

ORIGINAL ARTICLE

Chronic musculoskeletal pain among elderly individuals in a rural area of West Bengal: A mixed-method study

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Abstract

Introduction: The high prevalence among elderly individuals and potential adverse impact on their overall life quality make chronic musculoskeletal pain a significant public health concern. Chronic musculoskeletal pain is an important cause of self-medication, which must be addressed to avoid various side effects and improve elderly health. This study aimed to determine the prevalence of chronic musculoskeletal pain and its associated factors among individuals (age ≥ 60 years) in rural West Bengal and explore their perspectives and perceived barriers regarding pain and its management.

Methods: This mixed-method study was conducted in rural West Bengal from December 2021 to June 2022. The quantitative strand was conducted by interviewing 255 elderly participants (age ≥ 60 years) using a structured questionnaire. The qualitative strand was conducted via in-depth interviews of 10 patients with chronic pain. Quantitative data were analyzed using SPSS version 16, and chronic pain-related factors were analyzed using logistic regression models. Qualitative data were analyzed thematically.

Results: Among the participants, 56.8% reported chronic musculoskeletal pain. The most frequently affected site was the knee joint. Comorbidity (adjusted odds ratio [aOR]=7.47, 95% confidence interval [CI]=3.2–17.5), age (aOR=5.16, 95% CI=2.2–13.5), depression (aOR=2.96, 95% CI=1.2–6.7) and over-the-counter drug usage (aOR=2.51, 95% CI=1.1–6.4) were significantly associated with chronic pain. Analgesic dependency, lack of motivation to adopt lifestyle modifications, lack of knowledge on analgesic side effects were considered pain management barriers.

Conclusion: Managing comorbidities, providing mental support, generating awareness of analgesic side effects, strengthening healthcare facilities should be prioritized for holistic chronic musculoskeletal pain management.

Introduction

Chronic pain is defined as pain that persists or recurs for longer than 3 months according to the International Association for the Study of Pain. Its global burden has been projected to be large and to increase further over time. Chronic pain contributes significantly to increasing the burden of non-communicable diseases worldwide.¹ According to the World Health Organization, approximately 1.71 billion people worldwide are experiencing musculoskeletal conditions, of which chronic pain is a prominent feature.² The focus on musculoskeletal pain and its burden has been one of the driving forces in the establishment of the International Bone and Joint Decade (2000–2010).³ Epidemiological studies across the globe have reported a higher prevalence of chronic musculoskeletal pain among elderly persons than among the general adult

population.⁴ A number of key contextual factors influence the downstream impact of chronic musculoskeletal pain, such as the inability to maintain an independent lifestyle and disruption in productivity, social relationships and overall quality of life.⁵ In addition, the high prevalence of other comorbid conditions among elderly individuals further intensifies the challenging issue of pain management, as mere pharmaceutical management in this population is often ineffective and limited by side effects.⁶ Despite this fact, chronic pain has emerged as one of the significant reasons behind self-medication and unsolicited use of over-the-counter (OTC) analgesic drugs.^{7,8}

The proportion of elderly persons in India has increased from 5.6% of the total population in 1961 to 8.65% in 2011, thus reflecting

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a nationwide phenomenon of population ageing.⁹ This gradual demographic transition necessitates the achievement of elderly health and well-being, which becomes largely jeopardised by the burden of chronic musculoskeletal pain compounded with the practice of self-medication. In India, where social security systems are inadequate, and health sector investment is low, a substantial disparity persists between urban and rural healthcare service access, which consequently points towards a deprived rural sector. Although there is considerable evidence of a high propensity of chronic musculoskeletal pain among elderly individuals, the perception of patients regarding pain management remains neglected in previous studies, thus mandating the need for qualitative exploration. Accordingly, the current study aimed to assess the prevalence of chronic pain and its associated factors among an elderly population in rural West Bengal. Moreover, a deeper insight into the participants' perspectives and perceived barriers in regard to chronic musculoskeletal pain and its management was explored using a mixed-method approach.

Methods

Study design, setting and participants

This community-based mixed-method study (convergent parallel design: quantitative + qualitative) was conducted from December 2021 to June 2022 in villages situated in the service area of the Rural Health Unit and Training Centre at Singur, Hooghly district, West Bengal. A total of 64 villages catered by 2 primary health centres and 12 subcentres were included in this study. Elderly persons (age ≥ 60 years) residing in the study area were selected as the study participants. Only one elderly participant was selected from a single household. Those who were critically ill during data collection were excluded. Of the total surveyed elderly participants, those with chronic musculoskeletal pain were selected for in-depth interviews (IDIs) purposively to undertake the qualitative strand of the study.

Sample size determination

Cochran's formula for determining the sample size was applied for the quantitative strand.¹⁰ The standard normal variate was taken as 1.96 (5% type-I error); estimated prevalence of chronic pain among elderly individuals as 47.6% as per a study conducted in rural Tamil Nadu, India; and relative error in precision as 20%.¹¹ Considering a design effect of 2 and non-response allowance of 10%, the final

estimated sample size was 245. The sample size for the qualitative strand was determined using the theory of data saturation.

Sampling design

Concurrent mixed-method sampling (multistage probabilistic sampling for the quantitative strand and purposive sampling for the qualitative strand) was used. A two-stage 15-cluster sampling technique was implemented using the probability proportional to the population size method. Each of the 64 villages was considered a cluster. In the first stage of sampling, 15 clusters were selected after line-listing the villages according to their population.

In the second stage, 17 participants were selected from each of the 15 selected clusters (cluster size=sample size/number of clusters; i.e. $245/15=17$) using the random walk method. The random walk method was conducted in two steps. The first step was to select the starting point from the village, which was performed after identifying the centre of the village, from where a pen was rotated, and the starting point was selected by the direction of the pen-tip. The second step was to select the houses in the direction of the starting point, which was performed by writing the house number on pieces of paper and randomly drawing one piece of paper for selecting the first house, with the following houses subsequently selected in a clockwise direction until the desired sample was achieved.¹² When two or more elderly individuals were present in the same household, the eldest person was selected. Eligible participants were approached to participate in the study with the help of the respective honorary health workers assigned in that area. Ultimately, a total of 255 elderly participants were surveyed.

Participants for the qualitative strand were selected via a combination of different purposive sampling techniques, such as convenient and maximum variation sampling.

Data collection techniques, tools and parameters

The quantitative strand of the study was conducted via face-to-face interviews using a pre-tested schedule. Local-language versions of the schedule were face- and content-validated by public health experts. The schedule encompassed the following domains:

- a. Socio-demographic details, such as age, sex, education, marital status, caste, socio-economic status and family type.

- b. Self-medication practices (at least once in the past 3 months since the time of data collection). Self-medication was defined as the use of medicinal products by a consumer to treat self-recognised disorders or symptoms or the intermittent or continued use of a medication prescribed by a physician for chronic or recurring diseases or symptoms.¹³ Herein, the respondents were asked whether they had adopted any lifestyle modifications (e.g. weight reduction or exercise) to prevent the onset or deterioration of musculoskeletal pain.
- c. Past medical records were reviewed to identify comorbidities among the participants.
- d. Participants' knowledge of pain medications and their side effects was assessed using a five-item questionnaire (Cronbach's alpha=0.73). This questionnaire was developed by the authors of this present article. This was tested for internal consistency (Reliability) through Cronbach's alpha (0.73) and this instrument was again checked on the basis of expert judgment. It was face and content validated by the public health experts. A correct response for a particular question is given a score of '1', while an incorrect response or 'do not know' response is given a score of '0'. Herein, the cut-off for having satisfactory knowledge was the 50th percentile of the total attainable score.
- e. The mental health status of the participants was assessed using the Geriatric Depression Scale (Short Form) consisting of 15 items; a score of ≥ 5 is suggestive of the presence of depression.¹⁴
- f. The outcome variable of the study was the presence of chronic musculoskeletal pain among the study participants. The participants were enquired whether they had any chronic musculoskeletal pain existing for 3 months or more. Thereafter, those who reported having chronic pain were interviewed using the Brief Pain Inventory questionnaire.¹⁵ This inventory uses a numeric rating scale (0–10) consisting of two parts about pain intensity and severity and a front-and-back human body diagram. The pain severity score is assessed using the following item: 'Please rate your pain by circling the number that best describes your pain at its worst in the last week'. A

score of 1–4 is denoted as 'mild pain', 5–6 as 'moderate pain' and 7–10 as 'severe pain'. The pain interference score is calculated from the arithmetic mean of the scores attained on the seven questions of the Brief Pain Inventory. The site of pain is identified by asking respondents to show it in the diagram.

For the qualitative strand of the study, 10 IDIs were conducted among the participants with chronic musculoskeletal pain. Among them, three patients had severe pain; three had moderate pain; and four had mild pain according to the pain intensity scale of the Brief Pain Inventory. The participants were interviewed using a pre-tested, semi-structured interviewer guide. All IDIs were audio-recorded with prior consent obtained from the participants.

Statistical analysis

Quantitative data were analysed using SPSS (IBM Corp., Armonk, N.Y., USA, Version 28). Appropriate descriptive statistics were utilised for denoting the outcome variables as well as the independent variables. The Kruskal–Wallis test was used to compare the mean pain interference score among the categories of pain severity, with $P < 0.05$ considered significant. After exclusion of multicollinearity (variance inflation factor of > 5), the factors associated with chronic musculoskeletal pain among the participants were determined using a test of significance ($P < 0.05$) via a univariate logistic regression analysis separately. All biologically plausible significant variables in the respective univariate analysis were included in the final multivariable models to estimate the adjusted odds ratios (aORs).

For the qualitative strand, the data obtained through the IDIs were simultaneously processed via a conventional thematic analysis in which themes and codes were explored. The records were listened to and transcribed verbatim using Microsoft Word version 16. The transcripts were read thoroughly; the important sentences were underlined; and the main ideas derived from them were labelled as codes. Appropriate codes were then placed under respective themes. The qualitative and quantitative strands of the study were integrated at the level of forming the research question, results and discussion.

Results

Of the 255 respondents, 145 (56.8%) reported

having chronic musculoskeletal pain for 3 months or more. Among them, 61 (42%) were men, and 84 (58%) were women. As shown in **Table 1**, of all 255 participants, 141 (55.3%) were women, and 114 (44.7%) were men. The median age of the participants was 67 years (interquartile range=63–77 years). Approximately 45.8% (n=117) of the participants belonged to the young-old (60–69 years) age group, 44.7% to the old-old (70–79 years) age group and 9.5% to the very old (≥ 80 years) age group. Of the total participants, 84.3% were Hindus, while 59.3% were living in a joint family. Approximately 26.7% had an educational level below primary school, and 39.2% belonged to socio-economic class IV according to the modified B.G. Prasad Scale 2021.¹⁶

Table 1. Background characteristics of the respondents (N=255).

Parameter	Categories	Number (%)
Age	Young-old (60–69 years)	117 (45.8)
	Older-old (70–79 years)	114 (44.7)
	Oldest old (80 years and above)	24 (9.5)
Sex	Female	141 (55.3)
	Male	114 (44.7)
Religion	Hindu	215 (84.3)
	Muslim	40 (15.7)
Family	Joint	151 (59.3)
	Nuclear	104 (40.7)
Marital status	Married	145 (56.9)
	Widowed	94 (36.8)
	Unmarried	16 (6.3)
Education ¹	Below primary	68 (26.7)
	Primary	57 (22.4)
	Middle	49 (19.2)
	Secondary	44 (17.2)
	Higher secondary	25 (9.8)
	Graduate and above	12 (4.7)
Socio-economic status ²	Class I (upper class)	12 (4.7)
	Class II (upper middle class)	17 (6.7)
	Class III (middle class)	75 (29.4)
	Class IV (lower middle class)	100 (39.2)
	Class V (lower class)	51 (20)

¹ Below primary=illiterate and below the 5th standard, primary=passed the 5th standard, middle=passed the 8th standard, secondary=passed the 10th standard, higher secondary=passed the 12th standard

² According to the B.G. Prasad Scale 2021

Among the study participants who reported having chronic musculoskeletal pain (n=145), 74.5% reported feeling it at a single location and 25.5% in multiple sites (**Figure 1**). The pain was most frequently located in the knee joint (49.6%), followed by the lower back (33.1%). Regarding the intensity, 52.4% reported mild pain; 33.4%, moderate pain; and 17.2%, severe pain. The mean pain intensity score among the total participants was 5.81. High pain interference scores were associated with greater pain intensity (Kruskal–Wallis H=75.56, P<0.001) (**Figure 2**).

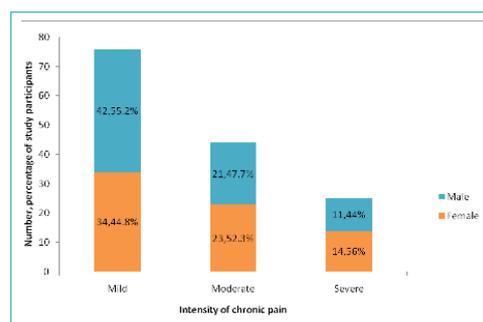


Figure 1. Intensity of chronic pain among the male and female participants (n=145).

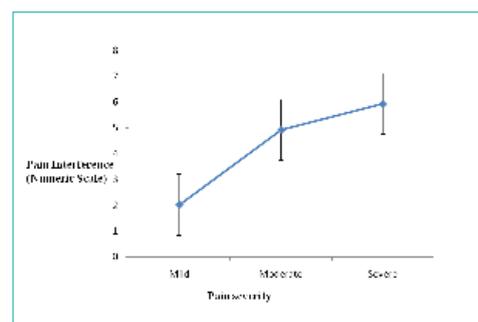


Figure 2. Pain interference in relation to pain severity (n=145).

Regarding the knowledge of the participants on pain medication and its side effects, 51.2% of the total participants were found to have unsatisfactory knowledge (maximum score=5, minimum score=0, median score=3.62). A total of 117 (45.9%) elderly participants had used OTC medicines at least once in the past 3 months for any ailments. Among them, 82 (72.6%) were experiencing chronic musculoskeletal pain, all of whom had consumed OTC analgesics to alleviate their pain exacerbation.

Factors associated with chronic musculoskeletal pain among the participants

In the multivariable regression analysis model, four variables emerged as significantly associated with chronic musculoskeletal pain among the elderly individuals. These included age (aOR=5.16, 95% CI=2.2–13.5), comorbidity (aOR=7.47, 95% CI=3.2–17.5), use of OTC drugs (aOR=2.51, 95% CI=1.1–6.4) and depression (according to the Geriatric Depression Scale) (aOR=2.96, 95% CI=1.2–6.7). The non-significant Hosmer–Lemeshow test statistic (>0.05) indicated the goodness of fit of this model, and 46–63% of the variance of the outcome variable could be explained by this multivariable model (Cox and Snell's R²=0.46, Nagelkerke's R²=0.63) (Table 2).

Table 2. Multivariable logistic regression analysis of the determinants of chronic musculoskeletal pain (N=255).

Parameters	Total no. (N=255)	Chronic musculoskeletal pain present (n=145)	Adjusted OR (95% CI)	P-value ^s
<i>Age</i>				
<70 years	117	37 (32%)	Ref (1)	<0.001
≥70 years	138	108 (78%)	5.16 (2.2–13.5)	
<i>Sex</i>				
Male	114	61 (53%)	Ref (1)	0.501
Female	141	84 (60%)	1.21 (0.5–1.2)	
<i>Comorbidity</i>				
Present	146	111 (76%)	7.47 (3.2–17.5)	0.001
Absent	109	34 (31.2%)	Ref (1)	
<i>Use of OTC drugs</i>				
Yes	117	85 (72.6%)	2.51 (1.1–5.8)	0.025
No	138	60 (43.5%)	Ref (1)	
<i>Lifestyle modification</i>				
Adopted	46	32 (69.6%)	1.52 (0.4–4.6)	0.001
Not adopted	209	113 (54%)	Ref (1)	
<i>Knowledge on pain medication and its side effects</i>				
Satisfactory	95	63 (66.3%)	1.34 (0.4–2.1)	0.623
Unsatisfactory	160	82 (51.2%)		
<i>Depression^ε</i>				
Present	141	104 (73.8%)	2.96 (1.2–6.7)	0.001
Absent	114	41 (36%)		

Hosmer–Lemeshow test statistic=0.76, Cox and Snell's R²=0.46, Nagelkerke's R²=0.63

CI: Confidence Interval Adjusted OR: Adjusted Odds Ratio

^s P<0.05 considered significant

^ε According to the Geriatric Depression Scale

Qualitative exploratory findings

Through the IDIs, 10 participants (all with musculoskeletal pain persisting for 3 months or more: five elderly men and five elderly women) shared their perspectives on their experience with chronic musculoskeletal pain, its overall effect on lifestyle, their coping behaviour and perceived barriers to pain management.

The major theme that was generated through the qualitative exploration was barriers to the management of chronic musculoskeletal pain and its impact on quality of life, under which three major categories were found: i) behavioural barrier, ii) cognitive barrier and iii) physiological barrier.

Important codes emerged under the mentioned theme, which were aligned with the severity of pain. The participants with moderate and severe pain (n=6, including four elderly women and two elderly men; mean age=71.6 years) had similar responses. The major codes found from their interviews were as follows: i) dependency on pain medication; ii) physical inability to visit a health facility; iii) lack of knowledge; and iv) inability to help in household work. Meanwhile, the respondents with mild pain (n=4, including three men and one woman; mean age=65.6 years) had satisfactory knowledge regarding pain analgesics and were agile to move around and perform daily activities but lacked motivation to improve their lifestyle for preventing progression of pain towards chronicity, which yielded the extraction of a fifth code: v) lack of motivation to adopt lifestyle modifications (Table 3).

Table 3. Findings of the qualitative exploration through joint display.

Pain intensity ¹	Interviewed patients with chronic pain	Major categories	Major qualitative codes	Quotable quotes
Severe and moderate	6 (mean age=71.6 years)	Physiological barrier	Physical inability to visit a health facility	‘Whenever my back pain increases, I send my grandson to buy analgesics from a local shop because at this age, it is impossible for me to visit a health centre and to wait for a long period’. (stated by an 81-year-old woman)
		Physiological barrier	Inability to help in household chores	‘I was once very much active, but nowadays, I can’t help even a little in household works. Being this inactive makes me feel so down’. (stated by a 67-year-old woman)
		Cognitive barrier	Lack of knowledge	‘I think there is no harm in taking pain-killers as long as the pain persists. To my knowledge, they have no side effects’. (stated by a 70-year-old woman)
		Behavioural barrier	Dependency on pain medication	‘As long as I’m taking pain-killers, I get a little relief, but upon stopping medication, I feel the same pain again on both of my knees’. (stated by a 78-year-old man)
Mild	4 (mean age=65.6 years)	Behavioural barrier	Lack of motivation to adopt lifestyle modifications	‘One doctor told me to reduce weight and exercise. Initially, I tried for a few weeks, but nowadays, I don’t get much time to practice them’. (stated by a 62-year-old man)

¹ According to the Brief Pain Inventory (Short Form)

Discussion

This study estimated the prevalence of chronic pain and its associated factors among elderly individuals and simultaneously explored their perception about chronic pain and its management. The prevalence of chronic musculoskeletal pain among the respondents (age ≥ 60 years) was 56.8% in this study. The most commonly reported site of pain was the knee joint, followed by the lower back. Most participants had mild pain (52.4%), and pain interference in day-to-day life increased with increasing pain intensity.

Qualitative exploration revealed that most participants perceived chronic musculoskeletal pain as a major hindrance to daily activities they used to perform easily before. This was a particular perceived barrier that adversely affected their mental health. In addition, their insufficient knowledge of analgesics drove them towards pain-killer dependency instead of adopting lifestyle modifications. These findings evoke the need for cognitive behavioural interventions for pain management among elderly individuals.

The study conducted in the city of Goiânia in Brazil by Pereira et al. showed a prevalence of chronic musculoskeletal pain of 52.8% among elderly individuals. Meanwhile, the present study reported a prevalence of 56.8%.¹⁷ It has been substantiated by some other population-based studies that women often have more propensity towards experiencing musculoskeletal pain than men.¹⁸ In the current study, although the prevalence of chronic pain was higher in the women (58%) than in the men (42%), no significant association was found between sex and chronic musculoskeletal pain in the multivariable regression model. Regarding the site of pain, the present study showed findings concordant to those of the study conducted by Panda et al. in Karnataka, India: The commonest sites of chronic pain were the lower back and knee.¹⁹

A study performed among an adult population in Poland reported that 91% of participants used OTC pain relievers.²⁰ The current study reported that among all OTC drug users, those with chronic pain comprised the majority (72.6%). Another pan-Indian study conducted on chronic pain prevalence and treatment patterns by Dureja et al. showed that the majority (68%) of their respondents were treated with OTC medications.²¹

Among the four significant factors in the multivariable logistic regression model herein, the two most important were depression (according to the Geriatric Depression Scale) and presence of comorbidity. Some studies conducted previously worldwide have also showcased these two as major risk factors of chronic musculoskeletal pain. The study performed in Southern Germany by Bauer et al. indicated a fourfold risk of depressed mood (Geriatric Depression Scale-15 score of ≥ 5) in participants with chronic pain compared with that in participants with no pain.²² The narrative review conducted by Mills et al. on epidemiology and associated factors of chronic pain identified multimorbidity as an important determinant of chronic pain.²³

The mixed-method study with an exploratory sequential design conducted in Tamilnadu, India, by Kirubakaran and Dongre showed that restriction of physical movements was a major perceived effect of chronic pain among elderly individuals.¹¹ This is similar to the present finding that physical inability to visit a health facility and inability to help in household chores were perceived as physiological barriers.

This study carries certain limitations. Owing to the cross-sectional study design, no causal relationship could be established between the presence of chronic musculoskeletal pain and its risk factors. As the responses were mostly recall-based, bias is possible. Further, the biomedical cause of pain was not explored in the current study.

Conclusion

International law recognises pain management as a basic human right; nations are therefore ethically mandated to provide pain treatment as part of their core obligations under the right to health. In this context, the availability of drugs must be ensured to mitigate the complexity of elderly pain management, and services must be scaled up to provide non-pharmacological aids, such as physiotherapy, adequate mental support, elderly-friendly health facilities, generation of awareness on the perilous effects of consuming OTCs, curtailment of the dependency on analgesics and shift towards lifestyle modifications.

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Author contributions

Dr. Trina Sengupta (Conceptualization/ Data curation / Formal Analysis/ Methodology/ Supervision/ Validation/ Visualization/ Writing – original draft / Publication Writing – review & editing)

Dr. Bobby Paul (Conceptualization/ Supervision/ Publication Writing – review & editing)

Dr. Ankush Banerjee (Data Analysis/ Supervision/ Publication Writing – review & editing)

Dr. Ranjan Das (Conceptualization/ Supervision/ Publication Writing – review & editing)

Dr. Riya Halder (Supervision/ Publication Writing – review & editing)

Ethical approval

All procedures in this study were conducted in accordance with the approved protocols of the Institutional Ethics Committee of All India Institute of Hygiene & Public Health. Written informed consent was obtained from the study participants for their anonymised information to be published in this article.

Conflicts of interest

The authors declare no potential conflicts of interest with respect to the research and authorship and/or publication of this article.

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Data sharing statement

The raw data used in this study are available upon request to the corresponding author.

How does this paper make a difference in general practice?

- This study focused holistically on chronic pain management among elderly individuals.
- The findings emphasise the importance of lifestyle modifications alongside medications for pain management.

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Supplementary tables

Table 1. Sites of chronic musculoskeletal pain among the study participants (n=145).

Sites*	Men	Women	Total n (%)
Neck	1	3	4 (2.8)
Shoulder	5	7	12 (8.3)
Upper limb	6	9	15 (10.3)
Lower back	20	28	48 (33.1)
Thigh	6	4	10 (6.9)
Knee	14	58	72 (49.6)
Calf muscle	4	5	9 (6.2)
Ankle	1	5	6 (4.1)
Foot	3	9	12 (8.3)

* Multiple responses allowed

Table 2. Responses of the study participants regarding their knowledge about pain analgesics and side effects (N=255).

Questions	Responses, n (%)		
	Yes, n (%)	No, n (%)	Do not know, n (%)
1. Name at least one pain-killer that you have heard of.	89 (for correct answers) (35%)	67 (for incorrect answers) (26.3%)	99 (38.7%)
2. One can use pain-killers as long as he/she wants.	102 (40)	86 (33.7)	67 (26.3)
3. Long-term use of pain-killers can cause gastric ulcer.	65 (25.5)	87 (34.1)	103 (40.4)
4. Long-term use of pain-killers can cause kidney dysfunction.	45 (17.6)	55 (21.6)	155 (60.8)
5. Consuming pain-killers may result in dependency.	96 (37.6)	82 (32.2)	77 (30.2)