Stress and resilience and associated factors among nursing undergraduates in the early stages of the COVID-19 pandemic

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Article Info

ABSTRACT

Personal, academic and clinical factors are the main stressors for nursing undergraduates. This study aimed to assess stress, resilience and associated factors among nursing undergraduates. A descriptive cross-sectional study was conducted among nursing undergraduates at one university in Sri Lanka. A self-administered questionnaire including demographics, Perceived Stress Scale and Resilience Scale for Adults was used. Data were analyzed using independent sample t-test, ONE WAY ANOVA and binary logistic regression model. This study found that 38% of undergraduates had a high level of stress and the majority had a moderate level of resilience (76.7%). The mean total resilience score (RS) was 102.4 ($\pm$5.53). "Not getting expected marks" adjusted odds ratio (AOR) 5.56, 95 % CI=1.37-22.6) and "not satisfied with the academic program" (AOR 4.87, 95 % CI=1.27-8.76) were found to be the factors for having a high-stress score. Statistically significant median RS differences were observed: "Perception of Self" with grade point average (p=0.02) and recreational activities (p=0.04), and "Perception of future" with gender (p=0.04), the physical well-being (p=0.03) and recreational activities (p=0.04) and "Structural style" with the academic year (p=0.03). Influencing factors on stress and resilience need to be taken into account for organising academic programs for nursing undergraduates.

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1. INTRODUCTION

Nursing is identified as a highly stressful profession due to the responsibilities, the workload, and their frequent interaction with the healthcare team [1]. Nursing curricula have been designed to train nurses with essential competencies [2] and consist of theoretical and clinical practice components [2], [3]. This plays a major role in empowering professional skills and entering the profession [4]. Nursing students experience a higher level of academic and clinical stress when compared to other health sciences students [5]. The stressors are related to their academic as well as the training in the clinical settings [3], [6], [7].

"Coping strategies refer, to both behavioural and psychological efforts that people employ to master, reduce, tolerate or minimise stressful events" [8]. The way nursing undergraduates cope with stress and stressors lead to positive or negative outcomes. A low or moderate level of stress may enhance students' motivation [9], [10] or on the other hand, a high level of stress can have negative influences such as depression and poor academic performance [11]. "Resilience is the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress" [12]. Key components of resilience have

been identified as self-efficacy, confidence and reflective ability control, commitment, positive self-attitude, humour, reflective ability, sense of empowerment, adaptability, ethical understanding (emotional intelligence) and ability to be an advocate [7]. As resilience is an important attribute in nursing, during their training as well as during their service, it would be important to assess the elements of resilience-building within a higher education setting [7].

In Sri Lanka, nursing undergraduates enrol into universities after completing their advanced level education. In universities, nursing undergraduates have to adapt to the new environment, medium of education, university subculture, new teaching and learning methods and especially the unfamiliar clinical environment [13]. Stressors among nursing undergraduates have been grouped into three; "academic stressors (testing and evaluation, fear of failure and workload), clinical stressors (work, fear of making mistakes, negative responses to the death or suffering of patients and relationships), and personal stressors (economic problems and the imbalance between housework/schoolwork)" [14]. Stressors among nursing undergraduates are mainly due to academic reasons such as assignments [15], examinations and high workload [15], [16]. Mostly, combining both academic and clinical activities [16]. Clinical stressors are mainly due to fear of unknown people, unfamiliarity with the medical history, lack of professional nursing skills, unfamiliar patients' diagnoses and treatments, fear of making mistakes, and the death of a patient [3], [15], [17], [18] and lack of pre-clinical knowledge [19]. Further, the attitudes of the clinical instructors, relatives of the patients and other health care professionals towards the nursing undergraduates are also considered as stressors [20]. In addition, clinical training related stressors include staff-nurse interactions, lack of involvement with undergraduates training and conflict in understanding the staff-student educational role [16] as shown in Figure 1.
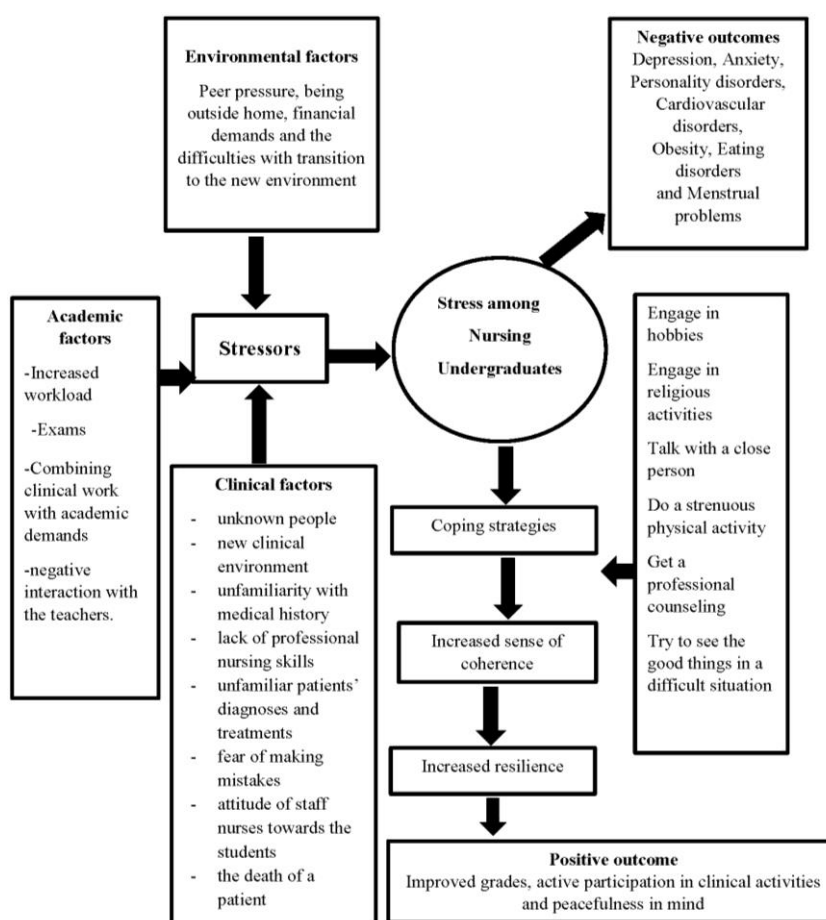

Figure 1. Perceived stress and resilience of nursing undergraduates

The COVID-19 pandemic has impacted socioeconomically and become a global crisis [21]. The pandemic has impacted all sectors of education including nursing education. Universities and higher education institutions were closed since March 2020 in Sri Lanka. Following that, there were major changes

in education as most of the educational institutions converted their teaching learning activities to distance online education [22]. This further impacted the stress among nursing undergraduates in Sri Lanka [2]. Having limited knowledge about COVID-19 can cause further anxiety and fear [23]. Stress may impact concentration, memory, and decision making and problem-solving skills [24]. Stress has an impact on the students' academic achievement [10], [24], [25] and may result in physical complaints, and behavioural problems [10], [24]. In long term, stress can lead to disappointments and undergraduates leave the profession [18]. Coping strategies help to manage stress and promote health [26], [27]. Resilience proved to be the only factor to affect academic success significantly [28]. A higher level of resilience among nursing undergraduates tends to have a lower level of psychological distress [29], [30] and have counteracted the negative effects of stress and enhanced a person's well-being [30]. With previous evidence, Nursing undergraduates in Sri Lanka are in a need of assistance in developing resilience and coping strategies towards perceived stress [13].

Nurse academics and clinical supervisors need to be aware of the common stressors of the nursing undergraduates and their negative experiences may have on students mentally, physically, psychologically and socially [26]. Hence, incorporating educational strategies into nursing curricula and creating a conducive learning environment for nursing undergraduates will enable them to develop resilience [31]. Nurses are expected to have a higher level of of psychological resilience and capabilities to manage stressful situations [24]. This would support them to develop resilience during their nursing career. There is little evidence relating to mental health problems and resilience among nursing undergraduates in Sri Lanka [13]. Hence, this study aimed to assess the perceived stress, resilience and associated factors among nursing undergraduates.

2. RESEARCH METHOD
2.1. Study design, setting, and sample
A descriptive cross-sectional design was used. All second-year, third year and fourth year nursing undergraduates who were enrolled at a university in Sri Lanka at the time of study period from March to December 2020 were included in the study. First-year nursing undergraduates were excluded due to a lack of clinical exposure during the study period. Hence the sample size was 73. A self-administered questionnaire was used to collect data. It was prepared as a google form and the link was shared among undergraduates during a mid of one academic term where the assessments were minimal to prevent additional stress on students and assuring minimal disturbance to their studies. During the COVID-19 pandemic, some of the academic activities such as assessments/practicals and training in clinical settings were conducted physically using small groups in between the first and second waves of the COVID-19 pandemic. The data collection was completed during the distance online education and physical practicals/clinical training conducted for small groups during the pandemic.

2.2. The study instruments
A socio-demographic inventory included questions on age, academic year, gender, ethnic background, living arrangement, and information related to lifestyle and physical well-being and common stressors. The survey questionnaire consisted of two validated scales: Perceived stress scale (PSS) and Friborg's Resilience scale for adult (RSA).

2.2.1. Perceived stress scale [32]
The PSS consists of 10 items on a 5-point Likert scale ranging from 0 (never) to 4 (very often), indicating how often they have felt or thought a certain way within the past month. Scores can range from 0 to 40, with the higher the score indicating the more perceived stress [11]. The internal consistency reliability was Cronbach's alpha 0.89 [6]. It has been validated and used in several studies in the local context [13], [33]. Scores were categorized as less than 20 (low level of stress) and more than 21 (high level of stress) [13].

2.2.2. Friborg's resilience scale for adult
It is developed to measure intrapersonal and interpersonal protective resources that may facilitate adaptation and tolerance to stress and adverse negative life events [34]. It has been used in similar studies to assess resilience among nursing undergraduates [24]. This scale has been validated in Sri Lanka [35]. The RSA consists of 33 items with six dimensions including: "Perception of Self": concerning the confidence in own abilities, self-confidence, self-efficacy, positive outlook (six items), "Perception of future": concerning a positive outlook on one's future, a sense of belief about the opportunity to succeed and the ability to plan and formulate clear goals (four items), "Social Competence": concerning individual's perception of her/his ability to initiate verbal contact and to be flexible in social interactions, create new friendships and feel at ease in a social setting (six items), "Structured Style": concerning goal-oriented, planning ability, organization of own time, routine-oriented (four items), "Family Cohesion": concerning shared values, enjoy family, cohesion,

shared an optimistic view of future, loyalty, mutual appreciation (six items), "Social Resources": concerning social support, presence of important person outside family, encouragement, feeling of cohesion, help when needed, appreciation (seven items) [34], [36]. It has 5-point Likert response options ranging from 1=strongly disagree to 5=strongly agree. A score of 1 to 5 is accepted as showing that psychological resistance increased as the score increased [34]. Scores vary between 33 and 165, with higher scores indicating higher levels of resilience. The resilience score was divided into low (0-53), moderate (54-106) and high (106-165).

2.3. Data analysis

The analysis for identifying factors associated with high stress started with simple univariate analysis followed by binary logistic regression using statistical package for the social sciences (SPSS) software version 26. An unadjusted odds ratio (OR) with a 95% confidence interval (CI) of the results was used to test the significance of the differences observed. A probability of <0.05 was considered statistically significant.

Binary logistic regression was used to control the confounding variables and the final model was selected based on the theoretical and statistical significance of factors associated with the high-stress score. The type 1 error rate was set at 0.05. The model estimates are presented with the adjusted odds ratios (AOR) and 95% CI. Variations of student resilience scores and the effect of associated factors were tested using an independent sample t-test or ONE-WAY ANOVA. Mann-Whitney U test or Kruskal-Wallis H test was performed when the resilience score is not normally distributed.

2.4. Ethical issues

Ethical approval was obtained from the Ethics Review Committee, the Faculty of Medical Sciences, University of Sri Jayewardenepura (Reference No: Nur/09/20). The study was conducted according to the principles of the Declaration of Helsinki [37]. An announcement on the study was shared in the online learning groups. An information sheet was sent by email. Participation was voluntary and informed consent was obtained. Online google forms were received to an email account of the principal investigator and it was not accessed by another person other than the supervisor of the study. Counselling facilities were explored to facilitate any students with a high level of stress.

3.   RESULTS AND DISCUSSION
3.1. Results
3.1.1. Undergraduates' socio-demographic characteristics

The Response rate was 100% (n=73). The undergraduates' age was ranged from 21 to 37 years and the mean age was 25.34 (±3.44SD) years. Most of the undergraduates were Sinhalese (89%), Buddhists (86.3%) and unmarried (87%). The majority of the undergraduates lived in the university hostels (60.3%) followed by living in their own homes (28.8%) during the university academic period. Undergraduates were from second year (n=29, 39.7%), third-year (n=23, 31.5%) and final year (n=21, 28.8%). The average family income of the undergraduates range from Rs.17.5-2000 USD and the mean family monthly income was 282.57USD (±292.11).

3.1.2. Perceived stress and resilience

The mean perceived stress score was 19.16 (±4.23). Nearly 38.4% of undergraduates scored a high level of stress which is more than 21 (n=28). Of that majority were female undergraduates (n=23, 31.5%). Easily feel tried (n=50, 68.5%), get restless (n=42, 57.5%), and disturbed sleep pattern (n=34, 46.6%) and loss of appetite (n=19, 26%) were identified as the most common stress-related symptoms among the undergraduates. The mean total resilience score was 102.4 (±5.53). The mean perceived level of stress was 19.16 (±4.23) as shown in Table 1. The majority of the undergraduates had a moderate level of resilience (n=56, 76.7%) and nearly twenty-three per cent of the undergraduates had a high level of resilience (n=17, 23.3%).

3.1.3. Factors associated with the perceived stress among undergraduates

None of the personal factors such as age, gender, religion, ethnicity or types of family was not significantly associated with the PSS level of the study participants. A high level of stress was significantly associated with personal factors such as personal problems (OR=2.46, 95% CI 1.03- 6.52), and the perceived status of own physical well-being (OR=6.63, 95% CI 1.61-27.29) as shown in Table 2.

The academic factors such as too many assignments/seminars (OR=2.68, 95% CI 1.01-7.88), not getting expected marks (OR=7.5, 95% CI 2.24-25.17), and not being satisfied with the academic program (OR=5.54, 95% CI 1.97-15.58) were found to be significantly associated with the high level of stress. A high level of stress was significantly associated with the clinical factor "inadequate support in the clinical area" (OR=3.68, 95% CI 1.19-11.41) as shown in Table 3.

Table 1. Mean scores of the resilience scale for adults, and perceived stress score

Scale	Sub-dimension	Mean ± SD	Min.-Max.
Resilience scale for adults	Total resilience score	102.42 ± 5.53	91-119
	Perception of self	17.93 ± 1.48	15-21
	Perception of future	13.74 ± 1.79	7-17
	Family cohesion	24.68 ± 4.17	12-30
	Social competence	14.45 ± 3.85	7-24
	Social resources	19.29 ± 1.84	13-24
	Structural style	12.33 ± 1.34	10-17
Perceived stress score (PSS)		19.16 ± 4.23	8-28

Table 2. Socio-demographic factors associated with perceived stress

Socio-demographic factors		PSS ≥ 21 (n, %)	PSS ≤ 20 (n, %)	p-value	Unadjusted OR	95% Cl
Age	≤ 29 years	25 (34.2)	38 (52.1)	0.56	1.53	0.36-
	≥ 30 years	3 (4.1)	7 (9.6)			6.50
Gender	Male	5 (6.8)	8 (11.0)	0.99	1.01	0.29-
	Female	23 (31.5)	37 (50.7)			3.45
Ethnicity	Sinhalese	25 (34.2)	40 (54.8)	0.96	1.04	0.23-
	Others	3 (4.1)	5 (6.8)			4.74
Religion	Buddhist	24 (32.9)	39 (53.4)	0.91	0.92	0.24-
	Others	4 (5.5)	6 (8.2)			3.61
Marital status	Single	25 (34.2)	39 (53.4)	0.74	1.28	0.29-
	Married	3 (4.1)	6 (8.2)			5.60
Types of the family	Nuclear	23 (31.5)	34 (46.6)	0.51	0.50	0.19-
	Extended	5 (6.8)	11 (15.1)			1.30
Personal problems	Yes	18 (24.7)	19 (26.0)	0.04	2.46	1.03-
	No	10 (13.7)	26 (35.6)			6.52
Perceived status of physical well-being	Unsatisfied	9 (12.3)	3 (4.1)	0.00	6.63	1.61-
	Satisfied	19 (26.0)	42 (57.5)			27.29
Resilience level	Moderate level (53-106)	24 (32.9)	32 (43.8)	0.15	2.44	0.71-
	High level (>107)	4 (5.5)	13 (17.8)			8.42

PSS= Perceived Stress Score, n= frequency, %= percentages

Table 3. Academic factors associated with the PSS level

Factors	PSS ≥ 21 (n, %)	PSS ≤ 20 (n, %)	p-value	Unadjusted OR	95% Cl
Tired feeling after the academic/clinical schedule	27 (37.0)	40 (54.8)	0.25	3.37	0.37- 30.51
Increased workload towards the exam	25 (34.2)	39 (53.4)	0.74	1.28	0.29- 5.60
Lack of free time	24 (32.9)	35 (47.9)	0.40	1.71	0.48- 6.11
Fear of failure in exams	23 (31.5)	32 (43.8)	0.29	1.86	0.58- 5.97
Deadlines of submission	19 (26.0)	29 (39.7)	0.76	1.16	0.43- 3.12
Too many assignments/seminars	22 (30.1)	26 (35.6)	0.04	2.68	1.01- 7.88
Inadequate support in clinical area	23 (31.5)	25 (34.2)	0.02	3.68	1.19- 11.41
Not getting expected marks	24 (32.9)	20 (27.4)	0.00	7.50	2.24- 25.17
Not satisfied with the academic program	20 (27.4)	14 (19.2)	0.00	5.54	1.97-15.58
Theory and practice gap	16 (21.9)	21 (28.8)	0.38	1.52	0.59- 3.94
Supervisors' pressure in the clinical practice	15 (20.5)	16 (21.9)	0.13	2.09	0.8- 5.47
Unrealistic expectation of the teachers	13 (17.8)	12 (16.4)	0.08	2.38	0.88- 6.44
Family constrains	9 (12.3)	14 (19.2)	0.93	1.05	0.38- 2.89
Absenteeism to the clinical training	10 (13.7)	13 (17.8)	0.54	1.37	0.5- 3.74
Lack of guidance and counseling from the faculty	12 (16.4)	11 (15.1)	0.1	2.32	0.84- 6.35
Peer competition	9 (12.3)	9 (12.3)	0.24	1.89	0.64- 5.57
Inadequate resources for studies	9 (12.3)	9 (12.3)	0.24	1.89	0.64- 5.57
Unrealistic expectations of the family	6 (8.2)	7 (9.6)	0.52	1.48	0.44- 4.97

PSS= Perceived Stress Score, n= frequency, %= percentages, Unadjusted OR= Unadjusted Odds Ratio

Binary logistic regression was applied to the control for confounding factors and to predict the variables for the perceived stress. The model included six independent variables (too many assignments/seminars, not getting expected marks, not satisfied with the academic program, inadequate support in the clinical area, personal problems and the perceived satisfaction with own physical well-being). The full model containing all predictors was statistically significant, [$x2$ (6, 73)=30.67, p<0.001]. Only two of the independent variables made a unique statistically significant contribution to the model (not getting expected marks and not being satisfied with the academic program) as shown in Table 4. Undergraduates who mentioned "not getting expected marks" as a factor for the PSS were nearly six times higher risk of being stressed than those who did not mention it as a factor (AOR 5.56, 95 % CI=1.37-22.6). Undergraduates who were not satisfied with the academic program were at nearly 5 times higher risk of being stressed than those who were satisfied with the academic program (AOR 4.87, 95 % CI=1.27-8.76) as shown in Table 4.

Table 4. Factors associated with stress: binary logistic regression

Factors	p-value	Adjusted OR	95% Cl
Too many assignments/seminars	0.24	2.29	0.58-9.02
Inadequate support in clinical area	0.43	1.83	0.41-8.23
Not getting expected marks	0.02	5.56	1.37-22.6
Not satisfied with the academic program	0.02	4.87	1.27-8.76
Perceived status of physical well-being	0.13	3.78	0.68-1.03
Not satisfied with the academic program	0.19	2.47	0.63-9.70

Adjusted OR= Adjusted Odds Ratio

3.1.4. Factors associated with the resilience

The median resilience score for "Perception of Self" was not statistically significantly different from the gender, academic year, PSS, perceived physical well-being except for the grade point average (GPA) categories (U=327.5, p=0.02) and participation in recreational activities (U=467.5, p=0.04). The median resilience score for "Perception of future" was statistically significantly different with gender (U=260.5, p=0.04), the perceived physical well-being (U=221.0, p=0.03) and participation in recreational activities (U=446.5, p=0.04). Kruskal-Wallis test results showed a statistically significant difference in the median resilience score for "Structural style" with the academic year (H (3)=7.04, p=0.03) of the study participants. The resilience scores for "Social Competence", "Social resource" and Total resilience score were not statistically significant with any of the factors as shown in Table 5.

Table 5. Factors associated with resilience scores of the undergraduates

Factors	Perception of self		Perception of future		Family cohesion		Social competence		Social resources		Structural style		Total resilience score	
	Median (IQR)	p-value	Median (IQR)	p-value	Median (IQR)	p-value	Mean ±SD	p-value	Median (IQR)	p-value	Median (IQR)	p-value	Median (IQR)	p-value
Gender														
Male	17.0 (5.0)	0.08*	16.0 (7.0)	0.04*	23.0 (18.0)	0.07*	14.23 (4.04)	0.82ᵃ	20.0 (9.0)	0.22*	12.0 (7.0)	0.94*	101.0 (15.0)	0.34*
Female	18.0 (6.0)		14.0 (9.0)		24.0 (16.0)		14.50 (3.84)		19.0 (11.0)		12.0 (4.0)		102.0 (28)	
PSS														
>21	17.0 (5.0)	0.67*	14.0 (7.0)	0.23*	24.0 (18.0)	0.29*	14.64 (4.47)	0.82ᵃ	20.0 (11.0)	0.36*	12.0 (7.0)	0.33*	102.0 (28.0)	0.60*
<20	18.0 (6.0)		14.0 (10.0)		27.0 (16.0)		14.33 (3.46)		19.0 (6.0)		12.0 (7.0)		101.0 (24.0)	
Academic year														
Second year	18.0 (6.0)	0.33ᵝ	14.0 (8.0)	0.75ᵝ	24.0 (16.0)	0.62ᵝ	14.76 (4.05)	0.37ᵷ	19.0 (6.0)	0.85ᵝ	12.0 (4.0)	0.03ᵝ	101.0 (25.0)	0.24ᵝ
Third year	18.0 (6.0)		14.0 (10.0)		24.0 (18.0)		13.52 (3.84)		20.0 (9.0)		12.0 (7.0)		101.0 (24.0)	
Final year	17.0 (5.0)		14.0 (4.0)		24.0 (11.0)		15.05 (3.56)		20.0 (11.0)		12.0 (3.0)		103.0 (16.0)	
GPA														
<2.5	17.0 (5.0)	0.02*	14.0 (6.0)	0.38*	24.0 (12.0)	0.33*	14.28 (3.62)	0.53ᵃ	19.0 (9.0)	0.85*	12.0 (7.0)	0.86*	101.0 (23.0)	0.41*
>2.6	18.0 (6.0)		15.0 (9.0)		25.0 (18.0)		14.91 (4.41)		20.0 (8.0)		12.0 (7.0)		102.0 (28.0)	
Perceived physical well-being														
Satisfied	18.0 (6.0)	0.71*	14.0 (10.0)	0.03*	24.0 (16.0)	0.09*	16.08 (4.14)	0.11ᵃ	19.0 (8.0)	0.34*	12.0 (7.0)	0.34*	101.0 (28.0)	0.71*
Unsatisfied	18.0 (3.0)		13.0 (6.0)		23.5 (18.0)		14.13 (13.74)		20.0 (7.0)		12.5 (7.0)		102.5 (16.0)	
Recreational activities														
yes	18.0 (5.0)	0.04*	14.0 (7.0)	0.04*	26.0 (18.0)	0.59*	13.78 (3.96)	0.25ᵃ	19.0 (11.0)	0.56*	12.0 (7.0)	0.55*	102.0 (28)	0.77*
No	17.0 (6.0)		13.5 (9.0)		24.0 (16.0)		14.85 (3.77)		20.0 (9.0)		12.0 (7.0)		101.0 (23)	

* Mann-Whitney U test, β Kruskal-Wallis H test, αIndependent sample t-test, £One-Way ANOVA

3.1.5. Coping strategies used by the undergraduates

As for coping strategies, most of the undergraduates tends to talk with their friend about how they feel (57.5%), followed by trying to improve themselves (get better grades) (45.2%), trying to think of good things in life (43.9%) and cry until the emotions pass off (32.9%) very often or seldom. Nearly 66% of undergraduates stated that they engage in hobbies sometimes, very often or seldom. The majority (67.1%) of

the undergraduates never or rarely talked to a teacher or counsellor at university when they feel stressed and get professional counselling (not from a university teacher/counsellor) (75.3%) as shown in Table 6.

Table 6. Coping strategies followed by the undergraduates

Coping strategies	Never n (%)	Rarely n (%)	Sometimes n (%)	Seldom n (%)	Very often n (%)
Talk to a teacher or counsellor at the university	25 (34.2)	24 (32.9)	23 (31.5)	1 (1.4)	0 (0.0)
Talk to your family member	14 (19.2)	7 (9.6)	16 (21.9)	9 (12.3)	0 (0.0)
Talk to a friend about how you feel	8 (11)	7 (9.6)	16 (21.9)	9 (12.3)	33 (45.2)
Get professional counseling (not from university teacher/counselor)	55 (75.3)	11 (15.1)	5 (6.8)	1 (1.4)	1 (1.4)
Cry until the emotions pass off	15 (20.5)	15 (20.5)	19 (26)	8 (11.0)	16 (21.9)
Engage in hobbies	10 (13.7)	15 (20.5)	25 (34.2)	11 (15.1)	12 (16.4)
Sleep when have stress	8 (11.0)	8 (11.0)	19 (26.0)	13 (17.8)	0 (0.0)
Go to church/temple when have stress	9 (12.3)	19 (26.0)	28 (38.4)	9 (12.3)	8 (11.0)
Try to improve (get better grades)	0 (0.0)	10 (13.7)	30 (41.1)	17 (23.3)	16 (21.9)
Try to think of the good things in life	0 (0.0)	8 (11.0)	33 (45.2)	11 (15.1)	21 (28.8)
Get angry and yell at people	15 (20.5)	23 (31.5)	24 (32.9)	7 (9.6)	4 (5.5)

3.2. Discussion

This study aimed to assess the perceived stress, resilience and associated factors among nursing undergraduates at a university in Sri Lanka. The result of this study has established that the perceived level of stress in nursing undergraduates was considered as low level (mean PSS 19 ±4.23). It is similar to many other studies where the majority of students experienced a low level of stress [33], a mild level of stress [38] and moderate stress [10], [15], [23], [27]. In contrast, higher mean stress scores have been reported in other studies conducted among nursing undergraduates in Australia [6], China [11], [17] and the UK. Stress-related symptoms such as disturbed sleep patterns, loss of appetite and feeling nausea and vomiting were among nursing undergraduates in the present study. This was consistent with other studies where a decrease in eating, frequency, duration of physical activity, emotional distress were the symptoms associated with perceived stress [10]. The perceived stress score was associated with some of the socio-demographic characteristics in other studies such as monthly income [15] and academic year [15], [25]. In contrast to that, there was no statistically significant association between PSS and demographic characteristics in the present study. It was consistent with other studies where marital status, age and number of dependents were not associated with the perceived stress level of nursing students [10], [13].

In the present study, there was no association between perceived stress level and the grade point average (GPA)/academic performance of the nursing undergraduates. This might be related to the study sample is having a low level of stress. The results were consistent with other studies where the majority of the students experienced a low or moderated level of stress with no impact on their academic performance [10]. The present study found an association of a high level of stress with personal factors such as personal problems, perceived status of own physical well-being and academic factors such as "too many assignments/seminars", "not getting expected marks", and "not satisfied with the academic program" and the clinical factor "inadequate support in the clinical area". Similar to that, a study conducted in Turkey has found four types of stressors among the students as personal problems, clinical concerns, interface worries, and academic workload [18]. It has been recommended to use assessments which are stratergically organized and providing support system for students during the undergraduate program to reduce stress and improve academic performance [16]. The academic factors identified as associated with the high level of stress was "too many assignments/seminars" and "not satisfied with the academic program" which might be related to the changes that took place due to the COVID-19 pandemic. Most of the academic programs of the nursing faculties have been changed to face the pandemic situation. Nurse academics during the pandemic use their best efforts and resources to revise curricula to suit it to meet students' academic requirements demonstrating flexibility, resilience and creativity [39].

Not getting expected marks was one of the academic factors identified in the present study. It has been reported in another study as "worry about poor grades" [15]. Similar to the clinical factor "inadequate support in the clinical area" which was associated with high stress in the present study, "pressure from the nature and quality of clinical practice" has been reported in another study [15]. Close supervision and support from the clinical setting are essential requirements for nursing training programs to support undergraduates learning. However, the factors identified for nurses' demotivation to mentor nursing undergraduates inadequate staff preparations for their role, the pressure of service demands,and intensified by low staffing [16].

The binary logistic regression revealed two academic factors associated with high stress among nursing undergraduates such as "not getting expected marks", and "not satisfied with the academic program"

in the present study. Nursing undergraduates are exposed to a variety of stressors (academic and clinical) and that is not unique when compared to published studies [16]. It is essential to consider those when planning a nursing curriculum and academic program. It is recommended to teach positive coping strategies in the nursing curriculum before clinical placements [27]. The most commonly used coping strategies in the present study are talking with their friends, trying to improve themselves, try to think of good things in life. Similaryly, Evans and Kelly [16] found that "talking to relatives and friends", "talking to peers", "just keep thinking", " I want to carry on" and "trying to stay out of trouble" as the coping strategies used commonly by nursing undergraduates. It has been evidenced that students who practice stress management techniques have less perceived stress levels [33]. Equipping nursing undergraduates with effective coping skills should be considered while planning nursing curricula to assist their future nursing careers [16]. The majority of the undergraduates had a moderate level of resilience and nearly twenty-three per cent of the undergraduates had a high level of resilience in the present study. The result may be attributed to the stressful study and clinical environment in Sri Lanka. This was consistent with other studies where the resilience level was low [31], [40] and moderate [17]. But inconsistent with the findings of the China and UK study where the resilience score was high [11]. There was no significant difference in resilience score and the PSS level and other demographic factors among the undergraduates in the present study. This was inconsistent with another study where a significant negative correlation between perceived stress level and resilience was found [41]. In contrast, some studies found resilience score was associated with age and intention to leave [11].

Low resilience score for "Perception of self" was correlated with low GPA levels and attending recreational activities in the present study. Supportive learning environment including recreational activities in the academic programs will be useful in develpoing resilience among nursing undergraduates. It was found that, high resilience score for "perception of future" and the perceived physical well-being, male gender and participation in recreational activities. It has been evidenced that higher resilience is associated with good psychological well-being for the student [31]. Nursing academic programs consist of projects, assignments, and examinations from other non-nursing subjects and that create the program harder than other programs [15]. Including recreational activities in the academic program which has been identified as a factor associated with the resilience of the nursing undergraduates in this study will be advantageous.

Although resilience develops over some time incorporating challenges and hardship faced [6], there was no significant difference in total resilience score between the undergraduate academic year in the current study. The result is consistent with studies conducted in China [17], [31] and Australia [41]. The resilience score for the "Structural style" was significantly different from the academic years in the present study. This might be due to the attributes such as the ability to goal-orientation, planning, and time management, which are improving with the experience. The undergraduates who are in the final year have a higher potential to develop these characteristics. The nursing academic programs are designed to include a higher level of learning for the advanced years. This will create additional stress from the combination of academic and clinical responsibilities as senior students [17]. But, undergraduates as they progress to their final years will develop effective ways of dealing with those stressors [15]. But the continuous stress/pressure may affect the resilience level of undergraduates [31]. Hence, well-developed resilience is imperative to nursing students studies and their future professional careers [31].

It is compulasary to evaluate level of stress among nursing students regularly to facilitate supportive mechanism and modifications to the academic programmes considering potential stressors [9]. Resilience and stress management needs to be of great concern by the higher education authorities to enable nursing undergraduates to thrive in both the clinical and academic arena, equip them to overcome the challenges of the nursing profession [17]. Appropriate learning opportunities such as the adoption of peer activities, reflective practice, directed study, problem-based learning and experiential learning can be used to develop resilient qualities among nursing undergraduates [7]. The present study identifies higher level stress and establishes the association between stress and academic factors, resilience in nursing undergraduates. Exploring factors associated with the educational environment (theory and clinical) and stress may be useful through future research.

The study has several limitations. The study was planned to assess the nursing undergraduates' perceived stress, resilience and associated factors. But the data collection was conducted during October-December 2020 when COVID-19 was declared as a global pandemic and undergraduates were facing extra stress. But the COVID-19 related factors were not considered as the study was planned before the pandemic. Future studies may consider the undergraduates' stress and resilience during pandemics and their effect on the academic and clinical training of the undergraduates. In addition, limited information was collected on the well-being of the undergraduates during the study. More reliable information would be gathered using validated tools such as physical wellbeing scale, and a coping checklist. The inclusion of the entire population of undergraduates is one of the strengths of this study. The results cannot be generalized to all nursing undergraduates because the research was conducted only with undergraduates in one university in Sri Lanka.

4.   CONCLUSION

The nursing programs constitute improving the theoretical knowledge, clinical skills and personal professional development of undergraduates. This has been greatly challenged during the COVID-19 pandemic. This study found two academic factors associated with high stress such as "not getting expected marks", and "not satisfied with the academic program" during the early phase of the COVID-19 pandemic. Further, the nursing undergraduates demonstrated a moderate level of resilience. This implies the need for nursing academics to attend to the curriculum changes during pandemic situations considering flexibility, resilience and creativity.

REFERENCES

[1]   J. L. Decker and T. Shellenbarger, "Strategies for nursing faculty to promote a healthy work environment for nursing students," *Teaching and Learning in Nursing*, vol. 7, no. 2, pp. 56–61, 2012, doi: 10.1016/j.teln.2010.12.001.
[2]   I. M. P. S. Ilankoon, G. Kisokanth, and S. S. P. Warnakulasuriya, "COVID-19: Impact on undergraduate nursing education in Sri Lanka," *Journal of Public Health Research*, vol. 9, no. s1, pp. 1–3, 2020, doi: 10.4081/jphr.2020.1916.
[3]   M. Pulido-Martos, J. M. Augusto-Landa, and E. Lopez-Zafra, "Sources of stress in nursing students: A systematic review of quantitative studies," *International Nursing Review*, vol. 59, no. 1, pp. 15–25, 2012, doi: 10.1111/j.1466-7657.2011.00939.x.
[4]   N. Jamshidi, Z. Molazem, F. Sharif, C. Torabizadeh, and M. N. Kalyani, "The challenges of nursing students in the clinical learning environment: a qualitative study," *Scientific World Journal*, vol. 2016, 2016, doi: 10.1155/2016/1846178.
[5]   T. Stecker, "Well-being in an academic environment," *Medical Education*, vol. 38, no. 5, pp. 465–478, 2004, doi: 10.1046/j.1365-2929.2004.01812.x.
[6]   F. X. He, B. Turnbull, M. N. Kirshbaum, B. Phillips, and P. Klainin-Yobas, "Assessing stress, protective factors and psychological well-being among undergraduate nursing students," *Nurse Education Today*, vol. 68, pp. 4–12, 2018, doi: 10.1016/j.nedt.2018.05.013.
[7]   P. Walsh, P. A. Owen, N. Mustafa, and R. Beech, "Learning and teaching approaches promoting resilience in student nurses: An integrated review of the literature," *Nurse Education in Practice*, vol. 45, 2020, doi: 10.1016/j.nepr.2020.102748.
[8]   R. A. Latif and M. Z. M. Nor, "Stressors and coping strategies during clinical practice among diploma nursing students," *Malaysian Journal of Medical Sciences*, vol. 26, no. 2, pp. 88–98, 2019, doi: 10.21315/mjms2019.26.2.10.
[9]   C. Gibbons, "Stress, coping and burn-out in nursing students," *International Journal of Nursing Studies*, vol. 47, no. 10, pp. 1299–1309, 2010, doi: 10.1016/j.ijnurstu.2010.02.015.
[10] S. A. M. Shalaby and S. M. Swaid AlDilh, "Exploring the relationship between perceived stress and academic achievement among critical care nursing students," *Athens Journal of Health*, vol. 2, no. 4, pp. 283–296, 2015, doi: 10.30958/ajh.2-4-4.
[11] F. Hasson, Z.-S. Li, P. Slater, and X.-J. Guo, "Resilience, stress and well-being in undergraduate nursing students in china and the UK," *International Journal of Research in Nursing*, vol. 12, no. 1, pp. 11–20, 2021, doi: 10.3844/ijrnsp.2021.11.20.
[12] L. Mureşan and A. Georgescu, "The Road to resilience in 2050," *The RUSI Journal*, vol. 160, no. 6, pp. 58–66, 2015, doi: 10.1080/03071847.2015.1123948.
[13] I. M. P. S. Illankoon and S. S. Warnakulasooriya, "Perceived stress and associated factors among bsc nursing undergraduates in University of Sri Jayewardenepura, Sri Lanka," *International research conference*, pp. 58–66, 2014.
[14] S. Pryjmachuk and D. A. Richards, "Predicting stress in pre-registration nursing students," *British Journal of Health Psychology*, vol. 12, no. 1, pp. 125–144, 2007, doi: 10.1348/135910706X98524.
[15] L. J. Labrague, "Stress, stressors, and stress responses of student nurses in a government nursing school," *Health Science Journal*, vol. 7, no. 4, pp. 424–435, 2013.
[16] W. Evans and B. Kelly, "Pre-registration diploma student nurse stress and coping measures," *Nurse Education Today*, vol. 24, no. 6, pp. 473–482, 2004, doi: 10.1016/j.nedt.2004.05.004.
[17] G. D. Smith and F. Yang, "Stress, resilience and psychological well-being in Chinese undergraduate nursing students," *Nurse Education Today*, vol. 49, pp. 90–95, 2017, doi: 10.1016/j.nedt.2016.10.004.
[18] G. Sarikoc, M. Bayram Demiralp, E. Oksuz, and B. Pazar, "Turkish version of the student nurse stress index: validity and reliability," *Asian Nursing Research*, vol. 11, no. 2, pp. 128–133, 2017, doi: 10.1016/j.anr.2017.05.006.
[19] L. Sun, Y. Gao, J. Yang, X.-Y. Zang, and Y.-G. Wang, "The impact of professional identity on role stress in nursing students: A cross-sectional study," *International Journal of Nursing Studies*, vol. 63, pp. 1–8, Nov. 2016, doi: 10.1016/j.ijnurstu.2016.08.010.
[20] C. Bradbury-Jones, S. Sambrook, and F. Irvine, "Empowerment and being valued: A phenomenological study of nursing students' experiences of clinical practice," *Nurse Education Today*, vol. 31, no. 4, pp. 368–372, 2011, doi: 10.1016/j.nedt.2010.07.008.
[21] UNDP, "COVID-19 Pandemic: Humanity needs leadership and solidarity to defeat COVID-19," *Undp*, 2020, [Online]. Available: https://www1.undp.org/content/brussels/en/home/coronavirus.html.
[22] L. W. and F. A.-M. M. Nabolsi, A. Zomot, "The experience of jordanian nursing students in their clinical practice," *Procedia - Social and Behavioral Sciences*, vol. 46, 2012, doi: 10.1016/j.sbspro.
[23] H. Aslan and H. Pekince, "Nursing students' views on the COVID-19 pandemic and their percieved stress levels," *Perspectives in Psychiatric Care*, vol. 57, no. 2, pp. 695–701, 2021, doi: 10.1111/ppc.12597.
[24] A. Ozsaban, N. Turan, and H. Kaya, "Resilience in nursing students: the effect of academic stress and social support," *Clinical and Experimental Health Sciences*, vol. 9, no. 1, pp. 71–78, 2019, doi: 10.33808/marusbed.546903.
[25] M. J. Khan, S. Altaf, and H. Kausar, "Effect of perceived academic stress on students' performance," *FWU Journal of Social Sciences*, vol. 7, no. 2, pp. 146–151, 2013.
[26] B. McCarthy *et al.*, "Nursing and midwifery students' stress and coping during their undergraduate education programmes: An integrative review," *Nurse Education Today*, vol. 61, pp. 197–209, 2018, doi: 10.1016/j.nedt.2017.11.029.
[27] M. D. Onieva-Zafra, J. J. Fernández-Muñoz, E. Fernández-Martínez, F. J. García-Sánchez, A. Abreu-Sánchez, and M. L. Parra-Fernández, "Anxiety, perceived stress and coping strategies in nursing students: a cross-sectional, correlational, descriptive study," *BMC Medical Education*, vol. 20, no. 1, 2020, doi: 10.1186/s12909-020-02294-z.
[28] G. Van Hoek, M. Portzky, and E. Franck, "The influence of socio-demographic factors, resilience and stress reducing activities on academic outcomes of undergraduate nursing students: A cross-sectional research study," *Nurse Education Today*, vol. 72, pp. 90–96, 2019, doi: 10.1016/j.nedt.2018.10.013.
[29] A. M. Pidgeon, N. F. Rowe, P. Stapleton, H. B. Magyar, and B. C. Y. Lo, "Examining characteristics of resilience among

university students: an international study," *Open Journal of Social Sciences*, vol. 02, no. 11, pp. 14–22, 2014, doi: 10.4236/jss.2014.211003.

[30] Z. S. Li and F. Hasson, "Resilience, stress, and psychological well-being in nursing students: A systematic review," *Nurse Education Today*, vol. 90, 2020, doi: 10.1016/j.nedt.2020.104440.

[31] K. M. Chow, W. K. F. Tang, W. H. C. Chan, W. H. J. Sit, K. C. Choi, and S. Chan, "Resilience and well-being of university nursing students in Hong Kong: A cross-sectional study," *BMC Medical Education*, vol. 18, no. 1, 2018, doi: 10.1186/s12909-018-1119-0.

[32] S. Cohen, T. Kamarck, and R. Mermelstein, "A global measure of perceived stress.," *Journal of health and social behavior*, vol. 24, no. 4, pp. 385–396, 1983, doi: 10.2307/2136404.

[33] S. Sathees, K. Sivapalan, and S. Sivayokan, "Influence of personal factors on the perceived stress level of students of college of nursing, Jaffna," *Proceedings of the Abstracts of Jaffna University International Research Conference*, p. 2012, 2012.

[34] O. Friborg, "Validation of a scale to measure resilience in adults," *University of Tromsø*, no. March, pp. 1–80, 2006.

[35] S. S. and V. S. C. Suraweera, R. Hanwella, "Rating scales validated for Sri Lankan populations," *Sri Lanka Journal of Psychiatry*, vol. 4, no. 2, p. 38, 2013, doi: 10.4038/sljpsyc.v4i2.6314.

[36] C. Caparina, P. Stratta, O. Hjemdal, A. Collazzoni, and A. Rossi, "The Italian validation study of the resilience scale for adults (RSA)," *BPA Applied Psychology Bulletin*, vol. 272, pp. 16–24, 2015.

[37] J. Ribeiro, "World medical association," *British Medical Journal*, vol. 1, no. 6060, p. 579, 1977, doi: 10.1136/bmj.1.6060.579-a.

[38] and D. S.-K. G. Papazisis, E. Tsiga, N. Papanikolaou, I, Vlasiadis, "Psychological distress, anxiety and depression among nursing students in Greece," *International Journal of Caring Sciences*, vol. 7, no. S1, pp. 42–46, 2008, doi: 10.1186/1744-859x-7-s1-s209.

[39] B. Seah, E. N. K. Ang, S. Y. Liaw, S. T. Lau, and W. Wang, "Curriculum changes for pre-registration nursing education in times of COVID-19: For the better or worse?," *Nurse Education Today*, vol. 98, 2021, doi: 10.1016/j.nedt.2020.104743.

[40] V. Pitt, D. Powis, T. Levett-Jones, and S. Hunter, "Nursing students' personal qualities: A descriptive study," *Nurse Education Today*, vol. 34, no. 9, pp. 1196–1200, 2014, doi: 10.1016/j.nedt.2014.05.004.

[41] P. R. Sam and P. Lee, "Do stress and resilience among undergraduate nursing students exist?," *Exist?," International Journal of Nursing Education*, vol. 12, no. 1, 2020, doi: 10.5958/0974-9357.2020.00032.

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