

Examination of Symptom Clusters in Acute and Chronic Pain Patients

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Objectives: (1) Determine which of 15 symptoms are more commonly found in community patients with pain (CPWP; N=158), acute pain patients (APPs; N=326), chronic pain patients (CPPs; N=324) versus community non-patients without pain (CNPWP; N=129); (2) Determine which symptoms are more commonly found in APPs and CPPs versus CPWP; (3) Determine which symptoms are more commonly found in APPs versus CPPs; (4) In CPWP, APPs, and CPPs, determine which symptoms cluster with each other and the number of clusters; and (5) Determine if cluster number and cluster symptom makeup differ by pain level.

Design: A larger set of items containing the 15 symptoms had been administered to the above groups who were compared statistically according to the above objectives for symptom endorsement. Next, a cluster analysis for the 15 symptoms was performed for CPWP, APPs, and CPPs. Finally, a two step cluster analysis was performed on CPPs with moderate pain (5-7 level) and CPPs with severe pain (8-10 level).

Setting: Community plus rehabilitation facilities.

Results: (1) All three groups (CPWP, APPs, and CPPs) had statistically significantly greater frequency of 14 symptoms versus CNPWP; (2) CPWP were similar to APPs for frequency of all 15 symptoms; (3) CPPs had a statistically significantly greater frequency than CPWP of 9 symptoms (numbness, dizziness, muscle weakness, difficulty staying asleep, muscle tightness, irritability, falling, concentration, headaches) and versus APPs for 13 symptoms (above 9 plus fatigue, depression, memory, nausea); (4) The cluster analysis generated 5 clusters for CPWP, 4 clusters for APPs, and 5 clusters for CPPs; (5) CPWP and APPs had similar cluster makeup; (6) For CPPs, the symptom makeup of the 5 clusters broke down into problems with memory, neurological symptoms, behavior, somatic, and autonomic symptoms; (7) CPPs with moderate pain had a 5 cluster solution while CPPs with severe pain had a 4 cluster solution and these 2 groups differed in cluster symptom constitution.

Conclusions: CPPs have significantly more comorbid symptoms versus CPWP and APPs and differ from these groups on numbers of symptom clusters and their composition. In addition, CPPs differ in symptom cluster number and symptom cluster composition according to pain group. These findings underline the importance of pain level to CPP symptom cluster studies.

Results

Table 1 displays frequencies (percentages) for the 15 symptom variables for CNPWP, CPWP, APPs, and CPPs, respectively. For all 3 sets of chi square comparisons, every item was significant ($p < 0.01$) except for being unable to open or close your mouth. Overall, CNPWP reported significantly fewer clinical symptoms compared to the CPWP, APPs, and CPPs.

TABLE 1.					
Comparing Frequency of Clinical Symptoms for Community Non-Patients without Pain versus Community Patients with Pain, Acute Pain Patients, and Chronic Pain Patients					
Variable	Category	Community Non-Patients without Pain	Community Patients with Pain	Acute Pain Patients	Chronic Pain Patients
Perception of fatigue?	No Problem	94 (72.9%)	51 (32.3%)	113 (34.7%)	87 (25.5%)
	A Problem	35 (27.1%)	107 (67.7%)	213 (65.3%)	254 (74.5%)
Perception of numbness or tingling?	No Problem	112 (86.8%)	79 (50%)	124 (38%)	73 (21.4%)
	A Problem	17 (13.2%)	79 (50%)	202 (62%)	268 (78.6%)
Frequently dizzy?	No Problem	123 (95.3%)	118 (74.7%)	240 (73.6%)	210 (61.6%)
	A Problem	6 (4.7%)	40 (25.3%)	86 (26.4%)	131 (38.4%)
Difficulty opening or closing mouth?	No Problem	123 (95.3%)	148 (93.7%)*	305 (93.6%)*	310 (90.9%)*
	A Problem	6 (4.7%)	10 (6.32%)	21 (6.4%)	31 (9.1%)
Sudden muscle weakness?	No Problem	121 (93.8%)	114 (72.2%)	235 (72.1%)	159 (46.6%)
	A Problem	8 (6.2%)	44 (27.8%)	91 (27.9%)	182 (53.4%)
No difficulty staying asleep?	No	48 (37.2%)	95 (60.1%)	199 (61%)	278 (81.5%)
	Yes	81 (62.8%)	63 (39.8%)	127 (39%)	63 (18.5%)
	No	111 (86%)	114 (72.2%)	242 (74.2%)	221 (64.8%)
Frequent depression?	Yes	18 (14%)	44 (27.8%)	84 (25.8%)	120 (35.2%)
	No	112 (86.8%)	99 (62.7%)	193 (59.2%)	131 (38.4%)
Frequent muscle tightness?	Yes	17 (13.2%)	59 (37.3%)	133 (40.8%)	210 (61.6%)
	No Problem	82 (63.6%)	53 (33.5%)	121 (37.1%)	106 (31.1%)
Frequently nervous?	A Problem	47 (36.4%)	105 (66.4%)	205 (62.9%)	235 (68.9%)
	No Problem	74 (57.4%)	46 (29.1%)	87 (26.7%)	55 (16.1%)
Frequently irritable?	A Problem	55 (42.6%)	112 (70.8%)	239 (73.3%)	286 (83.9%)
	No Problem	112 (86.8%)	93 (58.9%)	230 (70.6%)	188 (55.1%)
Unable to remember things?	A Problem	17 (13.2%)	65 (41.1%)	96 (29.4%)	153 (44.9%)
	No Problem	122 (94.6%)	123 (77.8%)	242 (74.2%)	173 (50.7%)
Falling because legs give way?	A Problem	7 (5.4%)	35 (22.1%)	84 (25.8%)	168 (49.3%)
	No Problem	124 (96.1%)	119 (75.3%)	256 (78.5%)	222 (65.1%)
Frequently nauseous?	A Problem	5 (3.9%)	39 (24.6%)	70 (21.5%)	119 (34.9%)
	No Problem	105 (81.4%)	82 (51.9%)	181 (55.5%)	134 (39.3%)
Unable to concentrate?	A Problem	24 (18.6%)	76 (48.1%)	145 (44.5%)	207 (60.7%)
	No Problem	103 (79.8%)	66 (41.8%)	111 (34%)	82 (24%)
Frequent migraine or tension headaches?	A Problem	26 (20.2%)	92 (58.2%)	215 (66%)	259 (76%)
	No Problem	103 (79.8%)	66 (41.8%)	111 (34%)	82 (24%)

Note: All chi-square comparisons are significant ($p < 0.01$) between community non-patients without pain versus community patients with pain, acute pain patients, and chronic pain patients, except for those noted with an asterisk.

Tables 4a-4c display the cluster analysis solutions for the 15 symptom variables for CPWP in Table 4a, APPs in Table 4b, and CPPs in Table 4c. For the CPWP, a 5-cluster solution was extracted with the majority of symptoms in cluster 1 that consisted of problems related to sleep, numbness, tight muscles, nervousness, irritability, and headaches. For the APPs, a 4-cluster solution was extracted and cluster 1 also centered on problems with sleep, tight muscles, nervousness, irritability, and headaches. For the CPPs, a 5-cluster solution was extracted and cluster 4 contained symptoms related to sleep, tight muscles, and headaches.

TABLE 4A.					
Cluster Analysis Solution for Community Patients with Pain					
Cluster	Variable	R ² with Own Cluster	R ² with Next Closest	(1-R ² Own)/(1-R ² Closest)	
Cluster 1	Perception of fatigue?	0.452	0.174	0.664	
	Frequent muscle tightness?	0.358	0.131	0.738	
	No difficulty staying asleep?	0.442	0.187	0.687	
	Frequent muscle tightness?	0.484	0.120	0.587	
	Frequently nervous?	0.375	0.109	0.702	
	Frequently irritable?	0.400	0.066	0.642	
Cluster 2	Frequent migraine or tension headaches?	0.490	0.196	0.634	
	Frequently dizzy?	0.755	0.206	0.308	
	Frequently nauseous?	0.755	0.159	0.291	
Cluster 3	Frequent depression?	0.462	0.103	0.600	
	Unable to remember things?	0.673	0.193	0.405	
Cluster 4	Unable to concentrate?	0.735	0.294	0.376	
	Sudden muscle weakness?	0.725	0.164	0.329	
Cluster 5	Falling because legs give way?	0.725	0.090	0.302	
	Difficulty opening or closing your mouth?	1.000	0.044	0.000	

Table 2 displays frequencies (percentages) for the 15 symptom variables for CPWP versus APPs and CPPs, respectively. For the first group of chi square comparisons, the CPWP were similar in their response to all 15 clinical symptoms to the APPs. For the second group of chi square comparisons, CPPs reported higher frequencies of problems for numbness or tingling, dizziness, sudden muscle weakness, sleeping, tight muscles, irritability, falling because legs give way, concentrating, and migraine or tension headaches compared to the CPWP.

TABLE 2.					
Comparing Clinical Symptoms for Community Patients with Pain Versus Acute Pain Patients and Chronic Pain Patients					
Variable	Category	Community Patients with Pain	Acute Pain Patients	Chronic Pain Patients	
Perception of fatigue?	No Problem	51 (32.3%)	113 (34.7%)	87 (25.5%)	
	A Problem	107 (67.7%)	213 (65.3%)	254 (74.5%)	
Perception of numbness or tingling?	No Problem	79 (50%)	124 (38%)	73 (21.4%)*	
	A Problem	79 (50%)	202 (62%)	268 (78.6%)	
Frequently dizzy?	No Problem	118 (74.7%)	240 (73.6%)	210 (61.6%)*	
	A Problem	40 (25.3%)	86 (26.4%)	131 (38.4%)	
Difficulty opening or closing mouth?	No Problem	148 (93.7%)	305 (93.6%)	310 (90.9%)	
	A Problem	10 (6.32%)	21 (6.4%)	31 (9.1%)	
Sudden muscle weakness?	No Problem	114 (72.2%)	235 (72.1%)	159 (46.6%)*	
	A Problem	44 (27.8%)	91 (27.9%)	182 (53.4%)	
No difficulty staying asleep?	No	95 (60.1%)	199 (61%)	278 (81.5%)*	
	Yes	63 (39.8%)	127 (39%)	63 (18.5%)	
	No	114 (72.2%)	242 (74.2%)	221 (64.8%)	
Frequent depression?	Yes	44 (27.8%)	84 (25.8%)	120 (35.2%)	
	No	99 (62.7%)	193 (59.2%)	131 (38.4%)*	
Frequent muscle tightness?	Yes	59 (37.3%)	133 (40.8%)	210 (61.6%)	
	No Problem	53 (33.5%)	121 (37.1%)	106 (31.1%)	
Frequently nervous?	A Problem	105 (66.4%)	205 (62.9%)	235 (68.9%)	
	No Problem	46 (29.1%)	87 (26.7%)	55 (16.1%)*	
Frequently irritable?	A Problem	112 (70.8%)	239 (73.3%)	286 (83.9%)	
	No Problem	93 (58.9%)	230 (70.6%)	188 (55.1%)	
Unable to remember things?	A Problem	65 (41.1%)	96 (29.4%)	153 (44.9%)	
	No Problem	123 (77.8%)	242 (74.2%)	173 (50.7%)*	
Falling because legs give way?	A Problem	35 (22.1%)	84 (25.8%)	168 (49.3%)	
	No Problem	119 (75.3%)	256 (78.5%)	222 (65.1%)	
Frequently nauseous?	A Problem	39 (24.6%)	70 (21.5%)	119 (34.9%)	
	No Problem	82 (51.9%)	181 (55.5%)	134 (39.3%)*	
Unable to concentrate?	A Problem	76 (48.1%)	145 (44.5%)	207 (60.7%)	
	No Problem	66 (41.8%)	111 (34%)	82 (24%)*	
Frequent migraine or tension headaches?	A Problem	92 (58.2%)	215 (66%)	259 (76%)*	
	No Problem	66 (41.8%)	111 (34%)	82 (24%)*	

Note: Chi-square comparisons for those noted with an asterisk are significant ($p < 0.01$) for community patients versus chronic pain patients

TABLE 4B.					
Cluster Analysis Solution for Acute Pain Patients					
Cluster	Variable	R ² with Own Cluster	R ² with Next Closest	(1-R ² Own)/(1-R ² Closest)	
Cluster 1	Perception of fatigue?	0.426	0.172	0.693	
	Frequent muscle tightness?	0.413	0.162	0.701	
	Frequently nervous?	0.534	0.195	0.579	
	Frequently irritable?	0.546	0.132	0.522	
	Frequent migraine or tension headaches?	0.636	0.214	0.463	
Cluster 2	Frequently dizzy?	0.579	0.220	0.540	
	Difficulty opening or closing your mouth?	0.435	0.057	0.599	
	Frequently nauseous?	0.654	0.144	0.405	
Cluster 3	Perception of numbness or tingling?	0.467	0.146	0.624	
	Sudden muscle weakness?	0.613	0.190	0.478	
	No difficulty staying asleep?	0.408	0.140	0.688	
	Falling because legs give way?	0.505	0.119	0.562	
Cluster 4	Frequent depression?	0.511	0.114	0.552	
	Unable to remember things?	0.593	0.187	0.501	
Cluster 5	Unable to concentrate?	0.735	0.333	0.398	

TABLE 4C.					
Cluster Analysis Solution for Chronic Pain Patients					
Cluster	Variable	R ² with Own Cluster	R ² with Next Closest	(1-R ² Own)/(1-R ² Closest)	
Cluster 1	Unable to remember things?	0.760	0.177	0.291	
	Unable to concentrate?	0.760	0.156	0.284	
Cluster 2	Perception of numbness or tingling?	0.457	0.025	0.556	
	Sudden muscle weakness?	0.727	0.110	0.307	
Cluster 3	Frequent depression?	0.407	0.096	0.656	
	Frequently nervous?	0.691	0.107	0.346	
	Frequently irritable?	0.538	0.054	0.488	
Cluster 4	Perception of fatigue?	0.419	0.102	0.647	
	No difficulty staying asleep?	0.245	0.024	0.773	
	Frequent muscle tightness?	0.497	0.078	0.546	
	Frequent migraine or tension headaches?	0.532	0.145	0.547	
Cluster 5	Frequently dizzy?	0.533	0.138	0.542	
	Difficulty opening or closing your mouth?	0.419	0.022	0.594	
Cluster 6	Frequently nauseous?	0.565	0.165	0.521	

Table 3 displays the chi squares for the 15 symptom variables for APPs versus CPPs. CPPs reported higher frequencies of problems for all symptoms, except for being unable to open or close your mouth and nervousness.

TABLE 3.				
Comparing Clinical Symptoms for Acute Pain Patients Versus Chronic Pain Patients				
Variable	Category	Acute Pain Patients	Chronic Pain Patients	
Perception of fatigue?	No Problem	113 (34.7%)	87 (25.5%)	
	A Problem	213 (65.3%)	254 (74.5%)	
Perception of numbness or tingling?	No Problem	124 (38%)	73 (21.4%)	
	A Problem	202 (62%)	268 (78.6%)	
Frequently dizzy?	No Problem	240 (73.6%)	210 (61.6%)	
	A Problem	86 (26.3%)	131 (38.4%)	
Difficulty opening or closing mouth?	No Problem	305 (93.6%)	310 (90.9%)NS	
	A Problem	21 (6.44%)	31 (9.1%)	
Sudden muscle weakness?	No Problem	235 (72.1%)	159 (46.6%)	
	A Problem	91 (27.9%)	182 (53.4%)	
No difficulty staying asleep?	No	199 (61%)	278 (81.5%)	
	Yes	127 (38.9%)	63 (18.5%)	
Frequent depression?	No	242 (74.2%)	221 (64.8%)	
	Yes	84 (25.8%)	120 (35.2%)	
Frequent muscle tightness?	No	193 (59.2%)	131 (38.4%)	
	Yes	133 (40.7%)	210 (61.6%)	
Frequently nervous?	No Problem	121 (37.1%)	106 (31.1%)NS	
	A Problem	205 (62.8%)	235 (68.9%)	
Frequently irritable?	No Problem	87 (26.7%)	55 (16.1%)	
	A Problem	239 (73.3%)	286 (83.9%)	
Unable to remember things?	No Problem	230 (70.6%)	188 (55.1%)	
	A Problem	96 (29.4%)	153 (44.9%)	
Falling because legs give way?	No Problem	242 (74.2%)	173 (50.7%)	
	A Problem	84 (25.7%)	168 (49.3%)	
Frequently nauseous?	No Problem	256 (78.5%)	222 (65.1%)	
	A Problem	70 (21.4%)	119 (34.9%)	
Unable to concentrate?	No Problem	181 (55.5%)	134 (39.3%)	
	A Problem	145 (44.4%)	207 (60.7%)	
Frequent migraine or tension headaches?	No Problem	111 (34%)	82 (24%)	
	A Problem	215 (65.9%)	259 (76%)*	

Note: All chi-square comparisons are significant ($p < 0.01$) between acute pain patients and chronic pain patients, except for those noted as NS.

Tables 5a-5b display the cluster analysis solutions for the 15 symptom variables for CPPs with moderate pain in Table 5a and CPPs with severe pain in Table 5b. For CPPs with mild chronic pain, a solution could not be extracted due to the small sample size ($n = 19$). For the CPPs with moderate chronic pain, a 3-cluster solution was extracted with the majority of symptoms in cluster 1 that consisted of problems related to sleep, behavior complaints, memory issues, nausea, and headaches. For the CPPs with severe chronic pain, a 4-cluster solution was extracted and cluster 1 also centered on problems with sleep, tight muscles, nausea, and headaches.

TABLE 5A.				
Cluster Analysis Solution for Chronic Pain Patients with Moderate Pain				
Cluster	Variable	R ² with Own Cluster	R ² with Next Closest	(1-R ² Own)/(1-R ² Closest)
Cluster 1	Perception of fatigue?	0.224	0.014	0.788
	Frequent depression?	0.246	0.034	0.780
	Frequently nervous?	0.303	0.032	0.720
	Frequently irritable?	0.250	0.039	0.780
	Unable to remember things?	0.423	0.073	0.622
	Frequently nauseous?	0.343	0.023	0.673
Cluster 2	Unable to concentrate?	0.555	0.026	0.457
	Frequent migraine or tension headaches?	0.254	0.033	0.772
	Perception of numbness or tingling?	0.221	0.008	0.785
Cluster 3	Frequently			