ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 10, Issue, 11, pp. 42348-42356, November, 2020
https://doi.org/10.37118/ijdr.20376.11.2020

RESEARCH ARTICLE **OPEN ACCESS**

WHY AND WHEN ANXIETY AND DEPRESSION OCCUR IN MEDICAL STUDENTS: A QUALITATIVE STUDY BASED ON COGNITIVE BEHAVIORAL THERAPY

Luiz R. C. König[1]* and Solena Z. Kusma[2]

[1]Clinical Psychologist Speciallising in Cognitive Behavioral Therapy and a Medical Student at the Pontifical Catholic University of Paraná, Curitiba, Paraná, Brazil
[2]PhD in Dentistry (Epidemiology and Public Health) at the Pontifical Catholic University of Paraná, MSc in Epidemiology and Public Health at University College London, Adjunct Professor at the Department of Community Health of the Federal University of Paraná (UFPR)

ARTICLE INFO

Article History:
Received 17th August, 2020
Received in revised form
28th September, 2020
Accepted 03rd October, 2020
Published online 30th November, 2020

Key Words:
Anxiety. Depression. Medical students.
Qualitative study.
Cognitive Behavioral Therapy.

Corresponding author:
Luiz R. C. König

ABSTRACT

This study sought to understand anxiety and depression factors in medical students; to identify the moment and mechanism of symptoms'onset; to recognize cognitive distortions among medical students displaying symptoms; and to reveal treatment and prevention efforts. The author conducted a qualitative field research with an individualized cross-sectional observational design through semi-structured interviews. The participants were 12 male and female medical students from different semesters at the Pontifical Catholic University of Paraná School of Medicine, Brazil, over March and April 2019. The analysis of qualitative data was in light of Cognitive Behavioral Therapy. It identified that medical students' schemas of thoughts, emotions, and behaviors influence their manifesting symptoms of anxiety and depression. This effect is due to the convergence of biological (temperament), environmental (characteristics of life at university), psychological (cognitive distortions), and personal factors (lack of coping strategies). The clinical manifestation of anxiety and depression lies in the impact suffered in the face of initial difficulties in taking the course. That implies considerable variation between medical students' self-image before and after starting university, giving grounds for maladaptive beliefs. Cognitive Behavioral Therapy helps prevent and treat symptoms, but the results also suggest the need for system-level changes to mitigate the problem.

Citation: ***Luiz R. C. König. 2020.*** "Why and when anxiety and depression occur in medical students: a qualitative study based on cognitive behavioral therapy", *International Journal of Development Research*, 10, (11), 42348-42356.

INTRODUCTION

News articles repeatedly draw attention to the considerable incidence of anxiety and depression symptoms among medical students. When present in individuals involved in healthcare, they cause additional concern, as those who look after the population's health should have an excellent physical and mental state because they have a differentiated role with high expectations, given by society itself (Meleiro, 2001). The disorders affect respectively 18% and 12.6% of the general population (WHO, 2020; Santos, 2009 and Brunoni, 2008), for as much as 32.8% and 35.5% of medical students (Cardozo, 2016; Tabalipa, 2015). They involve academic losses, perfectionism, procrastination, impaired rapport, relationship difficulties, clinical suffering, secondary physical and mental illness, drug abuse, risk behavior, and suicidal ideation (Rodrigues, 2012 and Victoria, 2013). National and international studies have established its prevalence. They have generally done so by comparing quantitative data and conducting meta-analyses based on temperament traits, personal and university life, living conditions, and habits (Tabalipa, 2015; Quinn, 2017; Pacheco, 2017; Kuhlmann, 2016; Lima, 2016; Mayer, 2016; Puthran, 2016; Wasson, 2016; Bassols, 2015; Kuhlmann, 2015; Mata, 2015; Pagnin, 2015; Vasconcelos, 2015; Bassols, 2014; Dyrbye, 2014; Hope, 2014; Baldassin, 2013; Ishak, 2013; Dyrbye, 2012; Henning, 2012; Ishak, 2009; Yates, 2008 and Dyrbye, 2005). Nevertheless, they have not sufficiently demonstrated cause and effect relations between these variables and the symptoms investigated (Dyrbye, 2006). Understanding whether the onset of medical students' anxiety and depression occur prior or after starting medical training and the reasons why these

disorders affect that particular population, will allow more adequate interventions, as well as positive changes on an institutional level in order to address the problem. Based on the hypothesis that there are specific conditions that subject medical students to increased risk factors, the present study sought to understand, in light of Cognitive Behavioral Therapy (CBT), the anxiogenic and depressiogenic conditions in this population; to identify the moment and mechanism of symptoms' onset; to reveal multi-level treatment and preventionefforts; to recognize dysfunctional thoughts.

MATERIALS AND METHODS

Setting, participants, and intervention: This individualized cross-sectional observational study sought to gather, analyze, and correlate qualitative data related to the risk of depression and anxiety symptoms in a sample of medical students at the Pontifical Catholic University of Paraná. After receiving explicit approval by the university review board, we gathered data through individual interviews with ten females and two male undergraduates[1] enrolled in the 2nd to the 11th semesters at the Curitiba campus of the Pontifical Catholic University of Paraná School of Medicine. Participant adherence was spontaneous after learning about the study by an invitation sent via electronic mail addresses held on the institution's students' records. Before the interviews, participants received information about their rights and research procedures. They then signed a Free and Informed consent form and filled in *Mind over Mood* Anxiety and Depression Inventories (Greenberger, 2017). We ensured confidentialityof interviewees' identities. The technique used to administer semi-structured interviews, their structure, and subsequent analysis was in line with CBT. The theoretical and clinical reference adopted, apart from being evidence-based, is the gold standard for diagnosis and treatment of mood and anxiety disorders (Knapp, 2008). Psychological Test Evaluation System (SATEPSI), developed and operated by the Brazilian Federal Council of Psychology (CFP), favorably issues the *Mind Over Mood*Anxiety and Depression Inventories (Brazil, 2018).

Having most of the previous studies limited the analyses to numerical epidemiological data justified the choice for qualitative research. Such a method enables inference of environmental and psychological-cognitive factors that could correlate them with greater or lesser incidence of the symptoms assessed. Besides, they help in the identification of onset mechanisms and students' history milestones that enlarge the understanding of anxious and depressive symptoms (Duarte, 2004). We prepared the basic script of the individual interview to enable investigation of environmental factors such as life history, family and social environment, tuition payment, health aspects, quality of sleep, substance use, spirituality, academic background before admittance to university, and patterns of thought relevant for CBT. Interviews occurred face-to-face in March and April 2019 on the campus premises and were audio-recorded with participants' prior agreement. Each interview lasted approximately 90 minutes. Table 1 presents the 12 selected participants' characteristics and their scores on both *Mind Over Mood* Anxiety and Depression Inventories.

Data analysis

The collected contents, including participants' quotes, were registered in an Interview Summary, and then analyzed through CBT. The analysis followed the technique of extracting and fitting relevant passages into categories, as suggested by Mayring (Flick, 2008) for qualitative studies. Finally, we consolidated the results obtained under the STROBE cross-sectional reporting guidelines (von Elm, 2007).

RESULTS

Getting it off one's chest: the interview contents: Most complaints we collected were in agreement with those noted in the preliminary bibliographic search (Cardozo, 2016; Victoria, 2013; Pacheco, 2017; Kuhlmann, 2016; Camargo, 2015; Valle, 2006). The overall issues referred to frustration with academic performance; insecurity regarding the next stages of the course; shortcomings in coping with the difficulties found; shortage of time to meet the demands of the course (attending lectures, preparing for case discussion sessions, taking part in extracurricular practice and academic leagues, and preparing for exams). Other issues reported compromised personal activities involving social and family life, rest, physical, leisure, and self-care. In the part of the university setting, participants pointed out lack of welcome, humanization, and understanding of students' vulnerability by the course faculty; failure to recognize symptoms related to anxiety and depression; lack of guidance on coping with these symptoms; low quality of sleep, indicated as being correlated to the academic routine and obligations; difficulties in establishing interpersonal relationships, restricted to a closed group of colleagues. We also detected a common personal history of participants.[2] Most of them reported excellent marks at elementary, middle, and high school, that being a period marked by having a good reputation as seen by parents and teachers and by being recognized as the best students in the class. This success, however, was frequently offset by a scenario of unsatisfactory interpersonal relationships, little integration (P1), being stigmatized, and even bullied by colleagues (P7, P9). These characteristics nearly always resulted in depreciation of self-image, insecurity (P1, P3, P7, P10), social isolation (P1, P4, P6, P7, P8, P9, P10, P11), and "taking refuge in studies" (P6).

There were no reports of a decision-making process based on objective parameters concerning the choice of profession: "*All my life I said I would have to be a doctor*" (P1). The majority of the participants took the option early in academic life, because of their excellent school performance, earning them from an early age recognition as students destined to become medical doctors in the future. The majority of interviewees had had a diagnosis and treatment for depression (P2, P4, P7, P10, P12), anxiety (P3, P5, P6, P8, P9, P10, P12), panic disorder (P4) or other psychiatric disorders (P6, P9) before the date of the interview. These conditions emerged for the first time or became intensified in the first years at university. Participants reported choosing their future profession accordingly to a socially shared vision of the role and

[1] In Brazil, students who have a high school certificate and successfully perform in application tests for medical school admittance have direct access to medical training. The undergraduate program lasts 12 semesters total, including internship over the last two years.

[2] P1 to P12 refer to participants, as per the Interview Summary.

importance of Medicine. They attributed the following qualities to medical professionals: altruism (P8), dedication (P3), help (P2), empathy/care (P3), prevention/protection (P2), humanization (P3), multiple skills (P3), use of "power for good" (P2), abnegation (P9) and heroism (P4): "*I see myself wanting to protect everyone against everything, I want to be responsible for a community where everyone is optimistic*" (P2); "*That's where the question of dedication and care comes in, you know, I have always been caring, dedicated, because in this profession I could articulate with other people my way of being, you know, being a doctor*" (P3). Through this, they projected an image of happiness (P3, P5, P9, P11), fulfillment (P1, P5), financial stability (P6) and recognition, even though, to achieve this condition, the professional needs to "leave their comfort zone" (P5). Later on, contact with reality and the limits of the profession thwarted idealization (Valle, 2006).

A source of disappointment related to how an ensemble encompassing its coordinating body, its staff, the institution's culture and structure, the reception given by senior students, and, especially, its teachers welcomed newly admitted students. The respondents reported massive frustration with the impersonality they claimed to have found: "*I passed the entrance exam, I'd never been so happy [...] and then I arrived here and the teachers sort of [acted as if they were saying:] you're doing nothing more than your obligation by being here [...] you all passed just the same as everyone else did*" (P4); "*I used to cry a lot, a great deal and... I thought I was alone in the world, I thought I made no difference for anyone*" (P7). This affects how the course is felt to be appropriate: "*[I used to think that] Medicine is not for me because... precisely because I have a view that is just a little bit... that I like, you know, a little bit more human, more related to this and I used to think, goodness me, not even the teachers transmit this, it's something I keep asking myself even today, they place so much emphasis on humanization, but even in the relationship with teachers this no longer exists [...] and I think that, like it or not, teachers have a lot of power, you know, to [influence]*" (P7). Indeed in this milieu, there is the reiterated belief that professional success depends on insensitivity to "singular experiences" (Lopes, 2006). The chief complaints related to the sharp drop in academic performance, impacting grades and self-image: "*When I was at high school I thought I was going to be an excellent student [...] but then I started university, which is [for me to qualify for] something I'm going to do for the rest of my life and my performance was poor [...] I felt I was a failure*" (P1); "*I never worried about things because they always worked out well, but then at university, they began to go wrong, that's why I got sort of desperate, I didn't know how to deal with that... Goodness, things are hard here, here I have to do a lot to achieve a little, before I used to do a little and achieved a lot, the pattern's reversed*" (P6); "*I cannot, so to speak, make mistakes, it weighs me down a great deal, it upsets me a lot*" (P3).

The interviews also made clear the greater abundance of symptoms in the initial stages of training: "*[In the] first year and a half of the Medicine course, which is the pre-clinical period, I... I don't know... I think I wanted to give up several times because I used to think: 'goodness, I didn't come here for this, you know? "*" (P1); "*At the beginning, when I was still feeling bad, in the first and second semesters at university [...] I didn't know whether it was usual, but I thought I wasn't making enough effort, I thought I needed to do more, that I needed to try harder. But later, looking back, I said, goodness, I didn't notice that my colleagues were having the same difficulties as I was, so maybe my difficulty at the beginning appeared to be abnormal*" (P2); "*For us, the second semester was tough going [...] a very heavy workload and subjects that I didn't like very much because they were the starting point, you know, they didn't have much applicability, so... well... I stopped doing the things I liked, so it was a disaster*" (P7). The critical nature of the initial stage of the medical program has been pointed out by many authors due to lifestyle transition, the volume of contents to master, time limitations, exams, competition between students, and issues involving personal, family, and financial relationships (Pacheco, 2017 and Lima, 2015).

This scenario led "from heaven to hell" students who had not had previous need to develop strategies to cope with academic failure: "*It was at university that I began to get worked up about exams because I was used to scoring ten in everything without studying [...] I studied hard in anatomy but I failed without getting to the end, and I didn't manage to get the minimum average score to make it to the end. That was when I started to panic, all the exams began to make me panic*" (P6). Participants expressed such perceptions through what we identified as patterns of dysfunctional thought: "*When I came across difficulties, I didn't know what to do"* (P1); "*I thought the following: I spent a long time doing a preparatory course, so now I'm not managing to keep pace at university, [so] my problem is studying, my problem is academic, it's in this realm of my life that I'm not making progress*" (P2); "*You start university with an idea of what university is, so I thought my life was going to change [...] but I started university and found that the demands are different from what I expected and that a great deal of dedication is required, so I stopped doing a lot of things I liked to do [...] what happened instead is that I... I got ill*" (P7). Cognitive distortions (Beck, 1997 and Wright, 2008) collected in the speech of interviewees and found in Table 2 disclaim samples of dysfunctional thoughts.

A series of doubts related to the participants' abilities, to a new view of Medicine and their professional future, came to the surface, uncovering insufficient comprehension of the scenario: "*Fear of not managing to cope [with future reality], overcoming the obstacles of a system that is flawed in itself*" (P2); "*Today it is Utopia for me to think of myself as the doctor I want to be*" (P4); difficulty in visualizing the future and fear of not becoming the type of doctor they see as being ideal (P8). Fortunately enough, notwithstanding the suffering along the course, students could also be seen to make progress as they move forward to the final steps of the program, after having developed personal growth, as collected in the following speeches: "*I didn't realize that I had health problems, you know, precisely because I was always thinking about something else, never about myself, so I think that at times we get into an 'infinite loop' in which this question of quality of life gets worse, you know, because we don't think about ourselves, I used to think about the exams, about my parents, but not about me [...] I simply ignored everything because I was so concerned thinking about not failing exams, thinking about residency*" (P6); "*[It would be] very unfair to think that three years from now I'll be qualified to practice as a physician and that I'm not going to be good enough, you know, because I'm preparing myself to be good enough*" (P3); "*And so [the teacher] said 'don't you want to be doctors?*

Table 1. Characteristics of selected participants from the Pontifical Catholic University of Paraná

Participant	Gender	Age[a]	Semester[b]	Housing	Funded by	Health issues	Psych.[c]	Sleeping issues	Recreational drugs	Leisure	Religion	Anxiety[d]	Depression[e]
1	Female	20	7th	Family	Parents	No	No	Moderate	None	Rarely	Non-practicing catholic	20	17
2	Female	29	11th	Partner	Public loan	No	Yes	None	Alcohol monthly	Rarely	No	23	24
3	Female	24	7th	Alone	Parents	No	Yes	None	Narguile weekly	Frequently	Catholic	22	18
4	Female	19	2nd	Family	Parents	No	Yes	None	None	Rarely	Catholic	49	15
5	Female	26	5th	Partner	Parents	No	Yes	None	None	Frequently	No	21	11
6	Male	20	5th	Family	Parents	Yes	Yes	Severe	Marijuana semiannualy	Rarely	No	22	16
7	Female	24	8th	Alone	Parents	No	Yes	Mild	Alcohol monthly	Moderately	Believer	20	11
8	Male	21	7th	Family	Parents	No	Yes	Mild	Marijuana monthly	Frequently	Believer	15	11
9	Female	30	6th	Alone	Parents	Yes	Yes	None	Tobacco daily	Frquently	Spiritism	30	23
10	Female	21	9th	Family	Private scholarship	Yes	Yes	Moderate	Alcohol monthly	Moderately	Non-practicing catholic	29	25
11	Female	19	2nd	Family	Parents	No	No	None	Narguile monthly	Frequently	No	15	11
12	Female	29	7th	Family	Parents	Yes	Yes	None	None	Moderately	Mennonite	43	40

[a]As of March and April 2019.
[b] Current enrollment by the time of the interview.
[c] Previous psychiatric or psychological interventions of any kind.
[d]Score on*Mind Over Mood Anxiety Inventory*ranging 0-72.
[e]Score on *Mind Over Mood Depression Inventory* ranging 0-57.
Source: The authors (2020).

Table 2. Cognitive Distortions of Participants from the Pontifical Catholic University of Paraná

COGNITIVE DISTORTION	*PARTICIPANTS' QUOTES*
Selective attention to failure (ignoring evidence, reaching conclusions after examining only part of the information)	"*I just think 'I don't know anything', even though I've revised the entire contents two or three times [...] later I can see that I knew several things, not everything, but I knew several things*" (P9)
Jumping to conclusions (reaching a conclusion about something based on little or no evidence)	"*The fact that I began badly will influence my entire life*" (P1)
Generalization(illogically scaling up an isolated event to a broader situation)	"*I get to the faculty and this [not doing well in exams] can happen again, it can happen several times*" (P1)
Magnification of the negative and minimization of the positive (a good aspect is ignored in favor of something bad and something unfavorable invalidates everything that is favorable)	"*It appears that part of me does not accept my commemorating having passed the university entrance exam... as if part of me does not accept that I really am capable of doing something*" (P8)
Personalization(a person taking the blame for something negative that was not their fault)	"*I thought, [it's me] that's not doing enough*" (P6) "*Was it my fault? I know it was. But even so, was there nothing else I could have done?*" (P9)
Catastrophization(worst possible forecast for the future, ignoring other more likely outcomes for the situation)	"*Fear of attending to a patient and not knowing what to do... fear of having a person's life in my hands*" (P1)
Fortune telling(predicting something as being certain, without logical evidence for this)	"*The first thing I think is that I'm not going to make it to residency*" (P1)
Should statements(Rigid, unbendable beliefs that conceive what the subject expects of oneself based on what their self-image tells them)	"*If I carry on, I'm going to be a bad doctor. I should stop studying and give up my course now, it's not working out right*" (P4) "*Each time something goes wrong I think it's a sign from God that I shouldn't be doing this, as if I'm not good enough to be taking Medicine, this affects me a lot*" (P4)
Tunnel vision / mental filter(focusing on negative aspects of a situation, ignoring other existing information or evidence)	"*I was successful because I passed [the entrance exam], but success stopped there*" (P1)
Emotional reasoning(what we find at a given moment in time, without submitting it to logic, is correct and true)	"*It's much more a case of fear of my not being able to do it rather than the fact of my not being able*" (P8)
Mind reading(believing that you know, based only on your own thoughts, what other people think and feel)	"*If I stopped being this good student, with good grades, people would stop liking me*" (P8) "*Even though I don't even know what [people] are planning, even though they're not planning anything, I think that's where my rapid thinking, my anxiety comes in, you know*" (P3)
Labeling (defining oneself based on isolated actions, as if they explained the permanent way a subject as a whole functions)	"*What I'm most afraid of is what I will think of myself*" (P8)

Source: The authors (2020).

Doctors don't have to have time for anything'. I put my hand up and said 'teacher, have you ever stopped to think how much people ask for doctors to be more humanized, but throughout our time at university we are totally disrespected? Goodness, while we're at university it's so important for us to have some time for leisure, physical activity, that way people even manage to concentrate more or to see more sense in it and so on...' She said 'yes, you're right, it's that throughout all my medical training demands like that were always made on me'. I said 'yes, but things change, don't they, the times change, perceptions change'" (P7); "*That's not how it is, but that's how I want it to be*" (P2).

DISCUSSION

Expectations *versus* reality - the why: The fashion an individual relates to reality involves direct influence from the cognitive schema (cognitions, whether functional or not, occurring through automatic thinking, intermediate and core beliefs, emotions and behaviors) articulated with other schemas (behavioral, motivational, affective, orienting and physiological responses), forming a set that Aaron T. Beck [1921-to date] has called cognitive *mode (*Neufeld, 2016*)*. Mode lies on a basis consisted of temperament, personal history, cognition, and environment throughout an individual's life. It defines their perception of the world around and the coping strategies, either functional or dysfunctional, with the concept they have about who they are as individuals. An individual can have several modes, as well as specific patterns in more than one mode. As such, if there is dissonance between their cognitions and their other schemas, individuals will present dysfunctional responses that will have physical, emotional, cognitive, affective, motivational, and physiological repercussions. Dissonance can generate serious consequences, such as exacerbated anxiety and depression symptoms, whereby the latter can even culminate in suicidal ideation (Knapp, 2008; Beck, 1997 and Rotenstein, 2016).

The analysis of the interviews showed that the contrast between expectation and reality caused changes in students' self-perception after they started university. The changes led to the need to cope with this discrepancy, loss of former self-image, and construction of a new one. Such processes allowed us to think that the mode of those future doctors originated in excellent academic performances that granted them a prominent position previously to entering university. After that, being close to other students with similar accomplishments deprived them of their previous self-references. Adding to the radical changes in reality, the difficulties inherent to medical training itself undermined students' old self-concept. They began to question their real capacity to achieve new skills and felt that their old strategies to manage academic challenges no longer worked the way they used to. In other words, their cognitive mode got dissonant (Valle, 2006 and Neufeld, 2010). As a consequence, illogical ideas, dysfunctional thoughts, materialized in the form of cognitive distortions, have arisen, resulting in anxiety and depressive symptoms, comparisons with classmates, maladaptive behavior, impostorism, distress, suicidal ideation, and burnout (Neufeld, 2010 and Rotenstein, 2016). The degree of morbidity of thoughts installed during students' new reality is undoubtedly proportional to their previous profile, as well as being proportional to the intensity of the stimuli that led to the adaptive change. If there is a long-distance separating reality before and after starting the course the force of dysfunctional thinking that follows this process occurs in the same extent, as does the severity of the symptoms installed as a result of it. Because medical students are demanding people, they are more likely to suffer the pressures imposed by failure. Along with this, students feel guilty because of the contents they are not able to master and, therefore, fear of making mistakes paralyzes them. Feelings of loss of worth and impotence[1] fill this scenario, measured through assessment grades. Grades then achieve paramount importance in academic life, representing a significant source of anxiety and depression. However, one could correctly state that some of the signs and symptoms described in the preceding paragraphs resemble those that point to a Narcissistic Personality Disorder (NPD) (Meleiro, 2001). It raises the question of whether narcissists could be prone to pursuing a career in such an outstanding profession because of its social status or being accepted into medical school would elicit a behavioral response similar to that observed in NPD patients. For the investigation presented here, we have not collected enough data to allow further reflections on the subject. Several researchers have also investigated traits of maladaptive perfectionism and impostorism among medical students (Hu, 2019; Chand, 2018; Arana, 2017; Leung, 2019; Mascarenhas, 2019; Seeliger, 2017 and Villwock, 2016). Because these syndromes were not part of the initial study objectives, it was surprising enough that the interviews performed gathered materials highly suggestive of their occurrence.

Before and after - the when

The study showed that symptoms originate from a process that stands from early academic life to after starting university. The critical element lies in a conflict between previous self-perception and a new perception, once college has started. Thus, it is a process extended through time. It happens because such disparity determines pathological processing of information which lies in the genesis or exacerbation of anxiety or depression symptoms, or of both disorders combined. Hopelessness, poor self-esteem, negative perception of the environment, negative automatic thoughts, mistaken attributions, overestimation of negative feedback, and bad performance in tasks that require abstract effort are dysfunctional cognitions that predominate in depression. Hypervigilance, fear, overestimation of risk, automatic thoughts associated with lack of control and inability to face up to feared situations, and incorrect interpretations of body stimuli are associated with anxiety. Increased processing of information, maladaptive schemas, higher frequency of cognitive distortions, reduced problem-solving ability and more considerable attention to personal problems or shortcomings are a standard association of both anxiety and depression (Wright, 2008). In behavioral terms, constant positive reinforcement of a successful trajectory, given from an early age to these students by their peers, families, and teachers, is reversed through learning owing to the need to be admired. The interruption of this reinforcement implies the loss of the abilities that had defined them thus far. Continually seeking to fulfill this belief is an anxiety factor, just as perceiving oneself to be unable to satisfy it is a depression factor. In this logic, anxiety is a response to feelings of inability to meet trust and expectations placed on the student. Depression, in turn, arises from the feeling of insufficiency and the perception that the identity based on academic success gives way to the feeling of being "just one more." Brilliant students might have little experience in coping with such an

unknown position. Paradoxically, the student who gets the highest grades reveals oneself to be the least capable of dealing with failure, frustration, and the flaw of having only an average performance. If problems such as inability, compromised performance, fear of failure, and perception of risk are not familiar to the reality of students with excellent pre-university performance, it is correct to deduce they have awoken, or resurrected, as pathological thoughts after starting the course. Thus, anxiogenic and depressiogenic conditions in this environment act as triggers for the first manifestation, relapse or exacerbation of worries and fears (Pacheco, 2017) that remained silent when poor academic performance used to be a merely remote possibility. Therefore, a collision involving the accomplished challenge of getting a place on competitive medical schools and what comes right after it is the perfect storm for a drastic change in entrants' self-concept. This perception was present in the history of all the participants of the study. Studies have extensively demonstrated that it is possible to address anxiety and depression on the level of individuals employing standard and group CBT (Hu, 2019; Chand, 2018; Arana, 2017; Hofmann, 2012; Bendelin, 2011; Otte, 2011; Hind, 2010; Beattie, 2008; Rangé, 2017; Yalom, 2006; Marmarosh, 2005).

There is more to it than thoughts: It would be applicable to ask why not every medical student is subject to mental disorders since this entire population is equally exposed to environmental stressors. There are clear demonstrations of the influence of biology on the way an individual reacts and adapts to external stimuli (Sadock, 2017). The impact of temperament, genetics, and physiology on medical students' ability to cope with distress has been extensively investigated (Leung, 2019; Sadock, 2017; Solis, 2016). However, levels of biological influence vary according to the type of disorder analyzed. Individuals with a depressive parent or sibling are up to 2 to 4 times more likely to have major depressive disorder throughout life. Whereas neuroticism has shown a 40% heritability and is related to both anxiety and depression, other temperament traits than neuroticism influence the former. The other temperament traits are behavioral disinhibition and harm avoidance, causing genetics to add to one-third of the risk of developing a generalized anxiety disorder ().[46] Thus, a toxic medical school environment can increase the risk regarding individuals with a biological predisposition to develop the commented symptoms. Nevertheless, an analysis solely on the level of individuals cannot explain the entire problem of anxiety and depression during medical school. As participants' stories indicate, system-level conditions may also be considered stressors and require urgent attention. The following aspects are worthy of reconsideration in courses as they stand at the moment: curricular inadequacy; academic demands marked by an impracticable timetable of activities of no real pedagogical value; focus on summative assessment rather than formative assessment; memorization of contents to the detriment of clinical reasoning; short respect for the students' natural rhythm and individual characteristics; an environment that is solitary, unwelcoming, not very favorable to reassuring exchanges of affection, so that a new student facing a harsh reality feels left to their fate; lack of guidance about learning objectives, possibilities of personal growth, and enhancement of strategies to cope with the challenges of Medicine (Lopes, 2006; Fitzpatrick, 2019; Slavin, 2019; Bailey, 2018; 2018; Hill, 2018; Moir, 2018; Barraza-López, 2017; Silva, 2017; 2017; Eley, 2016 and Slavin, 2016). The accountability for change also lies in public policy. It is quite alarming that not even curricular directives, *e.g.*, the Brazilian Education Council / Higher Education Chamber (CNE/CES) Resolution No. 3, dated June 20, 2014, (Brazil, 2020) contains express provisions for students' physical and mental health, although it makes extensive allusions to the need to humanize the course and the profession. Student representations are then required to advocate for changes to ensure the inclusion of care services.

CONCLUSIONS

Strengths and limitations: By using a qualitative method, this study was successful in addressing the mechanism and moment of onset regarding anxiety and depression symptoms in medical students. However, we can point out a large number of biases and shortcomings. These involve the lack of an approach regarding generational aspects, which would require a further chapter; the sampling method, which could have narrowed down participants to those who bear the symptoms investigated; finally, the difficulty inherent to qualitative studies in making generalizations, notwithstanding their aim of raising questions for further investigation.

Key results: The development or recurrence of anxiety and depression symptoms in medical students is a process that stands from early academic life to after starting university. It involves an emerging difference between their perception of themselves before and after admittance to the Medical school. Anxiety and depression reflect the convergence of *biological* and *environmental* factors, magnified *maladaptive cognitions*, and insufficient *self-knowledge* to enable emotional, behavioral, and functional cognitive responses. In addition to interventions on individuals, rethinking institutional culture is yet needed to prevent medical training from being a cause of clinical distress, impairment in many areas of functioning, suffering, or other medical conditions.

Funding: This research was supported by funding from the Pontifical Catholic University of Paraná. The funders had no role in study design, data collection, and analysis, decision to publish, or preparation of the manuscript.

Competing interests: The study was conducted in the absence of commercial or financial relationships representing a potential conflict of interest.

Authors' contributions: SZK was the project supervisor, revisioned the manuscript, and approved its final version. LRCK collected, analyzed and interpreted the data, and drafted the manuscript. The authors co-designed the study.

Ethical statement: This study was assessed and approved by the Pontifical Catholic University of Paraná Research Ethics Committee, as per the Certification of Submission for Ethical Appraisal (CAAE) No. 00761218.7.0000.0020, Opinion No. 2.979.762.

REFERENCES

American Psychiatric Association (APA). Manual diagnóstico e estatístico de transtornos mentais: DSM-5. Porto Alegre: Artmed; 2014:155-226.

Arana FG, Miracco MC,Galarregui MS, Keegan EG. A brief cognitive behavioural intervention for maladaptive

perfectionism in students: a pilot study. Behav Cogn Psychother. 2017; 45(5):537-42. doi: 10.1017/S1352465817000406.

Bailey E, Robinson J, McGorry P. Depression and suicide among medical practitioners in Australia. Intern. Med. J. 2018;48(3):254-58. doi: 10.1111/imj.13717.

Baldassin S, Silva N, de Toledo Ferraz Alves TC, et al. Depression in medical students: cluster symptoms and management. J Affect Disord. 2013;150(1):110-4. doi: 10.1016/j.jad.2012.11.050.

Barraza-López RJ, Muñoz-Navarro NA, Behrens-Péreza CC. Relación entre inteligencia emocional y depression-ansiedad y estrés en estudiantes de medicina de primer año. Rev Chil Neuro-Psiquiat. 2017;55(1):18-25. doi: 10.4067/S0717-92272017000100003.

Bassols AM, Carneiro BB, Guimarães GC, et al. Stress and coping in a sample of medical students in Brazil. Arch Clin Psychiatry. 2015;42(1):1-5. doi: 10.1590/0101-60830000000038.

Bassols AM, Okabayashi LS, Silva AB, et al. First- and last-year medical students: is there a difference in the prevalence and intensity of anxiety and depressive symptoms? Rev Bras Psiquiatr. 2014;36(3):233-40. doi: 10.1590/1516-4446-2013-1183.

Beattie A, Shaw A, Kaur S, Kessler D. Primary-care patients' expectations and experiences of cognitive behavioural therapy for depression: a qualitative study. Health Expect. 2009;12:45-59. doi: 10.1111/j.1369-7625.2008.00531.x.

BeckJS. Terapia cognitiva: teoria e prática. Porto Alegre: Artmed; 1997: 22,55,204.

Bendelin N, Hesser H, Dahl J, Carlbring P, Nelson KZ, Andersson G. Experiences of guided Internet-based cognitive-behavioural treatment for depression: a qualitative study. BMC Psychiatry. 2011;11(1):107. doi: 10.1186/1471-244X-11-107.

Brazil. Conselho Federal de Psicologia. Resolução n. 9, de 25 de abril de 2018.https://site.cfp.org.br/wp-content/uploads/2018/04/Resolu%C3%A7%C3%A3o-CFP-n%C2%BA-09-2018-com-anexo.pdf.Published April 25, 2018. Accessed May 6, 2018.

Brazil. Conselho Federal de Psicologia. Sistema de Avaliação de Testes Psicológicos: SATEPSI.http://satepsi.cfp.org.br/. Published 2018. Accessed May 18, 2018.

Brazil. Ministério da Educação. Conselho Nacional de Educação. Câmara de Educação Superior. Resolução CNE/CES n. 3, de 20 de junho de 2014.http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=15874-rces003-14&category_slug=junho-2014-pdf&Itemid=30192. Published June 23, 2014. Accessed April 15, 2020.

Brunoni AR. Transtornos mentais comuns na prática clínica. Rev Med. 2008;87(4): 251-263. doi: 10.11606/issn.1679-9836.v87i4p251-263.

Camargo VCV, Calais SL, Sartori MMP. Estresse, depressão e percepção de suporte familiar em estudantes de educação profissionalizante. Estud. psicol. (Campinas).2015;32(4):595-604. doi: 10.1590/0103-166X2015000400003.

Cardozo MQ, Gomes KM, Fan LG, Soratto M T. Fatores associados à ocorrência de ansiedade dos acadêmicos de Biomedicina. Saúde e Pesqui.2016;9(2):251-262. doi: 10.17765/2176-9206.2016v9n2p251-262.

Chand SP, Chibnall JT, Slavin SJ. Cognitive Behavioral Therapy for maladaptive perfectionism in medical students: a preliminary investigation. Acad Psychiatry. 2018;42(1):58-61. doi: 10.1007/s40596-017-0708-2.

Duarte R. Entrevistas em pesquisas qualitativas. Educ. rev.2004;24:213-225.

Dyrbye LN, Harper W, Moutier C, et al. A multi-institutional study exploring the impact of positive mental health on medical students' professionalism in an era of high burnout. Acad Med. 2012;87(8):1024-31. doi: 10.1097/ACM.0b013e31825cfa35.

Dyrbye LN, Thomas M, Shanafelt T. Medical student distress: causes, consequences, and proposed solutions. Mayo Clin Proc. 2005; 80(12):1613-22.

Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. Acad Med. 2006; 81(4):354-73.doi: 10.1097/00001888-200604000-00009.

Dyrbye LN, West CP, Satele D, et al. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. Acad Med. 2014;89(3):443-51. doi: 10.1097/ACM.0000000000000134.

Eley DS, Leung J, Hong BA, Cloninger KM, Cloninger CR. Identifying the dominant personality profiles in medical students: implications for their well-being and resilience. PLoS One. 2016;11(8):e0160028. doi: 10.1371/journal.pone.0160028.

Fitzpatrick O, Biesma R, Conroy RM, McGarvey, A. Prevalence and relationship between burnout and depression in our future doctors: a cross-sectional study in a cohort of preclinical and clinical medical students in Ireland. BMJ Open. 2019;9(4):e023297. DOI: 10.1136/bmjopen-2018-023297.

Flick U. Introdução à pesquisa qualitativa. 3rd ed. Porto Alegre: Artmed; 2008:291-294.

Greenberger D, Padesky CA. A mente vencendo o humor: mude como você se sente, mudando o modo como você pensa. 2nd ed. Porto Alegre: Artmed; 2017:186,213.

Henning MA, Krageloh CU, Hawken SJ, Zhao YP, Doherty I. The quality of life of medical students studying in New Zealand: a comparison with nonmedical students and a general population reference group. Teach Learn Med. 2012; 24(4):334–40. doi: 10.1080/ 10401334.2012.715261.

Hill MR, Goicochea S, Merlo LJ. In their own words: stressors facing medical students in the millennial generation. Med Educ Online. 2018;23(1):1530558. doi: 10.1080/10872981.2018.1530558.

Hind D, O'Cathain A, Cooper CL, et al. The acceptability of computerised cognitive behavioural therapy for the treatment of depression in people with chronic physical disease: A qualitative study of people with multiple sclerosis, Psychol Health. 2010;25:(6):699-712. doi: 10.1080/ 08870440902842739.

Hofmann SG, Asnaani A, Vonk, IJJ, Sawyer AT, Fang A. The efficacy of Cognitive Behavioral Therapy: a review of meta-analyses. CognTher Res. 2012;36(5):427-40. doi: 10.1007/s10608-012-9476-1.

Hope V, Henderson M. Medical student depression, anxiety and distress outside North America: a systematic review. Med Educ. 2014;48:963-79. doi: 10.1111/medu.12512.

Hu KS, Chibnall JT, Slavin SJ. Maladaptive perfectionism, impostorism, and cognitive distortions: threats to the mental health of pre-clinical medical students. Acad

Psychiatry. 2019;43:381-385. doi: 10.1007/s40596-019-01031-z.

Ishak WW, Lederer S, Mandili C, et al. Burnout during residency training: a literature review. J Grad Med Educ. 2009;1(2):236-42. doi: 10.4300/JGME-D-09-00054.1.

Ishak WW, Nikravesh R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: a systematic review. Clin Teach. 2013;10(4):242–5. doi: 10.1111/tct.12014.

Knapp P, Beck AT. Cognitive therapy: foundations, conceptual models, applications and research. Rev Bras Psiquiatr. 2008;30(Suppl II):S54-64.

Kuhlmann SM, Bürger A, Esser G,Hammerle F. A mindfulness-based stress prevention training for medical students (MediMind): study protocol for a randomized controlled trial. Trials.2015;16:40. doi: 10.1186/s13063-014-0533-9.

Kuhlmann SM, Huss M, Bürger A, Hammerle F. Coping with stress in medical students: results of a randomized controlled trial using a mindfulness-based stress. prevention training (MediMind) in Germany. BMC Med. Educ. 2016;16:316. doi: 10.1186/s12909-016-0833-8.

Leung J, Cloninger CR, Hong BA, Cloninger KM, Eley DS. Temperament and character profiles of medical students associated with tolerance of ambiguity and perfectionism. Peer J. 2019;7:e7109. doi: 10.7717/peerj.7109.

Lima RL, Soares MEC, Prado SN, Albuquerque GSC. Estresse do estudante de Medicina e rendimento acadêmico. Rev. bras. educ. med. 2016;40(4):678-684. doi: 10.1590/1981-52712015v40n4e01532015.

Lopes MHI, Francesconi CFM. Quais as expectativas e emoções que experimentam os ingressantes do Curso de Medicina. In: Cataldo Neto A, Antonello I, Lopes MHI, ed. O Estudante de Medicina e o Paciente: uma aproximação à prática médica. Porto Alegre: EDICPUCRS; 2006:21.

Marmarosh C, Holtz A, Schottenbauer M. Group cohesiveness, group-derived collective self-esteem, group-derived hope, and the well-being of group therapy members. GROUP DYN-THEOR RES. 2005;9(1):32-44. doi: 10.1037/1089-2699.9.1.32.

Mascarenhas VR, D'Souza D, Bicholkar A. Prevalence of impostor phenomenon and its association with self-esteem among medical interns in Goa, India. Int J Community Med Public Health. 2019;6(1):355-59. doi: 10.18203/2394-6040.ijcmph20185272.

MataDA, Ramos MA, Bansal N. Prevalence of depression and depressive symptoms among resident physicians: a systematic review and meta-analysis. JAMA. 2015;314(22):2373-83. doi: 10.1001/jama.2015.15845.

Mayer FB, Santos IS, Silveira PSP, et al. Factors associated to depression and anxiety in medical students: a multicenter study. BMC Med. Educ. 2016;16:282. doi: 10.1186./s12909-016-0791-1.

Meleiro AMAS. O médico como paciente. São Paulo: Lemos Editorial; 2001:34,54,72-74.

Moir F, Yielder J, Sanson J, Chen Y. Depression in medical students: current insights. Adv Med Educ Pract. 2018;9:323-333. doi: 10.2147/AMEP.S137384.

Neufeld CB, Cavenage CC. Conceitualização cognitiva de caso: uma proposta de sistematização a partir da prática clínica e da formação de terapeutas cognitivo-comportamentais. Rev. bras. ter. cogn. 2010;6(2):3-35. doi: 10.5935/1808-5687.20100014.

Otte C. Cognitive behavioral therapy in anxiety disorders: current state of the evidence. Dialogues Clin Neurosci. 2011;13(4):413-421.

Pacheco JP, Giacomin HT, Tam WW, et al. Mental health problems among medical students in Brazil: a systematic review and meta-analysis. Braz. J. Psychiatr. 2017;39:369-378. doi: 10.1590/1516-4446-2017-2223.

Pagnin D, Queiroz V. Comparison of quality of life between medical students and young general populations. Educ Health. 2015;28(3):209-12. doi: 10.4103/1357-6283.178599.

Puthran R, Zhang MW, Tam WW, Ho RC. Prevalence of depression amongst medical students: a meta-analysis. Med Educ. 2016;50:456-68. DOI: 10.1111/medu.12962.

Quinn MA, Bazari H, Ripp J, et al. A Roadmap for Research on Resident Well-Being. Am J Med.2018;131(3):323-328. doi: 10.1016/j.amjmed.2017.12.001.

Rangé BP, Pavan-Cândido CC, Neufeld CB. Breve histórico das terapias em grupo e da TCCG. In: Neufeld CB, Rangé BP, ed. Terapia Cognitivo-Comportamental em grupos: das evidências à prática. Porto Alegre: Artmed; 2017:17-32.

Rodrigues MES, Silveira TB, Jansen K, et al. Risco de suicídio em jovens com transtorno de ansiedade: estudo de base populacional. Psico-USF. 2012; 17(1):53-63.

Rotenstein LS, Ramos MA, Torre M, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. JAMA. 2016;316(21):2214-36. doi: 10.1001/jama.2016.17324.

Sadock BJ, Sadock VA, Ruiz P. Compêndio de Psiquiatria: Ciência do Comportamento e Psiquiatria Clínica. 11th ed. Porto Alegre: Artmed; 2017:349-354,408.

Santos EG, Siqueira MM. Prevalência dos transtornos mentais na população adulta brasileira: uma revisão sistemática de 1997 a 2009. Rev Bras Psiquiatr. 2010;59(3):238-246.

Seeliger H, Harendza S. Is perfect good? Dimensions of perfectionism in newly admitted medical students. BMC Med. Educ. 2017;17(1):206. doi: 10.1186/s12909-017-1034-9.

Silva V, Costa P, Pereira I, et al. (2016). Depression in medical students: insights from a longitudinal study. BMC Medical Education. 2017;17(1):184 DOI: 10.1186/s12909-017-1006-0.

Slavin SJ, Chibnall JT. Finding the why, changing the how: improving the mental health of medical students, residents, and physicians. Acad Med. 2016;91(9):1194-96. doi: 10.1097/ACM.0000000000001226.

Slavin SJ. Reflections on a decade leading a medical student well-being initiative. Acad Med.2019;94(6):771-74. doi: 10.1097/ACM.0000000000002540.

Solis AC,Lotufo-Neto F. Predictors of quality of life in Brazilian medical students: a systematic review and meta-analysis. Braz J Psychiatry. 2019;00:000-000. DOI: 10.1590/1516-4446-2018-0116.

Tabalipa FO, Souza MF, Pfülzenreuter G, Lima VC,Traebert E,Traebert J. Prevalence of anxiety and depression among medical students. Rev. bras. educ. med.2015;39(3):388-394. doi:10.1590/1981-52712015v39n3e02662014.

Valle V, Scharlau VC, Cataldo Neto A.O estudante de Medicina. In:Cataldo Neto A, Antonello I, Lopes MHI, ed. O Estudante de Medicina e o Paciente: uma aproximação à prática médica. Porto Alegre: EDICPUCRS; 2006:31-36.

Vasconcelos TC, Dias BRT, Andrade LR, Melo GF, Barbosa L, Souza E. Prevalência de sintomas de ansiedade e depressão em estudantes de Medicina. Rev. bras. educ. med. 2015;39(1):135-142. doi:10.1590/1981-52712015v39n1e00042014.

Victoria MS. Níveis de ansiedade e depressão em graduandos da Universidade Estadual do Rio de Janeiro (UERJ). Encontro,rev.psicol.2013; 16(25):163-175.

Villwock J, Lindsay BS, Lindsey AK, Harris TM. Impostor syndrome and burnout among American medical students: a pilot study. Int J Med Educ. 2016;7:364-69. doi: 10.5116/ijme.5801.eac4.

von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP.The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. J. Clin. Epidemiol. 2008;61(4):344-49. doi: 10.1016/j.jclinepi.2007.11.008.

Wasson LT, Cusmano A, Meli L, et al. Association between learning environment interventions and medical student well-being: a systematic review. JAMA. 2016; 316(21):2237-52. doi: 10.1001/jama.2016.17573.

World Health Organization. Global Health Observatory data repository. apps.who.int/gho/data/view.main. MHSUICIDEv?lang=en. Updated 2018. Accessed April 15, 2020.

Wright JH, Basco MR, Thase ME. Aprendendo a Terapia Cognitivo-Comportamental: um guia ilustrado. Porto Alegre: Artmed; 2008:15-24.

Yalom, I.D. & Leszcz, M. Psicoterapia de grupo: teoria e prática. Porto Alegre: Artmed; 2006.

Yates J, James D, Aston I. Pre-existing mental health problems in medical students: a retrospective survey. Med Teach. 2008;30(3):319-21. doi: 10.1080/ 01421590701797630.

****