

Cost estimation of productivity loss, healthcare resource utilization and symptom burden associated with migraine in Indian healthcare setting

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BACKGROUND

- Age-standardized one-year prevalence of migraine in India is 25.2%. This one-year prevalence is higher than the global average of around 14.7%.^{1,2}
- The economic impact of migraine is significant. It affects employee's personal, professional, social and financial wellbeing.^{3,4}
- Migraine prevalence peaks in patients during their most productive years leading to an economic burden⁵
- There are no scientific tools or literature to uncover this economic burden and is often ignored.^{6,7}

OBJECTIVE

- The objective of this study was to develop an evidence-based tool estimating migraine related costs associated with productivity loss, resource utilization and symptom burden

METHODS

Targeted Literature Review

- Targeted literature review was conducted to get insights about local epidemiology and costs related to migraine specifically from Indian perspective
- Authors considered publicly available prices for commonly used acute (acetylsalicylic acid, sumatriptan, almotriptan, naproxen, rizatriptan, zolmitriptan) and preventive (propranolol, topiramate, amitriptyline, flunarizine, divalproex) medications from All India Organization of Chemists and Druggists (AIOD)^{8,9}
- The India wage report 2018 was used to estimate earning potential of each patient and to arrive at the loss of productivity due to migraine related health events¹⁰
- Work productivity and activity impairment data specific to India (N=263) was adopted from MyMigraineVoice online survey.^{3,11}
- This survey was conducted from Sept-2017 to Feb-2018 in patients having at least four monthly migraine days and a failure on prophylactic therapy¹¹
- Table 1 exhibits costs and clinical inputs acquired by conducting a targeted literature review. All costs were presented in Indian currency (₹).

Conceptualization of Evidence-based Tool

- The evidence-based tool for migraine was developed in Microsoft (MS) excel
- Migraine levers that are considered in the tool are presented in Table 2
- These levers were decided based on insights from the targeted literature review and in addition to inputs from key medical experts

Table 1. Cost and Clinical Inputs for Migraine Tool

Variables	Reference
Cost Inputs	
Productivity loss due to absenteeism and absenteeism	(12)
Earning potential of migraine patient per day	(10)
Cost of hospitalizations, brain scans and emergency room visits	(13) & Inputs from KME
Cost of patients taking acute medications (acetylsalicylic acid, sumatriptan, almotriptan, naproxen, rizatriptan, zolmitriptan) and preventive medications (propranolol, topiramate, amitriptyline, flunarizine, divalproex)	(8,9) & KME
Clinical Inputs	
Percentage of work time lost due to migraine based on preventive treatment failure status	
Avg. no. of brain scans	(3, 11) & Inputs from KME
Percentage of patients taking acute medication and preventive medications	

Table 2. Migraine Levers in Evidence-based Tool for Users

Migraine Lever	Lever Description	Options for User	Reference
Migraine Patient's Attributes			
Preventive treatment failure	Characteristics of migraine patients based on their preventive treatment status	- No preventive TRT - 1 TRT failure - 2+ TRT failure	(3,11)
Time horizon	The time horizon for the tool is the duration over which migraine related costs are calculated	- 1 Month - 3 Months - 6 Months - 12 Months	NA
Work status	Patient's work status as employed (working) or non-employed (homemaker)	- Employed - Not-employed (Homemaker) - Not employed (RO)	NA
Earnings per day	Earning potential of each patient is captured. Approximate wages per day are based on latest India wage report 2018	- ₹ 500 - ₹ 1,000 - ₹ 1,500 - ₹ 2,000 - ₹ 2,500	(10)
Migraine Related Cost Estimation			
Productivity Loss	Productivity loss was attributed to absenteeism & presenteeism	- Absenteeism - Presenteeism	(12)
Healthcare Resource Utilization	Resource utilization included costs associated with overnight hospitalizations and emergency room visits	- Emergency room visit - Overnight hospitalization	Inputs from KME
Symptom Burden	Expenses related to brain scans and pharmacological management	- Brain scans - Pharmacological management	(11)

TRT, treatment

RESULTS

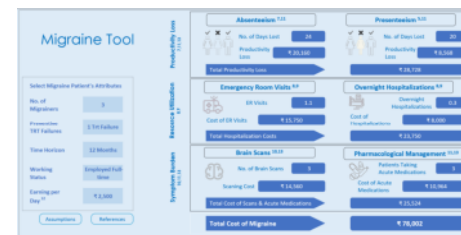
- Tool dynamically demonstrates total cost of migraine based on user provided inputs and are presented in Table 3 and Figure 1
- Average annual cost of migraine was lowest in patients with 1 treatment failure (₹45,751) and highest in patients with 2+ treatment failure (₹173,119)
- Productivity loss due to absenteeism and presenteeism was the cost driver across all patient profiles. Costs incurred due to productivity loss was in the range of ₹22,200 - ₹61,230 and represented 35% to 50% of the total annual migraine costs
- Costs due to healthcare resource utilization was in the range of ₹13,625 to ₹86,640, while expenses related to brain scans and pharmacological management were in the range of ₹9,116 to ₹25,249 (Table 3)

Table 3. Annual total cost of migraine across patients with preventive treatment failures

Cost Head	No Preventive Treatment	1 Treatment Failure	2+ Treatment Failure	Cost Range
Absenteeism	₹21,870	₹14,250	₹7,200	₹7,200 - ₹35,100
Presenteeism	₹10,725	₹9,450	₹15,810	₹8,450 - ₹26,130
Productivity Loss	₹32,595	₹23,700	₹23,010	₹61,230 - ₹1,230
Hospitalization	₹13,650	₹30,450	₹8,000	₹66,000 - ₹8,000 - ₹86,000
Emergency Visit	₹5,940	₹7,245	₹5,625	₹20,640 - ₹5,625 - ₹20,640
HRU	₹19,590	₹37,695	₹13,625	₹8,640 - ₹13,625 - ₹86,640
Brain Scans	₹5,576	₹8,640	₹5,200	₹13,552 - ₹5,200 - ₹13,552
Pharmacological Mgmt.	₹16,062	₹4,996	₹3,916	₹11,697 - ₹3,916 - ₹16,062
Symptom Burden	₹21,638	₹13,638	₹9,116	₹25,249 - ₹9,116 - ₹25,249
Total Costs	₹73,823	₹75,031	₹45,751	₹173,119 - ₹45,751 - ₹173,119

HRU, healthcare resource utilization; Postlogical, pharmacological; Mgmt, management. All costs are presented in Indian Rupees (₹)

Figure 1. Snapshot of the cost estimation tool in migraine



TRT, treatment

CONCLUSIONS

- Evidence-based tool provides insights related to economic burden associated with migraine in Indian setting. This includes productivity loss, healthcare resource utilization and symptom burden
- In a self-pay market like India, evidence-based tool enables decision makers to make an evidence-based decision for improved health outcomes
- Increasing cost burden in migraine can be reduced by optimal preventive treatment.

Discussion

- Employers in India might not be aware of the productivity losses that are incurred due to migraine in their employees and the extent to which these losses can significantly be reduced by optimal preventive treatment
- There are limitations of this tool that should be acknowledged. Employer's productivity losses could vary largely as there are variations in wage structures across different sectors. The tool does not consider other patient centric variables such as gender, etiology, age, presence of comorbidities, medication adherence etc. These variables need to be studied and incorporated into the tool in near future

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