

2023

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Recommended Citation

Obadeji, Adetunji; Oluwole, Lateef Olutoyin; and Adeyemo, Deborah A. (2023) "Exploring Learning Approaches of Undergraduate Medical Students and Their Association with Gender, Resilience, and Psychological Distress," *Health Professions Education: Vol. 9: Iss. 3, Article 6.*

Available at: <https://hpe.researchcommons.org/journal/vol9/iss3/6>

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ORIGINAL RESEARCH REPORTS

Exploring Learning Approaches of Undergraduate Medical Students and Their Association with Gender, Resilience, and Psychological Distress

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Abstract

Purpose: Learning approaches have been described as important factors in determining learning outcomes, nonetheless, several factors influence learning approaches adopted by each student. Understanding students' approaches to learning and those factors that influence such provide means of upgrading and updating instructional strategies to ensure learning opportunities are maximized. In this study we examined various learning approaches (as adopted by medical students in their clinical clerkship), and their relationship with students' resilience and levels of psychological distress (PD), and observe lest there are gender differences in these variables.

Methods: Participants were undergraduate medical students in their 4th, 5th, and 6th year at the Ekiti State University College of medicine. Each student completed a socio-demographic questionnaire, the Wagnild resilience scale, the Study Process Questionnaire (R-SPQ-2F), and the 4-item Patient Health Questionnaire (PHQ-4). Frequency distribution as well as bivariate inferential statistics were calculated. A p-value of <0.05 was adjudged significant.

Results: There was a significant positive correlation between psychological distress and surface strategy ($r = 0.191$, $P = 0.022$), and academic levels ($r = 0.234$, $P = 0.005$). Results revealed significant negative correlation between PD, and deep learning ($r = -0.179$, $P = 0.032$), deep motive ($r = -0.201$, $p = 0.016$), and resilience ($r = -0.193$, $P = 0.021$). Significant positive association between resilience and deep learning ($r = 0.213$, $P = 0.011$) as well as deep motive ($r = 0.265$, $P = 0.001$) were also observed. There was no significant difference in the mean resilience scores, the PHQ-4 scores, and the R-SPQ-2F and its subscales scores between both genders ($P > 0.05$).

Discussion: This group of medical students adopted multimodal learning approaches, however, deep approaches appeared more prevalent. Both psychological distress and resilience were associated with learning approaches of this group of medical students. Efforts at promoting a deep approach to learning in this group of students and other medical students should involve efforts at reducing stress, building resilience, and promoting mental well-being.

Keywords: Medical students, Resilience, Psychological distress, Learning approach

1. Introduction

Efforts in recent times have been geared towards improving both teachings and learning in medical and other health professions education with a focus on ensuring teaching is more engaging and student-centered [1]. Understanding students' approaches to learning will provide means of upgrading and updating instructional strategies to ensure learning opportunities are maximized.

Learning styles and approaches vary widely among students [2]. Primarily, four learning styles (visual, auditory, read/write, and kinesthetic) have been reported. Learners, according to individual preference, can be classified into either unimodal or multimodal depending on whether a learner predominantly uses one learning style or uses 2 or more learning styles [2]. Similarly, approaches to learning differ among students. The predominant learning approaches include superficial, strategic,

Received 14 March 2023; revised 10 June 2023; accepted 20 June 2023.
Available online 1 August 2023

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<https://doi.org/10.55890/2452-3011.1048>

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and deep. A superficial learner focuses attention on parts of the information deemed important with emphasis on memorizing individual details or pieces of information needed to pass. Strategic learners, on the other hand, aim to achieve the highest possible positive outcome, while a deep learner invests in reflection, and in understanding the content and the context. Students, however, oftentimes do adopt a mixture of these approaches depending on the context [2–4].

There is no doubt that the approach a student adopts in learning will affect the extent of learning or the learning outcomes, more importantly, in the health professions education like Medicine. A student's learning styles or approaches, besides other factors, affects his or her academic success [5,6], nevertheless, some other researchers did not find such association [7–9]. The general cognitive ability, attention, effort, and the learning environment, in addition to learning styles and approaches are other important factors influencing students' academic achievement [6]. In addition, the teaching methods, students' motivation [10,11], the age or students' maturity [12], and the formats of the assessment [13] are other factors influencing learning, and learning approaches adopted by students. For example, it has been reported that students were more likely to adopt deep learning approach with a problem-based learning method [11] and a superficial approach with multiple-choice questions [13].

Among medical students, strategic and deep approaches are the most common learning approaches often adopted, nonetheless, a superficial approach is not uncommon [2,3]. The medical curriculum favors deep and strategic learning approaches because it encourages critical analyses of ideas, linkage of knowledge and concepts, and usage of such knowledge for problem-solving in a new context [2,3,14]. Nonetheless, at the undergraduate level, medical students are more likely to adopt a mixture (multimodal) of learning styles [2,8], with a shift towards unimodal among postgraduate learners [2].

Resilience is another factor that determines a student's academic success. It determines the ability of a student to use or maximize resources at his or her disposal, and overcome academic adversities that can mitigate his or her academic success [15,16]. Intrinsically, a resilient student possesses strength, future orientation, determination, a sense of belongingness, and the ability to ask for support when needed [16,17]. A resilient student is well-motivated with a strong passion to excel. Resilience is essential in ameliorating stress, including academic stress, and in improving academic performance [18]. It is an important factor in predicting the

academic performance of students [19]. It also provides the needed capability to cope with stress and anxiety [20,21]. Higher levels of resilience have been reported to be associated with low level of psychological distress (PD) [22], and both stress and resilience play important role in mediating satisfaction among medical students [20,23].

Previous evidence suggests that there is a positive association between the surface approach to learning, high levels of perceived stress or distress and poor academic performance [24], and between higher resilience and a deep approach to learning [25]. There are no clear-cut relationships between strategic, deep approaches to learning and perceived stress despite predicting higher academic performance [24]. The more resilient a student is, the less stress he or she perceives, and the more likely he or she will adopt deep learning which may ultimately translate to better academic performance [25,26].

The learning approaches each medical student adopts vary considerably and this may be related to students' levels of perceived stress or distress and their degrees of resilience. We hypothesized that less resilient students as well those experiencing high level of psychological distress were less likely to adopt deep approach to learning. In this study we examined the relationship between learning approaches, and students' resilience and psychological distress while considering various learning approaches adopted by medical students in their clinical clerkship and observe whether there are gender differences in these variables.

2. Methods

2.1. Subjects

Participants in this study were undergraduate medical students in their clinical years (the 4th, 5th, and 6th year) at the Ekiti State University College of Medicine, Nigeria. All students in the clinical years were recruited for the study. Students in each class were approached by their class representatives at the end of a lecture. The purpose of the research was explained to each participant, and participation was voluntary. Each consenting individual completed the questionnaires and submitted the same into a box in the classroom from where it was retrieved immediately after the last submission.

2.2. Design and setting

This is a cross-sectional survey involving undergraduate medical students during their clerkship.

This is a relatively new medical school established 12 years ago in a well-established State University. The medical school runs a 6-year programme and operates the traditional subject-based curriculum with some level of horizontal integration. Usually, the assessment includes both formative (at the end of every system or posting) and summative assessments after completing a set of subjects. The core curriculum is divided into Basic Medical Sciences (comprising of Physiology, Biochemistry and Anatomy), Basic Clinical Sciences (incorporating, Morbid anatomy, Hematology, Chemical Pathology and Pharmacology and Therapeutics) and the Clinical Sciences. Summative assessments are conducted after completing various modules in each set of the core curriculum. For example, summative assessment in basic medical sciences is conducted after completion all the essential courses in Physiology, Biochemistry and Anatomy to determine progression to the clinical stages.

2.3. Measures

Each student completed a sociodemographic questionnaire (incorporating the gender, age, and academic level), the Wagnild resilience scale, the Study Process Questionnaire (R-SPQ-2F) and the 4-item Patient Health Questionnaire (PHQ-4).

The Study Process Questionnaire (R-SPQ-2F) was used to assess students' approach to learning with English as a medium of instruction. The R-SPQ2F is a 20-item questionnaire that measures two main to learning approaches - the deep approach (DA) scale that incorporates deep motive (DM) and deep strategy (DS) subscales, and the surface approach (SA) scale that incorporates the surface strategy (SS) surface motive (SM) subscales. Each subscale consists of 5-items that are measured on a 5-point Likert scale ranging from 1 ('rarely true of me') to 5 ('always true of me'). The summation of scores of questions 1, 2, 5, 6, 9, 10, 13, 14, 17, and 18 gives the DA while the SA was derived by the addition of items 3, 4, 7, 8, 11, 12, 15, 16, 19, and 20. The subscales on the other hand were derived from the addition of items 1, 5, 9, 13, and 17 representing DM; 2, 6, 10, 14, and 18 representing DS; 3, 7, 11, 15, and 19 represents the SM; while the summation of items 4, 8, 12, 16 and 20 make up the SS [27]. The R-SPQ-2F has an internal consistency coefficient ranging from 0.71 to 0.72 for deep and surface approaches [28].

Resilience Scale, the 14-item Wagnild and Young's Resilience Scale (RS-14), a derivative of the 25 items was used to measure resilience-the ability of an individual to cope with life challenges, thrive, and

make meaning from challenges. According to Wagnild, resilience comprises 5 major characteristics of a meaningful life: "purpose, perseverance, self-reliance, equanimity, and existential aloneness (i.e. coming home to yourself)". Purpose, amongst these features, represents the most important characteristic and lays the foundation for others [29]. The RS-14 is scored on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Both the 25-item version and its short version (RS-14) have good validity and reliability from several studies [29,30]. The internal consistency coefficient for the RS-14 was 0.81 and the RS was 0.87 [30].

The 'Patient Health Questionnaire-4' (PHQ-4) is a combination of the PHQ-2 - a screening tool for depression and the GAD-2 a screening tool for generalized anxiety disorders (GAD) [31]. The PHQ-2 collects self-report information about 2-core symptoms of depression while GAD-2 collects information about core symptoms of anxiety disorders. The PHQ- 4 is scored on a 4-point Likert scale ranging from 0 - 'not at all', 1- 'several days but less than one week', 2- 'more than half the days', and 3- 'nearly every day. The overall PHQ-4 score was graded as 0–2 (normal), 3–5 (mild), 6–8 (moderate), and 9–12 severe (9–12). At a cut up point of 2, it provides a brief, valid and reliable assessment of psychological distress [31,32].

2.4. Statistical analyses

The data were coded and analyzed using SPSS version 23 statistical software. Descriptive statistics were performed. Values of the different subscales of R-SPQ-2F (DA, SA, DM, DS, SM, and SS) were calculated following the guide in Biggs' R-SPQ-2F questionnaire. Pearson's correlation coefficient of R-SPQ-2F alongside its subscales, the RS-14, the PHQ-4, and other continuous variables were determined. The mean differences in R-SPQ-2F, PHQ-4, and RS-14 scores between males and females were calculated using an independent t-test. A p-value of <0.05 was considered significant.

3. Results

A total of one hundred and fifty-six took part in the study representing a response rate of 94%, however, 13 (8.3%) of the responses were discarded because some of the items in the questionnaire were not responded to. Eighty-six (60.1%) of those who completed the questionnaires were males while the remaining were females. Their ages ranges from 20 to 47 with a mean of 25.13 (SD = 3.46). A total of 60 (42%) experienced

significant psychological distress, mostly in the mild form (24.5%). The majority, 72 (50.4%) of the participants reported moderate resilience while about a third reported a high level of resilience. The mean score on the deep learning scale was 31.36 (SD = 6.93) while that on the surface learning approach was 26.84 (SD = 7.50). Other general measures were as shown in [Table 1](#).

[Table 2](#) shows the correlation between continuous variables (learning approaches, resilience, psychological distress, age, and academic levels). There was no significant correlation between various learning approaches and age ($p > 0.05$). However, there was significant positive correlation between experiencing psychological distress and surface strategy ($r = 0.191$, $p = 0.022$), as well as with academic levels ($r = 0.234$, $p = 0.005$). Likewise, a significant negative correlation between psychological distress and deep learning ($r = -0.179$, $p = 0.032$), deep motive ($r = -0.201$, $p = 0.016$), and resilience ($r = -0.193$, $p = 0.021$). Significant positive association was also found between deep learning ($r = 0.213$, $p = 0.011$), deep motive ($r = 0.265$, $p = 0.001$) and resilience.

[Table 3](#) shows the comparison of mean scores of both genders on age, resilience, learning approaches, and PHQ-4 scores. There was no significant difference in the mean resilience scores ($t = -0.859$, $p = 0.392$), the PHQ-4 scores ($t = -0.577$, $p = 0.565$), and the Study Process Questionnaire and its subscales scores ($p > 0.05$). The details of the differences in the learning strategies scores of both genders are shown in [Table 3](#).

4. Discussion

We examined the relationship between learning approaches, and students' resilience and psychological distress while considering various learning approaches adopted by medical students in their clinical clerkship. Participants, on average, had a

higher mean score on the deep learning scale compared with the surface learning, which affirmed earlier findings that medical students were more likely to adopt a deep approach to learning. Earlier reports had shown that strategic and deep approaches are the most common learning approaches commonly adopted by medical students albeit superficial approach is not uncommon [2,3]. The fact that medical education, particularly during clinical clerkship encourages critical analysis of information, linkage of knowledge and concepts, and application of prior knowledge in problem-solving in a new context may explain the prominence of the deep learning approach [2,3,14]. Nonetheless, a mixture of approaches was not unlikely to be adopted [2,8].

In this study, we did not find significant differences in learning approaches adopted by male and female participants. Prior studies have reported mixed findings, with some reporting association between learning approaches or styles and gender [33–35]. and others reporting no association [3,36]. Most students, nonetheless, were likely to use multimodal approaches [33] depending on other factors.

Forty-two percent (42%) reported some form of psychological distress, of which majority were mild. Studies had shown that medical students do experience psychological distress [37,38]. This may be due to the academic workload, financial challenges, or being self-funded, clinical year, age, gender, and academic performance [37–39]. As noted in this study, the higher the academic level, the higher the amount of stress perceived. This may be due to an increased workload and uncertainty surrounding the time of graduation.

There was a positive correlation between psychological distress and surface approach to learning including its subscales. Students with poor psychological well-being were more likely to exhibit low resilience [24], hence, adopt a surface approach to learning. Students with better psychological well-being on the other hand were more likely to be more resilient and adopt a deeper learning approach [25,40]. Nevertheless, a previous study had reported no clear-cut relationships between strategic and deep approaches to learning, and perceived stress or distress, despite predicting higher academic performance [24].

The more resilient a student is, the less stress he or she perceives [41]; and the more likely he or she will adopt a deep approach which may ultimately translate to better academic performance [25,26]. Resilience provides one with the needed capability to cope with stress and anxiety [20,21], and both

Table 1. General measures.

Characteristics	Number	Percentages
Gender		
Male	86	60.1
Female	57	39.9
PHQ-4 scores		
0–2 none	83	58.0
3–5 mild	35	24.5
6–8 mod	18	12.6
9–12 severe	7	4.9
Resilience		
4–64 (low)	22	15.4
65–81 (moderate)	72	50.3
82–94 (high)	49	34.3

Table 2. Correlation between learning approaches resilience, psychological distress and age * Low; ** Moderate, and ***High correlation.

		1	2	3	4	5	6	7	8	9
Age 1	Correlation	1								
PHQ-4 scores 2	Correlation	-0.026	1							
Surface learning 3	Correlation	-0.148	0.150	1						
surface strategy 4	Correlation	-0.143	0.191*	0.871**	1					
surface motive 5	Correlation	-0.116	0.176	0.875**	0.542**	1				
deep learning 6	Correlation	-0.014	-0.179*	-0.108	-0.045	-0.133	1			
deep strategy 7	Correlation	-0.006	-0.124	-0.119	-0.035	-0.168*	0.907**	1		
deep motive 8	Correlation	0.020	-0.201*	-0.067	-0.046	-0.057	0.861**	0.565**	1	
Resilience score 9	Correlation	-0.060	-0.193*	0.070	0.089	0.042	0.213*	0.125	0.265**	1
Academic level 10	Correlation	-0.159	0.234**	-0.044	0.059	-0.131	-0.216**	-0.131	-0.265**	-0.115

stress and resilience had been reported to play important role in mediating academic satisfaction [20,23]. Again, as the academic level increases, the higher the level of distress perceived by this group of students. This may be due to increase workload, uncertainty about the time of graduation due to incessant strikes and other factors earlier enumerated.

As noted in the study, students in the higher academic levels were more likely to adopt a superficial approach to learning compared to their counterparts in the lower classes. A similar observation had

been reported in an earlier study [42]. Assessment drives learning, and as students advance in their career and understand the assessment strategies or formats, they developed learning approaches that aid in achieving maximum score with least effort. Effort needs to be taken by curriculum developers in addressing this declining interest of students in a deep approach to learning. There may be a need to adopt instructional designs with a problem-based learning approach and assessment strategies that allow for critical thinking and in-depth appraisal of facts to mitigate this trend.

Table 3. Independent samples test comparing mean scores of resilience, learning strategies, and PHQ-4 scores of both genders.

	Mean score	F	t	Significance	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
AGE							
Male	25.84	3.835	2.727	0.007	2.388	0.657	4.120
Female	24.02						
Resilience score							
Male	74.13	0.027	-0.859	0.392	-2.030	-6.703	2.643
Female	76.16						
deep motive							
Male	15.78	0.081	-0.104	0.918	-0.063	-1.265	1.139
Female	15.84						
deep learning							
Male	31.23	0.223	-0.262	0.794	-0.311	-2.660	2.037
Female	31.54						
deep strategy							
Male	15.45	0.761	-0.339	0.735	-0.248	-1.697	1.201
Female	15.70						
surface motive							
Male	11.91	3.327	0.237	0.813	0.170	-1.251	1.591
Female	11.74						
surface strategy							
Male	14.63	0.297	-1.443	0.151	-1.056	-2.503	0.390
Female	15.68						
surface learning							
Male	26.53	0.616	-0.595	0.553	-0.763	-3.301	1.774
Female	27.30						
PHQ-4 scores							
Male	2.51	1.286	-0.577	0.565	-0.295	-1.307	0.717
Female	2.81						

4.1. Study limitations

Although findings from this study show association between learning approaches, resilience and the presence of psychological distress, it is difficult to infer the direction of relationship i.e. whether students with low resilience choose surface learning approaches or students who chose surface learning approach develop low resilience and subsequently experience high level of psychological distress. The results however, offer an interesting direction for future prospective study. Again, the instrument was not pretested in this population, however, the questionnaires had been used in similar population in this environment.

5. Conclusions

The study provides insight into the relationship between resilience, psychological distress, and various learning approaches adopted by medical students. Although the majority of the medical students demonstrated moderate to high levels of resilience, quite an appreciable number still experience psychological distress. Both psychological distress and resilience influence the learning approaches of this group of medical students. Efforts to promote a deep approach to learning in this group of students and other medical students may involve efforts at reducing stress, and distress, build resilience, thereby promoting mental well-being.

Ethical considerations

Ethical approval was sought and obtained from the authors' institution's Research and Ethical Committee (EKSUTH/A67/2022/06/003). Written informed consent was sought and obtained from each participant. Confidentiality of information obtained from all the participants was maintained throughout the course of the study.

Other disclosure

None.

Data availability statement

Data can be obtained on reasonable requests from the corresponding author.

Conflict of interest

The authors have no conflict of interests to be declared in connection with this manuscript.

References

- [1] Bucklin BA, Asdigian NL, Hawkins JL, Klein U. Making it stick: use of active learning strategies in continuing medical education. *BMC Med Educ* 2021;21(1):44. <https://doi.org/10.1186/s12909-020-02447-0>.
- [2] Samarakoon L, Fernando T, Rodrigo C, Rajapakse S. Learning styles and approaches to learning among medical undergraduates and postgraduates. *BMC Med Educ* 2013; 13(1):1–6. <https://doi.org/10.1186/1472-6920-13-42>.
- [3] Chonkar SP, Ha TC, Chu SSH, Ng AX, Lim MLS, Ee TX, et al. The predominant learning approaches of medical students. *BMC Med Educ* 2018;18(17). <https://doi.org/10.1186/s12909-018-1122-5>.
- [4] Leite WL, Svinicki M, Shi Y. Attempted validation of the scores of the VARK: learning styles inventory with multitrait–multimethod confirmatory factor analysis models. *Educ Psychol Meas* 2010;70(2):323–39. <https://doi.org/10.1177/0013164409344507>.
- [5] Farajollahi M, Najafi H, Nosrati Hashi K, Najafiyani S. Relationship between learning styles and academic achievement of university students. *Educ Strateg Med Sci* 2013;6(2):83–8. <http://edcbmj.ir/article-1-388-en.html>. [Accessed 8 November 2021].
- [6] Ruffing S, Wach FS, Spinath FM, Brünken R, Karbach J. Learning strategies and general cognitive ability as predictors of gender-specific academic achievement. *Front Psychol* 2015;6:1238. <https://doi.org/10.3389/fpsyg.2015.01238>.
- [7] Kohan N, Janatolmakan M, Rezaei M, Khatony A. Relationship between learning styles and academic performance among virtual nursing students: a cross-sectional study. *Educ Res Int* 2021;2021:e8543052. <https://doi.org/10.1155/2021/8543052>.
- [8] Liew SC, Sidhu J, Barua A. The relationship between learning preferences (styles and approaches) and learning outcomes among pre-clinical undergraduate medical students. *BMC Med Educ* 2015;15(1):44. <https://doi.org/10.1186/s12909-015-0327-0>.
- [9] Mozaffari HR, Janatolmakan M, Sharifi R, Ghandinejad F, Andayeshgar B, Khatony A. The relationship between the VARK learning styles and academic achievement in dental students. *Adv Med Educ Pract* 2020;11:15. <https://doi.org/10.2147/AMEP.S235002>.
- [10] Dolmans DHJM, Loyens SMM, Marcq H, Gijbels D. Deep and surface learning in problem-based learning: a review of the literature. *Adv Health Sci Educ* 2016;21(5):1087–112. <https://doi.org/10.1007/s10459-015-9645-6>.
- [11] Gурpinar E, Kulac E, Tetik C, Akdogan I, Mamakli S. Do learning approaches of medical students affect their satisfaction with problem-based learning? *Adv Physiol Educ* 2013;37(1):85–8. <https://doi.org/10.1152/advan.00119.2012>.
- [12] Lake W, Boyd W. Age, maturity and gender, and the propensity towards surface and deep learning approaches amongst university students. *Creativ Educ* 2015;6(22): 2361–71. <https://doi.org/10.4236/ce.2015.622242>.
- [13] Delgado ÁHA, Almeida JPR, Mendes LSB, Oliveira IN, Ezequiel ODS, Lucchetti ALG, et al. Are surface and deep learning approaches associated with study patterns and choices among medical students? A cross-sectional study. *Sao Paulo Med J* 2018;136:414–20. <https://doi.org/10.1590/1516-3180.2018.0200060818>.
- [14] Subasinghe S, Wanniachchi DN. Approach to learning and the academic performance of a group of medical students – any correlation ?. 2012. <https://www.semanticscholar.org/paper/Approach-to-learning-and-the-academic-performance-a-Subasinghe-Wanniachchi/bfaf102cd3fd7c4ce76866857716c77e9f0ff5bd>. [Accessed 12 November 2021].
- [15] Ainscough L, Stewart E, Colthorpe K, Zimbardi K. Learning hindrances and self-regulated learning strategies reported by undergraduate students: identifying characteristics of

- resilient students. *Stud High Educ* 2018;43(12):2194–209. <https://doi.org/10.1080/03075079.2017.1315085>.
- [16] Lessard A, Butler-Kisber L, Fortin L, Marcotte D. Analyzing the discourse of dropouts and resilient students. *J Educ Res* 2014;107(2):103–10. <https://doi.org/10.1080/00220671.2012.753857>.
- [17] Bailey KA. Indigenous students: resilient and empowered in the midst of racism and lateral violence. *Ethn Racial Stud* 2020; 43(6):1032–51. <https://doi.org/10.1080/01419870.2019.1626015>.
- [18] Martin AJ. Academic buoyancy and academic resilience: exploring ‘everyday’ and ‘classic’ resilience in the face of academic adversity. *Sch Psychol Int* 2013;34(5):488–500. <https://doi.org/10.1177/0143034312472759>.
- [19] Findyartini A, Greviana N, Putera AM, Sutanto RL, Saki VY, Felaza E. The relationships between resilience and student personal factors in an undergraduate medical program. *BMC Med Educ* 2021;21(1):113. <https://doi.org/10.1186/s12909-021-02547-5>.
- [20] Banerjee Y, Akhras A, Khamis AH, Alsheikh-Ali A, Davis D. Investigating the relationship between resilience, stress-coping strategies, and learning approaches to predict academic performance in undergraduate medical students: protocol for a proof-of-concept study. *JMIR Res Protoc* 2019; 8(9):e14677. <https://doi.org/10.2196/14677>.
- [21] Cicchetti D. Resilience under conditions of extreme stress: a multilevel perspective. *World Psychiatr* 2010;9(3):145–54. <https://doi.org/10.1002/j.2051-5545.2010.tb00297.x>.
- [22] Bacchi S, Licinio J. Resilience and psychological distress in psychology and medical students. *Acad Psychiatr J Am Assoc Dir Psychiatr Resid Train Assoc Acad Psychiatr* 2017; 41(2):185–8. <https://doi.org/10.1007/s40596-016-0488-0>.
- [23] Shi M, Wang X, Bian Y, Wang L. The mediating role of resilience in the relationship between stress and life satisfaction among Chinese medical students: a cross-sectional study. *BMC Med Educ* 2015;15:16. <https://doi.org/10.1186/s12909-015-0297-2>.
- [24] Öhrstedt M, Lindfors P. Linkages between approaches to learning, perceived stress and expected and actual academic outcomes among first-semester psychology students. *J Furth High Educ* 2018;42(1):116–29. <https://doi.org/10.1080/0309877X.2016.1206856>.
- [25] de la Fuente J, Fernández-Cabezas M, Cambil M, Vera MM, González-Torres MC, Artuch-Garde R. Linear relationship between resilience, learning approaches, and coping strategies to predict achievement in undergraduate students. *Front Psychol* 2017;8:1039. <https://doi.org/10.3389/fpsyg.2017.01039>.
- [26] MohammadJavad Y, Davood M. The relationship between resilience, Coping Strategies and Learning Approaches and Academic Performance 2020;8(14):205–24. <https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=746544>. [Accessed 10 November 2021].
- [27] Biggs J, Kember D, Leung DYP. The revised two-factor study process questionnaire: r-SPQ-2F. *Br J Educ Psychol* 2001; 71(1):133–49. <https://doi.org/10.1348/000709901158433>.
- [28] Martinelli V, Raykov M. Evaluation of the revised two-factor study process questionnaire (R-SPQ-2F) for student teacher approaches to learning. *J Educ Soc Res* 2017;7(2):9–13. <https://doi.org/10.5901/jesr.2017.v7n2p9>.
- [29] Wagnild G. A review of the resilience scale. *J Nurs Meas* 2009;17(2):105–13. <https://doi.org/10.1891/1061-3749.17.2.105>.
- [30] Abiola T, Udofia O. Psychometric assessment of the Wagnild and Young's resilience scale in Kano, Nigeria. *BMC Res Notes* 2011;4(1):509. <https://doi.org/10.1186/1756-0500-4-509>.
- [31] Materu J, Kuringe E, Nyato D, Galishi A, Mwanamsangu A, Katebalila M, et al. The psychometric properties of PHQ-4 anxiety and depression screening scale among out of school adolescent girls and young women in Tanzania: a cross-sectional study. *BMC Psychiatr* 2020;20(1):321. <https://doi.org/10.1186/s12888-020-02735-5>.
- [32] Christodoulaki A, Baralou V, Konstantakopoulos G, Touloumi G. Validation of the Patient Health Questionnaire-4 (PHQ-4) to screen for depression and anxiety in the Greek general population. *J Psychosom Res* 2022;160:110970. <https://doi.org/10.1016/j.jpsychores.2022.110970>.
- [33] Nuzhat A, Salem RO, Al Hamdan N, Ashour N. Gender differences in learning styles and academic performance of medical students in Saudi Arabia. *Med Teach* 2013;35(Suppl 1):S78–82. <https://doi.org/10.3109/0142159X.2013.765545>.
- [34] Wehrwein EA, Lujan HL, DiCarlo SE. Gender differences in learning style preferences among undergraduate physiology students. *Adv Physiol Educ* 2007;31(2):153–7. <https://doi.org/10.1152/advan.00060.2006>.
- [35] Zakaria NM, Farok NAJ, Adam SK, Nordin SA. Approaches of learning among medical undergraduates of faculty of medicine and health sciences. *Universiti Putra Malaysia*; 2016. Published online 2018:6.
- [36] Bin Eid A, Almizani M, Alzahrani A, Alomair F, Albinhamad A, Albarrak Y, et al. Examining learning styles with gender comparison among medical students of a Saudi university. *Adv Med Educ Pract* 2021;12:309–18. <https://doi.org/10.2147/AMEP.S295058>.
- [37] Al Saadi T, Zaher Addeen S, Turk T, Abbas F, Alkhatib M. Psychological distress among medical students in conflicts: a cross-sectional study from Syria. *BMC Med Educ* 2017;17(1): 173. <https://doi.org/10.1186/s12909-017-1012-2>.
- [38] Sahu PK, Nayak BS, Rodrigues V, Umakanthan S. Prevalence of psychological distress among undergraduate medical students: a cross-sectional study. *Int J Appl Basic Med Res* 2020;10(4):270–5. https://doi.org/10.4103/ijabmr.IJABMR_100_19.
- [39] Arif NMNA, Roslan NS, Ismail SB, Nayak RD, Jamian MR, Mohamad Ali Roshidi AS, et al. Prevalence and associated factors of psychological distress and burnout among medical students: findings from two campuses. *Int J Environ Res Publ Health* 2021;18(16):8446. <https://doi.org/10.3390/ijerph18168446>.
- [40] Behzadnia A, Smith DR, Goodson ML. A cross-sectional examination of the relationship between approaches to learning and perceived stress among medical students in Malaysia. *Educ Health* 2018;31(2):80. https://doi.org/10.4103/efh.Efh_280_17.
- [41] Houpy JC, Lee WW, Woodruff JN, Pincavage AT. Medical student resilience and stressful clinical events during clinical training. *Med Educ Online* 2017;22(1):1320187. <https://doi.org/10.1080/10872981.2017.1320187>.
- [42] Cebeci S. Medical students' approaches to learning and study skills. Published online 2013:5.