

The impact of pain intensity on quality of life of postherpetic neuralgia patients

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ABSTRACT

Aim To investigate the impact of pain intensity of postherpetic neuralgia (PHN) patients.

Methods This cross sectional study included 30 PHN patients attended to the Dermatology and Venereology Department of the School of Medicine of Universitas Sumatera Utara during the period between April 2019 and October 2019. Zoster Brief Pain Inventory questionnaire including the worst pain in 24 hours and the level of interference with seven domains of quality of life (QoL) (general activity, mood, walking ability, working, relationship with other people, sleep and enjoyment of life) were used. Pearson's correlation (r) was categorized as very weak ($0.0 < r < 0.2$), weak ($0.2 < r < 0.4$), moderate ($0.4 < r < 0.6$), strong ($0.6 < r < 0.8$), and very strong ($0.8 < r < 1.0$).

Results There was a very strong correlation between worst pain intensity and mood disturbance ($r=0.846$) and working status ($r=0.818$). Worst pain intensity had a strong correlation with general activity ($r=0.673$), relationship with other people ($r=0.653$), sleep ($r=0.774$) and disturbance of enjoyment of life ($r=0.783$). Therefore, the correlation between worst pain intensity and walking ability was moderate ($r=0.475$). The worst pain intensity had a significant correlation with all seven domains of QoL ($p < 0.05$).

Conclusion Pain intensity influences the QoL with directly proportional correlation between pain intensity and disturbance of QoL.

Key words: cross-sectional herpes zoster, pain, questionnaire, survey

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INTRODUCTION

Postherpetic neuralgia (PHN) is a long term neuropathic pain experienced commonly within more than three months after onset of herpes zoster (HZ) (1). Based on epidemiological data taken from 13 hospitals in Indonesia from 2011 to 2013, it was found that about 26.5% of the HZ total cases (593) developed into PHN. The risk factors of PHN include an age over 50 years, females, duration of pain during HZ, and psychological stress (2).

Chronic pain of PHN causes sleeping disorders, depression which leads to unsocialised behaviour, anorexia, weight loss, fatigue and disturbances of dressing, shower, general activity, traveling, shopping, cooking and household activities (3). Chen et al. have reported that economic burden caused by PHN was higher than in HZ, and this included medicines costs, consultation, and hospital treatment (4). Deterioration of quality of life (QoL) of PHN patients is assessed with a questionnaire or interview (5), while Zoster Brief Pain Inventory (ZBPI) is one of the questionnaires that assess pain intensity and reflect QoL in the same patients. Thus, an improvement to evaluate the impact of pain intensity on QoL of PHN patients remains a matter of urgency, considering the real impact in disruption of activities of daily living (ADL) (6). Coplan stated that intensity of pain from ZBPI questionnaire strongly correlated with disturbance of quality of life of PHN patients (7). There was no research about the correlation of pain intensity and quality of life of PHN patients in Indonesia.

The aim of this study was to investigate the impact of pain intensity of post herpetic neuralgia (PHN) patients.

PATIENTS AND METHODS

Patients and study design

This a cross sectional study conducted at the department of Dermatology and Venereology School of Medicine of Universitas Sumatera Utara, Medan, and 30 PHN patients were recruited during the period between April 2019 and October 2019. Data on patients with postherpetic neuralgia diagnosis were collected from medical records of Rumah Sakit Pendidikan Universitas Sumatera Utara, and two local public health centres located in Teladan and Padang Bulan. Postherpetic neuralgia was defined as persisting pain after more

than 90 days of herpes zoster rash. The shortest duration of PHN was 3 months, while the longest was 3 years after the HZ onset. Inclusion criteria were patients who had been diagnosed with PHN in the last 5 years (2015-2019), aged over 40 years (40-44, 45-49, 50-54, 55-59, and >60 age groups), who signed informed consent for investigation. Patient demographic data included age, sex, and employment history from medical records.

The research protocol was approved by Ethics Commission in the School of Medicine of Universitas Sumatera Utara and Adam Malik Hospital.

Methods

Demographic data included age, sex, employment record, phone number and patient's address. After being reconfirmed for their willingness to participate in the research, data were collected in the patients' houses. The researcher requested the patients to fill out the ZBPI questionnaire (with permission) (8). The questionnaire evaluated the pain level in 24 hours with Likert scale 0-10 (8): score 0 indicated no pain, up to score 10 which indicated the worst pain felt by the patients. The patients filled out the level of interference with seven domains of quality of life (QoL) questionnaire (8) including general activity, mood, walking ability, working, relationship with other people, sleep and enjoyment of life. The patients responded with a score of 0 to 10 according to the level of disturbance they had experienced. Score 0 indicated no disturbance, up to score 10 indicated worst disturbance in the daily activity.

Statistical analysis

Normality test was performed by using one sample Kolmogorov Smirnov test. Pearson's correlation was used as hypothesis testing. The $p < 0.05$ was considered as statistically significant. This analysis was classified into correlation categories: very weak ($r 0.0 < 0.2$), weak ($r 0.2 < 0.4$), moderate ($r 0.4 < 0.6$), strong ($r 0.6 < 0.8$), and very strong ($r 0.8-1.0$) (9). The increase of pain intensity is accompanied by the increase of QoL interference of PHN patients.

RESULTS

This research involved 30 PHN patients, most of them were over the age of 60, 16 (53.3%) and one (3.3%) was in the 50-54 years age

group. Based on gender, the patients were mostly female, 17 (56.7%), compared with male, 13 (43.3%). Majority of patients worked as private employees and were retired, seven (23.3%) of each, followed by housewives and farmers, six (20.0%) and two (6.7%), respectively (Table 1).

Table 1. Demographic characteristics of 30 patients with postherpetic neuralgia

Variable	No (%) of patients
Age (years)	
40-44	3 (10.0)
45-49	4 (13.3)
50-54	1 (3.3)
55-59	6 (20.0)
≥ 60	16 (53.3)
Gender	
Female	17 (56.7)
Male	13 (43.3)
Working status	
Salesman	4 (13.3)
Farmer	2 (6.7)
Government employees	4 (13.3)
Retired	7 (23.3)
Private employee	7 (23.3)
Housewife	6 (20.0)

Majority of patients had worst pain intensity, with score 9 accounted for nine (30.0%) patients, and minority of patients had score, 4 and 5, two (6.7%) patients each. Mean (SD) was 7.17 (2.321) (Table 2).

Table 2. Pain intensity in postherpetic neuralgia patients

Pain intensity	No (%) of patients	Men (SD)
0	0	7.17 (2.321)
1	0	
2	0	
3	4 (13.3)	
4	2 (6.7)	
5	2 (6.7)	
6	0 (0)	
7	6 (20.0)	
8	4 (13.3)	
9	9 (30.0)	
10	3 (10.0)	

There was a very strong correlation between the worst pain intensity and mood disturbance ($r=0.846$), as well as working status ($r=0.818$) ($p<0.001$). The worst pain intensity had a strong correlation with general activity ($r=0.673$), relationship with other people ($r=0.653$), sleep ($r=0.774$), and disturbance on enjoyment of life ($r=0.783$) ($p<0.001$). Therefore, the correlation between worst pain intensity and walking ability was moderate ($r=0.475$; $p<0.05$). The worst

pain intensity had positive correlation with all seven domains of QoL (Table 3).

Table 3. Correlation between pain intensity and QoL

The worst pain intensity in category	Correlation coefficient (No of patients)	P
General activity	$r = 0.673$ (30)	< 0.001
Mood	$r = 0.846$ (30)	< 0.001
Walking ability	$r = 0.475$ (30)	0.008
Working ability	$r = 0.818$ (30)	< 0.001
Relationship with other people	$r = 0.653$ (30)	< 0.001
Sleep	$r = 0.774$ (30)	< 0.001
Enjoyment of life	$r = 0.783$ (30)	< 0.001

DISCUSSION

The worst pain intensity had a very strong correlation with increasing interference of QoL and it affected all seven domains of ADL in ZBPI with significant impact on mood, sleep and general activity (10). In this research, PHN was mostly found in the age group over 60 years. Munoz-Quiles et al. reported the increasing risk of PHN was two times higher in age group 60-69 years, three times higher in the age group 70-79 years, and 3.67 higher in the age group over 80 years (11). Weaver reported that incidence of PHN was the highest at the age of 70 (73%), and it was followed by the age 55 years (27%) (12).

Incidence of PHN mostly involved females compared with the males because females have a low pain threshold. Whilst curiosity about pain for females is greater than that in males, and women have lower sensitization to sensory stimulus (13). In this research, it is shown that the female proportion was greater than male. Schmidt-Ot et al. and Nahm et al. reported that about 63% and 62.65% of PHN patients were female (14,15). Majority of patients had already retired because generally PHN involved older patients. Postherpetic neuralgia was caused by the economic burden due to the high absenteeism rate at work (16). In this research, majority of patients worked as private employee and already retired. This corresponds to Nakamura et al. that proposed the highest occurrence of PHN patients in retired conditions (39.6%), housewives (33.7%) and those still actively working (23%) (17). Johnson et al. also stated the same that 51.9% of PHN patients were already retired, those with full-time employment status (16%), housewives (13.7%), part-time employment status (11.4%), and the employed (6.9%) (18).

From the dimension of pain intensity items, pain at its worst has the highest internal validity compared with others (Cronbach's alpha 0.77-0.85), and also has the strongest correlation with disturbance of ADL (Cronbach's alpha 0.76-0.85) (19). Worst pain intensity was also recommended by Food and Drugs Administration (FDA) to assess patient reported outcomes (PRO) (20). Our research indicated that most of PHN patients had a worst pain intensity score of 9. This is in accordance with Wyrwich et al. who reported mean (SD) worst pain intensity score from the ZBPI questionnaire was 6.8 (2) (21). Van Seventer et al. reported that mean (SD) in placebo group (who have not yet received pregabalin) was 6.86 (1.49) with median (minimum-maximum) 7 (1.71-10) (10).

This research indicated that worst pain intensity was very strongly correlated with mood disturbance. This is different from Coplan et al. who stated that worst pain intensity was strongly correlated with mood disturbance (7). This research is in accordance with Schelereth et al. who mentioned Pain Rating Index (PRI) had a positive correlation with allodynia and Hospital Anxiety and Depression Scale (HADS) for anxiety and depression (22). Saxena et al. reported a negative correlation between Brain Derived Neurotrophic Factor (BDNF) and pain intensity in PHN patients, where an increase in pain intensity is followed by a decrease in BDNF level, and vice versa (23). Chen et al. also has reported that PHN/HZ was related to depression through a mechanism mediated by cellular immunity (24).

This research showed that there was a very strong correlation between worst pain intensity and working interference. Aunhachoke et al. mentioned that pain intensity was moderately correlated with work (25). Coplan et al. also mentioned strongly correlated occurrence between worst pain intensity and work disturbance (7). Meanwhile, Serpel et al. reported a decrease in effectiveness in their work in PHN patients who were still actively working (6).

This research indicated there was a strong correlation between worst pain intensity and general activity. Laurent et al. stated the disturbance of general activity including ability to dress (54%), move (47%), and wash (26%) (26). This is different from Coplan et al. research that reported a

very strong correlation between worst pain intensity and general activity (7). Nevertheless, the results of our research correspond with Oster et al. reporting moderate to strong impact of pain intensity value (with mean SD) on general activity ($40\% \pm 3.7-3.1$) (27).

The present research indicated worst pain intensity strongly correlated with relationship with others. Coplan et al. research reported that worst pain intensity moderately correlated with relationship with others (7). Deshpande et al. also stated that there was a decline on QoL from relationship with others (using SF-36 questionnaire) with score 70.3 (24.2) in PHN patients with VAS score 5 (2.1), while in the control group normative values were obtained for relationship with other people at around 88.3 (18.6) (28).

Our results indicated that worst pain intensity strongly correlated with sleep disturbance, which corresponds with Coplan et al. study (7). Vinik et al. found that in PHN patients who receive no treatment with 6.64 of mean pain score intensity, a disturbance of sleep at the level of severe (43.3%), moderate (38.1%) and mild (18.6%) was experienced; relationship between pain intensity and sleep interference can occur in two directions, improvement and derivation of one component which can affect others. Vinik et al. also mentioned that by using pregabalin in PHN patients, pain intensity decreased, which can improve the sleep quality. It is because pregabalin works in the pathways responsible for pain response and sleep (29). Cao et al. reported that chronic pain in PHN caused sleep disturbance, based on an analysis of brain regional activities discovering a limbic system disturbance, which regulates sleep activity, otherwise it caused persistent chronic pain in PHN patients (30).

This research indicated that worst pain intensity strongly correlated with enjoyment of life which is consistent with Coplan et al. research (7). Oster reported that in PHN patients mean (SD) score of worst pain intensity was 6 (2.4), about 48% experienced impaired ability to enjoy life with moderate to severe level (27).

We reported that worst pain intensity moderately correlated with walking ability. Aunhachoke et al. reported that correlation between pain intensity and walking ability was low/moderate (25). This is different from Coplan et al. who menti-

oned the presence of strong correlation between worst pain intensity and walking ability (7).

Laurent et al. reported that impact of pain intensity in PHN was significant to general activity, mood and enjoyment of life (26). This is also relevant to Freeman's research that reported significant impact in pain intensity score with mean value of 7.3 on disturbance of sleep, enjoyment of life and mood (31). Correlation test analysis results in this study indicated the influence of worst pain intensity in PHN patients to their QoL. An increase in pain intensity followed by an increase in QoL interference, with significant impact on mood, work, general activity, relationship with others, sleep and enjoyment of life were found.

This study has some limitations including no exclusion of patients who were currently using analgesics and the wide range of persisted pain after HZ rash (3 months-3 years), which might influence the study results. Pain in PHN patients was normally intense in 3 months after HZ onset and reduced gradually in several years after (32).

In conclusion, the pain intensity influences the QoL, with directly proportional correlation between pain intensity and disturbance on QoL.

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- Worst pain intensity had a very strong correlation to mood and work, and a strong correlation to general activity, relationship with other people, sleep and enjoyment of life, but it has moderate correlation with walking ability.
- Intensity of pain level in PHN patients has a significant impact of the QoL, so the authors recommend to treat the PHN patients adequately based on patient's characteristic, routine monitoring of the treatment outcomes and prevention of PHN complication after onset of HZ by administering vaccination.

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