



Original Article

Frequency of Anxiety and Depression among Medical Imaging Technologists in Public Hospitals of Lahore

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ABSTRACT

A good psychological health is the base of wellness. Various factors have been identified that can predispose the medical students, nurses, physicians, radiographers, and other health care professionals to depression and anxiety. **Objectives:** To assess the frequency of anxiety and depression in Medical Imaging Technologists working in public hospitals of Lahore. **Methods:** A descriptive cross-sectional study was performed on 150 Medical Imaging Technologists. The sample size was collected by formula and simple random sampling technique was used. Collection of data was done by; a self-administered questionnaire to get demographic data and Hospital Anxiety and Depression (HADS) to assess depression and anxiety in Medical Imaging Technologists. Data analysis was done by using average, standard deviation, percentage, and Chi-square. **Results:** The average age of Medical Imaging Technologists was 30.49 ± 5.314 years. Among 150 participants, 95 (63.3%) were female and 55 (36.7%) were male. 54 (36%) were normal, 43 (28.7%) were borderline abnormal and 53 (35.3%) were abnormally depressed on HADS, and 97 (64.7%) were normal, 37 (24.7%) were borderline abnormal, and 16 (10.7%) were abnormally anxious on HADS. Gender, age, and marital-status were not found to be associated with depression and anxiety. Job-satisfaction, education, modalities, and physical exercise were found to be associated with depression and education and sleeping hours were found to be associated with anxiety. **Conclusions:** Anxiety and depression were common to find in the medical imaging technologists. Job-satisfaction, education, modalities, and physical exercise were associated with depression whereas education and sleeping hours were found to be associated with anxiety.

INTRODUCTION

A good psychological health is the base of wellness. According to comprehensive definition of health by World Health Organization (WHO), health is not only the absence of disease it is a state of complete physical, mental, and social well-being [1]. Around the globe, number of diseases is caused by depression. Pakistan is the 6th most populated country with an approximate population of twenty million people. According to 1999 report of UN, depression was predicted to be 2nd most common disease in both males and female individuals by the year 2020. It is

approximated that 10-44% of the individuals residing in developing countries are living with psychological disorders and near to 50.8 million are suffering from depression [2]. Depression is a psychological disorder in which a person presents with low mood and low energy that affects the thinking, emotions, behavior and sense of well-being of that individual [3]. This psychological disorder is characterized by insomnia, anorexia, tiredness, irritability, less focus, difficulty in decision making and even suicidal ideation [4]. Anxiety is a brain disorder that affects

functioning, cognition and behavior of an individual. According to Epstein anxiety, originate from the understanding of threat; threats to future happiness, threats to self-respect and threats to the decision-making ability of an individual [5]. A number of researches has been conducted in different western countries, as well as in other parts of the world that has presented increased rate of brain disorders i.e., depression and anxiety in medical students [6]. Health Care Workers (HCW) is another population that face psychological morbidities due to different causes of stress i.e. work load, work-setting changes relative to daily work and family obligations [7]. Other stressors that also affect mental health of HCWs and predispose them to depression and anxiety are defense mechanism of an individual and the presence of work related burnout [8]. The individuals who are suffering from Post-Traumatic Stress Disorder (PTSD) are highly vulnerable to develop suicidal thoughts and successful suicide. Health care-workers belong to a risky profession that can predispose them to develop PTSD [9]. A number of researches has been conducted to evaluate the causes of stress among different health care professionals, specifically nursing but literature is short about the evaluation of the risk factors that cause the appearance of stress among radiographers [10]. Health services require a contribution of diagnostic services. X-ray, Computed Tomography (CT-scan), Magnetic Resonance Imaging (MRI), and Ultrasound are the modalities that are used by the radiographers to image body parts and organs for finding out the disease. Accident, emergency, outpatients, operation theatre and wards are the departments where diagnostic radiographers provide the services. Whereas the therapeutic radiographers are those who work in collaboration with doctors, nurses and physicists. As radiographers and their services are an important asset to health care department it is important to assess the stressors that can affect their mental health [11]. Physical, emotional, psychosocial stressful events, and danger of ionizing radiation's harms can affect the happiness, focus, reasoning, decision-making ability and energy of the individuals working as radiographers and eventually develop the psychological instability in them [12]. Along with other health care professionals, radiographers are also expose to multiple stressors. Burden of evaluating the sufferers, increased exposure to patients affected from several infectious diseases, increased work intensity in emergency, high workload, lack of proper staff members, insufficient resources, lack of empathy from administration and senior colleagues consequently predispose the radiographers to develop depression and anxiety. Such mental instability of the radiographers can affect the health services provided by radiographers as

well as lead to their less productivity with higher chances of medical errors [13]. During the time of SARS-CoV-2 infection, it was imperative to ensure the safety of health care workers who were working on the frontlines and various policies were implemented to ensure the safety of health care professionals but still many felt to be at risk to develop the infection. Diagnostic radiographers experienced the same scenario. Researches from around the globe and from the African region presented multiple challenges related to change in flow of work, working environment, strategies, infection control practices, and personal care. All these challenges increase the number of stressors experienced by the radiographers. Along with the presence of aforementioned stressors, the conscious effort to prevent from infection and limited resources made the working environment more stressful for the radiographers. This effect of adapted environment increased the occupational stress, depression and other brain diseases among radiographers [14]. Depression and anxiety have been extensively studied for the populations of medical students, doctors, and nurses. It is important to evaluate the rate of depression and anxiety among the medical imaging technologists working in Public Sector Hospitals. Therefore, the proper policies should be developed to make sure the safety as well as stable brain health status of medical imaging technologists. The objective of this research was to assess the frequency of anxiety and depression in medical imaging technologists working in public hospitals of Lahore.

METHODS

It was a descriptive cross-sectional study. Data were acquired from two public hospitals of Lahore, Lahore General Hospital, and Children Hospital Lahore. The study was completed in a time period of 9 months. Total 150 participants were taken and sample size was calculated by using frequency of anxiety and depression among medical imaging technologists in public hospitals of Lahore through given formula:

$$n = \frac{Z^2 - ak}{d^2} p(1-p)$$

Level of significance (α) = 95%, prevalence of depression among technologists (p) = 52%, precision level (d) = 0.08, Z_2 = 3.84, sample size (n) = 150. The sampling technique was Simple Random Sampling. Imaging Technologists working at any of public hospitals of Lahore with age 25 and more than 25 years and Imaging Technologists with at least B.SC (Hons) MLT degree, who gave their consent to participate in the study were included in the study, whereas, Imaging Technologists having less than one-year professional experience, individuals with any pre-existing psychological illness, death in family six months before, and

Technologists working in DHQ Hospitals were all excluded. A simple demographic sheet was used to collect demographic information, whereas to determine prevalence of depression and anxiety self-reported Hospital Anxiety and Depression Scale (HADS) was used. HADS most commonly used tool to measure the prevalence of psychological disorders in non-psychiatric patients. This standardized scale consists of 14 components and rate each component on 4-point Likert scale ranging from 0-3. This scale consists of two sub-scales to evaluate depression and anxiety. Each sub-scale consists of 7-items. The overall score was the addition of all 14 items, and for depression and anxiety sub-scales, the total ranges from 0-21 that was the sum of the respective seven items. Based on scoring individuals were categorized into normal, borderline cases, and abnormal cases either of depression or anxiety or of both. Data were collected from Imaging Technologists who fulfilled inclusion criteria. For demographic data simple demographic sheet was used whereas to assess prevalence of depression and anxiety standardized self-reporting questionnaire, Hospital Anxiety and Depression scale (HADS) was used. The variables of demographic sheet were gender, age, modality, educational degree, marital status, sleeping status (hours), practice of physical exercise, weekly working hours, and job satisfaction. Data were evaluated and analyzed with the help of the Statistical Package for Social Science (SPSS) version 21.0. For the qualitative variables of demographic sheet i.e., gender, modality, educational degree, marital status, sleeping status (hours), practice of physical exercise, weekly working hours and job satisfaction; percentages were calculated, whereas for the quantitative variable of demographic sheet i.e., age; mean \pm standard deviation was calculated. The included individuals categorized in normal, borderline and abnormal for depression and anxiety on the basis of score on HADS. To find out the association between variables of demographic sheet and psychological disorders i.e., depression and anxiety Chi-square test statistic was used. α -level of significance was set at 0.05 and confidence interval was 95%.

RESULTS

We collected the data from two different tertiary care hospitals; Children Hospital Lahore and Lahore General Hospital by using Hospital Anxiety Depression Scale (HADS) and demographic data sheet to collect demographics of the medical imaging technologists. Total 150 medical imaging technologists participated in our study with average age of 30.49 ± 5.314 years. Among 150 participants, 63.3% were female and 36.7% were male. Majority of medical imaging technologists 81 (54%) had done

Bachelors and 41 (27.3%) were using the MRI. In our research, (63%) participants were satisfied with their job. 43 (28.7%) participants were borderline abnormal, and 53 (35.3%) were abnormally depressed. 37 (24.7%) were borderline abnormal, and 16 (10.7%) were abnormally anxious. Gender, age and marital status were not found to be associated with depression and anxiety whereas education and sleeping hours were found to be associated with anxiety and job satisfaction, education, modalities and physical exercise were found to be associated with depression. According to table 1, 150 Medical Imaging Technologists participated. Among them 95 (63.3%) were female and 55 (36.7%) were male. Out of 150 Medical Imaging Technologists, 83 (55.3%) were in the age range of 25-29 years, 41 (27.3%) were in the age range of 30-34 years, 16 (10.7%) were in the age range of 35-39, and 10 (6.7%) were in the age range of more than 40 years. The education level of medical imaging technologist in this study was 81 (54%) had done Bachelors, 43 (28.7%) Master's degree, and 26 (17.3%) had M.Phil. 27 (18%) Medical Imaging Technologists were using the CT-scan, 41 (27.3%) were using the MRI, 37 (24.7%) were using the ultrasound, 30 (20%) were using the X-rays, 8 (5.3%) were using the angiography, and 7 (4.7%) were using the echocardiography. According to marital status, 67 (44.7%) Medical Imaging Technologists were single and 83 (55.3%) were married. 100 (66.7%) Medical Imaging Technologists were practicing the physical exercise whereas 50 (33.3%) were not practicing physical exercise. 95 (63.3%) Medical Imaging Technologists were satisfied with their job, 48 (32.0%) were not satisfied with their job and 07 (4.7%) did not answer this question. 63 (42%) were working for 35-44 hours/week, 70 (46.7%) were working for 45 - 49 hours/week, and 17 (11.3%) were working for more than 50 hours/week. According to depression level, 54 (36%) medical imaging technologists were normal, 43 (28.7%) were borderline abnormal and 53 (35.3%) were abnormal. To find anxiety among technologists, 97 (64.7%) were normal, 37 (24.7%) were borderline abnormal and 16 (10.7%) were abnormal (Table 1).

| Variables | Frequency (%) | Variables | Frequency (%) |
|------------------|---------------|-----------------------------|---------------|
| Female | 95 (63.3%) | Less than 8 | 31 (20.7%) |
| Male | 55 (36.7%) | 6 to 8 hours | 116 (77.3) |
| Age | | More than 8 | 3 (2.0) |
| 25 - 29 | 83 (55.3%) | Physical Exercise | |
| 30 - 34 | 41 (27.3%) | Yes | 100 (66.7%) |
| 35 - 39 | 16 (10.7%) | No | 50 (33.3%) |
| More than 40 | 10 (6.7%) | Weekly Working Hours | |
| Education | | 35 - 44 | 63 (42.0%) |
| Bachelor | 81 (54.0%) | 45 - 49 | 70 (46.7%) |
| Master | 43 (28.7%) | More than 50 | 17 (11.3%) |
| M.Phil. | 26 (17.3%) | Job Satisfaction | |

| | | | |
|-----------------------|------------|---------------------|------------|
| Modalities | | Yes | 95 (63.3%) |
| CT Scan | 27(18.0%) | No | 48 (32.2%) |
| MRI | 41 (27.3%) | I do not answer | 7 (4.7%) |
| Ultrasound | 37 (24.7%) | Depression | |
| X-rays | 30 (20.0%) | Normal | 54 (36.0%) |
| Angiography | 8 (5.3%) | Borderline abnormal | 43 (28.7%) |
| Echocardiography | 7 (4.7%) | Abnormal | 53 (35.3%) |
| Marital Status | | Anxiety | |
| Single | 67(44.7%) | Normal | 97 (64.7%) |
| Married | 83 (55.3%) | Borderline abnormal | 37 (24.7%) |
| Sleeping Hours | | Abnormal | 16 (10.7%) |

Table1: Distribution of participants in accordance with the Socio-demographic characteristics

To determine the association between, gender, age, modalities, marital status, education, sleeping hours, physical exercise, weekly working hours and job satisfaction with depression and anxiety in medical imaging technologists, Chi-square test- statistic was performed shown in table 2.

| Variables | Depression | Anxiety |
|----------------------|-----------------------------|-----------------------------|
| | Person Chi square (p-value) | Person Chi square (p-value) |
| Job Satisfaction | 14.875 (0.005) | 7.791 (0.100) |
| Age | 5.666 (0.462) | 7.697 (0.261) |
| Gender | 0.515 (0.773) | 2.909 (0.233) |
| Education | 21.501 (0.000) | 10.790 (0.029) |
| Modalities | 25.176 (0.005) | 9.184 (0.515) |
| Marital Status | 3.830 (0.147) | 0.316 (0.854) |
| Sleeping Hours | 8.934 (0.063) | 14.397 (0.006) |
| Physical Exercise | 14.312 (0.001) | 5.138 (0.077) |
| Weekly Working Hours | 9.573 (0.048) | 8.66 (0.070) |

Table 2: Ordered Chi Square for factors associated with mild, moderate and severe depression and Anxiety

There was association between job satisfaction (p = 0.005), education (p = 0.000), modalities (p =0.005), and physical exercise (p = 0.001) with depression level among technologist. According to Chi-square test- statistic, gender (p = 0.773), age (p = 0.462), marital status (p = 0.147) and sleeping hour (p = 0.063) have no relationship with depression There was association found between sleeping hours (p=0.006) and education (p=0.029) with anxiety. Job satisfaction (p = 0.100), gender (p = 0.233), age (p = 0.261), modalities (p = 0.515), marital status (p = 0.854), physical exercise (p = 0.077) and weekly working hours (p = 0.070) have no association with anxiety (Table 3 and 4).

| Job Satisfaction – Depression Cross Tabulation | | | | | Chi-Square Analysis for Job Satisfaction – Depression | | | |
|--|------------|---------------------|----------|-------|---|--------|-----------------------|-------|
| Job Satisfaction | Depression | | | | Value | DF | Asymp. Sig. (2-sided) | |
| | Normal | Borderline abnormal | Abnormal | Total | | | | |
| Yes | 42 | 29 | 24 | 95 | Pearson Chi-Square | 14.875 | 4 | 0.005 |
| No | 10 | 11 | 27 | 48 | Likelihood Ratio | 14.683 | 4 | 0.005 |
| Don't answer | 02 | 03 | 02 | 07 | Linear-by-Linear Association | 8.383 | 1 | 0.004 |
| Total | 54 | 43 | 53 | 150 | N of Valid Cases | 150 | | |

| Education – Depression Cross Tabulation | | | | | Chi-Square Analysis for Education – Depression | | | |
|---|------------|---------------------|----------|-------|--|---------------------|-----------------------|-------|
| Education | Depression | | | | Value | DF | Asymp. Sig. (2-sided) | |
| | Normal | Borderline abnormal | Abnormal | Total | | | | |
| Bachelor | 30 | 33 | 18 | 81 | Pearson Chi-Square | 21.501 ^a | 4 | 0.000 |
| Master | 17 | 08 | 18 | 43 | Likelihood Ratio | 22.174 | 4 | 0.000 |
| M.Phil. | 07 | 02 | 17 | 26 | Linear-by-Linear Association | 7.506 | 1 | 0.006 |
| Total | 54 | 43 | 53 | 150 | N of Valid Cases | 150 | | |

| Modalities – Depression Cross Tabulation | | | | | Chi-Square Analysis for Modalities – Depression | | | |
|--|------------|---------------------|----------|-------|---|---------------------|-----------------------|-------|
| Modalities | Depression | | | | Value | DF | Asymp. Sig. (2-sided) | |
| | Normal | Borderline abnormal | Abnormal | Total | | | | |
| CT-Scan | 15 | 05 | 07 | 27 | Pearson Chi-Square | 25.176 ^a | 10 | 0.005 |
| MRI | 14 | 14 | 13 | 41 | Likelihood Ratio | 23.489 | 10 | 0.009 |
| Ultrasound | 16 | 10 | 11 | 37 | Linear-by-Linear Association | 4.008 | | 0.045 |
| X-Rays | 05 | 06 | 19 | 30 | N of Valid Cases | 150 | 1 | |
| Angiography | 01 | 06 | 01 | 8 | | | | |
| Echocardiography | 03 | 02 | 02 | 7 | | | | |
| Total | 54 | 43 | 53 | 150 | | | | |

CT= Computed Tomography MRI= Magnetic Resonance Imaging DF= Degree of Freedom

Table 3: Chi-Square analysis for Depression and Anxiety with different variables

| Physical Exercise – Depression Cross Tabulation | | | | | Chi-Square Analysis for Physical Exercise – Depression | | | |
|---|------------|---------------------|----------|-------|--|---------------------|-----------------------|-------|
| Physical Exercise | Depression | | | | Value | DF | Asymp. Sig. (2-sided) | |
| | Normal | Borderline abnormal | Abnormal | Total | | | | |
| Yes | 43 | 43 | 25 | 100 | Pearson Chi-Square | 14.312 ^a | 2 | 0.001 |
| No | 11 | 11 | 28 | 50 | Likelihood Ratio | 14.155 | 2 | 0.001 |
| Total | 54 | 54 | 53 | 150 | Linear-by-Linear Association | 12.552 | 1 | 0.000 |
| | | | | | N of Valid Cases | 150 | | |

| Education – Anxiety Cross tabulation | | | | | Chi-Square analysis for Education – Anxiety | | | |
|--------------------------------------|---------|---------------------|----------|-------|---|---------------------|-----------------------|-------|
| Education | Anxiety | | | | Value | DF | Asymp. Sig. (2-sided) | |
| | Normal | Borderline abnormal | Abnormal | Total | | | | |
| Bachelor | 44 | 24 | 13 | 81 | Pearson Chi-Square | 10.790 ^a | 4 | 0.029 |
| Master | 31 | 9 | 3 | 43 | Likelihood Ratio | 13.370 | 4 | 0.010 |
| M.Phil. | 22 | 4 | 0 | 26 | Linear-by-Linear Association | 10.616 | 1 | 0.001 |
| Total | 97 | 37 | 16 | 150 | N of Valid Cases | 150 | | |

| Sleeping hours- Anxiety Cross tabulation | | | | | Chi-Square analysis for Education- depression | | | |
|--|---------|---------------------|----------|-------|---|---------------------|-----------------------|-------|
| Sleeping Hours | Anxiety | | | | Value | DF | Asymp. Sig. (2-sided) | |
| | Normal | Borderline abnormal | Abnormal | Total | | | | |
| | | | | | Pearson Chi-Square | 14.397 ^a | 4 | 0.006 |
| Less than 8 | 21 | 10 | 0 | 31 | Likelihood Ratio | 13.620 | 4 | 0.009 |
| More than 8 | 1 | 0 | 2 | 3 | Linear-by-Linear Association | 3.539 | 1 | 0.060 |
| More than 8 | 1 | 0 | 2 | 3 | | | | |
| Total | 97 | 37 | 16 | 150 | N of Valid Cases | 150 | | |

CT= Computed Tomography MRI= Magnetic Resonance Imaging DF= Degree of Freedom

Table 4: Chi-Square analysis for Depression and Anxiety with different variables

DISCUSSION

Anxiety and depression among medical imaging technologists has extensive effects on the technologists and society. Burden of evaluating the patients, increased exposure to patients affected from several infectious diseases, emergency increased work intensity, lack of proper staff members, insufficient resources, lack of empathy from administration and senior colleagues consequently predispose the radiographers to develop depression and anxiety. Medical students as well as the residents suffer from different psychological morbidities i.e. depression, anxiety and burnout [15]. Around the globe, anxiety is a frequent mental illness among medical students. The severity of problematic anxiety ranges from twenty-five to forty percent in undergraduate medical students and has a negative effect on grades and success of students [16]. Burnout is a mental morbidity that arises in the workplace of prolonged work-related stress. The classical characteristics of burnout are emotional disturbance, lack of interest towards sufferers or colleagues and feelings of personal lack of efficiency. The burnout not only affects the health of the physician, also effects negatively the quality of health care services. Depression, anxiety, substance abuse, and suicidal ideation are associated with burnout of physician. All these condition affects the efficiency of physician and provide the base of medical errors [17]. In this research, we used the HADS to assess the rate of depression and anxiety among medical imaging technologists. In a study conducted by Kebede *et al.*, data was also collected from two hundred and seventy-three medical students by using Hospital anxiety and depression scale (HADS) to evaluate anxiety and depression [18, 19]. In our study, there was no association ($p=0.233$) between gender and anxiety was found but, in a study, conducted by Kebede *et al.*, anxiety was significantly associated with gender [20]. In our study, there was no association ($p=0.773$) between gender and depression was found. In another study conducted by Alvi *et al.*, there was no significant association of depression with gender [21]. But a study conducted by Ahmadi *et al.*,

reported a higher prevalence of depression in medical students as compared to general population and female students were found to have severe depression as compared to men [22]. Another study conducted Pappa *et al.*, on medical students' depression and anxiety was found to be associated with gender [23]. In our research, there was no association of marital status with depression and anxiety whereas job-satisfaction was associated depression. Whereas in a study conducted by van de Venter *et al.*, marital-status and lack of job satisfaction both were positively correlated with depression. The correlation of anxiety was found with marital status [17]. In our study, there was association ($p = 0.000$) between education and depression. And there was association ($p = 0.029$) of education with anxiety. In a study conducted by Sarhan *et al.*, education level was associated with the appearance of depressive symptoms [14]. In this study, out of one hundred and fifty (150) medical imaging technologists 31 (20.7%) were sleeping for less than 8 hours, 116 (77.3%) were sleeping for 6-8 hours, and 3 (2%) were sleeping for more than 8 hours. In our study, there was no association ($p = 0.063$) between sleeping hour and depression. While there was association ($p = 0.006$) between sleeping hours and anxiety. In a study conducted by Moutinho *et al.*, more than seventy percent of the doctors were found to have disturbed sleep, depression and anxiety during the SARS-CoV-2 infection [24]. In a study conducted by Brito *et al.*, older age, to be a nurse, and providing health care services in outer emergency medical team were found to be associated with quality of sleep [25, 26]. In our study, 54 (36%) medical imaging technologists were normal, 43 (28.7%) were borderline abnormal, and 53 (35.3%) were abnormal for depression; whereas 97 (64.7%) were normal, 37 (24.7%) were borderline abnormal, and 16 (10.7%) were abnormal for anxiety. We did not find association ($p=0.462$) between age and depression as well as between age and anxiety ($p = 0.261$). We also found association ($p = 0.000$) between education and depression; whereas association ($p = 0.029$) between education and anxiety. In a study conducted by Ngasa *et al.*, 34.6% of medical students were suffering from mild depression, 26.4% from moderate, 3.4% from moderately severe, and 0.80% from severe depression [27]. In a study conducted by Shao *et al.*, the prevalence of depression was 57.5% and anxiety 30.8% in medical students. The individuals of older age were found to have severe depression and anxiety. In their study depression and anxiety was found in those individuals who were experiencing disturbed sleep [28].

CONCLUSIONS

Our study revealed a considerable frequency of depression and anxiety among medical imaging technologists.

Depression was significantly associated with the factors of job satisfaction, education, type of modalities, and physical exercise. A considerable association of anxiety was found with factors of education and sleeping hours. In order to reduce depression and anxiety and improve the overall well-being of imaging technologists, it is recommended to perform regular psychological assessments of medical imaging technologists to screen out the individuals with risk factors.

Conflicts of Interest

The authors declare no conflict of interest

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ABSTRACT

Background: A good psychological health is the base of wellness. Various factors have been identified that can predispose the medical students, nurses, physicians, radiographers and other health care professionals to depression and anxiety.

Objective(s): The objective of this research is to assess the frequency of anxiety and depression in medical imaging technologists working in public hospitals of Lahore.

Methodology: A descriptive cross-sectional study was performed on one hundred and fifty (150) medical imaging technologists. Data collection was done from two different public hospitals in Lahore. The sample size was collected by formula and simple random sampling technique was used. Collection of data was done by a self-administered questionnaire to get demographic data and Hospital Anxiety and Depression (HADS) to assess depression and anxiety in medical imaging technologists. Using average, standard deviation, percentage and Chi-square did data analysis.

Results: The average age of medical imaging technologists was 30.49 ± 5.314 years. Among 150 participants, 95 (63.3%) were female and 55 (36.7%) were male. 54 (36%) were normal, 43 (28.7%) were borderline abnormal and 53 (35.3%) were abnormally depressed on HADS and 97 (64.7%) were normal, 37 (24.7%) were borderline abnormal and 16 (10.7%) were abnormally anxious on HADS. Gender, age, marital-status and were not found to be associated with depression and anxiety. Job-satisfaction, education, modalities, and physical exercise were found to be associated with depression and education and sleeping hours were found to be associated with anxiety.

Conclusion(s): Anxiety and depression were common to find in the medical imaging technologists. Job-satisfaction, education, modalities, and physical exercise were associated with depression whereas education and sleeping hours were found to be associated with anxiety.

INTRODUCTION

A good psychological health is the base of wellness. According to comprehensive definition of health by World Health Organization health is not only the absence of disease it is a state of complete physical, mental, and social well-being.¹ Around the globe, number of diseases is caused by depression. Pakistan is the 6th most populated country with an approximate population of two twenty million people. According to 1999 report of UN, depression was predicted to be 2nd most common disease in both males and female individuals by the year 2020. It is approximated that 10-44% of the individuals residing in developing countries are living with psychological disorders and near to 50.8 million are suffering from depression.²

Depression is a psychological disorder in which a person present with low mood and low energy that affects the thinking, emotions, behavior and sense of well-being of that individual.³ This psychological disorder is characterized by insomnia, anorexia, tiredness, irritability, less focus, difficulty in decision making and even suicidal ideation.⁴

Anxiety is a brain disorder that affects functioning, cognition and behavior of an individual. According to Epstein anxiety, originate from the understanding of threat; threats to future happiness, threats to self-respect and threats to the decision-making ability of an individual.⁵

A number of researches has been conducted in different western countries, as well as in other parts of the world that has presented increased rate of brain disorders i.e. depression and anxiety in medical students.⁶ Health care workers (HCW) is another population that face psychological morbidities due to different causes of stress i.e. work load, work-setting changes relative to daily work and family obligations.⁷ Other stressors that also affect mental health of HCWs and predispose them to depression and anxiety are defense mechanism of an individual and the presence of work-related burnout.⁸

The individuals who are suffering from post-traumatic stress disorder (PTSD) are highly vulnerable to develop suicidal thoughts and successful suicide. Health care-workers belong to a risky profession that can predispose them to develop PTSD.⁹ A number of researches has been conducted to evaluate the causes of stress among different health care professionals, specifically nursing but literature is short about the evaluation of the risk factors that cause the appearance of stress among radiographers.¹⁰

Health services require a contribution of diagnostic services. X-ray, Computed Tomography (CT-scan), Magnetic Resonance Imaging (MRI) and Ultrasound are the modalities that are used by the radiographers to image body parts and organs for finding out the disease. Diagnostic and Therapeutic Radiographers are the two categories of Radiographers. Accident and emergency, outpatients, operation theatre and wards are the departments where diagnostic radiographers provide the services. Whereas the therapeutic radiographers are those who work in collaboration with doctors, nurses and physicists. As radiographers and their services are an important asset to health care department it is important to assess the stressors that can affect their mental health.¹¹

Radiographers have to deal and handle the ionizing radiations and that lead to exposure of radiographers to physical ionizing radiation harms. Exposure to absorbed and ionized rays can cause short-term complications including skin burns as well as optic issues and long-term complications e.g., malignancies as well as sterility. Physical, emotional, psychosocial stressful events and danger of ionizing radiation's harms can affect the happiness, focus, reasoning, decision making ability and energy of the individuals working as radiographers and eventually develop the psychological instability in them.¹²

Along with other health care professionals' radiographers are also expose to multiple stressors. Burden of evaluating the sufferers, increased exposure to patients affected from several infectious diseases, increased work intensity in emergency, high work load, lack of proper staff members, insufficient resources, lack of empathy from administration and senior colleagues consequently predispose the radiographers to develop depression and anxiety. Such mental instability of the radiographers can affect the health services provided by radiographers as well as lead to their less productivity with higher chances of medical errors.¹³

Sample size n 150

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Sampling Technique:

The sampling technique was Simple random sampling.

Sample Selection:

Inclusion Criteria:

- Imaging Technologists working at any of two public hospitals of Lahore i.e., Lahore General Hospital and Children Hospital Lahore.
- Imaging Technologists with age 25 and more than 25 years.
- Imaging Technologists with at least B.SC (Hons) MIT degree.
- Imaging Technologists who gave their consent to participate in the study.

Exclusion Criteria:

- Imaging Technologists having less than one-year professional experience
- Any preexisting psychological illness, death in family six months before.
- Technologists working in DHQ Hospitals.

Equipment(s): A simple demographic sheet was used to collect demographic information, whereas to determine prevalence of depression and anxiety self-reported Hospital Anxiety and Depression Scale (HADS) was used. HADS most commonly used tool to measure the prevalence of psychological disorders in non-psychiatric patients. This standardized scale consists of fourteen (14) components and rate each component on 4-point Likert scale ranging from 0-3. This scale consists of two sub-scales to evaluate depression and anxiety. Each sub-scale consists of 7-items. The overall score was the addition of all fourteen (14) items, and for depression and anxiety sub-scales the total ranges from 0-21 that was the sum of the respective seven (7) items. On the basis of scoring individuals were categorized into normal, borderline cases, and abnormal cases either of depression or anxiety or of both.

ETHICAL CONSIDERATION:

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The rules and regulations set by the ethical committee of The University of Lahore were followed.

- Written informed consent was taken from all the participants.
- All information and data collection were kept confidential.
- The subjects were informed that there are no disadvantages or risk on the procedure of the study.
- They were also be informed that they will be free to withdraw at any time during the process of the study.

DATA COLLECTION PROCEDURE:

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After approval from Ethical Review Board of The University of Lahore data was collected from Imaging

Technologists who fulfilled inclusion criteria. For demographic data simple demographic sheet was used whereas to assess prevalence of depression and anxiety standardized self-reporting questionnaire, Hospital Anxiety and Depression scale (HADS) was used. The variables of demographic sheet were gender, age, modality, educational degree, marital status, sleeping status (hours), practice of physical exercise, weekly working hours, and job satisfaction.

DATA ANALYSIS PROCEDURE

Data was evaluated and analyzed with the help of the Statistical Package for Social Science (SPSS) version 21. For the qualitative variables of demographic sheet i.e., gender, modality, educational degree, marital status, sleeping status (hours), practice of physical exercise, weekly working hours and job satisfaction; percentages were calculated, whereas for the quantitative variable of demographic sheet i.e., age; mean \pm standard deviation was calculated. The included individuals categorized in normal, borderline and abnormal for depression and anxiety on the basis of score on HADS. To find out the association between variables of demographic sheet and psychological disorders i.e., depression and anxiety Chi-square test statistic was used. α -level of significance was set at 0.05 and confidence interval was 95%.

RESULT

We collected the data from two different tertiary care hospitals: Children Hospital Lahore and Lahore General Hospital by using Hospital Anxiety Depression Scale (HADS) and demographic data sheet to collect demographics of the medical imaging technologists. Total one hundred and fifty (150) medical imaging technologists participated in our study with average age of 30.49 ± 5.314 years. Among 150 participants 63.3% were female and 36.7% were male. Majority of medical imaging technologists 81 (54%) had done Bachelors and 41 (27.3%) were using the MRI. In our research, (63%) participants were satisfied with their job. 43 (28.7%) participants were borderline abnormal, and 53 (35.3%) were abnormally depressed. 37 (24.7%) were borderline abnormal, and 16 (10.7%) were abnormally anxious. Gender, age and marital status were not found to be associated with depression and anxiety whereas education and sleeping hours were found to be associated with anxiety and job satisfaction, education, modalities and physical exercise were found to be associated with depression.

According to table 1, one hundred and fifty (150) medical imaging technologists participated. Among them 95 (63.3%) were female and 55 (36.7%) were male. Out of one hundred and fifty (150) medical imaging technologists, 83 (55.3%) were in the age range of 25-29 years, 41 (27.3%) were in the age range of 30-34 years, 16 (10.7%) were in the age range of 35-39, and 10 (6.7%) were in the age range of more than 40

years. The education level of medical imaging technologist in this study was 81 (54%) had done Bachelors, 43 (28.7%) had done Master, 26 (17.3%) had done M.Phil. 27(18%) medical imaging technologists were using the CT-scan, 41 (27.3%) were using the MRI, 37 (24.7%) were using the ultrasound, 30 (20%) were using the X-rays, 8 (5.3%) were using the angiography and 7 (4.7%) were using the echocardiography According to marital status, 67 (44.7%) medical imaging technologists were single and 83 (55.3%) were married. 100 (66.7%) medical imaging technologists were practicing the physical exercise whereas 50 (33.3%) were not practicing physical exercise.95 (63.3%) medical imaging technologists were satisfied with their job, 48 (32.0%) were not satisfied with their job and 7 (4.7%) did not answer this question. 63

Table1: Distribution of participants in accordance with the Sociodemographic Characteristics

| Variables | Frequency | Percent | Variables | Frequency | Percent |
|-----------------------|-----------|---------|-----------------------------|-----------|---------|
| Female | 95 | 63.3 | Less than 8 | 31 | 20.7 |
| Male | 55 | 36.7 | 6 to 8 hours | 116 | 77.3 |
| Age | | | More than 8 | 3 | 2.0 |
| 25 – 29 | 83 | 55.3 | Physical Exercise | | |
| 30 – 34 | 41 | 27.3 | Yes | 100 | 66.7 |
| 35 – 39 | 16 | 10.7 | No | 50 | 33.3 |
| More than 40 | 10 | 6.7 | Weekly Working Hours | | |
| Education | | | 35 – 44 | 63 | 42.0 |
| Bachelor | 81 | 54.0 | 45 – 49 | 70 | 46.7 |
| Master | 43 | 28.7 | More than 50 | 17 | 11.3 |
| M.Phil. | 26 | 17.3 | Job Satisfaction | | |
| Modalities | | | Yes | 95 | 63.3 |
| CT Scan | 27 | 18.0 | No | 48 | 32.2 |
| MRI | 41 | 27.3 | I do not answer | 7 | 4.7 |
| Ultrasound | 37 | 24.7 | Depression | | |
| X-rays | 30 | 20.0 | Normal | 54 | 36.0 |
| Angiography | 8 | 5.3 | Borderline abnormal | 43 | 28.7 |
| Echocardiography | 7 | 4.7 | Abnormal | 53 | 35.3 |
| Marital Status | | | Anxiety | | |
| Single | 67 | 44.7 | Normal | 97 | 64.7 |
| Married | 83 | 55.3 | Borderline abnormal | 37 | 24.7 |
| Sleeping Hours | | | Abnormal | 16 | 10.7 |

(42%) were working for 35-44 hours/week, 70 (46.7%) were working for 45-49 hours/week, and 17 (11.3%) were working for more than 50 hours/week.

. According to depression level, 54 (36%) medical imaging technologists were normal, 43 (28.7%) were borderline abnormal and 53 (35.3%) were abnormal. To find anxiety among technologists, 97 (64.7%) were normal, 37 (24.7%) were borderline abnormal, and 16 (10.7%) were abnormal.

To determine the association between, gender, age, modalities, marital status, education, sleeping hours, physical exercise, weekly working hours and job satisfaction with depression and anxiety in medical imaging technologists, Chi-square test- statistic was performed shown in table 2.. There was association

between job satisfaction (p=0.005), education (p=0.000), modalities (p=0.005) and physical exercise

Table 2: Ordered Chi Square for factors associated with mild, moderate and severe depression and Anxiety among medical imaging technologists in public hospitals of Lahore.

| Variables | Depression | | Anxiety | |
|----------------------|-------------------|---------|-------------------|---------|
| | Person Chi square | P value | Person Chi square | P value |
| Job Satisfaction | 14.875 | 0.005 | 7.791 | 0.100 |
| Age | 5.666 | 0.462 | 7.697 | 0.261 |
| Gender | 0.515 | 0.773 | 2.909 | 0.233 |
| Education | 21.501 | 0.000 | 10.790 | 0.029 |
| Modalities | 25.176 | 0.005 | 9.184 | 0.515 |
| Marital Status | 3.830 | 0.147 | .316 | 0.854 |
| Sleeping Hours | 8.934 | 0.063 | 14.397 | 0.006 |
| Physical Exercise | 14.312 | 0.001 | 5.138 | 0.077 |
| Weekly Working Hours | 9.573 | 0.048 | 8.66 | 0.070 |

(p=0.001) with depression level among technologist given in table 4, 6, 8 and 10 respectively .

According to Chi-square test- statistic, gender (p=0.773), age (p=0.462), marital status (p=0.147) and sleeping hour (p=0.063) have no relationship with depression.

There was association found between sleeping hours (p=0.006) and education (p=0.029) with anxiety shown in table 12 and 14.

Job satisfaction (p=0.100), gender (p=0.233), age (p=0.261), modalities (p=0.515), marital status (p=0.854), physical exercise (p=0.077) and weekly working hours (p=0.070) have no association with anxiety.

Table 3: Job satisfaction- Depression Cross tabulation

| | | Depression | | | |
|------------------|--------------|------------|---------------------|----------|-------|
| | | Normal | Borderline abnormal | Abnormal | Total |
| Job Satisfaction | Yes | 42 | 29 | 24 | 95 |
| | No | 10 | 11 | 27 | 48 |
| | Don't answer | 2 | 3 | 2 | 7 |
| Total | | 54 | 43 | 53 | 150 |

Table 4: Chi- Square Analysis for Job satisfaction - Depression

| | Value | Df | Asymp. Sig. (2-sided) |
|------------------------------|--------|----|-----------------------|
| Pearson Chi-Square | 14.875 | 4 | .005 |
| Likelihood Ratio | 14.683 | 4 | .005 |
| Linear-by-Linear Association | 8.383 | 1 | .004 |
| N of Valid Cases | 150 | | |

Table 5: Education – Depression Cross-tabulation

| | | Depression | | | |
|-----------|----------|------------|---------------------|----------|-------|
| | | Normal | Borderline abnormal | Abnormal | Total |
| Education | Bachelor | 30 | 33 | 18 | 81 |
| | Master | 17 | 8 | 18 | 43 |
| | M.Phil. | 7 | 2 | 17 | 26 |
| Total | | 54 | 43 | 53 | 150 |

| | | Depression | | | |
|------------|-------------|------------|---------------------|----------|-------|
| | | Normal | Borderline abnormal | Abnormal | Total |
| Modalities | CT-SCAN | 15 | 5 | 7 | 27 |
| | MRI | 14 | 14 | 13 | 41 |
| | Ultrasound | 16 | 10 | 11 | 37 |
| | X-rays | 5 | 6 | 19 | 30 |
| | Angiography | 1 | 6 | 1 | 8 |

| | | | | | |
|-------|------------------|----|----|----|-----|
| | Echocardiography | 3 | 2 | 2 | 7 |
| Total | | 54 | 43 | 53 | 150 |

Table 6: Chi- Square Analysis for Education – Depression

Table 7 : Modalities- Depression Cross-tabulation

| | Value | Df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 25.176 ^a | 10 | .005 |
| Likelihood Ratio | 23.489 | 10 | .009 |
| Linear-by-Linear Association | 4.008 | 1 | .045 |
| N of Valid Cases | 150 | | |

Table 08: Chi- Square Analysis for Modalities - Depression

| | | Depression | | | Total |
|-------------------|-----|------------|---------------------|----------|-------|
| | | Normal | Borderline abnormal | Abnormal | |
| Physical Exercise | Yes | 43 | 32 | 25 | 100 |
| | No | 11 | 11 | 28 | 50 |
| Total | | 54 | 43 | 53 | 150 |

Table 09: Physical exercise- Depression Cross-tabulation

Table 10: Chi- Square Analysis for Physical exercise - Depression

| | Value | Df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 21.501 ^a | 4 | .000 |
| Likelihood Ratio | 22.174 | 4 | .000 |
| Linear-by-Linear Association | 7.506 | 1 | .006 |
| N of Valid Cases | 150 | | |

| | Value | Df | Asymp. Sig. (2-sided) |
|---------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 14.312 ^a | 2 | .001 |
| Likelihood Ratio | 14.155 | 2 | .001 |

| | | | |
|-------------------------------------|--------|---|------|
| Linear-by-Linear Association | 12.552 | 1 | .000 |
| N of Valid Cases | 150 | | |

Table 11: Sleeping hours- Anxiety Cross-tabulation

| | | Anxiety | | | |
|-----------------------------------|--------------|---------------------|---------------------|----------|-------|
| | | Normal | Borderline abnormal | Abnormal | Total |
| | Less than 8 | 21 | 14 | 3 | 38 |
| | More than 8 | 75 | 13 | 6 | 94 |
| | Total | 96 | 27 | 9 | 132 |
| Pearson Chi-Square | | 14.397 ^a | 10 | 4 | 0.006 |
| Likelihood Ratio | | 13.620 | 27 | 4 | 0.009 |
| Near-by-Linear Association | | 3.539 | 1 | 1 | 0.060 |
| N of Valid Cases | | 150 | | | |
| Total | | 97 | 37 | 16 | 150 |

Table 12: Chi- Square Analysis for Sleeping hours- Anxiety

Table 13: Education - Anxiety Cross-tabulation

| | | Anxiety | | | Total |
|------------------|-----------------|---------|---------------------|----------|-------|
| | | Normal | Borderline abnormal | Abnormal | |
| Education | Bachelor | 44 | 24 | 13 | 81 |
| | Master | 31 | 9 | 3 | 43 |
| | M.Phil. | 22 | 4 | 0 | 26 |
| Total | | 97 | 37 | 16 | 150 |

Table 14: Chi- Square Analysis for Education- Anxiety

| | Value | Df | Asymp. Sig. (2-sided) |
|-------------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 10.790 ^a | 4 | .029 |
| Likelihood Ratio | 13.370 | 4 | .010 |
| Linear-by-Linear Association | 10.616 | 1 | .001 |
| N of Valid Cases | 150 | | |

DISCUSSION:

Anxiety and depression among medical imaging technologists has extensive effects on the technologists and society. Burden of evaluating the patients, increased exposure to patients affected from several infectious diseases, emergency increased work intensity, lack of proper staff members, insufficient resources, lack of empathy from administration and senior colleagues consequently predispose the radiographers to develop depression and anxiety.¹³ Medical students as well as the residents suffer from different psychological morbidities i.e. depression, anxiety and burnout.¹⁶ Around the globe, anxiety is a frequent mental illness among medical students. The severity of problematic anxiety ranges from twenty-five to forty percent in undergraduate medical students and has a negative effect on grades and success of students.¹⁷ Burnout is a mental morbidity that arises in the workplace of prolonged work-related stress. The classical characteristics of burnout are emotional disturbance, lack of interest towards sufferers or colleagues and feelings of personal lack of efficiency. The burnout not only affects the health of the physician, also effects negatively the quality of health care services. Depression, anxiety, substance abuse, and suicidal ideation are associated with burnout of physician. All these condition affects the efficiency of physician and provide the base of medical errors.¹⁸

In this research, we used the HADS to assess the rate of depression and anxiety among medical imaging technologists. In a study conducted by Kebede et al., data was also collected from two hundred and seventy-three medical students by using Hospital anxiety and depression scale (HADS) to evaluate anxiety and depression.¹⁹

In our study, there was no association (p=0.233) between gender and anxiety was found but, in a study, conducted by Tabassum et al. anxiety was significantly associated with gender.²⁰ In our study, there was no association (p=0.773) between gender and depression was found. In another study conducted by Jamshid et al. there was no significant association of depression with gender.²¹ But a study conducted by Marie et

al. reported a higher prevalence of depression in medical students as compared to general population and female students were found to have severe depression as compared to men.²² Another study conducted Ivana et al. on medical students depression and anxiety was found to be associated with gender.²³

In our research, there was no association of marital status with depression and anxiety whereas job-satisfaction was associated depression. Whereas in a study conducted by Cheung et al., marital-status and lack of job satisfaction both were positively correlated with depression. The correlation of anxiety was found with marital status.¹⁵ In our study, there was association ($p=0.000$) between education and depression. And there was also association ($p=0.029$) of education with anxiety. In a study conducted by Sarhan et al., education level was associated with the appearance of depressive symptoms.¹³

In this study, out of one hundred and fifty (150) medical imaging technologists 31 (20.7%) were sleeping for less than 8 hours, 116 (77.3%) were sleeping for 6-8 hours, and 3 (2%) were sleeping for more than 8 hours. In our study, there was no association ($p=0.063$) between sleeping hour and depression. While there was association ($p=0.006$) between sleeping hours and anxiety. In a study conducted by Janaina et al. more than seventy percent of the doctors were found to have disturbed sleep, depression and anxiety during the SARS-CoV-2 infection.²⁴ In a study conducted by Zhou et al. older age, to be a nurse, and providing health care services in outer emergency medical team were found to be associated with quality of sleep.²⁵

In our study, 54 (36%) medical imaging technologists were normal, 43 (28.7%) were borderline abnormal, and 53 (35.3%) were abnormal for depression; whereas 97 (64.7%) were normal, 37 (24.7%) were borderline abnormal, and 16 (10.7%) were abnormal for anxiety. We did not find association ($p=0.462$) between age and depression as well as between age and anxiety ($p=0.261$). We also found association ($p=0.000$) between education and depression; whereas association ($p=0.029$) between education and anxiety.

In a study conducted by Ngasa et al. 34.6% of medical students were suffering from mild depression, 26.4% from moderate, 3.4% from moderately severe, and 0.80% from severe depression.²⁶ In a study conducted by Shao et al, the prevalence of depression was 57.5% and anxiety 30.8% in medical students. The individuals of older age were found to have severe depression and anxiety. In their study depression and anxiety was found in those individuals who were experiencing disturbed sleep.²⁷

CONCLUSION

Our study revealed a considerable frequency of depression and anxiety among medical imaging technologists. Depression was significantly associated with the factors of job satisfaction, education, type of modalities, and physical exercise. A considerable association of anxiety was

found with factors of education and sleeping hours. In order to reduce depression and anxiety and improve the overall well-being of imaging technologists, it is recommended to perform regular psychological assessments of medical imaging technologists to screen out the individuals with risk factors. Hospitals management should conduct effective group psychotherapy sessions focused on sleep management, occupational safety, and job satisfaction to ensure the mental health of medical imaging technologists. Implementation of such interventions could provide satisfied, productive, and high-quality imaging technologists

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Title of Paper: Frequency of Anxiety and Depression Among Medical Imaging Technologists in Public Hospitals of Lahore

Volume: 4 Issue: 1 Paper ID: 64

Reviewer's Name: Kashifa Ehsan Designation: Assistant Professor

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Context (Please Check Mark (X) in the Relevant Cell):

| <i>Rate the Following</i> | <i>Excellent</i> | <i>Good</i> | <i>Fair</i> | <i>Poor</i> | <i>N/A</i> |
|----------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|
| <i>Originality</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Brevity and focus</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Evaluation of analyses</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Interpretation of results</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Writing style</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Ethical Considerations</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>References</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Accuracy</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Language</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Plagiarism Found</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

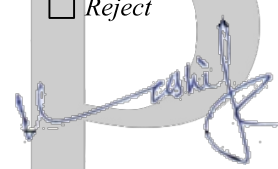
Overall Comments

MINOR REVISION

The discussion section should be expanded to provide a more comprehensive interpretation of the findings. Specifically, the authors should discuss the implications of the findings for medical imaging technologists, and how these findings compare to similar studies conducted in other countries. Additionally, the limitations of the study should be acknowledged and suggestions for future research should be provided.

Recommendations:

- Accept as it is*
- Accept with minor Revision*
- Accept with major Revision*
- Reject*


Signature with Stamp



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Title of Paper: Frequency of Anxiety and Depression Among Medical Imaging Technologists in Public Hospitals of Lahore

Volume: 4

Issue: 1

Paper ID: 64

Reviewer's Name: Dr. Shahida Perveen

Designation Professor

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Context (Please Check Mark (X) in the Relevant Cell):

| <i>Rate the Following</i> | <i>Excellent</i> | <i>Good</i> | <i>Fair</i> | <i>Poor</i> | <i>N/A</i> |
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| <i>Originality</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Brevity and focus</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Evaluation of analyses</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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| <i>Writing style</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Ethical Considerations</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>References</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Accuracy</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Language</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Plagiarism Found</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Overall Comments

MINOR REVISION

The methodology section needs to be more detailed. For instance, it is unclear how the sample size was calculated and more information is needed about the simple random sampling technique used.

Include specific percentages for the different levels of depression and anxiety found among the participants.

Additionally, the statistical analysis should be explained more clearly, including the significance level used.

Recommendations:

- Accept as it is*
- Accept with minor Revision*
- Accept with major Revision*
- Reject*

Signature with Stamp