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Study of price disparities among various brands of drugs used for post-traumatic stress disorder (PTSD) in the Indian pharmaceutical market

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Abstract

In order to assess the cost disparities and percentage variations in the pricing of various brands of commonly prescribed drugs for Post-Traumatic Stress Disorder within the Indian pharmaceutical market, the following methods were employed:

The highest and lowest prices for each brand of the drug, denominated in INR, were recorded using data from CIMS January to April 2023 edition and Drug Today Vol-1. The cost ratio and percentage cost variation were then computed for each individual drug brand. The calculation included determining the cost for one bottle in the case of 100ml syrup and 10 tablets/capsules for oral drugs, and recording the cost for one vial or ampoule in the case of injectable drugs. Subsequently, a comparison was made between the cost ratios and percentage cost variations of the different drug brands.

The findings revealed that among the Post Traumatic Stress Disorder drugs studied: Paroxetine (2mg) capsules displayed the highest cost ratio at 7.49 and the highest percentage cost variation at 649. Citalopram (20mg SR tablets) exhibited the lowest cost ratio at 2.25 and the lowest percentage cost variation at 125. In conclusion, it is worth noting that Post Traumatic Stress Disorder is a prevalent condition often requiring extended treatment with medication. Therefore, prescribing expensive brands places an unnecessary financial burden on patients. Additionally, significant variations in the cost of different brands of post-traumatic stress disorder drugs exist in the Indian market. Clinicians prescribing these medications should be mindful of these cost discrepancies in order to optimize the cost-effectiveness of drug therapy.

Keywords: PTSD, SSRI, SNRI, cost, efficacy

Introduction

Posttraumatic stress disorder (PTSD) was reclassified as a trauma and stress-related disorder in the DSM-5. Globally, mental illness accounts for approximately 14% of the burden of disease, with depression and anxiety being leading causes of disability ^[1]. PTSD is characterized by reexperiencing a traumatic event, such as sexual assault, severe burn, or military combat, along with a diminished response to current events related to the trauma. Research indicates that 5-10% of the population has suffered from PTSD, and it is twice as common in women as in men ^[2]. PTSD is more prevalent when the traumatic event is associated with physical injury.

Individuals with PTSD often face additional challenges, with 20-40% experiencing issues like divorce, parenting difficulties, legal problems, and substance abuse. Several psychological interventions have proven effective in treating PTSD in adults, with eye movement desensitization and reprocessing (EMDR) and trauma-focused cognitive-behavioural therapy (TF-CBT) ^[3] being prominent among them.

Etiology and Pathology

In the realm of PTSD, it is theorized that an excessive release of norepinephrine stemming from the locus coeruleus, triggered by stress, leads to heightened noradrenergic activity within the hippocampus and amygdala ^[4]. These changes, in theory, facilitate the formation of fear-based memories ^[5].

PTSD often manifests with heightened sympathetic responses to cues linked to the traumatic event, while pituitary adrenal responses tend to be diminished.

Treatment

Psychotherapy: Psychotherapy is best initiated promptly after the traumatic event, usually comprising a concise 8-12 session program, especially once the individual is in a safe environment. Various approaches like cognitive processing therapy, prolonged exposure therapy, and eye movement desensitization reprocessing have proven effective in significantly reducing symptom duration.

Medical: For alleviating depression, panic attacks, sleep disturbances, and startle responses in PTSD, SSRIs (Selective Serotonin Reuptake Inhibitors) have shown efficacy. Sertraline and paroxetine are FDA-approved for this purpose, making SSRIs the sole class of medications endorsed for PTSD treatment. Early intervention with beta blockers (e.g., Propranolol, 80-160mg orally daily) may ameliorate peripheral anxiety symptoms (e.g., tremors, palpitations) ^[5] but does not appear to prevent the development of PTSD. Non-adrenergic agents such as clonidine (titrated from 0.1 mg orally at bedtime to 0.2 mg three times daily) help manage hyperarousal symptoms. Alpha-adrenergic blockers like Prazosin (2-10mg orally at bedtime) are effective in reducing nightmares and enhancing sleep quality in PTSD. Antiseizure medications such as carbamazepine (400-800 mg orally daily) can mitigate impulsivity and anger management difficulties. While benzodiazepines like clonazepam (1-4 mg orally daily, divided into one or two doses) can reduce anxiety and panic attacks, concerns about dependency exist ^[6].

Prognosis: The prognosis for PTSD improves when therapy is initiated promptly after the trauma. Approximately half of the patients experience chronic symptoms, with the best prognosis seen in those with good premorbid psychiatric functioning. Acute stress disorder patients tend to fare better in the long term compared to those with delayed posttraumatic disorder ^[7].

The Department of Pharmacology at IGIMS has undertaken the commendable task of developing a personal formulary. Ensuring affordable access to the appropriate medication is crucial for patients hailing from disadvantaged socioeconomic backgrounds. The high cost of medications may impose a significant economic burden, consequently reducing adherence to prescribed treatments or resulting in complete non-compliance. Non-adherence, in turn, leads to incomplete treatment, ultimately leading to heightened morbidity. It is worth noting that there is a significant disparity in the pricing of various brands of identical generic drugs within the Indian pharmaceutical market. Research has indicated that an escalation in patient medication expenses correlates with a decline in adherence to prescribed medications ^[8].

Clinical Findings

The cornerstone of diagnosing PTSD lies in the patient's history of exposure to a perceived or real life-threatening event, severe injury, or sexual violence ^[3]. It's worth noting that this can also encompass serious medical illnesses, and individuals who have experienced such illnesses, like cancer, have a higher prevalence of developing PTSD ^[9].

Symptoms associated with PTSD encompass various aspects, including:

- **Intrusive Thoughts**
- These can manifest as flashbacks and nightmares, wherein the traumatic event reappears vividly in the patient's mind.
- **Avoidance**
- Individuals with PTSD often engage in withdrawal or avoidance behaviours, steering clear of situations or stimuli that may trigger distressing memories.
- **Negative Thoughts and Feelings**
- This category includes a range of emotional and cognitive symptoms, often resulting in pessimistic outlooks and persistent feelings of guilt, shame, or fear.

Increased Reactivity

Physiological hyperarousal is common in patients with PTSD. This can manifest as exaggerated startle reactions, distorted perceptions (illusions), overgeneralized associations, sleep disturbances, nightmares specifically related to the traumatic event, impulsivity, concentration difficulties, and heightened alertness.

Moreover, it's important to recognize that symptoms can be triggered or worsened by events that serve as reminders of the original trauma. In some cases, symptoms may have a delayed onset, such as when individuals who experienced childhood abuse develop PTSD later in life ^[10]. The DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) stipulates that these symptoms must persist for at least one month to meet the criteria for a diagnosis of PTSD. Given the array of available interventions and the necessity for efficient healthcare resource allocation, this study aimed to assess the cost-effectiveness of various psychological treatments for PTSD in adults ^[11]. The study was conducted from the perspective of the National Health Service (NHS) and Personal Social Services (PSS) in India, utilizing decision-analytic economic modelling. Therefore, the current study was undertaken to assess the cost discrepancies among various brands of Post traumatic drugs accessible in the Indian pharmaceutical market ^[12].

Materials and Methods

The study involved gathering the prices in Indian rupees (INR) of anti-epileptic drugs from various pharmaceutical companies in India. This data was sourced from the January to April 2018 edition of Current Index of Medical Specialists (CIMS) and the April to June 2023 issue of Drug Today, Volume 1 & II. These sources were chosen for their accessibility and regular updates. The cost of 10 tablets/capsules, a single bottle of syrup, and one ampoule/vial for each drug formulation were computed. Additionally, we cross-verified the drug prices at local pharmacies or retail stores.

To assess the cost variations, we calculated the difference between the highest and lowest prices for the same drug made by different manufacturers. We also determined the percentage variation in prices using the formula: Percentage cost variation = (Maximum cost - Minimum cost / Minimum cost) x 100. For each drug, we noted the maximum and minimum percentage cost variation as well as the cost ratio, calculated as follows: Cost ratio = Price of the costliest brand / Price of the least costly brand.

Inclusion criteria for the study encompassed drugs belonging to the PTSD category, with doses available in capsule/tablet, syrup, or ampoule/vial forms, and from reputable pharmaceutical companies. Additionally, drugs with various strengths were included.

Exclusion criteria involved drugs that were combined with other medications or were from dubious manufacturing sources.

Results: The results of the study revealed that tablet

Paroxetine (20-50mg) had the highest cost ratio and percentage cost variation at 7.49 and 649 in SSRI, respectively, while tablet Citalopram (2mg SR tablet) exhibited the lowest cost ratio and percentage cost variation at 2.25 and 125, respectively. To minimize the cost of drug therapy, we recommend selecting drugs with a cost ratio of less than 2 and a percentage cost variation of less than 100. In this context, tablet Paroxetine 20 mg SR tablet emerges as the preferred option due to its lower cost ratio and reduced percentage cost variation.

Table 1: Different groups of drug: Cost ration and percentage cost variation of Post-traumatic stress disorder drugs available in Indian pharmaceutical market

Drug/Drug Group	Dose	No of Brands	Range per tab	min/max	Average cost	Price ratio	% Price variation
1. SSRI							
a. Fluoxetine	20-60mg	29	2.5/10.3		6.4	4.12	312
b. Paroxetine	20-50 mg	7	3.75/28.1		17.8	7.49	649
c. Escitalopram	10-20 mg	33	2.8/13.43		9.51	4.79	379
d. Sertraline	25-200mg	23	2.4/13.7		8.05	5.70	470
e. Citalopram	20-60 mg	9	5.67/12.8		12.07	2.25	125
2. SNRI							
a. Venlafaxine	37.5-225mg	17	1.9/70.0		35.95	36.84	3584
3. Benzodiazepin							
a. Diazepam	5 - 30mg	13	0.29 / 2.52		40.5	8.68	768
b. oxazepam	30 - 60mg	3	0.66 / 1.14		0.9	3.93	72
c. Lorazepam	1 - 6mg	15	0.75 / 1.85		33.3	2.46	146
4. Beta Blockers							
1.Propranolol	40 -120mg	g 8	1.35 / 2.47		1.91	1.82	82

Given that Post traumatic stress is a prevalent central nervous system disorder, oral medications are often prescribed for extended periods. By selecting more cost-effective brands, patients can avoid unnecessary expenses. Physicians should be mindful of these cost variations when prescribing Post traumatic stress disorder drugs, as they can significantly impact the financial burden on patients. In India, there is often limited awareness among doctors regarding the price disparities among different brands of the same drug. Having access to information on drug prices could empower physicians to make more cost-effective choices, ultimately benefiting their patients.

Discussion

The costs of drugs are regulated by the Drug Price Control Order of 2013 (DPCO) [13]. Therefore, it becomes imperative to highlight the prices of different drug formulation brands in order to lower the overall cost of treatment. It is crucial to inform the treating physician about the most cost-effective drug option among the various brands, ensuring that the patient's financial burden is minimized [12].

The Indian market boasts an array of over 100,000 formulations, and it lacks a centralized system for registering medicines. Multiple companies sell the same drug under different brand names, apart from the original innovator company [11]. This situation has led to significant price disparities among marketed drugs [16].

These substantial price variations among various formulations of the same drug have profound economic implications in India. In contrast to developed countries, individuals in developing nations bear the entire cost of their medications, paying out of pocket. Many impoverished people frequently find themselves in the challenging position of choosing between purchasing medicines and securing essentials like food due to limited resources and

high drug prices. Hence, the cost of medicines is a critical concern in India, where over 80% of healthcare financing is shouldered by patients.

Studies have demonstrated that providing physicians with a manual containing comparative drug prices along with prescribing guidance can reduce the expenses incurred by their patients, especially in the case of chronic conditions like hypertension, which require long-term treatment.

Conclusion

In today's context, several drugs are subject to government regulation through the Drug Price Control Order (DPCO) [13]. It is essential for physicians to bear in mind that they should not refrain from prescribing a specific drug simply because it is expensive. Instead, they should strike a balance in their therapeutic decisions by taking into account the patient's socioeconomic status.

There exists a pressing necessity to raise awareness regarding the substantial price discrepancies among drugs. This awareness should target the general public, healthcare professionals, healthcare financiers, government entities, policymakers, and pharmacists. Such efforts are crucial to facilitate appropriate interventions aimed at alleviating the economic burden on patients and the healthcare system.

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