

Prevalence of Chronic Pain

Ted M. Birse, MN,¹ Janice Lander, PhD²

Chronic pain is defined as any pain that recurs or persists over an extended period of time, i.e., at least 3 to 6 months following the first pain episode.¹⁻⁷ In many epidemiologic surveys, the focus has been on the prevalence of chronic pain associated with specific disease entities, for example chronic pelvic pain.⁸ Nonetheless, extent and significance of chronic pain across diseases has been studied in several geographic areas in recent years including the United States,³ Sweden,⁴ Denmark,⁹ and Canada,^{10,11} with prevalence rates ranging from 11% to 40%. Variation in rates can be attributed to a narrow study population, non-random sampling methods and diversity in definitions of chronic pain.

Prevalence rates obtained in several Canadian general surveys of chronic pain^{10,11} likely have been underestimated because of sampling methods and definitions of chronic pain. Families receiving care in a Hamilton family practice group were sampled in one study¹⁰ where chronic pain was defined as the occurrence of pain during a two-week interval prior to the survey. In the National Population Health Survey (NPHS),¹¹ chronic pain was defined as usually having pain or discomfort. Both surveys may have underestimated chronic pain prevalence by excluding those with recurrent or episodic pain. With an appropriate definition of chronic pain and a random sample of the population, Sweden's chronic pain rate was found to be 40%.⁴ In the aforementioned Canadian studies, prevalence rates were found to be 11%¹⁰ and 17%.¹¹

Periodic assessment of prevalence rate is valuable for identifying the magnitude of

potential costs to society as well as our progress in managing chronic pain. The purpose of this study was to assess the prevalence and impact of chronic pain on adults in a Canadian city using an appropriate definition of chronic pain.

METHOD

Adults (≥ 18 years) who understood English and resided in the Edmonton area were sampled. Sample size ($n=410$) was calculated for an 11% prevalence rate (lowest rate obtained in previous studies) using the approach of Mendenhall and Ott.¹²

The study design was a cross-sectional telephone survey with random digit dialing. We employed the approach used by the University of Alberta's Population Research Laboratory for its annual public surveys. A random sample of households with telephones was obtained from the Population Laboratory's databank of random digit numbers. Their method eliminates duplicate numbers and ensures that unpublished numbers are included in the probability sample. Therefore, every working telephone number in the population was given an equal probability of selection, providing access to 97% of the population. Telephone numbers were randomly drawn from the computer file and printed as a random list. Numbers were called in their random sequence until the desired sample size was obtained.

Randomization within households was achieved by recruiting the adult who had the most recent birthday (assumes birth date is a random process¹³). If that individual declined to be interviewed, randomization continued within the household until a consenting adult was interviewed. If a telephone call was not answered, contact was attempted at varying times of the day and week to a maximum of five call-backs. Individuals who consented to the interview but found the time inconvenient were

scheduled at a later, mutually convenient time.

Respondents were asked to report occurrence of any pain in the previous six months and to identify each site where it had occurred. When pain was reported at more than one site, respondents were asked to name their most troublesome pain site. We then assessed onset and frequency of pain at each site as well as intensity when pain was at its worst. Pain intensity was assessed on an 11-point scale with the anchors 0 and 10 (representing none and worst possible pain, respectively). This numeric pain scale is frequently used in pain research because of its validity and ease of administration.¹⁴

Those who reported pain were also asked about perceived health status, sleep disturbances and background information (age, education, marital status). A parallel questionnaire about perceived health status and background information was administered to those not experiencing pain in the previous six months.

During data coding, respondents were classified into one of three groups based on responses about occurrence and onset of pain (No-pain, Chronic-pain and Acute-pain). Chronic pain was defined as recurrent or persistent pain of six months duration or longer. Acute pain was defined as pain of finite duration, beginning and ending during the six months prior to the interview *or* persistent pain of less than six months duration.

RESULTS

The first 1,712 telephone numbers from the list were dialed to obtain the targeted sample size; 1,120 telephone numbers were excluded: 643 (57%) were phone numbers generated by the computer that had not yet been assigned to households, 328 (29%) were for businesses or facsimiles and 134 (12%) were not answered after five

1. University of Alberta Hospitals, Edmonton, AB
2. Professor, Faculty of Nursing, University of Alberta, Edmonton, AB

Correspondence: Janice Lander, PhD, Professor, Faculty of Nursing, University of Alberta, Edmonton, AB T6G 2G3, Tel: 403-492-6317 or 492-6832, Fax: 403-492-2551, E-mail: janice.lander@ualberta.ca

attempted calls at various times and days of the week. A small number of non-English-speaking individuals were excluded (15, 1%). Of 592 qualifying individuals, 182 (31%) declined to participate. The completion rate was 69% (n=410) which is consistent with Population Research Laboratory rates. The characteristics of the samples are presented in Table I with population statistics from the City of Edmonton census.

Chronic pain was experienced by 182 (44%). Point prevalence rate for chronic pain was 44.4 with a 95% confidence interval of 41.8 and 45.4. Twenty-three respondents (6%) were considered to have long-term pain which could not yet be classified as chronic pain as it did not meet the requirement of ≥ 6 months duration. Twelve others (3%) had well-defined acute pain. These 35 individuals were classified in the Acute-pain group. Another 193 were categorized in the No-pain group.

For purposes of comparing our data with that of the NPHS,¹¹ we include a breakdown of prevalence by gender and age categories (Table II). Prevalence of chronic pain was highest among males in the 45-64 and 75+ age categories. Among females, prevalence was highest in the 18-24, 45-64 and 65-74 age groups. Overall, prevalence of chronic pain was higher among women than men.

Although chronic, not acute pain, was the focus of this study, some data for the small Acute-pain group are presented. The characteristics of the three pain groups were compared and participants were found not to differ significantly in terms of education and marital status (with Chi-square). There was a significant difference in gender (Chi-square = 5.89, $p=0.05$). Women were more likely than men to be classified in the Chronic-pain group.

The perceived general health of the three groups was also compared (with *worse* and *much worse* categories combined to overcome effects of small cell sizes). More respondents in the Chronic-pain group evaluated their general health as poor, whereas more in the No-pain group reported their health as better (Table III: Chi-square=66.4, $p<0.00001$).

Because of its small size, the Acute-pain group was dropped for purposes of analyzing

Characteristic	Sample			Adult Population* (n=461,855)
	Chronic Pain (n=182)	Acute Pain (n=35)	No Pain (n=193)	
Gender (%)				
Males	61 (34.5)	19 (54.3)	78 (40.4)	226,681 (49.1)
Females	121 (65.5)	16 (45.7)	115 (59.6)	235,174 (50.9)
Marital Status (%)				
Single	54 (29.7)	13 (37.2)	63 (32.6)	132,768 (24.4)
Married	94 (51.7)	18 (51.4)	108 (56.0)	257,697 (57.8)
Divorced/Separated	23 (12.6)	4 (11.4)	16 (8.3)	46,259 (10.2)
Widowed	11 (6.0)	0 (0)	6 (3.1)	25,075 (7.7)
Educational Level (%)				
Up to High School	34 (18.7)	7 (20.0)	30 (15.6)	not available
High School	58 (31.9)	8 (22.9)	72 (37.3)	
College/Trade	44 (24.2)	8 (22.9)	41 (21.2)	
University	46 (25.3)	12 (34.3)	50 (25.9)	
Employment (%)				
Full-time	84 (46.2)	19 (54.3)	112 (58.0)	not available
Part-time	21 (11.5)	7 (20.0)	20 (10.4)	
School	8 (4.4)	0 (0)	12 (6.2)	
Homemaker	11 (6.1)	1 (2.9)	19 (9.9)	
Retired	27 (14.8)	4 (11.4)	23 (11.9)	
Unemployed	14 (7.7)	2 (5.7)	6 (3.1)	
Unable to work	17 (9.3)	2 (5.7)	1 (0.5)	

* Source: City of Edmonton, 1991.

Sex	Survey Sample (n=410)	Chronic Pain	Prevalence of Chronic Pain
Males			
18-24	22 (13.9)*	8 (13.1)	36.4
25-44	89 (56.3)	32 (52.4)	36.0
45-64	31 (19.6)	14 (23.0)	45.2
65-74	9 (5.7)	3 (4.9)	33.3
75+	7 (4.4)	4 (6.6)	57.1
Females			
18-24	32 (12.7)	18 (14.9)	56.2
25-44	138 (54.8)	52 (43.0)	37.7
45-64	47 (18.7)	29 (24.0)	61.7
65-74	27 (10.7)	18 (14.9)	66.7
75+	8 (3.2)	4 (3.3)	50.0
Both Sexes			
18-24	54 (13.2)	26 (14.3)	48.1
25-44	227 (55.4)	84 (46.1)	37.0
45-64	78 (19.0)	43 (23.6)	37.0
65-74	36 (8.8)	21 (11.5)	58.3
75+	15 (3.7)	8 (4.4)	53.3

* Percent of cell total in parentheses

employment (in order to reduce percentage of cells with expected frequencies less than 5). The Chronic-pain and No-pain groups were significantly different (Chi-square = 24.23, $p<0.001$). The Chronic-pain group was less likely to report full-time employment and more likely to report inability to work compared to the No-pain group.

Most respondents with chronic pain (n=142, 78%) reported between one and

three sites of pain and the others reported more than three sites (total of 456 sites in the sample). Painful body sites reported most often were: back (n=94, 21%), head (n=68, 15%) and neck (n=56, 12%). Pain at most sites began spontaneously (n=195, 59%). The most common antecedents to pain otherwise were motor vehicle accidents (n=32, 10%), work accidents (n=30, 9%) and medical or surgical procedures (n=12, 4%). Effect of pain on sleep and

TABLE III
Perceived Health Status of Chronic Pain and No-Pain Groups

	Chronic Pain (n=182)		No Pain (n=193)		Acute Pain (n=35)	
Health Status Compared to Peers (%)						
Much better	9	(5.0)	16	(8.3)	5	(14.3)
Better	44	(24.2)	91	(47.2)	11	(31.4)
Same	78	(42.9)	84	(43.5)	15	(42.9)
Worse	49	(26.9)	2	(1.0)	4	(11.4)
Much worse	2	(1.0)	0	(0.0)	0	(0.0)

TABLE IV
Pain Experience of Chronic Pain Group

Mean pain intensity — most troublesome site when pain at its worst (SD)	7.9	(2.0)
Mean years since pain onset (SD)	10.2	(10.8)
Frequency of chronic pain (%)		
Infrequently	14	(7.7)
1-2 times per month	29	(15.9)
3-10 times per month	34	(18.7)
>10 times per month	105	(57.7)
Trouble falling asleep from pain (%)		
None	56	(30.8)
Infrequently	25	(13.7)
1-3 nights/week	59	(32.4)
4-6 nights/week	20	(11.0)
Every night	21	(11.5)
Don't know	1	(0.6)
Early awakening from pain (%)		
None	75	(41.2)
Infrequently	20	(11.0)
1-3 nights/week	51	(28.0)
4-6 nights/week	15	(8.2)
Every night	20	(11.0)
Don't know	1	(0.6)

characteristics of pain are reported in Table IV.

DISCUSSION

The results of this study indicate that chronic pain is widespread in the population surveyed. A higher percentage of the women sampled reported chronic pain compared to men. Rather than representing women's greater predisposition for developing chronic pain, this result may indicate a reporting bias which has previously been documented.¹⁵ Women may be more prepared to acknowledge pain than men.

Prevalence of chronic pain among men and women combined was related to age in that the lowest rate occurred in the 25-44 age group. Otherwise, rates were similar for the three oldest age categories. When examining men and women separately, there was no clear pattern of increasing chronic pain with age. These results differ from those obtained in the NPHS study¹¹

where prevalence of chronic pain was found to increase with age.

It seems that chronic pain may have a significant effect on the individual. Many experience chronic pain frequently (more than 10 times per month) and often have their sleep affected by it. Another measure of the impact of chronic pain on the individual and society is its effect on work or usual activities. A lower rate of full-time employment and higher rate of being unable to work may be an indication of some negative consequences of chronic pain.

The prevalence rate of 44% obtained in this study is much higher than the 11-17% obtained in prior Canadian studies.^{10,11} The rates of these earlier studies, including the NPHS, likely underestimate the true rate because of the definition of pain used. It should be noted that our chronic pain prevalence rate may have been inflated or deflated by respondents' poor recall and by the lack of probability sampling of individuals within households. For example, our sampling method may have affected the

prevalence rate since the probability of being selected in a household is related to the size of the household. The sampling method may also have been the reason that more females were sampled than males. As well, prevalence rates for Edmonton may be higher or lower than other parts of Canada. The rate obtained in this study, however, is consistent with that obtained with random samples of the general population in both Denmark⁴ (38%) and Sweden⁵ (40%) with similar definitions of chronic pain.

Conducting a comprehensive study of costs of chronic pain including effect on family life was beyond the scope of this research but should be part of a plan for future research. Individuals at risk for developing chronic pain should also be identified in future research.

REFERENCES

1. Taylor H, Curran N. *The Nuprin Pain Report*. New York: Louis Harris and Associates, 1985.
2. Merskey H. Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms. *Pain* 1986;S3:S1-2.
3. Von Korff M, Dworkin SF, Le Resche L, Kruger A. An epidemiologic comparison of pain complaints. *Pain* 1988;32:173-83.
4. Brattberg G, Thorslund M, Wikman A. The prevalence of pain in a general population. The results of a postal survey in a county of Sweden. *Pain* 1989;37:215-22.
5. Loeser J, Egan K. *Managing the Chronic Pain Patient*. New York: Raven Press, 1989.
6. Burckhardt C. Chronic pain. *Nursing Clinics of North America* 1990;25:287-94.
7. Bonica JJ. Definitions and taxonomy of pain. In: Bonica JJ, *The Management of Pain*. 2nd ed. Philadelphia: Lea & Febiger, 1990;19-27.
8. Mathias S, Kuppermann M, Liberman R, et al. Chronic pelvic pain: Prevalence, health-related quality of life, and economic correlates. *Obstetrics & Gynecology* 1996;87:321-27.
9. Andersen S, Worm-Pedersen J. The prevalence of persistent pain in a Danish population. *Pain* 1987;S4:S332.
10. Crook J, Rideout E, Browne G. The prevalence of pain complaints in a general population. *Pain* 1984;18:299-314.
11. Millar W. Chronic pain. *Health Reports* 1996;7:47-53.
12. Mendenhall W, Ott L, Scheaffer RL. *Elementary Survey Sampling*. Belmont, CA: Duxbury Press, 1971;46.
13. Salmon CT, Nichols JS. The next-birthday method of respondent selection. *Pub Opin Q* 1983;50:17-26.
14. Chapman C, Casey K, Dubner R, et al. Pain measurement: An overview. *Pain* 1985;22:1-31.
15. Lander J, Fowler-Kerry S, Hargreaves A. Gender effects in pain perception. *Perceptual and Motor Skills* 1989;68:1088-90.

Received: January 10, 1997

Accepted: September 29, 1997