MODELLING THE EFFECT OF WORKPLACE STRESS MANAGEMENT ON INSTITUTION'S PERFORMANCE IN RWANDA: A CASE EVIDENCE FROM KIBOGORA LEVEL II TEACHING HOSPITAL, RWANDA

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Abstract:

The study titled *Modelling the effect of workplace stress management on institution's performance in Rwanda: A case evidence from Kibogora Level II Teaching Hospital, Rwanda* was about assessing the contribution of workplace stress management on institution's performance in the area under study. The study was guided with the objective of exploring the utilization of multinomial logistic regression (MLR) in modeling the effect of workplace stress management on an institution's performance. In this regard, the MLR model was performed using a maximum likelihood estimation method on the data set collected to find the parameter estimates of the model describing the relationship between the independent and the dependent variables and determine the significance of the predictor variables that contribute significantly to the institution's performance in the area under study. The study adopted both qualitative and quantitative approaches to collect data from 321 respondents. Data were collected using questionnaire and interview schedule techniques and analyzed using SPSS-23. In this analysis, the results revealed that on the total of twelve explanatory variables, the explanatory variables such as age, gender, the status of licensed or not and own avoidance of stress at the workplace of the workers were dropped from the training set of predictors variables that contribute significantly to the institution's performance at Kibogora Level II Teaching Hospital, Rwanda. In the model selection that overall fits well the data, the obtained variables that contributed significantly to the dependent variable were Status of workers who faced the issue of having a stress at the workplace, education level of the workers to whom the study was conducted, working experience of the workers, the main applied stress

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preventive measures at Kibogora Level II Teaching Hospital and knowledge on the strategies to use for coping with the stress of workers working at Kibogora Level II Teaching Hospital. The parameters estimate of the selected model revealed that the explanatory variables that best predicted the probability of increasing the institution's performance at Kibogora Level II Teaching Hospital once the stress management is controlled at the workplace were education level of the workers, working experience of the workers and main stress preventive measures applied by Kibogora Level II Teaching hospital. Finally, the study recommended that regarding stress preventive measures adopted in the area under study, the top management of Kibogora Level II Teaching Hospital in partnership with other funders should be ensure that all employees are trained on how to avoid occupational hazards and most importantly, the hospital need to provide recreational activities to the employees. On stress source identification, the study recommends that Kibogora Level II Teaching Hospital needs to increase incentives to employees for motivation while on duty and the hospital staff should as well be increased so as to reduce the challenge of work overloaded.

1. Introduction

1.1 Background information

Workplace or occupational stress is known as a worldwide phenomenon and a domesticated word ranging from homes, families to organizations. Twenty-six percent of the young nurses indicated that they often considered leaving treatment. Some factors were responsible for this consideration, such as personal burnout and dissatisfaction with work schedules based on quantitative data to intention to leave. There were also poor opportunities for the development low affective professional commitment, low job satisfaction, work-family conflicts and high quantitative work demand correlated with nurse's intentions to leave the profession, by identifying the factors that influence young nurse's decisions to leave nursing and implement the targeted preventive measure, it could be possible to retain more nurses in the field. There is a global shortage of nurses according to who the crisis of the workforce in the field of health is seriously affecting many countries' abilities to fight disease and improve health (WHO, 2016).

In the European Union (EU), the European Survey on Working Conditions revealed that stress and muscular-skeletal disorders are the main health risks at work between 2002 and 2012. It was understood that in the EU, trends and characteristics in occupational stress management in Western countries, especially are under-viewed. Most stress management activities are oriented towards secondary or tertiary prevention, and are worker-oriented. But in future, the priority strategy for intervention should be primary prevention, and focus on the organization as the generator of risk. In the group of countries paying a lot of attention to work stress, health policies or legal framework at

the national level and a variety of activities for stress prevention at the company level are well integrated. By analyzing various stress management cases or projects, key factors for a successful approach to stress prevention are extracted from various reports (Ibrahim, and Dauda, 2014).

In Asia and the Pacific, except in China, stress has been ranked as the number one lifestyle risk factor higher than physical inactivity and obesity by all employers that were surveyed by the professional services company Towers Watson. However, only a third of the companies polled cited "*improving the emotional and mental health of employees*" among their priorities in developing health and productivity programs. In addition, only one in four (26 percent) of employers in Asia currently offer stress management programs, according to the results of the 2013/2014 Towers Watson Survey. The said survey was conducted between May and July 2013 in North America, Latin America, Europe and Asia among a total of 892 employers. In Asia, the survey had 372 respondents from the Philippines, China, India, Hong Kong, Malaysia and Singapore. In addition, there is an increase in the decreasing rate of the number of those completing the education needed before stress management training. Voluntary turnover is decreasing the labor supply in the field, from some reports one in five professionals is expected to leave the profession within the next 5 years (Mayers, 2014).

Consequently, studies in Latin America have shown that stress work-related stress is a real problem among both public organization and private healthcare professionals. As far as life is a concern, stress is a necessary and common problem associated with it, stress has undesirable consequences in the emotional, mental and physical well-being of an individual, thus we can say that stress can be physical and psychological and then leads to decreased quality of life and poor organizational institutional performance. Stress management has become a most important and valuable technique to boost employee morale and the company's productivity in all companies. All the organizations have understood that the employees play a key role and they should be out of stress to give a high institutional performance atmosphere. There are varieties of techniques to manage stress in organizations (Farías and Pimenta, 2012).

Stress at work is a relatively new phenomenon of modern lifestyles in Sub-Saharan Africa. It is an unavoidable consequence of modern living in Africa in general but especially in South Africa. The nature of work has gone through drastic changes over the last century and it is still changing at a whirlwind speed. They have touched almost all professions, starting from an artist to a surgeon, or a commercial pilot to a sales executive. With change comes stress, inevitably. In most cases, job stress is attributable to negative situations such as a formal reprimand by one's superior for poor institutional performance. It is submitted that stress is much more common in employees at lower levels of workplace hierarchies because they have less control over their work situation. However, pleasant circumstances could also bring about job stress, such as job promotion and transfer to another location (Paxton, 2012).

According to a report by Private Sector Federation (2010), in Rwanda, like many other African developing countries following the civil wars, the economy gradually was

stabilized. However, in the recent past following political stability, the economy registered notable growth and due to Rwanda's favorable investment policy, there has been the setting up of many industrial establishments and increased employment opportunities which are so needed hence becoming stressful to a number of workplaces. In developing countries like Rwanda, the experience in the practice of occupational health is never limited. Workplace stress is a harmful physical and psychological effect that often happens due to conflicting interests between the job's tasks and individual capacity to handle a given task. In other words, it is a combination of high demands in a job and a low amount of control over the situation which leads to stress. Workers in large public institutions such as hospitals are at great risk of work-related stress, unfamiliarity with the work process and inadequate training in managing stress.

Therefore, the study was carried out as an investigation on whether workplace stress management has an effect on institutional performance in Rwanda, taking Kibogora District Hospital as a case study.

2. Literature review

The literature is presented in two major sections. The first section presents the theoretical framework, which was used to analyze the study. The second section is a review of the detailed empirical literature on workplace stress management and institutional performance. The chapter ends with an empirical review of related literature and gap analysis.

2.1. Theoretical review

This study stems primarily on three theories; Lazarus Stress Theory and Demand Control Support Model. These theories enhance understanding of workplace stress management in regard to institutional performance.

2.1.1. Lazarus Stress Theory

Lazarus states that stress is a condition or feeling experienced when a person perceives that the "*demands exceed the personal and social resources the individual is able to mobilize.*" This is called the 'transactional model of stress and coping. Neither the environmental event nor the people's response defines stress, rather the individual's perception of the psychological situation is the critical factor. He defines psychological stress as a "*particular relationship between the person and environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her wellbeing*". Lazarus stated that cognitive appraisal occurs when a person considers two major factors that majorly contribute to his response to stress. These two factors include; the threatening tendency of the stress to the individual, and the assessment of resources required to minimize, tolerate or eradicate the stressor and the stress it produces (Gibson, 2012).

In general, cognitive appraisal is divided into two types or stages: a primary and a secondary appraisal.

Primary Appraisal: In the stage of primary appraisal, an individual tends to ask questions like, "What does this stressor and/ or situation mean?", and, "How can it influence me?" According to psychologists, the three typical answers to these questions are: "this not important", "this is good", "this is stressful". To better understand primary appraisal, suppose a non-stop heavy rain suddenly pours at your place. You might think that the heavy rain is not important, since you don't have any plans of going somewhere today. Or, you might say that the heavy rain is good, because now you don't have to wake up early and go to school since classes are suspended. Or, you might see the heavy rain as stressful because you have scheduled a group outing with your friends. After answering these two questions, the second part of the primary cognitive appraisal is to classify whether the stressor or the situation is a threat, a challenge or a harm-loss (Farías and Pimenta, 2012).

Secondary Appraisal: Unlike in other theories where the stages usually come one after another, the secondary appraisal actually happens simultaneously with the primary appraisal. In fact, there are times when secondary appraisal becomes the cause of a primary appraisal. Secondary appraisals involve those feelings related to dealing with the stressor or the stress it produces. Uttering statements like, "I can do it if I do my best" "I will try whether my chances of success are high or not", and, "If this way fails, I can always try another method" indicates positive secondary appraisal. In contrast to these, statements like, "I can't do it; I know I will fail", "I will not do it because no one believes I can" and, "I won't try because my chances are low" indicate negative secondary appraisal (Barahona and Elizondo, 2012).

Although primary and secondary appraisals are often a result of an encounter with a stressor, stress doesn't always happen with a cognitive appraisal. One example is when a person gets involved in a sudden disaster, such as an earthquake, and he doesn't have more time to think about it, yet he still feels stressful about the situation. Coping which is defined as a process of "*constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands is appraised as taxing or exceeding the resources of the person*". There are four steps to manage this stress: define the problem, generate alternative solutions, learn new skills to deal with stressors, reappraise and find new standards of behavior. Emotion-focused coping use is when an individual feels as if they cannot manage the source of the problem. It involves gaining strategies for regulating stress (Barahona and Elizondo, 2012).

2.1.2 Demand Control Support Model

The Demands-Control model is currently perhaps the most influential model of stress in the workplace and the original model focuses on the two psychosocial job characteristics of job demands and job control. The latter factor is sometimes called decision latitude and is made up of the sub-factors of decision authority (control over work situation) and skill discretion (possibility of using learnt skills and competencies). They call the demand-control model an "interactional" model, as it focuses on the structural features of an individual's interactions with their environment (as opposed to the process of what is

occurring in this interaction). It has been shown that those exposed to high levels of demand, as well as having low levels of job control (high-strain situation) were disproportionately more likely to show increased levels of depression, fatigue, and cardiovascular disease and mortality. However, the lowest levels of illness were in individuals with moderate or even high demands, if they also had high levels of job control (Karasek, 2009).

The model was expanded to include social support (DCS) as evidence suggested that support may act as a buffer in high-demand situations. There is significant evidence in a variety of populations associating health outcomes with control, demands, and support. However, there is mixed support for the interactive effects of demands and controls, with some claiming these effects to be largely additive. Despite the later inclusion of social support, the model is limited in the number of job characteristics it considers, which may not reflect the dynamic multi-stressor nature of modern workplaces. While the model has good predictive validity at the macro level, it does not take into account individual differences in susceptibility to stressors and is unable to explain why the same levels of demand and control in two individuals may give rise to different behavioral or health outcomes (Karasek, 2009).

This issue may be related to the "oversimplification assumption" which can arise from too great a focus on environmental demands and is the notion that the presence of an environmental demand is an indication that the event is demanding, when in some cases for some individuals it is not. Other criticisms of the DCS model include its definition of demand as based primarily on workload and no other types of demand and that the conceptualization of control is quite a narrow view of this multi-dimensional construct. The DCS model also assumes that high control is always a desirable state (and a positive moderator of negative demands) however it could be argued that some individuals may not see job control as desirable, and may find having control a stressor in itself, for example, if they have a low sense of self-efficacy (Karasek, 2009).

2.2 Gap Identification

A number of studies on the effect of occupational stress management on institutional performance whereby most writers like Auty (2013), (Rauch, 2013) and Putzel et al. (2011) concluded that efforts provided by institutions as regards workplace stress management have a positive effect on the institutional performance compared to others that tend not to care about workplace stress management. Without training and creating a conducive environment at work, workforce productivity would cease to exist. In addition, the question of what drives institutional performance is at the top in understanding workforce productivity and institutional performance and hence realizing institutional performance. Substantial research efforts have gone into addressing this question, starting from the strategic level and going down to operational details (Balmford et al., 2012).

However, for the present study, the researcher believes that Rwanda still lacks more studies on a similar subject which need to be addressed in order to promote

effective and efficient institutional performance as regards workplace stress management. Hence, this study targets bridging the prevailing gap as far as the current situation is concerned.

2.3 Conceptual framework

The conceptual framework illustrating the relationship between the variables governing the research is pictured in Figure 1.1 below. It highlights the dependent variable under study and the independent variables with the intervening variables that may contribute the change of the outcome variable of the study in line with the objectives of the study (Howard et al., 2015).
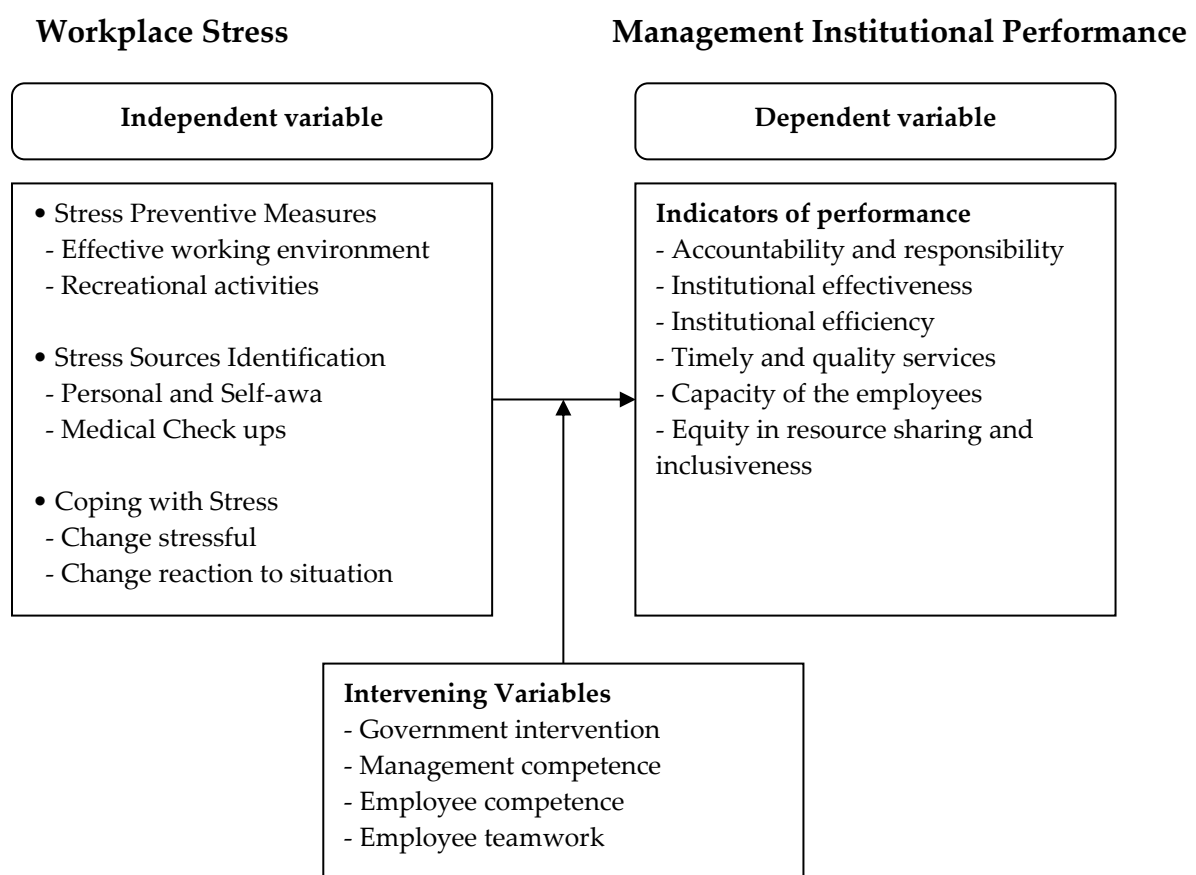
Workplace Stress   **Management Institutional Performance**

Independent variable

Dependent variable

• Stress Preventive Measures
 - Effective working environment
 - Recreational activities

• Stress Sources Identification
 - Personal and Self-awa
 - Medical Check ups

• Coping with Stress
 - Change stressful
 - Change reaction to situation

Indicators of performance
- Accountability and responsibility
- Institutional effectiveness
- Institutional efficiency
- Timely and quality services
- Capacity of the employees
- Equity in resource sharing and inclusiveness

Intervening Variables
- Government intervention
- Management competence
- Employee competence
- Employee teamwork

Figure 1.1: Conceptual framework of institutional performance

2.5 Research objectives

The purpose of the paper is to:

- Attest the utilization of ordered multinomial logistic regression in modeling the effect of workplace stress management on institutional performance s in the area under study.
- Evaluate the use maximum likelihood estimation method to estimate the parameters of the model governing the institutional performance status and the explanatory variables

- Assess the goodness-of-fit of the ordered multinomial logistic regression model with the presence of the explanatory variables.
- Determine the significance of the explanatory variables that contribute significantly to the institutional performance status in the area under study.

Following the fourth research purpose, the hypothesis of the research to be posed is:

H₀: There is no significant impact of workplace stress management on institutional performance.

H₁: There is a significant impact of workplace stress management on institutional performance.

3. Methods and Materials

This study used a target population of 321 workers of Kibogora Level II Teaching Hospital from three main units of this institution; that is, unit of Medical services Directorate (154 employees), unit of Nursing and Midwifery Directorate (116 employees) and unit of Allied health Services Directorate (51 employees). Since the results from the entire population are more preferred than those ones from the sample from the population the researchers decided to enumerate the entire population in the study rather than using any sampling procedure to draw a sample in this population.

3.1 Brief introduction on Multinomial Logistic Regression Model

The multinomial logistic regression (MLR) model is a generalization of the binary model and both models depend mainly on logit regression (Abdallah, 2012). Logistic analysis in the logistic regression can be extending to models with multiple explanatory variables. Let consider the case of k predictors for a binary response Y by $x_1, x_2, \ldots x_k$, the model for log odds is

$$Logit[p(Y = 1)] = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \cdots + \alpha_k x_k.$$

And the alternative formula, directly specifying $\pi(x)$, is

$$\delta(x) = \frac{\exp(\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \cdots + \alpha_k x_k)}{1 + \exp(\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \cdots + \alpha_k x_k)}$$

The parameter α_i refers to the effect of x_i on the log odds that $Y = 1$, controlling other x_j, for instance, $exp(\alpha_i)$ is the multiplicative effect on the odds of a one unit increase in x_i, at fixed levels of x_j.

If there are m independent observations with q-explanatory variables, and the qualitative response variable has k categories, to construct the logits in the multinomial case, one of the categories must be considered the base level and all the logits are constructed relative many ways is the natural complement of ordinary linear regression

whenever the response is categorical variable. When such discrete variables occur among the explanatory variables, they are dealt with by the introduction of one or several $(0, 1)$ dummy variables, but when the response variable belongs to this type, the regression model breaks down. Logit analysis provides a ready alternative. For a response variable Y with two measurement levels (dichotomous) and explanatory variable X, let: $\delta(x) = p(Y = 1|X = x) = 1 - p(Y = 0|X = x)$, the logistic regression model has linear form for logit of this probability

$$Logit[\delta(x)] = \log\left(\frac{\pi(x)}{1 - \pi(x)}\right) = \alpha_0 + \alpha_1 x,$$

where the $odds = \frac{\delta(x)}{1-\delta(x)}$.

The $odds = e^{(\alpha_0 + \alpha_1 x)}$, and the logarithm of the odds is called logit, so:

$$Logit[\delta(x)] = \log\left(\frac{\delta(x)}{1 - \delta(x)}\right) = \log[\exp(\alpha_0 + \alpha_1 x)] = \alpha_0 + \alpha_1 x.$$

The logit has linear approximation relationship, and logit = logarithm of the odds.

The parameter α is determined by the rate of increase or decrease of the S-shapedcurve of $\delta(x)$. The sign of α_1 indicates whether curve ascends ($\alpha_1 > 0$) ordescends ($\alpha_1 < 0$), and the rate of change increases as $|\alpha_1|$ increases.

3.2 Multinomial logistic regression
The logistic regression can be extending to models with multiple explanatory variables. Let consider the case of k predictors for a binary response Y by $x_1, x_2, \ldots\ldots x_k$, the model for log odds is

$$Logit[p(Y = 1)] = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \cdots + \alpha_k x_k.$$

And the alternative formula, directly specifying $\pi(x)$, is

$$\delta(x) = \frac{\exp(\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \cdots + \alpha_k x_k)}{1 + \exp(\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \cdots + \alpha_k x_k)}$$

The parameter β_i refers to the effect of x_i on the log odds that $Y = 1$, controlling otherx_j, for instance, $exp(\alpha_i)$ is the multiplicative effect on the odds of a one unit increase in x_i, at fixed levels of x_j.

If there are m independent observations with q-explanatory variables, and the qualitative response variable has k categories, to construct the logits in the multinomial case, one of the categories must be considered the base level and all the logits are constructed relative to it. Any category can be taken as the base level, so we will take

category k as the base level. Since there is no ordering, it is apparent that any category may be labeled k. In this case we let δ_j denotes the multinomial probability of an observation falling in the jth category, to find the relationship between this probability and the m explanatory variables, $X_1, X_2, \ldots, X_q$, the multiple logistic regression model is then

$$\log\left(\frac{\delta(x_i)}{\delta_k(x_i)}\right) = \alpha_{0i} + \alpha_{1j}x_{1i} + \alpha_{2j}x_{2i} + \cdots + \alpha_{qj}x_{qi},$$

where $j = 1, 2, \ldots, (k-1), i = 1, 2, \ldots, m$.

Since the sum of all the $\delta's$ add to unity, this reduces to:

$$\log[\delta_j(x_i)] = \frac{\exp\left(\alpha_{0i} + \alpha_{1j}x_{1i} + \alpha_{2j}x_{2i} + \cdots + \alpha_{qj}x_{qi}\right)}{1 + \sum_{j=1}^{k-1} \exp\left(\alpha_{0i} + \alpha_{1j}x_{1i} + \alpha_{2j}x_{2i} + \cdots + \alpha_{qj}x_{qi}\right)},$$

for $j = 1, 2, \ldots, (k-1)$, the model parameters are estimated by the method of Maximum Likelihood estimation.

3.3 Workplace stress management data

Researchers used the real data collected from the sample at Kibogora level II Teaching Hospital, on workplace stress management at the institutional level for the application of multinomial logistic regression model. The data set consisted of 321 observations recorded on 12 variables.

4. Modeling workplace management: Kibogora Level II Teaching Hospital

4.1. Specification of the variables
4.1.1 Outcome variable

From the questions enclosed in the questionnaire disseminated to the respondents of the survey, there was a question that brought attention to the respondents in determining whether the workplace stress management has an impact on institution's performance having three levels as; a high level, medium level or low level, and with this regard, the outcome variable had three levels "1" for high level, "2" for medium level and "3" for low level respectively. With the aim of the analysis, the reference category of this response variable has been "2" of low level of mentioning that the workplace stress management has a negligible effect on institution's performance

4.1.2 The predicator variables

Researchers attempted to select a set of independent variables related to workplace stress management that, they believe to have an impact on the institution's performance. These independent variables are viewed in detail using the following questions on the questionnaire of the survey:

- What are main stress preventive measures? The answer to this question has two optional categories "Effective working environment" and "Recreational activities" coded as "Effw=0" and "RA=1" respectively. In SPSS, this variable is named as "SPM".
- What is the stress sources identification? The answer to this question has responses like "Personal and Self-awareness" and "Medical Checkups" coded as "PsA=0" and "MCs=1" respectively. In SPSS, this variable is named as "SSI".
- What are the strategies to use for coping with stress? The answer to this question has responses such as "Change stressful situation" and "Change reaction to situation" coded as "ChS=0" and "Chr=1" respectively. In SPSS, this variable is named as "STS".

4.2 Baseline category of the outcome variable

Any category of outcome variable can be chosen to be the baseline category, the model will fit equally well data, obtained the same probability and yielding the same estimated values, only the values and interpretation of the parameters will vary (Abdalla, 2012). In this situation under study, researchers considered the reference category with smallest frequency so we selected category of (1-negatively). With this choice of the reference category, we meant the comparison will be against the employees of Kibogora Level II Teaching Hospital who suggested that workplace management has no impact on the institution's performance.

5. Results and Discussions

5.1 Estimation of the multinomial logistic regression model

We selected 10 predictor variables that we believed they had impact of workplace stress management on institution's performance in the area under study. We attempted to seek the effect of these independent variables on the outcome variable by constructing the multinomial logistic regression model and then checked out the results. To accomplish this aim, we used SPSS software version 23, and NOMERG command to estimate the response variable and all the explanatory variables to find the primary model.

5.2 Control of outcome variable

From the Table 4.1 below of case processing summary we can exam some points:

Table 4.1: Case processing summary by using 11 independent variables

Outcome variable categories	N	Marginal Percentage
1 High	173	53.90%
2 Medium	148	46.10%
3 Low	0	0.00%
Valid	321	100.00%
Missing	0	

Total	321	
Subpopulation	302	

Source: Computed.

The outcome variable has only one value observed in 321 (100.0%) subpopulation. Table 4.1 above is a portion of huge table from SPSS that contains all the variables, outcome variable and explanatory variables. Since we were interested on the dependent variable, from the above table we could see that the number of valid observations used in the outcome variable is 321, distributed into three categories. The column of marginal percentages in the table gives the proportion of valid observations obtained in each of the outcome variable' groups,

53.9% of the valid case (High level of institution's performance due to the fact of managing the stress at the workplace), 46.1% of the valid case had been subjected by (medium level) of institution's performance and 0.0% by (low level of institution's performance) because of managing the stress at the workplace. From the above table we then directly computed the chance accuracy of the model as:

$$(0.539)^2 + (0.461)^2 = 0.0503042 = 50.3042\%.$$

At this level we could compute the proportional by chance accuracy that will be compared to the overall percentage of the final model and this yielded 62.88025% (1.25 x 50.3042%. =62.88025%).

5.3 Examination of explanatory variables

To determine which explanatory variables to be included in the final model we extracted the information from the output from SPSS in the table of likelihood ratio tests. Table 4.2 below highlights the independent variables that contribute significantly to the model.

Table 4.2: Status of independent variables by Likelihood Ratio Tests

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	40.000	115.429	98.283[a]	0	0	.
Age	36.000	103.886	90.865[b]	2.483	2	0.108
TimeStress	26.000	93.886	86.247[b]	8.864	2	0.005
Gender	36.998	100.886	88.968[b]	0.684	2	0.408
Education	40.687	115.429	96.986	49.703	0	0.000
Licensed	26.001	85.429	69.683[b]	8.400	2	0.089
SPM	28.099	83.886	78.096[b]	27.812	0	0.000
OwnA	40.367	118.429	98.311[b]	0.027	4	0.868
WorkExp	36.388	101.547	98.358[b]	0.078	0	0.005
HadStress	46.678	118.429	101.237	132.653	0	0.000
STS	38.265	102.429	82.262[b]	41.678	0	0.000
SSI	40.196	115.429	89.190[b]	31.088	0	0.000

| ICv | 38.098 | 102.449 | 87.907 | 2.678 | 0 | 0.044 |

Source: Computed.

From the above table illustrating the contribution of the independent variables to the outcome variable, it was revealed that the explanatory variables such as age , gender, status of licensed or not and own avoidance of the stress at the workplace are independent variables to be dropped from the final model since they do not contribute meaningfully to the full model and this is due to that fact that, their corresponding p-values to their Chi-Square metrics are greater than the level of significance (cutoff, that is, 5% used in the analysis of the paper**).** In this regard, the above stated four independent variables are to be dropped from the final model and the overall fit of the model will not be significantly reduced.

5.4 Model selection

For the next stage, we refitted the model after excluding the independent variables that did not contribute significantly to the final model given by the test of Likelihood Ratio Tests in table 4.2 above. This procedure has been replicated ten times and stopped when we found parameters estimates are significant.

Table 4.3: Specification of the selected model

Description	Model (1)	Model(2)	Model (3)	Model (4)	Model (5)
Number of explanatory variables	8	7	6	5	4
Valid cases	321	321	321	321	321
Missing cases	0	0	0	0	0
Chi-square value (likelihood ratio test)	341.167	310.432	305.569	304.167	67.803
Subpopulation	174	168	178	165	128
Df	14	13	12	10	4
R-square Cox and Senell	.464	.457	.452	.450	.261
R-square Nagelkerke	.652	.643	.635	.633	.315
R-square Mc Fadden	.391	.383	.378	.378	.12.6
Classification Overall percentage	79.8%	82.1%	89.8%	92.5%	82.9%

Source: Computed.

Table 4.3 above revealed that the Model (4) is the best to be appropriate to the data compared to the remaining other models. It has the highest classification overall percentage, includes 5 predictor variables. The details of this selected model can be summarized by its case processing from SPSS output in NOMERG command.

Table 4.4: Case processing of the selected model

Outcome variable categories	N	Marginal Percentage
1 High	173	53.90%
2 Medium	148	46.10%
3 Low	0	0.00%
Valid	321	100.00%
Missing	0	
Total	321	
Subpopulation	174	

Source: Computed.

In addition, by comparing the classification overall percentage of this selected model computed from SPSS, we could notice is greater than the proportional by chance accuracy criterion computed, that is 92.5% > 62.88025% and this supported again the overall fit of the selected model.

4.5 Goodness of-fit and parameters estimation

To test whether the null hypothesis is rejected or retained, we needed to check if the model without explanatory variables is different from the model with explanatory variables. The table below showed that the final model is close to fit the data than the null model.

Table 4.5: Model fitting information

Model	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	683.255	690.798	69.255			
Final	32.000	92.343	.00	679.255	10	.000

Source: Computed.

The presence of a relationship between the response variable and combination of explanatory variables is based on the statistical significance of the final model chi-square. In our model, the p-value of the model chi-square (679.255) was 0.000, less than the level of significance 0.05.

We rejected the null hypothesis which states that there was no difference between the model without explanatory variables and the model with explanatory variables. The existence of a relationship between the explanatory variables and the response variable was supported.

The AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) can be used to check how the fitted values and observed values of the model are close. Using the likelihood ratio test of the selected model, the AIC, BIC and -2log likelihood are close.

Table 4.6: Likelihood ratio tests of the selected model

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	Df	Sig.
Intercept	24.000	69.257	53.256a	0	0	.
Education	24.000	69.257	53.256	33.880	0	.000
SPM	20.000	57.714	46.276b	28.023	2	.000
WorkExp	681.883	712.055	560.132b	29.678	4	.000
HadStress	24.000	69.257	46.34	37.088	0	.000
STS	20.000	57.714	43.56	25.809	2	.000
Source: Computed						
The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.						
a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.						
b. Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.						

The parameters estimate of each predicator variables gave the information of the expected amount of change in the logit for each one unit change in the predictor. The table below revealed the logistic coefficients of the selected model that contribute to the logit of the alternative category of the outcome variable.

Table 4.7: Parameter Estimates of the selected model

DVa		B	Std. Error	Wald	df	Sig.	Exp(α)	95% Confidence Interval for Exp(α)	
								Lower Bound	Upper Bound
1.0	Intercept	-1.110	2.529	.193	1	.551			
	[Education=1.0]	6.414	2.583	6.168	1	.011	610.474	3.867	86383.648
	[Education=2.0]	0b	.	.	0	.	.	.	.
	[SPM=.0]	10.375	5.336	3.781	1	.041	32062.520	.826	1016408433.319
	[SPM=1.0]	7.891	5.238	2.270	1	.115	2673.965	.093	69808371.866
	[WorkExp=1.0]	4.016	7.810	.264	1	.508	55.455	1.247E-5	1946666000.188
	[WorkExp=2.0]	4.065	7.812	.271	1	.513	58.253	1.305E-5	249975016.233
	[WorkExp=3.0]	4.081	4.922	.687	1	.316	59.194	.004	895505.472
	[HadStress=1.0]	7.828	5.023	2.429	1	.115	2508.982	.133	46309707.580
	[HadStress=2.0]	85.932	.000	.	1	.	2.088E+37	2.088E+37	2.088E+35
	[STS=.0]	7.688	5.382	2.040	1	.144	2182.258	.057	81213482.252
	[STS=1.0]	8.010	6.078	1.737	1	.177	3011.410	.020	439249528.624
	Intercept	7.523	6.375	1.393	1	.137	1850.111	.007	483707882.268
	[Education=1.0]	2.847	4.897	.338	1	.462	17.230	.001	243696.176
	[Education=2.0]	-.287	6.796	.002	1	.922	.750	1.231E-4	447329.555
	[SPM=.0]	-.178	9.545	.000	1	.883	.837	6.281E-6	11413206.812
	[SPM=1.0]	-.377	4.694	.006	1	.845	.686	6.929E-3	6691.727
	[WorkExp=1.0]	0b	.	.	0	.	.	.	.

2.o	[WorkExp=2.0]	-10.845	5.333	4.136	1	.035	1.950E-5	5.635E-8	.5665
	[WorkExp=3.0]	.099	4.265	.001	0	.884	1.104	.000	4609.374
	[HadStress=1.0]	0ᵇ	.	.	0	.	.	.	.
	[HadStress=2.0]				0				
	[STS=.0]				1				
	[STS=1.0]				0				
Source: Computed									
a. The reference category is: 3.									
b. This parameter is set to zero because it is redundant.									

The Parameter estimates illustrated in Table 4.7 above highlighted the useful information about the parameter estimate α for each predictor variable for each alternative category of the dependent variable. The logistic coefficient is the expected quantity of change in the logit for each one unit variation in the predictor and the logit being the predicted one; it is the odds of elements in the category of the outcome variable which has been specified (in this current situation of ours is the first value: 1 that was specified, rather than the alternative value 2). As we could see in the table illustrating the parameters estimates, the independent variables in the final model that less affect in predicting the logit are status of the workers who faced the issue of having stress at the workplace (coded in SPSS as "HadStress") and knowledge of people who are aware about different strategies to use for coping with stress at the workplace (coded as "STS" in SPSS) and this is due to the fact that their logistic coefficient that are closer to zero (cf. Table 4.4). Further information can also be recorded from the Wald statistic and the associated p-value to assess whether or not the estimated logistic coefficients of the independent variables are different from zero. In our case we expected predictor variables which increased the logit to show anexp (α) which is greater than 1.0, those independent variables that which did not have impact on the logit showed an exp (α) of 1.0 and explanatory variables which decreased the logit have displayed an exp (α) values less than 1.0. Applying these criteria, we found that the explanatory variables that increased the logit of the outcome variable (that is, "managing the stress at the workplace has a positive effect on institution's performance") are Education (coded as "Education=1" for education status of the employees at Kibogora Level II Teaching Hospital) and Working experience (coded as "WorkExp") respectively and the explanatory variable that could decrease the logit of the outcome variable was in the categories of main stress preventive measures applied at Kibogora Level II Teaching Hospital (coded as "SPM" in SPSS) and no independent variable had been found to no have impact of stress management at workplace on institution's performance.

5. Conclusion

We modeled the impact of workplace stress management on institution's performance in Rwanda, a case evidence from Kibogora Level II Teaching Hospital in Nyamasheke District, using multinomial logistic regression (MLR) model on twelve explanatory variables that we guessed they had effect on this dependent variable. Based on different

statistical metrics associated to multinomial logistic regression model tests in model evaluation and specification of predictor variables, the explanatory variables such as age, gender, status of licensed or not and own avoidance of the stress at the workplace were dropped at the initial phase from other explanatory variables since they did not contribute significantly to the dependent variable at all. To move forward, we attempted to select the model that fits well the data and that can predict the logit of the dependent variable and noticed that the model that overall fitted the data had only five explanatory variables that could have effect of workplace stress management on the institution's performance at Kibogora Level II Teaching Hospital and could be used to predict the logit of this dependent variable and these predictors were "*Status of workers who faced the issue of having a stress at the workplace, Education level of the workers to whom the study was conducted, Working experience of the workers, the applied main stress preventive measures at Kibogora Level II Teaching Hospital and knowledge on the strategies to use for coping with stress of workers working at Kibogora Level II Teaching Hospital*". In addition, among these explanatory variables that contributed less affect in predicting the logit are status of the workers who faced the issue of having stress at the workplace and knowledge of people who are aware about different strategies to use for coping with stress at the workplace and we also found that the explanatory variables that increased the logit of the outcome variable, that is, "*managing the stress at the workplace has a positive effect on institution's performance*" are Education level of the workers at Kibogora Level II Teaching Hospital and Working experience and finally the independent the variable that could decrease the logit of the dependent variable was found to be in the categories of main stress preventive measures applied at Kibogora Level II Teaching Hospital.

6. Recommendations

Based on the conclusion from the model which has been used to fit the data on modeling the impact of workplace stress management on institution's performance a case evidence from Kibogora Level II Teaching Hospital, in Nyamasheke District, Rwanda, the following recommendations are addressed to the employer and public in area under study: With the conclusion revealed by the model that has been used to fit the data and the clarification percentages of the selected, the recommendations to the public and to local leaders in Nyamasheke District, in the following outlines:

1) Regarding stress preventive measures adopted in the area under study, the top management of Kibogora Level II Teaching Hospital in partnership with other funders should be ensure that all employees are trained on how avoid occupational hazards and most importantly, the hospital need to provide recreational activities to the employees. This could be done through subscribing to monthly services such as swimming, gym and other exercises.

2) On stress source identification, Kibogora Level II Teaching Hospital needs to increase incentives to employees for motivation while on duty. The hospital staff should as well be increased so as to reduce the challenge of work overloaded.

3) Kibogora Level II Teaching Hospital should also find out why the employees are not timely while providing services since according to the findings most of them confirmed they are not timely and that the quality of their services is also not perfect.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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