Background

Medical students are usually subjected to a high workload environment and stress is one of the most important health risks that medical students encounter. The negative impact of stress on the student’s mental and general health in basic science has often been under reported.

Methods and Materials

A cross-sectional questionnaire survey was performed in Avalon University School of Medicine (AUSOM), Curacao, amongst the first to fourth semester basic science students with an objective to explore and understand their perspectives on different health risks.

Results

More than ⅔ of the students (79.61%, n=82) were feeling stressed out during their basic sciences. The mean stress level among the basic science students was 7.42 ± 2.13 (scale:1-10). Common health issues encountered by the students were: sleep problems, impaired concentration, low mood, mood swings, difficulty in making decisions, emotional distress, anxiety, substance abuse, and abnormal weight gain.

Conclusion

Although lack of sleep and behavioral problems are the most common health issues encountered by the pre-clinical medical students. There is an urgent need to implement health promotion strategies in
medical curriculum for mental and physical well-being of the students.

**Keywords**
Medical Students, Medical Education, Health, Risk

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**Competing interests:** No competing interests were disclosed.

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Introduction

Medical school is a stressful time for physicians’ training. Medical students’ workload is considerably higher than that of many other non-medical students. Medical training has been recognized to account for numerous stressors that can directly affect students’ well-being. Academic pressures include issues, such as overwhelming burden of knowledge, different learning styles and the impact of the learning environment (Dunn, Iglewicz and Moutier, 2008; Firth-Cozens, 2001; Tyssen et al., 2000). Due to the associated stressors, medical students have higher risks of developing certain health conditions such as obesity, stress, anxiety, fatigue, and depression (Voltmer, Kötter and Spahn, 2012).

Methods

The aim of our study was to explore and understand the different health risks in medical students. A cross-sectional survey was conducted at Avalon University School of Medicine (AUSOM), Curacao among 103 students of basic science semester MD1 - MD4 during September - December, 2018 semester. Potential participants were informed about the purpose of the study. Only the full-time basic science students attending AUSOM with more than 90% mandatory attendance as per the university attendance regulation were included in the study. Students who declined to be part of the study and were below the required attendance were excluded.

A customary set of questionnaires were organized and distributed into quantitative and qualitative questions (Appendix 1 Questionnaire). Self-reports collecting social demographic data, including gender and current semester were taken into consideration. Questionnaires were gathered, analyzed and recorded after the completion. Stata 15© was used for data analysis. Quantitative data was represented with the help of mean, median, range, standard deviations, as applicable. The standard student’s t-test was applied to test the level of significance for two different groups. P<0.05 as considered to be statistically significant. Faculty senate validated by questionnaires, while the reliability estimated with the Cronbach’s alpha (.87) after the data collection.

Ethical Consideration

Approval for the study was obtained from the research and ethics committee of Avalon University. All the participants involved in this cross-sectional survey were aware of the purpose of this study. Student anonymity was upheld with top priority to ensure confidentiality of the study participants. Data were coded and stored in the university computer and protected with password for the authorized personnel to retrieve and analyze.

Results/Analysis

One-hundred three, out of 105 students, participated in the study from MD1-MD4. More than 2/3 of the students (79.61%, n=82) reported feeling stressed out during basic science studies. Similarly, 43.69% (n=45) of the female and 56.31% (n=58) of the male respondents thought that medical students have a higher risk of health problems than other graduate programs. The mean stress level during the basic science studies was 7.42 ± 2.13 (scale:1-10). While, the mean stress during the examination time was 8.06 ± 2.04 (scale:1-10). The mean stress during the examination time was significantly higher than the average stress during the basic science (mean difference: -0.640 ± 0.288SE; 95% CI -1.2074 to -0.0726; P = 0.0273).

The most common health issues faced by medical students were: sleep problems (16.50%, n=17), impaired concentration (15.53%, n=16), low mood (13.59%, n=14), mood swings (12.62%, n=13), difficulty in making decisions (10.68%, n=11), emotional distress (9.71%, n=10), anxiety (6.80%, n=7), substance abuse (4.85%, n=5), abnormal weight gain (3.88%, n=4), and others not specified (2.91%, n=3). When asked about the ways to endure up with the academic pressure, the majority of students favored watching movies/TV/videos and listening to music (60%), sleeping (30%), exercising (7%), and other various activities (3%).

Regarding the sleep-hour, 6% of students slept 2-4 hours, 26% slept 4-6 hours, 14.5% slept 6-10 hours, and 2% slept 8-10 hours. Number of sleep-hour was compared between male and female students. Results showed that 31% of males and 21% females were getting 4-6 hours of sleep (difference:10%; 95% CI: -1.8810% to 21.5293%; P = 0.0994), and 21% of males and 8% females students were getting 6-10 hours of sleep (difference: 13%; 95% CI: 3.46 to 22.54%; P = 0.0076) respectively.

Discussion

Medical training requires processes and procedures that differ significantly from other courses. High expectations and extensive knowledge-based learning coupled with rigorous clinical training requirements exposes medical students to high levels of stress and other related health problems (Dahlin, Joneborg and Runeson, 2005). A study performed amongst the US and Canadian medical students (Dyrbye, Thomas and Shanafelt, 2006) found high prevalence of
depression and anxiety among medical students with higher overall psychological distress than the general population and age-matched peers. Similarly, incidence of burnout among residents and staff physicians is significantly higher than other professions (Glauser, 2017). In the baseline survey of our study on medical student’s health, we found that most medical students were feeling stressed out in their basic science studies. Sleep problems, impaired concentration, low mood, mood swings, difficulty in making decisions, emotional distress, anxiety, and substance abuse was one of the key findings of our survey, and most of it is likely to be as a result of the academic pressure that each medical student needs to face every day.

In our study, male students had significantly higher sleep-hour than their female counterparts, although it did not achieve statistical significance. Similar to our study, a systematic review showed no significant difference between the depression rate between male and female students (Cuttilan, Sayamanathan and Ho, 2016). However, in our sample male students were at high risk of having health problems compared to female students. Similarly, another study (Giri, Baviskar and Phalke, 2003) concluded that sleep quality in female students is better than the males. Students with daytime sleepiness were associated with higher prevalence of addictions in males. Similarly, obesity is a growing problem among medical students (Rampal et al., 2007; Abbate et al., 2006; Kumar and Ramaiah, 2005). Many medical students suffer from obesity due to the sedentary lifestyle, which makes them at greater risk of developing cardiovascular diseases and blood pressure conditions (Bertsias et al., 2003). A study showed that overall, around 9% of the students experienced weight gain in the first year of university (De Vos et al., 2015). Only 4.85% of students reported abnormal weight gain in our study, possibly due to our sample representing the first two years of medical studies.

Stress has been found to impair both mental and physical health, greater the stress the greater the impairment (Sadeghi et al., 2018; Toussaint et al., 2014). Stress free lifestyle is known to have a major impact on the general health and academic performance of medical students. Beyond doubt, stress in medical school is likely to predict mental health problems later in life. But medical students seldom seek medical attention for their problems (Abdulghani et al., 2011). It is imperative to find out the health risks in medical students to address them effectively (Glauser, 2017). Many medical schools have started initiatives to reduce health risks in medical students through personal stress management programs, provision of support groups, organization of workshops, and formation of well-being committees and other psychosocial support (Yiu, 2005). We recommend that medical schools should acknowledge these substantial health risks in medical students and formulate plans and policies to integrate systematic programs, early in curriculum, to decrease their health burden.

At Avalon University, there is help for students who are going through stress and personal issues by psychology counselor. Students can approach the counselor if they have any issues. At orientation, students are introduced to the school’s professional psychological counsellor program for an individual or family counselling including, but not limited to, depression, anxiety, and substance abuse. To maintain confidentiality, the student can directly contact the counsellor or may ask the help of the secretary, if desired, without the involvement of the faculty. At orientation, the student affairs office introduces students to the importance of recognizing the physical and emotional demands of their education on themselves as well as family. Students are provided information about stress management, relaxation, and realistic expectations for meeting the demands of medical school. The student affairs office focuses on issues such as stress management, communication, handling conflict, and other issues identified by students as important to their adjustment and well-being in medical school during student meetings.

In addition to psychology counselor, students are supported by student support programs like faculty mentorship program and peer mentoring program. AUSOM will provide a student mentor program through the Student Government Association (SGA). The student mentor program provides students with a great opportunity and valuable experience to interact with their peers as well as receive help in their physical and emotional adjustment to the medical school. It also aids in developing leadership and social skills of students. All new basic science students are assigned a student mentor. The student-mentor serves as a big brother/big sister to the new student to help in their personal life. The student-mentor benefits from the opportunity to develop leadership and social skills.

This study was conducted at AUSOM to operate as a model for a large-scale study, so the results are limited due to small sample size for general extrapolation in medical students. Despite these limits, the use of a validated set of questionnaire permits us to associate our findings to further studies done under similar situations and using the same evaluating mode. We recommend further comprehensive studies to be carried out through health organizations all over the world to report this critical concern of medical education.

Conclusion
Sleep problems, impaired concentration, low mood, mood swings, difficulty in making decisions, emotional distress, anxiety, and substance abuse were major health problems reported by pre-clinical medical students. Psychological and
social support, and regular counseling can be crucial to uplift general health of medical students. Medical schools should acknowledge the presence of substantial health problems in medical students and develop strategies to effectively address them.

Take Home Messages

- Stress and other health issues are prevalent among the basic sciences students than expected.
- Even though stress and other mental health issues are common among medical students they do no seek help at an appropriate time.
- Medical schools should implement appropriate and adequate programs for the well-being of medical students.

Notes On Contributors

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Appendices

Appendix 1 Questionnaire

Age: Sex: M/F Class: MD1/MD2/MD3/MD4
Topic: Improving the understanding of health risks faced by medical students
1. Do you feel stress out in your basic science studies? (Yes/No) ________, Scale (1-10) ________
2. Do you think medical students have higher risk of health problems? (Yes/No) ________, Scale (1-10) ________
   If yes, what can be different health problems in medical students? ____________________________________
3. How do you cope with your academic pressure? ________________________________________________
4. Do you have any health problem, which you consider to have a negative impact on your learning?
   If yes, please describe it: _____________________________________________________________________
5. Did you experience any of these health issues during your basic science studies? (Yes/No) ______
   a. Emotional distress b. Mood swings
   c. Anxiety issues d. Difficulty in making decision
   e. Concentration and memory impairment f. Sleep problems
   g. Abnormal weight changes h. Substance abuse
   i. Others (not specified here) ___________
6. How many hours of sleep do you get every night?
   a. 2-4hrs b. 4-6hrs c. 6-8hrs d. 8-10hrs e. other:__________
7. How would you rate your stress during examination on a scale of 1-10?)__________
8. What are the most useful measures to decrease your stress?
   a. Eating/overeating b. Watching movies/entertainment programs
   c. Sleep d. Meditation
   e. Exercise f. Smoking/Alcohol
   g. Other: ____________
9. Are you taking any prescribed drugs to cope with the academic pressure? (Yes/No) ______
10. What are your suggestions in improving the health of students faced with constant academic pressure?

Declarations

The author has declared that there are no conflicts of interest.
Ethics Statement
This study was approved by Research and Ethics Committee of Avalon University School of Medicine on September 7th 2018. Reference number: Q0002-7/9/2018.

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The authors haven’t used any third party images or figures.

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Reviewer Report 12 April 2020

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P Ravi Shankar
American International Medical University

This review has been migrated. The reviewer awarded 4 stars out of 5

Thank you for the invitation to review this interesting paper. I am happy to note that many of the co-authors are medical students. The article is generally well-written though language and grammar corrections may be required in a few places. I am not sure about the title of the manuscript. I think health risks may be OK but the first thing which comes to my mind on hearing the phrase is infections like hepatitis B and HIV/AIDS. How many students could not participate in the study because their attendance was below the 90% required for participation? Why did the authors choose this cut off for participation? I think the participation rate is very good. Where was the questionnaire administered? The authors can explain in greater detail which parameters were compared among different subgroups of respondents? Did these variables follow a normal distribution? The Introduction is very brief and the authors can consider expanding the same. Toward the end of the Introduction they can provide a brief explanation of the study and highlight the study objectives. The Discussion is well written and the authors review the student support systems present in their institution. I did not understand the Acknowledgements section. The Appendix shows the questionnaire used in the study. How was the questionnaire developed? How was it validated? It will be interesting if the study can also be conducted among clinical students. This is an important study and will be of interest to a wide group of medical educators.

Competing Interests: No conflicts of interest were disclosed.

Reviewer Report 12 April 2020

https://doi.org/10.21956/mep.20015.r30524
This review has been migrated. The reviewer awarded 4 stars out of 5

This is an interesting study to read about medical students' welfare. It is evident to me that the authors, too, did lots of work for the paper to get done. Below are my comments, and I hope the authors and readers would find it helpful.

The abstract consists of essential parts that the reader finds it informative before reading the whole paper. The authors presented an introduction to contextualize the issues on medical student's health risk and with the literature. However, I had trouble understanding the variables involved, especially the “health risk,” wherein part, the introductory text is about stress, or was it implied that the health risk is stress as stated in the abstract. Perhaps a discussion of the variable “health risk” was included to aid the reader. While the introduction is short, a statement or information on how the curriculum is set up at the Avalon University School of Medicine would help understand the context where the study was conducted. On methods, considering the aim of the study, which is to “explore and understand...” I wish a qualitative design or a mixed-method would have been used to address the aim. A bit more discussion on how the questionnaire was developed and of the validation process, including the language used, would also be helpful here. Also, I'm not sure if the data collection was through paper and pencil or online. About the data analysis, I wish there was also a statement on how the data analysis for the open-ended questions was handled. The authors addressed the ethical consideration in the study; however, no information about the process of obtaining consent was provided or was it implied when the authors mentioned that students were aware of the study.

On the results, the presentation started with the respondent's characteristics and followed by the data obtained from the questionnaire; however, I cannot see where the results of the open-ended questions were. Also, I wish they included a table to display the respondents' characteristics and of the descriptive statistics of the variable under study. In the discussion, the authors provided a detailed analysis of their findings consistent with previous research. The first paragraph contains a summary of the findings, which gives the reader a general view. Also, the authors interpreted the result where there was no statistical significance was achieved between males and females on “sleep-hour,” and supported by the literature. The discussion about psychological counseling at Avalon University would have been presented earlier in the introduction of the study. The recommendation, conclusion, and take-home messages are rightfully in place. Overall this paper is valuable to stakeholders, educators, and students.

**Competing Interests:** No conflicts of interest were disclosed.
Deb Halder

This review has been migrated. The reviewer awarded 4 stars out of 5

Notes on the Abstract, Reference and Appendices

The abstract has categorically dealt with the tools and techniques which are used in this study in brief. The references are highly relevant to the scope of the paper and recent studies have been taken for evaluating the study. The questionnaire reveals mixed in nature, combination of closed ended and open ended questions. Kim (1970) established a stress scale to measure the academic stress of the tertiary level of learners. This questionnaire could have been highly significant if it could be more structured and organic.

Introduction

Introduction cannot highlight what the paper wants to study; rather it exposed some academic difficulties a student experiences.

Methodology

This part could have been more justified why these methods were applied, why triangulation of both quantitative and qualitative has been necessitated.

Discussion

The best part of this paper is its discussion which has been comparatively analyzed with the references of reasonable studies. But the portion beginning with “We recommend that medical schools should acknowledge these substantial health risks in medical students and formulate plans and policies to integrate systematic programs, early in curriculum, to decrease their health burden” cannot fit with the discussion; rather, a different part of recommendation suits this validated assumption.

Overall, the paper is readable and reliable with its findings.

Competing Interests: No conflicts of interest were disclosed.

Reviewer Report 10 April 2020

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Felix Silwimba

University of Lusaka

This review has been migrated. The reviewer awarded 5 stars out of 5

This is a very good study in medical education. it partly explains some experiences observed in qualified doctors in low income countries. I recommend this study.
Competing Interests: No conflicts of interest were disclosed.