

Assessing the Stress Level among Medical Students in Rwanda

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Abstract

Purpose: Many medical students suffered from some levels of emotional disturbances or disorders, causing negative physical and mental health problems, affecting performance academically, professionally, and personally. This study was conducted to assess the stress among medical students in Rwanda, in order to design appropriate strategies to address or prevent any related potential negative consequences. **Method:** Medical students who were enrolled in the two medical schools in Rwanda completed an online survey that was developed based on the Stress in Academic Life Scale (SALS). The SALS has 27 4-point Likert scale questions assessing stress related to social support, motivation, curriculum and teaching, academic ambition, self-confidence, performance anxiety, and career. One open-ended question was also included for respondents' comments. The SALS scores were categorized into "no to fairly", "fairly to very" and "very to severely" stress levels. **Results:** A total of 137 samples responded. The overall median SAL score was 1.22, with over 54% of the respondents reported experiencing fairly to severe levels of stress. The highest stress levels were related to Curriculum and Teaching (median = 1.5), Self-confidence (median = 1.33), and Motivation (median = 1.33). The stress score was found to be negatively correlated to age ($r = -0.205$, $P = 0.02$), and the number of years in the program ($r = -0.218$, $P = 0.01$), and associated with receiving government funding ($P = 0.01$). Lack of financial support, lack of support from instructors, and disorganized academic activities were also reported as sources of stress. **Conclusion:** The results of this study suggested mild to moderate levels of stress were faced by the medical students in Rwanda. Finance plays a role, but the main stressors stemmed from the curriculum, teaching, and administrative organization. Medical schools should proactively create appropriate interventions to improve students' physical and psychological well-being and provide mental health services in schools.

Keywords

Medical Student Stress, SALS, Mental Health, Rwanda

1. Introduction

Many studies from various countries had documented 26% to 75% of medical students suffered from some levels of emotional disturbances or disorders [1]-[7]. Medical programs are known to impose high academic pressures on the students due to overload of study materials, financial indebtedness, lack of leisure time, pressures of academic and clinical work, personal relationships, career choices. Although some studies have shown some stress in medical school training can enhance learning and therefore is needed [8], many have also documented the negative physical and mental health problems from experiencing excessive stress.

Academically, excessive stress may impede the students' concentration, their ability in problem-solving and decision making, thus affecting their academic achievement [8] [9]. Professionally, the stress may reduce students' abilities to establish good relationships with patients. Many had reported dissatisfaction with clinical practice, and eventually, affected their professional development [10] [11]. Excessive stress may also reduce students' self-esteem, causing anxiety, depression, interpersonal conflict, sleep disturbances, decrease attention, reduce concentration, feelings of inadequacy, incompetence, fear, anger, and guilt [10] [12] [13].

If not addressed, stress has been linked to medical student suicide, drug and alcohol abuse, depression, and in a long run, may affect the lives of patients and the health of a community [11] [12] [13].

Although many studies had documented the stress faced by medical students in many countries, none was conducted in Rwanda. Stressors are culture-specific, since people with different cultures and values perceive stress differently, and respond differently [14]. It is important to understand the stressors specifically among the medical students in Rwanda, related to the local culture, in order to design appropriate strategies to address or prevent any potential negative consequences related to stress among medical students. Accordingly, this study was conducted to assess the stress level among students who are currently enrolled in medical schools in Rwanda.

2. Materials

2.1. Study Design

We conducted the study in Rwanda, utilizing a self-administered online survey.

2.2. Sample

We sent the survey link to the students who were enrolled in the two medical

schools, one private and one public, in Rwanda between February and April 2021. The private medical school admits about 30 to 40 students each year, and the public school admits about 110 each year. First year medical students were excluded from this study due to their exposure to medical programs being still new. The total population was estimated to be approximately 500. This study utilized a non-probability sampling method. The survey link was sent through the known contacts at the medical schools. Considering that the usual response rate for mobile online surveys is around 20% [15], we anticipated our sample size to be 100.

2.3. Data Collection Tool

We developed the survey based on the Stress in Academic Life Scale (SALS), a previously validated questionnaire to assess the stress level among students [16]. The survey has two parts. The first part of the survey included some demographic information of respondents. The second part has 27 questions assessing stress divided into seven areas: 1) Social support (5 questions); 2) Motivation (3 questions); 3) Curriculum and teaching (4 questions); 4) Academic ambition (5 questions); 5) Self-confidence (3 questions); 6) Performance anxiety (4 questions); 7) Career-related (3 questions). Each question was set up in the format of a 4-point Likert scale, with 0 points assigned to “not stressful”, 1 point to “Fairly stressful”, 2 points for “Very stressful”, and 3 points for “Severely stressful”. The total mean score ranges from 0 to 3. One open-ended question was also included at the end to solicit respondents’ additional comments.

The University of Global Health Institutional Review Board has approved the study.

2.4. Measures

The key measure of the study was the median SALS score, as well as the stress levels, categorized as no to fairly stress level (mean score of 0.00 to 1.00), fairly to very stressful (1.01 to 2.00), and very to severely stressful (2.01 to 3.00) [16].

2.5. Data Analysis

We used descriptive statistics to summarize the demographic information and SALS scores by subcategories. Mann Whitney tests were used to analyze the associations between demographics and the overall stress score. Spearman correlation was also conducted to analyze the association between age and stress score. All quantitative analyses were conducted using SPSS, with P-value set at 0.05. Content analysis was performed for the open-ended question, responses were grouped and presented as themes.

3. Results

3.1. Demographics

A total of 137 respondents completed the survey with a mean age of 23.5 (SD =

2.7). Among all the respondents, 58 (43.6%) were females, 116 (87.2%) studying in a public university, and 91 (68.9%) resided on campus. The majority of the respondents (52.6%) were in the second year of their medical study. The funding sources for their study were mostly from the government (n = 60, 45.1%) and parents (n = 20, 15%) (Table 1).

3.2. Stress Level

The overall median SAL score was 1.23 with an IQR of 0.88. Seven (5.3%) of the respondents reported having a “very to severe” stress level, 68 (51.1%) reported “fairly to very”, and 58 (43.6%) reported a “none to fairly” level of stress. Among the different subcategories within the SALS, respondents reported experiencing the lowest stress level in Social Support (median = 0.4). The highest stress level was reported in Curriculum and Teaching (median = 1.5), followed by Self-confidence (median = 1.33), and Motivation (median = 1.33) (Table 2).

The four items causing the highest stress were: 1) I am afraid of making mistakes in school/at the hospital (median = 2); 2) Some lecturers do not present the subjects clearly, and their lectures are boring (median = 2); 3) I believe that medical students are overloaded compared with students from other programs (median = 2); 4) There are not enough meetings with staff to discuss openly our academic problems (median = 2) (Table 3).

The stress score was found to be negatively correlated to age ($r = -0.205$, $P = 0.02$), and the number of years in the program ($r = -0.218$, $P = 0.01$) (Table 4).

Table 1. Summary of sample demographics.

	N (%)	
Sample		137
Gender	Female	58 (43.6%)
	Male	75 (56.4%)
University	Public	116 (87.2%)
	Private	17 (12.8%)
Year in program	2	70 (52.6%)
	3	9 (6.8%)
	4	48 (36.1%)
	5	6 (4.5%)
Reside	On campus	91 (68.9%)
	Off campus	41 (31.1%)
Funding	Government	60 (45.1%)
	Parents	20 (15%)
	Work	5 (3.8%)
	Other sponsors	6 (4.5%)
Age	Mean (SD)	23.5 (2.7)

Table 2. Summary of reported stress level.

Subgroups	Stress level			
	Median score (IQR)	None to fairly n (%)	Fairly to very n (%)	Very to severe n (%)
Social support	0.4 (1.1)	97 (73.5%)	29 (22%)	6 (4.5%)
Motivation	1.33 (1.33)	60 (45.1%)	42 (31.6%)	31 (23.3%)
Curriculum and teaching	1.5 (1)	50 (37.6%)	52 (39.1%)	31 (23.3%)
Academic ambition	1.23 (1.23)	56 (42.1%)	62 (46.6%)	15 (11.3%)
Self-confidence	1.33 (1.33)	54 (40.9%)	56 (42.4%)	22 (16.7%)
Performance anxiety	1 (1.1)	76 (58%)	38 (29%)	17 (13%)
Career related	1 (1.42)	72 (55.4%)	44 (33.8%)	14 (10.8%)
Overall SALS score	1.23 (0.88)	58 (43.6%)	68 (51.1%)	7 (5.3%)

Students receiving government funding were also found to be associated with the stress score ($P = 0.01$) (Table 4).

3.3. Qualitative Analysis

Three main themes were generated from the 26 comments respondents provided through the open-ended questions.

Theme one: Lack of financial support.

The most common comment ($n = 12$, 46%) respondents provided was the lack of financial support was a source of their stress.

“There should be a special living allowance given to medical students when they start clinical rotations because expenses increase such that regular monthly living allowance becomes insufficient which is stressful to them (22 years old, female, public university).”

“Supporting yourself as a student to get the basic need is a main stressor (20 years old, female, private university).”

“Life is very complicated because of the lack of money. We are almost always hungry and can’t get additional support from parents. Suggestion: Students’ bursary must be increased. We hardly afford transport and living costs during our clinical rotations. This gives me an unimaginable stress of always being in debt (24 years old, male, public university).”

Theme two: Lack of support from instructors.

Another common source of stress mentioned by the respondents ($n = 8$, 31%) was related to the lack of support from their instructors, both within academic programs and clinical.

“Poor teacher-student relationship that doesn’t permit outside class asking of questions (20 years old, female, public university).”

“Some lecturers are very harsh and intimidate us (24 years old, male, public university).”

“Most lecturers don’t motivate students, instead they discourage them (22

Table 3. Median stress score for individual items.

		Score (Median)
Social support	Sometimes, I feel lonely, and I feel that nobody likes me in school	0.00
	I do not have a pleasant group to eat, study, and hang out with from my school	0.00
	I do not receive good support from colleagues, as many of them are selfish	0.00
	I am dissatisfied with the group with whom I work in school/hospital	0.00
	I am in love with a classmate/colleague, but I cannot express my feelings to him/her	0.00
	Subcategory score	0.4
Motivation	I have poor management of time (I study for only short periods even when I have enough time)	1.00
	Somehow, I am lazy and cannot work hard	1.00
	I cannot maintain my motivation to study	1.00
	Subcategory score	1.33
Curriculum and teaching	I wish for more flexibility in the curriculum, but our program does not allow it	1.00
	There is not enough sport lessons and recreation in our annual curriculum	1.00
	There are not enough meetings with staff to discuss openly our academic problems	2.00
	Some lecturers do not present the subjects clearly, and their lectures are boring	2.00
		Subcategory score
Academic ambition	I would like to be a top student academically, but I cannot	1.00
	I tend to be impatient; I am more worried about my future career than the present	1.00
	I fear my family's reaction when they know my grades	0.00
	I am very competitive with my peers (colleagues) to get better grades	0.5
	I believe that medical students are overloaded compared with students from other programs	2.00
	Subcategory score	1.20
Self-confidence	I care too much about others' thoughts/impressions about me	1.00
	I cannot forget my social mistakes with my friends/lecturers easily	1.00
	I am afraid of making mistakes in school/at the hospital	2.00
	Subcategory score	1.33
Performance anxiety	I have frequent and sudden exams	1.00
	I do not have enough time during exams to answer all the questions	1.00
	Usually, I prepare the wrong material for my assignments and exams	1.00
	I get poor grades and cannot attain my goals even if I work hard	1.00
		Subcategory score
Career-related	I feel that my school programs do not prepare me well for the future as a physician	1.00
	Usually, I have poor communication with the staff in school/hospital	1.00
	I lack the proper clinical knowledge to be a healthcare professional	1.00
		Subcategory score
	Overall SALS score	1.23

Table 4. Association of socio-demographic factors to SALS score.

		Median score (IQR)	P-value
Age	Coefficient	-0.205	0.02*
Gender	Female	1.19 (0.93)	0.87
	Male	1.23 (0.87)	
Years in program	Coefficient	-0.218	0.01*
University	Public	1.23 (0.97)	0.43
	Private	0.98 (0.72)	
Residing	On-campus	1.23 (0.86)	0.53
	Off-campus	1.11 (1.03)	
Government-funded	no	0.96 (0.92)	0.01*
	Yes	1.43 (0.76)	
Parents funded	no	1.20 (0.85)	0.27
	Yes	1.53 (1.29)	
Work	no	1.23 (0.89)	0.35
	Yes	0.87 (0.91)	
Other sponsors	no	1.19 (0.92)	0.06
	Yes	1.54 (0.95)	

*Significant at P = 0.05.

years old, male, public university).”

“Professors who are not understanding and tend to not teach properly but rather want to put you in a stressful environment thinking that they’re motivating you (21 years old, female, public university).”

Theme three: Disorganized academic activities

Respondents also mentioned the disorganized school activities could cause them stress (n = 8, 31%). Examples included their grades were visible to other students, or the results of their tests were not announced.

“Not providing continuous assessment results before entering in exam (25 years old male, public university).”

“We don’t have enough time to prepare for exams. And the fact that the whole class can see your grades (20 years old, female, public university).”

“Stress of disorganized school activities. I face many surprises and things change too fast (23 years old, male, public university).”

4. Discussion

This study assessed the stress level of medical students in Rwanda. The results showed that over half of the respondents experienced a “fairly to very” level of stress (n = 68, 51.1%) and 43.6% (n = 58) experienced a “none to fairly” level of stress. The stress levels were not statistically different between those attending public versus private universities. The results were consistent with other pre-

vious studies in different countries [17] [18] [19]. There is a growing concern about the stresses involved in medical training, as medical students may suffer from various negative psychological and health consequences, including sleep deprivation, anxiety, depression, substance abuse, and even suicidal ideation [20] [21] [22]. Studies have shown high stress level was significantly associated with lower level of cortical plasticity [23] [24] which is linked to learning and memory [25] [26] [27]. Stress in medical students has also been associated with using cannabis, coffee, energy drinks and other stimulants to cope with stress for neuroenhancement [28] [29] [30]. The issue should be handled with care and sensitivity. This study was the first in Rwanda in assessing the stress levels among medical students across both universities in the country, the results can help inform program design to help reduce unnecessary stress.

Two of the four items that caused the most stress to students were related to “Curriculum and Teaching”. Medical curricula are known to be highly demanding [9] [22]. The vast amount of materials covered in medical training can be demanding. As the context of clinical and professional practices changed, the medical curriculum had to incorporate not only basic and clinical sciences but also the social determinants and population health sciences, in order to be comprehensive [31], making the curriculum even more difficult and less flexible.

Apart from the structural issue of the curriculum, stress could also be stemmed from the instructors. Many students reported that some lecturers did not present the subjects clearly, they found some lectures were boring, and there were not enough meetings with staff to openly discuss their academic problems.

Many instructors working in higher education may be content experts, that, however, does not directly translate to being educators, many instructors were not trained to help their students to learn such content [32]. Universities should invest in their faculty by providing them instructional training.

With the vast amount of materials to be taught in a relatively short time, medical students may find it hard to schedule office hours with instructors. Instructors to provide more flexible office hours for instructor-student discussions should be encouraged. That could potentially enhance students’ learning and thus reduce their stress and anxiety levels. The results also indicated that more support and encouragement from faculty seemed to be needed. The administrative arrangement of the schools to avoid unplanned changes in academic activities or provide timely feedback to students’ performance could also help. Special attention to students who are just entering the program should be given. Our results showed younger students had higher stress levels. A lot of adjustments are needed when students enter a new program, especially when transiting from classroom to clinical rotations, the uncertainties of a new environment, and taking on new responsibilities to handling patients’ life and death situation, in addition to the heavy workload, could be sources of stress. Extra effort should be provided to help them transit into the new phase of their lives.

Another major risk factor contributing to the stress reported by many respondents was finance. The 6-year medical programs in Rwanda could easily put

students in prolonged financial hardship if no scholarship or sponsorship of some kind were offered. As stated by many respondents, providing financial support to medical students, especially during their clinical rotation years, should be explored. The results showed that students who received government funding experienced significantly higher stress levels compared to those who did not receive government funding. Discussions with some medical students reviewed that very often government funding was received much later than scheduled. Such inconsistent funding releases could potentially cause more stress to students than not receiving the support. However, more exploratory studies to understand the magnitude and root cause of the delay are needed.

On the other hand, most respondents felt the least stressed in the “Social Support” sub-category. Rwandan society has strong positive national cultural values, with a great emphasis on family. In the National Policy for Family Promotion 2005, it was stated that the family “is considered as an essential element for safeguarding social order, maintaining social cohesion and for reconciling an individual with the society [33].” The policy summed up the core positive cultural values in Rwanda. Any future intervention design should capitalize and build on this great asset.

Limitations

The survey was conducted using the online platform, we could not eliminate the potential selection bias, and thus the results may not be completely generalizable. The study was also conducted during the COVID-19 pandemic, we could not eliminate the possibility that the respondents were experiencing heightened stress levels due to other pandemic-related issues. Despite the limitations, this study was the first to assess the stress levels among medical students in Rwanda. The results can serve as a baseline for any further studies. Important insights gained from the study could inform future program design.

5. Conclusion

The results of this study suggested mild to moderate levels of stress were faced by the medical students in Rwanda. Finance plays a role, but the main stressors stemmed from the curriculum, teaching, and administrative organization. Medical schools should proactively create appropriate interventions, including curriculum revision and enhancing teaching and learning methodology to improve students’ physical and psychological well-being and provide mental health services in schools.

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Authors’ Contributions

L Kubwimana, G Mutatsineza, and L Tesi conceived the study. All authors con-

ducted the literature review, study design, data collection, interpretation of data, drafting and editing the manuscript. All authors have seen and approved the final manuscript.

Ethical Approval

Ethical approval has been granted by the Institutional Review Board of the University of Global Health Equity on Feb 18th, 2021, with the reference number of 0122.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

SALS: Stress in Academic Life Scale.

Appendix 1. Questionnaire

Part A. Basic Demographics

- 1) What is your age? _____
- 2) What gender do you represent?
 - Female
 - Male
- 3) Which medical school do you attend?
 - University of Rwanda
 - University of Global Health Equity
- 4) What is your current year of study in medical school?
 - 2
 - 3
 - 4
 - 5
 - 6
- 5) What is your residence?
 - On-campus
 - Off-campus
- 6) What is your main source of income? Check all that apply.
 - Government-funded stipend
 - Parental allowance
 - Other:

Part B. Academic Stress Survey

		Not stressful	Somewhat stressful	Quite stressful	Severely stressful
	Sometimes, I feel lonely and I feel that nobody likes me in school	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I do not have a pleasant group to eat, study and hangout with from my school	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Social support	I do not receive good support from colleagues, as many of them are selfish	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I am dissatisfied with the group with whom I work in school/ hospital	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I am in love with a classmate/colleague, but I cannot express my feelings to him/her	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Motivation	I have poor management of time (I study for only short periods even when I have enough time)	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	Somehow, I am lazy and cannot work hard	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I cannot maintain my motivation to study	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Curriculum and teaching	I wish for more flexibility in the curriculum, but our program does not allow it	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³

Continued

	There is not enough sport lessons and recreation in our annual curriculum	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	There are not enough meetings with staff to discuss openly our academic problems	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	Some lecturers do not present the subjects clearly, and their lectures are boring	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Academic ambition	I would like to be a top student academically, but I cannot	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I tend to be impatient; I am more worried about my future career than the present	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I fear my family reaction when they know my grades.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I am very competitive with my peers (colleagues) to get better grades.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I believe that medical students are overloaded compared with students from other programs.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Self-confidence	I care too much about others' thoughts /impressions about me.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I cannot forget my social mistakes with my friends/lecturers easily.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I am afraid of making mistakes in school/at hospital	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Performance anxiety	I have frequent and sudden exams.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I do not have enough time during exams to answer all the questions	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	Usually, I prepare wrong material for my assignments and exams.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I get poor grades and cannot attain my goals even if I work hard	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Career related	I feel that my school programs do not prepare me well for the future as a physician.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	Usually, I have poor communication with the staff in school/hospital.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I lack the proper clinical knowledge to be a healthcare professional	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I find it hard to get enough money to cover food expenses.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
Economically related	I find it hard to get enough money to cover transport needs.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I find it hard to get enough money to cover health expenses.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³
	I find it hard to get enough money to cover other personal expenses.	<input type="checkbox"/> ⁰	<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³