

Chronic Pain: A Population-Based Study

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Abstract

Background: The prevalence of chronic pain in the general population ranges from 10% to over 40%, depending on the definition and the population studied. No large study has been conducted in Israel.

Objectives: To evaluate the prevalence of patients with chronic pain, and characterize them in a large community random sample.

Methods: We conducted a survey of Clalit Health Services members, interviewing them by phone. A random sample of 4063 Clalit members, 25 years or older and Hebrew speakers, were screened for chronic pain, defined as: any pain or discomfort that in the last 6 months has persisted continuously or intermittently for more than 3 months.

Results: Eight percent (n=325) refused to participate. Of the 3738 included in the study, 1722 (46%) reported chronic pain in at least one site. Most of the patients were over 50 years old (62%) (mean age 56 ± 16, range 27–97 years). Women suffered significantly more than men, as did those who were older, less educated and born in Israel and Eastern Europe. Prevalent painful sites were the back (32%), limbs (17%) and head (13%). More than a third reported severe pain and impaired life activities. Only 4.8% of the patients suffering from chronic pain were referred to pain specialists and 11% used complementary medicine. A logistic regression model showed that women and patients with a low education level were the only significant variables predicting higher life impact index and higher pain severity.

Conclusions: We found a high prevalence of chronic pain in the study population. Chronic pain causes severe disturbance to quality of life. A low rate of referral to pain specialists and complementary medicine was observed.

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The prevalence of chronic pain in the general population ranges from 10% to over 40%, depending on the definition and the population studied [1,2]. The prevalence was 23.4% in Spain [3], 35.1% in Finland [4], 16% for men and 21% for women in Denmark [5], and 31.4% in Sweden [6]. Blyth et al. [7], in a national random sample of the adult Australian population, reported a prevalence of 17.1% in males and 20% in females. Chronic pain was defined as pain experienced every day for 3 months in the 6 months prior to the interview [7].

Chronic pain results in many days lost from work [8,9]. The share of this cost was about 1% of total health care expenditures and 0.1% of the gross domestic product. A national survey of the American workforce showed that 13% of the total workforce

experienced a loss in productive time during a 2 week period due to common pain conditions. Workers with lost productive time from a pain condition lost a mean of 4.6 hours/week. Lost productive time from common pain conditions among active workers costs an estimated \$61.2 billion per year [10].

Chronic pain is also associated with high direct and indirect costs for the health care system on one hand and considerable personal impairment of mood, function and the quality of life on the other [1]. Patients with chronic pain use health services up to five times more than patients without chronic pain [11,12]. It was also found that higher pain intensity, aging, depression, ethnicity and socioeconomic level have the greatest impact on physicians' consultation rates [13].

However, most of the studies attempting to assess and characterize chronic pain are mainly based on local samples or practices and use different definitions for the condition. Thus, there is still a need to determine the prevalence in large populations, its characteristics and its impact on health care utilization in order to better plan the allocation of resources in the future. In the present study we evaluated the prevalence of patients suffering from chronic pain, and characterized them from a random sample of members of the Clalit Health Services, the largest health management organization in Israel.

Patients and Methods

This descriptive population-based survey examined the point prevalence of chronic pain in a random sample, depicting its prevalence at the time of the study. The sample was extracted from the main databases of Clalit Health Services using a random programming selection method and was tested to ensure the validity of the sample and that it is representative of the population of Clalit. The study was conducted within the framework of Clalit, which provides services to 54% of the Israeli population.

A random sample of 4063 listed Clalit members aged 25 years and older was extracted from its national database. All participants were initially screened for chronic pain according to the following definition: any pain or discomfort that persists continuously or intermittently for longer than 3 months, in the last 6 months. Patients refusing to participate, non-Hebrew speakers, or those unable to comprehend for other reasons, were excluded from the study. Patients matching the above criteria were further interviewed regarding the characteristics of their pain (full interview).

Patients were contacted by phone using a structured questionnaire. Five attempts at different times and days were made before noting the patient as a non-respondent. Members identified in the screening interview as not suffering from chronic pain were only asked for their sociodemographic data. The full interview questionnaire for patients identified as suffering from chronic pain included sociodemographic details and location of the pain. For every pain site the Brief Pain Inventory Short Form questionnaire was used to measure and characterize pain and the interference of pain with the patient's life (reactive dimension). The BPI questionnaire includes a 0–10 rating scale to measure the pain and the influence of pain on different aspects of daily life (general activity, mood, sleep, relationship with other people, work) that constitute the life impact index. This tool was validated in Hebrew in our previous study [14] and has been utilized as an outcome measure in different clinical trials [15,16].

Also recorded were treatments for pain (in the past and in the present), medications, visits to consultants and primary care physicians, physiotherapy, and complementary medicine use; absenteeism from work and sick leave due to the chronic pain, co-morbidities and other chronic medication use.

Ethical approval was received by the Helsinki Committee of the Soroka University Medical Center.

Statistical analysis

All data were coded and entered using Epidata 2.1 software and imported to SPSS statistical package (version 14.0) for further analysis. Analysis included descriptive as well as univariate analysis comparisons using chi-square for categorical variables and ANOVA for continuous variables, where $P < 0.05$ was considered statistically significant in all analyses. In order to control for different confounders, logistic regression was used.

For analysis purposes, in order to compare with other variables, pain intensity was also categorized into four categories: 0 indicating no pain, 1–3 indicating mild pain; 4–7 indicating moderate pain, and 8–10 severe pain. A life impact index was calculated. Life impact index is the mean of all the scores of responses regarding the impact of pain on everyday activities, according to the BPI (general activities, mood, walking ability, quality/quantity of sleep, relationships with other people, need for bed rest during the day, and influence on routine work). The categories were 0–3 for no or mild impact, 4–7 for modest impact and 8–10 for major impact [14,17].

Results

Of the 4063 participants, 325 (8%) refused to take part in the study, leaving 3738 study participants. The age profile of those who refused to participate was younger ($P < 0.05$); gender distribution was similar. Of the 3738 Clalit members included in the study, 1722 (46%) reported suffering from chronic pain and completed the full interview questionnaire. The most prevalent pain sites were the back (552, 32%), limbs (294, 17%) and head (227, 13%).

BPI = Brief Pain Inventory

Table 1. Study population characteristics

	Interviewees with chronic pain		Interviewees without chronic pain		P
	N=1722	%	N=2016	%	
Gender					
Male	679	39%	1064	53%	< 0.001
Female	1043	61%	952	47%	
Age (yrs)					
25–30	89	5%	197	10%	< 0.001
31–40	221	13%	443	22%	
41–50	346	20%	435	22%	
51–60	412	24%	421	21%	
61–70	266	15%	239	12%	
71–80	271	16%	198	10%	
81–90	105	6%	76	4%	
91–100	12	1%	7	0%	
Average \pm SD	56.22 \pm 15.77		50.47 \pm 15.74		
Median	55		49		
Country of origin					
Israel	844	49%	1115	55%	< 0.0001
Asia, North Africa	377	22%	313	16%	
East Europe, former USSR	392	23%	451	22%	
Western Europe, America, Australia, South Africa	101	6%	58	3%	
Other	8	0%	79	4%	

The socioeconomic variables of the group with chronic pain were compared to the group without chronic pain [Table 1]. The average age of the group with chronic pain was significantly older (56.2 ± 15.8 , vs. 50.5 ± 15.7 , $P < 0.001$, range 27–97); 38% aged 25–50 had chronic pain compared to 62% aged 51 and older ($P < 0.001$). Women were more likely to report chronic pain (61% vs. 39% of men, $P < 0.001$) [Table 1]. A total of 267 patients (15.5%) reported having pain in more than one location.

Sixty-three patients (3.7%) reported suffering from mild pain (Visual Analog Scale 1–3), 1019 patients (59.2%) reported a moderate level of pain (VAS 4–7), and 639 patients (37.1%) reported severe pain (VAS 8–10). The average degree of pain in our study population was 6.7 ± 2.1 . When examining the impact of pain on daily activities, 527 patients (30.6%) reported no or mild influence, 653 (37.9%) reported a moderate influence and 542 (31.5%) reported a severe disturbance of daily activities due to pain.

Severe pain was found to be associated with female gender ($P < 0.0001$), being divorced, a widow/er or separated ($P < 0.05$), lower education level ($P < 0.0001$), and days of work lost ($P < 0.0001$) [Table 2].

The majority of patients with chronic pain reported consulting with their family physician or other health service providers for treatment of their pain (67.2%) during the previous 6 months. Of them, 14.7% visited 3–5 times. Over half of the participants (51.1%) had consulted with a specialist other than their family physician, mainly with orthopedists (60%). Of the 880 patients

VAS = Visual Analog Scale

Table 2. Association of pain intensity (0 = no pain at all, 10 = unbearable pain) with demographic variables

	Pain intensity						P value
	1-3		4-7		8-10		
	n	%	n	%	n	%	
Gender							
Male	32	50.8%	443	43.5%	203	31.8%	< 0.001
Female	31	49.2%	576	56.5%	436	68.2%	
Total	63		1019		639		
Age (yrs)							
25-50	27	42.9%	381	37.4%	248	38.8%	NS
50+	36	57.1%	638	62.6%	391	61.2%	
Total	63		1019		639		
Family status							
Single	8	12.7%	60	5.9%	41	6.4%	< 0.05
Married	49	77.8%	789	77.7%	470	73.7%	
Divorced, widow/er, separated	6	9.5%	167	16.4%	127	19.9%	
Total	63		1016		638		
Country of birth							
Israel	37	58.7%	504	49.5%	302	47.3%	NS
Asia, North Africa	9	14.3%	209	20.5%	159	24.9%	
East Europe, former USSR	14	22.2%	240	23.6%	138	21.6%	
West Europe, North America, Australia, South & Central America, South Africa	2	3.2%	61	6.0%	38	5.9%	
Other	1	1.6%	5	0.5%	2	0.3%	
Total	63		1019		639		
Years of education							
0	2	3.3%	56	5.5%	51	8.0%	< 0.001
1-12	35	57.4%	565	55.9%	416	65.3%	
13-15	15	24.6%	225	22.3%	102	16.0%	
16+	9	14.8%	164	16.2%	68	10.7%	
Total	61		1010		637		
Employment status							
Employed	32	51.6%	503	49.8%	286	44.9%	NS
Total	62		1011		637		
Days off work							
Yes	4	6.3%	126	12.4%	182	28.5%	< 0.001
Total	63		1019		639		

visiting a consultant, 37.6% reported that it resulted in major relief for their pain, and 34.5% that it helped slightly or not at all. Only 22.8% reported currently taking pain killers; of them 47% noted that the treatment helped, and 13.2% that the treatment helped slightly or not at all. Two-thirds noted using analgesics in the past; 39% had no relief.

Complimentary medicine was used by 11.4% of the patients: 46.8% had acupuncture, 15.6% reflexology, 13.9% shiatsu, and 12.2% chiropractic. Nearly 44% noted that the treatments helped significantly to relief their pain.

Eighteen percent of the patients indicated that they had to take sick leave due to chronic pain in the past 6 months. On average, 21.7 ± 94.9 days were lost off work (median 4 days). Approximately

Table 3. Association of life impact index with demographic variables (n=1722)

	Life impact Index						P value
	0-3 (n=881)		4-7 (n=650)		8-10 (n=191)		
	n	%	n	%	n	%	
Gender							
Male	388	44.0%	235	36.2%	56	8.2	< 0.001
Total	881		650		191		
Age (yrs)							
25-50	386	43.8%	208	32.0%	62	9.5	< 0.001
50+	495	56.2%	442	68.0%	129	12.1	
Total	881		650		191		
Family status		0.0%					
Single	63	7.2%	35	5.4%	11	10.1	< 0.001
Married	701	79.6%	486	74.8%	122	9.3	
Divorced, widow/er, separated	117	13.3%	129	19.8%	58	19.1	
Total	881		650		191		
Country of birth							
Israel	491	55.7%	276	42.5%	77	9.1	< 0.001
Asia, North Africa	149	16.9%	174	26.8%	54	14.3	
East Europe, former USSR	177	20.1%	166	25.5%	49	12.5	
Western Europe, America, Australia, South Africa	58	6.6%	33	5.1%	10	9.9	
Other	6	0.7%	1	0.2%	1	12.5	
Total	881		650		191		
Years of education							
0	33	3.8%	48	7.4%	28	25.7	< 0.001
1-12	452	51.8%	440	68.1%	125	12.3	
13-15	214	24.5%	100	15.5%	28	8.2	
16+	174	19.9%	58	9.0%	9	3.7	
Total	873	100.0%	646		190		
Employment status							
Employed	525	60.1%	237	36.6%	60	7.3	< 0.001
Total	8747		6473		190		
Religiosity							
Religious	123	14.0%	114	17.6%	37	13.5	< 0.001
Traditional	337	38.4%	285	44.1%	89	12.5	
Secular	417	47.5%	247	38.2%	65	8.9	
Total	877		646		191		
Pain intensity							
1-3	59	6.7%	4	0.6%	0	0	< 0.001
4-7	719	81.7%	281	43.2%	19	1.9	
8-10	102	11.6%	365	56.2%	172	26.9	
Total	880		650		191		

70% of those absent from work reported up to a week of days off work, 6.5% reported absenteeism of 1-3 months. Four patients noted absenteeism of 2-3 years due to chronic pain.

Table 3 depicts the impact of pain on everyday life (life impact index). Thirteen percent of women noted that pain had a major

Table 4. Logistic regression model predicting high pain severity (8-10) and high Life Impact Index (7-10)

	High pain severity			High life impact		
	Odds ratio	95%CI	P	Odds ratio	95%CI	P
Gender						
Male	1			1		
Female	1.66	1.34-2.06	0.000	1.45	1.02-2.05	0.039
Years of education						
0	2.13	1.27-3.59	0.004	5.52	2.34-3.01	0.000
1-12	1.85	1.33-2.56	0.000	2.92	1.43-5.95	0.003
13-15	1.13	0.78-1.63	0.527	2.16	0.99-4.69	0.052
16+	1					

The following variables were introduced into the model and found non-significant: age, family status and country of birth.

impact on everyday functioning, compared to only 8.2% of men ($P < 0.001$). Age had a similar effect on life impact index, with the older age group (over 50) being more affected ($P < 0.001$). A reverse relationship was found between the life impact index and education ($P < 0.001$) as well as employment ($P < 0.001$). Daily functioning was more influenced by pain among interviewees who defined themselves as traditional or religious than those who were secular ($P < 0.001$). The level of pain intensity was directly associated with higher levels of life impact index ($P < 0.001$).

A multiple logistic regression model [Table 4] showed that women and patients with lower education level were the only significant variables predicting higher life impact index and higher pain severity. Further analysis of this model to include age and other sociodemographic interactions was found to be not significant.

Discussion

We found a high prevalence of chronic pain compared with other studies [7,18-21]. In a survey of 1964 adults (18 years of age and older) in Catalonia, Spain [19], overall pain prevalence (any pain experienced in the previous 6 months regardless of intensity and duration) was 78.6%, significantly higher among women, with an inverse relationship to age. A recent study comparing chronic pain across 16 European countries, including Israel, found a prevalence of 17% in Israel. In the European study, pain was defined only if pain levels were 5 or higher, of at least 6 months duration, experienced in the last month and at least twice a week. It was evaluated in a sample aged 18 and above [18]. In Israel, another cross-sectional population survey of 2210 adults was conducted in a small town (Yeruham), and the prevalence of chronic widespread pain was 9.9%, 14% in women and 3% in men ($P < 0.01$) [22].

We believe the high prevalence found in this study is a result of the difference in pain definition, 3 months vs. 6 months, not defining a minimum frequency (e.g., at least twice a week), minimum duration (e.g., in the last month) and not setting a cutoff point for pain intensity (e.g., at least 5/10 and above). We

also had an older population and more refusals among younger patients, thus there could be a bias towards the older age group where pain is more prevalent.

Women reported pain more than men and the prevalence was higher among the older age groups. These findings are in concurrence with other studies from around the world [9,18-20]. The recent European study also showed that in Israel 61% of chronic pain sufferers were women [18].

The life impact index showed that women are more affected than men, as were older age and unemployed groups. There is an inverse relationship between life impact and years of education. Female gender, housing, employment status and educational attainment were found to be independently associated with both "significant" and "severe" chronic pain [21]. Our findings showed only women and education as the predicting variables related to prevalence of severe pain.

People with chronic widespread pain reported more frequent visits to the physician (10.8 visits/year) and more frequent use of anti-inflammatory and analgesic drugs. They were referred more frequently to specialists and were hospitalized slightly more often [22]. We found that two-thirds of the patients with chronic pain consulted their family physician or other health service providers during the preceding 6 months. Of them, 14.7% visited between three and five times. Over half of the participants (51.1%) had consulted with a specialist other than their family physician, mainly orthopedists (60%).

Among the sufferers of chronic pain 11.4% were referred to complementary treatment, compared with 5.9% in Sweden [13]. In the European comparative study, 69% of respondents had used non-drug methods, remedies or treatments for their pain. The most common was massage (30% in other countries on average, 10% in Israel), physical therapy (21%, 33% respectively), and acupuncture (13% and 33% respectively) [18].

Chronic pain sufferers had on average 21.7 days off work in the 6 months prior to the interview. As the standard deviation was very high it should be noted that the median was 4 days. In the European comparative study the mean number of days lost from work due to pain in the previous 6 months was 7.8 days and in Israel specifically, 8.9 days. In general, 45% of the respondents with chronic pain had days lost from work [18]. In this study we did not evaluate mood disability and quality of life. Using the BPI we were able to obtain some information about functioning.

We believe that the findings from this study further contribute to our understanding of chronic pain, its burden on the health system and its influence on patients' quality of life. Since chronic pain is referred to as an illness with the highest prevalence, it is our responsibility to train physicians in all settings to treat this common disease, provide them with the skills needed, and encourage them to accept the responsibility for its management.

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References

1. Nickel R, Raspe HH. Chronic pain: epidemiology and health care utilization. *Nervenarzt* 2001;72:897–906.
2. Verhaak PFM, Kerssens JJ, Dekker J, Sorbi MJ, Bensing JM. Prevalence of chronic benign pain disorder among adults: a review of the literature. *Pain* 1998;77:231–9.
3. Catala E, Reig E, Artes M, Aliaga L, Lopez JS, Segu JL. Prevalence of pain in the Spanish population: telephone survey in 5000 homes. *Eur J Pain* 2002;6:133–40.
4. Mantyselka PT, Turunene JHO, Ahonen RS, Kumpusalo EA. Chronic pain and poor self-rated health. *JAMA* 2003;290:2435–42.
5. Eriksen J, Jensen MK, Sjogren P, Ekholm O, Rasmussen NK. Epidemiology of chronic non-malignant pain in Denmark. *Pain* 2003;106:221–8.
6. Bergman S, Herrstorm P, Hogstrom K, Petersson IF, Svensson B, Jacobsson LTH. Chronic musculoskeletal pain, prevalence rates, and sociodemographic associations in a Swedish population study. *J Rheumatol* 2001;28:1369–77.
7. Blyth FM, March LM, Brnabic AJ, Jorm LR, Williamson M, Cousins MJ. Chronic pain in Australia: a prevalence study. *Pain* 2001;89:127–34.
8. 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.
9. Borghouts JA, Koes BW, Vondeling H, Bouter LM. Cost of illness of neck pain in the Netherlands in 1996. *Pain* 1999;80:629–36.
10. Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. *JAMA* 2003;290(18):2443–54.
11. Von Korff M, Dworkin SF, Le Resche L. Graded chronic pain status: an epidemiologic evaluation. *Pain* 1990;40:279–91.
12. Von Korff M, Wagner EH, Dworkin SF, Saunders KW. Chronic pain and use of ambulatory health care. *Psychosom Med* 1991;53:61–79.
13. Andersson HI, Ejertsson G, Leden I, Schersten B. Impact of chronic pain on health care seeking. Self care and medication. Results from a population-based Swedish study. *J Epidemiol Community Health* 1999;53:503–9.
14. Shvartzman P, Friger M, Shani A, Barak F, Cohen Y, Singer Y. Pain control in ambulatory cancer patients – can we do better? *J Pain Symptom Manage* 2003;26:716–22.
15. Doyle D, Hanke G, MacDonald N, eds. Oxford Textbook of Palliative Care. 2nd edn. Oxford: Oxford University Press, 1997.
16. Cleeland CS, Ryan KM. Pain assessment: global use of the brief pain inventory. *Ann Acad Med Singapore* 1994;23:129–38.
17. Beck SL, Falkson G. Prevalence and management of cancer pain in South Africa. *Pain* 2001;94:75–84.
18. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life and treatment. *Eur J Pain* 2006;10:287–333.
19. Bassols A, Bosch F, Campillo M, Canellas M, Banos JE. An epidemiological comparison of pain complaints in the general population of Catalonia (Spain). *Pain* 1999;83:9–16.
20. James FR, Large RG, Bushnell JA, Wells JE. Epidemiology of pain in New Zealand. *Pain* 1991;44:279–83.
21. Smith BH, Elliot AM, Chambers WA, Smith WC, Hannaford PC, Penny K. The impact of chronic pain in the community. *Fam Pract* 2001;18:292–9.
22. Buskila D, Abramov G, Biton A, Neuman L. The prevalence of pain complaints in a general population in Israel and its implications for utilization of health services. *J Rheumatol* 2000;27:1521–5.

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