Psychological illness in Patients reporting to Radiology Department and audit of Unnecessary Radiological Tests at Tertiary Care Hospital

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ABSTRACT

Background: Depressive symptoms and anxiety are the two frequent mental disorders in the general population along with in clinical practice. The Patient Health Questionnaire—9 (PHQ-9) and the Generalized Anxiety Disorder Questionnaire–7 (GAD-7) are small screening scales used for recognition of depression and anxiety symptoms in all clinical settings. Therefore, the purpose of this study was to evaluate psychological illnesses by using factorial structure of the PHQ-9 and the GAD-7 in a tertiary care hospital of DHQ.

Methodology: This cross sectional study was carried out in the Department of Radiology DHQ Teaching hospital, Gujranwala. The duration of the study was about 7 months comprising from July 2021 to January 2022. A total of 230 patients of both genders with somatic complaints such as headache, anxiety, and depression were included in the study. Quantitative variables were reported as mean±SD, and qualitative variables were documented as frequency and percentages.

Results: The results findings revealed that out of 230 patients, 58(25.2%) were males and 172(74.8%) were females. Headache was the main reason for anxiety and depressive symptoms in 197(85.7%) patients. About 217(94.3%) patients advised for CT scan brain. According to PHQ, a mild depression was found in most of the cases 130(56.5%), and moderate depression observed in 31(13.47%) patients. There was an insignificant association observed between depression levels, (p=0.79). According to GADQ-7, minimal anxiety was reported in 26(11.3%) patients, mild anxiety was reported in 204(88.7%) cases with an insignificant association between both anxiety levels, (p=0.78).

Conclusion: This study concluded that females experienced more somatic complaints than males. Headache was the most common reason for psychological illnesses. Moreover, according

to the Patient Health Questionnaire-9 and the Generalized Anxiety Disorder Questionnaire-7, Mild anxiety and mild depressive symptoms were more prevalent with significant association found with respect to gender.

Keywords: Anxiety, depression, headache, Anxiety Disorder, Patient Health Questionnaire.

INTRODUCTION

Mood disorders and anxiety have been observed to be the most significant psychiatric comorbidities that is connected with migraine, having an effect on disease occurrence, diagnosis, management and its clinical consequences [1]. It has been reported by one of the studies, people with migraine are 2 to 10 folds more commonly affected by mood and anxiety disorders than general populace[2]. Furthermore, psychiatric comorbidities are prognostic factors for the development of migraine from periodic to chronic state [3]. Patients with tension type headache and comorbid psychiatric illnesses frequently show disturbed temperament and attempt suicidal actions [4,5].

Generally, anxiety and mood ailments coexist in the general populace as well as in patients with headache complaints [6]. The unnecessary worried state indicates anxiety, whereas depression reflects by dearth of liveliness, enthusiasm and sorrow. Both ailments show remarkable somatic symptoms. In the prospect of diagnosis, anxiety is commonly presented by bad temperament, lack of attentiveness, and distress, while depression is reflected by lethargy, lack of concentration, disturbed sleep and loss of appetite [7].

In general, university students frequently experience severe psychological stress and are at greater possibility of psychological complaints than younger people [8, 9]. It has been revealed in the meta-analysis performed by Ibrahim et al. that occurrence of depressive symptoms in university students were reported from 10 to 85% [10]. Similarly, a Canadian research included 148 students revealed that about 39.5% students experienced moderate to severe depression, 23.8% students showed moderate to severe anxiety while 80.3% students had indications of moderate to high stress although insignificant differences found between both genders [11].

Depression and anxiety illnesses may have equally instant and late negative consequences such as diminished learning activities, raised social and personal problems, develop inferior complex and reduced quality of life [9,12]. Consequently, dependable, reliable and effective implements are required for assessment of depression and anxiety symptoms in order to get timely diagnosis and to support students psychologically[13]. Therefore, the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder Questionnaire-7 (GAD-7) are two confined screening scales that are extensively employed for measuring depressive and anxiety symptoms [14,15].

The PHQ-9 is a scale based on nine criteria upon which the depressive disorders are recognized [16]. The PHQ-9 is valuable in identifying clinically significant arrangement of depressive symptoms; it also offers continuous scores for assessment of severity of depressive symptoms [17]. The PHQ-9 is accepted as a reliable tool for screening of depressive symptoms in the general populace [13,18], along with all clinical situations [18-22]. The PHQ-9 determines measurement variations across socio demographics, subdivisions of gender, culture and educational status [23,24].

On the other hand, The GAD-7 is based on seven items self-report scale, specially interrelated to the DSM-IV standards of GAD [25]. Though,GAD-7 directed at assessment of generalized anxiety, it is also presented to be a reliable screening instrument for assessment of further anxiety disorders, comprising panic, societal nervousness, and post-traumatic tension disorders [26]. As stated by GAD-7, cut-off points of 5, 10, and 15 might be considered as mild, moderate, and severe anxiety level [26]. This scale is extensively implemented innon-clinical and clinical situations, as well as in educational research [8,9]. Presently, an innovative measuring scale, the PHQ-ADS, merging the PHQ-9 and the GAD-7 into a single score that was anticipated as a measure of symptoms associated with depression and anxiety [27].

A psychiatrist is frequently encountered predicament concerning neuroimaging by computerized tomography (CT) scan or magnetic resonance imaging (MRI) during assessment of patients. CT scan may be of useful in psychiatric practices in one of two means. Firstly, CT scanning can assist to endorse or eliminate the existence of an biological reason for the clinically recognized

neurological irregularity,[28]Though the definite role of structural neuro-imaging in psychiatry remains vague, Secondly, it is performed to support the obtainable clinical indication in the endorsement of psychiatric illnesses[28].The neuroimaging is not usually advised in cerebral disability. Additionally, neuroimaging is recommended to exclude medical illnesses like traumatic brain damages, cancers, infections, brain infarctions and hemorrhages [29].

Even though, anxiety and mood disorders are interrelated as the two leading psychological concerns associated with migraine, restricted data is available on relevant symptoms or aspects on it. In Pakistan, the societal standards and traditional customs worsen the mental health. People belongs to lower socioeconomic status are more probable to undergo many mental health issues for instance generalized anxiety disorder, depression, and tension-type headaches. Therefore, this study was planned to investigate the psychological illness in patients reporting to the Radiology Department and to audit the unnecessary radiological tests at tertiary care hospital.

METHODOLOGY

This cross sectional study was carried out in the Department of Radiology DHQ Teaching hospital, Gujranwala using non-probability convenient sampling technique. The study was approved by the Institutional Review Board of concerned Hospital. The duration of the study was about 7 months comprising from July 2021 to January 2022. A total of 230 patients of both genders with somatic complaints such as headache, anxiety, and depression, who underwent for brain CT scan to the Department of Radiology, were included in the study whereas patients of cancer, HIV/AIDS, and substance abuse disorders were excluded from the study.

Informed consent was obtained from all the patients. The socio-demographic information was gathered as quantitative data after a detailed examination of all patients. At the DHQ government teaching hospital in Gujranwala, Google Forms was used to create structured questionnaires/scales to collect data from the patients. Patients filled the questionnaire honestly and their information was kept strictly confidential. In order to assess depression and anxiety disorders, two screening scales were implemented. The PHQ-9 is a 9-item scoring scale using DSM-V criteria, used for diagnosing and grading depressive symptoms. The symptoms description included suicidal contemplations, self-harm, difficulty in sleeping, change in

appetite, feeling of guilt and blame, lacking concentration, delayed feeling and restlessness. On a four-point scale (0=never, 1=several days, 2=> half the time, and 3=nearly every day), symptoms were rated for two weeks. There were a total of 27 possible outcomes. Cronbach alpha reliability for this scale was 0.79. Over a period of two weeks, GAD-7 is seven questions based scale that was used to assess anxiety symptoms. One of the four options was applied, C1: Never; C2: Only briefly; C3: Frequently; C4: Almost every day. Points between 0 and 21 were presented. Using the Cronbach alpha, this scale had a reliability of 0.78.

Data was analyzed by using Statistical Package for Social Sciences (SPSS) version 23.0. Quantitative variables were reported as mean±SD, and qualitative variables were documented as frequency and percentages. A p value of < 0.05 was reflected as statistically significant.

RESULTS

A total of 230 patients with somatic symptoms wherein 58(25.2%) were males and 172(74.8%) were females. The majority of patients in the study population 85(37.0%) were in the 26-35 years age group followed by 63(27.4%) were in the 13-15 years age group. Whereas, 44(19.1%) patients were in the age group 36-45 years and 38(16.5%) patients were in the age group 45 and above years. Educational status revealed that most of the patients57(24.8%) were had middle education, 43(18.7%) were had primary education, 37(16.1%) were had matric, 29(12.6%) were had intermediate education, 26(11.3%) were graduated, and 16(7.0%) were had post-graduated. Only one had MBBS qualification and about 21(9.1%) were uneducated. Mostly patients 196(85.2%) were Muslims while 34(14.8%) were non-Muslim. Furthermore, about 217(94.3%) patients agreed that CT scan was advised by the doctor whereas 13(5.7%) patients disagreed. Moreover, about half of the patients 110(47.8%) had one year of illness, 66(28.7%) patients had two years of illness, 25(10.9%) patients had three years of illness and 29(12.6%) had more than three years of illness. Regarding source of referral, mostly patients 186(80.9%) were referred by outdoor doctor, while 21(9.1%) were referred by indoor doctor and 23(10.0%) were self-referred. In addition, patients referred by the psychiatry department 18(7.8%) showed a lower response rate than those 65(28.3%) referred by the General medicine department. On the other hand, 59(25.7%) were from Neurology, 51(22.2%) were from Neurosurgery and 37(16.1%) were referred from other departments. The most common reason of psychological illness was

headache in 197(85.7%) patients followed by forgetfulness in 10(4.3%) participants. Whereas, less likely reason was Vertigo in 6(2.6%) patients, as depicted in Table I.

Psychometric properties of patients revealed that the PHQ first scale had nine items with a mean score of 14.24 ± 5.58 with high alpha reliability of 0.79. Additionally, the GADQ, had seven items with a mean score of 11.72 ± 4.54 with high Cronbach's alpha of 0.78, as depicted in Table II.

Mean source of reference was reported 1.22 ± 0.563 in males and 1.31 ± 0.662 in females with an insignificant difference between them (p= 0.063). Mean referring Department was found 2.57 ± 1.25 in males and 2.70 ± 1.40 in females with an insignificant difference between them (p= 0.409).

Mean reason of reference was found 2.03 ± 1.53 in males and 1.16 ± 0.699 in females with an insignificant difference between them (p < 0.001). As far as the assessment of depressive and anxiety symptoms are concerned, mean PHQ was reported13.07 ± 6.94 in males and 14.63 ± 5.01 in females with an insignificant difference between them (p = 0.004). Additionally, mean GADQ was reported 10.84 ± 5.49 in males and 12.602 ± 4.15 in females with an insignificant difference between them (p = 0.001), as depicted in Table III.

CT scan brain was advised for 58(25.2%) males and 172(74.8%) females. Most of the patients 85(37.0%) advised for CT scan brain were in the range of 26-35 years of age. About 65(28.3%) patients referred from Medicine Department. Furthermore, Source of referral of majority patients 186(80.9%0 was OPD. About 110(47.8%) patients had < 1 year of illness. Headache was the main reason for CT scan brain in 197(85.7%) patients. Out of 230, 217(94.3%) patients advised for CT scan brain, as depicted in Table IV.

According to PHQ, a mild depression was found in most cases 130(56.5%). It was also revealed that moderate depression observed in 31(13.47%) patients. Furthermore, minimal depression was found in 69(30.0%) patients. There was an insignificant association observed between depression levels, (p=0.79), as shown in Table V.

According to GADQ-7,minimal anxiety was reported in 26(11.3%)patients. Mild anxiety was reported in 204(88.7%) cases, with an insignificant association was found between both anxiety levels, (p=0.78), as shown in Table VI.

Table I: Socio-demographic Characteristics of patients(n=230)

Variable		n	%
Age	13-15	63	27.4
	26-35	85	37.0
	36-45	44	19.1
	45 & above	38	16.5
Gender	Male	58	25.2
	Female	172	74.8
Education	Uneducated	21	9.1
	Primary	43	18.7
	Middle	57	24.8
	Matric	37	16.1
	Intermediate	29	12.6
	Graduation	26	11.3
	Post-Graduation	16	7.0
	MBBS	1	4.0
Religion	Muslim	196	85.2
	Non-Muslim	34	14.8
Is your CT scan advised by your doctor?	Yes	217	94.3
	No	13	5.7
Duration of Illness	One year	110	47.8
	Two years	66	28.7
	Three years	25	10.9
	Above three years	29	12.6
Source of referral	Advised by Outdoor Doctor	186	80.9
	Indoor Doctor	21	9.1
	Self	23	10.0
Referring Department	Neurology	59	25.7
	Neurosurgery	51	22.2
	Medicine	65	28.3
	Psychiatry	18	7.8
	Others	37	16.1
Reason of Referral	Headache	197	85.7
	Low Mood	8	3.5
	Vertigo	6	2.6
	Forgetfulness	10	4.3
	Body aches	9	3.9

Table II:Psychometric Properties of the patients.

Variable	Mean±SD
PHQ (Patient Health Questionnaire)	14.24±5.58
GADQ (Generalized Anxiety Disorder Questionnaire)	11.72±4.54

Table III:Association of means of source and reason of referral, PHQ and GADQ with respect to gender.

Variable	Male (n = 58) Mean±SD	Female (n = 172) Mean±SD
Source of Ref	1.22±0.563	1.31±0.662
Referring Dept.	2.57±1.25	2.70±1.40
Reason of Ref	2.03±1.53	1.16±0.699
PHQ	13.07±6.94	14.63±5.01
GADQ	10.84±5.49	12.02±4.15

Table IV: OPD referrals for CT scan brain with respect to demographic characteristics.

CT Scan Brain		Radiology Department DHQ Gujranwala						%age
	Male/ Female	Age (26-35)	Medicine	OPD	<1 year	Headache	CT Scan Advised	%
Gender	58/172	-	-	-	-	-	-	25.2/74.8%
Age	-	85	-	-	-	-	-	37.0%
Referring Department	-	-	65	-	-	-	-	28.3%
Source of Referral	-	-	-	186	-	-	-	80.9%
Duration of illness	-	-	-	-	110	-	-	47.8%
Reason of Referral	-	-	-	-	-	197	-	85.7%
CT scanBrain	-	-	-	-	-	-	217	94.3%

Table V:Association of depression levels in PHQ-9 of the patients presented at radiology department at DHQ.

PHQ-9	Depression (Depression Level)					Total	%	p-value
	Minimal Depression	Mild Depression	Moderate Depression	Moderately Severe Depression	Severe Depression			
0-4	-	-	31	-	-	31	13.4%	0.79
5-9	-	47	-	-	-	47	20.4%	
10-14	24	-	-	-	-	24	10.4%	
15-19	-	83	-	-	-	83	36.0%	
20-27	45	-	-	-	-	45	19.5%	
TOTAL	69	130	31	-	-	**230**	**100%**	

Table VI:Association of anxiety levels in GADQ-7 of the patients presented at radiology department at DHQ.

GADQ-7	Generalize Anxiety Disorder (Hospital Anxiety Level)				Total	%age	p-value
	Minimal Anxiety	Mild Anxiety	Moderate Anxiety	Severe Anxiety			
0-4	-	19	-	-	19	8.2%	0.78
5-9	-	32	-	-	32	13.9%	
10-14	26	-	-	-	26	11.3%	
15-21	-	153	-	-	153	66.6%	
TOTAL	26	204			**230**	**100%**	

DISCUSSION

This study demonstrated psychometric properties of the PHQ-9 and the GAD-7 in a sample of tertiary care hospital in Pakistan.

One of the researchers evaluated psychiatric in patients who had gone through a CT and MRI scan and reported that Out of 213 patients, mostly patients 91(42.75%) were in the age group between 30–49 years with male preponderance 112(52.6%). It was also observed that CT scan brain in 198(93%) cases was the most frequently performed neuro-imaging modality in their study, whereas MRI scan was suggested for only 5(2.3%) and both forms of neuro-imaging modalities were done in about 10(4.7%) cases [29].Moreover, it was also revealed that mostly abnormal scans were had in the age group between 30–39 years[29]. These findings were not in the lines of further researches that reported a re6lationship between old age and abnormal CT scans.[28,30,31]. The present study was inconsistent with the above reported research and showed that mostly patients 85(37.0%) had somatic complaints were existed in the age range between 26-35 years with female predilection 172(74.8%). On the other hand, the present research was in agreement with the above reported researches in terms of performed CT scan brain indicating that about 217(94.3%) patients were advised CT scan brain by the doctor.

Psychometrically comprehensive screening tools are essential for mental health consultants employed in college and universities, as several researches demonstrated higher occurrence of depression and anxiety disorders among them [8,10-12]. These findings corroborated with another research that revealed prevalence of depression and anxiety levels are greatly reliant on type of assessment measuring scale. Their study reported that according to the PHQ-9, 45% students had moderate to severe depressive symptoms. Whereas, GAD-7 demonstrated that about 38% students showed moderate to severe anxiety level [32]. These findings were inconsistent with the present study and revealed that according to the PHQ-9, mostly participant 130(56.5%) experienced mild depression and GAD-7 demonstrated that 204(88.7%) cases reported mild anxiety, regardless of their educational status.

Age of the participant was also an important prognosticator of moderate and severe anxiety scores. Similarly, another research revealed the wide age range of studied population and reported substantial relationship of younger age (< 25 years) with anxiety symptoms that may be the sign of ambiguity about studies and future prospects among young students as compared to

elder students [11]. Likewise, numerous researches endorsed the relationship between anxiety levels with years of studies and reported that more anxiety existed in the initial years of education [9, 33, 34]. The present study did not corroborate the above mentioned researches and showed that overall patients had reflected minimal and mild anxiety with an insignificant association, (p=0.78). Whereas, mostly patients were had aged between 26- 35 years having mild anxiety however, no association was observed between age groups and anxiety levels.

Correspondingly, a research by Juang et al. related patients with transformed migraine with those patients with chronic tension-type headache, and observed a high occurrence of anxiety in transformed migraine patients following modification for age and gender [35].Furthermore, another research reported that patients suffering from migraine revealed greater severity of somatic, depression and anxiety symptoms. Additionally, migraine seemed to be the robust autonomous aspect in envisaging severity of main depressive disorder, even after monitoring for anxiety comorbidities and demographic variables.[36] The present study showed consistency with the above cited researches and indicated that headache or migraine was the most common cause of psychological illnesses, resulting a mild depression and mild anxiety in most of the patients according to psychological assessment scales.

A coherent and organized method in choosing correct investigations assists a psychiatrist to ensure an exact diagnosis, to instigate proper management, and to reduce expenses.[37] In contrast, incorrect investigations is probably to negotiate in efficiency or cost-effectiveness of clinical care. Insufficient investigations may cause misdiagnosis of an important physical disorder [37]. Conversely, overemployment of offered laboratory services and performing needless investigations can raise the encumbrance on health facilities, raised expenditures, excessive troublesomeness and uneasiness to the patients, and can lay patients on iatrogenic risks.[37,38] Numerous researches have stated restricted usefulness of common investigations in psychiatric patients either owing to low test yield or shortage of proper follow-up action.[38] Despite the significance of CT scan and MRI, various studies have emphasized uselessness or least efficacy of expensive investigations like MRI and CT brain.[39,40] The present study did not support the above reported researches and demonstrated that about 217(94.3%) patients advised for CT scan brain in order to exclude the traumatic and organic reason of psychological illnesses and to get appropriate direction of diagnosis and treatment.

This study had few limitations. This study was single center study. In this study, sample was drawn by using non-probability convenient sampling technique that can be collected randomly. Furthermore, other psychiatric complaints, psychological and cultural characteristics, opinions, temperament, and organic variables, from genetics to neuroimaging modalities should be analyzed for future prospect, as implications in public well-being and management consequences. Reviewing further pain diseases, additional headache ailments, migraine subtypes, migraine chronicity with their association to anxiety and depressive symptoms would enhance our consideration in the field.

CONCLUSION

This study concluded that females experienced more somatic complaints along with more sensitive to pain as compared to males. Headache was the most common reason for psychological illnesses. Moreover, according to the Patient Health Questionnaire-9 and the Generalized Anxiety Disorder Questionnaire-7, Mild anxiety and mild depressive symptoms were more prevalent with significant association found with respect to gender. Consequently, these screening scales are useful for identification of mental disorders. Nonetheless, comprehensive psychological assessment for patients at danger are necessary for a correct clinical identification and management purposes.

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