Int J Epidemiol Health Sci 2023;4: e48
doi: http//doi.org/10.51757/IJEHS.4.2023.697489

Original Article

Insight into the impact of COVID-19 on Malta's future medical workforce - A Call to Action?

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Cite this article: Cuschieri, S., Grech, E. Insight into the impact of COVID-19 on Malta's future medical workforce - A Call to Action? Int J Epidemiol Health Sci 2023;4: e48. Doi: 10.51757/IJEHS.4.2023.697489.

Abstract

Background: Medical research dynamics are complex, and stressors such as the COVID-19 pandemic make them even more so.

Aims: The purpose of this article was to assess the impact of COVID-19 on medical students' willingness to become doctors and their goals. It also investigated how COVID-19 affects students' mental health and well-being.

Methods: A literature-based anonymous online survey was created to assess students' future career goals, willingness to become doctors, and various aspects of their mental health. There was descriptive and univariate regression analysis.

Results: Males enrolled in medical school at a higher rate than females. After the pandemic, a minority of students changed their initial specialty choice, but there was no statistical significance in their willingness to become a doctor (p =0.45). Only students who had long COVID-19 symptoms showed significant variation in their sleep patterns (p =0.01). Female students had significantly higher anxiety levels than male students, with 11.21% (CI95%:6.34 - 18.74) experiencing severe anxiety.

Conclusion: Enrolling in medical school is a deeply personal decision that should not be taken lightly. Workplace conditions should be improved to attract the next generation of health-care providers. It is thus recommended that medical schools consider establishing a pre-entry course to inform and expose potential medical students to the working lives of doctors. All medical schools must ensure that mental and psychological support is easily accessible and non-stigmatizing.

Keywords: Career choice, COVID-19 Pandemic, Mental health, Malta

Introduction

The provision of high-quality medical education and practical experiences by medical schools should be based on medical students' expectations and aspirations (1). Furthermore, understanding the motivational factors for entering medical school is critical in understanding medical students' attitudes and future aspirations, which will translate into the next generation workforce (2). Individuals' motivations for attending medical school vary greatly, but they typically include a desire to interact with people, the fact that the profession is prestigious, and the knowledge that studying medicine may provide a wide range of opportunities as well as a generally good wage (3). A primary interest in medicine as a profession, as well as parental influence, are other influencing factors.

Because of different socioeconomic and cultural influences, the extent to which the listed factors influence a person's choice varies across countries (3,4).

One common motivation for medical students is the desire to make a difference in people's lives. After overcoming the challenge of applying to and being accepted to medical school, every medical student must consider their specialty. A good work-life balance, the pace and variety of work, and the working environment are all important considerations in this decision (5). This decision may also be influenced by the desire for job security and a steady income (6). An individual's personality, personal values, and professional and lifestyle expectations may all play important roles in specialty selection (7).

Stringent public health measures were implemented globally at the end of 2019 and into 2020, resulting in global disruption of medical teaching and clinical experience for medical students due to the introduction of COVID-19 (8). As a result, universities all over the world are shifting to online teaching and learning (9). Although there is evidence that online teaching methods are as effective as clinical teaching, medical education requires hands-on clinical experience that cannot be replaced by remote teaching (10,11). Although simulations can be used to provide clinical scenarios as an alternative to clinical experience, they are not realistic representations of hospital life. Concurrently, the existing hospital workforce, including doctors, was put under extreme strain as their workloads were drastically increased, exacerbating the already-existing health care workforce shortages (12). Such experiences may have influenced medical students' willingness and outlook on becoming doctors. Furthermore, medical students who are subjected to sub-optimal clinical training through simulations as a result of the global pandemic may have fewer clinical opportunities, which may affect their medical education as well as career advancement (13). Indeed, students around the world expressed concern because limited access to clinical experience limited their ability to explore specialties of interest and made them less confident in their abilities to become competent doctors. Exhaustion, stress, and anxiety levels were all elevated. This was more noticeable in female students (14). During the COVID-19 pandemic, university students were found to be at an increased risk for psychopathology due to insomnia, social dysfunction, and other psychological ailments (15).

In Malta, the 'Doctor of Medicine and Surgery' program is a five-year degree program. The program is divided into two years: preclinical (MD1 and MD2) and clinical (MD3 to MD5). The teaching methodology combines traditional didactic teaching methods such as lectures, tutorials, small group instruction, and problem-based learning. Preclinical years also include cadaver anatomy dissection, whereas clinical years focus on bedside teaching shadowing, skills training, and theatre and ward attendance (16).

The COVID-19 pandemic had a significant impact on the Faculty of Medicine and Surgery at the University of Malta, as schools and universities in Malta were forced to stop in-person teaching by mid-March 2020. (17). Administrative offices were evacuated to make way for makeshift emergency wards, and instructional methods were shifted online overnight. For one and a half academic years (2020/2021 and 2021/2022), pre-recorded lectures, live lectures, and small group teaching via Zoom® and online resources were the primary teaching and learning modalities. As part of the pandemic response, Malta's only state hospital underwent significant changes (infrastructure and healthcare workforce shift) (17,18). These unexpected and drastic changes may have had an impact on the learning and teaching outcomes of medical students, as well as their mental health (19). The goals of this study were to 1) assess the impact of COVID-19 on medical students' willingness to become doctors and their professional aspirations, while also attempting to understand the potential motivators for any changes, and 2) investigate the impact of COVID-19 on the mental health and wellbeing of the next generation of doctors.

Methods

The authors conducted an anonymous survey based on published literature, validated measurement tools, and questions about the characteristics of local students. A pilot study was conducted by distributing the survey to two students from each year. Following student feedback, the questionnaire was slightly modified. The survey was then distributed to all medical students in their first, second, third, and fourth years at the University of Malta's Faculty of Medicine and Surgery, the country's only state university. MDS1 and MDS2 medical students enrolled during the COVID-19 pandemic, while MDS3 and MDS4 enrolled prior to the pandemic. The MDS5 cohort was excluded from this survey because they were finishing up their final exams at the time of the survey. Furthermore, it was deemed appropriate to exclude this class in order to maintain consistency between classes: two classes enrolling in medical school prior to COVID-19 and two classes enrolling after the pandemic's onset. No sampling

was required because the entire medical student cohort (MDS1 to MDS4) was given an equal opportunity to participate. Between the 7th of February and the 7th of March 2022, the survey was distributed to students via Google Forms with the assistance of class representatives. The term "class representatives" refers to two students who are elected each year to serve as the point of contact for faculty and lecturers and thus pass on information to their class cohort. Throughout the data collection period, all students received several reminders. Because of the study's anonymity, the authors were unable to prompt non-responders or describe the characteristics of the non-responding student.

The survey was divided into the following sections: (i) demographic data, including whether they pursued a previous undergraduate degree, (ii) reasons for enrolling in medical school, (iii) specialty aspirations at the time of enrolment and since the onset of the pandemic, (iv) willingness to become a doctor at the time of enrolment and since the onset of the pandemic (20), (v) concerns about becoming a doctor, (vi) COVID-19 experience, (vii) insomnia severity index (21), (viii) GAD-7 assessment of general anxiety disorder (22). The final two sections assessed the impact of COVID-19 on sleep patterns via the insomnia severity index and anxiety levels since COVID-19 via the GAD-7 score. The Faculty of Medicine and Surgery Research Ethical Committee granted ethical approval (MED-2021-00071). Prior to beginning the questionnaire, participants provided informed written consent. Figure 1 depicts a summary of the procedures used.

Data analysis

Response rates and sample margins of error were calculated retrospectively for both groups (pre-covid and post-covid). Students were asked to rate their willingness to become doctors before and after the COVID-19 pandemic using a visual analogue scale (VAS). This ranged from 1 to 10, with 1 being the lowest and 10 being the highest. The pre- and post-COVID-19 mean scores were calculated. McNemar's chi squared test was also used to compare the results. The willingness scale was divided into three categories: no change in willingness, decreased willingness, and increased willingness. These three categorical groups were compared to demographic and enrollment reasons data. The willingness score was used as the independent variable, and the "reasons for enrolling in medical school" were used as the dependent variables in univariate regression models.

The insomnia severity index was calculated using published validated guidelines (21). The sum of each student's insomnia severity index was classified as follows: 0-7 = "no clinically significant insomnia"; 8-14 = "subthreshold insomnia"; 15-21 = "clinical insomnia moderate severity"; 22-28 = "clinical insomnia severe".

The GAD-7 score was computed in accordance with published guidelines (22). The sum of each student's GAD-7 questionnaire score was classified as =4 for no symptoms, 5 - 9 for mild symptoms, 10 - 14 for moderate symptoms, and >15 for severe symptoms.

The IBM SPSS software version 26 was used for descriptive and analytic analyses (IBM, Chicago Illinois, USA). For categorical statistical analyses, the Chi squared test was used. If the p-value was less than or equal to 0.05, the value was considered significant.

Results

A total of 167 students (30% of all enrolled medical students) responded, with 38% (n=102) enrolling during COVID-19 (margin of error 7.64) and 19% (n=65) enrolling prior to COVID-19 (margin of error 10.93). Many of respondents (69.46%) were female, and the majority (47.31%) were between the ages of 18 and 20. Table 1 demonstrates the demographic characteristics of the participants. Most of respondents (74.85%) were pursuing an MD degree as their first degree. The course was taken as a secondary course by the majority of those who had previously completed the 'Bachelor of Science in Nursing' degree (10.78%).

Reasons for enrolling into medical school

Male students' primary reason for enrolling in medical school was "long term desire/aspiration," whereas female students aspired "to help others" (Figure 2). Figure 2 shows that more males than females enrolled in medical school for the job prestige, social status, and money. Most students admitted that they did not know which specialty they wanted to pursue after finishing the course (Figure 2). Figure 3 shows that 20.36% (CI 95%: 14.69 - 27.43) want to start surgical training, while 13.77% (CI 95%: 9.11 - 20.16) want to work in pediatrics. During their medical school training and during the COVID-19 pandemic, only 16.77% (CI 95%: 11.61 - 23.50) reported wanting to change their initial specialty choice, with preferences for psychiatry, surgery, and pediatrics, respectively.

Table 1. Demographic characteristics of the survey participants

		Male (*n*=51)	**Female (*n*=116)**
Age group	18 - 20 years	57%	43%
	21- 23 years	25%	42%
	24 - 27 years	14%	12%
	28 - 30 years	2%	1%
	30+ years	2%	2%
*MD year	MDS1	29%	30%
	MDS2	35%	29%
	MDS3	16%	16%
	MDS4	20%	25%
Previous Degree	Yes	24%	26%
	No	76%	74%

*MD: Medical Doctor

Table 2. Categorization of the willingness to become a doctor pre- and post- COVID-19 stratified by demographic parameters and reasons for enrolling into medical school

		Willingness to Become Doctor			
		Remain the same (*n*=95)	Decreased (*n*=37)	Increased (*n*=35)	Chi sq. p-value
Sex	Male	34%	19%	34%	0.22
	Female	66%	81%	66%	
Age group	18 - 20 years	43%	62%	43%	0.02
	21- 23 years	34%	30%	54%	
	24 - 27 years	20%	5%	0%	
	28 - 30 years	2%	0%	0%	
	30+ years	1%	3%	3%	
*MD year	MDS1	32%	30%	26%	0.86
	MDS2	29%	35%	31%	
	MDS3	15%	11%	23%	
	MDS4	24%	24%	20%	
Reason for enrolment	To help others	75%	76%	80%	0.82
	For Money	16%	24%	11%	0.32
	Job prestige and social status	24%	19%	29%	0.63
	Family of Doctors	7%	11%	3%	0.43
	Peer Pressure	2%	3%	3%	0.96
	Long-term desire/aspiration	75%	76%	51%	0.03

*MD: Medical Doctor

Table 3A. Impact of COVID-19 on insomnia levels among medical students stratified by demographic characteristic and COVID-19 experience

		No clinically significant insomnia (*n*=102)	**Subthreshold insomnia (*n*=53)**	**Clinical insomnia moderate severity (*n*=9)**	**Clinical insomnia severe (*n*=3)**	**Chi Sq. *p*-value**
Sex	Male	31%	34%	0%	33%	0.23
	Female	69%	66%	100%	67%	
Age group (year)	18- 20	45%	55%	44%	0%	0.74
	21- 23	36%	38%	33%	67%	
	24- 27	15%	6%	22%	33%	
	28- 30	2%	0%	0%	0%	
	30+	2%	2%	0%	0%	
*MD Year	MDS1	28%	32%	33%	33%	0.99
	MDS2	31%	32%	22%	33%	
	MDS3	17%	15%	11%	0%	
	MDS4	24%	21%	33%	33%	
Had COVID	Yes	14%	15%	33%	0%	0.39
	No	86%	85%	67%	100%	
	N/A	0%	0%	0%	0%	
Experienced Long COVID	Yes	0%	9%	22%	0%	**0.01**
	No	19%	8%	11%	0%	
	N/A	81%	83%	67%	100%	
Family members with COVID	Yes	38%	45%	56%	67%	0.52
	No	62%	55%	44%	33%	
	N/A	0%	0%	0%	0%	

*MD: Medical Doctor

Table 3B. Impact of COVID-19 on anxiety levels among medical students stratified by demographic characteristic and COVID-19 experience

		Mild (*n*=115)	**Moderate (*n*=36)**	**Severe (*n*=16)**	**Chi Sq. p-value**
Sex	Male	37%	17%	19%	0.04
	Female	63%	83%	81%	
Age group	18 - 20 years	45%	50%	56%	0.82
	21- 23 years	36%	42%	38%	
	24 - 27 years	15%	8%	6%	
	28 - 30 years	2%	0%	0%	
	30+ years	3%	0%	0%	
*MD Year	MDS1	30%	25%	38%	0.7
	MDS2	30%	39%	25%	
	MDS3	16%	11%	25%	
	MDS4	24%	25%	13%	
Had COVID	Yes	13%	19%	19%	0.58
	No	87%	81%	81%	
	N/A	0%	0%	0%	
Experienced Long COVID	Yes	3%	6%	13%	0.35
	No	15%	17%	6%	
	N/A	83%	78%	81%	
Family members with COVID	Yes	37%	56%	44%	0.15
	No	63%	44%	56%	
	N/A	0%	0%	0%	

*MD, Medical Doctor

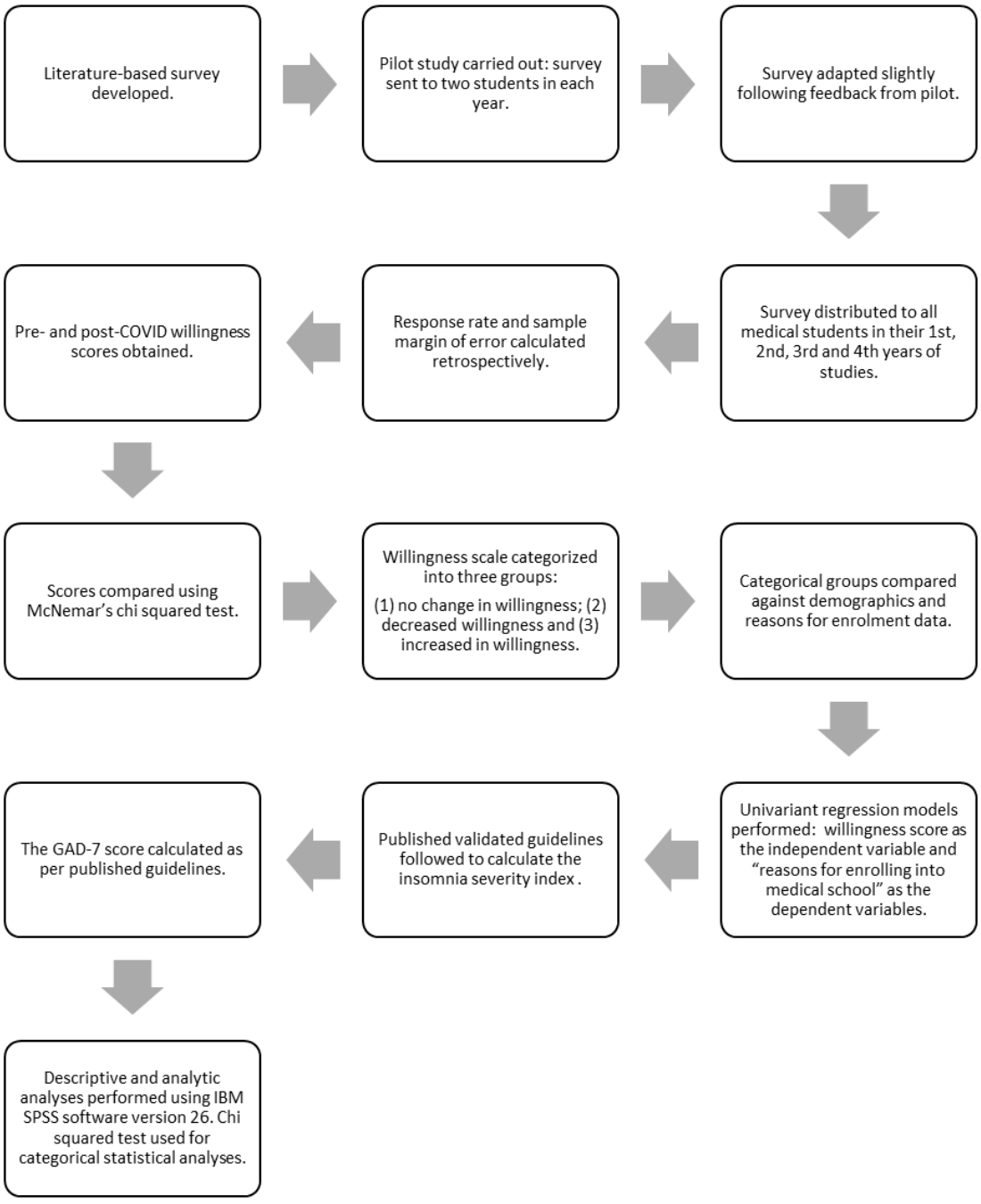

Figure 1. Summary of applied procedures

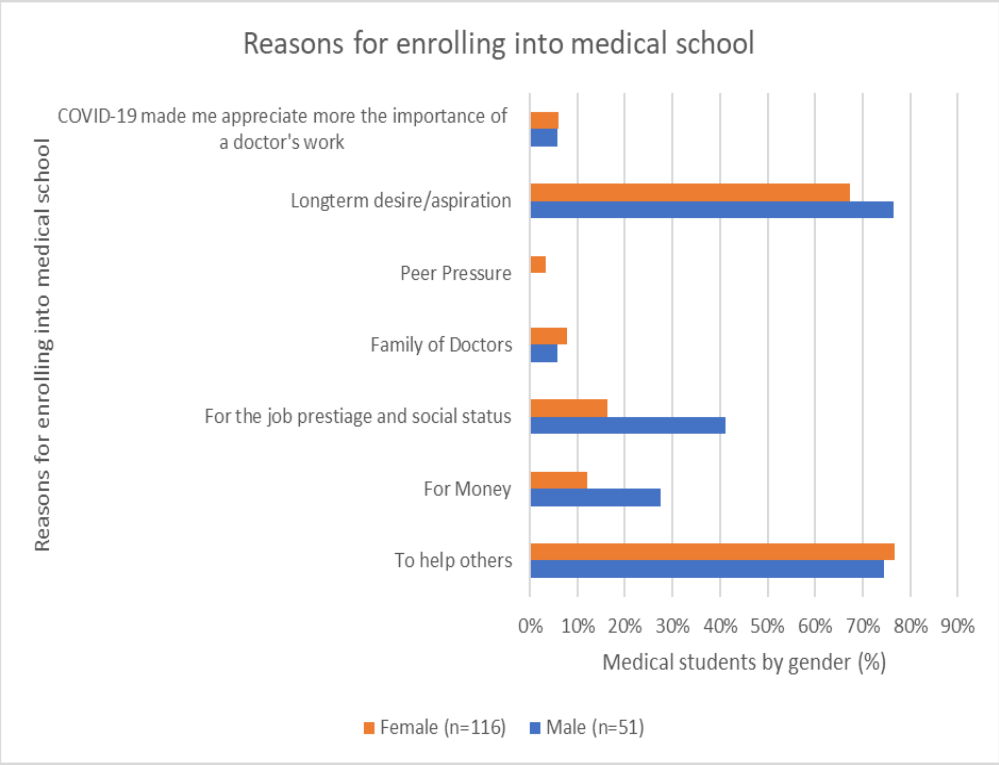

Figure 2. Reasons for enrolling into medical school across the study population stratified by gender.

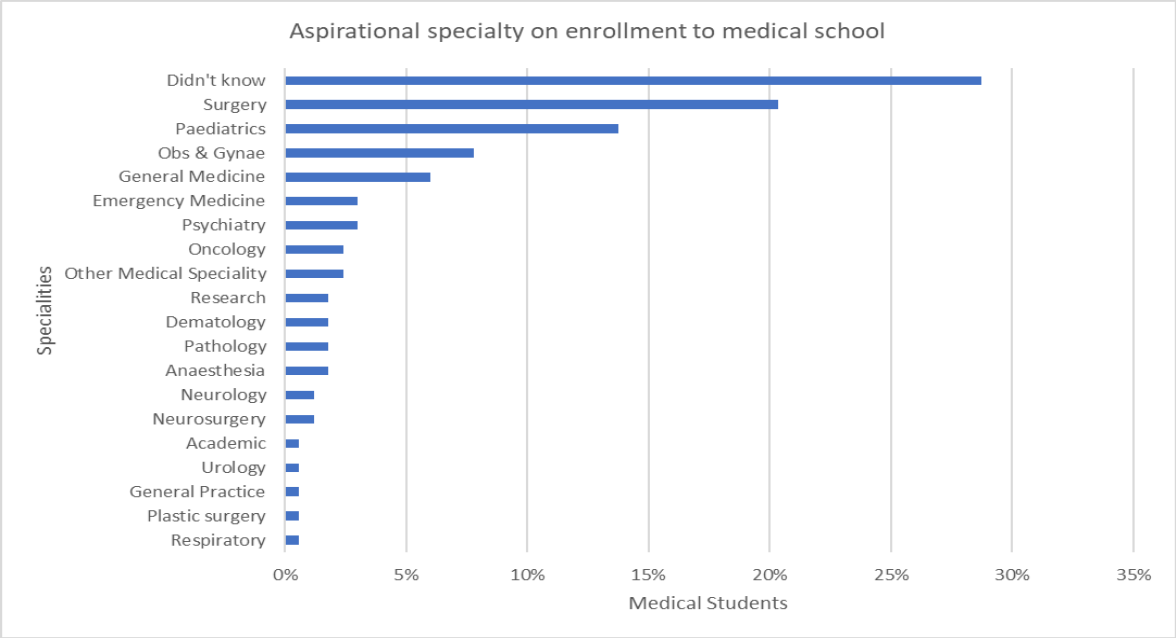

Figure 3. Aspirational specialty training following completion of medical school

Willingness to become a doctor

Students rated their willingness to become a doctor on a scale of 1 to 10, with a pre-COVID-19 mean score of 8.85 (SD 1.52) and a post-COVID-19 mean score of 8.82. (SD 1.32). There was no statistically significant difference in willingness score between pre-COVID-19 and post-COVID-19 (p=0.45). As shown in Table 2, there was a significant difference between the age groups (p=0.02) and the three willingness categories, as well as those enrolling in medical school after a long-term desire/aspiration (p=0.03). Those between the ages of 18 and 20 tended to fall into the "decreased willingness" category, whereas those between the ages of 21 and 23 fell into the "increased willingness" category. (Table 2). Univariate regression modeling revealed a significant negative relationship between students who enrolled in medical school to fulfill family expectations (OR: 0.29 CI95% 0.09 - 0.87; p=0.03) and those who enrolled to help others (OR: 0.24 CI95%: 0.07 - 0.81; p=0.02).

Impact of COVID-19 on insomnia and anxiety levels

As shown in Table 3A, students were asked to report any changes in their insomnia patterns since the onset of COVID-19. Only students with Long COVID-19 symptoms showed significant variation in insomnia patterns (p=0.01) when compared to their peers.
Anxiety levels varied across the student population. Female students reported significantly higher levels of anxiety than male students, with 25.86% (CI95%: 18.38 - 34.97) reporting moderate anxiety and 11.21% (CI95%:6.34 - 18.74) reporting severe anxiety (Table 3B.)

Discussion

Reasons for enrolling into medical school

Males and females have different motivations for attending medical school. Women were discovered to be more empathic than men (23). This may explain why female students indicated that they joined the medical course "to help people" while "long term desire/aspiration" was a greater factor in male students. This is consistent with the findings of a study, which found that male medical students prioritized personal reasons for entering the medical program over female students, who prioritized interpersonal factors such as helping others (24). Female medical students have higher emotional intelligence and stronger prosocial preferences than their male counterparts (25,26).
Males outnumber females in medical school because of the job prestige, social status, and high income. Although the medical profession has historically been regarded as prestigious, it has been demonstrated that doctors themselves believe the profession's prestige has declined over time (27). Other professions have been deemed just as prestigious as a medical career, and the older generation holds the profession in especially high regard (28,29). Medical doctors' high social status is under threat from competition from other health professionals, consumerism, changing patient attitudes, and other phenomena (30). Medical doctors are widely perceived to be wealthy, but significant costs such as insurance, taxes, and Continuing Medical Education (CME), to name a few, combined with long, arduous hours suggest that monetary rewards may not be as substantial as one might believe (31). This implies that the decision to become a doctor should not be based solely on the promise of material gain or social advancement, as many other professions may provide the same satisfaction and may be a better fit for individuals. Indeed, the European healthcare workforce is on the verge of collapsing as fewer medical professionals, including doctors, graduate, with the World Health Organization (WHO) urging better "work conditions that promote a healthy-work-life balance" as one of ten actions needed to strengthen the workforce (12).
Many of medical students had no idea what specialty they wanted to pursue. This is understandable, as adequate medical exposure and career advice are required to make an informed decision on the matter. This can only be obtained over time and after being exposed to a wide range of specialties (32). Even though most doctors are expected to choose a specialty within two or three years of graduation, many qualify without being properly informed of their career options (33).
Prior to the onset of the COVID-19 pandemic, global recruitment to psychiatry was insufficient to meet projected mental health service needs (34). Since the beginning of this global public health crisis, there has been an increase in demand for the treatment of psychiatric conditions such as anxiety and depression, and psychologists have reported increased workloads and long waiting lists (35). The WHO's report in 2022 calls for immediate action to "protect the health and well-being of the workforce" (12). Given that a significant number of students stated that they entered medical school for financial gain, medical students may have recognized the increased strain on mental health services and may have aimed to go into psychiatry to help ease the burden on the services available or to capitalize on

the increased need for mental health professionals. However, altruism and a sense of social responsibility have been demonstrated in medical students, as they were found to be willing to join the healthcare response to the COVID-19 pandemic before graduating (36). Medical students all over the world have reported switching their preferred specialty to psychiatry, citing the importance of psychiatric support during stressful times like the pandemic (37).

The COVID-19 pandemic has been found to have a positive impact on students' decision to become pediatricians (38). The presence of a role model and work-family balance have been found to influence the choice of pediatrics as a career (39), echoing important characteristics required to strengthen the healthcare workforce (12). These are factors that may have been exacerbated during the global public health crisis because people spent more time at home or were separated from their families as a result of social distancing and quarantine measures.

Exposure to surgical procedures and interaction with surgeons have been reported to be important factors in students' decision to pursue a surgical career (40). Although theatre time and contact with surgeons have been limited because of the COVID-19 pandemic, this does not appear to have discouraged medical students in Malta from pursuing surgery as a career, as a significant number of students changed their original specialty choice to surgery following the pandemic. Personal experiences of students throughout the COVID-19 crisis may also influence specialty choice, implying a complex interaction of factors influencing specialty choice (37).

Willingness to become a doctor

The COVID-19 pandemic did not appear to have a significant impact on medical students' general willingness to become doctors, though younger age cohorts (MDS1 and MDS2) may be deliberating their decision more than older cohorts. This contrasts with concerns about high turnover intentions among healthcare workers during the COVID-19 pandemic in more severely affected countries, where a significant minority of medical students said they would choose a different career path if they could start over (41). Malta was not as adversely affected by the pandemic as other countries as the public health response was effective overall and was even praised by the World Health Organization's regional director (18,42). However, this is not representative of other countries, posing a health and workforce challenge as we enter the post-pandemic period (12).

The significant negative association between willingness to become a doctor and family expectations among students who enrolled in medical school to help others may be explained by students' realization that a career that involves significant personal health risk and long working hours that may affect work-life balance may not be worth the personal cost, especially when the decision to enter medical school was not made entirely autonomously. During the COVID pandemic, a survey of medical students in New York revealed that a significant number of students shifted away from frontline specialties for the same reasons (37).

Impact of COVID-19 on insomnia and anxiety levels

The COVID-19 pandemic has caused global mental health issues such as anxiety disorders, major depressive disorder, and extreme exhaustion. Individual routines have been disrupted because of these factors, resulting in negative effects on the homeostatic sleep drive, the circadian rhythm, and the arousal system (43). Furthermore, both insomnia and increased anxiety are symptoms of COVID-19 post-viral syndrome, also known as 'long COVID' (44).

Only students with long COVID-19 symptoms were found to have significant variation in their sleep patterns when compared to their peers, according to our findings. Insomnia treatment strategies may thus help reduce the severity of mental health disorders in medical students (45). Students with long COVID may have been more prone to insomnia than the rest of the cohort, as prolonged symptoms may have contributed to higher anxiety levels (46).

Female medical students have been found to be more anxious in general than their male counterparts (47). Our findings support this theory, as female students were found to have higher levels of anxiety. When considering the prevalence of anxiety during the COVID-19 outbreak, females appeared to have suffered a greater psychological impact of the crisis. This includes increased anxiety, stress, and depression (48–51).

Study Strengths and Limitations

The study's strengths and weaknesses must be considered. Malta has only one state university, where both local and international students' study for the degree of Doctor of Medicine and Surgery.

This allows us to invite the entire medical student body to participate in our survey without the need for sampling. However, this is an observational study in which students were invited to participate voluntarily. Despite the authors' best efforts to collect responses from every student, the response rate remained low,

limiting the study's power. This reflects the current trend observed among medical bodies in response to surveys conducted both in Malta and elsewhere (52–54). A survey was used to collect information. This could have resulted in self-reporting bias.

Conclusion

The decision to attend medical school is a deeply personal one that should not be made lightly or based on personal gain. The profession can have a significant impact on an individual's life and lifestyle, especially when faced with stressors like the COVID-19 pandemic. Students who enrolled in the course due to family pressures or because they 'wanted to help people' were less willing to become doctors after the pandemic, possibly due to fear of personal cost. Given the current dire healthcare workforce situation, it is critical that working conditions be improved and the medical profession made more appealing to medical students, as this will have an impact on the next generation of health care professionals. Furthermore, it is suggested that medical schools consider establishing a pre-entry course to inform and expose potential medical students to the working lives of doctors to ensure that entry into medical school is a true calling and not based on a widespread misconception. This will save medical students from unnecessary stress and indecision later in their careers. Furthermore, mental health has suffered significantly since the onset of COVID-19, particularly among female students. All medical schools must ensure that mental and psychological support is easily accessible and non-stigmatizing.

Funding: The authors received no funding from any organization for the work they submitted.

Declaration of interest: There are no relevant financial or non-financial interests to disclose for the authors.

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