A Bio-Psychosocial Framework for Chronic Daily Headaches: A Mixed Methods Study

Bhuvaneshwari Balasubramanian, PhD[1],
Vasundharaa. S. Nair, PhD[1], Nimmy George[2], Ashok V. Reddy[2],
Priya Treesa Thomas[1] [iD], and Girish B. Kulkarni[2]

Abstract

Chronic daily headaches (CDH) are primarily understood from a psychophysiological formulation. A broad biopsychosocial understanding, where there is equal importance given to biological, psychological and socio-cultural factors, is underexplored in headache. Socio-cultural factors, such as gender, socio-economic factors can perpetuate and worsen the condition. For an effective and sustainable intervention, these factors need to be considered. The current study aims to explore and develop a biopsychosocial framework for headache disorders. A convergent parallel mixed methods design was used and participants were recruited from a tertiary referral care hospital, Bengaluru, India. Headache Assessment Sheet, GAD 7, HDRS, PSS and B COPE were used in the quantitative phase. The data was analysed using r software. Qualitative phase of the study, in depth interview guide was used and data analysed thematically. Quantitative phase, 38 participants were recruited. The average age, was 38.02 (±10.17), majority of the participants being females 31 (81.58%). The mean duration of illness was 8.63 (±4.73) years. The anxiety scores positively correlated with pain intensity ($r = 0.50$ at $P \leq .001$) and the median anxiety scores varied with photophobia ($P \leq .03$). The anxiety scores correlated with PSS ($r = 0.428$ at $P \leq .007$) and HDRS ($r = 0.428$ at $P \leq .007$) scores. Gender variations in coping were seen, avoidant coping having higher median scores in women. ($P \leq .08$). In qualitative phase of the study, six participants were recruited. Three main themes emerged from the qualitative phase of the study: *headache - an illness, headache factors and the impact*. Chronic daily headaches are influenced by biological, psychological, environmental and socio-cultural factors. A bio-psychosocial framework will help to understand and develop targeted interventions.

Keywords

chronic daily headaches, bio-psychosocial framework, stress, interventions, mixed methods study

Introduction

Chronic Daily Headache (CDH), headache that affects an individual for 15 days a month for three months or more (1), has the global prevalence of 3% (2), and 2.1% in India (3). A systematic review of the prevalence of chronic pain conditions in low and middle-income countries also places the prevalence of chronic daily headaches at 5% (4). There is an increasing recognition of the impact of headache worldwide, and headache is recognised as the third most frequent cause of disability worldwide and migraine alone is sixth (5).

Most persons with CDH initially suffer from episodic headache which later transforms due to several risk factors. Risk factors for transformation could be modifiable (eg: psychiatric problems, sleep-related problems, obesity, etc) or non-modifiable (eg: gender, age, socio-economic status, major life events, etc) (6).

From a biomedical understanding of headache disorders, it is conceptualised as a chronic condition that is characterised by acute episodes of pain lasting from a few minutes to days. A more psychophysiological formulation that has evolved in recent years has formed the basis for a number of behavioural treatments for headache disorders (7). Psychophysiological formulation looks at the psychological

[1] Department of Psychiatric Social Work, National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru, Karnataka, India
[2] Department of Neurology, National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru, Karnataka, India

Corresponding Author:
Priya Treesa Thomas, Associate Professor, Department of Psychiatric Social Work, National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru, , Karnataka, India.
Email: priyathomasat@gmail.com

and environmental stressors and its influence on the headache, directly leading to recommendations for psychopharmacological management. The importance of social factors that influence the headache disorders are under explored. In 1970, Engel first proposed the bio-psychosocial model for illness especially chronic diseases stressing the need to move away from a purely bio-medical model of illness. Even after 40 years of positive research and application of this model the complete utilisation of the same in many chronic conditions is wanting (8). Adopting this broader biopsychosocial model for headache disorders has been increasingly found useful in recent decades. (9,10). The current study aims to explore and develop a biopsychosocial framework for headache disorders, taking into account the sociocultural context.

Methods

Mixed methods research is popularly used in health care research especially in chronic pain conditions to utilise the strengths of both methods. To maintain the rigour in the mixed methods study, O' Cathain's 4 criteria of reporting have been followed (11). The study employed a convergent or parallel design, where the qualitative and quantitative data are given equal importance. The data was collected simultaneously, analysed separately and then integrated at the stage of interpretation of the findings. The integration was done to check the complementarity of data and develop a biopsychosocial framework for the headache disorders (12). The interpretative rigour as discussed by Tashakkori has been followed to maintain the methodological rigour in the study.(13)

Participants and Setting

Patients, both male and female, seeking treatment from a tertiary referral care centre in Bangalore, India, with a confirmed diagnosis of CDH, who gave consent to participate, were recruited for the study. Patients with a primary diagnosis other than CDH (Chronic migraine or Chronic tension-type headache) were excluded from the study.

Quantitative

38 participants were interviewed with standardised assessment tools. The participants being recruited from a referral care centres, the population was diverse across educational, socio-economic and cultural background. Hence an interview was used as technique to collect data, so as to ensure uniformity and clarity. The measures were:

> *Headache Assessment proforma* prepared by the researcher and had details regarding the socio-demographic details, description of the headache episodes, precipitating, and relieving factors.

*Hamilton Depression Rating Scale (HDRS),*17 item version of HDRS assessing the symptoms of depression over the past week (14).

Generalized Anxiety Disorder-7 (GAD-7), is a 7-item scale measured on a Likert scale, focussing on anxiety symptoms over the past 2 weeks with an additional question that looks at the impact on functionality (15).

Perceived Stress Scale (PSS), is a widely used psychological measure for assessing the perception of stress. It measures to what extent the events in life are appraised as stressful (16).

Brief Cope Inventory is a 28-item self-report questionnaire designed to measure effective and ineffective ways of coping with stressful life events. The scale has been widely used in health care settings (17).

The software Epinfo-7 (free software) was used to code and record the quantitative data. The results of the study were analysed using r software. The Shapiro-Wilk test was used to examine the headache duration frequency, pain intensity and the scores from the scales used in the study to test whether the distribution was normal. Descriptive statistics and inferential statistics were done and interpretations were drawn to understand the different variables of the study.

Qualitative

In-depth interviews were conducted with six participants with Chronic Daily Headache (both chronic migraine and chronic tension type headache) with the help of a topic guide. The topic guide had questions pertaining to the nature of headaches, impact of the condition etc. which was used as a prompt for the interview. Some of the questions from the topic guide were,

- Can you describe your headaches?
- How has the headaches impacted your personal life; can you give specific instances?
- How has the headaches impact your family, can you give some specific instances?
- How do you feel about your headaches?

The interviews were recorded and transcribed, and analysed using an inductive thematic analysis (18). The analysis was carried out manually. Each interview was analysed individually and the codes were created, then the themes were generated iteratively. The study used code saturation to determine the sample size of the qualitative phase of the study. The interviews were analysed in the order they were conducted. The first interview had both inductive and deductive codes. By the 5th interview majority of the codes for the study was developed. An additional

interview was carried out to ensure no new codes were emerging (19).

The ethical approval of the study was obtained from the NIMHANS Institutional Ethics Committee. Informed consent forms were developed, the study was explained in detail to the participants and option to withdraw from the study at any point was given before receiving consent.

Results

In this section the QUAN and QUAL findings of the study are presented separately. The results are integrated to explore the different factors contributing to primary headache disorders.

Quantitative Findings

Socio-Demographic and Headache Characteristics

The average age of the participants was 38.02 ($\pm$10.17), with the majority of the participants being females 31 (81.58%). 73.68% (28) of the participants were married. The mean duration of the illness was 8.63 ($\pm$4.73) years. The average headache days reported per month was 21.31 ($\pm$4.08) days. The mean pain intensity on a VAS scale between 1–10 was 7.34 ($\pm$0.66), indicating a high intensity of pain. Stress was the most reported precipitating factor and sleep was the most effective relieving factor (Table 1 and 2).

Depression and Anxiety

The mean score, on GAD was 11.92 ($\pm$1.92) indicating moderate levels of anxiety and on HDRS was found to be 11.05 ($\pm$2.47) indicating mild levels of depression.

The pain intensity scores were further grouped as $\leq$ 7 and >7. HDRS score differed between the groups with the $\leq$ 7 pain intensity group having higher median score (Wilcoxon test $P \leq$ .055). The headache days in a month was divided into three group pf 15–20 days, 21–25 days, and $\geq$26 days in a month. The HDRS score varied among the groups with the 21–25 days/month group showing higher median scores (Kruskal-Wallis test $P \leq 0.02$).

There was variation in median GAD scores with photophobia ($P \leq$ .03). The HDRS scores were influenced by the associated symptoms, the presence of giddiness and fatigue increased the median HDRS score (Wilcoxon test $P \leq 0.02$). The presence of photophobia also increased the median HDRS score (Wilcoxon test $P \leq$ .07).

Stress and Coping

The mean score on PSS was 21.52 ($\pm$2.93) indicating moderate levels of perceived stress. It was found that there were gender variations in the type of coping adopted with avoidant coping having higher median scores in women than in men. (Wilcoxon test $P \leq$ .08). The coping pattern also changed with the pain intensity; it was found that in the $\leq$ 7 pain intensity group the median approach coping scores were higher. (Wilcoxon test $P \leq$ .02).

Correlation Analysis

On spearman correlation, it was found that GAD scores and PSS scores were positively correlated (r = 0.428 at $P \leq$ .007), GAD score and HDRS score were positively correlated (r =

Table 1. Socio-Demographic Variables.

Variable	n (%)
Gender	
Male	7 (18.42)
Female	31 (81.58)
Education	
Primary	8 (20.05)
Highschool	17 (44.74)
Graduation and above	13(34.21)
Marital Status	
Married	28 (73.68)
Unmarried	6 (15.79)
Widowed	4 (10.53)

Table 2. Headache Characteristics.

Variable	n (%)
Associated Symptoms	
Nausea	31 (81.58)
Vomiting	15 (39.47)
Photophobia	35 (95.11)
Phonophobia	32 (84.21)
Giddiness and Fatigue	16 (42.11)
Irritability	9 (23.68)
Pain Distribution	
Unilateral	17 (44.74)
Bilateral	16 (42.11)
Unilateral to Bilateral	6 (15.79)
Type of Pain	
Throbbing and Pulsating/hammering	32 (84.21)
Heaviness and Band-like around the head	6 (15.79)
Precipitating Factors	
Stress	26 (68.42)
Exposure to sunlight/travelling	18(47.37)
Decreased Sleep	14 (36.84)
Skipping meals	14 (36.84)
Loud Sound	2 (5.26)
Specific smell	1 (2.63)
Relieving factors	
Massage and Balms	5 (13.16)
Sleep	33 (86.84)
Analgesic use	11 (28.95)

Table 3. Socio-Demographic Details.

Participants	Age	Sex	Education	Occupation	Marital Status	Duration of the illness in years	Site/side of pain	Type of pain	Associated Symptoms	Diagnosis
P1	36	F	Highschool	Homemaker	Married	6	Unilateral (alternating from side to side) in the frontal and temporal region	Pulsating pulling	Nausea, vomiting, photophobia, phonophobia	Chronic migraine
P2	64	M	Post-Graduation	Retired	Married	14	Unilateral (mostly in the left side). Occipital region moving to the frontal and temporal region	Hammering Throbbing	Phonophobia, photophobia, nausea, occasional vomiting	Chronic Migraine
P3	29	F	Highschool	Homemaker	Married	10	Unilateral (alternating from side to side) in the occipital, temporal region and around the eyes	Throbbing hammering	Nausea, vomiting, photophobia, phonophobia	Chronic migraine
P4	38	F	Primary	Homemaker	Married	15	Unilateral. Starts in the temporal region and moving towards the back of the head	Pulsating, throbbing.	Phonophobia, photophobia, nausea, occasional vomiting	Chronic Migraine
P5	35	F	Highschool	Cook	Widow	9	Bilateral. On the frontal and temporal region.	Heaviness of the head Pressing	phonophobia vomiting	Chronic Tension type headache
P6	31	F	Primary	Homemaker	Married	5	Unilateral. The temples and around the eyes.	Pulsating hammering	Phonophobia, photophobia occasional vomiting	Chronic Migraine

0.37 at $P \leq .02$). The GAD score was positively correlated with the pain intensity score on VAS ($r = 0.50$ at $P \leq .001$).

Qualitative Findings

In this section the qualitative findings of the study are discussed. The socio-demographic and illness details of the participants are presented (Table 3).

Emergent Themes

Three main themes emerged from the qualitative phase of the study these were, **headache- an illness, headache factors and the impact.**

Headache—An Illness

Headache is a disorder that is characterised by episodes of pain and other symptoms.

Headache Features. Headache is described by a number of characteristics or features.

> "*my headache always starts in the left side… always my left side… it is so painful (pressing her head..). It is generally around my forehead and temples…. Mam the pain is so bad that I can't even lie down…. It hurts (pt. appears distressed and starts to cry)*" – P3

> "*…. if it was only headaches also somehow managed… But headaches starts vomiting starts… can't eat anything….*"- P 6

Headache Can Increase. Headache can become chronic, most participants report of their headaches changing and increasing over a period of time.

> "*…. My headaches are never the same… I usually get a one-sided headache that is generally very painful. But sometimes I have a dull ache also in my headache sometimes. The one-sided headache, doctors say it is migraine has increased now it comes everyday…*" – P 2

Headache Factors

In headache disorders, triggers can range from lifestyle factors (eating habits, sleeping habits etc), environmental factors (travelling, head bath etc), psychological factors (fear of headaches, sense of hopelessness and helplessness), social factors (poor understanding of headache disorders, easy availability of OTC analgesics etc).

Lifestyle and Environmental Factors

These are one of the most commonly reported triggers of headache disorders. Poor eating habits and skipping meals was reported by many participants as a trigger. A number of environmental factors such as travelling, being out in the sun were also frequently reported.

> "*… hmm… When I go out in the sun, taking head bath, travelling… I start having headaches.*" – P 4

Sleep and Headache

Sleep is very essential for human beings. Irregular sleeping habits, poor sleep patterns are often reported triggering factors for headache disorders.

> "*Sleep is very important. I don't sleep properly, the next day morning I get up with heavy head and blurry eyes. Within an hour I will have headaches*- P 4

Psychological Factors

A number of psychological factors have been reported as precipitating factors for the headache disorders.

> "*…. When will I free from my headaches? I feel whatever do I am not going to free from these headaches. I feel a headache coming, I get so angry and frustrated. Then god.. the pain becomes more and more bad*"- P 4

Stress and Headaches

Stress is one of the most commonly reported factors in headache condition. Perceived stress and the person's reaction to the same can be a key factor.

> "*…I always get headaches when I worry about something… but you cant stop thinking for that na…*"- P 6

Socio-Cultural Factors

There are a number of socio-cultural factors that contribute towards headache disorders. One of the most prominent is gender, socio-economic status and different kinds of vulnerabilities that add to the stress of headache disorders.

> "*….. I lost myself when I lost husband, I have to manage my kids, work etc etc… I cant stop to think about me right…..*"- P 5

> "*… I am a man, I can't have headaches. I cant say I am in pain, I am not supposed to cry…*"- P 2

The Impact

The impact of headache disorders ranges from personal, familial, social and productive areas too.

Personal Impact of Headache Disorders

The presence of a chronic condition characterised by episodes of pain almost on an everyday basis has a direct impact on the person.

> *"I have almost forgotten who I am…. Pain, Pain Pain…. Every single day there is nothing much left in my life" P 4*

> *"I know taking a lot of medicines is bad for my health but how is one to get away from this pain."*

Familial Impact of Headache Disorders

The headache disorders doesn't only impact the person with headache disorders but also their families.

> *" I feel I am not good enough mother, which mother would be irritated with child, when he wants to play… headache make me like that" – P 3*

Impact of Headache Disorders on Work and Employment

The presence of headache disorders intrudes into a person's day to day activities and their productivity.

> *" I used to help my husband with farming when we both were working we had enough income. Nowadays, I don't get work because I take too many leaves….."- P 4*

> *"I cant afford the treatment for myself. One person earning and having to feed so many mouths… Even buying headache medicines I have to think…" – P 4*

Triangulation of the Results

The Figure 1 represents gives the triangulation of the findings. There were many convergent findings between the two phases of the study, the most outstanding of them were the descriptions of headache disorders, especially that of pain and the associated symptoms. The different triggers of headache especially the environmental and lifestyle factors, the importance of sleep and stress emerged clearly from both the phases of the study. Psychological factors such as anxiety and depression and their association with different dimensions of headache were highlighted in both phases.

The divergent factors were also noticeable. The qualitative phase highlighted significant number of the socio-cultural factors, and the familial impact of headache disorder. The quantitative phase of the study highlighted the relation between the psychological variables and the socio-demographic variables.

Discussion

The conceptualisation of headache disorders had been primarily biomedical. The main type of treatment focused upon is pharmacotherapy. But in the last decade the diverse nature of the triggers for headache disorders have highlighted the need for non-pharmacological therapy to work hand in hand with the medicines to improve treatment efficacy. Hence currently the conceptualisation of headache disorders have moved from a purely bio-medical model to a more broader bio-behavioural model of headache disorders (7,20). Present study attempted to find factors that are convergent and divergent in the biopsychosocial conceptualisation of headache.

The headache characteristics found in the study reveal the chronicity of the headache conditions and the delay in reaching proper treatment. In the study there emerged a rich understanding and description of pain, indicating a preoccupation with the pain experience. A survey of the chronic daily headache characteristics from a similar population found the age range to be 14–44 years, predominantly female gender and primarily chronic tension type headache. The most reported associated symptoms were vomiting, nausea, photophobia and phonophobia (21). Changing nature of the headaches leading to increase in intensity and frequency of headache often increased the distress. The nature of associated symptoms, especially vomiting, fatigue etc were more distressing than the pain itself (22).

Factors that precipitate a headache episode, the triggers, range from environmental factors such as travelling, being out in the sun; lifestyle factors such as skipping meals, poor sleep hygiene, erratic daily routine; psychological factors such as fear of pain, pain catastrophising or maximisation (23). A number of socio-cultural factors like interpersonal issues and major life events in the family context, poor understanding about headache disorders can also become a precipitating and maintaining factor (24).

Stress and sleep disturbance are the most reported trigger in all headache conditions, with more than 90% of patients reporting stress to affect at least some of their headache episodes. Stress is also associated with fear of pain and perceived inability to control pain sensation, leading to the overuse of analgesics leading to the worsening of CDH (25). Sleep was the most common relieving factor. Sleep has a bidirectional relationship with headaches. Sleep is seen both as a trigger and also the most common relieving factor too (26,27).
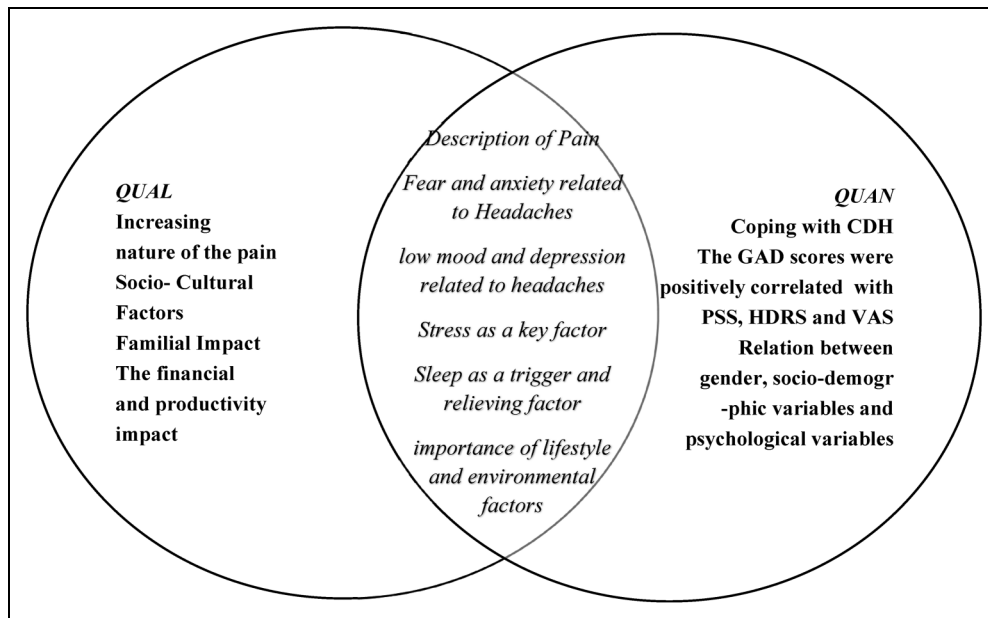
Figure 1. Triangulation of findings.

Dysfunctional coping behaviours have often been an important precipitating and maintaining factor. Pain cognitions and avoidance have been found to increase pain intensity and frequency of headaches (28). In the current study it was found that gender influences the type of coping adopted (29,30).

When headaches and psychiatric comorbidities are explored, a bidirectional relationship between headache, depression, and anxiety, as seen in other studies (31,32). In the current study, it was found that participants had mild/moderate depression, high levels of anxiety, and high levels of perceived stress. All the psychological variables significantly co-related with each other, influencing the headache event (33,34).

The qualitative findings mapped the multi-level impact of headache disorders on the person, which highlighted
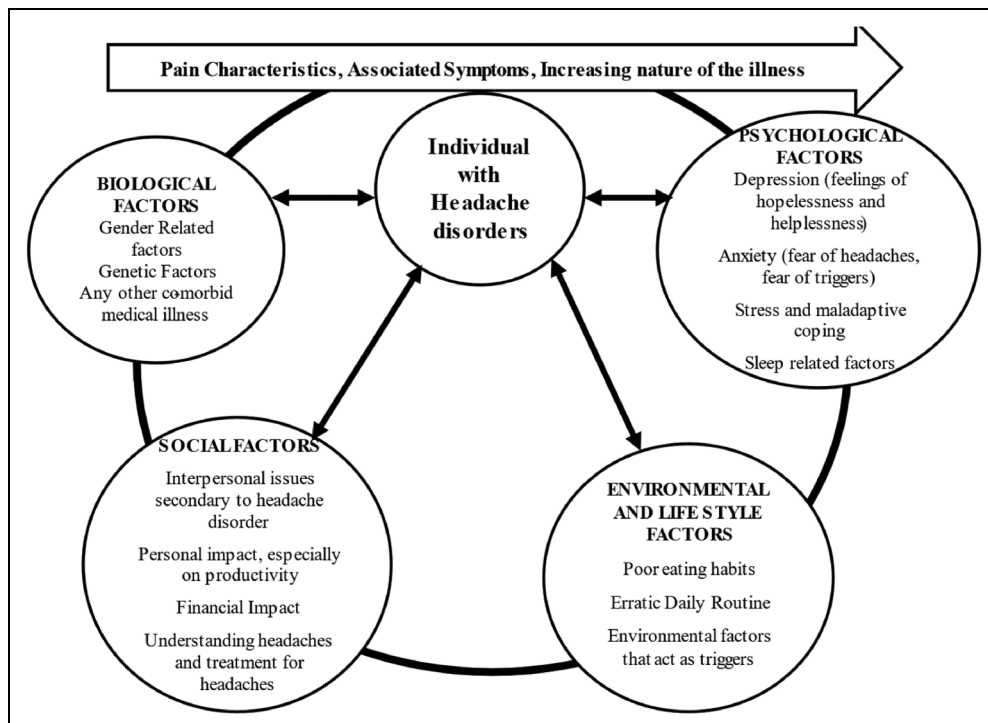

Figure 2. Bio-Psychosocial framework for chronic daily headaches.

the importance of socio-cultural factors that influence headache disorders. The constant presence of headache in their life affects the way they cope with the all the stressors in their life. The study confirms that there are a number of biological, psychological, environmental, lifestyle, socio-cultural factors that influence headache disorders. Understanding these factors would be necessary to address the multi-pronged impact of the condition. Engel's bio-psychosocial model suggested that illness was an entity that is a constant interaction of biological, social, psychological and behavioural factors. Adapting this to chronic pain condition, pain is a convergence of biological, psychological and social processes (35). (Figure 2)

Strengths and Limitations

The main strength of the study is the inductively generated evidence to highlight the need for a broader and more inclusive biopsychosocial framework for chronic headache disorders (Figure 2). This framework would aid the practitioners to be sensitive to the presence of psychological factors that need to be explored, to understand the impact of headache conditions, keeping in mind the socio-cultural context and develop multi-component, wholistic interventions.

The main limitation of the study is the sample size that limits generalisability. The study was conducted among participants who reached out for management of their, headache which could have influenced the findings.

Conclusion

Headache disorders evolve from acute episodes and transform into chronic condition in the complex psychosocial context. Understanding this context helps us to build intervention that address these factors in turn improving the quality of life. Headaches hence can be best conceptualised in a bio-psychosocial model.

ORCID iD

Priya Treesa Thomas https://orcid.org/0000-0003-2421-7303

References

1. Yancey JR, Sheridan R, Koren KG. Chronic daily headache: diagnosis and management. Am Fam Physician. 2014 Apr 15;89(8):642-8.
2. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007;27(3):193-210.
3. Rao GN, Kulkarni GB, Gururaj G, Rajesh K, Subbakrishna DK, Steiner TJ, et al. The burden of headache disorders in India: methodology and questionnaire validation for a community-based survey in Karnataka state. J Headache Pain. 2012;13(7):543-50.
4. Jackson T, Thomas S, Stabile V, Han X, Shotwell M, McQueen K. Prevalence of chronic pain in low-income and middle-income countries: a systematic review and meta-analysis. Lancet [Internet]. 2015 Apr 27;385(S10), [cited 2020 Jun 24]. Available from: http://www.thelancet.com/article/S0140673615608054/fulltext
5. Steiner TJ, Birbeck GL, Jensen RH, Katsarava Z, Stovner LJ, Martelletti P. Headache disorders are third cause of disability worldwide [Internet]. Journal of Headache and Pain. Springer-Verlag Italia s.r.l.; 2015;16:58. [cited 2020 Jun 24]. Available from: https://thejournalofheadacheandpain.biomedcentral.com/articles/10.1186/s10194-015-0544-2.
6. Cho S-J, Chu MK. Risk factors of chronic daily headache or chronic migraine sleep and headache view project sleep and headache study view project risk factors of chronic daily headache or chronic migraine. Curr Pain Headache Rep [Internet]. 2014;19:469 –469. [cited 2020 Jun 24]; Available from https://www.researchgate.net/publication/268794684
7. Rains JC, Penzien DB, McCrory DC, Gray RN. Behavioral headache treatment: history, review of the empirical literature, and methodological critique. Headache J Head Face Pain [Internet]. 2005;45(S2):92-109. Available from: http://10.0.4.87/j.1526-4610.2005.4502003.x%5Cnhttp://0-search.ebscohost.com.library.ucc.ie/login.aspx?direct=true&db=pbh&AN=17101421&site=ehost-live
8. Wade DT, Halligan PW. The biopsychosocial model of illness: A model whose time has come [Internet]. Vol. 31, Clinical Rehabilitation. Sage Publications Ltd; 2017. p. 995-1004 https://doi.org/10.1177/0269215517709890.

9. Andrasik F, Flor H, Turk DC. An expanded view of psychological aspects in head pain: the biopsychosocial model. Neurol Sci [Internet]. 2005 May;26(SUPPL. 2) S89-S91. [cited 2021 Jan 8]. Available from: https://pubmed.ncbi.nlm.nih.gov/15926029/

10. Nicholson RA, Houle TT, Rhudy JL, Norton PJ. Psychological risk factors in headache. Headache. 2007;47(3):413-26.

11. O'Cathain A, Murphy E, Nicholl J. Three techniques for integrating data in mixed methods studies. BMJ [Internet]. 2010 Sep 17;341(7783):1147-50. [cited 2021 Aug 3]. Available from: https://www.bmj.com/content/341/bmj.c4587

12. Creswell J. A Concise Introduction to Mixed Methods Research - John W. Creswell . Sage; 2014 [cited 2020 Sep 3]. Available from: https://books.google.co.in/books?hl=en&lr=&id=51UXBAAAQBAJ&oi=fnd&pg=PR1&dq=a+concise+introduction+to+mixed+methods+research+pdf&ots=69LwK9UqKC&sig=_lSts5AShid1z_GxcMLIJmGRVYk#v=onepage&q&f=false

13. Tashakkori A, Teddlie C. SAGE Handbook of mixed methods in social & behavioral research. SAGE Handb Mix Methods Soc Behav Res. 2015 Dec 23.

14. M HAMILTON. A rating scale for depression. J Neurol Neurosurg Psychiatry. 1960 Feb 1;23:56-62

15. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med [Internet]. 2006 May 22;166-(10):1092-7. [cited 2020 Sep 7]. Available from: https://jamanetwork.com/

16. Cohen S. PERCEIVED STRESS SCALE [Internet]. 1994 [cited 2020 Jan 9]. Available from: www.mindgarden.com

17. Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. Int J Behav Med. 1997;4(1):92-100.

18. Braun V, Clarke V. Thematic analysis. In: APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological [Internet]. American Psychological Association; 2012 p. 57-71. [cited 2020 Dec 29]. Available from: /record/2011-23864-004

19. Hennink MM, Kaiser BN, Marconi VC. Code saturation versus meaning saturation: how many interviews are enough? In: Qualitative Health Research http://dx.doi.org/101177/1049732316665344 [Internet]. 2016 Sep 25;27(4):591-608. [cited 2021 Aug 31]. Available from: https://journals.sagepub.com/doi/full/10.1177/1049732316665344.

20. Rathier L, Rathier L, Roth PJ. EN A biobehavioral approach to headache management. R I Med J [Internet]. 2015;26:28–28. [cited 2021 Jan 8]; Available from http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.684.314

21. Kumar N, Chaturvedi P, Parashar V, Kannauje P, Tiwari R, Bhattanagar R. Clinical profile of chronic daily headache in patient attending tertiary centre. Natl J Physiol Pharm Pharmacol 2018;8(6):771–774.

22. Srikiatkhachorn A, Phanthurachinda K. Prevalence and clinical features of chronic daily headache in a headache clinic. Headache J Head Face Pain [Internet]. 1997 May 1;37-(5):277-80. [cited 2020 Feb 28]. Available from: https://doi.wiley.com/10.1046/j.1526-4610.1997.3705277.x

23. Wöber C, Holzhammer J, Zeitlhofer J, Wessely P, Wöber-Bingöl Ç. Trigger factors of migraine and tension-typeheadache: experience and knowledge of the patients. J Headache Pain. 2006 Sep 11;7(4):188-95.

24. Yadav RK, Kalita J, Misra UK. A study of triggers of migraine in India. Pain Med [Internet]. 2010 Jan 1;11(1):44-7. [cited 2020 Jul 10]. Available from: https://academic.oup.com/painmedicine/article-lookup/doi/10.1111/j.1526-4637.2009.00725.x

25. Houle TT, Butschek RA, Turner DP, Smitherman TA, Rains JC, Penzien DB. Stress and sleep duration predict headache severity in chronic headache sufferers. PAIN® [Internet]. 2012 Dec 1;153(12):2432-40. [cited 2019 Jun 17]. Available from: https://www.sciencedirect.com/science/article/pii/S0304395912005003

26. Rains JC, Steven Poceta J, Penzien DB. Sleep and headaches. Curr Neurol Neurosci Rep. 2008;8:167-175.

27. Thorpy M, Billiard M, Editors S. Tension-Type headache and sleep. Curr Neurol Neurosci Rep. 2015;15:Article number 520, 1-9.

28. Wieser T, Walliser U, Womastek I, Kress HG. Dysfunctional coping in headache: avoidance and endurance is not associated with chronic forms of headache. Eur J Pain [Internet]. 2012 Feb 1;16(2):268-77. [cited 2019 Jun 17]. Available from: https://doi.wiley.com/10.1016/j.ejpain.2011.06.011

29. Bolay H, Ozge A, Saginc P, Orekici G, Uludüz D, Yalın O, et al. Gender influences headache characteristics with increasing age in migraine patients. Cephalalgia [Internet]. 2015 Aug 25;35(9):792-800. [cited 2020 Mar 4]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25424708

30. Rollnik JD, Karst M, Piepenbrock S, Gehrke A, Dengler R, Fink M. Gender differences in coping with tension-type headaches. Eur Neurol [Internet]. 2003;50(2):73-7. https://www.karger.com/Article/FullText/72502. [cited 2020 Mar 4]. Available from.

31. Victor TW, Hu X, Campbell J, White RE, Buse DC, Lipton RB. Association between migraine, anxiety and depression. Cephalalgia. 2010;30(5):567-75.

32. Beghi E, Bussone G, D'Amico D, Cortelli P, Cevoli S, Manzoni GC, et al. Headache, anxiety and depressive disorders: the HADAS study. J Headache Pain [Internet]. 2010 Apr 27;11-(2):141-50. [cited 2019 May 30]. Available from: https://thejournalofheadacheandpain.biomedcentral.com/articles/10.1007/s10194-010-0187-2

33. Leiper DA, Elliott AM, Hannaford PC. Experiences and perceptions of people with headache: a qualitative study. BMC Fam Pract [Internet. 2006 Dec 2;7(1):1-11. [cited 2019 Jun 7]. Available from: http://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-7-27

34. Ashina S, Bendtsen L, Buse DC, Lyngberg AC, Lipton RB, Jensen R. Neuroticism, depression and pain perception in migraine and tension-type headache. Acta Neurol Scand

[Internet]. 2017 Nov 1;136(5):470-6. [cited 2020 Mar 3]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28261782

35. Day MA, Thorn BE, Burns JW. The continuing evolution of biopsychosocial interventions for chronic pain. J Cogn Psychother [Internet]. 2012 Jan 1;26(2):114-29. [cited 2021 May 25]. Available from: https://connect.springerpub.com/content/sgrjcp/26/2/114

Author Biographies

Bhuvaneshwari Balasubramanian is a Senior Research Scholar at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, India. She is currently pursuing her doctoral studies in the area of headache disorders, at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru. Her work in NIMHANS focusses on working with the psychosocial aspects of neurological conditions and especially Primary Headache Disorders.

Vasundharaa S. Nair is a Senior Research Scholar at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, India. She is currently pursuing her doctoral studies in the area of Acute Brain Infections, at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru. Her work in NIMHANS focusses on working with the psychosocial aspects of neurological condition especially in neurological emergency setting.

Nimmy George is research assistant at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, India. She has completed her master's in microbiology, and her work in NIMHANS focuses on working with persons with headache disorders and stroke.

Ashok. V. Reddy is a Neurologist at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, India. He has completed his postdoctoral fellowship in Stroke from National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru. His areas of work focus on Stroke and Headache Disorders.

Priya Treesa Thomas is an Associate Professor of Psychiatric Social Work at the National Institute of Mental Health and Neurosciences, Bangalore, India. She was awarded PhD in Psychiatric Social Work from NIMHANS Bangalore in 2011, for her work with family caregivers of children with Duchenne Muscular Dystrophy. In NIMHANS, her work focuses on psychosocial assessment and interventions with patients and families of the neurologically ill.

Girish B. Kulkarni is a Professor of Neurology at the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, India. He has completed his DM in Neurology from National Institute of Mental Health and Neurosciences. He was awarded fellowship in Stroke from Calgary Institute, Canada in 2017. His areas of expertise include Stroke and Headache disorders.