An investigation into the well-being of pre-clinical medical students at the University of the Witwatersrand

G Dove; **M Botes,** BSc; BSc (Hons); **K Colborne,** BHSc; **P Letsoalo,** BSc; **P Mashiane**; **S Moodley**; **E Naidoo,** BSc; **L Nyoka**; **P Sodo,** MPH; **A Dreyer,** MPH

University of Witwatersrand, Johannesburg, South Africa

Corresponding author: *G Dove (1853329@students.wits.ac.za)*

Student-author biography
At the time of publication, G Dove was pursuing a Bachelor of Medicine and Surgery (MBBCh) degree at the University of the Witwatersrand, in the fifth year of study and scheduled to commence final year in 2024.

Background. Globally, medical students experience a low level of well-being, high levels of distress and burnout.
Objective. To evaluate the well-being of fourth year students in the Bachelor of Medicine and Surgery (MB BCh) degree at the University of the Witwatersrand (WITS).
Methods. A cross-sectional study was conducted among 333 fourth year MB BCh students at WITS in 2023. The minimum sample size was 179 (95% CI, $p<0.05$). The students completed an online questionnaire using the Medical Students Well-being Index (MSWBI). Multivariable logistic regression was used to identify predictors of severe distress.
Results. The response rate was 53.75%. Most participants were distressed (97.06%) and many (74.71%) severely distressed. Several factors were associated with distress, including sex, age, funding, underutilisation of mental health resources, lack of faculty support, preferred time off and perception of the academic content. Predictors of severe distress were age, school leavers, perceived distress, exercise and feelings about grades.
Discussion. We found higher levels of distress than reported in other developing countries. More than half (53.57%) of the participants were depressed, which is notably higher than the 36.4% previously reported in another South African study. Participants who self-identified as distressed were more than five times more likely to be severely distressed, however, mental health resources are still severely underutilised.
Conclusion. This study provided insight into the distress levels among fourth year MB BCh students at WITS and the contributing factors. Early intervention during the students' pre-clinical years of training is crucial and would benefit both the students and the future patients under their care.

Undergraduate Res Health 2023;1(2):e1628. https://doi.org/10.7196/URHJ.2023.v1i2.1628

Well-being is defined as a state of being comfortable, healthy and happy and, therefore, can be understood as the absence of distress.[1] There is an increased prevalence of distress among medical students internationally, with an increase in prevalence in developing countries.[2] This is highlighted by the 30% prevalence of distress in the UK compared to Turkey and Malaysia, where the prevalence is 47.9% and 41.9%, respectively.[2] Similarly, Medical students experience increased distress in comparison with non-medical studies as evidenced by medical students in Canada experiencing higher levels of stress,[3] and medical students in Australia experiencing higher rates of depression than non-medical students.[4] A doctor will experience the most amount of distress during training.[5]

The consequences of poor well-being include depression, suicidal ideation, stress and burnout. There is an 11.1% pooled prevalence of suicidal ideation among medical students globally.[6] The prevalence of suicide among medical students in South Africa (SA) is double that of the national prevalence in the same age group.[7] A large number of medical students in Lebanon (75%)[8] and England (82%)[9] experience burnout. Despite a consensus regarding the problem related to the well-being of medical students, the prioritisation of mental health awareness at medical schools has only emerged recently.[10] Studies have stressed both access to and awareness of mental health resources as crucial in improving the levels of well-being.[11] The poor mental health of medical students affects both their studies as well as their efficacy in patient care.[12]

Several factors affect the well-being of medical students. An American study reported that factors internal to medical schools (institutional factors), such as the rigorous curriculum, constant student evaluations and the university culture, coupled with those external to medical school (individual factors), including sex, personal debt and race, had a detrimental effect on the well-being of medical students.[10] Medical students in SA also grapple with these individual factors, including the inability to pay for tuition fees, gender identity, ethnicity and race.[13]

The assessment of well-being is challenging as this term encompasses both objective and subjective well-being.[14] The information obtained

regarding objective well-being targets specific domains, hence, results are broadly applicable to all populations.[12] In contrast, deriving appropriate interventions for a population based on results obtained from subjective measures of well-being is difficult.[12] Various scales and indices have been used to objectively measure well-being.[10,12,15,16]

The Medical Student Well-being Index (MSWBI) is a validated tool commonly used to evaluate the well-being of medical students in terms of distress and severe distress through a seven-point questionnaire targeting the domains of distress.[12,17] The domains are burnout (in terms of depersonalisation and emotional exhaustion), depression, fatigue, stress, poor mental quality of life and poor physical quality of life.[12] If the participant possesses four or more of the seven domains, then he/she is considered to be severely distressed. Individuals or groups who are severely distressed are specifically in need of interventions because they are more likely to have poor mental quality of life, suicide ideation or thoughts of dropping out.[17]

There is limited research into the well-being of medical students at the University of the Witwatersrand (WITS), including the fourth year Bachelor of Medicine and Surgery (MB BCh) students. WITS offers a Graduate Entry Medical Programme (GEMP), in which qualified students who have graduated with a previous degree are allowed to enter into the third year of MB BCh, instead of starting medical school at a first-year level. Therefore, students in the fourth year of MB BCh evaluated in this study consisted of two groups: the aforementioned GEMP students and students who enrolled into medical school after high school (school leavers).

The purpose of this study was to describe the level of well-being amongst the fourth year MB BCh students from WITS and determine the factors associated with their well-being. Understanding these factors could aid in making the resources for improved well-being available and known among this group of students.

Methods

Study design and setting

This was an analytical, cross-sectional study, using an electronic survey instrument called Research Electronic Data Capture (REDCap).[18,19] The study targeted the fourth year MB BCh students in the School of Clinical Medicine, Faculty of Health Sciences, at WITS, Johannesburg, SA in 2023. The study sample was selected as this class was in the last year of their preclinical medical education, allowing the opportunity to assess the target population's well-being before being exclusively trained in hospitals. Convenience sampling was used to recruit participants. Inclusion criteria included being a fourth year MB BCh student at WITS, 18 years and older, and a willingness to participate in the study. Exclusion criteria included students taking a temporary leave of absence and an incomplete questionnaire. The online platform, Raosoft, was employed to determine the optimum sample size.[20] The calculated minimum sample size for this study was 179 based on the total number of 333 medical students in this cohort in 2023, using a 95% CI, $p<0.05$ and 50% response distribution.[20]

Data collection tool and procedures

The study used the MSWBI, which is a validated self-administered questionnaire that was adapted and modified from previous studies.[21] Permission to use the MSWBI tool was obtained for use in this study. The questionnaire was divided into three sections: Part 1 focused on the demographics of the respondents (sex, age, race and start of medical studies). Part 2 explored the MSWBI's seven domains of distress. Part 3 addressed possible external factors (exercise, sleep, funding, accommodation, leisure time, psychological help and chronic medical conditions) and internal factors (grading system preference, satisfaction with grades, use of mental health resources, teaching style preference, faculty support, holiday, content load and ease of access to faculty support) associated with well-being. An additional factor considered was the participants' subjective perception of being in severe distress, for instance, does the participant think that they are severely distressed?

The tool was peer reviewed by members of the MB BCh 5 class who gave feedback on the clarity of Parts 1 and 3. Questions were subsequently adjusted to ensure understanding. Data from the peer review were not included in the main study.

Participants were recruited through a unique link generated on REDCap and distributed to their student emails via the WITS registrar's office. The survey link included an information sheet, a distress protocol, informed consent form and the questionnaire itself. The distress protocol supplied contact numbers of support services before and after the completion of the questionnaire.

Data analysis

The data were transferred from REDCap[18,19] into Excel for cleaning, and then into STATA version 15 (StataCorp., USA)[22] for analysis. Descriptive statistics such as frequencies were used to describe the study sample's characteristics. Following the MSWBI's guidelines, the proportion of participants per domain of distress, plus those who were distressed and severely distressed were then determined using descriptive statistics. Associations were explored using bivariate analysis. Similar associations were described for severe distress. All the significant variables from the bivariate analysis were included in a multivariable logistic regression model where an adjusted odds ratio (aOR), 95% CI and p-values were described. $P<0.05$ was considered statistically significant.

Ethical considerations

Ethics clearance was obtained from the Medical Human Research Ethics Committee at WITS (ref. no. M221012). Additionally, permission was granted from the WITS registrar's office. Participants provided informed consent by ticking a checkbox indicating their agreement to participate before accessing the survey. Participation was voluntary, anonymous and confidential. Given the potentially triggering content in the questionnaire, a distress protocol was implemented. This protocol provided contact details for support services before and after the completion of the questionnaire. Participants were informed that they could opt out of the survey at any time.

Results

The survey was distributed to 333 participants and received 179 responses, resulting in a response rate of 53.75%. Nine responses were excluded due to incomplete data. The majority of participants were female (70%), and the vast majority (91.76%) were between 18 and 24 years old. There was no significant difference in the proportion

of school leavers and GEMP students. Most participants were White (43.53%), followed by Indian (25.29%), Black (24.12%) and Coloured (7.06%) (Table 1).

Level of distress using the MSWBI

The majority of participants (97.06%) were distressed. The prevalence of poor physical quality of life was the lowest among the participants (23.08%) (Table 2).

Factors associated with distress

Bivariate analysis showed several factors associated with distress (Supplementary Table 1). There was a significant association between distress and sex, age, funding, use of mental health resources, areas of faculty support, preferred time off between blocks and perception regarding the academic content. Females were more distressed than males (71.52% v. 28.48%). The vast majority (92.73%) of those aged between 18 and 24 years were more distressed compared to the more mature students. There was a significant association between distress and being self-funded (40.61%) compared to those who were bursary funded (20.61%) and those who were funded by parents or guardians (38.79%). Those who did not use any mental health resources were more distressed compared with those who used the available resources (78.18% vs 21.82%). Moreover, most participants (73.94%) were unsure of how to access wellness resources offered by WITS. The majority (60.12%) of those who did not receive any academic, emotional or social support from faculty were distressed, compared with those who did. A large majority (90.91%) of those who preferred to have a holiday after every block were more distressed compared with those who preferred to have a break during the university-prescribed holiday (7.88%). Surprisingly, the proportion of those who found the academic content interesting (63.03%) were also distressed.

Table 1. The socio-demographic characteristics of MBBCh 4 medical students at WITS University, South Africa

Variables	*N* (%)
Sex	
Male	51 (30.0)
Female	119 (70.0)
Age	
18-24	156 (91.76)
25-29	11 (6.47)
≥30	3 (1.76)
Race	
Black	41 (24.12)
White	74 (43.53)
Coloured	12 (7.06)
Indian	42 (25.29)
Start of medical studies	
1st year (school leaver)	83 (48.82)
3rd year (GEMP student)	87 (51.18)

MBBCh = Bachelor of Medicine and Surgery; GEMP = Graduate Entry Medical Programme.

Factors associated with severe distress

Several factors were associated with severe distress in bivariate analysis (Supplementary Table 2). Severe distress was significantly associated with age, entry-level at medical school, perceived distress, exercise and feelings about grades. A vast majority (93%) of those aged between 18 and 24 years were severely distressed compared with older students. Just over half (53.54%) of those who entered medical school in the first year (school leavers) were severely distressed compared with 46.46% who joined the program in the third year (GEMP students). A large majority (81.75%) of those who perceived themselves as distressed were severely distressed. Only 14.9% of those who exercise almost every day were severely distressed compared with those who exercise twice a week or less. More than two-thirds (73.23%) of those who wish their grades were higher were severely distressed when compared with those (20.47%) who were satisfied with their grades and those who were unfazed (6.30%).

Predictors of severe distress

All characteristics that had a *p*-value of 0.05 or less were included in the multivariable logistic regression. As shown in Table 3**,** the odds of reporting severe distress were lower among those who exercise once a week (aOR 0.07; 95% CI 0.01 - 0.46), those who exercise two to three times a week (aOR 0.08; 95% CI 0.01 - 0.46), and those who exercise almost every day (aOR 0.10; 95% CI 0.01 - 0.64), compared with those who never exercise. The odds of being severely distressed were lower among GEMP students (aOR 0.40; 95% CI 0.16 - 0.97) compared with school leavers. The odds of reporting severe distress among those who wished that their grades were higher were 3.54 times higher than those who were satisfied with their grades (aOR 3.54; 95% CI 1.41 - 8.90). Those who perceived themselves as distressed were 5.66 times more likely to be severely distressed than those who did not perceive themselves as distressed (aOR 5.66; 95% CI 2.28 - 14.01) (Table 3).

Discussion

This was a novel study aiming to describe the level of well-being amongst the MB BCh 4 medical students from WITS and determine the factors associated with their well-being. The results suggest that almost all the participants are distressed, with the majority experiencing severe distress. This prevalence is higher than in other developing countries like Turkey and

Table 2. The frequency and severity of distress among MBBCh 4 medical students at WITS University, South Africa

Variables	*N* (%)
Distress	165 (97.06)
Stress	161 (95.27)
Fatigue	160 (94.67)
Burnout - emotional exhaustion	140 (83.33)
Severe distress	127 (74.71)
Burnout - depersonalisation	121 (72.02)
Depression	90 (53.57)
Poor mental quality of life	58 (35.52)
Poor physical quality of life	39 (23.08)

MBBCh = Bachelor of Medicine and Surgery.

Table 3. Predictors of severe distress among MBBCh 4 medical students at WITS University, South Africa by using multivariate logistic regression

Variables	Adjusted Odds Ratio	95% Confidence Interval	*p*-value
Exercise			
Never	1	-	-
Once a week	0.07	0.01 - 0.46	0.01**
2 - 3 times a week	0.08	0.01 - 0.46	0.01**
Almost everyday	0.10	0.01 - 0.64	0.01**
Feelings on grades			
Satisfied	1	-	-
Wish they were higher	3.54	1.41 – 8.90	0.01**
Unfazed	0.80	0.18 – 3.63	0.78
Start of medical studies			
1st year	1		
3rd year	0.40	0.16 – 0.97	0.04*
Age			
18 – 24	1	-	-
25 – 29	0.67	0.12 – 3.77	0.65
≥30	1	-	
Perceived Severe Distress			
No	1	-	-
Yes	5.66	2.28 – 14.01	<0.001***

MBBCh = Bachelor of Medicine and Surgery.
*p<0.05
**p<0.01
***p<0.001

Malaysia, where the prevalence of distress in medical students was less than 50%.[15] The finding may be due to a multitude of internal and external factors, including socioeconomic factors and increased disease burden.[13] Distress can be divided into several subcategories according to the MSWBI. In the study, stress and fatigue were the two most widespread experiences of the participants. More than half (53.57%) of the participants were found to be depressed, which is notably higher than the 36.4% reported in a previous SA study.[13] The majority of participants experience burnout with emotional exhaustion and burnout with depersonalisation, which is similar to the results of a study conducted in Lebanon.[8] This high level of burnout is concerning and may have both personal and professional consequences. The level of burnout increases throughout the years of medical school and continues to rise into postgraduate training.[23] It is well understood that on a personal level, burnout can result in substance abuse, thoughts of dropping out and other mental health issues.[24] Burnout has furthermore been linked to reducing the clinician's level of performance manifesting as reduced cognitive caution needed to prevent errors.[25] Additionally, there is an inverse relationship between burnout and empathy in medical students.[26] The aforementioned professional repercussions may have dire consequences for patients. Hence, efforts must be made to reduce burnout in the preclinical setting to prevent reduced quality of patient care and improve students' quality of life.

Female participants made up just under three-quarters of those who were distressed. This result may be due to the greater number of female participants (7:3). However, previous studies also reported that women are at a higher risk of experiencing distress, even when taking into account the higher representation of females in medical schools.[27] It has been found that females are more likely to experience mental health issues and report such issues.[28] Thus, targeted interventions are necessary to meet the needs of female students and encourage improved reporting of mental health issues by male students.

A concern highlighted in the SA setting is financial difficulties,[13] which is supported by our study findings where a significant association between distress and being self-funded was observed. Self-funded students do not have an external sponsor. The distress can be attributed to concerns related to the affordability of university fees as well as increased pressure to succeed in medical school.

Those who were dissatisfied with the university-prescribed holiday and preferred to have a holiday between blocks were more distressed than those who were satisfied to have a break only during the university-prescribed holiday, which includes three separate one-week holidays between terms. It can be deduced that the university-prescribed holidays are insufficient. Appropriate time off between blocks has been suggested as an important way to reduce distress and allow students an opportunity to decompress from their demanding studies.[29] Allowing for adequate vacation time within the term is an amendment that can be instituted.

Our study suggests that three-quarters of the participants are severely distressed. According to the MSWBI, severe distress correlates with poor mental quality of life, suicide ideation, and thoughts of dropping out. This is the population in which intervention is needed most. In this study, severe distress was significantly associated with age, school leavers,

Supplementary Table 1. The level of distress according to various factors among MBBCh 4 medical students at WITS University, SA as determined by the χ^2 test (*N*=170)

Variables	Distressed (%)	Not Distressed (%)	*p*-value
Gender			
Male	47 (28.48)	4 (80)	0.01**
Female	118 (71.52)	1 (20)	
Age			
18 – 24	153 (92.73)	3 (60)	<0.001***
25 – 29	10 (6.06)	1 (20)	
≥30	2 (1.21)	1 (20)	
Race			
Black	40 (24.24)	1 (20)	0.35
White	70 (42.42)	4 (80)	
Coloured	12 (7.27)	0 (0)	
Indian	43 (26.06)	0 (0)	
Start of medical studies			
1st year	81 (49.09)	2 (40)	0.69
3rd year	84 (50.91)	3 (60)	
Perceived severe distress			
No	45 (27.44)	3 (60)	0.11
Yes	119 (72.56)	2 (40)	
Exercise			
Never	34 (20.61)	0 (0)	0.68
Once a week	41 (24.85)	2 (40)	
2-3 times a week	63 (38.18)	2 (40)	
Almost everyday	27 (16.36)	1 (20)	
Sleep			
<7 hours	51 (30.91)	3 (60)	0.37
7 – 8 hours	106 (64.24)	2 (40)	
≥9 hours	8 (4.85)	0	
Funding			
Self-funded	67 (40.61)	5 (100)	0.03*
Bursary/scholarship	34 (20.61)	0 (0)	
Parent/guardian funded	64 (38.79)	0 (0)	
Accommodation			
With parents	99 (60.37)	4 (80)	0.51
At res/with other medical students	29 (17.68)	0 (0)	
With non-medical students	20 (12.20)	0 (0)	
Alone	16 (9.76)	1 (20)	
Non-medical school-related activity			
Yes	114 (69.09)	3 (60)	0.67
No	51 (30.91)	2 (40)	
Psychological help			
Nothing	99 (60.74)	1 (25)	0.24
Psychologist, counsellor	18 (11.04)	0 (0)	
Psychiatrist and/or use medication	26 (15.95)	2 (50)	
Support groups, apps, religious groups/leaders	13 (7.98)	1 (25)	
Other	99 (60.37)	4 (80)	

...continued

Supplementary Table 1. The level of distress according to various factors among MBBCh 4 medical students at WITS University, SA as determined by the χ^2 test (*N*=170)

Variables	Distressed (%)	Not Distressed (%)	*p*-value
Chronic conditions			
Yes	57 (34.76)	2 (40)	0.81
No	107 (65.24)	3 (60)	
Feelings on grades			
Satisfied	44 (26.67)	0 (0)	0.26
Wish they were higher	110 (66.67)	4 (80)	
Unfazed	11 (6.67)	1 (20)	
Mental health resources			
Use	36 (21.82)	3 (60)	0.05*
Do not use	129 (78.18)	2 (40)	
Teaching			
In-person	30 (18.18)	1 (20)	0.22
Online	44 (26.67)	3 (60)	
Blended	91 (55.15)	1 (20)	
Areas of faculty support			
Academic	40 (24.54)	1 (20)	0.04*
Emotional	10 (6.13)	2 (40)	
Social	15 (9.2)	0 (0)	
None	98 (60.12)	2 (40)	
Time off between blocks			
Holiday between every block	150 (90.91)	3 (60)	0.04*
University prescribed holiday	13 (7.88)	2 (40)	
None	2 (1.21)	0 (0)	
GEMP 2 content			
Manageable	56 (33.94)	5 (100)	0.01**
Interesting	104 (63.03)	0 (0)	
Neither manageable nor interesting	5 (3.03)	0 (0)	
Ease of access to wellness resource			
Easy	43 (26.22)	2 (40)	0.49
Unsure	121 (73.78)	3 (60)	

MBBCh = Bachelor of Medicine and Surgery; GEMP = Graduate Entry Medical Programme.
**p<0.05*
***p<0.01*
****p<0.001*

perceived distress, exercise, and feelings about grades. Additionally, using a linear regression model, several predictors of severe distress could be identified.

Exercise was found to significantly impact the level of distress experienced by participants. A smaller proportion of those who exercise almost every day were found to be severely distressed compared with those students who never exercise.

The rigorous curriculum, constant assessments and university culture have been shown to greatly affect the well-being of medical students.[10] A statistically significant difference was found regarding experiencing severe distress between students who are satisfied with their grades and those who are not. Those who were unsatisfied with their grades were 3.5 times more likely to be severely distressed. Medical students have higher personal standards regarding their academic performance in comparison to the general population.[30] Hence failure to meet such standards can result in distress and increased pressure. It is also possible that those satisfied with their grades study more productively and therefore experience less distress. It is recommended that mentorship programmes be instituted to aid students in managing both the intense curriculum and the self-inflicted pressure to perform well academically.

A statistically significant difference was also found between school leavers and GEMP students, with GEMP students less likely to be severely distressed compared to school leavers. This may be due to GEMP students having already been successful at obtaining a degree and being older. While there was a significant association found between severe distress and less and more mature students, this did not remain a significant predictor in the linear regression model. This finding suggests that other factors, possibly external factors, play a greater role in distress than age.

Supplementary Table 2. (continued) The severity of distress according to various factors among MBBCh 4 medical students at WITS University, South Africa as determined by the χ^2 test (*N*=170)

Variables	Severely Distressed (%)	Not Severely Distressed (%)	*p*-value
Sex			
Male	34 (26.77)	17 (39.53)	0.11
Female	93 (73.23)	26 (60.47)	
Age			
18 - 24	119 (93.70)	37 (86.05)	0.01**
25 – 29	8 (6.30)	3 (6.98)	
≥30	0 (0)	3 (6.98)	
Race			
Black	30 (23.62)	11 (25.58)	0.51
White	52 (40.94)	22 (51.16)	
Coloured	10 (7.87)	2 (4.65)	
Indian	35 (27.56)	8 (18.6)	
Start of medical studies			
1st year	68 (53.54)	15 (34.88)	0.03*
3rd year	59 (46.46)	28 (65.12)	
Perceived severe distress			
No	23 (18.25)	25 (58.14)	<0.001***
Yes	103 (81.75)	18 (41.86)	
Exercise			
Never	32 (25.20)	2 (4.65)	0.03*
Once a week	31 (24.41)	12 (27.91)	
2 – 3 times a week	45 (35.43)	20 (46.51)	
Almost everyday	19 (14.96)	9 (20.93)	
Sleep			
<7 hours	45 (35.71)	9 (20.45)	0.09
7 – 8 hours	74 (58.73)	34 (77.27)	
≥9 hours	7 (5.56)	1 (2.27)	
Funding			
Self-funded	50 (39.37)	22 (51.16)	0.33
Bursary/scholarship	28 (22.05)	6 (13.95)	
Parent/guardian funded	49 (38.58)	15 (34.88)	
Accommodation			
With parents	76 (90.32)	27 (62.79)	0.56
At res/with other medical students	24(19.05)	5 (11.63)	
With non-medical students	13 (10.32)	7 (16.28)	
Alone	13 (10.32)	4 (9.3)	
Non-medical school-related activity			
Yes	87 (68.5)	30 (69.77)	0.88
No	40 (31.5)	13 (30.23)	
Psychological help			
Nothing	70 (56.00)	30 (71.43)	0.18
Psychologist/counsellor	15 (12.00)	3 (7.14)	
Psychiatrist and/or use medication	25 (20.00)	3 (7.14)	
Support groups, apps, religious groups/leaders	9 (7.20)	5 (11.9)	
Other	6 (4.80)	1 (2.38)	

...continued

Supplementary Table 2. (continued) The severity of distress according to various factors among MBBCh 4 medical students at WITS University, South Africa as determined by the χ^2 test (N=170)

Variables	Severely Distressed (%)	Not Severely Distressed (%)	*p*-value
Chronic conditions			
Yes	43 (34.13)	16 (37.21)	0.71
No	83 (65.87)	27 (62.79)	
Feelings on grades			
Satisfied	26 (20.47)	18 (41.86)	0.01*
Wish they were higher	93 (73.23)	21 (48.84)	
Unfazed	8 (6.30)	4 (9.3)	
Mental health resources			
Use	29 (22.83)	10 (23.26)	0.96
Do not use	98 (77.17)	33 (76.74)	
Teaching			
In-person	25 (19.69)	6 (13.91)	0.25
Online	31 (24.41)	16 (37.21)	
Blended	71 (55.91)	21 (48.84)	
Areas of faculty support			
Academic	28 (22.22)	13 (30.95)	0.16
Emotional	7 (5.56)	5 (11.9)	
Social	10 (7.94)	5 (11.9)	
None	81 (64.29)	19 (45.24)	
Time off between blocks			
Holiday between every block	117 (92.13)	36 (83.72)	0.10
University prescribed holiday	8 (6.30)	7 (16.28)	
None	2 (1.57)	0 (0)	
GEMP 2 content			
Manageable	41 (32.28)	20 (46.51)	0.13
Interesting	81 (63.78)	23 (53.49)	
Neither manageable nor interesting	5 (3.94)	0 (0)	
Ease of access to wellness resource			
Easy	32 (25.40)	13 (30.23)	0.54
Unsure	94 (74.60)	30 (69.77)	

MBBCh = Bachelor of Medicine and Surgery; GEMP = Graduate Entry Medical Programme.
**p<0.05*
***p<0.01*
****p<0.001*

Participants exhibited high levels of self-awareness because those who self-identified as severely distressed were more than five times more likely to be severely distressed. Despite the insight into their low level of well-being, most participants do not make use of and are unsure of how to access mental health resources offered by WITS. Improvements regarding awareness and ease of access to mental health resources offered may result in an increased likelihood amongst students to seek help early and consequently lead to improved levels of well-being. The underlying reason for students not making use of available resources must be investigated for appropriate changes to be implemented.

This study found high levels of severe distress among the participants. However, it is encouraging that the factors internal to the medical school negatively affecting the well-being of students, including the preferred amount of time off, dissatisfaction with grades and access to well-being resources, are modifiable.

Study limitations

MB BCh 4 is a preclinical year; however, it does have more clinical exposure than MBBCh 3, which makes this year's curriculum unique. Therefore, results may not apply to all years of study and further research into other years of study is needed to address this. Traumatic events and the intensity of the academic workload during the time of the survey could have influenced the results. It is possible that those who felt distressed at the time of the study were more likely to participate in the

study resulting in selection bias. Male students were underrepresented in the sample. The use of a cross-sectional study design means that it is not possible to prove the cause of the distress.

Conclusion

Well-being among the fourth-year medical students at WITS is compromised. This study was able to provide insight into the level of distress in these students as well as the factors contributing to their distress. Further research should be done to assess medical students in their clinical period of training and fluctuations in well-being as students progress through the phases of medical training. However, there is a high level of awareness among fourth year MB BCh students regarding their generally low level of well-being. Therefore, instant action is imperative while these students are still in their pre-clinical years of training to benefit both the student and the future patients in their care.

Declaration. This research article formed part of the requirements for the fulfilment of a Bachelor of Medicine and Surgery (MBBCh) at the University of Witwatersrand (WITS).

Acknowledgements. We would like to thank Simphiwe Shabangu and Lisa Kempshall for their help with the conceptualisation of the protocol. Furthermore, we would like to thank all the students who participated in the study.

Author contributions. All co-authors conceived and designed the study. GD, MB and KC wrote the manuscript with contributions from the co-authors. EN collected the data which was analysed by PS and GD. The study was supervised by PS and AD. Writing of review and editing was done by MB and GD.

Funding. None.

Conflicts of interest. None.

1. Oxford University Press. Oxford English Dictionary. Version 11.7.712, 2020. https://www.oed.com/ (accessed 20 November 2023).
2. Jafari N, Loghmani A, Montazeri A. Mental health of medical students in different levels of training. Int J Prev Med 2012;3(Supplementary 1):S107.
3. Rahimi B, Baetz M, Bowen R, Balbuena L. Resilience, stress, and coping among Canadian medical students. Can Med Educ J 2014;5 (1):e5–e12. https://doi.org/10.36834%2Fcmej.36689
4. Lawrence D, Wu F, Ireland M, Hafekost K. National mental health survey of doctors and medical students. Beyond Blue; 2013.
5. Dyrbye LN, West CP, Satele D, et al. Burnout among US medical students, residents, and early career physicians relative to the general US population. Acad Med 2014;89(3):443-451. https://doi.org/10.1097%2Facm.0000000000000134
6. 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):2214-2236. https://doi.org/10.1001%2Fjama.2016.17324
7. Van Niekerk L, Scribante L, Raubenheimer PJ. Suicidal ideation and attempt among South African medical students. S Afr Med J 2012;102(6):372-373. https://doi.org/10.7196%2Fsamj.5503
8. Fares J, Al Tabosh H, Saadeddin Z, El Mouhayyar C, Aridi H. Stress, burnout and coping strategies in preclinical medical students. N Am J Med 2016;8(2):75. https://doi.org/10.4103%2F1947-2714.177299
9. Farrell SM, Kadhum M, Lewis T, Singh G, Penzenstadler L, Molodynski A. Wellbeing and burnout amongst medical students in England. Int Rev Psychiatry 2019;31(7-8):579-583. https://doi.org/10.1080%2F09540261.2019.1675960
10. Langness S, Rajapuram N, Marshall M, Rahman AS, Sammann A. Risk factors associated with student distress in medical school: associations with faculty support and availability of wellbeing resources. PLos One 2022;17(4):e0265869. https://doi.org/10.1371/journal.pone.0265869
11. Lu CM, Lien YJ, Chao HJ, Lin HS, Tsai IC. A structural equation modeling of mental health literacy in healthcare students. Int J Environ Res 2021;18(24):13264. https://doi.org/10.3390%2Fijerph182413264
12. Dyrbye LN, Szydlo DW, Downing SM, Sloan JA, Shanafelt TD. Development and preliminary psychometric properties of a well-being index for medical students. BMC Med Educ 2010;10:1-9. https://doi.org/10.1186%2F1472-6920-10-8
13. Van der Walt S, Mabaso WS, Davids EL, De Vries PJ. The burden of depression and anxiety among medical students in South Africa: A cross-sectional survey at the University of Cape Town. S Afr Med J 2020;110(1):69-79. https://doi.org/10.7196%2Fsamj.2019.v110i1.14151
14. Western M, Tomaszewski W. Subjective wellbeing, objective wellbeing and inequality in Australia. PLos One 2016 Oct 3;11(10):e0163345.
15. Jafari N, Loghmani A, Montazeri A. Mental health of medical students in different levels of training. Int J Prev Med 2012;3(Suppl1):S107. https://doi.org/10.1371/journal.pone.0163345
16. Schwartz CE, Stucky BD, Stark RB. Expanding the purview of wellness indicators: validating a new measure that includes attitudes, behaviors, and perspectives. Health Psychol Behav 2021;9(1):1031-1052. https://doi.org/10.1080%2F21642850.2021.2008940
17. Dyrbye LN, Schwartz A, Downing SM, Szydlo DW, Sloan JA, Shanafelt TD. Efficacy of a brief screening tool to identify medical students in distress. Acad Med 2011;86(7):907-914. https://doi.org/10.1097%2Facm.0b013e31821da615
18. PA Harris, R Taylor, R Thielke, J Payne, N Gonzalez, JG. Conde, Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support, J Biomed Inform. 2009 Apr; 42(2): 377-81.
19. PA Harris, R Taylor, BL Minor, V Elliott, M Fernandez, L O'Neal, L McLeod, G Delacqua, F Delacqua, J Kirby, SN Duda, REDCap Consortium, The REDCap consortium: Building an international community of software partners, J Biomed Inform. 2019 May 9. https://doi.org/10.1016/j.jbi.2019.103208
20. Raosoft Inc. Sample size calculator. Raosoft Inc, 2004. http://www.raosoft.com/samplesize.html (accessed 14 June 2022).
21. Haykal KA, Pereira L, Power A, Fournier K. Medical student wellness assessment beyond anxiety and depression: A scoping review. PLos One 2022;17(10):e0276894. https://doi.org/10.1371%2Fjournal.pone.0276894
22. StataCorp L. Stata statistical software: Release 15 (2017). College Station, TX: StataCorp LP. 2017.
23. Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. Med Educ 2016 Jan;50(1):132-49. https://doi.org/10.1111/medu.12927
24. Mian A, Kim D, Chen D, Ward WL. Medical student and resident burnout: a review of causes, effects, and prevention. J Fam Med Dis Prev 2018 Dec 31;4(4):1-8.
25. Olson KD. Physician burnout—a leading indicator of health system performance? Mayo Clin Proc 2017 Nov 1 (Vol. 92, No. 11, pp. 1608-1611). Elsevier. https://doi.org/10.1016/j.mayocp.2017.09.008
26. Brazeau CM, Schroeder R, Rovi S, Boyd L. Relationships between medical student burnout, empathy, and professionalism climate. Academic medicine. 2010 Oct 1;85(10):S33-6.
27. Rajapuram N, Langness S, Marshall MR, Sammann A. Medical students in distress: The impact of gender, race, debt, and disability. PLos One 2020;15(12):e0243250. https://doi.org/10.1371%2Fjournal.pone.0243250
28. Otten D, Tibubos AN, Schomerus G, et al. Similarities and differences of mental health in women and men: a systematic review of findings in three large German cohorts. Frontiers in Public Health. 2021 Feb 5;9:553071.Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. Mayo Clin Proc 2005;80(12):1613-1622. https://doi.org/10.4065%2F80.12.1613
29. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. Mayo Clin Proc 2005;80(12):1613-1622. https://doi.org/10.4065%2F80.12.1613
30. Enns MW, Cox BJ, Sareen J, Freeman P. Adaptive and maladaptive perfectionism in medical students: a longitudinal investigation. Med Educ 2001;35(11):1034-1042. https://doi.org/10.1111%2Fj.1365-2923.2001.01044.x

Accepted 27 November 2023