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Original Research Article

A study of stress factors during the learning of anatomy in Gaston Berger University of Saint-Louis

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ABSTRACT

Among medical students, stress has always been a major problem. Medical studies are known to be long, stressful, and difficult. The dropout rate is high in medical studies; it is often associated with chronic fatigue and a permanent state of stress. The objectives of our work were to determine the different aspects of stress, to assess the intensity of stress, to determine an association between perceived stress and socio-demographic characteristics; and to make recommendations to optimize our student's performance.

This was a cross-sectional and descriptive study aimed at determining the different aspects of stress experienced by license 2 and license 3 medical students at Gaston BERGER University during the teaching of anatomy. We proposed 29 questions with 5-level Likert scale responses.

The response rate was 91.5% with a male predominance (sex ratio of 1.17). The minimum, average and maximum stress degrees were 4%, 54.52% and 100% respectively; the intensity was higher among female students (60%) than male students (50%); the youngest between 18 and 21 years old had a stress intensity of 50%; and 60% between 22 and 25 years old.

Our study, which focused on the stress experienced by medical students during the "anatomy and organogenesis" teaching unit, highlighted many particularities. It appeared that stress is relatively common among medical students, and that most of them are moderately or highly stressed. We also found that the issue of stress is only rarely discussed with the teacher, or between students. Moreover, the existence of the "stress" factor and its poor management with students are directly correlated to academic performance.

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1. Introduction

In recent years, the word "stress" has been used more and more, it is easy to notice that it is on the increase and that it is becoming a major social issue in our society.¹ If today, we carried out a study in the field, a micro-sidewalk to ask passers-by if they know about stress, 100% would probably

answer "yes". If we asked them to explain it to us, what might their answer be? a student would think about his exams, an overworked boss about the smooth running of his business ... so many situations that everyone interprets as stressful in a subjective way. Often stress is associated with a feeling, an emotion, which the individual interprets as the cause of his state of stress. While everyone has their own definition of stress, the fact remains that it is universal.² Perceived by many as a negative element, this response is an inevitable phenomenon, a source of sensory and motor

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excitation making it possible to adapt to life on earth and to develop.³

Stress is a major problem among medical students.⁴ Medical studies are known to be particularly long, stressful, and difficult. The medical student is, in fact, subject to several obstacles during his university curriculum, and a high level of stress can have a negative effect on the cognitive functioning and learning of these students in a medical school.⁵ The objective of our work was to determine the different aspects of stress experienced by students in a university environment, explicitly the stress around the learning of anatomy (lectures, tutorials, preparation of written exams, group work, personal work...).

2. Materials and Methods

This is a cross-sectional and descriptive study aimed at determining the different aspects of stress experienced by students in a university environment, more specifically the stress around the learning of anatomy (lectures, tutorials, preparation of evaluations written, group work, personal work, etc.), via the declarations of students in license 2 and license 3 of Medicine, based on a self-administered questionnaire, given to students.

The study was carried out using a questionnaire that was specially developed and validated to conduct our survey, based on a review of the literature. This questionnaire includes 29 questions in the form of multiple-choice questions with a 4 level Likert scale and divided into 4 sections. At the end of each questionnaire, the students were free to add personal comments.

The questionnaire was tested on license 2 and license 3 medical students at Gaston Berger University in Saint-Louis, Senegal. It should be noted that participation was voluntary. We distributed the questionnaires in the classrooms in March 2021. All participants were informed of the objectives of the study, their participation was voluntary with respect for anonymity. The average response time, previously estimated at 60 min, was respected.

Statistical analysis was performed using SPSS software. The descriptive analysis consisted in calculating the absolute and relative frequencies for the qualitative variables, and the positioning and dispersion parameters for the quantitative variables (means and standard deviations).

3. Results

The total number of questionnaires collected at the end of the data collection is 140 out of 153 students in L2 and L3, i.e., a response rate of 91.5%. Among the 140 questionnaires, one L3 student did not complete the second page, which gives us 139 correctly completed questionnaires. This workforce breaks down as follows:

1. 80 students out of the 82 second-year students, i.e., a response rate of 98%.
2. 59 students out of 71 third-year students, a response rate of 83.10%.

3.1. Descriptive statistical study

3.1.1. Gender

Our study population included 47% (75) male students and 53% (64) female students. The predominance was male (Figure 1).

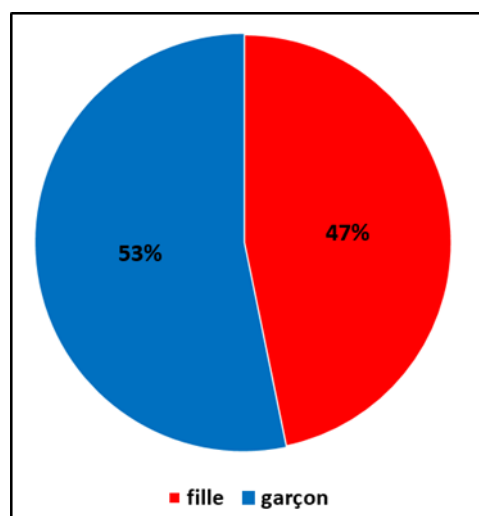


Fig. 1: Graphical representation of the population studied according to sex (male in blue and female in red)

3.1.2. Distribution of students by age

The average age of the students was 21, 30 with extremes of 18 and 25 years old and the standard deviation was 1.36. The distribution of students according to age groups is shown in Figure 2.

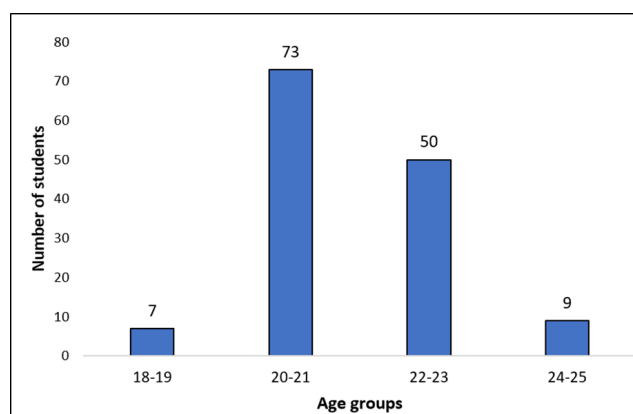


Fig. 2: Graphic representation of the distribution of the population studied according to age

3.1.3. Stress intensity

1. 14% (20 students) had a very high stress intensity between [80-100].
2. 32% (44 students) were between [60-80].
3. 37% (51 students) had a stress intensity between [40-60].
4. 13% (18 students) had a stress intensity between [20-40].
5. 4% (6 students) had low stress intensity below 20% (Figure 3).

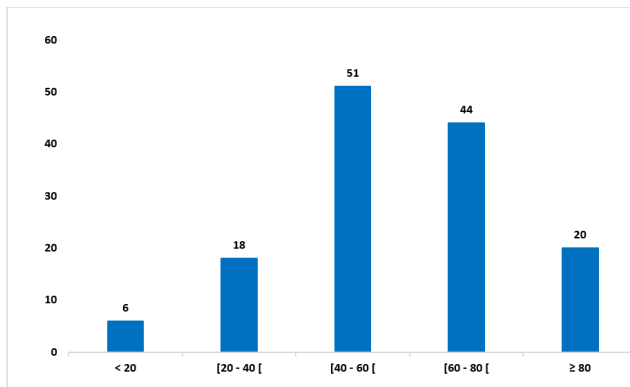


Fig. 3: Distribution of students according to stress degree

The maximum stress degree was 100%, the minimum 4% with an average of 54.52% and the standard deviation was 21.4.

4. Discussion

Stress is a concept widely disseminated and used both in daily and professional life, several studies in Europe or America speak of student stress. In general, entering university is a potentially stressful time that requires many adaptations.⁶ The beginning of university studies is therefore a delicate stage of transition which will serve as a learning process for autonomy and represents the transition to adult life and the professional future.

The various works, essentially quantitative studies, using different types of scales (quality of life, burnout, depression, etc.) clearly show that this is a very special population because it is subject to intense stress and to a deep unhappiness. It seemed interesting to us to focus on this population, because as future doctors, they will have to manage stressful situations, both privately and professionally.⁷

The experience of studying at university and the impact of stress would not be the same depending on the year of study. Hellemans, in 2004, claims that the level of perceived exam stress increases among first-year university students.⁸ We found several studies about stress in medical students that showed high stress intensity in undergraduate

medical students. Our results point in the same direction. The majority (82%) were found to have significant stress intensity with minimum, average and maximum stress intensity being 4%, 54.52% and 100% respectively.

A study was conducted among students of the Faculty of Medicine and Pharmacy of Fez.⁹ According to the stress level, 11.3% of the students had a severe stress level, 51.5% had a moderate stress level while 34.8% had a low stress level. A study done on Stress and coping strategies in medical students showed that students have a greater high stress intensity during the first-year.⁵ In another study conducted among undergraduate medical students in Mumbai, Maharashtra, between January and June 2018, among 356 participants, 324 participants (91%) suffered from high levels of stress.

The prevalence of stress among university students has been addressed by many studies in many countries.⁸ In France, Vandentorren et al., in 2005 show that 79% of students declare themselves stressed.⁸ The USEM17 survey establishes that 36.2% of students have difficulty managing their stress (USEM, 2007). The same survey, in 2009, declared a high rate of stress at 35.5% (USEM, 2009). In addition, 12% of undergraduate students have a high level of stress in a French study (Neveu, 2010).⁸

However, opposite results can be seen in some studies. For example, Mazé and Verhac in 2013 find that students do not show a particularly high level of stress ($M = 1.55$ on a scale ranging from 0 to 9).¹ Boudoukha and his team (2011) find that students rarely declare themselves stressed in general by "loneliness or academic functioning, but more specifically by "revisions, the amount of work, or even the fear of failure in the competition, items belonging to academic stress".¹⁰ The background of the students at the university also plays an important role according to the scientific literature. Indeed, studies highlight this problem particularly among medical students (Abdulghani et al., 2011; Bughi et al., 2006; Koochaki et al., 2011; O'Brien et al., 2012; Shaikh et al., 2004; Sherina et al., 2004; Sreeramareddy et al., 2007) and in odontology (Acharya, 2003; Rosli et al., 2005). However, Masten and his team in 2009 did not observe significant differences in stress coping strategies between three groups of medical, sports, and psychology students.¹¹

Stress is a major problem among medical students.⁴ Medical studies are known to be particularly long, stressful, and difficult. The medical student is subject to significant stress on several occasions during his university career and a high level of stress can have a negative effect on the cognitive functioning and the learning of these students in a medical school.⁵ The study by Pereira and Barbosa in 2013 confirmed that the stressors perceived by medical students are intense and diversified, and the strategies used to manage this stress are far-reaching.¹² The working and supervision conditions are different from those of secondary education:

Table 1: Results of the survey questionnaire

S.No.	Proposals	Strongly disagree	Disagree	Agree	Strongly agree
1.	My anatomy studies require me to learn new things	0	0	63	76
2.	I don't feel stressed at all in anatomy	40	83	12	4
3.	During my anatomy studies, I have to be creative	11	14	86	28
4.	My anatomy studies consist of doing the same things repeatedly	10	8	57	64
5.	During anatomy class, I can do several different things	41	74	8	16
6.	During anatomy class, I can develop my personal skills	17	40	56	26
7.	My anatomy studies allow me to make decisions independently	11	54	53	19
8.	I have complete freedom to decide how my anatomy studies go	64	49	10	16
9.	I have little influence on how things turn out happen during the learning of anatomy	11	24	76	28
10.	Teaching anatomy requires going very fast and it stresses me out	10	8	57	64
11.	My personal work in anatomy requires very hard work mentally	10	16	65	48
12.	In anatomy, I am not asked to do an excessive amount of work	31	74	18	16
13.	I have enough time for my personal work in anatomy	61	63	11	4
14.	I think it takes stress to succeed in medical studies	42	27	45	25
15.	My personal work in anatomy requires me to concentrate intensely for long periods of time and it is stressful	9	30	65	35
16.	In anatomy, my task is often interrupted before I have it finished, so I must come back to it later	8	14	74	43
17.	Anatomy classes are very often hectic	26	58	38	17
18.	I am often slowed down during anatomy class because I must wait for the other students to understand	48	70	18	10
19.	I would like the issue of the stress of medical studies to be addressed more often by our teachers	0	0	39	100
20.	My anatomy teacher pays attention to what I say	5	15	63	56
21.	My anatomy teacher has a hostile and stressful attitude towards me	72	55	12	0
22.	My anatomy teacher facilitates the flow of anatomy studies	30	34	36	39
23.	I think medical studies are more stressful than others	10	16	49	64
24.	On campus there are activities to combat and prevent stress	35	35	42	27
25.	I feel more stressed in anatomy than in other disciplines	35	76	22	6
26.	Our various teachers (in anatomy or others) never talk to us about the stress of medical studies	4	5	40	90
27.	I frequently discuss stress with my peers	54	54	17	14
28.	The anatomy students I work with seem less stressed than me.	14	70	44	11
29.	I think stress can prevent any student from achieving their educational goals	15	54	41	29

Table 2: Descriptive statistics

	N	Minimum	Maximum	Mean	Standard deviation
How would you rate the degree of stress you felt when fixing anatomy tests	139	4	100	54,52	21,400
Valide N (liste)	139				

the workload is often greater, as well as autonomy. Students entering university suddenly find themselves alone in the middle of everyone. The student learns to manage his personal work and revisions himself. Yet, 32% of students say they often feel overwhelmed.

Increasingly, some students are dropping out of school. Depression, fatigue, stress seem to be associated with an increased probability of intentions to drop out of school. Medical training would be risky to the mental health of students.¹³ Regardless of factors such as age and gender, our work revealed considerations in the target population. Anatomy is still considered a fundamental discipline and all students are of this opinion regardless of their level of stress. Many works reveal important changes in disciplines such as anatomy and physiology, however these disciplines keep a important place at the beginning of medical studies.⁵ Moreover, in nearly 9 out of 10 students surveyed, our work shows that anatomy, although stressful, remains an entertaining discipline for learners.

It also emerges from our work that the notion of stress is correlated, for students, with a low freedom of action in learning activities. Indeed, the 75% of the most stressed students find that they have little influence on how things go during anatomy teaching. This trend is confirmed by several studies which show the interest of diversifying learning methods, and of empowering learners.⁵

Other contextual factors have also been studied, related to the intensity of stress. It emerges that the speed with which lessons are run is stressful, as is the large volume of time allocated to the "anatomy and organogenesis" teaching unit: 87% of students believe that the learning anatomy requires to go fast and that it is stressful, and 90% of them think that they do not have enough time for personal work in anatomy. These tendencies are inherent in many fundamental disciplines. They are only partly due to the volume of lessons. Indeed, the predominant factor here is the lack of experiences (as learners) of first- or second-year medical students.¹³ The learning strategies are not yet established, nor adapted to medical studies. This results in an additional stressor. As proof, the more the medical student evolves in his course, the less likely he is to fail, including for disciplines with a high volume of hours.^{7,14,15}

Our students also associate stress with other factors, such as the nature of the medical studies (starting a medical course requires a lot of skills and unfailing determination), the goal of success (for half students (stress is a prerequisite for success), the need to concentrate intensely, the monotony

in the anatomy class (the least stressed students are those who find that the class is lively), the non-existence of exchanges around stress between learners and teachers (the issue of stress has never been addressed for almost all of them), the attitude of the teacher (the hostile teacher is stressful, especially when he does not share either the course objectives or the teaching program), the scarcity of activities to combat or prevent stress at the level of the educational campus.

The multifactorial stress that is reported here by our learners makes it possible to set the context of medical studies in sub-Saharan Africa. It demonstrates the need to adopt another, more inclusive approach for medical studies, placing the student at the center of his training.^{16–18} Many works before ours have shown the relevance of considering the environment in which the student evolves, as a factor of academic success or failure. Indeed, experience shows that the academic team focuses mainly on the didactic aspect of medical studies, even though the learning context is as important.^{7,19,20}

5. Conclusion

Stress has been the subject of several works for several years, given its harmful effects on a person's balance. In fact, it is responsible for the deterioration of the quality of life, risky behavior with regard to health and/or bad results in examinations. The many changes in the student's life are sources of this.

Our study focused on the stress experienced by students of the first cycle of medical studies at gaston berger university (senegal) during the course of the teaching unit "anatomy and organogenesis". This was a cross-sectional and descriptive study aimed at determining the different aspects of the stress they experience. But also to find an association between perceived stress and socio-demographic characteristics.

We had included 139 students out of 153. The response rate was 91.5% with a male predominance (sex ratio of 1.17). It appeared that stress is relatively common among medical students and most of them are moderately or highly stressed. The minimum, average and maximum stress degrees were 4%, 54.52% and 100% respectively; with a peak between 40 and 80% for the age group of 20 to 22 years. This stress turned out to be more present in women (60%), men (50%) below the average. The crossing of variables highlighted the correlation between the intensity

and expression of stress on the one hand, and various considerations on the other hand (such as the satisfaction of learning "new things", monotony in teaching of anatomy, the speed of the teacher during lessons, the hostility of the teacher, the spirit of medical studies, the scarcity of "anti-stress activities", the mention of the difficulties linked to stress with the teacher or with other students). So the stress stemmed from the relationships of the student, on the one hand with his environment (the university) and with teachers on the other hand. In fact, the student experienced frustrations and felt anxiety in the face of situations beyond his control (heavy workload, busy schedules, academic exams, etc.).

We also found that the issue of stress is only rarely discussed with the teacher, or between students. Moreover, the existence of the "stress" factor and its poor management with students are directly correlated to academic performance.

6. Source of Funding

None


7. Conflict of Interest

The authors declare no conflict of interest through this work.

References

- Mazé C, Verliac JF. Stress and coping strategies of first-year students: Distinctive roles of transactional and dispositional factors. *Psychol Française*. 2013;58(2):89–105.
- Prévôt T, Neurosciences [q-bio NC]. Pathogénicité du stress chronique chez l'adulte dans un modèle murin : impact à long terme et rôle de la somatostatine. Français; 2015.
- Bardou J, Paultre U, Thèse de doctorat Médecine. Etude du stress perçu et de l'empathie chez les internes de médecine générale d'aquitaine. Lyon; 2015.
- Sévigny F, Dodin S, Lamontagne G, Rochefort L, Belleville G. Sources et moyens de réduction du stress chez les étudiants en médecine : analyse d'entretiens focalisés. *Pédagogie Méd*. 2013;14(1):9–15.
- Aurore S, Thèse de doctorat Médecine. Stress et stratégies de coping chez les étudiants en médecine de première et sixième année. Paris; 2014.
- Berrewaert J, Desselles M. Etat des lieux du stress et de la dépression chez les étudiants de 1er et 2ème année de Médecine ». *Acta Psychiatrica Belgica*. 2015;116(2):16–26.
- Aouatef M, Salima MM. Evaluation épidémiologique et hormonal du stress chez les étudiants de tronc commun de l'université Echahid Hama Lakhdar El-Oued; 2017. Available from: <http://dspace.univ-eloued.dz/handle/123456789/359>.
- Dalia S, Thèse de doctorat en psychologie. Santé mentale et gestion du stress chez des étudiants à l'université : mise en place et évaluation d'un programme de gestion du stress par internet. France; 2017. Available from: <https://bdr.parisnanterre.fr/theses/internet/2017/2017PA100024/2017PA100024.pdf>.
- Madani HE, Yazghich I, Baya M, Aarab C, Berraho M. Évaluation des méthodes de gestion du stress chez les étudiants de médecine de Fès : données d'inclusion du projet Stress-free ». *Revue d'Epidémiologie et de Santé Publique*. 2018;66(3):189.
- Boudoukha H, Bonnaud-Antignac A, Chaillou AE. Anxiété et stress : impact de la préparation du concours de pharmacie. *J Behav Cogn Ther*. 2011;21(3):90–6.
- Masten R, Tusak M, Zalar B, Zihrel S. Stress, coping and social support in three groups of university students. *Psychiatr Danub*. 2009;21(1):41–8.
- Ye Y, Zhang Y, Chen J, Liu J, Li XJ, Liu YZ, et al. Internet-Based Cognitive Behavioral Therapy for Insomnia (ICBT-i) Improves Comorbid Anxiety and Depression - a meta-analysis of randomized controlled trials. *PLoS One*. 2015;10(11):e0142258.
- Provost ASL, Loddé B, Pietri J, Parscau LD, Pougnet L, Dewitte JD, et al. Souffrance au travail des étudiants en médecine : étude qualitative par entretiens semi-dirigés. *Rev Med Brux*. 2018;39(1):6–14.
- Truchot D. Le burnout des étudiants en médecine : Rapport de Recherche pour L'Union Régionale des Médecins Libéraux De Champagne-Ardenne. Université de Franche-Comté. Available from: http://internat.martinique.free.fr/biblio/rapport_burnout_etudiant.pdf.
- Crémère ML, Thèse de doctorat Médecine. Stress chez les internes en médecine générale : une étude qualitative. France; 2014. Available from: <https://dumas.ccsd.cnrs.fr/dumas-01100440>.
- Grange A, Thèse de doctorat. Stress chez les étudiants en soins infirmiers : stratégies de coping en prévention : revue de la littérature. Switzerland; 2019. Available from: <https://sonar.ch/hesso/documents/317283>.
- Rikis M, Rezzag B, Mémoire de master en biologie. Evaluation épidémiologique des symptômes du stress et son impact sur la cortisolémie chez les étudiantes de 2ème année tronc commun de biologie. Annaba; 2016.
- Boujut E, Thèse de doctorat Médecine. Facteurs prédisant le développement de symptômes dépressifs, de symptômes somatiques, de troubles des conduites alimentaires et de l'échec académique chez des étudiants de première année; 2007. Available from: <https://www.theses.fr/2007BOR21424>.
- Thevenet M, Thèse de doctorat Médecine. Analyse du burn out chez les internes de médecine générale sur la base d'une étude comparative entre l'Ile-de-France et le Languedoc-Roussillon. France; 2011. Available from: [https://psychanalyse.com/pdf/ANALYSE%20DU%20BURN%20OUT%20CHEZ%20LES%20INTERNES%20DE%20MEDECINE%20GENERALE%20-%20THESE%202011%20\(175%20Pages%20-%201,7%20Mo\).pdf](https://psychanalyse.com/pdf/ANALYSE%20DU%20BURN%20OUT%20CHEZ%20LES%20INTERNES%20DE%20MEDECINE%20GENERALE%20-%20THESE%202011%20(175%20Pages%20-%201,7%20Mo).pdf).
- Coquet J, Thèse de doctorat chirurgie dentaire. Evaluation nationale du stress chez les étudiants en odontologie pédiatrique. France; 2019. Available from: <https://dumas.ccsd.cnrs.fr/dumas-02371745/document>.

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