Multi-criteria decision analysis of occupational stress among healthcare professionals in Nigeria

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ABSTRACT

Introduction: Stress among healthcare professionals has become a major issue in healthcare organizations operating at the domestic, international and global fronts. This profession however, requires people to be physically, emotionally and mentally alert, in order to care for other people.

Purpose: To ascertain stress factors among healthcare professional in Nigeria. In order to rank and establish causal relationships among the various stress factors using the Multi-Criteria Decision Making methods (MCDM).

Materials and methods: A validated AHP-based questionnaires was used to conduct a survey of 386 healthcare professionals from two tertiary teaching hospitals in South-west, Nigeria, using proportional quota sampling procedure.

Results: The results reveal that relationship factor has the most significant impact on the stress of healthcare professionals with an Eigen vector of 0.3531. It finds also that the role factor has the least significant criterion, having an Eigen vector of 0.0778. At the global level of ranking the alternative decision occupational stress factor, speed of change has the highest priority, the least being financial problems.

Conclusions: In comparison with others, the health care profession is highly stressful, due mainly to the fact that it has a higher rate of psychological distress. Keeping this in mind, this study has examined what determines occupational stress among healthcare professionals in teaching hospitals in Nigeria.

Keywords: Occupational stress, Health care professionals, MCDA, AHP, Healthcare service delivery, Nigeria

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INTRODUCTION

The pressure at the workplace is unavoidable, due to the demands of the contemporary work environment. However, work environment pressures may be positive or negative, considering the degree of pressure. Pressure may be acceptable to an individual or not depending on the situations, magnitude and the capacity to cope. Often times, it may keep workers on the alert, even motivates them to achieve what they would not achieve ordinarily or learn in the process depending on the availability of resources and personal characteristics. Nevertheless, when pressure becomes excessive or otherwise unmanageable, it may become negative, thereby leading to stress [1].

Stress among healthcare professionals has become a major issue in healthcare organizations operating at the domestic, international and global fronts. This profession however, requires people to be physically, emotionally and mentally alert, in order to care for other people. Mistakes by healthcare professionals are hardly allowed, because they may be disastrous and irreversible. Healthcare professionals are therefore required to be in a stable and perfect state of mind, with no worries and anxieties [2].

Meanwhile, the causes and effects of job-related stress have been widely acknowledged within the extant literature and academic researchers. The reason for this acknowledgement is that most workers, in their line of duties, may have experienced stress in one way or another [3]. Much of the extant research studies on occupational stress have also demonstrated that healthcare-related professions can result in excessive stress levels [4,5]. Upon the recognition that healthcare profession is a stressful one, Somaz and Tuglan [6] however, pointed out workload, job duplications, inadequate resources, physical environment, inadequate allocation of job, psychological environment, among others, as responsible for stress. Nonetheless, much of the prolific research on occupational stress among healthcare professionals has concentrated on developed and developing countries, using different methodology. However, this phenomenon has global appeal as evidenced in studies within Delhi [7], Iran [8], Ghana [9], Taiwan [10], India [11], Ghana [12], Dubai [13]. The aforementioned empirical review however, shows that studies have been undertaken to assess stress factors among healthcare professionals across developed and developing countries, using different methodology, however, similar studies do not exist in Nigeria and also no study has sought to rank and establish causal relationships among the various stress factors affecting the healthcare professional.

Consequently, this research study is necessary because it provided evidence that stress factors among healthcare professional are numerous but they are all treated with equal importance in prior research. The study also represents one of the few formal research studies to focus on West Africa region and the first one to focus on pairwise comparison for ranking and establishing causal relationships among the various occupational stress factors affecting the healthcare professionals in Nigeria using the Multi-Criteria Decision Making methods (MCDM). Hence, the study proposed a framework based on cause and effect relationship among occupational stress factors. It thus offers a novel perspective. Similarly, this study has also provided empirical evidence that, in practice, prioritization of stress factors among healthcare professional will advance the understanding of both practitioners and academics to know which stress factors act as causes to other stress factors, or which stress factors lead to other stress factors in order to stimulate research driven policy for its management.

Ultimately, the purpose of this research study is to ascertain the influence of stress factors among healthcare professionals in Nigeria and to rank and establish causal relationships among the various stress factors using the Multi-Criteria Decision Making methods (MCDM).

The term "stress" has become an amorphous term since there are numbers of research studies on the subject with different definitions of stress. The implication of this, that stress is a multidimensional concept, its definition then depends largely on the focus of the particular research study undertaken. For instance, The National Institute of Occupational Safety and Health [14], Health and Safety Executive [15], Howard [16], Moustaka & Constantinidis [17], Radhakrishnan & Jins [18] among others, defined stress to encompass the physical, mental, psychological and emotional pressures on the individual(s) which result from the interaction with the environment which they live, that are alleged as hurting and/or beyond their adaptive aptitude and having threats to human wellbeing.

However, as earlier mentioned in this study, numerous empirical studies have been conducted on stress factors among healthcare professionals in various contexts. Bhatia et al. [19] in their study on comparative analysis of occupational stress among nurses in two tertiary care hospitals in Delhi found that the most significant stressors in the case of the causes of stress were high level of skill requirement of the job, while the least significant stressor was the helpfulness of the supervisors. In the same way,

Saranbadi et al. [8] conducted a study on employee occupational stress among Military hospital personnel in Iran. The Cross-sectional survey design was employed. The results of the study show that there is a higher stress level among healthcare employees compared to their administrative counterparts, which depicts that working conditions in military health settings are even more stressful for clinical staff. Also, from the findings of the study, no significant effect was identified for other demographic and professional characteristics, including age, sex, marital status, educational level, and work experience either between entire employees, or between clinicians.

Rita et al. [9] also carried out a comparative study at Ridge and Pantang hospitals in Ghana, in order to find out the main causes of stress among nurses in both hospitals and their level of job satisfaction. The results of study reveal that the main causes of stress are the same for both sampled, except workload which is higher in Ridge hospital. It also found out that there was a weak negative correlation relationship between work stress and job satisfaction in the two Hospitals. In Taiwan, Pan [10] also conducted a study to identify the determinant of nurses' capabilities of stress using the Analytic Hierarchy Process model (AHP) in two regional hospitals in southern Taiwan. This study identified stress factors and classified them according to their order of importance. Four factors were identified as the second level of hierarchy. Of these, family factor was considered the most important, followed by personal attributes. The top three sub-criteria that enhanced nurse's stress-coping capability are children's education, good career plan, and healthy family.

For Gulavani and Shinde [11] the results of their study show that there is no significant relationship between occupational stress, job satisfaction and age, sex, professional education, and year of experience. Yeboah et al. [12] also examined the relationships between six key organizational factors, namely: demand, control, support, relationships, change, and role conditions. To do this, they analyzed the data collected from 453 healthcare professionals working in a teaching hospital in Ghana, using the three sequential steps in linear regression analysis. This helped to identify the causes of stress among human resource personnel sampled. The overwhelming finding in their study is that six elements significantly impact on employee stress with differential influences. They called for a model like the AHP, which will not only estimate the influence of major factors (criteria), but contribute to each component (sub-criteria). In the long run, this helped

to arrive at a comprehensive assessment of occupational stress influences of health professionals.

Furthermore, Khan and Khurshid [13] conducted an empirical study on the impact of workplace stress of employees among hospitals' staff in Dubai. A total of 150 employees working in various healthcare centers and hospitals in UAE were surveyed. The results of the study show that workplace has negative impact on employees' well-being and the impact was found to be weak. The findings of the study suggested that an increase in workplace stresses will reduce wellbeing of employees. Also, the researchers recommend that in order to reduce the impact of stress on employees' well-being, organizational support, family support and social support are essential.

Although, in the above empirical review, studies have been undertaken to assess stress factors among healthcare professional across developed and developing countries, using different methodology, similar studies do not exist in Nigeria. To be precise, there has not been any know study that mobilize the Multi-Criteria Decision Making methods in order to assess occupational stress among healthcare professionals in Nigerian teaching hospitals. It can thus be said that the interest of this paper in situating the MCDM model within the context of Nigerian healthcare experience is seminal. Since, little stress situation can have positive effects by energizing employees towards achieving both personal and organizational goal, conversely unnecessary stress can seriously and undesirably impact an employee's health and job performance from time to time [20].

MATERIALS AND METHODS

The cross-sectional design was used in the selected teaching hospitals in South-west, Nigeria. The Lagos University Teaching Hospital (LUTH), Lagos, Nigeria, and Olabisi Onabanjo University Teaching Hospital (OOUTH), Ogun-state, Nigeria were purposively selected to guarantee easily access to information. The population of this study comprises all doctors and nurses in the selected teaching hospitals in South-west, Nigeria. The total population of the healthcare professional in the selected teaching hospitals is 5917. The choice of the healthcare professionals (doctors, nurses and other healthcare professionals) for the study is necessitated by the fact that they are recognized as the closest tertiary caregiver to numerous patients and patient relatives in the teaching hospital. Additionally, the quota sampling technique was used. This helped to determine the percentage of respondents from each of the hospitals, so as to ensure effective representation.

Meanwhile, 16% (975) of the total respondents were healthcare professional of OOUTH while 84% 4,942) of the respondents were healthcare professional of LUTH.

The researchers depended on the widely adopted formula developed by Cocharan [21] to determine appropriate sample size, based on the population from 5, 917 health professionals.

$$n = \frac{z^2 P(1-P)N}{z^2 P(1-P) + N(e)^2}$$

Where: n = sample size; N = population size; Z = standard normal variable (z = 1.96 at 95% confidence level); P = proportion or degree of variability = 50%; e = the level of precision = 5%.

$$n = \frac{(1.96)^2(0.5)(0.5)5917}{1.96^2(0.5)(0.5) + 5917(0.05)^2}$$

$$n = \frac{3.8416(0.25)(5917)}{3.8416(0.25) + 5917(0.025)} = \frac{5682.6868}{15.7529} = 361$$

The appropriate sample size for the population of this study is approximately 361. This is clearly less than the standard sample size of 384 being proposed for population that is unknown by the [21]. In order to guide against incomplete entries/low response rate which are the main disadvantage of questionnaire as an instrument for data collection, the researchers administered more questionnaires than the
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determined sample size. The copies of questionnaire administered were 400. The quota sampling of the healthcare professional of the hospitals under study would be used to determine the number of copies of questionnaire to be administered to each of the hospitals as well as the categories of health care professionals

Table 1. Quota sampling of the health care professionals

Health care professionals	OOUTH	LUTH	TOTAL	Quota Sampling	Copies of questionnaire administered
Doctors	203	1112	1315	22%	22% of 400 = 88
Nurses	236	1417	1653	28%	28% of 400 = 112
Others	536	2413	2949	50%	50% of 400 = 200
Total			**5917**		**400**

Table 1 shows that 22%, 28% & 50% of the copies of questionnaire were given to doctors, nurses and other categories of health professionals in that order.The present study adapted and modified the causes of stress identified by in the new UK Health and Safety Executive's (HSE) Management Standards (MS) model, taking it as the key measurement in organizing questionnaire. This is in response to growing concern in the extant literature that the General Health Questionnaire has been the major device for evaluating the causes of stress, since it helps organizations to manage potential sources of work-related stress [12,13].

The management standards had identified six key factors that cause stress, namely: Demands factors: this includes issues such as workload, work patterns and the work environment.; Control factors – how much say the person has in the way they do their work.; Support factors – this includes the

encouragement, sponsorship and resources provided by the organisation, line management and colleagues; Relationships factors – this includes promoting positive working to avoid conflict and dealing with unacceptable behavior; Role factors – whether people understand their role within the organization and whether the organization ensures that they do not have conflicting roles; and Change factors – how organizational change (large or small) is managed and communicated in the organization.

The factors were used in formulating the AHP-based questionnaire for pairwise comparison by respondents. Figure 1 below shows the hierarchical model of the occupational stress factors among healthcare professionals.
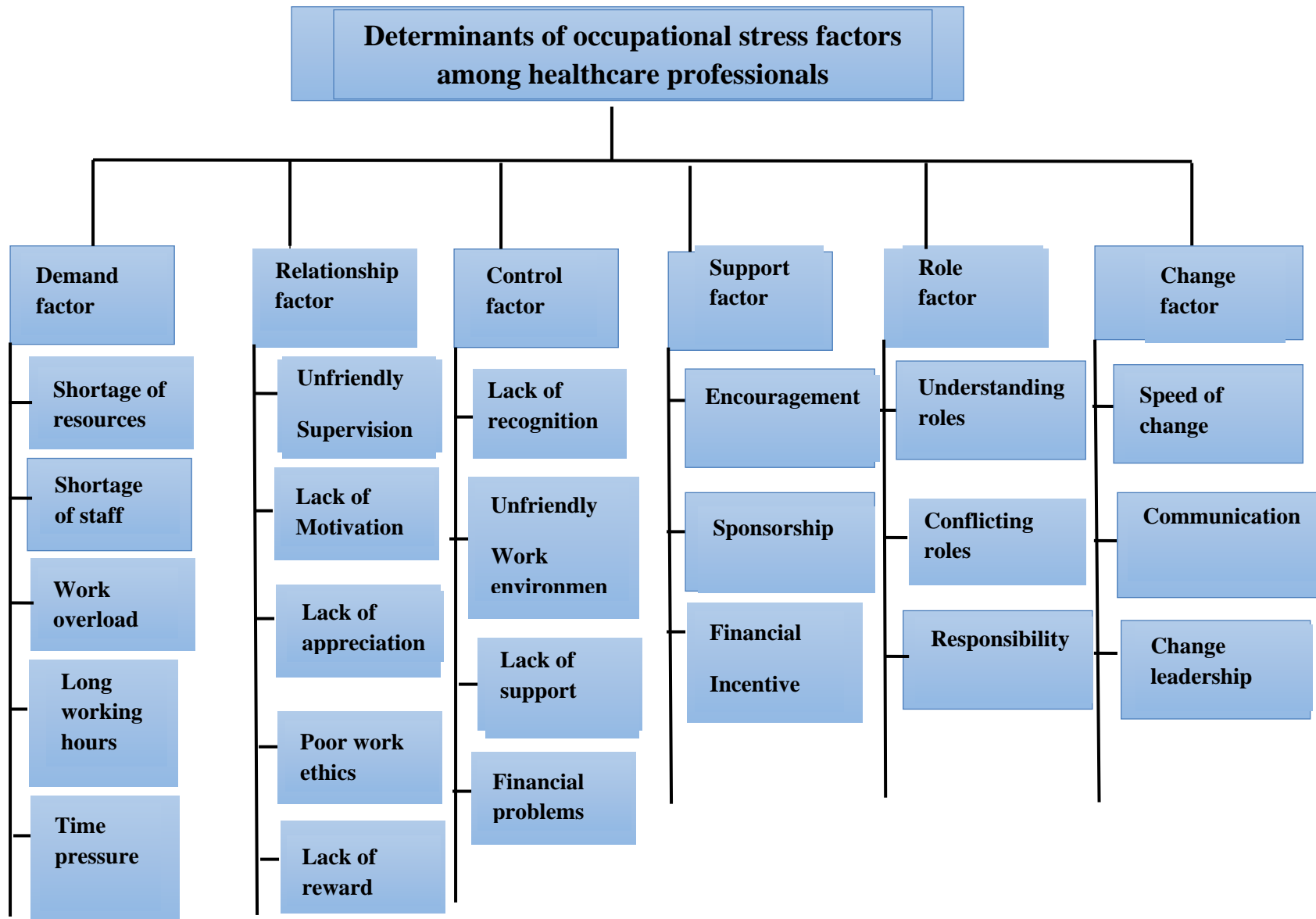
Figure 1. Hierarchical structure of Occupational stress, as adapted from UK Health and Safety Executive's (HSE) and the Management Standards (MS) model of stress

RESULTS

Four hundred (400) copies of questionnaire were administered. Out of these, three hundred and ninety (390) were returned, indicating 97.5% of the administered copies of the questionnaires. In all, 98.9% were found to be useful for analysis. It is necessary to note that analysis was done based on the total number of retrieved questionnaires that were found to be useful and valid.

The demographic characteristics of the respondents reveal that 139 (36%) of the respondents were males, while 247 (64%) were females. Two hundred and sixty-six (266) or 69% of them were between 31 - 50 years of age, while 23 (6%) were within the age bracket of 21-30 years. Similarly, 27 (7%) were above the age of 60 years. In regard to the educational level of respondents, 259 (representing 67%) are B. Sc./MBBS degree holders. Also, an assessment of the working experience of respondent shows that 290 (65%) had put in 6-15years into labor. Also, eighty four (84) of them were doctors, 108 nurses and 194 respondents (50%) fall under the category of other healthcare professionals. All respondents experience work related stress in one way or another. Likewise, Sixty-eight percent (68%) of the respondents revealed that

their experience of stress lasted for 2 to 3 weeks, 17% for a month and 15% lasted just within a week. While the stress lasted, it negatively affected the labor input and ultimately the service delivery of an average health worker.

Comparison matrices

This section of the study presents information on the comparison matrix derived from the questionnaires administered to respondents. Two thousand, seven hundred and two (2702) comparison matrices were obtained from 386 respondents (health care professionals) in the two teaching hospitals selected purposely for this study. These include matrixes for each level of the hierarchy and the reversed judgment matrices when consistency ratio (CR) is >10 %.

For AHP analysis, each comparison matrix must be reduced to 1 for each level of the hierarchy. Therefore, the 2702 matrices were later reduced to seven (7) comparison matrices as shown Table 2.

This was done by using 1/386 ratio, since it is assumed that health care professionals are likewise knowledgeable about their occupational stress factors in the selected teaching hospitals.

Table 2. Reduced matrix for determinants of occupational stress factors among health care professionals

CRITERIA	Demand factor	Relationship factor	Control factor	Support factor	Role factor	Change factor	WEIGHT
Demand factor	1.0000	0.4105	0.3708	0.2252	1.9928	0.2653	0.0956
Relationship Factor	2.4359	1.0000	1.7790	4.0000	3.6000	2.4000	0.3531
Control factor	2.6972	0.5621	1.0000	0.3409	0.2205	2.3429	0.1536
Support factor	0.4072	0.2500	2.9335	1.0000	0.1223	2.4000	0.1616
Role factor	0.5018	0.2778	0.7275	0.3527	1.0000	0.5079	0.0778
Change factor	3.7695	0.4167	0.4268	0.4167	1.9688	1.0000	0.1582
$\lambda_{max} = 6.3204$		CI = 0.0605			CR = 0.0484		

The values found in the last column of Table 2, as denoted by weight, are also known as eigenvector which a direct physical meaning in the interpretation of AHP result. The values determine the participation or weight of those criteria relative to the total results of the goal. Based on the occupational stress factors identified, relationship factor has the weight of 35.31%, relative to the goal. This indicates that a positive evaluation of this factor contributes approximately five times more than that of the role factor (7.78%).

Following the procedure of AHP, there is a need to check for data inconsistencies. The reason for this is to capture enough information to determine whether the health care professionals have been consistent in their choices. The inconsistency index is based on maximum lambda, which is calculated by summing the product of each element in the eigenvector (weight) by the respective column total of the original comparison matrix. Table 3 demonstrates the calculation of the maximum eigenvalue, also called maximum lambda, denoted as (λ_{max}).

Table 3. Calculation of the maximum eigenvalue of the six criteria, with respect to goal which states determinant of occupational stress factors among health care professionals

Criteria	Demand factor	Relationship factor	Control factor	Support factor	Role factor	Change factor
Eigen vector	0.0956	0.3531	0.1536	0.1616	0.0778	0.1582
Total sum	10.8116	2.9171	7.2376	6.3355	8.9044	8.9161
Maximum eigenvalue	{(0.0956*10.8116) + (0.3531*2.9171) + (0.1536*7.2376) + (0.1616*6.3355) + (0.0778*8.9044) + (0.1582*8.9161)}= (1.0336 + 1.0300 + 1.1117 + 1.0238 + 0.6928 + 1.4105) = 6.3024					

The test of consistency is done using the formula:

$CI = (\lambda Max - n)/(n-1)$;

$CI = (6.3024 - 6)(6-1)$

$= 0.3024/5$

$= 0.0605$

In order to verify the Consistency Index (CI), Saaty [23] prescribes what is called the Consistency Ratio (CR), which is determined by dividing the Consistency Index (CI) by Random Index (RI).

The matrix will be considered consistent if the resulting ratio is less than 10%.

The Random Index value is fixed and based on the number of evaluated criteria. In the case of occupational stress factors of health care professionals, the Consistency Ratio for the initial group criteria is

$CR = CI/RI = 0.0605/ 1.25$

$= 0.0484 = 4.8\%$ approx. 5%

The AHP model employed for this study has three levels, namely: The goal, the criteria, and alternatives. The healthcare professionals of the teaching hospitals under study were able to pairwise the occupational stress factors in the order of importance and as they affect their functionality and healthcare service delivery. The analysis of the different levels is shown in Table 4.

Table 4 majorly consist of seven sections in which the first section denoted as part 1 displays average composite priority and relative reference ranking of the criteria with respect to main goal. However, the remaining six sections fall under part 2 of the table 6 displays average composite priority and relative reference ranking of the decision alternatives with respect to each criterion.

The part 1 of the table 5 presents the priorities of the criteria with respect to the main goal of the study, which is to determine the level of occupational stress among healthcare professional in Nigerian teaching hospitals.

This is done by considering six identified causes of stress, adopting appropriate stress models like the new UK Health and Safety Executive's (HSE) and the Management Standards (MS). Based on the perception and pairwise comparison of the occupational stress factor among healthcare professional, the most affected factor is that of relationship factor, with a priority of 0.3531.

Support factor has 0.1616 of priority. Likewise change factor has a priority of 0.1582.

While control factor has a priority of 0.1582, the priority of demand factor is 0. 09956.

The least is the role factor that has a priority of 0.0778.

However, the first section of part 2 of table 4 shows the perception of healthcare professionals, with regards to decision alternatives of the demand factors, using the composite priorities.

The most affected factor of this alternative under the demand factor is shortage of resources, with a priority of 0.2458.

This is followed by the work load, with a priority of 0.2413.

Next is the shortage of staff, with a priority of 0.2249, followed by the pressure of time with priority of 0.1670.

The least affected of the alternative is the long working hours, with priority of 0.1271.

Since the shortage of resources was the most affected factor among the alternatives of the demand factor, it may stop the healthcare professionals from achieving an extra role performance, by losing motivation, commitment and disengagement from the system. To resolve this, there is need for health care managers to provide more   resources for the health care professional. This will help to assuage or eliminate stress in their work place, so that improved performance can be guaranteed. In addition, the second section of part 2 displays the perception of healthcare professionals with regards to decision alternatives of the relationship factors using the composite priorities. The most affected factor of this alternative under the relationship factor is lack of appreciation, with a priority of 0.2753. This is followed by the unfriendly supervisors/boss, with a priority of 0.2563. Next is lack of motivation, with a priority of 0.2104.

While lack of reward has a priority of 0.1472, poor working ethics occupies the least, with 0.1126 priority value.

In considering the perception of healthcare professionals with regards to decision alternatives of the control factors using the composite priorities. The most affected factor of this alternative under control is lack of support from the principal officers of the hospitals, with a priority of 0.3289.

The next is unfriendly working environment, having a priority of 0.3040. Closely following this is the lack of recognition, which has 0.1549 of priority. No Personal growth has a priority of 0.1546, while that of individual financial problem is 0.0576.

Also, the fourth section of part 2 of the table 4 reveals the perception of healthcare professionals with regards to decision alternatives of the support factors using the composite priorities.

The most affected factor of this alternative under support is encouragement, with a priority of 0.5204. Sponsorship has a priority of 0.3124 that of financial incentives is 0.1672. It is evident form the result that more than halves 52% of the contribution to stress through lack of support due to lack of encouragement.

The management of human and facilities in the healthcare sector should encourage their workers always as the healthcare professionals value it most as support factor than can help to reduce the stress on the job.

Moreover, the fifth section of part 2 reveals the perception of healthcare professionals with regards to decision alternatives of the role factors using the composite priorities.

The most affected factor of this alternative understanding is the roles to be performed, with a priority of 0.4899. This is followed by the responsibility that has a priority of 0.2690.

The least affected factor goes to conflict roles, having a priority of 0.2411. This result is reflecting the Nigeria perspective on the role factors as criteria of occupational stress among healthcare professionals. Recruitment workers into hospitals should be based on merit as it is evident from the result that lack of proper understanding of what is expected at work may influences stress more than conflict at work.

The last section of the part 2 shows the perception of healthcare professionals with regards to decision alternatives of the change factors using the composite priorities. The most affected factor of this alternative unawareness is the speed of change, with a priority of 0.7143.

Communication has a priority of 0.2067, while change leadership is the least affected, cornering only a priority of 0.0789.

Furthermore, local priorities (weights) were derived for each of the occupational stress criteria and decision alternatives, with respect to decision criteria, as presented in table 5.

Table 6 shows the individual local weight of occupational stress factors denoted as criteria and the local weight of the decision alternatives with respect to the stress factors criteria. These local weights of the decision criteria and alternatives were subsequently used to calculate the total weight or global weight/priority.

From the result, shortage of resources to work with by healthcare professions is the most dangerous stressor with highest local priority of 0.2458, leading all other alternatives.

This is in line with the psychological view of stress as posited by Lazarus and Folkman [22] been the relationship between an employee and the working environment. As the employee assessed by the person as demanding his or her resources and threatening his or her wellbeing. The resources available for healthcare professionals are in limited supply or at times obsolete in terms of meeting the modern days healthcare service delivery thereby constituting stress to the healthcare professionals.

Figure 2 vertical bar chart denotes the pictorial diagram of the decision alternatives of occupational stress. It is the global priority of each of the alternatives.

From the chart, it can be seen that the alternative speed of change has the longest bar, with priority of 0.1130. This is followed by lack of appreciation, with priority of 0.0966. Unfriendly supervisors or boss has a priority of 0.0905. Encouragement has 0.0841.

Lack of motivation and reward respectively has priorities of 0.0743 and 0.0505. The priority of sponsorship and lack of support from healthcare management is 0.0505.

Likewise, unfriendly working environment, poor work ethics, understanding roles, and communication have priorities of 0.0467, 0.0398, 0.0381 and 0.0327, in that order.

As can also be deciphered from the chart, the shortest bar is that of financial problems as an alternative, with a priority of 0.0088. Long working hours follows, with a priority of 0.0121.

The priorities of change of leadership, time pressure, conflicting roles, responsibility, shortage of staff, work load, shortage of resources, no personal growth and lack of recognition, and financial incentives are 0.0125, 0.0154, 0.0188, 0.0209, 0.0215, 0.0231, 0.0235, 0.0238 and 0.0270, in that order.

These priorities were summed up into one, and as a consequence, they satisfy the law of probability.

Table 4. Combined composite priority and relative reference ranking of the criteria and decision alternatives

Determinant of Occupational stress factors among healthcare professionals	PART 1 Criteria to Goal					
	Demand	Relationship	Control	Support factors	Role factors	Change factors
Pooled average composite priority	0.0956	0.3531	0.1536	0.1616	0.0778	0.1582
Relative reference ranking	5th	1st	4th	2nd	6th	3rd

	PART 2 Decision alternatives to criteria				
Decision alternatives with respect to Demand factors	Shortage of resources	Shortage of staff	Workload	Long working hours	Time pressure
Pooled average composite priority	0.2458	0.2249	0.2413	0.1271	0.1670
Relative reference ranking	1st	3rd	2nd	5th	4th
Decision alternatives with respect to Relationship factors	Unfriendly supervisors	Lack of motivation	Lack of appreciation	Poor work ethics	Lack of reward
Pooled average composite priority	0.2563	0.2104	0.2753	0.1126	0.1472
Relative reference ranking	2nd	3rd	1st	5th	4th
Decision alternatives with respect to Control factors	Lack of recognition	No personal growth	Unfriendly working environment	Lack of support	Financial problems
Pooled average composite priority	0.1549	0.1546	0.3040	0.3289	0.0576
Relative reference ranking	3rd	4th	2nd	1st	5th

Decision alternatives with respect to support factors	Encouragement	Sponsorship	Financial incentives
Pooled average composite priority	0.5204	0.3124	0.1672
Relative reference ranking	1st	2nd	3rd

Decision alternatives with respect to Role factors	Understanding roles	Conflicting roles	Responsibility
Pooled average composite priority	0.4899	0.2411	0.2690
Relative reference ranking	1st	3rd	2nd

Decision alternatives with respect to change factors	Speed of change	Communication	Change leadership
Pooled average composite priority	0.7143	0.2067	0.0789
Relative reference ranking	1st	2nd	3rd

Table 5. Tabular presentation of the decision criteria and alternatives local priority

Criteria	Local Priority	Alternatives	Local Priority
Demand factor	0.0956	Shortage of resources	0.2458
		Shortage of staff	0.2249
		Work overload	0.2413
		Long working hours	0.1271
		Time pressure	0.1610
Relationship factor	0.3531	Unfriendly supervisors	0.2563
		Lack of motivation	0.2104
		Lack of appreciation	0.2735
		Poor work ethics	0.1126
		Lack of reward	0.1472
Control factor	0.1536	Lack of recognition	0.1549
		No personal growth	0.1546
		Unfriendly working environment	0.3040
		Lack of support	0.3289
		Financial problem	0.0576
Support factor	0.1616	Encouragement	0.5204
		Sponsorship	0.3124
		Financial Incentive	0.1672
Role factor	0.0778	Understanding roles	0.4899
		Conflicting roles	0.2411
		Responsibility	0.2690
Change factor	0.1582	Speed of change	0.7143
		Communication	0.2067
		Change of leadership	0.0789

Table 6. Tabular presentation of decision alternatives with their corresponding global weight

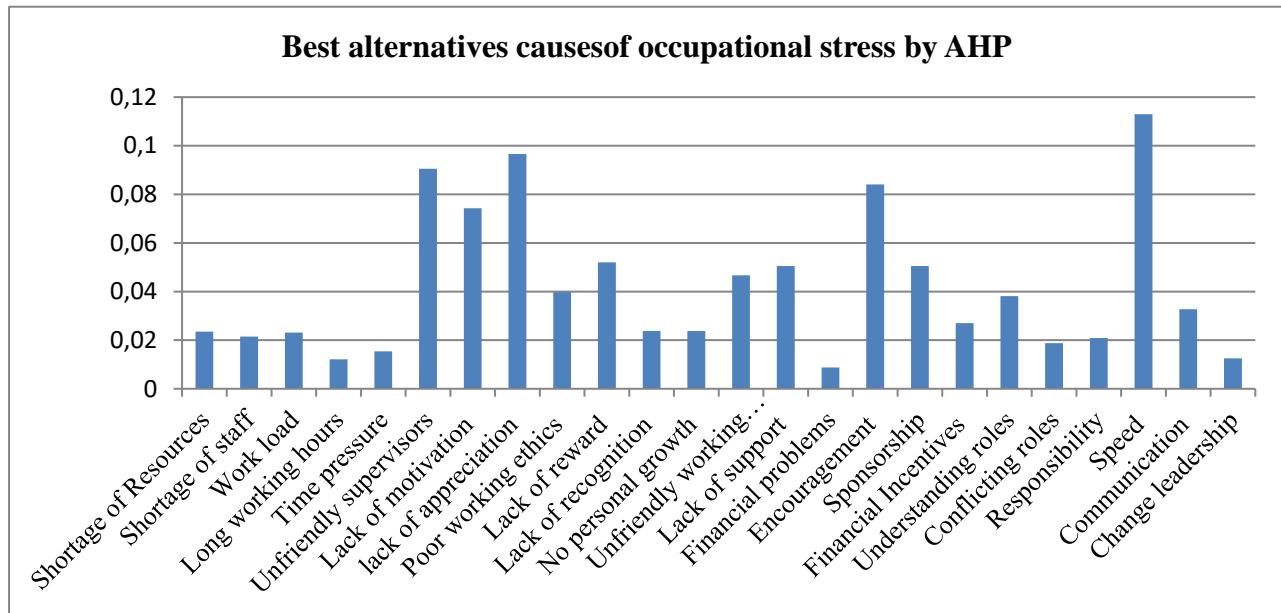| Decision Alternatives	Global weight	Ranking	Decision Alternatives	Global weight	Ranking
Shortage of Resources	0.0235	16th	Unfriendly working environment	0.0467	9th
Shortage of staff	0.0215	18th	Lack of support	0.0505	7th
Work load	0.0231	17th	Financial problems	0.0088	24th
Long working hours	0.0121	23rd	Encouragement	0.0841	4th
Time pressure	0.0154	21st	Sponsorship	0.0505	7th
Unfriendly supervisors	0.0905	3rd	Financial Incentives	0.0270	13th
Lack of motivation	0.0743	5th	Understanding roles	0.0381	11th
lack of appreciation	0.0966	2nd	Conflicting roles	0.0188	20th
Poor working ethics	0.0398	10th	Responsibility	0.0209	19th
Lack of reward	0.0520	6th	Speed of Change	0.1130	1st
Lack of recognition	0.0238	14th	Communication	0.0327	12th
No personal growth	0.0238	14th	Change leadership	0.0125	22nd

Figure 2. Bar chart of the decision alternatives of the occupational stress and their corresponding global weight

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DISCUSSION

The study demonstrated a multi-criteria decision-making analysis for pairwise comparison of occupational stress criteria and alternatives thereby revealing the healthcare profession perspective as well as research driven policy directions in its management in Nigeria. The results revealed that financial factor came out to be a least factor influencing stress of healthcare professionals, contrary to the wide believe that brain drain in the health sector is majorly influenced by financial inducement. No amount of studies conducted on different aspect of occupational stress will be too much since studies have suggested that stress and health are strictly connected [24,25]. Among the five alternatives under the control factor criteria, lack of support is highly prioritised as most influencer of occupational stress among healthcare professionals in Nigeria. This result corroborates the findings of Van-der-Colff and Rothmann [26], using different methodology (factor analysis) in South Africa found out that lack of support from contemporaries at work serve as source of stress for professionals in their working environment. This shows that support from co-workers serves as hygiene factors that employees consider necessary if their working environment (hospitals) will stimulate the best from employees (healthcare professionals).

On the demand factor criteria, shortage of resources, work overload and shortage of staff takes substantial seventy percent (70%) among all the factors influencing stress of healthcare professionals in the hospitals. This is in line with submission of Somaz and Tuglan [6] that workload, job duplications, inadequate resources, among others are responsible for stress. Although using a different methodology, AHP pairwise comparison was able to assign weight to each of factors as they influences demand factor as a criteria stress and ultimately the occupational stress of healthcare professionals in the hospitals. AHP is used in this study owing to it arguably the most well-known and widely used multi-criteria method, which has firm theoretical underpinnings and has been used successfully to help people make better decisions in a wide variety of complex circumstances [27,28], such as the occupational stress management of healthcare professionals in a developing nation like Nigeria.

The results of the study also point out that lack of appreciation and unfriendly supervisor as most stressors with over 50% contribution to relationship stress related factor. This is indicating the training needs for Managers in the health sector for effective motivation of colleagues thereby bring out the best from all categories of healthcare professionals in their role of managing peoples health and life. In all, this study present a comprehensive assessment of occupational stress influences of health professionals in the hospitals using AHP where all categories of healthcare professionals (experts opinion) are duly represented as respondents in the pairwise comparison and judgment process.

The present study however, has the following limitations. First, a unique contribution of this study is ascertain stress factors among healthcare professional in Nigeria and to rank and establish causal relationships among the various stress factors using the Multi-Criteria Decision Making methods (MCDM). There is the need for further empirical work to test the degree to which the findings can be generalized to other industries and countries. Second, the study conducted a survey of only healthcare professionals: future work can be carried out to validate the findings using statistical methods and taking a large sample of respondents.

CONCLUSIONS

1. In comparison with others, the health care profession in Nigeria is highly stressful, mainly to the fact that it has a higher rate of psychological distress.
2. The results reveal that relationship factor has the most significant impact on the stress of healthcare professionals.
3. It finds also that the role factor has the least significant criterion.
4. At the global level of ranking the alternative decision occupational stress factor, speed of change has the highest priority, the least being financial problems.

Conflicts of interest
The authors declare that they have no conflicts of interest.

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