Quality of Life among Patients with Neuropathic Pain Attending Outpatient Department of a Tertiary Care Hospital, Kolkata, India

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Abstract:

Introduction: Neuropathic pain is a complex, painful condition, difficult to diagnose and treat with a negative impact on patients' health and quality of life. **Objectives:** To evaluate the correlation between neuropathic pain and quality of life along with identifying the limiting aspects in the daily life of the patients suffering from it; and also, to find out association of socio-demographic factors with quality of life. **Methods:** A cross-sectional study was conducted for 3 months among 404 patients with neuropathic pain attending the outpatient department of Neuro-medicine and Physical medicine of a tertiary care teaching Hospital, Kolkata using WHO QOL-BREF Scale. Data were tabulated in MS-Excel spreadsheet, statistical analysis was done in SPSS version 26. **Results:** Among the study participants 264 (65.4%) were female, about 252 (62.2%) were Muslim and 372 (92.2%) were married. More than half of the study participants had poor quality of life 238 (59%) with burning 343 (93%), tingling 365 (90%) sensation. A total of 290 (72%) of the study participants were suffering from severe pain. It was found that the limiting aspect was the psychological domain. Significant association ($p<0.05$) was seen with age, gender, religion and education with QOL. **Conclusion:** Majority of the study participants had poor quality of life (59%) with the greatest impact on psychological domain after the onset of pain and presented a positive attitude for treatment towards it.

Keywords: Neuropathic pain, Psychological domain, Quality of life

Introduction:

Pain affects different aspects of human being and its interpretation varies from one culture and socio-economic condition to one another. It is a multifactorial phenomenon that involves everything from tissue damage to environmental aspects.[1] According to IASP (Indian Association for the study of pain), pain is a sensory and emotional experience associated with real or potential lesion of tissue.[2] Neuropathic pain is a complex, painful condition, difficult to diagnose, and treat with a negative impact on patient's health and quality of life.[3] Neuropathic pain occurs due to direct consequence of a disease or injury that affects the somatosensory system. The pathophysiological states that determined the onset of neuropathic pain mostly involved are metabolic disorder, viral infection, chemotherapy-induced, autoimmune disorder, spinal cord injury and inflammatory disorder. In patients

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suffering from neuropathic pain, the perceived pain is usually spontaneous, manifesting itself without needing a stimulus.[4] It is characterized by abnormal hypersensitivity to stimuli (hyperalgesia) and nociceptive responses to non-noxious stimuli (allodynia).[5] This condition is the result of a series of different pathological mechanisms and it is usually described based on the anatomic localization or aetiology. Damaged nerve fibres send the wrong signals to pain centres in body, resulting in neuropathic pain (central sensitization) This pathological condition substantially affects the quality of life of patients, compromising their psychological state. Hence with this background a study was carried out to evaluate the correlation between neuropathic pain and quality of life along with identifying the limiting aspects in the daily life of the patients suffering from it; and also, to find out association of socio-demographic factors with quality of life.

Methods:

A descriptive type of observational study with a cross-sectional design, was conducted among patients attending outpatient department of neuro-medicine and department of physical medicine rehabilitation (PMR) of tertiary care hospital, Kolkata, West Bengal. The study was done for a time period of 3 months. (April 2024 to June 2024). All the patients having pain with burning, numbness, tingling sensation attending in outpatient department were included as study participants. Assuming the prevalence as 47.3 % of poor quality of life[1]. p= 0.47; Confidence interval (C.I) = 95%; Level of Absolute precision = 5%; standard normal deviate (Z)= 1.96, the Cochran's formula for cross-sectional studies was applied which is: $n = Z^2 pq/d^2$. After applying the formula, the minimum sample size (n) was calculated to be 382. Five patients from each department i.e. PMR and neuro-medicine department were selected for the pretesting of the schedule and were included in the study, so after the end of data collection total sample size was found to be 404. Dependent variable was Quality of life and neuropathic pain and independent variable socio-demographic characteristics.

A pre-designed, pre-tested, structured study was employed to collect data from the participants, where it was first translated to local language and then back translated. It comprised of the following variables: i) socio-demographic characteristics of the study participants; ii) DN4 (Douleur Neuropathique 4) questionnaire; iii) WHO QOL BREF[7] scale for assessing the quality of life of patients with neuropathic pain[8]; iv) a visual pain scale to find the intensity of pain[9] and v) Michigan Body Map to identify the sites of pain[10]. A sample frame of the study participants was first made by making a list of the patients attending the out-patient department of neuro-medicine and physical medicine rehabilitation in between 10 am to 12 noon. 25 was the desired sample size achieved each day. Approx 150 patients attended the out-patient department in last 3 months. Then sample interval was calculated 150/25= 6. First patient was selected randomly from the sampling frame and then every 6th patient was selected and desired sample size was achieved.

While analysing the WHOQOL-BREF scale the patient's responses were assigned according to their corresponding predefined scores ranging from 1 to 5, signifying worst possible to best possible health status for all questions except question no. 3, 4 and 26, where the point values had to be reserved. A domain score was calculated for each of the four domains by taking the average for each domain and multiplying it by 4. The domains scores were converted into a scale from 0 to 100 (where 100 is the highest QoL and 0 is the lowest QoL) by the formula: transformed score = (domain score – 4) X (100/16). There is no defined cut-off point for QoL according to this scale. The overall domains of WHOQOL-BREF were taken together for the analysis of the perceived QoL. Individual above the mean were classified having good QoL and less than mean was having poor QoL. The Visual Pain Scale (often called the Visual Analogue Scale (VAS) or Faces Pain Scale) was used to help patients describe the intensity of their pain visually-especially when words are not enough or hard to explain. Left end = no pain (0) and right end= Worst pain imaginable (10). The Michigan Body Map (MBM) is a clinical tool used to help patients identify and document the location of chronic pain on their body. It's often used in pain clinics and research to assess the distribution of widespread pain-especially in conditions like fibromyalgia, neuropathy, or chronic musculoskeletal pain. It is a diagram of the human body (front and back); divided into 19 standard regions. Patients mark the part where they feel chronic pain in the past 3 months. The DN4 Questionnaire is a screening tool used to identify neuropathic pain. The DN4 helps distinguish neuropathic pain (nerve-related) from nociceptive pain (due to tissue damage). Total 10 items, 7 interviews based like burning, painful cold, electric shock, tingling, pins and needles, numbness and itching and 3 clinical based like hypoesthesia to touch and prick and pain increase by brushing). Each yes=1 point. Total score ranges from 0-10; Score e" 4 suggests the pain likely to be neuropathic in origin. Score< 4 unlikely to be neuropathic pain

Ethics: Anonymity and confidentiality of study participants were maintained throughout the study. Informed verbal consent was taken from each study participant. Proposal of study was submitted, and clearance was obtained from the Institutional Ethics Committee IPGME&R/IEC/2024/0436)

Statistical analysis: Data were tabulated in Microsoft Office Excel 2021 (Microsoft Corp, Redmond, WA, USA) and analysed using Statistical Package for the Social Science (SPSS) version 26.0. Categorical data were represented as proportion and with the help of suitable diagram. Continuous data were represented as mean/median and other suitable measure. Descriptive statistics were represented by Mean ± SD, frequency and percentage. $p<0.05$ was considered statistically significant.

Results:

Out of 404 studied participants, 264 (65.4)% were female and age was >50 yrs 130 (52.9%). Most of the study participants were Muslim by religion 251 (62.2%) and half of the participants (51.4%) were illiterate. Majority of the studied participants (92.2%) were married and according to the modified BG Prasad's Scale 2025, 30.5 % of the patients with neuropathic pain belong to lower middle class which was highest and 9% belonged to upper class which was lowest.(Table 1)

Table 1: Distribution of study participants with neuropathic pain according to socio-demographic characteristics (N=404)

Variables	Frequency	Percentage
Age in completed years		
<35	93	23.0
36-50	181	44.8
>50	130	32.2
Gender		
Female	264	65.4
Male	140	34.6
Religion		
Hindu	153	37.8
Islam	251	62.2
Education		
Illiterate	208	51.5
Primary	73	18.4
Middle school	62	15.3
Secondary	6	1.4
Higer-secondary and above	55	13.5
Marital status		
Single	18	4.4
Married	372	92.2
Widowed and divorced	14	3.4
Socio-economic status		
Upper class	39	9.6
Upper middle class	88	21.7
Middle class	98	24.2
Lower middle class	114	28.2
Lower class	65	16.3

Table 2: Descriptive statistics of quality-of-life scores of participants with neuropathic pain. (N=404)

Domain	Mean ±Standard deviation
Overall domain	37.13 ±21.65
Physical health	27.33 ±18.6
Psychological health	25.46±20.1
Social relations	58.42±32.6
Environment	37.30±15.3

Patients with neuropathic pain was confirmed by DN4 Questionnaire. When considering the aspects involved in the questionnaire, the most prevalent sensory descriptors were tingling (93.3%), numbness (90.3%) and burning (88.1). Regarding the physical related to sensitivity hypoesthesia to touch was the predominant one (79.4%) and 137 (34%) of the study participants had good quality of life.

Table 2 showing mean values of all the four domains of WHO QoL BREF Scale, with over all mean score of 37.13 ±21.65 and lowest being the psychological domain which is 25.46±20.1.(Table 2)

Michigan body map was used to locate the various sites of the pain, showed more than half of the study participants (54.5%) suffered from lower back pain. (Figure 1) A scatter plot showing a negative correlation between intensity of pain and overall quality of life among the study participants. It showed Spearman correlation coefficient: -478 with a p value 0.005. (Figure 2) Association between quality of life and socio-demographic characteristics were found to be in age, gender, religion and education (Table 3) Binary logistic regression showed significant association between age, residence and marital status (p=0.002) with quality of life. (Table 4)

Figure 1: A body map showing the location of pain in multiple sites (N=404)

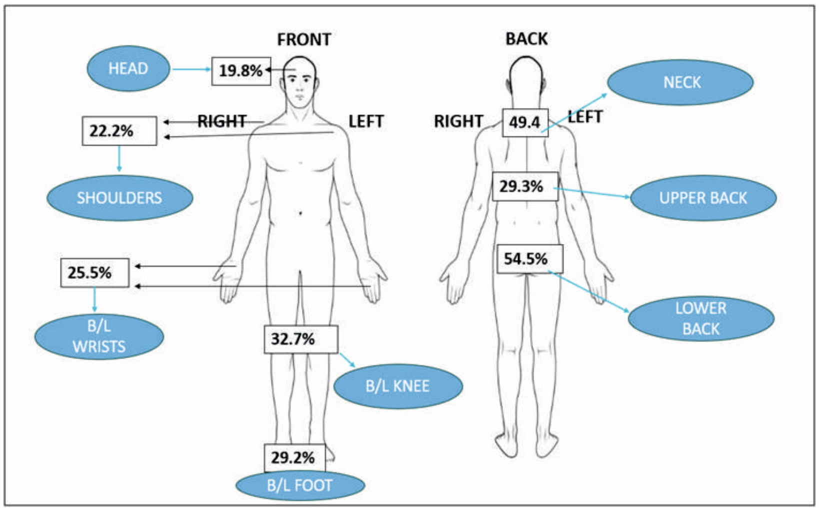

Figure 2: A scatter plot showing the correlation between intensity of pain and overall quality of life. (N=404)

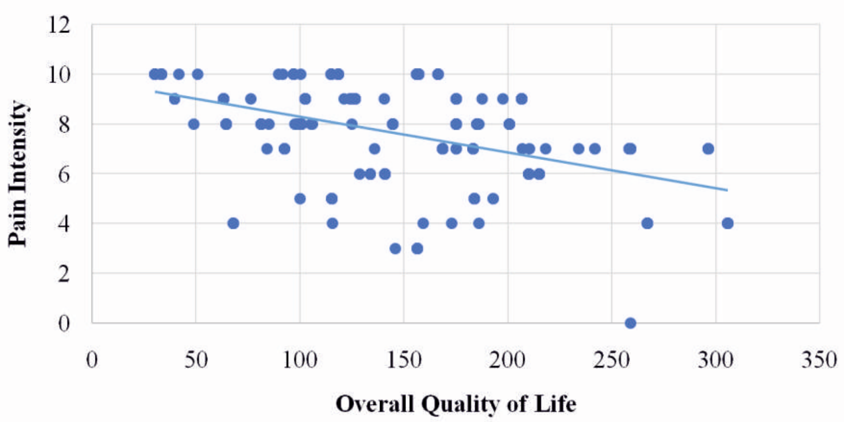

Table 3: Association of quality of life with socio-demographic characteristics. (N=404)

Socio-demographic characteristics	Quality of life			
	Good n (%)	Poor n (%)	Total n (%)	Chi-Square Value, p-value
Age of the participants (in Completed Years)				
<35	48 (51.6)	45 (48.4)	93 (100)	10.75, 0.001
>36-50	80 (44.1)	101 (55.9)	181 (100)	
>50	45 (34.6)	85 (65.4)	130 (100)	
Gender				
Male	30 (21.4)	110 (78.6)	140 (100)	15.98, 0.001
Female	109 (41.3)	155 (58.7)	264 (100)	
Religion				
Hindu	39 (25.5)	114 (74.5)	153 (100)	8.87, 0.003
Muslim	100 (36.8)	151 (60.2)	251 (100)	
Level of Education				
Illiterate	58 (29.7)	150 (72.1)	208 (100.0)	60.33, 0.001
Primary	43 (58.9)	30 (49.1)	73 (100.0)	
Middle	35 (56.5)	27 (43.5)	62 (100.0)	
Secondary	4 (56.9)	2 (43.1)	6 (100.0)	
Higher Secondary and above	20 (65.5)	35 (34.5)	55 (100.0)	
Marital Status				
Married	136 (36.6)	236 (63.4)	372 (100.0)	11.47, 0.009
Single	1 (5.5)	17 (94.5)	18 (100.0)	
Widowed/Divorced	3 (23.1)	11 (76.9)	14 (100.0)	
Socio-Economic class (Modified B G Prasad Scale)				
Upper class (I)	15 (38.5)	24 (61.5)	39 (100.0)	18.07, 0.001
Upper middle class (II)	19 (21.6)	69 (78.4)	88 (100))	
Middle class (III)	44 (44.9)	54 (55.1)	98 (100.0)	
Lower middle class (IV)	31 (27.2)	83 (72.8)	114 (100.0)	
Lower class (V)	30 (46.2)	36 (53.8)	65 (100.0)	

Table 4: Multivariable binary logistic regression showing association between quality of life and socio-demographic characteristics. (N=404)

Socio-demographic characteristics	Quality of life					
	Good n (%)	Poor n (%)	OR (95% CI)	p-value	AOR (95% CI)	p-value
Age of the participants (in Completed Years)						
<35	48 (51.6)	45 (48.4)	0.45	0.002	0.953	0.001
>36-50	80 (44.1)	101 (55.9)	(0.43-0.55)		(0.932-0.974)	
>50	45 (34.6)	85 (65.4)				
Gender						
Male	30 (21.4)	110 (78.6)	0.56	0.001	0.566	0.038
Female	109 (41.3)	155 (58.7)	(0.41-0.76)		(0.331-0.970)	
Religion						
Hindu	39 (25.5)	114 (74.5)	0.89	0.004	0.600	0.05
Muslim	100 (36.8)	151 (60.2)	(0.78-1.87)		(0.359-1.00)	
Marital Status						
Married	136 (36.6)	236 (63.4)	1.23	0.001	1.034	0.002
Single	0 (0.0)	18 (100)	(1.13-1.45)		(3.559-13.431)	
Widowed/Divorced	3 (23.1)	11 (76.9)				

Model fitness information: Cox and Snell R- Square=0.38, Nagelkerke R-Square=0.56, Omnibus Test of Model coefficients was significant (p<0.001) and Hosmer-Lemeshow Goodness of Fit Test was not significant(p=0.040), suggesting a good fit of the model

Discussion*:*

In this study the mean age was 45 years, 64.5% were female. The minimum age was 18 years and maximum age was 70 years. According to Flavia CA et al.[1] 57.3% were women, mean age was 50.6. The minimum age observed was 21 years, and the maximum age was 74 years which was similar with this study.

All patients had NP confirmed by DN4. When considering the aspects involved in this questionnaire, the pain intensity was 5.1±1.2, and the most prevalent sensory descriptors were tingling (52%) and burning (28%). Regarding the physical signs related to sensitivity, hypoesthesia to the touch was the predominant one (62%). In this study pain intensity was 5.5±1.5 with burning (93%), tingling (90%) and numbness (88%).

This study showed a decrease of psychological domain whereas the compared study showed decrease in physical domain. In present study it is seen that majority of the study participants were having low psychological domain. According to Anna Sherly et al[12], 42.4% showed pain in lower back while in this study it showed 54.4% lower pain which was highest for both the studies. The most affected locations of the body were knees, lumbar region and head. In 60.2% of interviewees, neuropathic pain, of high intensity (VAS = 7.09 ± 3.0) predominated, with duration of 8.53 ± 8.8 years and mean QoL was reduced in 47.13%.

By DN4 questionnaire it showed neuropathic pain of 65.2% while in the compared study it showed a neuropathic pain of 62.4%. The intensity of pain was 5.1±1.2 where in the compared study it was 7.09 ± 3.0. According to Jensen MP et al[13] psychological domain of quality of life is greatly hampered whereas in this present study it is the same. A study by Troth et al[14], it is seen that chronic pain was present in 35%, where 17.9% presented with neuropathic pain and had poor quality of life and female were mostly affected in this study, where as in present study 59% presented with poor quality of life and neuropathic pain and majority were female.

In a study by Garifi et al.[15] The prevalence was higher in women and individuals older than 60. Chronic pain with Nociplastic pain was significantly more prevalent in women, elderly, illiterate respondents, and respondents from lower social class. It was more frequently located in the lower limbs, and its intensity and duration were higher in comparison with chronic pain without neuropathic characteristics; it is also seen in present study that lower class and middle class suffers more with neuropathic pain. Bouhasira et al.[16] conducted a study, where there was a higher prevalence of chronic pain with neuropathic characteristics was associated with middle age (50-64 years), manual professions and those living in rural areas. It was more frequently located in the lower limbs and its intensity and duration were higher in comparison with chronic pain without neuropathic characteristics; where in present study it was also seen the same that lower back pain is more.

Like other studies present study also had some limitations. Being a cross-sectional study, it captures data at a single point in time, limiting the ability to assess changes in quality of life over time or establish cause-effect relationships. The assessment of quality of life and pain intensity was based on self-reported questionnaires, which can be influenced by recall bias, emotional state, or misunderstanding of question. Detailed psychological evaluation should be made. Without follow-up it is not possible to understand how pain progression or treatment over time affects the QOL.

Conclusion:

Majority of the study participants had poor quality of life with the greatest impact on psychological domain after the onset of pain and presented a positive attitude for treatment towards it. Assessing quality of life (QoL) should be part of routine care for patients with neuropathic pain. Early detection of reduced QoL enables personalized treatment and better outcomes. Policymakers and administrators must invest in training and resources to strengthen comprehensive pain management programs.

Declaration

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Conflict of Interest: Nil

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