Knowledge of Stress as a Risk Factor for Coronary Heart Disease and Coping Mechanisms among Postgraduate Students in South-West Nigeria

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Abstract

Objectives: Stress has been known to trigger spikes in blood pressure, increase heart rate variability and promote vasoconstriction; all of which are direct contributors to coronary heart disease causation. Given the recent decline in the age of incidence among coronary heart disease sufferers, this study was designed to assess knowledge and perceived levels of stress, and stress management strategies.

Methods: This cross-sectional study involved 406 participants, randomly drawn from the postgraduate faculties of University of Ibadan, South-West Nigeria. Data was collected using the 10-point standardized knowledge scale for cardiovascular disease, the 10-item Perceived Stress Scale (PSS-10) and the 28-item Brief COPE Inventory Scale.

Results: Significant associations were observed between knowledge scores and fields of study (p = 0.002), and as well as gender (p = 0.000). Whereas only 2.2% of the respondents were severely stressed, most of the respondents (69.2%) were moderately stressed, and significant associations were observed between stress levels and fields of study (p = 0.026). Although healthy stress management strategies were widely adopted, an association was observed between gender and substance use as well as the use of emotional support as stress management strategies (p = 0.000 and 0.001 respectively).

Conclusions: Given the factors found to influence choice of stress coping mechanisms, the use of targeted behavioural change communication materials should be encouraged to help build skills for healthy stress coping mechanisms.

Keywords: stress, coronary heart disease, cardiovascular disease, stress management, knowledge, coping mechanism.

Introduction

Coronary heart disease refers to a condition where waxy substances (plaques) block the arteries supplying blood to the heart, thereby causing an interference with blood flow through such vessels to the heart[1]. Coronary heart disease is a cardiovascular disease and cardiovascular diseases are the leading causes of death and disability in the world[2]. Coronary heart disease is associated with 62.6 million Disability Adjusted Life Years (DALYs) globally as at 2004[3]. When segregated into the World Bank Income Group categorization of countries, 26 million of the 62.6 million DALYs were recorded in Low Income Countries while 28.9 million were in Middle Income Countries such as Nigeria. In 2012, a total of 17.5 million deaths were attributable to cardiovascular diseases, and among these, 7.4 million were due to coronary heart disease[4].

An analysis of the trend of distribution of coronary heart disease among the Nigerian population showed that coronary heart disease had a prevalence of 8.1% among Nigerians aged 0 – 59 years, and 11.9% among Nigerians aged 60 years and above[3]. More so, 136 – 190 deaths per 100,000 males and 84 – 111 deaths per 100,000 females among Nigerians aged 15 – 59 years are due to coronary heart disease[5]. In 2010, coronary heart disease ranked among the leading causes of Disability Adjusted Life Years (DALYs) in Nigeria[6].

According to the American Institute of Stress[7], "coronary heart disease is also much more common in individuals subjected to chronic

stress". In a presentation on "Why Stress is a Far More Important Cause of Coronary Disease Than Cholesterol"[8], the institute provided medical evidence on the causative association between stress and conditions such as: the aggravation or unhealthy promotion of cholesterol (low density lipoprotein), smoking, hypertension, diabetes, obesity and coronary vasoconstriction. Stress was also shown to reduce heart rate variability which is an important predictor of cardiovascular diseases like coronary heart disease[8]. Furthermore, independent associations devoid of confounders were established between the development of coronary heart disease among previously healthy adults and stress[9]. Studies have shown that chronic and acute stress can predispose individuals to coronary heart disease. Whereas acute (severe and sudden) stress stimulates the immediate release of homocysteine and fibrinogen hormones which stimulate the process of blood clot formation within the arterial walls, thereby causing vasoconstriction within the blood vessels. The end of this being coronary heart disease. Chronic stress on the other hand has been linked to individual personality traits which in-turns increases the risk of developing of coronary heart disease. Two personalities mainly: "Type A" and "Type D" have been shown to bear this causal effect on stress and subsequently coronary heart disease. The "Type A" personality describes those who are aggressive achievers; the go getters who are more focused on being overwhelmingly successful in all of their endeavors and rarely have time for leisure or play. Such persons constantly live under self-induced pressure and since they are driven by their impulse to always achieve more, this condition of stress soon becomes chronic. Whereas on the contrary, the "Type D" personality describes those individuals with an overwhelming sense of negativity. Such persons are constantly under anxiety and depression with characteristic outbursts of anger when confronted with challenging circumstances[8]. So, severe and sudden stress (acute stress) have been proven to yield negative physiological effects on the heart – an immediate constriction of arterial vessels which may lead to death. This is often referred to as the broken heart syndrome[10].

Typically, coronary heart disease usually manifests clinically in middle-aged and older people, as from the age of 40[11]. However, the disease is now common among young adults.

Medical statistics show that 2 – 10% of sufferers of coronary heart disease are below the age of 45[12,13]. Research has also shown that the atherosclerotic process which results in coronary heart disease begins early on in life, soon after the age of 20[14]. Given this gradual decline in the age of incidence coupled with findings from the most recent study on the prevalence of stress among a Nigerian student population which showed that 59.8% of Nigerian students are stressed[15], there was a need to investigate this phenomenon among this postgraduate student population in South-West Nigeria.

Materials and Methods

Participants

The study population consisted of students of University of Ibadan admitted for regular postgraduate academic programme at the University. This population was selected based on recent findings which showed that 60% of Nigerian students were stressed[15]. More so, a study conducted among University of Ibadan students reported the presence of stress and depression[16].

Procedure

This cross-sectional study designed required respondents to complete self-administered, semi-structured questionnaire comprising an adopted knowledge scale to assess knowledge of coronary heart disease[17], the Perceived Stress Scale (PSS-10) tool to measure the levels of stress among respondents[18] and the Brief COPE Inventory Scale[19] to examine respondents' stress coping practices. Following a sample size computation for 406 respondents, a 5-stage multistage sampling method was employed to select respondents Admission into regular postgraduate programmes either on full-time or part-time basis constituted the inclusion criteria for the study.

Knowledge on Coronary Heart Disease

Using an adopted 10-point knowledge scale to assess knowledge of coronary heart disease[17], respondents' knowledge on coronary heart disease and stress as a risk factor for coronary heart disease was assessed. The knowledge scale weighed a total of 10 points and was categorized as "poor knowledge" for those who scored 3 points or less, "fair knowledge" for those who scored 4 – 6 points, and "good knowledge" for those who scored 7 – 10 points.

Perceived Stress Levels

A 10-item standardized Perceived Stress (PSS-10) Scale was used to measure prevalent levels of stress among the respondents[18]. Stress levels were measured via scored responses such as: Very Often = 0 point, Often = 1 point, Sometimes = 2 points, rarely = 3 points, Never = 4 points, for the positive items on the scale (e.g. "In the last month, how often have you felt that things were going your way?")

Contrarily, the negative items on the scale were scored in the reverse pattern: Very Often = 4 points, Often = 3 points, Sometimes = 2 points, rarely = 1 point, Never = 0 point (e.g. "In the last month, how often have you felt that you were unable to control the important things in your life?")

Total scores were categorized as "low level of stress" (0 – 13 points), "moderate level of stress" (14 – 26 points) and "severe level of stress" (27 – 40 points).

Stress Coping Mechanisms

A 28-item Brief COPE Inventory Scale[19] was used to assess the stress coping practices among sampled respondents. The Brief COPE Inventory Scale is comprised of 14 components (or "strategies") which were split into 28 items; each component (or "strategy") had two items on the scale. These components (or "strategies") were categorized as either "adaptive coping" (for identified coping strategies such as active coping, planning, positive reframing, acceptance, humour, religion, using emotional support, and using instrumental support) or "maladaptive coping" (self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame).

Data Analyses

Collected data were then sorted, cleaned and analyzed electronically using the IBM Statistical Package for Social Sciences (SPSS) software version 20. The level of significance (α) was set at 5% following the standard for the 95% confidence level. Descriptive statistics such as mean, median, standard deviations inter-quartile range and proportions were computed where appropriate. Whereas non-parametric test statistics were computed for knowledge and stress coping scores (Mann-Whitney test and Kruskal-Wallis test respectively), parametric test (One-Way Analysis of Variance) test were computed for perceived stress scores. These were the inferential statistics used to measure relationships between several variables.

Results

Knowledge of Coronary Heart Disease

It was found that most of the respondents had a good knowledge of coronary heart disease (75.1%) whereas 20.9% and 4.0% had fair and poor knowledge respectively. Particularly, it was noted that on the relationship between coronary heart disease causation and stress was known to 70.4% of the respondents. More so, almost all (91.1%) of the respondents knew that acute stressors such as events that breed sudden anxiety or panics have negative impacts on the heart (like the "broken heart syndrome") and 77.6% knew that chronic stress could result in coronary heart disease.

It was found that female postgraduate students were significantly more knowledgeable of the subject than the males (p = 0.000) as approximately 82% of them had a good knowledge of stress and its causative relationship with coronary heart disease as opposed to their male counterparts where only 68% of them had a good knowledge of the subject.

Similarly, postgraduate students from Health Sciences were significantly more knowledgeable than their colleagues in the Arts and Sciences (p = 0.002) as 88% of them had a good knowledge of the subject compared to Arts where only 74% and Sciences where 71% of them had a good knowledge of the subject.

Perceived Stress Levels

It was observed that 69.2% of the respondents were moderately stressed, 28.6% were mildly stressed and 2.2% were highly stressed as at the time of this study.

From analysis, stress levels were found to differ significantly between fields of study (p = 0.026). Tukey post hoc analysis showed that postgraduate students from the field of Arts were significantly more stressed than their colleagues in both Health Sciences and Sciences, whereas those in Health Sciences experienced more stress than postgraduate students in Sciences.

Stress Coping Practices

A total of 99.5% of the respondents indicated the practice of adaptive (healthy) stress coping, as

opposed to 0.5% who indicated maladaptive (or unhealthy) stress coping practices.

Analyses showed that Active Coping was the most adopted strategy (94.3%), followed by Planning (90.1%). On the other hand, Substance Use (6.7%) and Behavioral Disengagement (22.9%) were the least adopted strategies for coping with stress. Among those who reported Substance Use as a stress coping strategy, a significant difference was observed between the number of males and females (77.8% males vs 22.2% females; $p = 0.000$). Similarly, significantly more females than males were seen to adopt the use of emotional support as a strategy for coping with stress (46.5% males vs 53.5% females; $p = 0.001$) as shown in table 1.

Table 1. Stress Coping Practices

Stress Coping Strategies	Females (%)	Males (%)
Use of Emotional Support	53.5	46.5
Use of Instrumental Support	52.7	47.3
Acceptance	52.3	47.7
Positive Reframing	52.1	47.9
Religion Score	51.3	48.7
Humour	50.4	49.6
Self-blame	50.3	49.7
Venting	50.2	49.8
Self-distraction	49.8	50.2
Active Coping	49.6	50.4
Denial Score	48.7	51.3
Behavioural Disengagement	48.4	51.6
Planning	48.1	51.9
Substance Use	22.2	77.8

Factors Influencing Postgraduate Students' Coping Practices

About half of the respondents (58.1%) identified their personal or religious beliefs to be the biggest deciding factor when adopting stress coping strategies. Interestingly, familial ties with siblings was seen to play a crucial role as 16% of the respondents indicated that they learnt to cope with stress by observing and imitating their siblings. These factors are illustrated in figure 1.
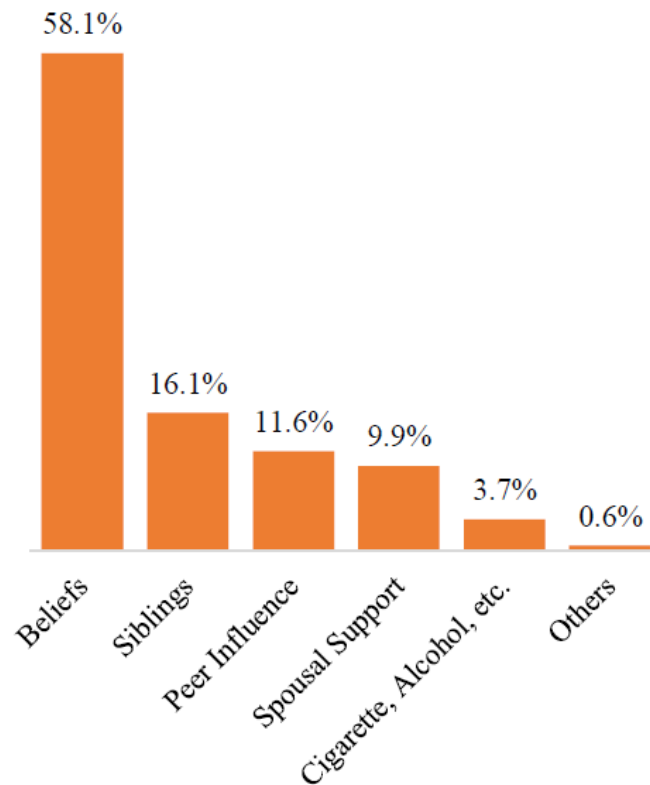
Figure 1. Factors Influencing Coping

Strategies

Discussion

Knowledge on Coronary Heart Disease:

Findings that majority of the postgraduate students in Nigeria have a good knowledge of coronary heart disease agrees with previous studies conducted in Egypt and India where a good knowledge of the subject was found to be common – 79.2% and 65% respectively[20,21]. Particularly, most of the respondents were able to identify stress as a risk factor for coronary heart disease in this study as was the case in several other studies conducted in the United Arab Emirates, Pakistan, India and the United States of America[21–25]. It can be deduced from this that the knowledge of coronary heart disease and its causative association with stress is widespread across different populations. This prevalent good knowledge could be attributed to the level of educational attainment among the various study populations as literature has shown a significant association between level of education and knowledge of coronary heart disease – the higher the level of education, the better the knowledge of coronary heart disease[20,26].

Furthermore, a significant difference in knowledge scores between the males and females was reported in India where males had significantly higher knowledge of the subject than the females (OR = 1.89)[23]. In this study, there was no significant difference in knowledge scores between genders.

Field of study was another personal characteristic that was of interest in this study as it was found that the knowledge scores among respondents in the health sciences differed significantly from the others. This was expected as postgraduate students in health sciences are supposed to be experts on this subject.

Perceived level of stress

In Malaysia, the proportions for the levels of stress were evenly spread across the student population: 31.8% had a low level of stress, 34.78% had a moderate level of stress and 33.3% had a high level of stress[27]. Elsewhere in India, more of the students had a low level of stress (54%), some had a moderate level of stress (22%) while few had a high level of stress (10%). Interestingly, from the same study, 14% of the students reported not be stressed at all[28]. When juxtaposed with findings from this study, there seems to be a pattern in the prevalent levels of

stress among these student populations as most university students indicated either low or moderate levels of stress with very few being severely stressed, except in Malaysia where the stress levels were observed to be evenly distributed.

Another critical observation was the disparity in self-reported stress levels across fields of study. Literature has shown that medical education was generally perceived to be more stressful than other academic programmes in Universities across the world[28, 29]. Thus, it was expected that higher levels of stress will be reported among the medical student population as was seen in Kano[15]; however, findings from this study calls for further research to explore contextual factors that could better explain these findings.

More so in France, it was observed that a relationship existed between gender and perceived stress scores, and female students were more likely to report higher perceived stress levels[30]. Also, a study among American college and university students (both undergraduate and graduate students) found a statistically significant difference in the levels of stress between the male and female participants; female students were found to be significantly more stressed than their male counterparts[31]. However, this study and three others investigated this same phenomenon and found no statistically significant difference between gender and perceived stress levels in Malaysia and Nigeria[15,32,33].

Stress coping practices

In a study conducted among 1,139 college and universities students in the United States of America where 58.5% of them were postgraduate students, it was reported that the postgraduate students were more likely to adopt good coping practices[31]. This agrees with this study where almost all of the students adopted healthy stress coping practices. Observably, a contrary situation was found among the postgraduate students in Malaysia where unhealthy stress coping practices were largely in practice[27]. According to an American study, some graduate students perceive themselves to be unable to properly manage stress and consequently, some of them do not properly manage the stress they encounter[34]. Thus, there are divergent views from available literature on stress coping practices among postgraduate's student populations.

In Malaysia, it was observed that postgraduate students commonly practiced self-distraction, denial and self-blame more than the other stress coping strategies[27]. Also, male and female Malaysian postgraduate students differed significantly in their practice of maladaptive stress coping strategies like self-blame as a strategy for stress coping (p = 0.027). This conclusion coincides with findings from a study in America where female postgraduate students were reported to have a greater use of venting (of emotions) than their male counterparts, whereas the males were found to have greater use of self-blame, behavioral disengagement, active coping, positive reframing, planning and acceptance than their female counterparts[35]. However, findings from this study highlights a widespread adoption of adaptive coping strategies and gender only accounted for a significant disparity in use of substances and emotional support as coping strategies for stress coping. These findings are critical because they portray the inclination of male postgraduate students in South-West Nigeria towards practices that could incur the risk of both physical and mental ill-health.

Conclusion

This study is of importance to future research efforts because it has established the foundation for further exploration into stress coping strategies as psychosocial risk factors of coronary heart disease among adult in-school populations in Low- and Middle-Income Countries (LMICs).

It is pertinent that effective behavioral change communication messages be designed to target male postgraduate students in South-West Nigeria in order to curb the dependence on substance use among this sub-population. Also, support systems like clubs and associations should be encouraged among postgraduate student populations to dissuade behavioral disengagement while fostering active coping skills among other adaptive coping strategies.

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