PriMera Scientific
Medicine and Public Health
Volume 4 Issue 1 January 2024
DOI: 10.56831/PSMPH-04-111
ISSN: 2833-5627

Psychological Indexes Among Secondary School Pupils During COVID-19 Pandemic in Selected Schools of Lusaka, Zambia; A Cross Sectional Study

Type: Case Study
Received: September 22, 2023
Published: December 29, 2023

Citation:
Allan Mbewe., et al. "Psychological Indexes Among Secondary School Pupils During COVID-19 Pandemic in Selected Schools of Lusaka, Zambia; A Cross Sectional Study". PriMera Scientific Medicine and Public Health 4.1 (2024): 33-42.

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Abstract

Background: Learners continued learning and preparing for their final examinations during COVID-19 pandemic. However, the extent to which the pandemic had affected the mental health status of these learners was largely unknown. We investigated psychological indexes among secondary school pupils in Lusaka, Zambia in the era of the on -going COVID -19 pandemic.

Methodology: A cross-sectional study was conducted among pupils attending secondary schools in Lusaka district between June and September 2020. Five out of sixteen high secondary schools were randomly selected from the list. Insomnia severity Index, a rating instrument for anxiety and a patient health questionnaire for depression were used to collect data. Data analyses were conducted using IBM SPSS®. Statistics 20. Adjusted odds ratios (AOR) and their 95% confidence intervals (CI) are reported.

Results: A total of 1333/1800 (74.1%) pupils participated in the survey. Males were 792 (59.4%). The majority (60.4%) of the pupils were aged between 12-19 years. Age, gender, marital status and religion were associated with anxiety ($p < 0.05$). Pupils of age 12 - 19 years were 25% (AOR=1.25, 95% CI [1.11, 1.42]) more likely to have anxiety compared to those aged 20 - 25 years. Gender was the only factor that was independently associated with insomnia. Male pupils were 13% (AOR=0.87, 95% CI [0.77, 0.97]) less likely to have insomnia than female pupils.

Conclusion: Insomnia, depression and anxiety were common among learners especially among female students in their final year of their secondary education. The government should develop policy that compel schools to provide psychological services for the learners and more targeted at female students and younger learners.

Keywords: COVID-19 pandemic; High school, Pupils, Adolescents; Insomnia; Anxiety; Depression

Introduction

The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) outbreak is the virus responsible for COVID-19 that has been the world's major health problem since 2020. It spread across the globe in a short time, leading the World Health Organisation (WHO) to declare it a pandemic on March 11, 2020 [1]. By the end of June 2020, more than 89 million people had been infected, with over 1.9 million deaths reported worldwide [2]. The pandemic forced millions of people across the globe to work from home, and this lead to disruption in outdoor activities such as in school, colleges and universities calendars.

The WHO recommended preventive measures that encouraged isolation of people with mild respiratory symptoms and emphasised social distancing even in countries with no reported cases. As a preventive response, the Zambian government imposed strict lock-down rules to prevent the spread of COVID-19 [3]. This included banning international flights, closing non-examination classes and banning large social gathering such as mass prayer gatherings, large wedding and funeral ceremonies [3]. These restrictions changed lifestyles and social relationships that psychologically affected individuals for not only fearing to get the infection but also watching their beloved ones affected or dying due to the virus [4]. Although restrictions of socialisation freedom were fundamental to reduction of the virus transmission, a possible high psychological cost was induced by COVID-19 epidemic.

Traumatic events such as those caused by COVID-19 pandemic can produce psychological distress and anxiety symptoms, which negatively impact on the quality of sleep, anxiety and depression [5, 6]. Literature has demonstrated negative impact on the mental health of people that face sudden events that could even culminate in similar post-traumatic stress. Previous studies reported that acute diseases such SARS could increase levels of anxiety, depression, stress both in survivors and non-infected people [4, 7]. The ever-increasing numbers of infected people and those dying, travel and the stay-at-home restrictions, as a means of controlling the spread of the pandemic have been cited to have a negative effect on the mental well-being of people [8]. Furthermore, a study examining the psychosocial responses of the general population towards SARS epidemic, summarized common themes of psychological responses including anxiety, depression and anger [9]. Another study conducted in 194 cities in China among the general public, Cuiyan et al. found that 53.8% of respondents rated the psychological impact of the outbreak as moderate or severe; 16.5% of the participants reported moderate to severe depressive symptoms; 28.8% reported moderate to severe anxiety symptoms; and 8.1% reported moderate to severe stress levels [10].

The pandemic had not spared the education sector. Effects had been on the system as well as the learners ranging from abrupt changes in teaching and learning method; mainly a shift from classroom to on-line methods and implementation of the control measures such as physical distancing and sanitising of hands. The effects on learners had mostly been related to psychosocial [11]. According to Wenjun et al. in a study conducted in China at a medical college found that 0.9% of the respondents experienced severe anxiety, 2.7% moderate anxiety, and 21.3% mild anxiety [12, 13].

In responding to the pandemic, the Zambian authorities at all levels of education except for examination classes in primary and secondary schools, suspended classroom learning from April to August 2020. Thus only grade 9 and 12 pupils were allowed to attend physical classes as the country was under partial lockdown control measures of the covid-19 pandemic. This gave learners a chance to prepare for state examinations at the end of the year. In all, there were close to 147 055 pupils in the country that continued learning during the lockdown period [14]. Whereas this approach ensured that the learners continued learning and preparing for their final examinations, the extent to which COVID-19 pandemic had affected the mental health status of these learners was largely unknown. Therefore, this study sought to investigate psychological indexes among secondary school pupils in Lusaka, Zambia in the era of the ongoing covid-19 pandemic.

Material and Methods

Study sites

The study was conducted in Lusaka, the capital city of Zambia with a population of over 2,000,000 people. There are 16 high secondary schools in Lusaka comprising a pupil's populace of 7680 [15]. Lusaka was selected on the basis of the high number of reported cases in the district by Zambia National Public Health Institute (ZNPHI), which reported 80% as laboratory-confirmed cases in the country between March and June, 2020 [16].

Population, study design, sample size and sampling

A cross-sectional study was conducted among pupils attending secondary schools in Lusaka district between June and September 2020. The full list of the schools in the district was provided by the Ministry of General Education. Five out of sixteen high secondary schools where randomly selected from the list. Each selected school, through the head teacher, was contacted and requested to participate in the study. With the approval of the head teacher, all pupils in the examination classes (grades 9 and 12 pupils) were invited to participate in the study. The total number of pupils was determined from class lists provided by the school.

The head masters or their appointed representatives, were briefed about the study and requested to explain to the pupils. An appointment was scheduled with the school to deliver the consent forms for the pupils two weeks prior to the study and they were requested to return them within three days for pupils that were below 16 years old. Pupils that were 16 and above completed and signed the consent forms on the day of data collection.

Data collection tools

Health outcomes

A modified mental health questionnaire was used to estimate levels of anxiety and insomnia [17, 18]. The insomnia severity index: psychometric indicators to detect insomnia cases and evaluate treatment response [17]. Based on self-rating, the severity of the anxiety was classified as follows: Score of 0-39 was No anxiety, depression 0-9 No depression, 10-14 Moderate, 15-19 moderately severe and 20-27 Severe. Insomnia 0-7 No insomnia, 8-14 Subthreshold, 15-21 Moderate and 22-28 Severe [17-19].

Confounders

Potential confounding variables included the following: gender (male/female), age (12-19/20-25), residential area (low/medium/high), history of travel (yes/no), marital status (married/single/co-habiting), and grade (grade 9/grade 12).

Statistical analysis

Data analyses were conducted using IBM SPSS® Statistics 20. Bivariate analyses, using Yates' corrected Chi-square test and Pearson's Chi-square test where applicable were performed to evaluate associations between socio-demographic and COVID-19 factors such as; anxiety, depression and insomnia. Results yielding p values of less than 5% were considered statistically significant. In order to determine factors that were independently associated with anxiety, depression and insomnia, a multivariate logistic regression analysis was conducted using a Backward Stepwise (Likelihood Ratio) variable selection method and considering Deviation as the contrast for independent factors; 95% confidence interval, probabilities for stepwise entry of factors of 5.0% and that for removal of 5.1%. We report adjusted odds ratios (AOR) together with their 95% confidence intervals (CI) as measures of magnitudes of associations.

Ethical consideration

The Tropical Diseases Research Centre Research Ethics Committee and Zambia National Health Research Authority approved the study. Further permission was sought from the Ministry General Education, District Education Board Secretaries, and Headmasters. Consent to participate in the study was obtained from the individuals of consenting age (16 years and above) while those below consenting age, assent was obtained from their guardians.

Results

Description of respondent's demographic and socioeconomic characteristics

Data collection took place from May to July 2020. Demographic characteristics of study participants are presented in Table 2. Four of the five selected schools, with total of 1800 potential participants, were included in the study. One failed to give consent at the time of data collection. This was because the headmaster who should have given permission was not found during the three attempts we made to visit the school. A total of 1333/1800 pupils participated in the survey, achieving a 74% response rate. Males were 792 (59.4%). The majority (60.4%) of the pupils were aged between 12-19 years. Slightly over half (52%) of the participants lived in high density. Despite being in the examination class most grade 9 pupils' class did not attend classes for fear of contracting the disease.

Table 1 shows the mental health status of the pupils. Overall, 421 (31.6%) had anxiety, 350 (26.3%) were depressed and 563 (42.2%) had insomnia.

Factor	***n (%)***
Insomnia	
No insomnia	(57.8)
Sub-threshold	(30.6)
Moderate	(9.8)
Severe	24 (1.8)
Depression	
None	(52.3)
Mild	(21.5)
Moderate	(15.1)
Moderately severe	(7.0)
Severe	56 (4.2)
Anxiety	
Did not experience anxiety	(68.4)
Experienced anxiety	421 (31.6)

Table 1: Mental health status of pupils (n=1333).

Table 2 shows socio-demographic factors associated with mental health in bivariate analyses. Age, gender, marital status and religion were associated with anxiety. While, age, gender and marital status were associated with depression. Only gender and religion were associated with insomnia.

Factor	***Total***	***Anxiety***		***Depression***		***Insomnia***	
		n (%)	***p value***	***n (%)***	***p value***	***n (%)***	***p value***
Age (Years)							
12-19	805	288 (35.8)	<0.001	231 (28.7)	0.015	355 (44.1)	1.000
20-25	528	133 (25.2)		119 (22.5)		208 (39.4)	
Gender							
Male	792	206 (26.0)	<0.001	184 (23.2)	0.003	316 (39.9)	0.042
Female	541	215 (39.7)		166 (30.7)		247 (45.7)	

Marital status							
Married	53	8 (15.1)	0.008	12 (22.6)	<0.001	23 (43.4)	0.069
Single	1234	393 (31.8)		312 (25.3)		513 (1.6)	
Other*	46	20 (43.5)		26 (56.5)		27 (58.7)	
Religion							
None	68	13 (19.1)	0.033	17 (25.0)	0.181	40 (58.8)	0.004
Pentecostal	420	141 (33.6)		114 (27.1)		167 (9.8)	
Catholic	282	103 (36.5)		80 (28.4)		126 (4.7)	
Jehovah's witness	128	43 (33.6)		42 (32.8)		62 (48.4)	
Other	417	120 (28.8)		95 (22.8)		156 (37.4)	
Residence							
High density	398	119 (29.9)	0.381	98 (24.6)	0.544	167 (42.0)	0.299
Medium density	690	231 (33.5)		191 (27.7)		305 (4.2)	
Low density	224	67 (29.9)		59 (26.3)		86 (38.4)	
History of travel							
Travelled	121	39 (32.2)	0.870	34 (28.1)	0.747	53 (43.8)	0.809
Did not travel	1187	374 (31.5)		312 (26.3)		501 (42.2)	

*Other include cohabiting, divorced, widowed, and separated.

Table 2: Socio-demographic factors associated with mental health among high secondary school pupils.

Table 3 shows findings of multivariate logistic regression analyses for anxiety, depression and insomnia. Independent factors associated with anxiety were age, gender and marital status. Pupils of age 12 - 19 years were 25% (AOR=1.25, 95% CI [1.11, 1.42]) more likely to have anxiety compared to those aged 20 - 25 years. Male pupils were 28% (AOR=0.72, 95% CI [0.64, 0.81]) less likely to have anxiety compared to female pupils. Married pupils were 54% (AOR=0.46, 95% CI [0.26, 0.80]) less likely to have anxiety compared to pupils who were separated, widowed, divorced or cohabiting.

Compared with pupils of age 20 - 25 years, those of age 12 - 19 years were 17% (AOR=1.17, 95% CI [1.02, 1.33]) more likely to be depressed. Male pupils were 19% (AOR=0.81, 95% CI [0.71, 0.92]) less likely to be depressed than female pupils. Regarding marital status, married and single pupils were less likely to be depressed compared with pupils who were separated, widowed, divorced or cohabiting (AOR=0.60, 95% CI [0.37, 0.98]) for married pupils and AOR=0.63, 95% CI [0.46, 0.86]) for single pupils. Gender was the only factor that was independently associated with insomnia. Male pupils were 13% (AOR=0.87, 95% CI [0.77, 0.97]) less likely to have insomnia than female pupils.

Factor	***Anxiety***	***Depression***	***Insomnia***
	AOR (95% CI)	***AOR (95% CI)***	***AOR (95% CI)***
Age (years)			
12-19	1.25 (1.11, 1.42)	(1.02, 1.33)	-
20-25	1	1	
Gender			
Male	0.72 (0.64, 0.81)	0.81 (0.71, 0.92)	(0.77, 0.97)
Female	1	1	1
Marital status			
Married	0.46 (0.26, 0.80)	(0.37, 0.98)	-

Single	1.03 (0.73, 1.44)	(0.46, 0.86)	
Other	1	1	
Religion			
None	-	-	(1.20, 2.67)
Pentecostal			(0.62, 0.94)
Catholic			(0.75, 1.18)
Jehovah's witness			(0.82, 1.51)
Other			1

AOR - Adjusted Odds Ratio; CI - Confidence Interval.

Table 3: Independent factors associated with mental health among high school pupils.

Discussion

This study investigated the psychological impact of covid-19 pandemic on school going pupils who were in examination classes in selected schools of Lusaka using a self-reported questionnaire. The prevalence of the psychological disorders related to insomnia, anxiety and depression were high. Furthermore, age, gender and marital status were associated with depression while only gender and religion were associated with insomnia. Pupils of age 12-19 were more likely to have anxiety compared to those aged between 20-25 years. Additionally, female gender was associated with the higher levels of insomnia, anxiety and depression compared to the male pupils.

A review of the existing literature demonstrated that the societal changes caused by the response to the COVID-19 pandemic had psychological effects on specific groups of people in the general population and on such groups as school pupils and pregnant mothers [4, 20, 21]. While available evidence is consistent with a broad range of the benefits of physical distancing and partial lock down measures enforced in most countries to minimise the spread of COVID-19, psychological impact was noted in specific groups of individuals [22, 23]. Increased levels of anxiety, depression and stress during the COVID-19 pandemic as a results of fears of contamination, infection, grief, stress, boredom and consequences of social and economic chaos have been reported [24, 25]. Social isolation is strongly correlated with the likelihood of clinically significant depression or anxiety [26]. Quarantined people are significantly more likely to report depression, stress and insomnia [27, 28].

Insomnia was prevalent in this study. Compared to boys, girls were more likely to be affected. These findings are similar to those reported elsewhere; a high prevalence of insomnia among adolescents in general with girls being affected more than boys. Difficult social situations are known to contribute to insomnia [29]. The pandemic can be particularly distressing during specific situations; the study participants were in their final year of the secondary school education and were due to write final examination in the November/December of the same year. Prior to the COVID-19 pandemic, pupils in examination classes would be allowed to spend extra hours in school premises to study, consult their teachers and peers where they needed clarification. However, the enforcement of physical distancing and reduced number of hours of learning interfered with this supportive environment and thus potentially inducing anxiety and ultimately insomnia among the learners. Our finding is therefore not unexpected. Sleep deprivation has been associated with negative impact on youth mental and physical health [30]. Pupils could have failed to copy with the series of transitions in their daily activities. Moreover, the mandatory wearing of masks and adherence to hand washing could be considered as psychosocial stressors which may lead to maladjustment and make the pupils vulnerable to mental health problems, including fear, anxiety and depression [31]. Furthermore, according to Guessoum et al. in a study that was conducted in China reported that less door activities and social interactions of face-to-face with peers, teachers and others generated a mental health threat that may lead to disturbances in sleep patterns [32].

Female adolescent pupils were more like to experience self-reported anxiety compared to their male counterparts. Similar results on the effect of gender on the self-reported stress during the pandemic have been previously reported by Wang et al; Duan et al. and Gilsbach et al [33-35]. Additionally, a survey of the general Italian population during the COVID-19 pandemic revealed female gender to be associated with the higher levels of affective symptoms [36]. Female gender and having an intermediate occupation were associated with experiencing more severe depression, anxiety, and distress. The phenomenon of the way female are physiologically created; easily emotionally affected; not hiding their emotions unlike male counterparts and being caring could explain higher prevalence of psychological symptoms.

In this study, younger participants aged 12 - 19 when compared to those older than 20 years reported higher psychological indices. Our findings are congruent with results from an online survey in Chinese adolescents aged between 12 and 17 that showed rates of depressive and anxiety symptoms as high as 37.4 and 43.7%, respectively [37]. Similarly, a German population-wide study revealed that children of younger age were at particular risk for higher psychological burden [38]. Another study conducted amongst university students revealed increased levels of stress, anxiety, and depressive thoughts arising from fear and worry about their own exposure, general health and of their loved ones led to negative impacts of the pandemic [39]. In relation to academic matters, difficulty in concentration, disruption in sleeping patterns and decreased social interactions due to physical distancing could be additional stressors [40]. This in turn may increase concerns on academic performance and more anxiety as students may have anticipated failure [41]. Additionally, studies have also revealed that younger people spend most of their time in front of the television and thus catching all the latest information about the escalating number of cases of covid-19 pandemic which tend to increase the feeling of hopelessness and fear [42].

Contrary to findings in other studies, residential area, an indirect measure of population density and socioeconomic status, did not attain statistical significance in this study. Population density influences the spread of the disease [43]. The disparity from other studies could be due to respondents deliberately reporting residing in low density as opposed to high density residential areas. The former is associated with affluence and highly desirable.

Limitations

Results of this study need to be interpreted with caution. We attained 74% response rate; some pupils stayed away from school reportedly for fear of contracting the COVID-19. Therefore, it would be logical to conclude that our findings may have underestimated the magnitude of mental health problem as those that stayed away were likely anxious about the prevailing situation at the time. The researchers could not follow pupils at their homes because of COVID-19 restrictions that were in place at the time of the study. Therefore, the generalizability of the study findings to the general pupils population may be limited.

Conclusion

In this study the prevalence of covid-19 related insomnia, depression and anxiety were common among learners in their final year of their secondary education. Female pupils were more likely to suffer from the psychological indexes compared to the male. Additionally, younger participants were more affected. We recommend that the government develops policy that should compel schools to provide psychological services for the learners and more targeted at female students and younger learners.

Abbreviations

SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus-2; Covid disease 2019; SARS: Acute respiratory syndrome; WHO: World Health Organisation; ZNPHI: Zambia National Public Health Institute; AOR: adjusted odds ratios; CI: Confidence intervals.

Acknowledgement

We are most grateful to Dr Micky Ndhlovu who provided valuable suggestions on the final manuscript.

Author contributions

SS, AM, EN and RN; conceived and designed the study. AM, EN and RN: recruitment and data collection. SS analyzed the data. AM, EN RN and SS wrote the paper; all authors contributed to the article and approved the submitted version.

Funding

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The Tropical Diseases Research Centre Research Ethics Committee and Zambia National Health Research Authority approved the study. Further permission was sought from the Ministry General Education, District Education Board Secretaries, and Headmasters. Consent to participate in the study was obtained from the individuals of consenting age (16 years and above) while those below consenting age, assent was obtained from their guardians.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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