Section: Anesthesiology

Original Research Article

EFFECT OF CHRONIC PAIN ON THE DAILY LIFE OF PATIENTS RECEIVING TREATMENT FROM A PAIN CLINIC IN A TERTIARY CARE CENTRE IN SOUTH INDIA - A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Chronic pain is a complex condition affecting multiple domains of daily life, with limited region-specific evidence from South India. This study assessed the association between pain intensity and daily life interference and evaluated the influence of treatment modalities and patient characteristics.

Materials and Methods: A serial cross-sectional observational study was conducted among adult chronic pain patients (≥3 months) attending a tertiary care centre. Pain intensity and interference were assessed using the Visual Analogue Scale (VAS) and Brief Pain Inventory (BPI). Statistical analysis included Spearman's correlation and multivariable linear regression adjusting for confounders.

Results: Among 73 participants (mean age 51.7±11.8 years; 70% female), baseline median VAS score was 7 (IQR 5–8). A strong positive correlation between pain severity and interference was observed before treatment (ρ=0.76, $p<0.001$) and after treatment (ρ=0.87, $p<0.001$). Mean BPI scores significantly decreased from 5.4±1.8 to 3.5±1.8 ($p<0.001$). Pain intensity measures also improved: average pain reduced from 5.8±2.0 to 3.9±2.0 ($p<0.001$). Opioid-only therapy showed greater median pain relief (2.29, IQR 1.68) compared to non-opioid therapy (1.07, IQR 1.73; p=0.0117). Pain intensity independently predicted interference (β=0.639, 95% CI: 0.517–0.761; $p<0.001$). Malignant conditions showed poorer response (β=–0.970, p=0.002).

Conclusion: Chronic pain significantly impairs daily functioning, with pain intensity strongly predicting interference. Combined and opioid-based therapies provide superior relief, supporting multimodal management approaches.

Keywords: Chronic Pain, Pain Measurement, Quality of Life, Analgesics, Opioid, Cross-Sectional Studies.

INTRODUCTION

Chronic pain transcends disease boundaries. While universally experienced, its treatment remains complex due to the difficulty of quantifying it. The International Association for the Study of Pain (IASP) defines chronic pain as "persistent or recurrent pain lasting for longer than 3 months".[1] A study conducted by Johns Hopkins University economists estimated the annual cost of chronic pain to quantify its burden better. The estimate in the US was at a staggering $635 billion in 2010, exceeding cancer, heart disease, and diabetes combined.[2] A study in Central India found an average of 11 workdays lost per adult participant, incurring significant financial losses.[3] The mean annual economic loss was 4.9% of the annual per capita income for the village under study during that time.[3] There is a global burden of chronic pain. In 2021, over 20% of US adults experienced chronic pain, with nearly 7% experiencing high-impact pain.[4] Prevalence of chronic pain is documented in Europe, America, and Australia through extensive studies, but there is a dearth of such data from Asian countries. Due to differences in not only culture but also genetic variation between these groups, the findings of these

studies cannot be accurately extrapolated to our settings. One Indian study reported a 19.3% prevalence of chronic pain, with a higher rate and significant impact on daily function in females.[5] This not only shows significant prevalence but also demonstrates that impairment is a burden not only to the individual but also to the economy of the country. Hence, studies on chronic pain are crucial.

The primary objective of this study was to assess the association between pain intensity and its effect on daily life among patients receiving treatment. It also focused on the effects factors like sex, duration, diagnosis, and socioeconomic status had on patients treated for chronic pain. By collecting data on demographics, pain characteristics, and treatment modalities used in a clinical setting, the study aims to provide preliminary insights into present pain management strategies.

MATERIALS AND METHODS

This institutional based serial cross sectional observational study was conducted at a tertiary care medical college for a duration of three months. Prior approval from the Institutional Ethics Committee (IEC) was obtained (IEC/2024/3/55). The trial was also registered under CTRI (CTRI / 2025 / 08/092770). Written informed consent was obtained from all the participants. Adult patients receiving treatment from pain clinic for chronic pain were participants of the study.

Consenting participants 18 years and older, who had experienced pain for three months or more, patients who were able to understand and complete the questionnaire in the chosen language were included in the study. Patients with known psychiatric disorders, pregnant and breastfeeding patients were excluded from the study.

A structured questionnaire was used for data collection. The outcome measurement was done using the Brief Pain Inventory (BPI). The questionnaire was translated into the local language of the patients, and its linguistic validity was tested by back- translating to English with the help of language experts. The BPI is a self-administered measure of the sensory and reactive dimensions of pain (the severity or intensity of the pain and the level of interference it has on various aspects of life). Interference is divided into activity and affective sub-dimensions. The BPI has been used to measure pain in a range of conditions, including cancer, musculoskeletal conditions and depressive disorders.[6,7] It collects information on the location of pain, the current medications and treatment the patient is under and the interference of chronic pain on various aspects of life. All consecutive patients attending pain clinic were offered participation and recruited. The treatment groups were divided as the opioid-only group, the non-opioid-only group and the combined opioid and non-opioid group. [Figure 1] Basic demographics, such as age, gender, occupation, education, and socioeconomic status, were noted. The site of the pain, its duration, type, aggravating and relieving factors were noted down for each patient. At the start of treatment, pain variables were assessed using the Visual Analogue Scale (VAS) and Brief Pain Inventory (BPI). VAS - Visual analogue scale, consists of a line with one end representing no pain and another end representing the worst pain. The participants were asked to point to a position in the line that indicated their pain level at that moment. After two weeks, the participants were reassessed similarly with the questionnaires to compare their experience of chronic pain.

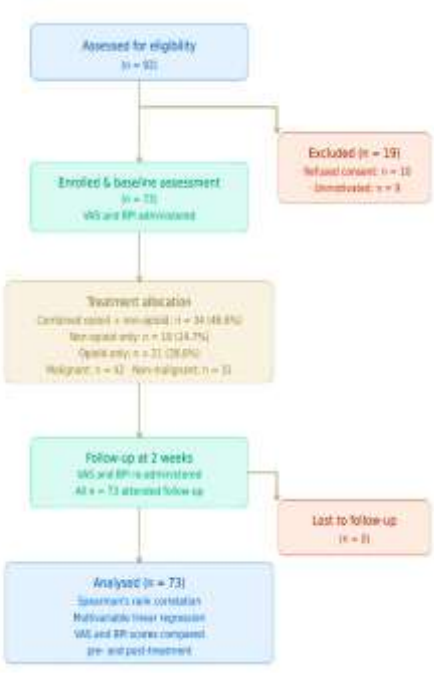

Figure 1: Study flow chart (STROBE flow diagram)

The sample size was calculated based on a formula for correlation studies. The formula used incorporated the anticipated correlation coefficient based on the psychometric validation of BPI, an allowable error of 20% and a confidence interval of 95%. The required sample size was determined to be 73.[6] Data was compiled in Microsoft Excel and subsequently analysed using the statistical software STATA. Descriptive statistics were employed to summarise demographic and baseline characteristics, including age, gender, occupation, education, socioeconomic status, pain site, pain duration, pain type, and aggravating/relieving factors. Means and standard deviations were calculated for continuous variables (e.g., age, pain duration, quality of life domains), while frequencies and percentages were used for categorical variables (e.g., pain interference, socioeconomic status). To assess the association between pain intensity and its effect on daily life, the VAS and BPI scores were used. Spearman's rank correlation coefficient was utilised for the data, as it was not normally distributed. Additionally, multiple linear regression analysis was conducted to examine

the independent effects of pain intensity (VAS) on daily life measures (BPI) while adjusting for potential confounding factors. For this purpose, the data was converted from wide form to long form for BPI and VAS scores. The confounders chosen were age, sex, socio-economic status, diagnosis (malignant or non-malignant), and type of treatment (opioid only, NSAID only or combination). Initially, univariable linear regression was conducted, and variables with $p < 0.25$ were included in the multivariable model. The level of significance was considered at $P < 0.05$.

RESULTS

The study comprised a total of 92 participants initially; 19 participants were excluded due to a lack of motivation to fill out the questionnaire and a lack of informed consent. 73 participants were included in the study. The social demographic characteristics of the study sample are shown in Table 1. At baseline, the pain intensity measured by the VAS was 7, with an IQR of 3 (range 5–8), suggesting that most participants experienced moderate to severe pain. A significant positive correlation was observed between pain severity and pain interference, both before and after treatment. [Figure 2] Before treatment, Spearman's rank correlation coefficient was $\rho = 0.76$, $p < 0.001$, and after treatment, this correlation further strengthened, with $\rho = 0.87$, $p < 0.001$, indicating that higher pain severity means greater interference with daily life.

Table 1: Sociodemographic characteristics of the study sample

Variable	Categories	Observation
Age (years)	–	Mean ± SD: 51.7 ± 11.8
Sex	Female	51 (70.0%)
	Male	22 (30.0%)
Socioeconomic Status	Lower	6 (8.22%)
(Kuppuswamy scale)	Upper-lower	31 (42.47%)
	Middle	36 (49.32%)
Diagnosis	Malignant	42 (57.53%)
	Non-malignant	31 (42.47%)
Duration of Pain	–	Median: 5 months IQR: 3–7 months
Baseline Pain Intensity (VAS)	–	Median: 7 IQR: 5–8
Mode of Treatment	Combined opioid + non-opioid	34 (46.6%)
	Non-opioid only	18 (24.66%)
	Opioid only	21 (28.77%)

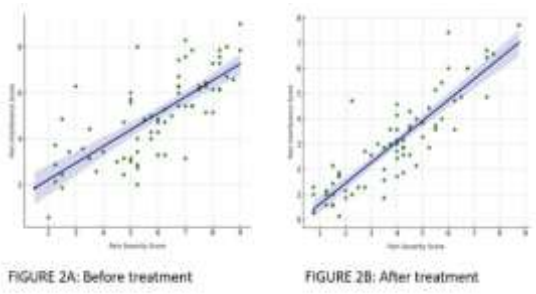

Figure 2: Co relation between pain severity and interference

Pain relief was greater in the opioid-only group (median 2.29, IQR 1.68) compared to both the non-opioid group (median 1.07, IQR 1.73; $p = 0.0117$) and the combined treatment group (median 1.83, IQR 0.86; $p = 0.0331$). There was no significant difference between the combined and non-opioid only groups ($p = 0.087$). No statistically significant association was found between duration of pain and socioeconomic status. However, a trend was noticed in participants from upper-lower socioeconomic backgrounds who tended to report longer durations of pain more often than those from other categories. Of the 73 participants, 42 were malignant, and 31 were non-malignant cases. Among those receiving combined opioid and non-opioid therapy, the distribution was equal, with 17 (50.0%) having malignant and 17 (50.0%) having non-malignant conditions. The overall association was not statistically significant ($\chi^2 = 2.38$, $p = 0.304$), indicating that diagnosis type did not significantly influence the treatment modality.

The lower limbs were the most affected pain site, with 31.51% of participants reporting pain in this region. This was followed by the upper back (36.99%) and lower back (30.14%), highlighting a high prevalence of axial musculoskeletal involvement. Among the anterior regions, thoracic and upper limb involvement were each reported by 26.03% of participants, while head and neck pain was similarly frequent (26.03%). Pain in the abdomen and groin was reported by 17.81%, making it the least commonly affected anterior site. [Figure 3] Posteriorly, aside from the upper and lower back, middle back pain was less commonly reported (13.70%). Notably, multisite pain was common, with several participants experiencing symptoms across both axial and appendicular regions. For the purposes of this study, pain severity has been classified as mild, moderate or severe. based on its interference with function.

Pain intensity dropped significantly in all parameters assessed (worst pain felt, least pain felt, average pain felt, and current pain levels) and significant relief was noted following treatment. [Table 2] The impact of pain on various aspects of daily life also showed improvement following treatment. [Table 3] The

Brief Pain Inventory (BPI) score decreased from 5.4 (SD: 1.8) at baseline to 3.5 (SD: 1.8) after treatment ($p < 0.001$).

Table 2: Change in pain intensity before and after treatment

BPI severity item (past 24 hours)	Before treatment Mean (SD)	After treatment Mean (SD)	P value
Worst pain	7.6 (1.8)	6.0 (2.2)	<0.001
Least pain	3.9 (2.2)	2.0 (1.8)	<0.001
Average pain	5.8 (2.0)	3.9 (2.0)	<0.001
Pain right now	6.1 (2.2)	3.8 (2.2)	<0.001
Pain relief from medication	5.0 (2.7)	6.7 (2.3)	<0.001

Table 3: Effect of pain on quality-of-life indicators

	Mean (SD)		Median (IQR)		Patients scoring 7–10 on BPI (95% CI)	
How much has pain affected the following in the past 24 hours?	**Prior to treatment**	**2 weeks after treatment**	**Prior to treatment**	**2 weeks after treatment**	**Prior to treatment**	**2 weeks after treatment**
General activity	6.4 (2.5)	4.4 (2.5)	7 (4–8)	5 (2–6)	54.8% (43.1–66.0)	24.7% (16.0–36.0)
Mood	5.2 (2.4)	2.8 (2.3)	6 (3–7)	2 (1–4)	35.6% (25.4–47.4)	8.2% (3.7–17.3)
Walking ability	5.1 (3.6)	3.3 (3.0)	6 (1–8)	3 (0–6)	41.1% (30.3–52.9)	17.8% (10.5–28.5)
Normal work	6.4 (2.3)	4.2 (2.3)	7 (4–8)	4 (2–6)	52.1% (40.5–63.4)	20.5% (12.7–31.5)
Relations with other people	1.8 (1.9)	0.9 (1.6)	1 (1–2)	0 (0–1)	5.5% (2.0–13.9)	1.4% (0.2–9.4)
Sleep	4.2 (2.9)	2.2 (2.3)	4 (2–6)	2 (0–3)	24.7% (16.0–36.0)	6.8% (2.8–15.6)
Enjoyment of life	5.8 (2.3)	3.5 (2.2)	6 (4–7)	3 (2–5)	41.1% (30.3–52.9)	13.7% (7.5–23.8)
Overall BPI interference score	**5.4 (1.8)**	**3.5 (1.8)**	**5 (4–6.9)**	**4 (2–4.4)**	–	–

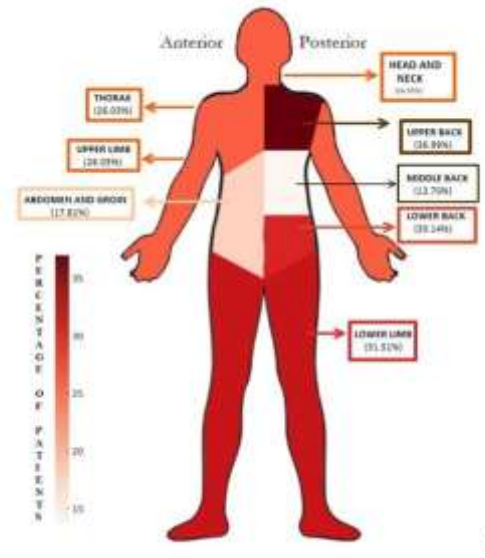

Figure 3: Heat map of pain distribution across body parts

A multivariable linear regression was performed to identify factors associated with pain interference scores. [Table 4] After adjusting for relevant clinical and demographic factors, it was noted that pain intensity (VAS score) was significantly associated with pain inventory scores ($\beta = 0.639$, 95% CI: 0.517 to 0.761; $p = <0.001$) even after adjusting for malignancy and treatment provided to the participants (Opioid only, non-opioid only or combined treatment). It was also noted that there was higher BPI scores (more pain related interference) among participants treated with non-opioids only ($\beta = –0.791$; 95% CI: –1.533 to –0.051; $p = 0.036$) as compared to combined treatment with opioid and non-opioid which means participants who received combined treatment and opioid only treatment showed more improvement ($\beta = –0.293$; 95% CI: –0.991 to –0.405; $p = 0.408$) in their pain scores as compared to those treated with non-opioids alone. Further, those treated with opioids only had smaller pain reduction than participants receiving combined treatment, but this was not statistically significant. Additionally, participants who had malignant conditions also demonstrated a smaller reduction in pain scores ($\beta = –0.970$; 95% CI: –1.591 to –0.350; $p = 0.002$) as compared to those with non- malignant conditions; that is, non-malignant diagnoses responded better to treatment in comparison with malignant diagnoses. This also proved significant in the adjusted model. No significant associations were found for age, sex, or socioeconomic status after adjustment ($p > 0.05$). [Table 4]

Table 4: Association of various factors with BPI score

Variable	Crude Beta Coefficient (95% CI)	P Value (Crude)	Adjusted Beta Coefficient (95% CI)	P Value (Adjusted)
Age	–0.126 (–0.280, 0.037)	0.131	–0.185 (–0.498, 0.129)	0.246
Sex (reference: female)				
Male	–0.027 (–0.446, 0.393)	0.900	0.498 (–0.182, 1.178)	0.150
Treatment modality (reference: combined opioid + non-opioid)				
Non-opioid only	–0.896 (–1.368, –0.423)	<0.001	–0.792 (–1.533, –0.051)	0.036
Opioid only	–0.399 (–0.849, 0.050)	0.082	–0.293 (–0.991, 0.405)	0.408
Diagnosis (reference: non-malignant)				
Malignant	–0.940 (–1.320, –0.561)	<0.001	–0.970 (–1.591, –0.350)	0.002
Socioeconomic status (reference: middle class)				
Lower class	0.350 (–0.376, 1.076)	0.344	0.435 (–0.686, 1.556)	0.444
Upper-lower class	0.053 (–0.350, 0.456)	0.797	0.089 (–0.559, 0.738)	0.785
VAS score	0.623 (0.544, 0.702)	<0.001	0.639 (0.517, 0.761)	<0.001

DISCUSSION

Chronic pain is a global issue that incurs major healthcare costs, lowers productivity and causes significant suffering, disabilities, somatic symptoms and strained interpersonal relationships.[3] The subjective nature of chronic pain makes it challenging to manage, a challenge that can be mitigated by an objective and accurate scale to measure the experience of chronic pain. The tool should appropriately translate symptom severity to measurable results. The BPI and the VAS were chosen for this study due to their reliability, validity, and ease of administration. Our study showed a significant positive correlation between pain severity and interference both before (ρ=0.76, $p<0.001$) and after treatment (ρ=0.87, $p<0.001$). These results are in accordance with the pre-existing literature. Many studies discuss how pain intensity and disease activity cause functional impairment, impairment that is improved by treating the pain.[7,8] Furthermore, Moreno-Ligero et al,[7] also elaborates how pain is compounded by the negative effects on psychological domains of daily life, like depression and anxiety.

The experience of chronic pain is influenced by many sociodemographic (age, gender) and clinical (malignant, non-malignant) factors. As such, when developing interventions for chronic pain management, these variables must be considered.[5,8,9] Our multivariate analysis [Table 4], demonstrated a trend of older patients experiencing smaller pain reductions, a finding that was not significant in both the crude and adjusted models. Tinnirello A et al,[10] discusses how the elderly are more susceptible to chronic pain due to delayed recovery from injury, hyperalgesia and decreased efficacy of endogenous opioid production areas which could be the reason for lesser reduction of pain with age. Studies on the effect of sex on pain have been scarce historically, due to presence of inherent sex biases. In our study, there was a non-significant trend of women reporting longer durations of chronic pain. This aligns with present research which suggests women have both a higher prevalence of chronic pain and a higher sensitivity to its perception as compared to men. A study by Casale R et al,[11] attributed biological and psychosocial factors as potential reasons as to why women report pain more frequently and why they are at a higher risk for many chronic pain conditions like fibromyalgia and rheumatoid arthritis. Miclescu et al report that women may return to baseline more quickly than men following pain stimuli, indicating faster recovery.[12] A 2021 meta-analysis by Prego- Domínguez J et al,[9] showed a relation between lower socioeconomic classes and chronic pain, attributing the finding to factors like more prevalence of manual labour, lower education leading to poor pain coping strategies and unhealthy lifestyle factors like tobacco or alcohol, with lack of social support. Even at the same intensity of pain and the same number of painful body sites, people in the lowest socioeconomic classes were two to three times more likely to feel disabled through pain as compared to the highest socio-economic class.[13] Since most of these studies were done in developed countries, their results cannot be directly extrapolated to developing countries.

The crude analysis of this study found that non-malignant diagnoses responded better to treatment in comparison with malignant diagnoses. [Table 5] Malignant pain is multifactorial, with the origin of pain being attributed not only to the cancer itself but also to the modalities used in its management, all of which must be addressed to treat malignant pain.[11] Both malignant and non-malignant groups received similar treatment for chronic pain, though a non-significant trend was seen where cancer patients were more commonly put on single drug regimens as compared to non-cancer-related chronic pain. Combination drug therapies have been widely used for the treatment of multimechanistic pain. Combining different drug groups allows for lower

dosing offering synergistic pain relief and reduced adverse effects, all without sacrificing analgesic benefits.[13]

Opioids are generally not first-line for treatment of chronic pain,[14] and when considered, it is usually if other methods are not effective or tolerated. Despite opioids having adverse effects like sedation, fatigue, dependence risk, abuse and gastrointestinal issues that directly affect domains of daily living, studies have found them more effective in high-intensity pain that affected sleep quality. A combination of both non-steroidal anti- inflammatory drugs (NSAIDs) and opioids can address severe pain while simultaneously maintaining opioid stewardship to reduce the risks associated with opioid monotherapy.[12,13] Pain catastrophizing, characterised by feeling helpless and constantly ruminating about the painful situation, has also been shown to adversely affect coping and overall prognosis.[15] Several studies noted that combining NSAIDs like paracetamol with opioid therapy helped reduce the dose of opioids consumed and hence opioid related adverse effects.[15,16] When studying post- surgical pain relief, Maund et al. found the pain relief provided by morphine, paracetamol, NSAIDs and other COX-2 inhibitors to be comparable.[16] This highlights the importance of curating the long-term management of chronic pain individually for each patient.

Though the success of combination therapy in comparison to the other treatment groups under this study might reflect the patient profile under each treatment group, it also exposes a critical avenue for further research on chronic pain management. The symptomatic relief provided by opioids cannot be overlooked, and opioids might always be central to chronic pain management, but in the background of increasing global reliance on opioids to treat the same, research on multimodal non-pharmacological approaches to manage chronic pain is needed, with a focus on opioid stewardship.

Strength of the study: The strengths of this study are that it has a prospective design, which means it follows the treatment to improvement, and as such, it avoids recall bias. It uses a validated tool, which also allows for multidimensional analysis, which helps understand the efficacy of treatment and understand what factors affect pain and how they influence management.

Limitations: In this study, the questionnaire was administered by the investigator to allow increased patient participation in the study. To reduce the confounding factors, the patient population, surgical indication, and surgical method were all made homogeneous. The study followed the actual prescribing practices and patient responses of the centre, giving a better picture of the present scenario in pain management. It was a regional study, bridging the gap of a dearth of pain studies reflecting local scenarios in the region, allowing for more targeted interventions to specific problems. The most important limitation is the short follow-up duration of 2 weeks, which can only capture acute treatment responses and does not account for long-term problems like compliance, risk of dependence. Since the study was based on a single centre, the findings may not be universally applicable as resource availability and prescribing practices vary from centre to centre. The convenience sampling also means there is a possibility of selection bias, and the study population might not be representative of the actual population with chronic pain.

CONCLUSION

This study found that chronic pain affects all domains of daily life, thus reducing quality of life. Additionally, it was also seen that combined therapy provided superior pain reduction amongst other treatment groups and that non-malignant pain responded best to therapy. Though our study did not yield significant results on the effects of factors like age, sex and socioeconomic status on chronic pain, promising trends were observed, suggesting potential avenues for future research. We believe that well-conducted trials can determine if treatment modification based on these factors can reduce chronic pain or even improve quality of life. Furthermore, there is a need to investigate non-pharmacological options like interventional pain management modalities for the treatment of chronic pain.

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