International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 8, Issue 5, 2016

Original Article

ASSESSMENT OF PSYCHOLOGICAL STRESSORS OF DEPRESSION AND ANXIETY USING DEPRESSION ANXIETY STRESS SCALE-21 IN SOUTH INDIAN HEALTHY VOLUNTEERS

ABHILASH THOMAS[1*], SATENDRA K DUBEY[2], MALAY K SAMANTA[3], ANU ALEX[4], SANESH P JOSE[5]

[1,2,3]Department of Pharmaceutical Biotechnology, JSS College of Pharmacy, Ooty 643001 Tamil Nadu India (JSS University, Mysuru), [4]Department of Pharmacology, [5]Department of Pharmacy Practice, JSS College of Pharmacy, Ooty 643001 Tamil Nadu India (JSS University, Mysuru)
Email: abhi0882@gmail.com

Received: 08 Feb 2016 Revised and Accepted: 30 Mar 2016

ABSTRACT

Objective: The objective of this study was to assess the prevalence of the components of psychological stresses like depression, anxiety as a measure of the perception of the stress response (SR) and its influences on physiological functions in healthy human volunteers under various occupational stresses by using depression anxiety stress scale-21 (DASS-21).

Methods: A total of 128 healthy subjects from various sites of Ooty were enrolled in this study, according to the inclusion-exclusion criteria in the study protocol. DASS-21 was administered to the subjects, by 'Questerview' method. The intensity of psychological stresses of depression, anxiety and other mental stress was measured.

Results: The incidence of depression, anxiety and their components such as hopelessness, dysphoria, anhedonia, low self-esteem, autonomic arousal, musculoskeletal symptoms, etc. were found high in both men and women participants. In men blood pressures were 136.16±6.6; 84.34±6.4 and in women 130.5±3.9; 86.48±3.4 as systolic, diastolic respectively. The body temperatures and heart rate were not altered, but the respiratory rate was found significantly elevated. The abdominal breathing was 45.21% in men and 52.77% in women indicated poor adaptation response towards the perception of stress.

Conclusion: The results are concluding high prevalence of moderate to high-level depression and anxiety indicated stress response triggers a cascade producing a series of changes in human vital physiological functions such as blood pressure, respiratory rate, heart rate were significantly higher. We suggest future researchers are potential for the cumulative health benefits of patients in secondary or tertiary level treatment.

Keywords: Psychological stressors, Stress response (SR), Depression anxiety stress scale-21 (DASS-21), Depression, Anxiety, Autonomic Arousal

INTRODUCTION

A stressor is 'any external or internal factors affecting the normal functions of human beings' and a broad spectrum of occupational or sometimes hostile stressors signal threats to the survival or well-being of humans and produces a set of complex, highly orchestrated responses within physiological systems and their functions [1]. Psychological stressors like emotional distress, depression, and anxiety assess the subjective level of stress appraisal and its affective responses [2] will lead to elevated heart rate, blood pressure and respiratory rate [3].

Occupational stress factors like over workload, poor working conditions, poor to environment fit, financial difficulties, high levels of job demand, low levels of job control or decision making latitude, high levels of task uncertainty or technical knowledge and skill and low organizational support or personal recognition to which a person's reactions or responses will vary according to different occasions and along with hostile environmental events such as physical exertion, deprivation of sleep, fatigue, dehydration, irregular food intake, some negative effects on mood changes such as depression, anxiety, drowsiness and euphoric, irritable, or argumentative behaviors [4] will further influenced by their own perception of either a single or a series of stressors result in cumulative [5, 6]. The individual's responses towards occupational stress are a hugely complex network of mediating and moderating factors operating in stress causing elements determine the strength of existing stress enough to elicit a negative impact on an individual [9]. Hence, a stressor could have presented itself in a person, but may not necessarily experience stress, whether work related or just stress in general [7, 8] and stress experienced by an individual may not always be of the same magnitude; sometimes, the encounter event may be perceived as highly stressful and at another time it is just mildly stressful [9].

Decades of research demonstrate that physiological patterns of stress response constitute an integrated pathway through which psychosocial and environmental factors are transmuted into the behavioral, immunologic and autonomic manifestations of human pathology [10]. The principle of stress perception is that stress is a consequence of the interaction between an individual and the environment; here the individual factors are able to act on the environment factors and *vice versa* where people are distressed to the extent of suffering from a range of disorders including anxiety, depression and other stress-related conditions.

DASS were developed by Lovibond and Lovibond as a single instrument to evaluate the severity of core symptoms of depression, anxiety and stress or tension over the previous week in people aged 17 or older [12]. As per the conceptualization of DASS depression is an emotional disorder usually triggered by unfavorable living conditions. DASS-21 contains 7 items for assessing depression 7 items for assessing anxiety and 7 items for assessing stress as the third factor of psychological stress, requires half the time to complete the investigation of symptoms as compared to full version [11]. These 3 subscales of DASS-21 together provide an assessment of emotional disturbances in a broad range of psychological distress symptoms in the three dimensions because they are intercorrelated caused by some common factors and can be used for research and clinical outcome assessment purposes [12].

The each item of DASS-21 comprises a statement and four short response options to reflect the severity and scored from 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time). It was a self-reporting questionnaire with 21 items (seven items for each category) based on a four-point rating scale. Items included, "I found it hard to wind down", "I was aware of dryness of my month" and "I couldn't seem to experience any positive feeling at all". Participants were asked to rate how much of each of the items

(in the form of statements) applied to them over the past week, with "0 = did not apply to me at all" to "3 = applied to me very much, or most of the time". The higher the score, the more severe the emotional distress [13]. On completion of one's answering of each set of question, DASS-21 will indicate individual's symptoms, both to depression and anxiety over the past one week. DASS-21 also has therapeutic use, where it is used to measure the outcome of psychiatric treatment.

The present study aimed to measure the psychological stresses, depression and anxiety by using DASS-21 in selected south Indian healthy volunteers of different occupational environments of Ooty, the Nilgiris district of Tamil Nadu.

MATERIALS AND METHODS

Study design and ethical approval

The protocol for this prospective observational study was designed in compliance with the ethical principles originating in or derived from schedule Y 2005. The study protocol, informed consent form (ICF) and the questionnaire were reviewed and approved by the Institutional Review Board (IRB) (approval no. JSSCP/DPP/ IRB/008B/2013-14). of JSS College of Pharmacy, Ooty.

Study period and sample size

The study was conducted over a period of 6 mo from October 2013 to March 2014. A total of 150 participants were enrolled from different locations of Ooty, the Nilgiris district of Tamil Nadu.

Study subjects

The participants were who have worked at various levels of occupation, such as Government employees, factory workers, workers on daily wages, load transporters, the people working at a construction site, housekeeping staff, salesmen, security persons were participating in the study.

Inclusion and exclusion criteria

The criteria for inclusion of eligible participants were healthy males or females aged 20 to 60 y with normal body mass index and Waist-Hip Ratio. The selected subjects were diagnosed with their clinically relevant abnormalities by the clinical co-investigator who is a medical practitioner, and detailed past medical and medication history were collected. Subjects have any kind of diseases are under treatment for various illness conditions, hypertension, diabetes; risks of cardiovascular and metabolic disorders were excluded. The subjects were also asked about their current and past medication history. Any kind of medicines, including Over the Counter (OTC) drugs, supplemental products, and herbal preparations, the subjects used to take were excluded from the study. Subjects practicing Yoga or meditation were excluded from this study. Subjects who had consulted a doctor for last 60 d for antipsychotic drug therapy or any kind of counseling were also excluded.

Informed consent form (ICF)

Voluntary participation was ensured throughout the study by using a written informed consent form. An English version of written Informed Consent Form contains the aim and objective of the study purpose of the study, type of research, selection criteria (how come the person is selected for the study), description of study drug, dose administration time, description of methodology procedure, sample collection, confidentiality of the subject's rights and information, risk and benefits was prepared and translated to Tamil version. This translated version was given to all the participants and the content was explained verbally in Tamil. The participant's perceptions and doubts were received verbally and clarified. Two copies of an Informed Consent Form were signed by each subject in which one copy was kept in research document file, and another copy was given back to the participant.

Measuring of vital physiological parameters

The participants were undergone for their vital parameters checking 30 min before the questionnaire administration. The subjects were seated with them back supported, legs uncrossed, and feet on the floor. The blood pressure, heart rate, respiratory rate, and breathing pattern readings were taken manually. Repeated readings were recorded at every 15-minute interval and continued up to 1 hour after the questionnaire administration. A total of 7 readings was recorded, and the average values were obtained. The objective of repeated reading was to analyze consecutive levels of vital parameters over a period of time.

Breathing pattern analysis

Subjects were asked to lie down on the bed comfortably. The investigator placed his both hands, one on the subject's chest and the other hand on the abdomen just below the ribcage with palm faced down. The subjects were instructed to breathe normally. The hand movement was noticed to check which hand was moved the most. It is measured that if the hand placed on the abdomen is moving and the hand on the chest was slower or still, then the subject was using the diaphragm and breathing correctly. Similarly, if the hand placed on the subject's chest was found moving and hand on the abdomen was moved slowly or still, it was considered as the subjects were under stressed chest breathing.

DASS-21 questionnaire administration

The English version of DASS-21 was obtained from website www.psy.unsw.edu.au/groups. The permission was taken from the author Peter Lovibond. The Tamil Language version of DASS-21 which was available on the same website translated by Mr. Sugirthan was contacted, and the permission was obtained. The participants were called on to a separate room individually and given the questionnaire. A social worker who was not the part of the study had asked each question to the subject to avoid administer bias. The questionnaire was administered to the participants by 'Questerview' method which is self-explanatory, open, closed to fixed answer questionnaires with face to face, one to one, asking interview method and by using pencil and paper (PAPI) method for self-completion of questionnaires to enable transparency in conveying the true meaning of each question and also to encourage participants to ask doubts and clarifications. The incomplete questionnaires were excluded, and those subjects were not asked for the second time to attend the study. This was to avoid bias in the total data processing and interpretation of results. Out of 150 subjects participated, 128 subjects had found with a complete questionnaire. These questionnaires were put into an envelope for data processing and analysis.

Internal consistency analysis

Internal consistency of the items of DASS-21 was measured using Cronbach's alpha coefficient ranges from 0 to 1 developed by Lee Cronbach in 1951 [14]. The value 0.7 to 0.8 is normal, and up to 0.9 is strongly accepted for alpha when the purpose is related to research.

Test-retest validity assessment

The questionnaire's test-retest validity or reproducibility was obtained by a second-time administration of DASS-21on the selected 20 subjects (>10% of the total participants) after 14 d' time period. A period of 1 to 2 w is often recommended. However, there may be reasons for Shortening or lengthening this time [15]. The objective was to measure whether the same questionnaire answered at the times of second administration have any significant difference from the first time administration or not.

Psychometric property analysis of DASS-21

The emotional states of psychological stress, depression, anxiety and other stress were calculated by summing the individual scores for each question in DASS-21 rate how the individual was feeling in the last week. The scores for each set of DASS-21 contains 7 questions for the 3 subscales scored on a Likert four points (0, 1, 2 and 3) ranging from 0 (Never) to 3 (Almost always) were calculated separately to get a score for depression, anxiety and stress other than depression and anxiety. These four answers for level of severity or frequency of psychological stresses were analyzed based on DASS-21 scoring guidelines in which depression scores are categorized as normal (0-4), mild (5-6), moderate (7-10), severe (11-13), and extremely severe (14 and above); Anxiety scores are

categorized as normal (0-3), mild (4-5), moderate (6-7), severe (8-9) and extremely severe (10 and above); Stress scores are categorized as normal (0-7), mild (8-9), moderate (10-12), severe (13-16) and extremely severe (17 and above).

Psychological stress symptoms analysis in different occupations

For every occupational set of participants, their scoring for each question of subscales of DASS-21 was segregated, and the average and standard deviation values were calculated. The depression symptoms such as dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia and inertia, anxiety symptoms such as autonomic arousal, skeletal musculature effects, situational anxiety and subjective experience of anxious effect and stress symptoms such as difficulty in relaxing, nervous arousal, easily upset/agitated, irritable/over-reactive and impatient were measured. The intensities of each of these symptoms were measured by summing the individual questions which are the measures of symptoms of depression, anxiety and stress in DASS-21.

RESULTS

Out of the total 150 healthy subjects enrolled into this study, 128 subjects were completely responded to all questions in DASS-21. Some subjects were rejected due to the reason of incomplete questionnaires. Among the 128 subjects, 92 were men (71.8%), and 36 were women (28.2%). The average ages for men and women were 35.73±10.57 and 37.25±11.2 respectively. The participant's occupational details are given in table 1 where the distribution of each category people to the total participants was represented by a percentage value. The occupational status shows majority was planters and construction site workers. People working in various factories were also constituted some part of the total participants. Few government employees were also included. The security contributes another major part (n-17) includes men (n-10) and women (n-7). The small scale entrepreneurs, running an own business (n-9) were men, and some other subjects were working in sales (n-12). The 5 unemployed women were a housemaid.

Table 1: Occupational details of the study population

Type of employment	Number of subjects (n-128)	Men (n-92)		Women (n-36)	
		n	%	n	%
Small scale entrepreneurs	9	09	7.03	0	0
Drivers of transport	12	12	9.37	0	0
Government employees	7	3	2.34	4	3.12
Factory workers	15	12	9.37	3	2.34
Construction site workers	19	17	13.29	2	1.56
Housekeeping staff	8	3	2.34	5	3.91
Sales persons	12	7	5.47	5	3.91
Security persons	17	10	7.81	7	5.47
Planters	19	19	14.84	0	0
House made	5	0	0	5	3.91

The vital physiological parameters such as systolic and diastolic blood pressure, heart rate, respiratory rate and body temperature of participants were measured at 7 consecutive time points of 15-minute interval, and the average values were shown in table 2. The average values of systolic blood pressure (SBP) of men in resting state was 136.16±6.6 which was comparatively higher than in women 130.5±3.9. The resting diastolic blood pressure was higher in both men and women 84.34±6.4 and 86.48±3.4 respectively. Their respiratory rates were 24.42±1.5 in men and 22.41±2.2 in women, which are significantly higher at rest state. The body temperatures were found normal; 98.74±1.5 in men and 98.55±1.2 in women. The standard deviation (SD) calculated shows the possible temperature fluctuations due to the cold climatic conditions and associated low oxygen concentrations especially in hill areas of altitude>1500m. The body temperature readings were not changed in subjects, even though the period of the data collection was done in the winter session. The heart rate at rest state was found normal in both genders, but when in comparison with a healthy, normally active person 60 to 72 beats per minute is considered as normal resting state heart rate.

Table 2: Vital physiological parameters

Parameters	Men (n-92)	Women (n-36)
Average Age (SD)	35.73±11.87	37.25±11.75
Resting BP Systolic (SD)	136.16±6.6	130.5±3.9
Resting BP Diastolic (SD)	84.34±6.4	86.48±3.4
Heart Rate (SD)	74.48±1.5	73.6±2.8
Respiratory Rate (SD)	24.42±1.5	22.14±1.8
Body Temperature (SD)	98.74±1.5	98.55±1.2

This assumption was supported by the standard deviation (SD) values of systolic blood pressures in both genders. The upper and lower cut-off points of systolic blood pressure might notify the stress response cascade along with higher respiratory rate and quite a normal heart rate. This was once again proved by the previous researchers and some of the case report studies found that the subjects may not feel their heart beats high, either it might lower closed to normal, but their rate of respiration will be higher. Among the physiological parameters of the participants, systolic and diastolic blood pressures, heart rate and respiratory rate, we seemed to be the valid indicators for measuring the stress responses. In this context, the next step was to measure the breathing pattern otherwise called 'stress adaptation response' of the participants. This was described in table 3 in which the rate of change over of slow chest breathing (stress breathing) to shallow abdominal breathing (relaxed breathing).

Table 3: Breathing pattern analysis

Particulars	Men (n-92)	Women (n-36)
Breathing Pattern-Chest	92	36
Breathing Pattern-Abdomen	41	19
% Abdominal Breathing	45.21	52.77

The analysis showed in table 3 that the number of subjects who had found using abdominal breathing (diaphragmatic breathing) was lesser than chest breathing. The numbers of subjects found using abdominal breathing to chest breathing in both sets of people in both sexes were 45.21% of men and 52.77 % in women. The percentage values of the ratio of abdominal breathing explore the individual physiological adaptation responses towards their stress exposure was poor. The concept of breathing pattern during stress exposure says the subjects will start a higher respiration, but initially, it will be slow chest breathing. This averages that even though the subjects were found in higher respiration, they could neither be relaxed nor their vital physiological functions come down to a normal state as they follow chest breathing. Here the breathing pattern and other increased vital functions which were described in table 2 had a two-way relationship in function. The stress responses were non-compensatory level at indices of cardiovascular and respiratory symptoms.

Reliability analysis was carried out by calculating the Cronbach's Alpha values of individual scores of 50 subjects. The overall Cronbach's Alpha value obtained for each item in DASS-21 was 0.72 that reveal the questionnaire has excellent reliability. Test-retest reliability assessment carried out by scores of 20 subjects. After 14 d, the questionnaire was re-administered by the same method. The scores were subjected to intra-class Pearson correlation coefficient to evaluate their consistency of the questionnaires over the period of time. The Pearson correlation coefficient value for DASS-21was 0.99 states that the time frames in which the questionnaire was re-administered, the measures of stress score values were not changed significantly. Therefore, individual scores of Depression, Anxiety, and Stress subscales were assumed not deviated significantly. The scores on the three subscales of DASS-21 analysis provide different perceived psychological stress factors such as depression, anxiety and stress was described in tables 4, 5 and 6.

Table 4: Psychometric properties of DASS-D (Depression)

Depression (D) scales analysis of DASS-21							
Levels of stress (DASS-21 score)	**Men**			**Women**			**Average score of men and women subjects (SD)**
	n	**Average age (SD)**	**Average score (SD)**	**n**	**Average age (SD)**	**Average score (SD)**	
Normal (0-4)	10	23.53±10.77	2.87±2.78	05	24.88±10.14	2.67±4.70	2.79±4.64
Mild (5-6)	19	27.77±10.12	5.55±4.65	10	40.11±10.22	5.36±5.52	5.48±4.65
Moderate (7-10)	24	39.91±11.44	8.31±4.55	14	44.33±11.01	8.17±7.09	8.27±4.55
Severe (11-13)	32	47.16±11.97	12.42±5.47	07	52.0±04.44	12.5±1.7	12.43±5.48
Extremely severe (+14)	07	48.25±09.57	25.25±6.87	0	0	0	25.25±6.87

Table 5: Psychometric properties of DASS-A (Anxiety)

Anxiety (A) scale analysis of DASS-21							
Levels of stress (DASS-21 score)	**Men**			**Women**			**Average score of Men and Women subjects (SD)**
	n	**Average age (SD)**	**Average score (SD)**	**n**	**Average age (SD)**	**Average score (SD)**	
Normal (0-3)	11	24.0±09.05	2.45±2.79	06	25.33±09.87	2.4±1.9	2.29±0.94
Mild (4-5)	12	25.83±06.45	4.7±4.6	05	34.9±11.52	4.7±0.24	4.7±2.7
Moderate (6-7)	17	29.07±10.22	6.23±4.65	10	39.4±10.14	6.2±0.14	6.42±2.17
Severe (8-9)	25	40.19±11.32	8.42±4.5	12	48.2±08.52	8.4±0.02	8.7±2.04
Extremely severe (10+)	27	48.0±11.97	15.29±5.3	03	52.0±04.11)	12.5±0.72	13.89±4.14

Table 6: Psychometric properties of DASS-S (Stress)

Stress (S) scale analysis of DASS-21							
Levels of stress (DASS-21 score)	**Men**			**Women**			**Average score of men and women subjects (SD)**
	n	**Average age (SD)**	**Average score (SD)**	**n**	**Average age (SD)**	**Average score (SD)**	
Normal (0-7)	32	26.44±11.21	4.5±4.5	14	33.23±11.44	5.7±1.7	4.45±2.57
Mild (8-9)	21	40.10±10.35	8.4±4.5	11	48.2±06.57	8.5±0.12	8.55±3.17
Moderate (10-12)	24	47.57±09.85	11.57±5.3	5	50.0±0	11.04±0.52	11.47±2.91
Severe (13-16)	12	48.57±10.87	13.14±1.12	4	54.0±0	14.97±1.02	14.05±1.07
Extremely severe (17+)	3	47.66±07.55	29.4±2.7	2	0	24.97±4.27	27.19±3.4

According to the DASS-21 subscale score levels, men subjects (n-32, average age 47.16±11.97) were found to have severe levels of depression while women subjects were found (n-14, average age 44.33±11.01) found to be affected by moderate levels of depression (table 4). Table 5 shows the number of subjects and their percentage of the total participants involved under each item of DASS-21 subscales which aimed to measure depression, anxiety and stress. The values were represented according to their intensity and frequency to each perceived symptom. Psychological stresses other than depression and anxiety (DASS-S subscale scores) were also affected severely in both genders. In table 6 DASS-S subscale analysis where the number of subjects distribution to each level of stress seemed to decrease from normal to extremely severe scores was shown. The women subjects were seemed to have moderate depression, severe anxiety, but the other mental stress was normal according to DASS-21.

In the present study, the various occupational status of the participants derives the major causes of depression and anxiety variables in their daily life. When comparing the different psychological stresses like depression, anxiety and stress with the occupational status of participants, the link between works related factors induced mental stress and their impacts on cardiovascular and respiratory indicators such as heart rate, systolic, diastolic blood pressures and respiratory rate were almost clear and linear. Considering the occupational status of the participants in this study,

we found that psychological stress, depression, and anxiety were perceived to women and men in two different manners. Men were found more depressed, and women were found more anxious with no far from both depression and anxiety. The symptoms of depression, anxiety and stress measured through each question of DASS-21 were described in table 7.

Table 7: Psychological stress symptoms analyzed through DASS-21 subscales. Values expressed in number of subjects and percentage in total study population

DASS-21 Subscale	Symptoms	Q no.	Questions in DASS-21	DASS-21 score frequency			
				Never 0	Some times 1	Often 2	Almost Always 3
Depression	Dysphoria	Q13	I felt downhearted and blue	12 (9.37%)	37 (28.91%)	29 (22.66%)	22 (17.19%)
	Hopelessness	Q10	I felt I had nothing to look forward to	8 (6.25%)	35 (27.35%)	33 (25.78%)	24 (18.75%)
	Devaluation of life	Q21	I felt that life was meaningless	9 (7.03%)	27 (21.09%)	41 (32.03%)	23 (17.97%)
	Self-deprecation	Q17	I felt I was not worth much as a person	27 (21.09%)	31 (24.22%)	30 (23.44%)	12 (9.39%)
	Lack of interest/involvement	Q16	I was unable to become enthusiastic about anything	7 (5.47%)	32 (25.0%)	34 (26.56%)	27 (21.09%)
	Anhedonia	Q3	I could not seem to experience any positive feelings at all	14 (10.94%)	24 (18.75%)	41 (32.03%)	21 (16.41%)
	Inertia	Q5	I found it difficult to work up the initiative to do the things.	11 (8.59%)	42 (32.81%)	26 (20.31%)	21 (16.41%)
Anxiety	Autonomic arousal	Q19	I was aware of the action of my heart in the absence of physical exertion (e. g. sense of heart rate increase, heart missing a beat)	12 (9.37%)	39 (30.47%)	28 (21.87%)	21 (16.41%)
		Q2	I was aware of dryness of my mouth	7 (5.47%)	26 (20.31%)	43 (33.59%)	24 (18.75%)
		Q4	I experience breathing difficulty (e. g. excessively rapid breathing, breathlessness in the absence of physical exertion)	7 (5.47%)	37 (28.91%)	29 (22.67 %)	27 (27.09%)
	Skeletal musculature effects	Q7	I experienced trebling in hands	7 (5.47%)	32 (25.0%)	34 (26.56%)	27 (21.09%)
	Situational anxiety	Q9	I was worried about situations in which I might panic and make a fool of myself	12 (9.38%)	40 (31.25%)	34 (26.57%)	14 (10.94%)
	Subjective experience of anxious effect	Q15	I felt that I was close to panic	10 (7.81%)	28 (21.87%)	37 (28.91%)	25 (19.53%)
		Q20	I felt scared without any good reason	9 (7.03%)	37 (28.91%)	35 (27.34%)	19 (14.84%)
Stress	Difficulty in relaxing	Q1	I found it hard to wind down	14 (10.94%)	32 (25.0%)	43 (33.59%)	11 (8.59%)
		Q12	I found it difficult to relax	5 (3.91%)	37 (28.91%)	29 (22.67%)	29 (22.67%)
	Nervous arousal	Q8	I felt that I was using a lot of nervous energy	5 (3.91%)	39 (30.47%)	32 (25.0%)	24 (18.75%)
	Easily upset/agitated	Q11	I found myself getting agitated	12 (9.38%)	29 (22.67%)	32 (25.0%)	27 (21.09%)
	Irritable/over reactive	Q6	I tend to over react to situations	12 (9.38%)	38 (29.67%)	31 (24.22%)	19 (14.84%)
		Q18	I felt that I was rather touchy	10 (7.81%)	37 (28.91%)	29 (22.67%)	24 (18.75%)
	Impatient	Q14	I was intolerant of anything that kept me from getting on with what I was doing	7 (5.47%)	44 (34.38%)	34 (26.56%)	15 (11.72%)

Altogether, Question no. 3, no. 5, no. 10, no. 13, no. 16, measured symptoms like anhedonia, inertia, hopelessness, dysphoria, lack of interest or involvement, respectively with questions no. 17 and no. 21 measured devaluation of life and self-deprecation provided the total scores of depression, anxiety and stress. Depression, anxiety and stress pattern analyzed among different occupations of the study participants were shown in table 7 and the comparison of average values of DASS-depression, DASS-anxiety and DASS-stress scores between different occupational statuses was shown in table 8. As described in table 7, each symptom of depression was measured by single questions in the DASS-21 depression subscale (DASS-D) for them these questions were unique. The participants were reported to have a high prevalence of anhedonia during the period of study, which was measured by question no. 3 'I could not seem to experience any positive feelings at all' and the data showed most of the participants (n-41, 32.03%) had experienced a negative feeling during the past month.

Anxiety and stress symptoms were measured by both single question and the combination of questions collectively they aimed for some symptom. The question no. 2, 4 and 19 were considered for autonomic arousal, there the scores for each 3 questions were summed, and the average and standard deviation values were calculated. The question no 15 and 20 were considered for the subjective experience of anxious effects. Difficulty in relaxing was a symptom of stress in each set of occupation was calculated by considering question no 1 and 12 and question no 6 and 18 were considered for the status of irritability or over reactive to situations. The perception of anxiety on skeletal muscles, autonomic arousal, situational anxiety and subjective experiences of anxious stimuli was also measured.

Table 8: Comparison of average (SD) for DASS-depression, DASS-anxiety and DASS-stress scores between different occupations

DASS-21 Sub Scale	Symptoms	Type of occupation									
		Entrepreneurs (n-9)	Drivers (n-12)	Gov. employees (n-7)	Factory workers (n-15)	Construction workers (n-19)	Housekeeping (n-8)	Sales (n-12)	Security (n-17)	Planters (n-19)	House made (n-5)
Depression	Dysphoria	0.44 ± 0.52	0.08 ± 0.28	0.71 ± 0.49	0.87 ± 0.64	1.05 ± 0.77	1.13 ± 0.35	2.25 ± 0.97	2.17 ± 0.72	1.47 ± 0.91	1.82 ± 0.84
	Hopelessness	0.55 ± 0.72	0.55 ± 0.72	0.58 ± 0.51	0.29 ± 0.49	0.87 ± 0.74	1.52 ± 0.91	1.01 ± 1.07	2.17 ± 0.57	1.77 ± 0.56	1.42 ± 1.02
	Devaluation of life	0.11 ± 0.33	0.54 ± 0.49	0.33 ± 0.49	0.14 ± 0.37	0.53 ± 0.74	1.47 ± 1.02	1.12 ± 1.01	1.92 ± 0.97	1.35 ± 0.87	0.95 ± 0.91
	Self-deprecation	0.55 ± 0.52	0.59 ± 0.67	0.42 ± 0.79	0.53 ± 0.51	1.79 ± 0.85	1.01 ± 0.75	2.33 ± 0.65	1.76 ± 0.83	1.32 ± 0.89	1.24 ± 1.31
	Lack of interest/involvement	0.22 ± 0.44	0.58 ± 0.51	0.42 ± 0.79	0.84 ± 0.82	1.52 ± 0.84	1.62 ± 0.52	1.83 ± 0.72	1.76 ± 0.75	1.42 ± 0.69	1.22 ± 1.01
	Anhedonia	0.55 ± 0.88	0.92 ± 0.91	0.43 ± 0.79	1.33 ± 1.04	2.21 ± 0.85	1.25 ± 0.87	1.67 ± 0.89	1.71 ± 0.67	1.21 ± 1.79	1.62 ± 1.14
	Inertia	0.44 ± 0.72	0.75 ± 0.87	0.71 ± 0.49	1.33 ± 0.82	2.11 ± 0.74	1.87 ± 0.35	1.75 ± 0.97	1.41 ± 0.94	1.37 ± 0.89	1.42 ± 1.14
Anxiety	Autonomic arousal	0.31 ± 0.68	0.17 ± 0.64	0.19 ± 0.69	1.09 ± 0.77	1.47 ± 0.82	1.17 ± 0.74	1.55 ± 0.84	1.45 ± 0.84	1.17 ± 0.87	1.45 ± 0.91
	Skeletal musculature effects	0	0.17 ± 0.39	0.14 ± 0.37	1.01 ± 0.65	1.47 ± 0.96	1.25 ± 0.46	1.42 ± 0.67	2.01 ± 0.71	1.42 ± 0.69	1.21 ± 0.84
	Situational anxiety	0.77 ± 0.83	1.17 ± 0.57	1.57 ± 0.79	0.67 ± 0.49	1.52 ± 0.69	1.12 ± 0.84	1.92 ± 0.91	2.24 ± 0.67	1.57 ± 1.01	1.11 ± 1.01
	Subjective experience of anxious effect	0.39 ± 0.52	0.08 ± 0.48	0.35 ± 0.61	0.67 ± 0.67	1.42 ± 0.77	1.37 ± 0.79	1.83 ± 0.86	1.51 ± 0.91	1.12 ± 0.87	1.22 ± 0.89
	Difficulty in relaxing	1.04 ± 0.77	0.58 ± 0.67	0.52 ± 0.74	0.53 ± 0.81	1.07 ± 0.85	0.94 ± 0.79	1.29 ± 0.87	1.29 ± 0.89	1.13 ± 0.79	1.82 ± 0.92
	Nervous arousal	0.55 ± 0.52	0.47 ± 0.52	0.42 ± 0.79	0.87 ± 0.84	1.42 ± 0.61	1.25 ± 0.71	1.84 ± 0.71	1.82 ± 0.64	1.74 ± 0.81	1.65 ± 1.14
	Easily upset/agitated	0.44 ± 0.89	0.67 ± 0.78	0.42 ± 0.79	0.47 ± 0.64	1.27 ± 0.81	1.12 ± 0.64	2.25 ± 0.62	2.05 ± 1.02	1.69 ± 0.89	2.01 ± 1.22
Stress	Irritable/over reactive	0.67 ± 0.65	0.41 ± 0.61	0.64 ± 0.74	0.83 ± 0.74	1.65 ± 0.81	1.37 ± 0.71	1.92 ± 0.77	1.89 ± 0.78	1.52 ± 0.85	1.31 ± 0.91
	Impatient	0.77 ± 0.67	0.84 ± 0.57	0.42 ± 0.79	1.41 ± 0.82	1.37 ± 0.77	1.25 ± 0.71	1.75 ± 0.62	1.71 ± 0.84	1.37 ± 0.75	1.21 ± 0.84

The stress effects of the sympathetic nervous system cause autonomic arousal, which was responsible for cardiovascular and respiratory stimulation or hyperstimulation was measured by question no. 2 'I was aware of dryness of my mouth,' question no. 4 'my experience breathing difficulty (e. g. Excessively rapid breathing or breathlessness in the absence of physical exertion' and question no. 19 'I was aware of the action of my heart in the absence of physical exertion (e. g. Sense of heart rate increase, heart missing a beat.' The question no. 4 measured breathing difficulty in the form of either excessive or low breathing without any physical exertion was similar to what observed during breathing pattern analysis. It revealed that psychological stress alone can cause an increase in respiratory rate as a compensatory step overcome slow chest breathing.

The effects of anxious situations or stimuli on heartbeat even in the absence of physical activity represented the influence of psychological stress on physiological functions in humans. Question no. 15 'I felt that I was close to panic' and question no. 20 'I felt scared without any good reason' measured subjective experiences of anxious stimuli to different situations. Similarly, question no. 9 'I was worried about situations in which I might panic and make a fool of myself' had a close relationship with situational anxiety perceived at the individual level. Anxiety sometimes depends on upon the individual experiences of their past or present situation in life where the individual had a feeling of the scare of some unknown or known reasons might cause a feeling of 'close to panic' due to their past experience of similar kind of situations or some other conditional exposure of the same stimuli. Psychological stresses other than depression and anxiety were measured by question no. 1, no. 6, no. 8, no. 11, no. 12, no. 14 and no. 18 in DASS-S subscale of DASS-21, in which nervous arousal was similar to hyperstimulation of the nervous system when individual exposed to stress situations. Nervous arousal could be associated after or during exposure to stress induces some kind of irritability or tend to react over thereby individuals became easily upset or rapidly agitated.

In DASS-21 question no.13, 'I felt downhearted, and blue' which is a measure of dysphroia might be due to loneliness in life; together

with depression, it activated Hypothalamic Pituitary Axis (HPA) system. In table 7 the number of participants answered the DASS-21 question no 13 were distributed mostly in the frequency range 1 (sometimes), 2 (often) and 3 (almost always). 37 (28.91%) participants were scored 1, 29 (22.66%) were scored 2 and 22 (17.19%) were scored 3 irrespective of their gender. The content of dysphoria was partially supported by question no. 10 'I felt I had nothing to look forward to' is the symptom of hopelessness, a mediating factor to dysphoria. Another prominent symptom among this study population was inertia. Question no. 5 'I found it difficult to work up the initiative to do the things' measured the level of inertia experienced in subjects whose feelings carried over from one moment to the next triggered by either external or internal stress stimuli. The individual's sensitivity towards stressful events also thought to be another causative factor for inertia in the participants. Anticipated stressful events either by social or psychological origin might have created a negative evaluation by the participants of different occupational status with a low self-esteem.

DISCUSSION

Stress has a close relationship to both depression and anxiety which has been demonstrated in research since decades. Exposure to chronic psychological stressors may lead to the development of either depression or anxiety disorders or both [16]. The distinction between depression and anxiety as stress and as disorders could be done by using DASS-21 because it was made up on a tripartite model of stress, which indicate depression, anxiety and other mental stresses as perceived stimuli [17]. In this study majority of participants were seemed under frequency level 1 (sometimes) and approximately an equal number of participants were under frequency level 2 (often) and 3 (almost always). This data shows subjects had experienced many symptoms of stress and the degree to which their maladaptation to particular work environments and normal daily life were explained as said by the conventional stress theories of 'person-environment fit' and 'demand-control.' The men and women participants were observed with the difference in their stress reactivity, stress buffering and restorative process to enhance resistance against their life stress, including events or daily hassles [18]. These stress reactivity had a longitudinal change which is assumed to be moderated by self-esteem and mediated by hopelessness in both genders according to their negative or dissatisfying relationship with surroundings could result in disruption of work performance and poor organizational appraisal [19].

The research works on cultural adaptations of DASS-21 showed excellent reliability similar to other studies which have been done earlier. This character shall make use of DASS-21 as a measuring tool for occupational physicians to diagnose mental problems in employees working in various occupations and the degree to which employees adhere to work [20]. As the nature of the job and occupational environments had a role in the occurrence of depression, anxiety and the development of similar psychological problems, probably this data of psychological stresses would help them rolling out how the employees react to their stress stimuli in the work field. Moreover, DASS-21 has been suggested by the researchers as a measuring tool to identify depression and anxiety levels in both patients and healthy individuals [21, 22]. It could be the additional benefit of finding out how these people adjust to their work environments. DASS-21 measured general distress symptom which was the non-specific factor of both depression and anxiety in this study. On one side DASS-21 measured the low positive effect of depression and on another side physiological hyperarousal symptom which were thought to be another contributing factor for increased blood pressure, respiratory rate and perhaps heart rate in our participants.

Stress-induced depression and dysphoria can themselves change physiological functions in some instances through altered Hypothalamic Pituitary Axis (HPA) system activity; thereby the physiological functions were increased [23]. Loneliness was thought to be the stress factor which caused dysphoria in house made. Self-conception is similar as self-esteem, a close association with psychological perceptions of emotion presumably caused complex buffering of stress linked to their psychological states, stresses that damage or threaten self-concepts in this population especially individuals with more self-identities that could be measured by this study.

CONCLUSION

Stress is the functional response of a living organism through which they prepare to adapt to situations, and psychological demands have a strong correlation between perceived psychological stress and physiological functions. This psychological stress of their living conditions and work-related stress predispose them towards high levels of stress. As the several studies proved earlier, the subscales of DASS-21 had an excellent affinity towards measuring depression and anxiety which were perceived through negative events from a person's occupation, social and personal background. All these components of psychological stressors identified and measured where the part of the spectrum of human experience in life. The limitation of my study was, we could not collect data on a large number of the population due to the refusal of many subjects to participate. They were either reluctant of signing the informed consent form or refusal due to diverse reasons like 'I am too busy', 'I don't like to share my feelings' even though we explained about data confidentiality. Another limitation was we could not collect data on 'work migration' habits of participants due to stress and its impacts on personal well-being. However, cultural and social issues should be considered in understanding stress as an emotional state, which may predict or aggravate depression and anxiety disorders. This study provides further support for methodology aimed at identifying symptoms of depression, anxiety and stress using a validated instrument like DASS-21 that enables a more accurate diagnosis of these disorders by different professionals outside the field of psychiatry, eliminating the use of different instruments to assess these states.

CONFLICT OF INTERESTS

Declared none

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