Perceived Stress, Its Stressors and Coping Mechanism Among Nursing Students in Clinical Practice During COVID-19 Pandemic

Salizar Mohamed Ludin[1]* & Putri Amira Noor Azman[2]

[1]Department of Critical Care Nursing, Kulliyyah of Nursing, International Islamic University Malaysia, Pahang, Malaysia.

[2]Medical & Surgical Department, Thompson Hospital, Selangor, Malaysia

ABSTRACT

Introduction: Being stressed-out and overwhelmed during the period of nursing training is the frequent complaint by nursing students due to clinical training that are very stressful. Moreover, with the COVID-19 pandemic that just happened in 2020, modification of lifestyle during the lockdown leads to psychological distress and stress especially among undergraduate nursing students.
Objectives: This study aims to assess the perceived stress and coping mechanism among nursing students in clinical practice during COVID-19 pandemic.
Method: A cross-sectional study was conducted among nursing students from IIUM Kuantan using online surveys. Data was interpreted in descriptive and inferential analysis using Statistical Package for the Social Sciences (SPSS) version 20.
Results: Among 128 participants, the students perceived high stress levels (M = 2.06, SD = 0.66). The most common types of stressors are stress from assignments and workload (M = 2.72, SD = 0.82). Meanwhile, the most common type of coping mechanism applied by nursing students is transference (M = 2.57, SD = 0.75), while the least frequently applied by the students is avoidance (M = 1.65, SD = 0.77). The association between demographic profile such as hours of sleep and the worry of being infected with COVID-19 were significant with perceived stress levels, while being quarantined due to suspected infection or infected by COVID-19 and hours of sleep were statistically significant with coping mechanism. Furthermore, there was a positive significant association between total perceived stress and coping mechanism using the Spearman correlation.
Conclusion: This study may help in planning to overcome the high stress problems among nursing students through nursing education, nursing practice and nursing research.

Keywords: Stress level, stressors, coping mechanism, clinical practice, nursing students, COVID-19

*Corresponding author
Assoc. Prof. Dr. Salizar Mohamed Ludin
Department of Critical Care Nursing,
Kulliyyah of Nursing,
International Islamic University Malaysia,
Jalan Sultan Ahmad Shah, Bandar Indera Mahkota,
25200 Kuantan, Pahang, Malaysia.
E-mail: msalizar@iium.edu.my

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INTRODUCTION

Stress among university students has become a common issue in the world, especially among nursing students. Being stressed-out and overwhelmed during nursing school days is a frequent complaint by nursing students (1). It is because the components of the clinical training are very stressful (2). Stress can be defined as a response of the brain and the body to any demand or any type of challenges such as performance in work or school, significant life changes, or traumatic events (3). Therefore, being unable to respond to excessive demands can lead to stress. Besides that, student nurses experienced challenging drastic life changes due to COVID-19 (4). In addition, as the nursing program has the requirement that involve practical in the real hospital setting, it made the program harder and even more stressful than the other programs as it aims to develop the students into professional nurses naturally (5). This has put more stress on nursing students to complete their requirement for clinical practices, especially during the COVID-19 pandemic. Thus, the modification of lifestyle during the lockdown lead to psychological distress and stress (4).

There are various stressors or causes of stress among nursing students during their training which affect their learning and performance directly or indirectly (6). Some literature categorized the stressors according to the academic aspects, clinical aspects, and personal aspects. The factors of stress can be workload, interpersonal conflict with peers, lack of readiness, less support from staff and unsure about the treatment of the patients (7). Other than that, due to the COVID-19 pandemic, the students faced new stressors (8), for instance, the shortage of personal protective equipment (PPE) such as gowns, gloves, masks, aprons, and face shields. Considering all these factors, it is significant for the nursing students to perceive high-stress levels during the clinical placement.

When students cannot handle the stressors properly with positive coping, they will experience prolonged stress which may affect their physical and mental health. Report shows that high-stress levels during clinical practice to have an impact on psychological and emotional impairment and affect their quality of care to the patients (9). Therefore, it is crucial to determine the level of stress, the stressors and coping mechanisms among nursing students in a particular area or institution to develop an intervention to manage students' stress. Thus, this study aims to assess the stress levels and types of stressors perceived by IIUM undergraduate nursing students in clinical practice during the COVID-19 pandemic and to determine their coping mechanism as well. This study hypothesized that there should not be any association of difference between students' stress level, stressors, and coping mechanism to their demographic characteristics.

METHODS

A total of 169 IIUM undergraduate nursing students who had clinical experiences during COVID-19 were invited to participate in this study using the convenience sampling method. Only 128 nursing students answered the surveys and were included as study samples. Data were collected through an online survey and disseminated using emails and WhatsApp medium platform. These platforms measured the following two main areas: perceived stress levels and types of stressors; and coping mechanism.

Perceived Stress Scale (PSS)

The questionnaire (10) consisted of 29 items which are divided into six factors related to stressors. The six factors were stress from taking care of patients (8 items), stress from assignments and workload (5 items), stress from lack of professional knowledge and skills (3 items), stress from the environment (3 items), stress from peers and daily life (4 items), and stress from teachers and nursing staff (6 items). It has a 5-point Likert scale with possible response ranges from "never" to "always" and it scored from 0–4 (0 = never, 1 = infrequently, 2 = sometimes, 3 = frequently, 4 = always). Both total and subtotal scores were measured where a higher score indicates a higher degree of stress while a lower score indicates a lower degree of stress. PSS score will be determined based on mean from the total score using the scale developed by Sheu and colleagues (10): 2.67–4.00 (high stress), 1.34–2.66 (moderate stress) and 0–1.33 (low stress). The reliability showed a good Cronbach's alpha of 0.89 and high content validity index which was 0.94.

Coping Behaviour Inventory (CBI)

The questionnaire consisted of 19 items which is divided into four categories. The four categories were labelled as avoidance behaviours (efforts to avoid the stressful situation) (6 items), problem solving behaviours (efforts to manage or change the stress arising out of a stressful situation) (6 items), optimistic coping behaviour (efforts to keep a positive attitude towards the stressful situation) (4 items) and transference behaviour (efforts to transfer one's attention from the stressful situation to other things) (3 items). Higher scores for each factor showed the coping behaviours were frequently used by the students. The reliability of the CBI revealed that the Cronbach's alpha was 0.76.

Data Collection

Data collection was conducted from mid-October until December 2020. Students who met the inclusion criteria were approached by the researcher and invited to voluntarily answer the questionnaire. The link for the online questionnaires is given to the group leader in each year of study to be distributed to the participants. The link to the consent also given with the questionnaire, explaining the purpose of the study, its procedure, confidentiality statement, and the right to withdraw, as well as the contact information of the researcher. All information given by the participants is kept confidential throughout the study process.

Data analysis

The collected data were analysed by using computer software, Statistical Package for Social Science (SPSS) version 20.0 for windows. Descriptive analysis was conducted to describe the sociodemographic characteristics, in terms of frequency (n) and percentage (%). Inferential analysis was also conducted with set P-value<0.05 is categorised as statistically significant.

RESULTS

Demographic profile

A total of 169 nursing students were approached; however, only 128 students agreed to participate in the study which is a response rate of 75.7%. The majority of students were female (85.9%) and the rest were male (14.1%). Furthermore, most of them had family income of more than RM4000 (43%), followed by RM1000–RM2000 (28.1%), RM2000–RM3000 (17.2%) and RM3000–RM4000 (11.7%). The majority of the students also had sleep for 5 hours (34.4%), followed by 6 hours (33.6%), more than 6 hours (17.2%), and less than 4 hours (14.8%). Furthermore, about half of the respondents with 50.8% of nursing students were from year 4 semester 2, followed by 39.8% of year 3 and 9.4% from year 4 semester 1.

Perception of COVID-19

Most of the nursing students followed the development of COVID-19 (93%) while only a minority (7.0%) were not following the development of COVID-19. Moreover, among 128 nursing students, 84.4% had no family that tested positive for COVID-19 while 15.6% had family that tested positive for COVID-19. Most of the nursing students also were worried of getting infected during the COVID-19 pandemic (89.9%) while the rest were not worried (10.2%). Approximately 84.4% of the nursing students had someone around them that were positive for COVID-19 and the rest were 15.6%. Additionally, 85.9% of the student nurses had tested for COVID-19 while the remaining 14.1% were not tested. More than half of the respondents were quarantined due to suspected infection or infected by COVID-19 (64.1%) while the rest that were not quarantined was 35.9%. Furthermore, 85.9% of the respondents took enough precautions during the COVID-19 pandemic while 14.1% did not take enough precautions. Among the precautions taken, wearing a mask had the highest percentage with 100% of the students' wearing masks. The second highest percentage of the precaution taken was washing hands frequently after contact (94.5%), followed by 89.1% maintaining social distance, 77.3% wearing face shield and 70.3% drinking plenty of water. Meanwhile, half of the respondents, that is, 50% applied wearing gloves and 43.8% ventilated the environment. In terms of the feelings of the students staying at the campus during the COVID-19 pandemic, most of the students felt bored (87.5%), while the rest felt worried, angry, safe and others with 62.5%, 43.8%, 36.7% and 29.7%, respectively.

Perceived stress in clinical practice

The mean of stress perceived by IIUM undergraduate nursing students was 2.06 (SD = 0.66) (Table 1). The most common types of stressors perceived were stress from assignments and workload (M = 2.72, SD = 0.82), followed by stress from taking care of patients (M = 2.10, SD = 0.72) and stress from peers and daily life (M = 1.98, SD = 0.85).

Table 1: Level of stress perceived by nursing students during clinical practice.

Stress factor/item	Factor ranking	Item ranking	Mean	SD
I. Stress from taking care of patients	2		2.10	0.72
Lack of experience and ability in providing nursing care and in making judgments		14	2.10	0.92
Do not know how to help patients with physio-psycho-social problems		11	2.24	0.89
Unable to reach one's expectations		8	2.39	1.01
Unable to provide appropriate responses to doctors', teachers', and patients' questions		13	2.11	0.86
Worry about not being trusted or accepted by patients or patients' family		16	2.01	1.15
Unable to provide patients with good nursing care		20	1.84	0.92
Do not know how to communicate with patients		25	1.66	1.01
Experience difficulties in changing from the role of a student to that of a nurse		10	2.30	1.05
II. Stress from teachers and nursing staff	4		1.97	0.74
Experience discrepancy between theory and practice		7	2.40	0.92
Do not know how to discuss patients' illness with teachers, and medical and nursing personnel		24	1.68	0.93
Feel stressed that teacher's instruction is different from one's expectations		6	2.47	1.06
Medical personnel lack empathy and are not willing to help		18	1.97	1.00
Feel that teachers do not give fair evaluation on students		26	1.64	1.07
Lack of care and guidance from teachers		23	1.68	1.13
III. Stress from assignments and workload	1		2.72	0.82
Worry about bad grades		1	3.18	1.00
Experience pressure from the nature and quality of clinical practice		3	2.75	1.04
Feel that one' performance does not meet teachers' expectations		2	2.80	0.97
Feel that the requirements of clinical practice exceed one' physical and emotional endurance		4	2.55	1.06
Feel that dull and inflexible clinical practice affects one's family and social life		9	2.32	1.01
IV. Stress from peers and daily life	3		1.98	0.85
Experience competition from peers in school and clinical practice		15	2.07	1.15
Feel pressure from teachers who evaluate students' performance by comparison		5	2.48	1.22
Feel that clinical practise affects one's involvement in extracurricular activities		12	2.11	0.98
Cannot get along with other peers in the group		29	1.23	1.15
V. Stress from lack of professional knowledge and skills	6		1.77	0.91
Unfamiliar with medical history and terms		22	1.69	1.05
Unfamiliar with professional nursing skills		21	1.77	1.01
Unfamiliar with patients' diagnoses and treatments		19	1.86	0.94
VI. Stress from the environment	5		1.82	0.91
Feel stressed in the hospital environment where clinical practice takes place		17	2.00	1.25
Unfamiliar with the ward facilities		28	1.54	1.06
Feel stressed from the rapid change in patient's condition		27	1.63	1.05
Total mean stress (Mean ± SD)	2.06 ± 0.66			

The major contributory stress factors that the nursing students experienced were worrying about bad grades (M = 3.18, SD = 1.00), followed by the feeling that their performance do not meet teachers' expectations (M = 2.87, SD = 0.97) and experiencing pressure from the nature and quality of clinical practice (M = 2.75, SD = 1.04). Meanwhile, the minor contributory stress events were such as not getting along with other peers in the group (M = 1.23, SD = 1.15), followed by being unfamiliar with the ward facilities (M = 1.54, SD = 1.06) and feeling stressed from the rapid changes in the condition of patients (M = 1.63, SD = 1.05).

Coping mechanism during clinical practice

The most common coping mechanism applied by the IIUM undergraduate nursing students was transference (M = 2.86, SD = 0.06), followed by staying optimistic (M = 2.62, SD = 0.67) and problem solving (M = 2.57, SD = 0.75) (Table 2). Meanwhile, avoidance (M = 1.65, SD = 0.77) was less frequently applied by the students.

Table 2: Coping mechanism activities used by nursing students during clinical practice.

Factor/item	Factor ranking	Item ranking	Mean	SD
I. Avoidance	4		1.65	0.77
To avoid difficulties during clinical practice		15	2.05	1.03
To avoid teachers		17	1.52	1.09
To quarrel with others and lose temper		19	0.79	0.88
To expect miracles so one does not have to face difficulties		14	2.14	1.34
To expect others to solve the problem		18	1.45	1.00
To attribute to fate		16	1.96	1.09
II. Problem solving	3		2.57	0.75
To adopt different strategies to solve problems		5	2.73	0.78
To set up objectives to solve problems		10	2.55	0.86
To make plans, list priorities, and solve stressful events		6	2.70	0.97
To find the meaning of stressful incidents		12	2.41	1.00
To employ past experience to solve problems		8	2.69	0.88
To have confidence in performing as well as senior schoolmates		11	2.52	0.97
III. Stay optimistic	2		2.62	0.67
To keep an optimistic and positive attitude in dealing with everything in life		7	2.69	0.95
To see things objectively		9	2.65	0.95
To have confidence in overcoming difficulties		4	2.73	0.90
To cry, to feel moody, sad, and helpless		13	2.40	1.23
IV. Transference	1		2.86	0.06
To feast and take a long sleep		2	2.76	1.05
To save time for sleep and maintain good health to face stress		3	2.75	0.99
To relax via TV, movies, a shower, or physical exercises		1	3.07	0.92

The most used coping mechanism based on transference were relaxing by watching TV or movies, having a shower, or physical exercises (M = 3.07, SD = 0.92); feasting and taking a long nap (M = 2.76, SD = 1.05) and saving time for sleep and maintaining good health to face stress (M = 2.75, SD = 0.99), followed by other methods such as being confident in overcoming difficulties (M = 2.73, SD = 0.90) and adopting different strategies to solve problems (M = 2.73, SD = 0.78).

The association between demographic and perceived stress

The independent t-test was done to see the association between genders, perception of COVID-19 and perceived stress were not significant except for the worry of getting infected during the COVID-19 pandemic as it is the only variable that was significantly different with a p-value of 0.044 (p < 0.05).(Table 3)

Table 3: Association between nursing students' socio-demographic profile and perceived stress

Variables	Characteristics	n	Mean (SD)	Mean diff (95% CI)	t-statistics (df)	p-value
Gender	Male	18	2.14 (0.68)	0.89 (-0.24, 0.42)	0.528 (126)	0.598
	Female	110	2.05 (0.66)			
Follow the development of Covid-19	Yes	119	2.06 (0.67)	0.60 (-0.39, 0.51)	0.26 (126)	0.793
	No	9	2.00 (0.58)			
Any individual who tested positive for Covid-19 in family/circles?	Yes	20	2.19 (0.48)	0.16 (-0.16, 0.48)	0.992 (126)	0.323
	No	108	2.04 (0.69)			
Worry of getting infected during Covid-19 pandemic	Yes	115	2.10 (0.66)	3.88 (0.11, 0.76)	2.04 (126)	0.044
	No	13	1.71 (0.57)			
Anyone around who has positive Covid-19 test results	Yes	20	2.09 (0.49)	0.30 (-0.29, 0.35)	0.187 (126)	0.852
	No	108	2.06 (0.69)			
Have being tested for Covid-19	Yes	18	2.01 (0.66)	-0.06 (-0.39, -0.41)	-0.33 (126)	0.741
	No	110	2.07 (0.66)			
Have being quarantined due to suspected or infected by Covid-19	Yes	46	1.98 (0.57)	-0.13 (-0.37, 0.11)	-1.08 (126)	0.284
	No	82	2.12 (0.70)			
Have taken enough precautions during Covid-19 pandemic	Yes	110	2.04 (0.67)	-0.13 (-0.46, 0.20)	-0.78 (126)	0.439
	No	18	2.17 (0.59)			
Precaution taken: Wearing masks	Yes	128	2.06	-	-	-
	No	0	0			
Precaution taken: Wearing gloves	Yes	64	2.08 (0.73)	0.34 (-0.20, 0.27)	0.29 (126)	0.772
	No	64	2.04 (0.58)			
Precaution taken: Wearing face shield	Yes	99	2.06 (0.69)	-0.08 (-0.28, 0.27)	-0.06 (126)	0.956
	No	29	2.07 (0.57)			
Precaution taken: Washing hands frequently after contact	Yes	121	2.07 (0.66)	0.23 (-0.28, 0.74)	0.89 (126)	0.375
	No	7	1.84 (0.68)			
Precaution taken: Maintaining social distance	Yes	114	2.05 (0.65)	-0.08 (-0.45, 0.29)	-0.43 (126)	0.666
	No	14	2.13 (0.71)			
Precaution taken: Drinking plenty of water	Yes	90	2.04 (.72)	-0.54 (-0.31, 0.20)	-0.42 (126)	0.675
	No	38	2.10 (0.48)			
Precaution taken: Ventilate the environment	Yes	56	2.03 (0.72)	-0.53 (-0.29, 0.18)	-0.45 (126)	0.654
	No	72	2.08 (0.61)			
Feeling of staying at the campus during Covid-19 pandemic: Bored	Yes	112	2.10 (0.63)	0.30 (-0.05, 0.64)	1.71 (126)	0.091
	No	16	1.80 (0.83)			
Feeling of staying at the campus during Covid-19 pandemic: Worried	Yes	80	2.10 (0.61)	0.95 (-0.14, 0.33)	0.79 (126)	0.430
	No	48	2.00 (0.73)			
Feeling of staying at the campus during Covid-19 pandemic: Angry	Yes	56	2.15 (0.66)	0.15 (-0.78, 0.39)	1.31 (126)	0.192
	No	72	2.00 (0.66)			
Feeling of staying at the campus during Covid-19 pandemic: Safe	Yes	47	1.93 (0.67)	-0.20 (-0.44, 0.35)	-1.69 (126)	0.094
	No	81	2.13 (0.65)			
Feeling of staying at the campus during Covid-19 pandemic: Other	Yes	38	1.98 (0.51)	-0.12 (-0.34, 0.11)	-1.04 (96.26)	0.303
	No	90	2.09 (0.71)			

Meanwhile, using the ANOVA test, only the hours of sleep variable demonstrated a significant difference (F = 3.34, df = 3, 127, p < 0.05) (**Table 4**). Further analysis with Bonferroni post-hoc test showed that the students with less than four hours of sleep had significantly more stress (M = 2.48, SD = 0.50) than students with five hours of sleep (M = 2.04, SD = 0.52), six hours of sleep (M = 1.95, SD = 0.80) and students with more than six hours of sleep (M = 1.95, SD = 0.66). The difference between less than four hours and five hours of sleep, and between less than four hours and more than six hours were not statistically significant.

Table 4: Association between nursing students' demographic profile and perceived stress

Variables	Characteristics	n	Mean (SD)	F-Statistics (df)	p-value
Family income	1000 – 2000	36	2.10 (0.76)	0.75 (3, 127)	0.523
	2000 – 3000	22	1.87 (0.52)		
	3000 – 4000	15	2.15 (0.46)		
	More than 4000	55	2.08 (0.68)		
Hours of sleep	Less than 4 hours	19	2.48 (0.50)	3.34 (3, 127)	0.021*
	5 hours	44	2.04 (0.52)		
	6 hours	43	1.95 (0.80)		
	More than 6 hours	22	1.95 (0.66)		
Year of study	Year 3	51	1.93 (0.62)	1.85 (2, 127)	0.162
	Year 4 Semester 1	12	2.20 (0.70)		
	Year 4 Semester 2	65	2.12 (0.67)		

*Significant value <.05

The association between demographic and coping mechanism

Using the independent t-test, the association between gender, perception of COVID-19 and coping mechanism were not significant except for one of the perceptions of COVID-19, which is being quarantined due to suspected infection or infected by COVID-19. The result was statistically significant with a p-value of 0.020 (p < 0.05).

Meanwhile, using the ANOVA test, only the hours of sleep variable demonstrated a significant difference (F = 3.34, df = 3, 127, p < 0.05). Further analysis with Bonferroni post-hoc test showed that the students with less than four hours of sleep had significantly more stress (M = 2.48, SD = 0.50) than students with five hours of sleep (M = 2.04, SD = 0.52), six hours of sleep (M = 1.95, SD = 0.80) and students with more than six hours of sleep (M = 1.95, SD = 0.66). The difference between less than four hours and five hours of sleep, and between less than four hours and more than six hours of sleep were not statistically significant.

The association between perceived stress and coping mechanism

There was a positive significant association between total perceived stress and coping mechanisms, specifically avoidance (r = 0.535, p < 0.01) and transference (r = 0.198, p < 0.05) (Table 3). Avoidance was significantly and positively associated with all six factors of perceived stress: stress from taking care of patients (r = 0.478, p < 0.01), stress from teachers and nursing staff (r = 0.437, p < 0.01), stress from assignments and workload (r = 0.429, p < 0.01), stress from peers and daily life (r = 0.518, p < 0.01), stress from lack of professional knowledge and skills (r = 0.376, p < 0.01) and stress from the environment (r = 0.427, p < 0.01).

Table 5: The association between perceived stress and coping

	Overall coping mechanism	Avoidance	Problem solving	Stay optimistic	Transference
Total perceived stress	0.327**	0.535**	0.056	0.086	0.198*
Stress from taking care of patients	0.222*	0.478**	0.001	-0.025	0.131
Stress from teachers and nursing staff	0.219*	0.437**	0.001	0.025	0.194*
Stress from assignments and workloads	0.296**	0.429**	0.057	0.096	0.211*
Stress from peers and daily life	0.383**	0.518**	0.128	0.154	0.198*
Stress from lack of professional knowledge and skills	0.177*	0.376**	0.002	0.001	0.126
Stress from the environment	0.197*	0.427**	-0.016	0.039	0.079

*Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the 0.01 level (2-tailed)

Meanwhile, there was also a positive significant association between transference and perceived stress, specifically stress from teachers and nursing staff ($r = 0.194$, $p < 0.05$), stress from assignments and workload ($r = 0.211$, $p < 0.05$) and stress from peers and daily life ($r = 0.198$, $p < 0.05$). Meanwhile, the other coping mechanisms such as problem solving and staying optimistic were not significantly associated with perceived stress ($p > 0.05$). Overall, total perceived stress and overall coping mechanisms were found to be statistically significant ($r = 0.327$, $p < 0.01$).

DISCUSSION

Stress levels perceived by nursing students

The stress level was determined according to the total mean score during the analysis. From the analysis, the level of stress among IIUM undergraduate nursing students in clinical practice during the COVID-19 pandemic is considered high ($M = 2.72$, $SD = 0.82$). This result was proven by Reyna and Sauced (11) that reported the overall score of stress between the educational programs was similar ($p < 0.05$) by using the KEZKAK questionnaire and showed the high stress levels perceived among them. Meanwhile, Karaka and colleagues (2017) using PSS found that nursing students from four Turkish universities had high stress levels ($M = 1.75$, $SD = 0.43$). Bodys-Cupak et al., (12) also found that 60% of nursing in Poland had high stress levels.

On the other hand, there were different results that found undergraduate nursing students

had moderate stress levels (4, 13, 14). A conducted during the COVID-19 pandemic (15) Turkey found moderate stress levels ($M=31.69$; $SD = 6.91$), which contradicted with this study. Meanwhile, not all students had high level of stress (16). This could be cause by different populations and situations (17). Moreover, the result of this study may also be influenced by the COVID-19 pandemic, in which these elements will be discussed in the association between demographic and perceived stress.

Types of stressors perceived by nursing students

From this study, the first and the most common types of stressors perceived by IIUM undergraduate nursing students were from assignments and workload ($M = 2.72$, $SD = 0.82$), followed by the second which was taking care of patients ($M = 2.10$, $SD = 0.72$) and the third was stress from peers and daily life ($M = 1.98$, $SD = 0.85$). The other stressors also include stress from teachers and nursing staff ($M = 1.97$, $SD = 0.74$), stress from the environment ($M = 1.82$, $SD = 0.91$), and stress from lack of professional knowledge and skills ($M = 1.77$, $SD = 0.91$).

In the case of stress from assignments and workload, it came from being worried about bad grades ($M = 3.18$, $SD = 1.00$), feeling that their performance does not meet teachers' expectations ($M = 2.87$, $SD = 0.97$), being pressured from the nature and quality of clinical practice ($M = 2.75$, $SD = 1.04$) and feeling that the requirements of clinical practice exceed one's physical and emotional endurance specifically ($M = 2.55$, $SD = 1.06$). Meanwhile,

the minor stressful situations faced by the students were such as being unable to get along with other peers in the group (M = 1.23, SD = 1.15), unfamiliar with the ward facilities (M = 1.54, SD = 1.06) and stress from rapid changes in the condition of patients (M = 1.63, SD = 1.05).

A study among 200 nursing students in Saudi Arabia (18) found that assignments and workload (M = 2.89, SD = 0.85) was ranked as the first and the most common stressor, consisting of the worry about bad grades (M = 3.03, SD = 1.09) and pressure from nature and quality of clinical practice (M = 2.90, SD = 1.29), which was consistent with the result of this study. Following assignments and workload were stress due to the lack of professional knowledge and skills (M = 12.70, SD = 1.27) and stress from the environment (M = 1.58, SD = 1.07), which contradicted with the current study.

On the other hand, a study finding (19) shows that peers and daily life (M =1.89, SD = 0.67) was the first stressor, followed by assignments and workload (M = 1.6, SD = 0.43) and patient care (M= 1.56, SD= 0.45), which contradicted with the current study that found assignment and workload as the first stressor among the students, followed by stress from patient care and peers and daily life. Hence, all the different results of stressors that said someone's interpretation of a stressful situation could be explained by their perceptual and cognitive processes based on a trans-cultural model (20).

However, the result obtained was mainly stressors during clinical practice but in fact, the COVID-19 pandemic that is currently ongoing may influence their stress levels and that the mental health of an individual can be affected by a pandemic (4). Moreover, nursing students face hectic lifestyles, especially the drastic changes that happened due to the COVID-19 pandemic which can be very challenging.

In this study, the perception of COVID-19 which has been included in the demographic part that contained nine elements may be the stressors and this will be discussed further in another subtopic to see the association of the perception on COVID-19 with perceived stress levels. Similar finding also showed that the probability of getting infected by COVID-19 from patients and transmitting it to family members were the most stressful factor (M =

2.89, SD = 0.39 and M = 2.72, SD = 0.62, respectively) (21).

Coping mechanisms frequently used by nursing students

This study showed that the first and the most frequently used coping mechanisms by IIUM undergraduate nursing students is transference (M = 2.86, SD = 0.06), which is by relaxing activities like watching television or movies, having a shower, or physical exercises, feasting and taking a long nap, saving time to sleep, and maintaining good health to face stress. Consistent with previous study (22, 23), the current study also showed that the nursing students cope with staying optimistic such as overcoming the difficulties by building up their confidence and problem-solving mechanisms by adopting different strategies to solve the problems. Meanwhile, the least frequently adopted mechanism is avoidance.

This is proven by previous studies (19, 22, 23) with similar results that most of the nursing students applied transference mechanism (M = 2.38, SD = 0.65) by relaxing activities such as watching television or movies, having a shower or by doing physical exercise (M = 2.48, SD = 0.90), followed by staying optimistic (M = 2.26, SD= 0.52) and problem solving (M = 2.24, SD = 0.55). Meanwhile, avoidance was found to be the least frequently used coping mechanism (M = 2.15, SD = 0.59). Avoidance was the least frequently applied method. Various studies also showed the first and mostly used coping mechanism by the students was problem solving, followed by staying optimistic and transference respectively as the second and the third choices of coping mechanisms among the students. (14,18,19,23).

In addition, students also coped the COVID-19 pandemic by using maladaptive strategies (4). Meanwhile personal coping mechanisms such as being strict on following the protective measures and reading about information regarding the mechanism of transmission and how to prevent from COVID-19 were the most frequent coping mechanisms used during the pandemic. This helps them to take more precautions to protect themselves from COVID-19 which will reduce the worry that leads to stress.

On the other hand, the finding from a review (24) on stressors and coping strategies among

nursing students during the COVID-19 pandemic found that staying optimistic and transference were the sub-themes of coping strategies applied by nursing students. These results are like the current study that found transference and staying optimistic as the coping mechanisms used by the respondents. Moreover, these coping mechanisms were used to stabilize and achieve the adaptation for their psychology during the pandemic.

Association between demographic and perceived stress

The first demographic information was gender. Gender can be categorized as the identity of an individual. This study showed that gender was not significant with perceived stress ($p > 0.05$). The result was contradicted to other studies that found students' gender was significantly associated with perceived stress level in which the females perceived more stress than males ($p < 0.05$).

The second demographic profile that had been analysed was family income. The result of this study found that the family income was not associated significantly with perceived stress ($p > 0.05$). This means that family income did not affect the stress levels of students either perceived high or low stress. Moreover, this may be due to the financial assistance received by the students such as university's scholarship, Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN), zakat assistance and many more which reduced their financial burdens. Thus, helping the students to support study fees and other expenditures. This result was similar with previous studies (6, 23) which showed no significant difference between perceived stress and monthly household income. However, the result was inconsistent with previous studies (25) that found that the monthly living income was significantly associated with perceived stress levels ($p < 0.05$) and negative weak correlation between stress levels and income ($r = -0.22$, $p = 0.024$) (30).

The third demographic variable was hours of sleep. There was a significant difference between hours of sleep and perceived stress in this study ($p < 0.05$). Further analysis by Benferroni post-hoc also showed that students with less than four hours of sleep had significantly more stress than the others who sleep for five hours, six hours and more than six

hours. Thus, the students who had less sleep tend to get more stressed. This can occur as students are always stressed due to the short time to do revision with many hours spent during clinical practice (26). This makes them stay up all night to study thus, their sleep time leading to exhaustion and stress. The result was similar to a study found that irregular sleep was statistically significant with perceived stress (27).

Next, the year of study was not significant with perceived stress in this study ($p > 0.05$). The result was similar with previous study (18,21) and this shows that all the students regardless of year had their own stress and the stress level depends on each individual. However, contradicted result (6, 17) found students' academic year was significantly associated with stress levels.

Meanwhile, in terms of perception of COVID-19, the result of this study showed that all demographics related to perception of COVID-19 were not statistically associated with perceived stress ($p > 0.05$) except for worrying of getting infected during the COVID-19 pandemic ($p < 0.05$). It means that the worry of getting infected may affect students' stress levels. This showed that IIUM undergraduate nursing students who were worried about getting infected by COVID-19 perceived more stress as they still had clinical practice during COVID-19 to complete their semester. This increased their worries of getting infected because of contact with many patients that were probably positive for COVID-19 and may endanger their health. Another few studies (24, 28) also stated that the students became fearful due to COVID-19 which leads to high cases of psychological distress.

Association between demographic and coping mechanisms

This study showed that the association between gender and coping mechanisms ($p > 0.05$) and consistent with previous studies (15, 23). This is because female and male students had also learned time management and coping methods (29). Thus, both have coping mechanisms to overcome their stress. However arguably there should be different between gender and coping mechanisms, specifically problem solving (6, 26).

Like previous finding (23), this study found that there was no significant difference between family income and coping mechanism. Everyone regardless of their income have their own coping mechanisms to overcome stress. However, correlation was found between coping mechanisms and monthly income (6). Moreover, financial situation is one of the most pronounced factors related to the negative perception of COVID-19 on students' well-being which generally means that students perceived financial situation as such could give a negative impact during the pandemic (16). Significant negative association between family income and coping mechanism, specifically for the avoidance subscale (r = −0.28, p = 0.02) which is a result that contradicted with the current study (30).

Sleeping hours were found to be significant with coping mechanisms. As hours of sleep increases, the students tend to employ the transference mechanism to cope with the stress. This can be proven by previous study (30) that showed a weak positive correlation between hours of sleep and coping mechanisms of transference specifically. Despite coping mechanisms were found not being influenced by students' year of study (24), there are studies (16, 17) the academic year of study was significantly associated with coping mechanisms.

Meanwhile, in terms of perception of COVID-19, this study found that only being quarantined due to suspected infection or infected by COVID-19 was statistically significant with coping mechanisms (p < 0.05), while the other demographics related to COVID-19 were not significant (p > 0.05). This means that nursing students that are quarantined employ coping mechanisms to overcome their stress. This may occur as they are worried of being positive or a carrier of COVID-19. Moreover, the need for clinical practice replacement in the future will disrupt their study planning. Hence, they perceived high stress and applied coping mechanisms to overcome the stress.

Quarantine will also invoke feelings of loneliness, create distance from loved ones, grief, anxiety, and increase their stress (18). Thus, the students were more likely to use coping mechanisms to tackle the stress of being quarantined. According to WHO, isolation and restriction during COVID-19 will worsen the feeling of anxiety, fear and anger especially for those with mental disorders (31). Thus, specific interventions to reduce the negative impacts due to isolation or quarantine is needed to improve their quality of life, which in this case, transference was used as the best coping mechanism to overcome the stress.

Association between perceived stress and coping mechanisms

Overall, this study shows that students perceived high stress levels influenced the type of coping mechanisms specifically for avoidance (r = 0.327, p < 0.01) and transference (r = 0.198, p < 0.05). Among all four factors of coping mechanisms, only avoidance was significantly associated with all six factors of stressors with p < 0.01 while transference was significantly associated with stress from teachers and nursing staff (r = 0.194, p < 0.05), stress from assignments and workload (r = 0.211, p < 0.05) and stress from peers and daily life (r = 0.198, p < 0.05).

These results were consistent with previous study that showed significant correlation between total perceived stress score (PSS) and total coping behaviour inventory score (CBI) (r = 0.181, p < 0.001) (6). Their study also found a positive correlation between total perceived stress with avoidance (r = 0.413, p < 0.001) and transference (r = 0.181, p < 0.001). There was also negative correlation between total perceived stress score and coping mechanisms, specifically staying optimistic (r = −0.183, p < 0.001) and problem solving (r = −0.074) which contradicted with the current study.

Based on another study by among nursing students during clinical practice in the psychiatric/mental health course, there was significant correlation between avoidance coping mechanism with total perceived stress during pre-clinical practice experience (r = 0.36, p = 0.003), stress from taking care of patients (r = 0.27, p = 0.03), stress from teachers and nursing staff (r = 0.29, p = 0.02), stress from clinical environment (r = 0.35, p = 0.003), and stress from assignment and workload (r = 0.35, p = 0.005) and stress from peers and daily life (r = 0.13, p = 0.01). Significant correlation also seen between total perceived stress and coping mechanisms, specifically problem solving (14, 23).

CONCLUSION

During the COVID-19 pandemic, IIUM undergraduate nursing students were found to have high stress levels mainly due to assignments and workload, followed by stress from taking care of patients and stress from peers and daily life. They utilised transference as a coping mechanism to overcome their stress. Moreover, the worry of getting infected during COVID-19 and total hours of sleep affect their stress levels and being quarantined due to suspected infection or being infected by COVID-19 also affect their application of coping mechanisms. Overall, perceived stress affects their use of coping mechanisms. Therefore, as stress develops within them, they will foster the coping mechanism to maintain their mental health condition. Hopefully, these results may help nursing institutions to develop strategies in combating this problem as high stress levels among the students may affect their future career if it affects their physical and mental health.

ETHICAL MATTERS

The study was approved by the Kulliyyah Nursing Committee (KON) and the University Ethics Committee (IREC). Information regarding the study's purpose, procedures, assurance of confidentiality and statements about their right to withdraw at any time. The return of the completed questionnaire was treated as informed consent to participate.

LIMITATION OF THE STUDY

This study had been successfully conducted. However, some limitations may affect the overall findings of this study. First, the study had to be postponed for a few months due to Movement Control Order (MCO) during the COVID-19 pandemic. Some of the respondents were at home and only able to return to campus and resume their clinical placement in the hospital after the approval obtained. This may affect their responds to the questionnaire as they must be having a lot of stress and their coping mechanism may be varied when they are at home as compared to being in the hostel and having only friend rather than family members around them. Also, due to online survey, some respondent may have internet problem thus this may affect the response rate.

CONFLICT OF INTEREST

The author has no conflict of interest to declare regarding this work.

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