Work-Related Stress and the Relationship with the Health Belief Model among Medical Doctors in a Tertiary Hospital in Port-Harcourt, Nigeria

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Authors’ contributions

This work was carried out in collaboration between both authors. Author OC, collected the data, performed the statistical analysis, managed the literature searches and wrote the first draft of the manuscript. Author BBO corrected the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

Background: Work-Related Stress (WRS) is a harmful physical and/or emotional response resulting from a mismatch between the requirements of a job and the capabilities, resources, or needs of the worker in the work environment. The health belief model (HBM) is a psychological health behaviour change model established to describe and predict health-related behaviours regarding the uptake of health services. This study sought to determine the prevalence of WRS and to assess WRS among medical doctors in the University of Port Harcourt Teaching Hospital (UPTH), Rivers State, using the Health Belief Model (HBM).

Methods: The study design was descriptive cross-sectional conducted among medical doctors in the UPTH. A proportionate stratified and random sampling method was used to recruit 363 medical doctors in two stages. Data was collected using a self-administered questionnaire which assessed respondents’ socio-demographics, Work-related Stress and Health Belief Model domains. Data was analysed using SPSS version 23.0. The Pearson’s correlation coefficient was used to assess...
relationship between WRS and the HBM components, while the multiple linear regression analysis was used to identify the HBM components that significantly predicted work-related stress. The level of significance was set at p= 0.05.

**Results:** Most of the respondents were females (56.5%), married (90.1%), Christians (93.7%) and ≥36 years (71.6%). The mean age of respondents was 39.7±0.45 years. The prevalence of work-related stress was 66%, (Overall mean score ± SD=3.30±0.27). All components of the HBM were significantly correlated with Work-Related Stress, and perceived severity showed the strongest positive correlation (r=0.687; p<0.001). All components of the HBM significantly predicted work-related stress except perceived susceptibility.

**Conclusion:** All the components of the health belief model significantly predict Work-related Stress except perceived susceptibility. Measures to address stress among doctors in the workplace should put into consideration these domains of the health belief model.

**Keywords:** Work-related stress; health belief model; medical doctors; UPTH.

### 1. INTRODUCTION

Work is an integral aspect of human life [1]. It is a social activity that has the ability to adversely affect the health and livelihood of the individual and result in stress. Work-related stress (WRS) describes the untoward effects of excessive pressures felt by the worker at work [2]. While stress has varying effect and interpretations in different individuals, when it persists for prolonged periods, mental or physical illness may develop [3,4]. Work-related stress often results when the requirements of a job do not match with the capabilities, resources or needs of the worker in the workplace [3]. Work-related stress was found to be the second most common work-related health problem across the European Union in a survey done in 2007. It was also found to occur more commonly in health and social services jobs [5].

The hospital environment in which the medical doctors work may present potential stressors [3]. These stressors include work overload, understaffing, use of redundant equipment, delayed promotion, poor managerial relationship with staff, excessive/prolonged working hours, etc.[2] Many of these potential stressors are beyond the control of the regular working doctor. Occupational health among health care workers is a critical public health issue [6]. According to the National Institution for Occupational Safety and Health (NIOSH) in 2008, 60% to 90% of health care providers’ poor attitude to clients is attributed to their stress response [7]. The poor funding of the Nigerian health sector has left the medical doctors at the various levels of care working under harsh and un conducive conditions, with the attendant poor patient care outcomes [8].

There are varying methods of assessing stress that has been employed by previous researchers. [1,2,8-10] However, there is a dearth of research in how the Health Belief Model could be used to examine WRS. The Health belief model (Fig. 1) is a veritable tool used to predict health-related behaviours. [11] It suggests that peoples’ beliefs concerning their health problems predict their behaviour. There are five major domains of the HBM- perceived severity, susceptibility, benefits, barriers, and cues to action [12]. While perceived severity describes the subjective assessment of the seriousness of an illness and its consequences, perceived susceptibility is the individual perception of risk of contracting the disease [12]. Perceived benefit implies the individual's opinion of the importance of engaging in health behaviour to avoid the health threat, while perceived barriers are the individual’s belief concerning the difficulties associated with performing health-related behaviour. [13] The health belief model also states that a cue, or trigger, is necessary for prompting engagement in health-promoting behaviours [13].

The HBM is of particular interest, because of its wide adoption and application in several health situations. Many health interventions have been developed that are based solely on the primary variables (susceptibility, severity, benefit, and barrier) proposed by the HBM. The information from this novel research work will guide program planning in terms of services to address the growing problem of WRS among medical doctors. Based on this background this study intends to determine the prevalence of Work-related stress, to apply the Health Belief Model in the assessment of WRS and to determine the relationship between WRS, and the HBM among medical doctors in the University of Port Harcourt Teaching Hospital, Rivers State.
2. METHODOLOGY

2.1 Study Area

The study was conducted at the University of Port Harcourt Teaching Hospital (UPTH), a major tertiary-care teaching and research facility in Rivers State, Nigeria. About 200,000 patients are seen annually in both outpatient and inpatient settings, as well as over 3000 surgical operations holding per year. Apart from providing medical services, the hospital also provides clinical education and training to medical students, nurses, and other health care professionals. The UPTH has over 35 departments, with both clinical and non-clinical staff, of which about 524 are medical doctors.

2.2 Study Design

The study was a descriptive cross-sectional study.

2.3 Study Population

The study was conducted among medical doctors (house-officers, medical officers, resident doctors and consultants) selected from the various health care providing departments of the University of Port Harcourt Teaching Hospital. All doctors are responsible for the day to day care of patients presenting to the hospital via the emergency or outpatient clinics. Some doctors are also involved in academic activities in preparation for specialty examinations. House-officers are young medical doctors who are under-taking a one-year mandatory internship with provisional registration by the Medical and Dental Council of Nigeria. Resident doctors are doctors undergoing specialist training in various fields of medicine with full registration by the Medical and Dental Council of Nigeria, which means that they are eligible to be licensed to practice medicine independently with or without supervision. Resident doctors, however, must carry out all their medical practice under the auspices of a supervising consultant.

2.3.1 Inclusion/ exclusion criteria

All doctors employed and a part of the clinical staff of the hospital who have worked in the hospital for more than 6 months were included in the study. However, doctors who were away from work either on leave or off duty at the time of administering the questionnaire were excluded.

2.3.2 Sampling and sample size determination

A sample size of 363 doctors was considered to be adequate for the study. The sample size was calculated with the formula [14] for sample calculation for descriptive studies, using the prevalence of WRS among doctors in a previous study in the University College Hospital, Ibadan [9] and providing for a further 10% allowance for non-response.

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The Health Belief Model

![Image of the Health Belief Model]

Fig. 1. Conceptual framework showing the health belief model
The formula was: \( n = \frac{Z^2pq}{e^2} \), where \( n \) = minimum sample size for the study; \( Z \) = the normal curve, 1.96 at 95% confidence interval; \( e \) = margin of precision (5%); \( P \) = 31.6%, prevalence of Work-related stress; \( q = 1-p \). After computation, a sample size estimate for the study of 363 was arrived at. A proportionate stratified and random sampling method was used to recruit respondents in the study in two stages. A list of the 15 departments in the hospital where doctors are found, was made and categorized as strata. Secondly, a simple random sampling method was used to select respondents from each department/strata. The number of doctors from each of the department to be utilized for the study was obtained by using a simple formula to calculate a proportionate number of participants. Actual participants were chosen by a simple random sampling using a table of random figures. All the selected doctors who gave consent for the study were interviewed.

2.4 Study Instrument

The instrument for this study was a semi-structured, self-administered questionnaire. The questionnaire consisted of 28 questions designed in three sections; Section A asked questions about the respondent’s socio-demographic characteristics, including gender, age, marital status, designation; Section B asked questions on the components of the Health Belief Model (perceived severity, perceived susceptibility, perceived benefits, perceived barriers, and cues to action) with regards to work-related stress (adapted from the Champions Health Belief Model Scale) [15]. Section C assessed perceived work-related stress using the Cohen’s scale [16]. Champions Health Belief Model Scale- Fourteen (14) questions on the questionnaire tool were asked respondents under five (5) sub-headings: Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, and Cues to Action. These were scored on a Likert scale formula: 1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree, on an increasing scale of 1-5 (Positive-Negative), with 1 been most positive perception and 5 being most negative perception. Responses for scores on items 7, 8, 13 & 14 were reversed (e.g., 1 = 5, 2 = 4, 3 =3, 4 = 2, 5 = 1) to become negatively stated items.

Cohens Stress scale is the most widely used psychological instrument for measuring the perception of stress. It is the measure to which situations in one’s life are appraised as stressful. It consists of 10 items on a 5-point Likert scale: 0= Never, 1=Almost never, 2=Sometimes, 3=Fairly often, and 4=very often, on an increasing scale of 0-4, with 0 being no stress and 4 being high stress. The total scores are obtained by reversing the responses (eg. 0=4, 1=3, 2=2, 3=1 and 4=0) to the four positively stated items (4, 5, 7, and 8) and then summing across all scale items.

2.5 Study Procedure/ Data collection process

The data were collected by four research assistants. Two of the research assistants were fresh graduates of medicine awaiting internship, while the other two were graduates of basic medical sciences. The research assistants were trained for two days and acquainted with the study protocol, after which they were deployed to different departments where they distributed the questionnaire following the sampling procedure. The Principal Investigator supervised the process of data collection, and also collated and validated the retrieved completed questionnaire. Filled questionnaires were checked daily for completeness, legibility and consistency.

2.6 Data Analysis

Data collected were entered into the Microsoft Excel Spreadsheet (2016), after which it was transported into version 22.0 of the Statistical Package for Social Sciences (SPSS) statistical software for analysis. Summary measures were computed and displayed using tables and charts. The summary statistic for continuous variables such as respondent’s age was reported in mean and standard deviation, while those of categorical variables such as sex, marital status, job category, were reported in frequencies and percentages. Overall perception scores were computed. The Chi-square test of independence was used to identify statistically significant variables. The level of significance was set at a probability level of 0.05 at 95% confidence interval.

2.7 Validity/Reliability of the Instrument

The questionnaire used for this study was adapted from the Champions Health Belief Model Scale [15] and the Cohen perceived work-related stress scale. [16] To ensure the validity of the study instrument, the questionnaire was face and content- validated by experts in occupational medicine and public health. To ascertain the
reliability of the study instrument, the questionnaire was pretested among medical doctors in Rivers State University Teaching Hospital, a state-owned tertiary hospital. Ambiguous or improperly constructed questions were modified and made clearer before the questionnaire was re-distributed to the population to be studied. The tool was also subjected to Cronbach's alpha test where all the scales showed satisfactory internal consistency (Cronbach’s alpha 0.65 – 0.87).

3. RESULTS

A total of 370 questionnaires were distributed, 363 questionnaires were properly filled and used for this analysis. This gave a response rate of 98%.

Table 1 shows that 260 (71.6%) of the respondents were in the range of ≥36 years, with a mean age of 39.7±0.45 years. Most of the respondents 205 (56.5%) were females, 327 (90.1%) were married and most 340 (93.7%) were Christians. Of all the respondents, 120 (33.0%) were Consultants and 34 (9.4%) were House officers.

3.1 Prevalence of Work-Related Stress

A 10 item questionnaire was used to assess the prevalence of work-related stress among respondents. 58.1% of respondents reported that they sometimes got upset because of something that happened unexpectedly at work while 46.0% reported that they sometimes felt that they were unable to control important things at work. About a half (57.9%) of respondents reported that they sometimes felt nervous and “stressed” concerning work while half of them (51.0%) reported that they sometimes felt confident about their ability to handle work-related problems. The overall mean score was 3.30±0.27 which was equivalent to a percentage positive response of 66%. See Table 2.

3.1.1 Perceptions of work-related stress using the health belief model

Table 4 shows the perception of Work-related stress under the five domains of the Health Belief Model. Over half of the respondents strongly agreed that exposure to stressful conditions at work will not have any adverse effects on them ,while two-thirds strongly agreed that other doctors may suffer from Work-related stress. While 66.9% of respondents strongly agreed that taking a break when feeling stressed at work can protect the body from the adverse effects of stress 78.5% strongly agreed that although it may be a bit interrupting, taking necessary breaks is necessary to improve health.

It was also found that most (82.4%) respondents agreed that removing all stressful situations for workers may be difficult. Whereas about a half of respondents (58.4%) agreed that their colleagues often get sick from not observing resting periods at work and that their bodies often feel worn out after working for long hours without taking breaks (48.8%). See Table 4.

Table 5 summarized the overall mean of Work-related stress and the Health Belief Model components. The mean (standard deviation) for work-related stress, perceived susceptibility, perceived severity, perceived benefit, perceived barrier and cues to action are shown in the table. (Table 5).

3.1.2 Relationship between work-related stress and health belief model components

In Table 5, Pearson’s Correlation analysis was used to assess the correlation between work-related stress and the Health Belief Model. It was found that work-related stress had a weak positive significant correlation with perceived susceptibility (r=0.273; p<0.001) and perceived barrier (r=0.188; p<0.001), a moderate positive significant correlation with cues to action (r=0.478; p<0.001), and a fairly strong positive significant correlation with perceived severity (r=0.687; p<0.001). The model also showed a weak negative significant correlation of work-related stress with perceived benefit (r=-0.296; p<0.001). See Table 6.

In Table 7, the multiple linear regression analysis was used to assess the predictors of work-related stress and it was shown that all the components of Health Belief Model significantly predicted work-related stress except perceived susceptibility (R²=0.612; F=93.517; p<0.001). See Table 7.

4. DISCUSSION

The prevalence of WRS among doctors in this present study was high at 66%. This is lower than the findings of Ndom and Makanjuola [17] in Ilorin, Nigeria who reported a prevalence of
Table 1. Socio-demographic characteristics of respondents

| Variables                  | Frequency(n=363) | Percent (%) |
|----------------------------|------------------|-------------|
| Age(years)                 |                  |             |
| 20-35                      | 103              | 28.4        |
| ≥36                        | 260              | 71.6        |
| Mean Age                   | 39.7±0.45        |             |
| Gender                     |                  |             |
| Male                       | 158              | 43.5        |
| Female                     | 205              | 56.5        |
| Marital Status             |                  |             |
| Single                     | 36               | 9.9         |
| Married                    | 327              | 90.1        |
| Religion                   |                  |             |
| Christianity               | 340              | 93.7        |
| Islamic                    | 7                | 1.9         |
| Others                     | 16               | 4.4         |
| Departments                |                  |             |
| Anaesthesia                | 28               | 7.7         |
| Anatomical Pathology       | 8                | 2.2         |
| Chemical Pathology         | 10               | 2.8         |
| Community Medicine         | 18               | 5.0         |
| Ear/Nose/Throat Surgery    | 10               | 2.8         |
| Family Medicine            | 28               | 7.7         |
| General Surgery            | 56               | 15.4        |
| Haematology                | 18               | 5.0         |
| Internal Medicine          | 48               | 13.2        |
| Medical Microbiology       | 10               | 2.8         |
| Neuropsychiatry            | 11               | 3.0         |
| Obstetrics and Gynaecology | 36               | 9.9         |
| Ophthalmology              | 22               | 6.0         |
| Paediatrics                | 43               | 11.8        |
| Radiology                  | 17               | 4.7         |
| Designation                |                  |             |
| Consultant                 | 120              | 33.0        |
| Senior Registrar           | 107              | 29.5        |
| Registrar                  | 102              | 28.1        |
| House Officer              | 34               | 9.4         |

84.2% in a study done among resident doctors. The possible reason for the lower prevalence in this present study compared with the study in Ilorin may be because the study population in this present study included house-officers, residents and consultants, whereas the population of the Ilorin study consisted of only resident doctors. The residency training period is unarguably a very tedious aspect of the medical career. The doctors are made to work under strict supervision by consultants and are usually left with a greater chunk of responsibilities by their supervising consultants. Furthermore, they have a series of examinations to write at specific times, failure of which may lead to premature termination of their jobs at the teaching hospitals. This could likely have contributed to the stress they perceived which have been reflected in this present study.

On the other hand, the prevalence of WRS in this present study is higher than what was reported in another Nigerian study conducted in Ibadan, which reported a prevalence of 31.6%. [9] Though the Ibadan study was also done in a tertiary health facility (University College Hospital, Ibadan) as in this present study, the lower prevalence of WRS in the Ibadan study may be arising from the difference in the socio-demographic characteristics of the two group. While the mean age of respondents in this present study was 39.7 (+0.45) years, the mean age in the Ibadan study was lower at 29.9 (+4.1) years. The younger medical doctors are likely to
Table 2. Prevalence of work-related stress

| Items (n=363)                                                                 | Never (%) | Almost Never (%) | Sometimes (%) | Fairly Often (%) | Very Often (%) | Mean | SD  |
|------------------------------------------------------------------------------|-----------|------------------|---------------|------------------|----------------|------|-----|
| In the last month, how often have you been upset because of something that   | 6 (1.7%)  | 23 (6.3%)        | 211 (58.1%)   | 87 (24.0%)       | 36 (9.9%)      | 3.34 | 0.81|
| happened unexpectedly at work?                                               |           |                  |               |                  |                |      |     |
| In the last month, how often have you felt that you were unable to control   | 4 (1.1%)  | 103 (28.4%)      | 167 (46.0%)   | 53 (14.6%)       | 36 (9.9%)      | 3.04 | 0.93|
| the important things at work?                                                |           |                  |               |                  |                |      |     |
| In the last month, how often have you felt nervous and “stressed”            | 2 (0.6%)  | 60 (16.5%)       | 210 (57.9%)   | 33 (9.1%)        | 58 (16.0%)     | 3.23 | 0.93|
| concerning work?                                                             |           |                  |               |                  |                |      |     |
| In the last month, how often have you felt confident about your ability to   | 2 (0.6%)  | 32 (8.8%)        | 185 (51.0%)   | 114 (31.4%)      | 30 (8.3%)      | 3.38 | 0.78|
| handle your work-related problems?                                           |           |                  |               |                  |                |      |     |
| In the last month, how often have you felt that things were going your way   | 2 (0.6%)  | 34 (9.4%)        | 169 (46.6%)   | 145 (39.9%)      | 13 (3.6%)      | 3.37 | 0.73|
| at work?                                                                     |           |                  |               |                  |                |      |     |
| In the last month, how often have you found that you could not cope with all | 5 (1.4%)  | 74 (20.4%)       | 163 (44.9%)   | 85 (23.4%)       | 36 (9.9%)      | 3.20 | 0.92|
| the things that you had to do at work?                                       |           |                  |               |                  |                |      |     |
| In the last month, how often have you been able to control irritations        | 2 (0.6%)  | 34 (9.4%)        | 178 (49.0%)   | 127 (35.0%)      | 22 (6.1%)      | 3.37 | 0.76|
| occurring at work?                                                           |           |                  |               |                  |                |      |     |
| In the last month, how often have you felt that you were on top of things at  | 1 (0.3%)  | 4 (1.1%)         | 171 (47.1%)   | 166 (45.7%)      | 21 (5.8%)      | 3.56 | 0.63|
| work?                                                                        |           |                  |               |                  |                |      |     |
| In the last month, how often have you been angered because of things that    | 7 (1.9%)  | 50 (13.8%)       | 185 (51.0%)   | 67 (18.5%)       | 54 (14.9%)     | 3.31 | 0.95|
| were outside of your control at work?                                         |           |                  |               |                  |                |      |     |
| In the last month, how often have you felt difficulties were piling up so    | 2 (0.6%)  | 114 (31.4%)      | 90 (24.8%)    | 121 (33.3%)      | 36 (9.9%)      | 3.21 | 1.01|
| high at work that you could not overcome them?                               |           |                  |               |                  |                |      |     |
| Overall work-related stress                                                  |           |                  |               |                  |                | 3.30 | 0.27|

**SD=Standard Deviation; Overall percentage positive response to stress=66% (3.30 of 5)**
### Table 3. Perceptions of work-related stress using the health belief model

| Items (n=363)                                                                 | Strongly Disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly Agree (%) | Mean  | SD  |
|--------------------------------------------------------------------------------|-----------------------|-------------|-------------|-----------|-------------------|-------|-----|
| **Perceived Susceptibility**                                                   |                       |             |             |           |                   |       |     |
| Exposure to stressful conditions at work will not have any adverse effects on me | 2 (0.6%)              | 2 (0.6%)    | 3 (0.8%)    | 143 (39.4%) | 213 (58.7%)       | 4.55  | 0.60|
| Other doctors may suffer from work-related stress                             | 10 (2.8%)             | 4 (1.1%)    | 8 (2.2%)    | 88 (24.2%) | 253 (69.7%)       | 4.57  | 0.83|
| Stress is not dangerous to the human body                                     | 16 (4.4%)             | 12 (3.3%)   | 4 (1.1%)    | 60 (16.5%) | 271 (74.7%)       | 4.54  | 1.00|
| **Perceived Severity**                                                        |                       |             |             |           |                   |       |     |
| If I am exposed to stressful conditions at work, it would only cause a mild effect and I would recover soon | 111 (30.6%)           | 168 (46.3%) | 9 (2.5%)    | 40 (11.0%) | 35 (9.6%)         | 2.23  | 1.26|
| Work-related stress only causes tiredness                                      | 7 (1.9%)              | 8 (2.2%)    | 5 (1.4%)    | 223 (61.4%) | 120 (33.1%)       | 4.21  | 0.75|
| Fatigue as a result of work-related stress is not harmful                      | 26 (7.2%)             | 21 (5.8%)   | 9 (2.5%)    | 224 (61.7%) | 83 (22.9%)        | 3.87  | 1.06|
| **Perceived Benefits**                                                        |                       |             |             |           |                   |       |     |
| Taking a break when feeling stressed at work can protect the body from the adverse effects of stress | 3 (0.8%)              | 6 (1.7%)    | 2 (0.6%)    | 109 (30.0%) | 243 (66.9%)       | 4.61  | 0.67|
| Although it may be a bit interrupting, taking necessary breaks is necessary to improve health | 4 (1.1%)              | 2 (0.6%)    | 3 (0.8%)    | 69 (19.0%) | 285 (78.5%)       | 4.73  | 0.62|

SD=Standard Deviation; *=Inverted Response

### Table 4. Perception of work-related stress using the health belief model (Con’td)

| Items (n=363)                                                                 | Strongly Disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly Agree (%) | Mean  | SD  |
|--------------------------------------------------------------------------------|-----------------------|-------------|-------------|-----------|-------------------|-------|-----|
| **Perceived Barriers**                                                        |                       |             |             |           |                   |       |     |
| Removing all stressful situations for workers may be difficult                 | 7 (1.9%)              | 16 (4.4%)   | 4 (1.1%)    | 299 (82.4%) | 37 (10.2%)        | 3.94  | 0.68|
| Working for shorter hours may affect service delivery negatively                | 43 (11.8%)            | 104 (28.7%) | 47 (12.9%)  | 150 (41.3%) | 19 (5.2%)         | 2.99  | 1.18|
| A healthy working relationship with colleagues is not easy to achieve          | 27 (7.4%)             | 81 (22.3%)  | 51 (14.0%)  | 180 (49.6%) | 24 (6.6%)         | 3.26  | 1.10|
| **Cues to action**                                                            |                       |             |             |           |                   |       |     |
| My colleagues often remind me to take a break when I am exhausted at work.     | 15 (4.1%)             | 14 (3.9%)   | 89 (24.5%)  | 239 (65.8%) | 6 (1.7%)          | 3.57  | 0.78|
| My colleagues often get sick from not observing resting periods at work.       | 6 (1.7%)              | 81 (22.3%)  | 28 (7.7%)   | 212 (58.4%) | 36 (9.9%)         | 3.53  | 1.00|
| My body often feels worn out after working for long hours without taking breaks | 8 (2.2%)              | 28 (7.7%)   | 29 (8.0%)   | 121 (33.3%) | 177 (48.8%)       | 4.19  | 1.02|

SD=Standard Deviation; *=Inverted Response
Table 5. Mean and standard deviation of work-related stress and the health belief model components

|                      | Mean  | SD   | Range |
|----------------------|-------|------|-------|
| Work-related stress  | 33.00 | 2.72 | 10-50 |
| Perceived susceptibility | 13.66 | 1.84 | 3-15  |
| Perceived severity   | 10.32 | 1.92 | 3-15  |
| Perceived benefit    | 9.34  | 0.86 | 2-10  |
| Perceived barrier    | 10.20 | 2.21 | 3-15  |
| Cues to action       | 11.28 | 2.05 | 3-15  |

SD=Standard Deviation

Table 6. Correlation of perception of Work-related Stress and the Health Belief Model components

| Components of Health Belief Model | R    | p-value  |
|-----------------------------------|------|----------|
| Perceived susceptibility          | 0.273| <0.001*  |
| Perceived severity               | 0.687| <0.001*  |
| Perceived benefit                | -0.296| <0.001*  |
| Perceived barrier                | 0.188| <0.001*  |
| Cues to action                    | 0.478| <0.001*  |

r=Pearson Correlation; *=Statistically Significant

Table 7. Linear regression of work-related stress on health belief model components

|                      | R²   | B     | Standard Error | Beta | p-value  |
|----------------------|------|-------|----------------|------|----------|
| Work-related stress  | 0.612| 29.624| 1.973          | 0.049| 0.212    |
| Constant             |      |       |                |      | <0.001*  |
| Perceived susceptibility | 0.072| 0.058 | 0.046          | 0.506| <0.001*  |
| Perceived severity   | 0.717| 0.064 | -0.024         | -0.204| <0.001*  |
| Perceived benefit    | -0.647| 0.131 |                | -0.171| <0.001*  |
| Perceived barrier    | -0.210| 0.055 |                | -0.338| <0.001*  |
| Cues to action       | 0.449| 0.062 |                |      |          |

F=93.517; *=Statistically Significant

be generally healthier and have more stamina to cope with rigorous work compared with their older counterparts. Furthermore, the study population in this present study had more females, unlike the Ibadan study which consisted majorly of males. Early research had shown stress to affect females more than males [9].

Similar studies done outside Nigeria had also shown the varying prevalence in work-related stress, especially doctors, with prevalence ranging from 20.6% to as high as 89%. [6,18-20] These findings have shown work-related stress to be a significant public health problem among health care workers, especially medical doctors.

The study found that all the components of the health belief model (perceived susceptibility, perceived severity, perceived benefit, perceived barrier and cues to action) used to assess the perception of work-related stress among medical doctors were significantly correlated with work-related stress, but when this finding was further subjected to the linear regression model, only perceived susceptibility did not significantly predict work-related stress. Although a lot of studies had been conducted on work-related stress, [6,18-20] not much had been done to assess the perceptions of work-related stress using the health belief model. In general, all the Health Belief Model components were seen as independent predictors of health behaviours. The high-perceived threat, low barriers, and high perceived benefits to action had been found to increase the likelihood of engaging in the recommended behaviour, however, perceived severity might have a weak correlation with health action. [21] This present study revealed
that all the components of the HBM measured were significantly correlated with WRS; perceived severity showed the strongest positive correlation, while perceived benefit succeeded through a negative correlation. The present study also showed that all the model components significantly predicted work-related stress except perceived susceptibility, even though it showed a positive correlation.

The study found that perceived severity was the strongest predictor of WRS. This finding implied that work-related stress was felt most when a doctor perceives that he/she was already being exposed to stress. In an Indian study conducted among doctors, it was noted that the highest stressors in the hospital setting were perception of a doctor having too many responsibilities at a time, and ability to manage high profile patients. [19] Saini et al., [18] reported serving long duty hours as the highest stressor among resident doctors working in a Medical College in Delhi. In a more recent Chinese study conducted among resident doctors, the workload was pointed out as one of the major stressor. All these studies measured stress perception as an individual parameter rather than as a component of the health belief model.

Perceived benefit followed perceived severity in terms of prediction of WRS, although, perceived benefit succeeded through a negative correlation. The finding, therefore, implied that those who took a break when feeling stressed at work had reduced perception of work-related stress, while the stressor stimuli were increasingly felt among those who did not take a break when they felt stressed.

Cue to action was the next predictor following perceived benefit. It suggested that those doctors whose colleagues often reminded to take a break when exhausted at work, who often got sick from not observing resting periods at work, and/or who often felt worn out after working for long hours without taking breaks had increased perception of WRS.

A perceived barrier was also found to be a significant predictor of work-related stress. The study showed that doctors who found it difficult removing all stressful conditions for workers at work, who felt working for shorter hours, may affect service delivery negatively, and/or who found it difficult having a healthy working relationship with colleagues, had an increased perception of work-related stress.

Perceived susceptibility to work-related stress was high as most respondents strongly agreed that other doctors may suffer from work-related stress and also agreed that they too can be affected, but this did not significantly predict work-related stress using the linear regression model.

This showed that about half of the doctors interviewed had an appropriate behavioural response to stress. This proportion though large should be better because being health care workers; doctors should be at the fore-front of quick and appropriate response to sub-optimal health. However, this is not often the case, as was seen from the findings in this present study.

In this present study, it was found that work-related stress had a weak positive significant correlation with perceived susceptibility and perceived barrier, a moderate positive significant correlation with cues to action, and a fairly strong positive significant correlation with perceived severity. The model also showed a weak negative significant correlation of work-related stress with perceived benefit.

Furthermore, all the components of the Health Belief Model significantly predicted work-related stress except perceived susceptibility. This is very significant for further program planning in occupational health for medical doctors.

5. CONCLUSION

Work-related stress is recognized as one of the major contemporary challenges facing occupational health and safety. The components of Health Belief Model significantly predicted work-related stress. This reflects an awareness of work-related stress but low engagement in practical measures that will reduce the occurrence of work-related stress among the respondents.

6. RECOMMENDATION

The hospital work environment should be made more job-friendly. The minimum equipment and materials needed to perform duties should be provided. Medical doctors should engage in programmes and practical sessions on measures of avoiding work-related stress. Doctors should also take regular holidays to rest and refresh themselves.

CONSENT AND ETHICAL APPROVAL

Approval was sought and obtained from the Research and Ethics Committee of the
University of Port Harcourt (UPH/CEREMAD/REC/MM61/026), and the Ethics Committee of the University of Port Harcourt Teaching Hospital (UPTH/ADM/90/SII/VOL.XI/870). Informed consent was obtained from the respondents before administering the questionnaire. The respondents were assured of the confidentiality of the information provided. For the sake of anonymity, none of the respondents was asked of their names. Each respondent was identified by a serial number. After entry of the completed questionnaire into the Microsoft Excel Spreadsheet, the computer system was pass worded so that only relevant authorities had access to the data.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mojoyinola JK. Effects of Job Stress on Health, Personal and work Behaviour of Nurses in Public Hospitals in Ibadan Metropolis, Nigeria. Ethno-Med.2008; 2(2): 143-148.
2. Etim JJ, Bassey PE, Ndep AO. Work-related stress among healthcare workers in Ugep, Yakurr Local Government Area, Cross River State, Nigeria: a study of sources, effects, and coping strategies; International Journal of Public Health, Pharmacy and Pharmacology. 2015;1(1):23-34.
3. Al-Yousuf, M, Akerele TM, Al-Mazrou YY. Organization of the Saudi health system. East Mediterr Health J.2002;8:645–53.
4. Ugoji EI. Managing administrative stress in educational institutions: A study of selected Nigerian universities. J Niger Delta Res. 2003;5:90–9.
5. Parent-Thirion, A, Macias EF, Hurley J, Vermeulen G. ‘Work-related Stress’ European foundation for the improvement of living and working conditions, Luxembourg:2007.
6. Sathiya N, Ruwaidha R, Nusrath FS, Fathima F, Gomathy T, Shailendra HK. Perceived Stress Levels and its sources among doctors and nurses working in a Tertiary Care Teaching Hospital, Kancheepuram, Tamil Nadu. Natl J Community Med. 2016;7(7):603-608.
7. Available: https://www.cdc.gov.niosh
8. Onowhakpo A. Occupational Stress: Prevalence, Sources and Coping Mechanisms among Medical Doctors in a Tertiary Institution. The Nigerian Health Journal 2018;18:1597-4292.No 1- ISSN.
9. Adeolu JO, Yussuf, OB, Popoola, OA. Prevalence and Correlates of Job Stress among Junior Doctors in the University College Hospital, Ibadan. Annals of Ibadan postgraduate medicine.2016;14(2):92–98.
10. Al-Makhaita HM, Sabra AA, Hafez AS. Predictors of work-related stress among nurses working in primary and secondary health care levels in Dammam, Eastern Saudi Arabia. Journal of family & community medicine.2014;21(2):79–84.
11. Siddiqui TR, Ghazal S, Safia B, Ahmed W, Sajjad SF. (2016). "Use of the Health Belief Model for the Assessment of Public Knowledge and Householder Preventive Practices in Karachi, Pakistan, a Dengue-Endemic City". PLOS Neglected Tropical Diseases. 2016;10(11): e0005129
12. Janz NK, Marshall HB. "The Health Belief Model: A Decade Later". Health Education & Behavior.1984;11(1):1–47.
13. Jones CJ, Smith H, Lewellyn C. Evaluating the effectiveness of health belief model interventions in improving adherence: a systematic review; Health Psychol Rev. 2014;(10)4:23-28.
14. Araoye MO. Sample size determination. In: Araoye MO. Research methodology with statistics for health and social sciences. Ilorin: Nathadex; 2003.
15. Champion VL. Instrument development for health belief model constructs, Advances in Nursing Science. 1984;6:73–85.
16. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. Journal of Health and Social Behavior. 1983;24:386-396.
17. Ndom RJE, Makanjuola AB. Perceived stress factors among resident doctors in a Nigerian Teaching Hospital. West African Journal of Medicine.2004;23(3):5-8.
18. Saini N, Agrawal, Sandeep BS, Bhatia M, Sharma A. Prevalence of stress among resident doctors working in Medical
19. Amte R, Munta K, Gopal PB. Stress levels of critical care doctors in India: A national survey. Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine. 2015;19(5):257–264.

20. Birhanu M, Gebrekidan B, Tesefa G, Tareke M. Workload Determines Workplace Stress among Health Professionals Working in Felege-Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia. Journal of environmental and public health. 2018;6286010. DOI:10.1155/2018/6286010.

Berker MH, Maiman LA. Socio behavioural determinants of compliance with health and medical care recommendations. Medical Care. 1975;13:10-24.

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