2020 & Benjamin et al., 2020).

4.3. Association between intern-nursing students' demographic characteristic and their sense of psychological distress

Binary logistic regression analysis showed that female intern-nursing students recorded significantly higher psychological distress than male counterparts in response to the experience of pandemic-related stress. One possibility is that the master stereotypy related to the belief that females are labeled more emotionally responsive and reacts negatively to the unpleasant experiences than males (Chaplin, 2015). From the perspective of neuro-anatomical theory, males showed greater

down-regulation of amygdala activity and less prefrontal activity during stressful situation. Thus, they have the ability to regulate their negative emotions with less efforts and greater efficiency than females (McRae et al., 2008). This fact supported the findings of the Odd's ratio in the present study, where the male gender is proved to be a buffering factor against the development of COVID-19 associated psychological distress. However, these findings are inconsistent with Lock's study (2020), who found that the British women were more likely to bear the emotional brunt of the COVID-19 pandemic than men.

The regression analysis also highlighted that the clinical placement in the pediatric and neonatal intensive care units seemed to be a protective factor against the intern-nursing students' psychological distress during the pandemic. In this regard, Dong et al. (2020) documented a relatively low rate of COVID-19 cases among children. However, the results of the current study reflected that clinical training at adults' medical-surgical units is a significant risk factor for developing psychological distress among intern-nursing students. In similar vein, Zhang et al., 2020 & Schwirtz (2020) found that nurses were panicked and dispassionate due to the increased numbers COVID-19 cases in the adult intensive care units. Therefore, some of the nurses who worked in the adults' emergency units asked for reallocation to other departments, while some of them thought to quit the nursing profession. As, they perceived this infectious disease had become more fierce and deplorable (Lai et al., 2020).

The core existence of nursing profession revolves around the obligation to save patients' life and relieve their sufferings. This corroborates the findings of the present study, where more than half of the interns-nursing students reported their sense of commitment toward nursing job professionally and ethically during the pandemic. These results raise the need to explore factors contributed to the decisions of some students to drop out their practicum internship program. In that sense, This will help policy makers and managers in supporting novice nurses during the outbreak (Fernandez et al., 2020).

4.4. Psychological distress among the interns amid the pandemic

Of notice from previous studies of the SARS CoV-1 epidemic, the health care providers suffered from many psychiatric complications;

Table 2
Dimensions of Mental Strain among Intern-nurse students at Pediatric and Medical-Surgical Units during COVID-19 Pandemic in relation to their Demographic Characteristics.

	Number (%)	Feelings (Mean ± SD)	Factors Causing Stress (Mean ± SD)	Factors Reducing Stress (Mean ± SD)	Coping Strategies (Mean ± SD)	Incentives for Willingness to participate in Future outbreaks (Mean ± SD)
Gender						
Male	47 (31.33)	2.31 ± 0.28	2.24 ± 0.48	1.71 ± 0.44	1.96 ± 0.58	2.31 ± 0.44
Female	103(68.67)	2.24 ± 0.29	2.52 ± 0.45	1.73 ± 0.36	1.98 ± 0.60	2.22 ± 0.52
Significance		Z = -1.49, p = 0.14, df = 1	Z = -3.219, p = 0.001***	Z = -0.242, p = 0.81, df = 1	Z = -.158, p = 0.874, df = 1	Z = -0.587, p = 0.55, df = 1
Age/years						
22-	21 (14.00)	2.21 ± 0.32	2.55 ± 0.42	1.68 ± 0.40	1.97 ± 0.70	2.16 ± 0.47
23-	94 (62.67)	2.27 ± 0.2	2.38 ± 0.50	1.73 ± 0.38	1.96 ± 0.57	2.28 ± 0.49
24 & more	35 (23.33)	2.25 ± 0.25	2.49 ± 0.45	1.73 ± 0.41	2.02 ± 0.62	2.23 ± 0.54
Duration of internship clinical experience						
5 months	15(10.0)	2.27 ± 0.31	2.38 ± 0.46	1.74 ± 0.47	2.02 ± 0.62	2.36 ± 0.51
6 months	60(40.0)	2.29 ± 0.31	2.41 ± 0.50	1.79 ± 0.36	1.99 ± 0.61	2.27 ± 0.49
7 months	60(40.0)	2.24 ± 0.25	2.45 ± 0.47	1.67 ± 0.37	1.94 ± 0.59	2.19 ± 0.52
8 months	15(10.0)	2.21 ± 0.28	2.49 ± 0.44	1.64 ± 0.45	1.99 ± 0.59	2.29 ± 0.41
Significance		$\chi^2 = 2.95$ p = 0.39, df = 3	$\chi^2 = 0.662$, p = 0.88, df = 3	$\chi^2 = 4.287$, p = 0.23, df = 3	$\chi^2 = 0.025$, p = 0.97, df = 3	$\chi^2 = 0.250$, p = 0.97, df = 3
Clinical Setting						
Pediatric Units.						
Pediatric ICU	12 (8.00)	2.22 ± 0.30	2.21 ± 0.54	1.77 ± 0.41	1.89 ± 0.54	2.29 ± 0.55
Neonatal ICU	20 (13.33)	2.34 ± 0.24	2.34 ± 0.53	1.62 ± 0.30	2.06 ± 0.66	2.40 ± 0.37
Pediatric Dialysis Unit	3 (2.00)	2.02 ± 0.47	2.28 ± 0.54	1.36 ± 0.68	2.08 ± 0.80	2.07 ± 0.25
Pediatric surgical ICU	17 (11.33)	2.20 ± 0.35	2.54 ± 0.43	1.90 ± 0.39	2.00 ± 0.77	2.01 ± 0.50
Pediatric Open Heart ICU	8 (5.33)	2.32 ± 0.16	2.54 ± 0.44	1.56 ± 0.41	1.77 ± 0.56	2.05 ± 0.52
Medical-Surgical Units						
Burn ICU	15 (10.00)	2.16 ± 0.31	2.48 ± 0.36	1.58 ± 0.37	2.22 ± 0.69	2.29 ± 0.53
Neurology ICU	7 (4.67)	2.28 ± 0.25	2.40 ± 0.58	1.84 ± 0.33	1.96 ± 0.64	2.36 ± 0.45
Urology ICU	8 (5.33)	2.41 ± 0.26	2.51 ± 0.45	1.77 ± 0.40	2.20 ± 0.69	2.26 ± 0.49
Stroke ICU	9 (6.00)	2.30 ± 0.25	2.33 ± 0.60	1.60 ± 0.40	2.09 ± 0.60	2.11 ± 0.65
Orthopedic ICU	9 (6.00)	2.40 ± 0.32	2.30 ± 0.45	1.89 ± 0.36	1.92 ± 0.46	2.29 ± 0.54
Hematemsis ICU	9 (6.00)	2.37 ± 0.26	2.64 ± 0.50	1.74 ± 0.29	1.90 ± 0.43	2.14 ± 0.64
Adult Dialysis Unit	16 (10.67)	2.25 ± 0.30	2.48 ± 0.51	1.62 ± 0.38	1.74 ± 0.46	2.16 ± 0.38
Operating Theater	17 (11.33)	2.14 ± 0.24	2.47 ± 0.43	1.90 ± 0.40	1.90 ± 0.47	2.51 ± 0.47
Significance		$\chi^2 = 15.37$ p = 0.22, df = 12	$\chi^2 = 7.89$, p = 0.79, df = 12	$\chi^2 = 16.61$, p = 0.17, df = 12	$\chi^2 = 7.19$, p = 0.83, df = 12	$\chi^2 = 7.29$, p = 0.84, df = 12

Z = Mann–Whitney U tests χ^2 = Kruskal-Wallis tests *Significant at ***P < 0.0001.

Table 3
Correlational matrix between mental health status dimensions* among intern nurse students during COVID-19 pandemic.

	Mean	SD	Feeling	Factor causing stress	Factor reducing stress	Incentives to participate in Future outbreaks	Coping strategies
Feeling	2.26	0.29	r 1				
			p -				
Factors causing stress	2.43	0.48	r 0.136	1			
			p 0.098	—			
Factors reducing stress	1.72	0.39	r 0.110	0.039	1		
			p 0.180	0.636	—		
Incentives to participate in Future outbreaks	2.25	0.49	r -0.112	-0.333	0.018	1	
			p 0.172	0.000***	0.825	—	
Coping strategies	1.97	0.60	r -0.272	-0.229	-0.093	0.289	1
			p 0.001**	0.005**	0.256	0.000***	—

r = Pearson correlation *Significant at *P ≤ 0.5 **P < 0.001 ***P < 0.0001.

such as sleep disorders, depressive, and anxiety symptoms (Cheng et al., 2004 & Chua, 2004., Lee et al., 2005). These adverse impacts are recurring now with COVID-19 scenario that has already spread to approximately 185 countries and affected more than 4.238.703 people (Wang et al., 2020; Sonderskov et al., 2020; World Health Organization, 2020). In addition, Vindegaard and Benros (2020) declared that a huge after-wave of depression among the health care providers is expected. This fact could confirm the results of the current study, where the majority of interns-nursing students recorded high levels of psychological distress. This grounded in their losing the ability to sleep and concentrate. Besides, more than half of them reported their feeling of worthlessness and depression since the influx of COVID-19 pandemic. This finding corresponds to Smith's study (2020), who cited that European nurses experience emotional exhaustion, addiction of anxiolytics, depression and even committed suicide amid the stress of COVID-19 outbreak. Jun et al., 2020 added that COVID-19 had generated a

major anxiety and stress besides its considerable aftermaths on the healthcare providers, who are putting themselves at the edge for caring for these critically ill patients. Two recent studies also reported that Chinese students are afraid that their families are susceptible for infection with such deadly infection (Zhai & Du., 2020, Cao., 2020).

Lai et al. (2020) recommended that frontline health care providers, who suffered from COVID-19- related stress in an immense need for psychological interventions immediately after this outbreak. Another recent study also emphasized that nursing students should be well supported during COVID-19 crisis in order to guarantee their involvement in any future pandemics (Carolan et al., 2020). This urge lent further agreement with the results of the current study in which factors causing stress among the intern-nursing students were negatively correlated with their coping strategies and willingness to participate in the future outbreaks. Hence, the revealed findings shed the light for designating an emergency psychiatric unit. This unit would be

Table 4
Binary logistic regression analyses for psychological distress by demographic characteristics of intern-nursing students at pediatric and medical-surgical units.

	No Psychological distress N = 46	Psychological distress N = 104	Psychological Distress OR (95% CI)	P
Gender				
Male	27(58.7)	19 (18.3)	0.17 (0.057–0.49)	0.001**, df = 2
Female	19 (41.3)	85 (81.7)	1.00	
Age/years			1.00	p = 0.004, df = 2
22-	8 (17.4)	13 (12.5)	1.72 (0.571–5.18)	0.335
23-	20 (43.5)	74 (71.2)	3.92 (1.714–8.95)	0.001**
24 & more	18 (39.1)	17 (16.3)	1.72 (0.571–5.18)	
Duration of internship clinical experience				p = 0.001**, df = 3
5 months	11 (7.33)	4 (2.67)	1.00	
6 months	6 (4.00)	9 (6.00)	0.24 (0.05–1.133)	0.072
7 months	20 (13.33)	40 (26.67)	1.33 (0.42–4.271)	0.628
8 months	9 (6.00)	51 (34.00)	3.78(1.07–3.221)	0.038*
Clinical Setting				p = 0.079, df = 12
Pediatric Units.				
Pediatric ICU	13(28.3)	8(7.7)	6.07 (0.045–0.91)	0.031*
Neonatal ICU	1(2.2)	7(6.7)	1.732 (0.17–0.74)	0.044*
Pediatric Dialysis Unit	9(19.6)	2(1.9)	21.52 (0.55–89.56)	0.101
Pediatric surgical ICU	6(13.0)	8(7.7)	5.03 (0.48–52.82)	0.178
Pediatric Open Heart ICU	3(6.5)	2(1.9)	1.03 (0.82–4.29)	0.726
Medical-Surgical Units				
Burn ICU	3(6.5)	12(11.5)	20.53 (1.58–266.88)	0.021*
Neurology ICU	1(2.2)	6(5.8)	30.09 (1.05–863.89)	0.047*
Urology ICU	1(2.2)	7(6.7)	36.65 (1.51–892.40)	0.027*
Stroke ICU	2(4.3)	7(6.7)	9.79 (1.58–164.93)	0.013*
Orthopedic ICU	2(4.3)	9(8.7)	7.47 (0.00—)	0.999
Hematemsis ICU	1(2.2)	7(6.7)	8.62 (1.26–132.61)	0.022*
Adult Dialysis Unit	3(6.5)	15(14.4)	65.39 (3.26–1.31)	0.006**
Operating Theater	4(8.7)	14(13.5)	36.41 (2.71–489.69)	0.007**

OR = odds ratio; CI = confidence interval *Significant at *P ≤ 0.5 **P < 0.001 ***P < 0.0001.

concerned with ongoing monitoring and providing psychological first aids for vulnerable health care providers .

5. Conclusion

COVID-19 pandemic was identified as a great source of mental strain among intern-nursing students at pediatric and medical-surgical units and it had a negative impact on their psychological health. Based on the obtained findings; psychological first aid services should be available to the vulnerable intern-nursing students to excel their pursuit for successful career. Moreover, psychological training programs including counseling services and support systems should be conducted to help the nursing students to overcome stressors during any future outbreaks.

6. Limitation

Although, this study results captured a clear picture of the mental and psychological health status among the intern-nursing students amid the ambiance of COVID-19 pandemic, conducting the study on larger sample to include all nursing students would provide more generalizable findings.

Author contributions

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE [<http://www.icmje.org/recommendations/>]):

- Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data.
- Drafting the article or revising it critically for important intellectual content.

Declaration of competing interest

No conflict of interest has been declared by the authors.

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