Chronic pain and cost: An epidemiological study in the communities of Sunsari District of Nepal

Balkrishna Bhattarai,[1] Paras Kumar Pokhrel,[2] Mukesh Tripathi,[1] Tashneem Roshan Rahman,[1] Dharani Dhar Baral,[2] Rajesh Pande[1] and Abhjit Bhattachaya[1]

[1]Department of Anaesthesiology and Critical Care and [2]Department of Community Medicine
BP Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal

Corresponding author: Dr. Balkrishna Bhattarai, MD, Associate Professor, Department of Anaesthesiology and Critical Care, BP Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. Phone: 025-525555, 025-521017 Ext: 2012 (office), 3050 (residence) Fax: 025-520251, e-mail: bhattaraibk@yahoo.com

ABSTRACT

The purpose of the study was to find out the prevalence of chronic pain in economically active population and associated economic loss. This cross-sectional observational study was carried out in 3 VDCs of Sunsari District involving 1730 individuals of 15-64 years age group selected by multistage random sampling. Demographic data, absence or presence of pain, site, severity, duration and relieving measures, approximate expenditure in treating pain and number of days lost due to pain were noted using a preformed questionnaire. Out of 1730 individuals interviewed, 882 (50.1%) had pain of which 93.7% had chronic pain (pain lasting for >3 months). Backache (25.8%), headache (20.1%) and abdominal pain due to acid peptic disease (12.5%) were the most prevalent painful conditions. About 14% of individuals had severe grade pain. Female sex, age ≥30years, lack of formal schooling, smoking habit and dependent status were associated with higher prevalence of pain. Almost 19% of individuals with pain were unable to go to work the previous day. Man-days loss due to pain was 1.37 days/ month/ person in the study population. In terms of cost, pain related losses were Nepalese Rupees (NRs)1671.89/person/year as against the per capita GDP of NRs 98,640.00 (US$1370.0). The money incurred by individuals for therapy on pain was NRs 760.15/person/year. In conclusion, probably first time, we are reporting the prevalence of chronic pain in our communities with people having to spend significant portion of their scarce income (and country's GDP) to treat pain, thus, highlighting it as a public health problem.

Keywords: Chronic pain, community, cost, developing country, pain, pain prevalence, treatment practices.

INTRODUCTION

Despite being a common problem, the prevalence of chronic pain in the population at large is not well studied and the prevalence may be high.[1] Chronic pain may not only affect general health[2] but also affect patient psychology[3] , economics and the social behaviour.[4] Chronic pain has been shown to be one of the most common reasons to seek medical attention and for up to five times more frequent use of health services than the rest of the population.[5,6] High suicidal rate is also reported in chronic pain patients.[7] In addition to the patient per-se, family members, fellow workers, and even tax-payers may also suffer due to chronic pain morbidity.[8] It has been linked with the major loss of man work days[9]. Most of the studies are based on patients attending pain clinics[10, 11] which can not be considered to be true representative of the general population.[12]

Community level epidemiological studies for the pain are difficult to execute with limitations such as the use of non-specific measurement instruments.[13] Factors like lack of means of proper communication and transport, low literacy and ignorance make it even more difficult in developing countries like Nepal. The reported estimates of prevalence of chronic pain in the community have been up to almost half of the general population.[14] Data from developing countries are lacking and the prevalence may be even higher due to difficult lifestyle and hardship of earning. Moreover, the cultural and traditional concepts about the chronic pain may have influence on its prevalence in the community.

This cross-sectional study was designed and conducted to find out the point prevalence of chronic pain, treatment seeking practices for pain and its cost in the economically active population in the communities of Sunsari District of Eastern Nepal.

SUBJECTS AND METHODS

This cross sectional study was carried out in three randomly selected Village Development Committees (VDCs) of Sunsari District viz Hansposa, Jalpapur and Chakkarghatti (Mahendranagar). From each of these VDCs, 5 wards were randomly selected. From each of the selected wards, 2 Toles (collection of houses sharing a common road or trail) were randomly selected with the plan to interview 65 to 75 individuals from each Tole. Only five Toles could be covered in Chakkaghatti VDC due to unavoidable

circumstances. Thus only 25 selected Toles from three VDCs were taken for data collection. The data collection was carried out from 2060/1/13 BS to 2060/1/21 BS.

A total of 1730 individuals of both sexes of the age range of 15years to 64 years were interviewed by door to door visit using a preformed questionnaire. The variables noted included age, sex, education, occupation, religion, annual income, presence or absence of any pain, severity and duration of pain, associated surgery or trauma, pain relieving measures followed, practice of seeking pain relieving measures, number of days lost due to pain in a month, and the approximate expenditure in treating the pain.

Keeping in view of lower literacy rate of the subjects and simplicity, five ranked single dimension Verbal Descriptive Scale of Melzack and Torgerson[15] was modified into a three rank scale to document pain intensity. Pain constantly nagging a person but not requiring health workers for treatment was described as mild, discomforting or distressing pain was measured as moderate and horrible or excruciating requiring consultation with health worker for treatment was considered as severe. Any painful condition lasting or recurring for duration of 3 months or more was considered as chronic pain.

The instrument was initially made in English and was translated into Nepali language before using it. The instrument was validated by pre-testing it in 20 individuals not belonging to the VDCs selected for the study. The five enumerators were briefed and taught about the purpose of the study. They were taught in detail about the questions to be asked and the responses to be documented before starting the study. The enumerators were supervised by the investigators while collecting the data.

All data were entered into the statistical package (SPSS version 10.0) in computer for further statistical analysis. All the parametric data were expressed as means± standard deviation (mean± SD) and analyzed using one way analysis of variance (ANOVA) for descriptive parameters. The categorical data were expressed as percentage and χ^2 test was applied for statistical analysis. For the non-parametric observations logistic regression correlation was performed. The calculated value of $p< 0.05$ was considered as statistically significant at 95.0% confidence interval. To obtain direct cost of pain treatment/person/year, total sum of direct cost incurred was divided by the mean duration of treatment to calculate total direct cost per year which was then divided by the total sample population. The economic loss due to man work days loss was calculated by multiplying the man work days lost/person/year by the average earning/person/day. The conversion of US$ was calculated @ NRs 72.00 per $ wherever applicable.

RESULTS

Demography and characteristics of the sample population: In the area of total population of 45576, all together 1730 individuals, 902 females and 828 males were interviewed during the survey. The age of the population was 35.27± 14.74 years respectively with the median age of 31 years. The male to female ratio was 48:52. The literacy rate of the sample population was 55.2%. Most (64.0%) of the people were engaged in agriculture but most of the women responded their work as household work. Out of 1730 individuals interviewed, 446 (25.8%) were the main earner of the family (household chiefs). Approximately 24.0% of the individuals studied were smokers and approximately 14.0% consumed alcohol.

The average annual income of an individual was NRs 19623.12 (comparable to Nepal's per capita income) with the range from zero to NRs. 300000.00. This means an individual earned an average of Rs.53.76 per day in the study population.

Prevalence of pain: Current or chronic pain was present in 882 (50.1%) of the sample population of which 538 (61.0%) were women and 344 (39.0%) were men. The odds ratio of reporting pain in women compared to men was 1.4 (95.0% CI: 1.3-1.6, $p< 0.001$). The pain reported was mostly (44.0%) of musculoskeletal origin (viz. backache, multiple joint pain, generalized body ache, shoulder pain and knee pain). A significant proportion (12.5%) of people reported of having abdominal pain suggestive of acid peptic disease and relieved by antacids. Thirty individuals (3.4%) had abdominal pain not relieved by antacids (Table-1).

Trauma or surgery was attributed as cause of pain in 66 (7.5%) out of 882 patients reporting pain. Fifty-six (6.3%) patients had acute pain (duration of less than 3 months) and the remaining 826 (93.7%) had chronic pain (duration of more than 3 months). Majority of the patients (approximately 86.0%) had mild to moderate severity of pain (Table-2).

The prevalence of pain was more in people aged 30 years and above (Table-3) than in the younger age group (65.3% vs 36.2%) with odds ratio of 1.9 (95.0% CI: 1.7-2.1, $p< 0.001$). Individuals without formal schooling (illiterate or literate) had higher prevalence of pain (58.9%) than those with formal schooling (34.1%) with odds ratio of 1.7 (95.0% CI: 1.5-1.9, $p<0.001$) (Table-4). Individuals with economically dependent status had 1.1 (95.0% CI: 1.0-1.2, $p=0.01$) higher odds of reporting pain than those who earned.

Among the 446 household chief 262 (58.7%) had pain which constituted 29.7% of the total patients with pain. Smokers had an odds ratio of 1.2 (95.0% CI: 1.0-1.4, $p=0.01$) of reporting pain in relation to non-

smokers. However, no statistically significant association between any occupational group and prevalence of pain was found in our observation (Table-5).

Effect of pain on work: One hundred and seventy (9.8%) of 1730 individuals did not go to work of which 166 (97.6%) were due to pain. Out of 882 patients with pain, 716 (81.2%) continued to work on the previous day despite pain. In other words, 166 (18.8%) patients with pain could not go to work the previous day due to pain.

Total of 326 individuals with pain lost 7.25±7.78 days in a month. The median of the days lost in a month by these individuals was 4 days and the range was from one day to 30 days. This indicates that an average of 1.37 days were lost per individual per month (or 16.4 days per year) in the study population.

Treatment seeking attitude and practice: Most of the people (71.3%) go first to a hospital or health post when they have any pain. Remaining seek help from alternative practitioner or follow self-medication (Table-6). Most of the patients (70.0%) with pain in our study had taken treatment for pain from hospital or health post (Table-7).

Out of 882 patients having pain, 242 (27.4%) or 14.0% of the total sample population were taking one or another analgesic therapies including the use of antacids and H_2 blockers (Table-8).

Cost of pain treatment: Out of 882 patients with pain, 690 (78.2%) had spent an average total of NRs.4669.42 ±9661.18 for their pain with the median expenditure of NRs.1500.00 and the range of NRs.50.00 to 100,000.00 over the mean duration of 57.66 ±73.61 months and median duration of 36 months. The average money spent by an individual for the treatment of pain in the study population comes out to be NRs.1862.37 with the mean duration of 29.4 months. This amounts to NRs.760.15 spent for treatment of pain per individual per year without considering the loss due to man days lost.

An average of 16.4 man days are lost by an individual per year because of pain and that amounts to a loss of NRs.881.35 when calculated from the average daily income of that individual. Combining the direct cost of the treatment and loss due to man days lost caused by pain, the total cost becomes NRs.1641.50/person/year. This amount is 8.4% of the average total annual income of an individual of the study population (equivalent to 1.7% of our per capita GDP[16] of US$1370.00). This does not include the cost of time and money lost by the family members in taking care of the patients as well as the cost of being stressed and psychologically unwell.

DISCUSSION

Although carried out in a single district of Eastern Nepal, to the best of our knowledge, this is the first attempt to study the epidemiology of chronic pain in the rural community in Nepal. Unlike most of other epidemiological studies carried out on chronic pain in the developed countries using postal surveys, this study is based on personal interviews with the subjects by door to door visit. Being a cross sectional study, it has remained focused mainly to find out variables related to the health and economic burden caused by chronic pain in the community.

Our study has shown that chronic pain is a significant problem in the community with more than half of the study population reporting chronic pain. Prevalence of chronic pain in the communities has been varying and has been reported up to almost 54 percent.[9,14,17-19] As can be expected, our study has shown higher reporting of pain in individuals of 30 years or more of age than in the younger age group (OR: 1.9). Higher reporting of chronic pain has been observed in women than in men (59.6% vs 41.5%, OR: 1.4) in our study. Erikson *et al*[20] have also found 1.2 to 1.6 higher odds of reporting chronic pain in women than in men. They have also shown relatively higher odds for chronic pain among the people with an education of less than 10 years. Our study has also shown decreasing trend of reporting chronic pain with increasing level of education. Individuals without formal schooling had 1.7 higher odds of reporting pain in comparison to those with formal schooling in our study. It is a known fact that less educated people are likely to be involved in manual work and usually belong to low socioeconomic condition. Higher prevalence of reporting chronic pain has been shown in people involved in manual work and in those belonging to lower socioeconomic class.[20] People involved in household work, farming and business (shop keeping) have shown higher prevalence of chronic pain in our study but not to the level of statistical significance. Our finding of higher prevalence of pain in smokers is in conformity with the findings of British National Survey[21]

Severe and disabling chronic pain occurs in a smaller proportion of patients.[14] Our study showed about 14.0% of the patients having severe grade of chronic pain. Despite having severe pain some of the people may not seek medical help and believe that pain is part of the natural ageing process.

The most common pain sites were the back, head and abdomen (stomach). Majority of the pain involved musculoskeletal system followed by digestive system. Small proportion (5.0%) individuals had gynaecological pain viz. pelvic pain and dysmenorrhoea. Erikson *et al* also found majority of pain involving musculoskeletal system associated with long standing diseases.[19]

A study carried out in rural community of neighbouring Tibet has also shown high prevalence of chronic back pain.[22] Blyth *et al*[17] have reported injury as the most important cause for pain in the community in

contrast to the findings of our study which shows only small proportion of individuals had pain associated with trauma or surgery.

Chronic pain has been reported to be a reason for using substantial proportion of health care facility.[16] However, only about one fourth of the individuals suffering from pain were taking medications or using other treatment modalities concurrently in our study. This can be partly attributed to the lack of easy availability of health care facility in the locality, unavailability of easy transportation facility and inability to afford the treatment due to financial constraints. Moreover, some of the people in Nepal believe that pain is natural and is a part of the natural ageing process.[23]

NSAIDs, paracetamol and antacids were the commonest medications being used by the patients suffering from pain in the community. Small proportion of patients was using alternative modalities such as massage and herbal treatment. Opioid analgesics were not in use for the obvious reason that these drugs are not easily available. Study conducted in community in Australia[17] has also shown NSAIDs and paracetamol as the commonest medications being used to relieve pain but other analgesics including opioids or its combination as well as herbal and other natural preparation are also used by significant number of patients.

Our study has showed that majority of the people believe in hospital or health post for treating their pain but substantial number of people still believe in faith healers. Remaining people believe in pharmacy (local medicine shop) and very small proportion of people believes in self-medication, herbalist and Homeopathic treatment. Patients with pain in our study had taken treatment for pain in the same pattern. Substantial use of over-the-counter oral analgesics has been reported from developed countries[17] also indicating that seeking advice from local pharmacist may be important strategy in treating pain in this group if inappropriate use can be prevented. It is also reported that significant proportion of patients seek treatment from alternative practitioners.

It is very important to know that with the high prevalence of chronic pain in the community there is always a risk of pain related behaviours of limited usefulness, such as over-reliance on analgesic medication and frequent use of health services.[24]

The cost of treatment of chronic or recurrent pain for the patient can be overwhelming. The estimated societal cost of persistent or episodic pain disorders worldwide is more than hundreds of million US Dollars annually.[25] Calculation in our study has also shown that significant proportion of the annual income of an individual in the study population (as well as country's GDP) is being spent in pain treatment. Further, it has been found that an individual loses 16.4 working days in a year because of pain. These facts indicate that chronic pain is not only utilizing the scarce health resources but also creating a negative impact in the economic activities of individuals in the community. Moreover, unlike sufferers of other medical problems (e.g. TB, HIV, malaria, cancer etc) of public health scales, chronic pain sufferers do not have any supporting agencies or organizations (providing free or subsidized treatment) resulting in large amount of out of pocket expenditure for its treatment. Our primary health care set up is yet to be integrated and geared up to deal with this problem. Further studies with larger sample size and wider geographical coverage will be helpful in confirming these findings as well as estimating the magnitude of the problem of chronic pain in the community in the country as a whole.

The limitations of this study include data being based on reporting by the individuals, our inability to use validated grading scale of pain severity, inclusion of individuals of only 15- 64 year age group in the study as well as not evaluating the actual health services utilization by this population.

In conclusion, this study has clearly emphasized that chronic pain is one of the major health problems in our communities and is causing far-reaching economic impact too. This information is needed to be understood by the officials in the policy making capacity to develop strategy to tackle chronic pain related morbidities in the community. The study amply emphasizes for realizing chronic pain as an important chronic illness in developing countries as has been realized in the developed countries.[26,27] Definite health care planning keeping in view of the high prevalence of chronic pain in our communities has become an urgent need in our country.

ACKNOWLEDGEMENTS

This study was funded by the BPKIHS research grant. We are very thankful to the formal and informal leaders as well as the people of Hansposa, Jalpapur and Mahendranagar (Chakkarghatti) VDCs for their kind help and cooperation.

REFERENCES

1. Diamond A. The future development of chronic pain relief. *Anaesthesia* 1991; 46: 83-4.
2. Becker N, Thomsen AB, Olsen AK, Sjorgren O, Bech P, Eriksen J. Pain epidemiology and health related quality of life in chronic non-malignant pain patients referred to a Danish Multi-disciplinary pain centre. *Pain* 1997; 73: 393-400.
3. Magni G, Marchetti M, Moreschi C, Merskey H, Luchini SR. Chronic musculoskeletal pain and depressive symptoms in National Health and Nutrition Examination-I: epidemiological follow up study. *Pain* 1993; 53: 163-8.

4. Latham J, Davis BD. The socioeconomic impact of chronic pain. *Disabil Rehabil* 1994; 16: 39-44.
5. Von Kroff M, Dworkin SF, Le Resche L. Graded chronic pain status: an epidemiologic evaluation. *Pain* 1990; 279: 91.
6. Von Kroff M, Wagner EH, Dworkin SF, Saunders KW. Chronic pain and use of ambulatory health service. *Psychosom Med* 1991; 53: 61-79.
7. EPIC/ MRA. Executive brief. "State of Pain". Michigan pain Study- A statewide survey. News Release Oct 13, 1997.
8. Gallagher RM. Primary care and pain medicine: a community solution to the public health problem of chronic pain. *Med Clin North Amer* 1999; 83: 555-83.
9. Bowsher D, Rigge M, Sopp L. Prevalence of chronic pain in the British population: a telephone survey of 1037 households. *Pain Clinic* 1991; 4: 223-30.
10. Davies HTO, Crombie IK, Macrae WA, Rogers KM. Pain clinic patients in North Britain. *Pain Clinic* 1992; 5: 129-35.
11. Crook J, Weir R, Tunks E. An epidemiological follow up survey of persistent pain sufferers in group family practice and specialty pain clinic. *Pain* 1989; 36: 49-61.
12. Crombie IK, Davies HTO. Selection bias in the pain research. *Pain* 1998; 74: 1-3.
13. Crook J, Rideout E, Browne G. The prevalence of pain complaints in general population. *Pain* 1984; 18: 299-311.
14. Elliott AM, Smith BH, Penny KL, Smith WC, Chambers WA. The epidemiology of chronic pain in the community. *Lancet* 1999; 354: 1248-52.
15. Melzack R, Torgerson WS. On the language of pain. *Anesthesiology* 1971; 34: 50-9.
16. UNDP. Country fact sheet: Nepal. Human Development Report 2004. http://pooh.undp.org.
17. Blyth FM, March LM, Cousins MJ. Chronic pain related disability and use of analgesia and health services in a Sydney community. *Med J Aus* 2003; 179: 84-7.
18. Gureje O, Von Korff M, Simon GE, Gater R. Persistent pain and well-being: a World Health Organization Study in Primary Care. *J Amer Med Assoc* 1998; 280: 147-51.
19. Eriksen J, Jensen MK, Sjogren P, Ekholm O, Rasmussen NK. Epidemiology of chronic non-malignant pain in Denmark. *Pain* 2003; 106: 221-8.
20. Andersson HI, Ejlertsson G, Leden I, Rosenberg C. Chronic pain in a Geographical Defined General Population: Studies of Difference in Age, Gender, Social Class, and Pain Localization. *Clin J Pain* 1993; 9: 174-82.
21. Palmer KT, Syddall H, Cooper C, Coggon D. Smoking and musculoskeletal disorders: findings from a British national survey. *Ann Rheu Dis* 2003; 66: 33-6.
22. Hoy D, Toole MJ, Morgan D, Morgan C. Low back pain in rural Tibet. *Lancet* 2003; 361: 225-6.
23. Anderson RT. An orthopedic ethnography in Rural Nepal. *Med Anthropol* 1984; 8: 46-58.
24. Von Korff M, Dworkin SF, Le Resche L, Kruger A. An epidemiologic comparison of pain complaints. *Pain* 1988; 32: 173-83.
25. Bonica JJ. Introduction. In Bonica JJ (ed): Pain: Research Publications- Association for Research in Nervous and Mental Disorders. New York Raven Press, 1980.
26. Von Korff M, Glasgow RE, Sharpe M. ABC of psychological medicine. Organizing care for chronic illness. *Brit Med J* 2002; 325: 92-4.
27. Gallagher RM. Chronic pain: a public health problem? *Clin J Pain* 1998; 14: 276- 8.

Table-1: Distribution of the reported sites of pain (n=882)

Site of the reported pain	n (%)
Backache	227 (25.8)
Headache	177 (20.1)
Acid peptic disease	110 (12.5)
Multiple joint pain	56 (6.3)
Chest pain	40 (4.5)
Generalized body ache	39 (4.4)
Shoulder pain	34 (3.8)
Knee pain	31 (3.5)
Nonspecific abdominal pain	30 (3.4)
Pelvic pain	23 (2.6)
Dysmenorrhoea	22 (2.5)
Toothache	14 (1.6)
Earache	13 (1.5)
Others	66 (7.5)

Table-2: Distribution of severity of pain (n=882)

Pain severity	n (%)
Mild	355 (40.3)
Moderate	405 (45.9)
Severe	122 (13.8)

Table-3: Age group wise distribution of pain

Age group	Total individuals (n=1730)	Individuals with pain (n=882)	Percentage (%) of individuals with pain
15-30 yrs	849	307	36.2
30-45 yrs	423	264	62.4
45-60 yrs	337	229	68.0
≥ 60 yrs	121	82	67.8

Table-4: Distribution of pain in various educational level individuals

Education level	Total number of individuals (n=1730)	Number of individuals with pain (n=882)	Percentage (%) of individuals with pain
Illiterate	775	467	60.3
Literate	401	226	56.4
Primary	142	51	36.2
Secondary	206	78	37.9
SLC	94	25	26.6
Intermediate	78	24	30.8
Bachelor and above	34	11	32.4

Table-5: Distribution of pain in various occupational groups

Occupation	Total number of individuals (n=1730)	Number of individuals with pain (n=882)	Percentage (%) of individuals with pain
Household work	753	463	61.5
Farming	352	187	53.1
Labour	184	72	39.1
Students	169	37	21.9
Business	72	41	56.9
Mason	44	14	31.8
Service	43	16	37.2
Carpenter	28	12	42.9
Teacher	27	11	40.1
Others	58	29	50.0

Table-6: Distribution of treatment seeking attitudes for pain in the study population (n=1730)

Place for treatment	Number of individuals	Percentage (%)
Hospital/Health post	1233	71.3
Faith healers	237	13.7
Pharmacy (Medicine shops)	225	13.0
Self-medication	22	1.3
Herbalist	10	0.6
Homeopathy	3	0.2

Table-7: Places of treatment taken by the patients with pain (n=882)

Place of treatment taken	Number of individuals	Percentage (%)
Hospital/Health post	617	70.0
Faith healers	127	14.4
Pharmacy (Medicine shops)	115	13.0
Self-medication	20	2.3
Homeopathy	3	0.3

Table-8: Current medications or modalities followed by patients (n=242)

Medications or Modalities	Number of individuals	Percentage (%)
NSAIDs	141	58.3
Antacids	42	17.4
Paracetamol	37	15.3
Ranitidine	4	1.7
Tricyclic antidepressants	3	1.2
Massage with oil	3	1.2
Herbal	3	1.2
Others (vitamins, unknown)	9	3.7