

Stressors of Undergraduate Radiography Students during the COVID-19 Pandemic: Basis for Action Plan

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ABSTRACT

The COVID-19 pandemic has introduced unprecedented challenges to higher education, impacting students' well-being. This study investigates stress levels among undergraduate radiography students during the pandemic, focusing on identifying key stressors and their association with socio-demographic factors. A cross-sectional research design was employed, utilizing a researcher-made questionnaire to collect data on stress levels, academic, interpersonal, and environmental stressors. Socio-demographic characteristics, including age, gender, year level, financial status, number of units enrolled, and religion, were also recorded. Data were collected from students in two higher education institutions in Iligan City through an online survey platform. Statistical analyses, including descriptive statistics and regression analysis, were performed to assess stress factors and their relationship with socio-demographic variables. The study revealed moderate overall stress levels among undergraduate radiography students, with academic and interpersonal stressors, such as heavy workloads and familial expectations, identified as prominent sources of stress. Environmental stressors, though moderate, also contributed significantly. Sex was a significant predictor of stress, with female students experiencing higher stress levels. Other socio-demographic factors, including age, year level, financial status, number of units enrolled, and religion, did not significantly influence stress levels. This study provides critical insights into the stressors faced by undergraduate radiography students during the COVID-19 pandemic. The findings underscore the need for targeted interventions and support mechanisms to address academic, interpersonal, and environmental stressors. Sex-specific support and enhanced mental health services should be prioritized to promote student well-being and academic success.

KEYWORDS: COVID-19; Iligan City; Philippines; radiography students; stress

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1. Introduction

The pandemic paved the way for new challenges in academia, not only for teachers but students. The conventional way of lesson delivery was abruptly replaced with technology, which fortunately enabled formal education to continue amidst the pandemic. The lockdowns and varying quarantine classifications in different towns and municipalities in the country also comprised the new challenge posed by the pandemic because students cannot easily meet with each other physically and cannot consult with teachers face-to-face on matters they find confusing. Adding to the dilemma is the lack of stable internet connection for most radiography students.

Because numerous elements work as a stress trigger in today's world, stress has become an inextricable aspect of life. COVID-19 has wrecked people all over the world. Stress is not only impacting adults, but it is also affecting children of all ages. Stress management is adamant because parents do not have the time to care for their children adequately. People have a widespread misconception that an adverse event can only generate stress, but the truth is a positive experience may also cause that tension. In terms of student stress, a variety of factors might contribute to stress in a student's life, including a mismatch between the student and the teacher, which can produce tension and stress. It has also been blamed on a lack of parental attention for the attacks on all students. Children often do not pay attention to their eating habits, so they are more prone to stress. In addition, poor sleep is another prevalent cause of stress, and students worldwide are affected by it.

In the United States, an increased level of stress and burnout was noticed among radiography students and their families [1]. The main objective was to point out the primary reason or the source of the increase in the stress level for the radiography students and to determine an effective way to alleviate the stress experienced in the workplace. The method used was a survey wherein students were asked about their stressors and to rank them from the greatest to the insignificant in their opinion. The results showed seven major workplace stressors: fear of making a mistake or repeat, feeling unprepared/inexperienced, intimidation by staff and by instructors, difficult or critical patients, hurtful criticism, too much supervision, and negative responses to questions or requests for help. All these students experienced different stressors as radiographers in the workplace and allied health workers; stressors will differ from one field to another and one person to another. Factors that promote a healthy clinical environment are needed for the students, including the availability of an attending instructor, making changes to practice to give space for mistakes and to be learned from, feedback from various tasks, and assurance that mistakes happen.

In the Philippines, Baticulon et al. conducted a national survey among medical students to determine the barriers to online learning during the pandemic [2]. Accordingly, the barriers are categorized into five categories – technological, individual, domestic, and community. These barriers could be a source of stress among students. As mentioned previously, students are only interested in obtaining an acceptable grade, and anything that hinders them or acts as a barrier to that goal may be considered a stressor. These barriers contribute to students' stress, especially among

medical students. The imposition of lockdowns in various areas in the Philippines limited students' physical interaction, resulting in depression, anxiety, and stress.

At the local and even national levels, academic investigations on the challenges of online learning and barriers to excellent online learning experience among college students were already conducted. However, even at the national level, there is a shortage of pertinent literature investigating the stressors faced by medical students, specifically radiography students, in this pandemic. With this, the proponents thus reiterate the importance of this study because this gives radiography professors an insight into the current experience of radiography students amid this pandemic. Therefore, the proponents hope to give a basis for an action plan to address the experienced and lived stressors.

In the Philippines, most students, specifically radiography students, were still affected by the pandemic even though almost two years had passed since its outbreak. Television news reported that radiography students in the Philippines were manifesting a decline in motivation and increased in worry while on the verge of the pandemic. In addition to what has been said, a massive fear for the future is rising because the COVID-19 cases are not yet totally annihilated and the pandemic is uncertain when it will cease.

In Iligan city, the COVID-19 pandemic greatly altered the school life of radiography students due to the immediate shift from conventional face-to-face classes to online, modular, and blended lesson delivery. Only two educational institutions were offering radiographic technology courses in the said city, and the number of students who enrolled this semester is few compared to the pre-covid era.

Even before the emergence of the COVID-19 pandemic, several stressors for radiography students have existed globally. Factors associated with stress among them (radiography students) are academic pressures, social issues, and financial problems. During this pandemic, the same is true with those factors mentioned above. However, some stressors were added in the aforementioned category, which can affect the overall health aspects of the radiography students than during the pre-COVID-19 era.

In light of the circumstances outlined above, this study aimed to investigate the stressors experienced by undergraduate radiography students during the COVID-19 pandemic. The research addressed several key inquiries: firstly, it assessed the stress levels of these respondents in terms of physical, interpersonal, academic, and environmental factors. Secondly, the study explored the potential impact of socio-demographic characteristics on stress levels. Finally, based on the study's findings, an action plan was proposed.

2. Methodology

A cross-sectional research design was employed to gather data from various individuals at a single point in time. This approach was chosen to establish the relationship between stressors experienced by radiography students and the pandemic using numerical data from questionnaires. The research method utilized for this cross-sectional design was a survey, conducted online to adhere to local government policies and ensure the safety of researchers.

The study was carried out in two higher education institutions in Iligan City, selected because they offered Radiologic Technology programs and implemented distance education during the COVID-19 pandemic. The target respondents were freshmen, sophomores, juniors, and senior students in the Bachelor of Science in Radiologic Technology programs. The demographic information collected included optional names, age, gender, year level, financial status, number of units taken, religion, and address. Academic status, whether students were regular or irregular, was not considered in this study. A census sampling technique was employed to include all 149 enrolled radiography students from first to fourth-year levels.

A self-made questionnaire consisting of two parts was used. The first part focused on socio-demographic characteristics, while the second part assessed stress levels in physical, interpersonal, academic, and environmental domains, with a total of forty items answered on a five-point Likert scale.

The data gathering process began with the creation of an online questionnaire using Google Forms. The form included confidentiality and ethical clauses to ensure respondents' data privacy. After coordinating with year-level representatives and school administrators, the questionnaire link was distributed to the respective students and left open for one week. Subsequently, the data was downloaded, organized by year level, and analyzed individually by researchers. Meetings were held to discuss the results collectively and consult with a statistician.

Ethical considerations emphasized confidentiality and informed consent to protect participants' rights. Statistical tools such as frequency and percentage, mean, and regression were employed to analyze the data and determine stress levels, and factors influencing stress levels among the respondents.

3. Results

Table 1 provides valuable insights into the stress levels of the respondents. Overall, the respondents reported a moderate level of stress, with an average mean score of 2.82. This suggests that while stress is prevalent, it does not reach exceptionally high levels.

The highest stress factors identified were predominantly related to academic and interpersonal aspects. "Dealing with difficult subjects" and "Professors giving a lot of activities" were rated as "High" stressors, emphasizing the significant impact of academic challenges and workload on the respondents. Additionally, "Feeling guilty if parents' hope is not fulfilled" emerged as a "High" stressor, indicating that family expectations exert a considerable emotional burden on the respondents.

Environmental stressors, such as "Feeling fearful in an insecure location" and "Disorderly living conditions," were also notable sources of stress. While they did not reach the highest level, they were rated as "Moderate" stressors, highlighting the importance of addressing security and living conditions to reduce stress levels.

Conversely, certain factors, including eating disorders, headache, fatigue, and digestive issues, were rated as "Low" stressors, indicating that they have a relatively minor impact on stress levels. This suggests that respondents do not experience significant stress related to these physical issues.

Table 1. Stress level of the respondents.

Items	Mean	Descriptive Rating
Physical	2.64	Moderate
Anxiety, worry, or phobias	3.21	Moderate
Difficulty in sleeping	3.04	Moderate
Feeling sad or depressed	2.99	Moderate
Irritability	2.88	Moderate
Tensed muscles, neck, and back sores	2.64	Moderate
Eating disorders	2.54	Low
Headache	2.42	Low
Fatigue	2.37	Low
Restlessness or itching	2.21	Low
Diarrhea, cramps or constipation	2.07	Low
Interpersonal	2.48	Low
Feeling guilty if parents' hope is not fulfilled	3.59	High
Feeling pressured on the high expectations of family, relatives, and friends	2.95	Moderate
Easily distracted with problems	2.86	Moderate
Do group tasks individually rather than being with a large group	2.81	Moderate
Prefer to be alone than have friends for fear of being judged	2.40	Low
Sensing that relatives look down on one's intellectual capacity	2.33	Low
Parents failing to convey care but having high expectations	2.18	Low
Feeling disturbed when encountering relationship problems	2.01	Low
Teachers or instructors lacking support	1.90	Low
Perceiving a lack of family support for academic endeavors	1.80	Low
Academic	3.06	Moderate
Dealing with difficult subjects	3.57	High
Professors giving a lot of activities	3.55	High
Pressure associated with reporting or a return demonstration	3.26	Moderate
Unable to provide the right response due to nervousness/anxiety	3.23	Moderate
Submission deadlines	3.23	Moderate
Managing academic workloads	3.02	Moderate
Juggle time between study and society involvement	2.94	Moderate
Getting low scores in activities/quizzes	2.85	Moderate
Professors have preconceived ideas about intellectual capacity	2.63	Moderate
Interest in academics	2.33	Low
Environmental	3.08	Moderate
Feeling fearful in an insecure location	3.52	High
Disorderly living conditions	3.39	Moderate
Noise in the surroundings	3.32	Moderate
Poor internet connectivity	3.19	Moderate
Pollution	3.13	Moderate
Crowded environments	3.11	Moderate
Current news, such as wars and rumors of war	3.05	Moderate
Environment not conducive to learning	2.75	Moderate
Lack of necessary technologies	2.68	Moderate
Weather conditions	2.67	Moderate
Overall	2.82	Moderate

Note: 4.20–5.00=Very High; 3.40–4.19=High; 2.60–3.39=Moderate; 1.80–2.59=Low; 1.00–1.79=Very Low

Table 2 presents the results of the analysis examining the influence of various socio-demographic characteristics on the level of stress among the respondents. The variables considered in this analysis include age, sex, year level, financial status, number of units enrolled, and religion.

Firstly, the constant term in the regression model has a coefficient of 2.416 with a p-value of .000, indicating that when all other predictors are held constant, there is a significant baseline level of stress among the respondents. Age, which represents the respondents' age, has an unstandardized coefficient of 0.266 and a p-value of .145. Although the coefficient suggests a positive relationship between age and stress, the p-value is greater than the conventional significance level of .05, indicating that age does not significantly influence stress levels in this sample. Sex has an unstandardized coefficient of 0.525 with a p-value of .003. This finding indicates that there is a statistically significant association between gender and stress levels. Specifically, female respondents (coded as 1) tend to experience higher stress levels compared to their male counterparts (coded as 0).

Year level, representing the academic year of the respondents, has an unstandardized coefficient of -0.055 with a p-value of .434. The negative coefficient suggests a potential inverse relationship between year level and stress, but the p-value is not statistically significant. Therefore, year level does not appear to have a significant impact on stress levels among the respondents. Financial status, as indicated by the respondents' financial well-being, has an unstandardized coefficient of -0.003 and a p-value of .963. The p-value is much higher than the significance threshold, indicating that financial status does not significantly influence stress levels in this context.

Number of units enrolled, which reflects the academic course load, has an unstandardized coefficient of -0.027 and a p-value of .191. While the negative coefficient implies a potential inverse relationship between course load and stress, the p-value does not reach statistical significance. Therefore, the number of units enrolled does not have a significant effect on stress levels among the respondents. Religion, representing the respondents' religious affiliation, has an unstandardized coefficient of 0.005 and a p-value of .938. The p-value is notably higher than .05, suggesting that religious affiliation does not play a significant role in influencing stress levels among the respondents.

In summary, the analysis of socio-demographic characteristics reveals that sex significantly affects stress levels, with females experiencing higher stress than males. However, age, year level, financial status, number of units enrolled, and religion do not show significant associations with stress levels in this sample.

Based on the results of the study, an action plan was formulated. The action plan was designed to address and mitigate the stress factors identified in the previous analysis. These stressors were primarily related to academic, interpersonal, and environmental aspects, each contributing to the respondents' overall stress levels.

The first set of actions focused on academic stressors. It proposes the implementation of "Academic Support Programs" by academic affairs and faculty to provide students with additional resources such as tutoring and study skills workshops. Additionally, a "Faculty Workload Assessment" led by the school administration aims to ensure a balanced distribution of assignments, reducing academic stress.

The action plan also addressed interpersonal stressors, notably those related to familial expectations. It suggests organizing "Parental Expectations Forums" facilitated

Table 2. Influence of socio-demographic characteristics on the level of stress among the respondents.

Variables	Unstandardized Coefficients	
	B	p-value
Constant	2.416	.000
Age	0.266	.145
Sex	0.525	.003
Year Level	-0.055	.434
Financial Status	-0.003	.963
Number of Units Enrolled	-0.027	.191
Religion	0.005	.938

Table 3. Action plan to reduce stress level among the respondents.

Action Step	Responsible Party	Timeline	Resources Required	Outcome/Expected Impact
Academic Support Programs	Academic Affairs, Faculty	Ongoing	Academic resources, tutoring, workshops	Strengthen academic support systems, including tutoring services and study skills workshops, to help students cope with difficult subjects and workload.
Faculty Workload Assessment	School Administration	Within 6 months	Surveys, data analysis	Conduct an assessment of faculty workload to ensure a balanced distribution of assignments and reduce academic stressors.
Stress Management Workshops	Counseling Services, Faculty	Within 3 months	Workshop materials, facilitators	Organize stress management workshops targeting academic stress, time management, and coping strategies.
Parental Expectations Forum	Student Affairs, Counseling	Within 4 months	Workshop resources, facilitators	Host forums and workshops for students and parents to facilitate understanding and manage parental expectations.
Campus Security Enhancement	Campus Security, Facilities	Within 6 months	Security measures, facility improvements	Enhance campus security measures and create a safer environment to reduce environmental stressors.
Student Housing Improvements	Housing Services	Ongoing	Facility upgrades, cleanliness	Improve student housing conditions and cleanliness to reduce stress associated with living conditions.
Mental Health Support	Counseling Services	Ongoing	Counselors, outreach programs	Expand mental health services, providing accessible support for students dealing with stress, anxiety, or depression.
Gender-Specific Support	Counseling Services	Ongoing	Counselors, support groups	Offer gender-specific support groups and counseling services to address gender-related stress disparities.

by student affairs and counseling services to foster understanding and manage these expectations effectively.

To alleviate environmental stressors, the plan proposes a "Campus Security Enhancement" project by campus security and facilities, aiming to enhance security measures and create a safer campus environment. Furthermore, "Student Housing Improvements" led by housing services aims to enhance living conditions, reducing stress associated with disorderly housing.

Recognizing the importance of mental health, the plan recommends expanding "Mental Health Support" services provided by counseling services to ensure accessible support for students dealing with various stressors. Finally, the action plan includes "Stress Management Workshops" and "Gender-Specific Support" organized by counseling services and faculty to equip students with stress coping strategies and provide tailored support for gender-related stress disparities.

The expected outcomes of this action plan include reduced stress levels among students, a safer and more conducive learning environment, improved mental health support, and enhanced academic resources. Regular assessments and feedback mechanisms will ensure the effectiveness of these initiatives in promoting student well-being and academic success.

4. Discussion

This study shed light on the stress levels experienced by the undergraduate radiography students during the COVID-19 pandemic and offer valuable insights into the factors contributing to their stress. Overall, the study reveals that the respondents reported a moderate level of stress, with an average mean score of 2.82. This indicates that while stress is prevalent among the surveyed population, it does not reach exceptionally high levels. This finding aligns with previous research that often characterizes college or university students as experiencing moderate levels of stress due to various academic and personal pressures [3].

Interestingly, the highest stress factors identified in this study were primarily linked to academic and interpersonal aspects. "Dealing with difficult subjects" and "Professors giving a lot of activities" were rated as "High" stressors, underscoring the substantial impact of academic challenges and workload on the respondents. These findings corroborate the existing literature, which highlights the academic demands and rigorous coursework as common sources of stress for students [4].

Furthermore, the study identified "Feeling guilty if parents' hope is not fulfilled" as a "High" stressor, emphasizing the considerable emotional burden imposed by family expectations. This aligns with previous research that has consistently shown that family-related stressors, including parental expectations, can significantly influence the psychological well-being of college students [5].

Environmental stressors, such as "Feeling fearful in an insecure location" and "Disorderly living conditions," while not reaching the highest stress level, were rated as "Moderate" stressors. This underscores the importance of addressing security and living conditions to reduce stress levels among students. Previous studies have also highlighted the impact of environmental stressors, including concerns about safety and housing conditions, on students' overall well-being [6].

Conversely, certain factors, including eating disorders, headache, fatigue, and digestive issues, were rated as "Low" stressors, indicating that they have a relatively

minor impact on stress levels among the respondents. This suggests that these physical issues do not contribute significantly to the overall stress experienced by the respondents, a finding supported by previous research that often places greater emphasis on academic and interpersonal stressors in the college setting [7].

The regression analysis reveals that sex significantly affects stress levels, with female respondents reporting higher stress levels than their male counterparts. This sex-related disparity aligns with numerous studies that consistently find that female students tend to experience higher levels of stress and anxiety in academic settings [8-10]. The results emphasize the need for targeted interventions and support mechanisms to address sex-specific stressors.

5. Conclusion

This study underscores the prevalence of stress, with a particular focus on academic and interpersonal stressors, among undergraduate radiography students during the COVID-19 pandemic. The findings emphasize the importance of academic support programs and faculty workload assessment to address the challenges of difficult subjects and heavy workloads. Additionally, effective communication channels between parents and students are crucial in managing familial expectations. Environmental stressors and sex-specific variations further highlight the need for enhanced campus security, improved housing conditions, and tailored support for female students.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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References

1. Mason, S.L. Radiography student perceptions of clinical stressors. *Radiologic Technology* **2006**, *77*, 437-450.
2. Baticulon, R.E.; Sy, J.J.; Alberto, N.R.; Baron, M.B.; Mabulay, RE; Rizada, L.G.; Tiu, CJ; Clarion, C.A.; Reyes, J.C. Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Med Sci Educ* **2021**, *31*, 615-626.
3. Bell, A.S.; Rajendran, D.; Theiler, S. Job stress, wellbeing, work-life balance and work-life conflict among Australian academics. *J Appl Psychol* **2012**, *8*.

4. Ban, N.; Shannon, H.; Wright, C.J.; Miller, M.E.; Hargis, LE; Usher, EL; Hammer, JH; Wilson, SA. Identifying common perceived stressors and stress-relief strategies among undergraduate engineering students. *ASEE Ann Conf Expo* **2022**.
5. Pitt, A.; Opreescu, F.; Tapia, G.; Gray, M. An exploratory study of students' weekly stress levels and sources of stress during the semester. *Active Learn Higher Educ* **2018**, 19, 61-75.
6. Yikealo, D.; Yemane, B.; Karvinen, I. The level of academic and environmental stress among college students: a case in the college of education. *Open J Soc Sci* **2018**, 6, 40.
7. Huang, Y.; Lv, W.; Wu, J. Relationship between intrinsic motivation and undergraduate students' depression and stress: the moderating effect of interpersonal conflict. *Psychol Rep* **2016**, 119, 527-538.
8. Pourrajab, M.; Rabbani, M.; Kasmaienezhadfad, S. Different effects of stress on male and female students. *Online J Couns Educ* **2014**, 3.
9. Amr, M.; El Gilany, AH.; El-Hawary, A. Does gender predict medical students' stress in Mansoura, Egypt? *Med Educ Online* **2008**, 13, 4481.
10. Mishra, M. A comparative study on academic stress level of male and female B. Ed. students. *Indian J Health Wellbeing* **2018**, 9.

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