The invisible dual burden: A clinical study on the association between tension-type headache and major depressive disorder

Md. Shariful Islam[1] , **Mustanshirah Lubna[2]** , **K. M. Adnan Bulbul[3]** ,
Amal Krishna Paul[4] , **Md. Rakibul Hassan[5]** , **Mst. Jakia Afroz Zebun[6]**

[1]Department of Neuro Surgery, KPJ Specialized Hospital, Gazipur, Bangladesh, [2]Department of Pediatrics, National Center for Control of Rheumatic Fever and Heart Disease, Dhaka, Bangladesh, [3]Department of Internal Medicine, KPJ Specialized Hospital, Gazipur, Bangladesh, [4]Department of Medicine, KPJ Specialized Hospital, Gazipur, Bangladesh, [5]Department of Orthopedic, KPJ Specialized Hospital, Gazipur, Bangladesh, [6]Department of Psychology, KPJ Specialized Hospital, Gazipur, Bangladesh

Address for correspondence: Dr. Md. Shariful Islam, Consultant, Department of Neuro Surgery, KPJ Specialized Hospital, Gazipur, Bangladesh. E-mail: sharifulislam_sujon@yahoo.com

Abstract

Background: Tension-type headache (TTH) is the most prevalent primary headache disorder worldwide and is a major cause of functional impairment. Despite its high burden, the psychiatric comorbidities of TTH, particularly major depressive disorder (MDD), remain inadequately characterized, with limited evidence regarding their demographic and clinical correlates.

Objective: To assess the association between MDD and patients with TTH.

Methods: This hospital-based study was conducted at KPJ Specialized Hospital, Gazipur, Bangladesh, from September 2018 to December 2024, enrolling 4653 patients with clinically diagnosed TTH. Participants underwent a standardized clinical evaluation and psychiatric assessment for MDD. Sociodemographic data, psychiatric comorbidities, and psychosomatic symptoms were systematically recorded. Data were analyzed using the Statistical Package for the Social Sciences version 26.

Results: Among 4653 patients with TTH, 153 (3.3%) had comorbid MDD. Prevalence was higher in females, with 138 of 3223 (4.3%) affected, compared to 15 of 1430 males (1.0%, $P < 0.001$). Age ≥46 years showed 84 of 681 patients (12.4%) with MDD, versus 28 of 2389 (1.1%) in ≤30 years and 41 of 1623 (2.5%) in 31–45 years. Anxiety affected 100 (65.4%), insomnia 96 (62.7%), and chronic pain 54 (35.3%) of MDD cases.

Conclusion: MDD affects 3.3% of patients with TTH and is strongly associated with female sex, age ≥46 years, anxiety, insomnia, and chronic pain, highlighting the need for routine psychiatric assessment in high-risk patients.

Keywords: Anxiety, insomnia, major depressive disorder, psychiatric comorbidity, tension-type headache

Introduction

Tension-type headache (TTH) is one of the most prevalent primary headache disorders worldwide and contributes substantially to disability and reduced quality of life. Epidemiological evidence suggests that TTH affects approximately one-quarter to more than one-third of adults globally over the course of 1 year, with significant interpopulation variability.[1,2] Although historically considered less severe than migraine, TTH is increasingly recognized as a condition with

The invisible dual burden: A clinical study on the association
between tension-type headache and major depressive disorder

21

considerable functional impairment, particularly when frequent or chronic.[1,3] Psychiatric comorbidities, including anxiety and depressive disorders, are common in individuals with primary headache disorders. While much of the research focus has centered on migraine, recent studies indicate that people with TTH also experience higher rates of psychological distress compared to non-headache populations.[4,5] Community-based research in Korean adults showed that individuals with TTH had a significantly higher prevalence of depressive symptoms (4.2%) than those without headache, indicating that even episodic TTH may carry mental health consequences.[5] Similarly, clinical investigations have documented associations between TTH and mood disturbances, including depression and anxiety, suggesting overlapping biopsychosocial mechanisms.[6,7] The psychiatric burden of TTH extends beyond symptom frequency. Chronic TTH is particularly linked with greater emotional dysregulation, depressive symptoms, and anxiety, even in patients without prior psychiatric diagnoses or psychotropic medication use.[8] Such comorbidity compounds functional impairment and complicates clinical management, often necessitating multidisciplinary approaches that address both physical pain and psychological well-being.[8,9] The interplay between affective symptoms and TTH is further underscored by population analyses showing that primary headaches, including TTH, elevate the risk of subsequent depression and adverse outcomes such as suicidality.[10] These findings highlight the importance of mental health screening in patients with headache disorders. Despite mounting evidence, the prevalence and predictors of major depressive disorder (MDD) within TTH populations remain under-characterized, particularly in clinical settings outside of specialized headache clinics. Several cross-sectional and observational studies have reported widely varying rates of depression among TTH sufferers, with estimates influenced by headache chronicity, demographic factors, and assessment tools.[4,11] In addition, bidirectional relationships between depressive symptoms and TTH features – such as increased headache frequency and intensity – have been suggested, indicating a complex clinical picture that warrants further investigation.[12] Understanding the epidemiology and correlates of depression in TTH is crucial for optimizing patient outcomes. Integration of psychiatric evaluation into routine headache care may facilitate early identification of at-risk individuals and enable targeted interventions that address both headache and comorbid mental health conditions.

Methods

Study population

This hospital-based cross-sectional study was conducted at KPJ Specialized Hospital, Gazipur, Bangladesh, from September 2018 to December 2024. A total of 4653 patients clinically diagnosed with TTH were enrolled. The study population included both male and female patients aged 12 years and above who presented to the neurology outpatient department during the study period.

Inclusion criteria

Patients were included if they met the International Classification of Headache Disorders, 3rd edition criteria for TTH. All participants provided informed consent, and those willing to undergo a comprehensive psychiatric evaluation for MDD were considered eligible.

Exclusion criteria

Patients with secondary headaches due to trauma, infection, or structural brain lesions were excluded. Those with a prior diagnosis of severe psychiatric disorders other than MDD, current use of psychotropic medications, or chronic systemic illnesses that could confound headache assessment were also excluded.

Study procedure

Eligible patients underwent a standardized clinical evaluation including detailed headache history, neurological examination, and assessment of psychosomatic complaints. Psychiatric

22

The invisible dual burden: A clinical study on the association between tension-type headache and major depressive disorder

assessment for MDD was conducted using structured clinical interviews based on DSM-5 criteria. Sociodemographic data, headache characteristics, comorbidities, and lifestyle factors were systematically recorded.

Data analysis

Data were entered and analyzed using the Statistical Package for the Social Sciences version 26. Descriptive statistics were computed for demographic and clinical variables. Univariate logistic regression identified potential predictors of MDD, and variables with $P < 0.05$ were included in multivariable logistic regression to determine independent predictors of depression among TTH patients. Statistical significance was set at $P < 0.05$.

Results

A total of 4653 patients with TTH were included in the analysis [Figure 1]. Females constituted 69.3% of the study population, whereas males accounted for 30.7%. The mean age of the participants was 33.8 ± 11.6 years. Patients aged 19–30 years formed the largest group (37.6%), followed by those aged 31–45 years (34.9%). Adolescents aged ≤18 years comprised 13.2%, whereas patients aged 46–60 years and >60 years represented 11.3% and 2.9%, respectively [Figure 2]. MDD was identified in 3.3% of patients with TTH, whereas 96.7% had TTH without comorbid depression [Table 1]. Among female patients, 4.3% had MDD compared to 1.0% of male patients, showing a statistically significant sex difference ($P < 0.001$). Age-specific analysis demonstrated a progressive increase in MDD prevalence with advancing age. Patients aged ≤30 years had an MDD prevalence of 1.1% ($n = 28$), which increased to 2.5% ($n = 41$) among those aged 31–45 years and rose markedly to 12.4% ($n = 84$) in patients aged ≥46 years ($P < 0.001$) [Table 2]. The frequency of clinical and psychosomatic comorbidities was substantially higher among patients with TTH and MDD. Anxiety disorder was present in 65.4% of patients with MDD compared to 11.4% of those without MDD ($P < 0.001$). Insomnia or sleep
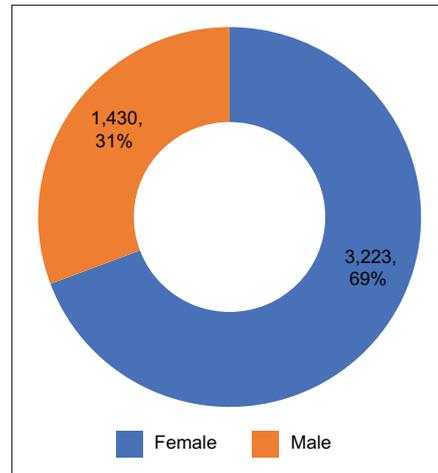

Figure 1: Gender distribution of patients with tension-type headache (n=4653)
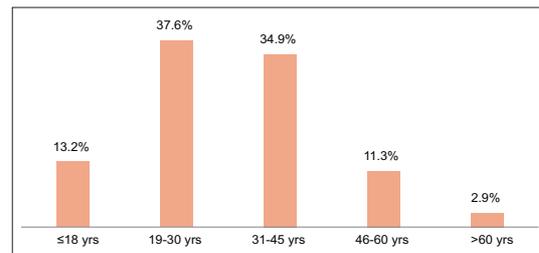

Figure 2: Age distribution of cases

disturbance was reported by 62.7% of patients with MDD versus 8.9% among non-depressed patients ($P < 0.001$). Gastrointestinal symptoms were observed in 53.6% of patients with MDD compared to 15.6% of patients without MDD ($P < 0.001$). Chronic musculoskeletal pain was reported by 35.3% of patients with MDD, which was significantly higher than the 6.5% observed in those without MDD ($P < 0.001$). Somatic symptom disorder was present in 24.8% of patients with MDD compared to 3.1% of patients without MDD ($P < 0.001$) [Table 3]. In univariate analysis, female sex was associated with an increased odds of MDD (Odds ratio [OR] 4.3; $P < 0.001$). Age ≥45 years showed a strong association with depression (OR 6.1; $P < 0.001$). Anxiety disorder demonstrated the highest risk (OR 14.5; $P < 0.001$), followed by insomnia (OR 12.8; $P < 0.001$) and chronic pain

The invisible dual burden: A clinical study on the association
between tension-type headache and major depressive disorder

23

Table 1: Prevalence of major depressive disorder among participants

Category	*n*	Percentage
TTH without MDD	4500	96.7
TTH with MDD	153	3.3
Total TTH patients	4653	100.0

TTH: Tension-type headache, MDD: Major depressive disorder

Table 2: Distribution of major depressive disorder

Variables	Major depressive disorder		*P*-value
	Present		
	n (%)		
Sex distribution			
Female	138 (4.3)	3085 (95.7)	<0.001
Male	15 (1.0)	1415 (99.0)	
Age group (years)			
≤30	28 (1.1)	2337 (98.9)	<0.001
31–45	41 (2.5)	1582 (97.5)	
≥46	84 (12.4)	594 (87.6)	

Table 3: Clinical and psychosomatic comorbidities among participants

Types	TTH cases, *n* (%)		*P*-value
	With MDD (*n*=153)	Without MDD (*n*=4,500)	
AD	100 (65.4)	512 (11.4)	<0.001
SD	96 (62.7)	402 (8.9)	<0.001
GS	82 (53.6)	702 (15.6)	<0.001
CMP	54 (35.3)	292 (6.5)	<0.001
SSD	38 (24.8)	141 (3.1)	<0.001

AD: Anxiety disorder, SD: Sleep disturbance, GS: Gastrointestinal symptoms, CMP: Chronic musculoskeletal pain, SSD: Somatic symptom disorder, TTH: Tension-type headache, MDD: Major depressive disorder

Table 4: Univariate analysis of factors associated with MDD among TTH patients

Variable	Odds ratio	95% Confidence interval	*P*-value
Sex (female)	4.3	2.6–7.1	<0.001
Age ≥45 years	6.1	4.3–8.8	<0.001
Anxiety disorder	14.5	10.2–20.6	<0.001
Insomnia	12.8	9.1–18.1	<0.001
CPS	7.8	5.2–11.8	<0.001

TTH: Tension-type headache, MDD: Major depressive disorder, CPS: Chronic pain syndrome

Table 5: Multivariable logistic regression analysis of predictors of MDD among TTH patients

Predictor	Odds ratio	95% Confidence interval	*P*-value
Sex (female)	2.8	1.6–4.9	<0.001
Age ≥45 years	3.4	2.1–5.6	<0.001
AD	8.6	5.7–13.1	<0.001
Insomnia	6.7	4.4–10.3	<0.001
CPS	2.9	1.7–5.0	0.001

AD: Anxiety disorder, CPS: Chronic pain syndrome, TTH: Tension-type headache, MDD: Major depressive disorder

Discussion

The current study adds important clinical evidence to the multifaceted relationship between TTH and MDD. Although TTH is often perceived merely as a benign pain condition, its association with psychiatric distress has gained increasing recognition.[13] Prior research has underscored that individuals with TTH exhibit elevated rates of depressive and anxiety symptoms compared with non-headache populations.[7,14] Our finding of a 3.3% prevalence of MDD among TTH patients, while numerically modest, aligns with observations that affective disorders are clinically relevant even in primary headache populations.[15] Gender and age differences in the prevalence of psychiatric comorbidities have been consistent across headache research. In this study, females exhibited significantly higher rates of MDD than

syndrome (OR 7.8; *P* < 0.001) [Table 4]. After multivariable adjustment, female sex (adjusted OR 2.8; *P* < 0.001), age ≥45 years (adjusted OR 3.4; *P* < 0.001), anxiety disorder (adjusted OR 8.6; *P* < 0.001), insomnia (adjusted OR 6.7; *P* < 0.001), and chronic pain syndrome (adjusted OR 2.9; *P* = 0.001) remained independent predictors of MDD among patients with TTH [Table 5].

24

The invisible dual burden: A clinical study on the association
between tension-type headache and major depressive disorder

males, and older age (≥46 years) was strongly associated with depression.[13,16] These demographic patterns resonate with broader evidence showing that women and older adults are more likely to report depressive symptoms in association with chronic health conditions, including headache disorders.[17] Although neurobiological, hormonal, and psychosocial mechanisms have been postulated to explain these patterns, they underscore the need for clinicians to maintain heightened surveillance for psychiatric symptoms in these subgroups.[18] Psychosomatic and clinical comorbidities such as anxiety disorders, insomnia, gastrointestinal complaints, and chronic pain were markedly more frequent among TTH patients with depression.[15,19] This clustering of symptoms reflects the complex biopsychosocial interplay in chronic pain syndromes and is consistent with prior case–control findings that chronic TTH is associated with higher depression and anxiety scores even in patients without prior psychiatric diagnoses.[20] Such comorbidity contributes to increased functional impairment and poorer quality of life. Moreover, depression and sleep disturbances have been shown to mediate the burden of chronic headaches, reinforcing the interdependent nature of psychological and pain experiences.[21] The bidirectional temporal relationship between headache and affective disorders, as demonstrated in longitudinal studies, suggests that not only does headache increase the risk of subsequent depression, but pre-existing depressive symptoms may predispose individuals to more frequent or chronic headache patterns.[22] This dynamic interaction highlights the importance of early recognition and intervention for psychiatric symptoms in headache care. The evidence also supports integrated treatment strategies that address both nociceptive pain and psychosocial contributors to optimize therapeutic outcomes.[23] Comparative studies in diverse clinical and community settings have reported variable prevalence of psychiatric comorbidity in TTH, ranging from modest elevations in depressive symptoms to much higher rates in specialized or chronic headache cohorts.[24] Differences in methodology, diagnostic instruments, cultural factors, and healthcare access likely account for such variability. Nonetheless, the consistent theme across studies is that depression and anxiety significantly exacerbate headache impact and reduce overall functioning, emphasizing their clinical significance. The observed associations between MDD and demographic as well as clinical predictors in TTH patients reinforce the need for comprehensive assessment strategies in clinical practice. Routine psychiatric screening, particularly for anxiety, sleep disturbance, and chronic pain symptoms, should be integrated into TTH management protocols. Such an approach may facilitate early identification of high-risk patients, enabling multidisciplinary care that addresses both neurological and psychological dimensions of TTH.

Limitations

This study was hospital-based, which may overrepresent patients with more severe or frequent TTH, potentially limiting generalizability to the broader community. In addition, its cross-sectional design precludes causal inferences between headache characteristics and MDD.

Conclusion

MDD affects a notable subset of patients with TTH, particularly females and individuals aged ≥46 years. Comorbid anxiety, insomnia, and chronic pain further increase the risk of depression, highlighting the complex interplay between neurological and psychiatric factors. Integrating routine psychiatric screening and multidisciplinary management into headache care can facilitate early detection, targeted intervention, and improved clinical outcomes, ultimately enhancing quality of life for high-risk TTH patients.

Recommendation

Routine psychiatric screening for depression, anxiety, and sleep disturbances should be integrated into TTH management. Early identification and multidisciplinary interventions targeting both neurological and psychological factors are recommended to improve patient outcomes and overall quality of life.

The invisible dual burden: A clinical study on the association
between tension-type headache and major depressive disorder

25

References

1. Song TJ, Cho SJ, Kim WJ, Yang KI, Yun CH, Chu MK. Anxiety and depression in tension-type headache: A population-based study. PloS One 2016;11:e0165316.

2. Zhang YJ, Li XY, Guo ZL. Temporal trends of migraine and tension-type headache burden across the BRICS: Implications from the global burden of disease study 2019. Front Neurol 2023;14:1307413.

3. Steiner TJ, Jensen R, Katsarava Z, Linde M, MacGregorEA, Osipova V, et al. Aids to management of headache disorders in primary care (2nd edition): On behalf of the European headache federation and lifting the burden: The global campaign against headache. J Headache Pain 2019;20:57.

4. Onofri A, Pensato U, Rosignoli C, Wells-Gatnik W, Stanyer E, Ornello R, et al. Primary headache epidemiology in children and adolescents: A systematic review and meta-analysis. J Headache Pain 2023;24:8.

5. Cho SJ, Song TJ, Chu MK. Sleep and tension-type headache. Curr Neurol Neurosci Rep 2019;19:44.

6. Saurabh J. Psychiatric comorbidities in patients with epilepsy: A cross-sectional study. Religion 2017;77:77.

7. Ghogare AS, Patil PS. A cross-sectional study of co-morbid generalized anxiety disorder and major depressive disorder in patients with tension-type headache attending tertiary health care Centre in central rural India. Niger Postgrad Med J 2020;27:224-9.

8. Romero-Godoy R, Romero-Godoy SR, Romero-Acebal M, Gutiérrez-Bedmar M. Psychiatric comorbidity and emotional dysregulation in chronic tension-type headache: A case-control study. J Clin Med 2022;11:5090.

9. Abu-Arafeh I. Headache and psychological comorbidities: An appraisal of the evidence. J Clin Med 2023;12:2683.

10. Giakas A, Mangold K, Androulakis A, Hyduke N, Galynker I, Thiam M, et al. Risks of suicide in migraine, non-migraine headache, back, and neck pain: A systematic review and meta-analysis. Front Neurol 2023;14:1160204.

11. Angelopoulou E, Papadopoulos AN, Spantideas N, Bougea A. Migraine, tension-type headache and Parkinson's disease: A systematic review and meta-analysis. Medicina (Kaunas) 2022;58:1684.

12. Mehta R, Pareek V, Kumar S, Sharma L, Rathore RS. Depression and tension type headache: Untangling the cause and effects relationship through HSQ-EV and PHQ-9 in medical students: A pan India study. J Pharm Res 2023;22:165-71.

13. Dvir Y, Ford JD, Hill M, Frazier JA. Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. Harv Rev Psychiatry 2014;22:149-61.

14. Lau-Jensen S, Berg CF, Hejl JL, Baker K, Rask CU, Hjortdal VE. Psychiatric co-morbidity in children and adolescents with CHDs: A systematic review. Cardiol Young 2023;33:1791-9.

15. Chiu YC, Hu HY, Lee FP, Huang HM. Tension-type headache associated with obstructive sleep apnea: A nationwide population-based study. J Headache Pain 2015;16:34.

16. Jaiswal A, Sharma E, Sharma C, Sharms S, Utkarsh K, Ali R. A comparative study of psychiatric comorbidity and quality of life between tension-type headache patients and healthy controls. Asian J Med Sci 2022;13:131-5.

17. Smith TR, Nicholson RA, Banks JW. A primary care migraine education program has benefit on headache impact and quality of life: Results from the mercy migraine management program. Headache 2010;50:600-12.

18. Johnson YL. An Exploration of Relationships between Parenting Stress and Primary Headache Disorders. Oxford: University of Mississippi; 2019.

19. Bhoi SK, Jha M, Chowdhury D. Advances in the understanding of pathophysiology of TTH and its management. Neurol India 2021;69 Suppl 1:S116-23.

20. Kumar S, Singh S, Kumar N, Verma R. The effects of repetitive transcranial magnetic stimulation at dorsolateral prefrontal cortex in the treatment of migraine comorbid with depression: A retrospective open study. Clin Psychopharmacol Neurosci 2018;16:62-6.

21. Patel A, Hasak S, Cassell B, Ciorba MA, Vivio EE, Kumar M, et al. Effects of disturbed sleep on gastrointestinal and somatic pain symptoms in irritable bowel syndrome. Aliment Pharmacol Ther 2016;44:246-58.

22. Rodriguez EM, Cabanilla RT, Cabanilla DT, Ardila PV. Relationship between anxiety/depression mood disorders and insomnia in patients with pain syndromes in primary health care: A cohort study. Int J Collab Res Intern Med Public Health 2022;14:1-3.

23. Tanaka T, Okita M, Jenkins S, Kozu R. Clinical and psychological impact of chronic pain in people with chronic obstructive pulmonary disease. Int J Chronic Obstruct Pulmon Dis 2022;17:893-903.

24. Ali G, Ali A, Gul E, Muneeb PM. Prevalence of depression among patients with primary headache and secondary headache. Prof Med J 2020;27:1165-70.