Resilience Level and Associated Factors among Medical Undergraduates in a Selected University in Sri Lanka

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Abstract: Medical undergraduates experience many challenges in their academic, social as well as financial aspects in present day circumstances. All these challenges make them vulnerable if they can't withstand it. Resilience is the ability to withstand adversities an individual faces. If they lack resilience, they are likely to face many negative consequences. Objective of the study was to assess the resilience level and associated factors among medical undergraduates in a selected university in Sri Lanka. A descriptive cross-sectional study was conducted among all the medical undergraduates (n= 578) studying in the medical faculty during April to September 2023 in Wayamba medical faculty. Study instruments consist of the 14-Item Resilience Scale, to assess the level of resilience and a self-administered questionnaire to inquire the associated factors. The levels of resilience were expressed as percentages with 95% CI. Bivariate and multivariate logistic regression is used to assess the associated factors of low resilience. Probability < 0.05 was selected as the significance level. The results were expressed as odds ratios (OR) and 95% CI. The response rate was 85.3% (n= 492). Mean age was 22 years (SD =1.2) and majority were females (69.3%). Low, moderate, and high levels of resilience of medical undergraduates were 51% (n = 251), 30% (n = 148) and 18.9% (n =93) respectively. In each academic year, half of the undergraduates had low level of resilience. Male sex (AOR = 2.4; 95% CI =1.2 – 4.8), getting angry frequently (AOR = 3.0; 95% CI = 1.5 -6.0) and not engage in extracurricular activities (AOR = 2.2; 95% CI = 1.2 - 4.2) were significantly associated with low resilience level among medical undergraduates. Except the sex, other two are modifiable factors and need to take necessary interventions to rectify it. Recommend resilience enhancing interventions among medical undergraduates. Needs to explore the research area with qualitative studies to get highest yield.

Keywords: Resilience, Medical undergraduates, Associated factors, Sri Lanka

1. Introduction

As defined by psychologists, "Resilience is the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress such as family and relationship problems, serious health problems, or workplace and financial stressors" (APA, 2013). In addition to "bouncing back" from difficult situations, resilience can lead to immense personal growth. Resilience is considered a complex biological and psychosocial adaptation to internal and external demands.

Even though the resilience was described as a trait in few decades back, nowadays it is described as a dynamic phenomenon. Every individual possesses some level of resilience, and this resilience level may be enhanced or suppressed with the attributes which influence the resilience. Peeping into the literature reveals that there are three types of attributes/associated factors of resilience. They are personal factors (personality related factors, demographic factors, socioeconomic factors), factors related to family (family support, connectivity with the family members and parental status) and factors related to community (peers, relationships with others, responsibilities and connection with the community) (Fergus & Zimmerman, 2005).

Youths are a group of people who undergo various challenges and stressors in their lives. Undergraduates are special group among youths, who face stressors to a greater extent. University life of a student is a period in

which students face various life challenges as individuals (Bataineh, 2013). Amongst them, the medical undergraduates, obviously face a high level of stressors and live a highly demanding university life (Nair *et al.,* 2023). This is a period in which they have to experience novel life events, challenges, and stressors such as meeting totally new peers, being subjected to peer pressure, being involved in romantic relationships, facing competitive examinations and managing financial hardships in present day circumstances. All the changes these undergraduates face as described above, makes them vulnerable to fail at their professional development and psychological balance. The students who are emotionally stable are less vulnerable to depression or anxiety, and the students who meet minimal stress are less likely to end up with depression or anxiety. Several studies show that the medical undergraduates have a higher stress level due to academic and psychosocial issues (Sreeramareddy *et al.,* 2007; Shah *et al.,* 2010). Anxiety and depression are not uncommon among medical students (Pokhrel *et al.,* 2020). Severity of symptoms of anxiety and symptoms of depression among medical students is negatively related to emotional stability and positively related to stress vulnerability (Bunevicius *et al.,* 2008).

Many factors are identified as associated factors of individual resilience. Connectedness with parents (Tian *et al.,* 2018), peer support (Dyrbye *et al.,* 2010), perception of one's own health (Oliveira *et al.,* 2017) are found to be associated with high level of resilience while lack of parental affection during childhood (Petrowski *et al.,* 2014) and sleep disorders (Palagini *et al.,* 2018) with low resilience level.

In the present world, lot of inadvertent events are reported among undergraduate students due to deficiency in resilience. Hence, resilience is needed to be addressed and to be enhanced among medical undergraduates which will help them withstand their stressors and spend a balanced life not only in undergraduate life but also as future medical professionals. Even though several studies done regionally and globally on this topic, (Mukherjee *et al.,* 2021, Bittmann, 2021, Ononye *et al.,* 2022, Thomas & Zolkoski, 2020) the studies conducted in Sri Lanka is not encountered. As such, assessment of the level of resilience and associated factors among medical undergraduates is worthy in present circumstances. Identification of these factors may lead us for corrective measures.

Even though in Sri Lanka there are several studies conducted to assess the resilience level among nurses (Walpita & Arambepola, 2022), adolescents (Manori *et al.,* 2023) there is dearth of literature on assessing resilience among medical undergraduates. With this background, the present study aimed to assess the resilience level and associated factors among medical undergraduates in a selected university in Sri Lanka.

2. Methods

This is a cross sectional study which was conducted among medical undergraduates in the Faculty of Medicine, Wayamba University of Sri Lanka (WUSL). There were five annual medical intakes in the faculty. All the medical undergraduates (N= 578) in all five batches, currently registered in the faculty were enrolled in this study. Being a newly emerged medical faculty, the first two batches were relatively small in size. All the students were enrolled in the study, and no specific exclusion criteria or sampling technique required. The study was conducted during the period of April to September 2023.

Two study instruments were used to collect data: the 14-Item Resilience Scale to assess the level of resilience and a self-administered questionnaire to gather associated factors of resilience.

The 14 Item Resilience scale (14 Item RS) was originally developed by (Wagnild & Young 2009). This questionnaire is Likert scale self-administered questionnaire which contains 14 items. The responses were marked on a seven-point scale ranging from 1 (totally disagree) to 7 (totally agree). The total score of the questionnaire ranged from 14 to 98 with lower scores indicating lower resilience. The questionnaire was validated to the Sri Lankan context by the principal investigator (Manori *et al.,* 2021). In which the tool yielded a Cronbach's alpha of 0.9 indicating excellent internal consistency. The self-administered questionnaire (SEQ) to gather associated factors was developed based on literature review, expert opinion and through a Delphi technique. The main components included in the questionnaire were personal factors, and factors related to family and community. Both 14 Item RS and SEQ were pretested among 25 undergraduates other than medical students. English version of the questionnaires was used in this study as the study participants (medical undergraduates) were conversant in English language.

The principal investigator and two other data collectors collected the data after obtaining the administrative clearance.

The data was analysed using Statistical Package for Social Sciences (SPSS) software version 22.0. Level of the resilience of medical undergraduates was described as proportions and expressed as percentages and 95% confidence intervals. Quantitative data were described as median and interquartile range as it was not normally distributed. In 14 Item Resilience Scale, the resilience score ranged from 14 to 98 with higher scores indicating a higher resilience. Based on the resilience score, six levels of resilience were identified namely: high (91-98), moderately high (82-90), moderate (74-81), on the lower end (65-73), low (57-64) and very low (14-56).

Bivariate analysis using Chi square test was followed by multivariate logistic regression to identify associated factors of low resilience after controlling for confounding factors. Probability < 0.05 was selected as the significant level. The results were expressed as odds ratios (OR) and 95% confidence intervals (CI).

Informed written consent was obtained from study participants prior to data collection. Ethical clearance was approved from the Ethics Committee, Faculty of Medicine, Wayamba University of Sri Lanka.

3. Results

There were 578 study participants. The response rate was 85.3% (492). The mean age of the participants was 22 years (SD = 1.2). The number of study participants from each 1st, 2nd, 3rd, 4th, and 5th batch were 57, 60, 116, 135, 124 respectively. Majority were females (n=341; 69.3%). Eighty six percent were Sinhalese (n = 421) (See Table 1).

Table 1. Demographic characteristics of study participants

Demographic Characteristic	Number	Percentage
Academic year	Number participated/Number in the batch	
1st year	124 (152)	25.2%
2nd year	135 (147)	27.4%
3rd year	116 (142)	23.6%
4th year	60 (66)	12.2%
5th year	57 (71)	11.6%
Sex		
Male	151	30.7%
Female	341	69.3%
Ethnicity		
Sinhalese	421	85.6%
Muslim	47	9.6%
Tamil	20	4.1%
Other	04	0.7%
Religion		
Buddhism	356	72.4%
Christian/Catholic	74	15.0%
Moor	52	10.6%
Hindu	10	2.0%

3.1 Level of resilience

Overall resilience score ranged from 15 to 98. The resilience score demonstrated a skewed distribution. The median was 73.0 and interquartile range was 67 to 79. Amongst medical undergraduates, 30.1% (n =148) had a moderate level of resilience. Four percent (n=19) had "high" level and 15% (n=74) had moderately high level of resilience. According to the resilience score, very low, low and on the lower end category of resilience were. 11% (n = 54), 9.3% (n = 46) and 30.7% (n = 151) respectively (see Table 2).

Table 2. Resilience level among medical undergraduates

Level of resilience	Resilience score	Medical undergraduates	
		Number	**Percentage (95% Confidence Interval)**
Very low	14 -56	54	11.0% (8.4% -14.0 %).
Low	57 -64	46	9.3% (6.9% - 12.3%)
On the lower end	65 - 73	151	30.7% (26.6% -35.0%)
Moderate	74 - 81	148	30.1% (26.1% -34.3%)
Moderately high	82 - 90	74	15.0% (12.0% -18.5%)
High	91 -98	19	3.9% (2.3% - 6.0)

Accordingly, 51% (n = 251) of medical undergraduates have a low level of resilience, 30% (n=148) with moderate resilience and only 18.9% (n=93) with high level of resilience.

For the analytical purposes, "very low", "low" and "on the lower end" categories were amalgamated as "Low" level of resilience (resilience score 14 – 73) and "on the lower end", "moderate", "moderately high" and "high" categories are combined and categorized as "high" level of resilience (resilience score 74 – 98). In accordance with this categorization, among medical undergraduates, 51% (n = 251) had a low level of resilience and only 241 (49%) demonstrated a high level of resilience.

According to the academic year, the majority with high resilience level (50.5%, n = 29) was reported in 5th year (senior most) students. Low resilience was highest among 1st year students (52.6%). Low resilience levels among 2nd, 3rd and 4th year students were 52.5%, 51.0% and 50.3% respectively. Overall, half of the batch in each had low level of resilience (see Table 3).

Table 3. The resilience level of medical undergraduates according to the academic year

Batch (No. of students)	High resilience	Low resilience
5th year (n=57)	50.5%	49.5%
4th year (n= 60)	49.7%	50.3%%
3rd year (n=116)	49.0%	51.0%
2nd year (n= 135)	47.5%	52.5%
1st year (n=124)	47.4%	52.6%

3.2 Associated factors of resilience among medical undergraduates

According to the bivariate analysis, male sex, getting angry frequently, not engage in extracurricular activities, number of friends less than 6, not seeking help from others when need, not discussing problems and sleep as a leisure time activity were significantly associated with low resilience level

Multivariate logistic regression analysis showed male sex, getting angry frequently and not engage in extracurricular activities were significantly associated with low resilience level among medical undergraduates (See Table 4).

Table 4. Factors associated with low resilience level in multivariate logistic regression.

Variable	AOR	95% Confidence Interval	p value
Sex			
Male	2.4	1.2 - 4.8	0.024
Female	1.0		
Engage in extracurricular activities			
No	2.2	1.2 -4.2	0.015
Yes	1.0		
Getting angry frequently			
Yes	3.0	1.5 - 6.0	0.003
No	1.0		

4. Discussion

The result of the present study reveals that 51% of medical undergraduates have low level of resilience, 30% with moderate resilience and only 18.9% with high level of resilience. This result was based on the 14 Item Resilience scale. This was developed by (Wagnild & Young 1993) and proved evidence of satisfactory psychometric properties not only in original study but also in several other versions which were validated in different context (Nishi et al., 2010, Damásio et al., 2011, Callegari et al., 2016, Aiena et al., 2015). The validation of this instrument in the Sri Lankan context also showed good psychometric properties (Reliability = Cronbach's alpha 0.875, hence the results are reliable in this study.

The non-resilient proportion reported from this study (51%) was similar (51.7%) to that in a study done to assess resilience among doctors and medical students in India (Verma et al., 2022). But the mean age of the study participants in the Indian study was 32.9 years whereas in the present study it was 22 years. However, for the age group of 15 -30 years, it was revealed that the non-resilient proportion was slightly higher (55.6%) than the present study.

In a study conducted in Sri Lanka (Walpita & Arambepola, 2022), nurses' resilience was reported as 28.4% (high), 55.6% (moderate) and 16% (low). However, the study instrument used to assess resilience in this study was Resilience at Work Scale- Sinhala version and it differs from the present study.

In this study, the low, moderate, and high resilience levels have been observed as 51%, 30% and 18.9% respectively. Hence it is clear that half of the medical undergraduates with low resilience level and one fifth of them displayed high level of resilience. According to (Manori et al., 2021), in a study of resilience among grade 10 school children in Sri Lanka, low, moderate, and high resilience levels were reported as 33.6%, 54.9% and 11.6%. It is obvious that the low resilience level was higher among medical undergraduates than adolescents, may be since medical undergraduates are facing much more adversities than adolescents.

In a study done in Oman (Al Omari et al., 2023) to assess the resilience level among undergraduates, 45.3% reported low levels of resilience, 49.3% normal resilience, and 5.5% high resilience level where the resilience was assessed with Brief resilience scale. Even though the study instrument was different, the low level of resilience was close to each other. In parallel with this, close low resilience level was reported in studies done in India (46.4%) (Pharasi et al., 2020) and Saudi Arabia (45.5%) (Aboalshamat et al., 2018).

In several studies, the resilience level among medical undergraduates was described as a quantitative variable describing mean or median (Bahadır-Yılmaz & Oz, 2015, Poh et al., 2021; Mukherjee et al., 2021). However, it is difficult to compare the level of resilience in this manner because the scales used to measure the level of resilience differ from one another.

The highest proportion of low resilience was demonstrated among the 1st year medical undergraduates. In parallel with this finding, Mukherjee et al. (2021) revealed that, higher the age and the semester of the participant, more the resilience level among medical undergraduates. Additionally in a study done among nursing students (Oz et al., 2012) also revealed that the senior students had higher level of reliance than juniors. This finding shows that the resilience level of students beginning their university life was low obviously since they experienced less adversities. Facing novel challenges in day today's life, social and academic life, these undergraduates' ability to withstand these challenges is also increasing.

Male undergraduates showed a low level of resilience than females and male sex is found to be a significant associated factor of low resilience level in the present study. Parallel to this, males showed a lower level of resilience than females in study done in Malaysian public university (Poh et al., 2021). In a few studies (Wasonga, 2002; Daining and De Panfilis, 2007) the same finding was reported. But in contrary to this finding, resilience level of male undergraduates was found to be higher than that of females in a study done in Turkey (Bahadır-Yılmaz & Oz, 2015). The same was reported in several other studies as well (Rodgers and Rose, 2002; Voges and Romney, 2003; Skinner et al., 2009). Revealing different results may be due to the cultural dimension of concept of resilience. Ungar, 2008 explained the cultural effects on peoples' ideologies and hence to resilience.

Even though the parents' educational level was inquired in this study, there was no significant association with resilience. (Rodgers and Rose 2002) showed that whose mothers with lower education had higher resilience level than their peers with more highly educated mothers. In some studies, it revealed that there is an association between fathers' education level and resilience level (Coşkun et al., 2014; Arastaman and Balci, 2013). Even though in this study, it was not found to be a significant factor, parents influence is affecting towards the resilience level of their kids, especially with parenting style, if they make feel important obviously the resilience level will be affected positively (Murry et al., 2001).

According to this study, the undergraduates who are not engaged in extracurricular activities were significantly had low resilience level compared to who engage in extracurricular activities. In several studies (Werner & Smith, 1982; Gordon, 1995) it is concluded that resilient students are more engaged in extracurricular activities. Werner & Smith further mentioned that resilient boys were engaged in extracurricular activities than the girls also. Participation in activities will introduce a newer experience of resilience for a person. Further, students who participated in extracurricular activities showed less substance abuse and delinquent acts (Han et al., 2017).

The medical undergraduates showed a low resilience among persons who get angry frequently than who do not in this study. Losing temper is quite common among youths. Anger arises due to poor emotional regulation and poor individual adjustment. Consistent with this finding, (Mestre et al., 2017) reported emotional regulation ability with high resilience level.

In bivariate logistic regression, out of eighteen variables assessed, seven were shown as significant factors with low resilience. They are male sex, getting angry frequently, involve in extracurricular activities, number of friends less than 6, not seeking help from others when need, not discussing problems and sleep as leisure time activity. But in multivariate logistic regression with control for confounding, only three factors shown to be significant with reliance level which were male sex, getting angry frequently and not involve in extracurricular activities. Out of the three factors shown to be significant associated factors of low resilience, except the sex, other two factors were modifiable. Hence it is a timely strategy to take necessary actions to rectify these unfavourable associated factors toward favourable by intervening where necessary. However, the non-significant factors in the present study also shown as important associated factors with resilience in many other studies. Specially, university life is a period where most of the undergraduates are living with peers. Hence, the number of friends they have and remedies they are taking when they face a problem are very important in the context of university.

All the necessary requirements related to ethical conduct of the study were carried out. Confidentiality of the information obtained was maintained and informed consent was obtained prior to data collection.

4.1. Strengths

The study population included all the registered medical students, and the response rate was satisfactory (85.3%). The completeness of the data is also satisfactory hence the quality of data is acceptable. In analysis, multivariate logistic regression is used to exclude the effect of confounding which increase the validity of the results.

4.2. Limitations

This study was conducted as a descriptive cross-sectional study to explore the level and associated factors of resilience among medical undergraduates. Being a cross sectional study, it is difficult to establish factors of causation wherever qualitative studies will do. The present study was conducted in a selected one medical faculty hence the generalizability of the findings is limited.

5. Conclusion and recommendations

One half of the medical undergraduates had shown a low level of resilience and only one fifth showed a high level. Eighty percent of medical undergraduates with moderate and low level of resilience is a fact to rethink and pay attention to. Medical undergraduates face high levels of stressors in their academic life obviously hence being resilient is an essential quality they should have to overcome the challenges and stressors which they encounter with. If not, they could end up with many negative consequences which will affect individually as well as towards society. As resilience is no longer a personal trait, it could be enhanced by necessary interventions. According to the study, male sex, getting angry frequently and not involve in extracurricular activities were significant associated factors of low resilience among medical undergraduates. Except the sex other two are modifiable factors and to be considered when planning a resilience enhancing interventions. Hence recommend adoption of a suitable intervention based on psycho behavioural therapy at the undergraduate level to enhance their level of resilience thereby make them more fruitful health officials who serve maximum potential to boost the health of the nation. As resilience is a multifactorial phenomenon, needs to explore the research area with qualitative studies to get highest yield.

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Conflict of Interest

The authors have no conflicts of interest to declare. There is also no financial interest to report. The authors certify that the submission is original work and is not under review at any other publication.

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