

# Predictor Variables for Six Forms of Suicidality in Chronic Pain Patients

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The objective of this study was to determine what rehabilitation chronic pain patient (CPP) variables are predictive of six forms of suicidality: wanting to die because of pain; wanting to die because life is hard; history of wanting to die; history of suicide attempts; recent frequent suicide ideation; and having a suicidal plan. These forms of suicidality were assessed using the Battery for Health Improvement 2 (BHI 2), which was administered to 341 CPPs. Patients affirming each suicidality item were compared to those not affirming the item on a wide range of demographic variables and BHI 2 scales. Significant variables ( $p < 0.01$ ) were then utilized as independent variables in six suicidality logistic regression models, all of which were significant ( $p < .001$ ). Affirmation of the suicidality items for CPPs ranged from 8% for having a suicide plan, to 35% for history of wanting to die. Contrary to the psychiatric suicide literature, no demographic variables (except employment) were predictive. In general, the set of predictor variables differed between each suicidality item. Most suicidality predictor variables had previously been delineated in the psychiatric literature (e.g., depression, substance abuse) but some variables were novel. These were perseverance (measure of self efficacy), somatic complaints, and chronic maladjustment (poor social coping). The range for correctly classifying patients in these models was from 83% to 94%. For all models, except “recent frequent suicide ideation”, the correct prediction rate was better than the base rate and significantly better in the case of “history of wanting to die”, history of suicide attempt, and wanting to die because life is hard. It was concluded that suicidality predictor variables were differentially distributed between different forms of suicidality, and some suicidality predictor variables appeared to be specific to pain patients.

**TABLE 1.**  
 Number and Percentage of Subjects Endorsing Suicide Ideation or Suicide History Items

Category	N	Yes to Having a Suicide Plan (n, %)	Yes to History of Wanting to Die (n, %)	Yes to History of Suicide Attempt (n, %)	Yes to Wanting to Die Because of Pain (n, %)	Yes to Recent Frequent Suicide Ideation (n, %)	Yes to Wanting to Die Because Life is Hard (n, %)
Community Healthy	1,329	22 (1.66%)	240 (18.06%)	84 (6.32%)	37 (2.78%)	42 (3.16%)	155 (11.66%)
Community Patients	158	11 (6.96%)	42 (26.58%)	14 (8.86%)	20 (12.66%)	11 (6.96%)	34 (21.52%)
Rehab Patients without Pain	110	8 (7.27%)	43 (39.09%)	22 (20.00%)	13 (11.82%)	12 (10.91%)	19 (17.27%)
Rehab Acute Pain Patients	326	23 (7.06%)	81 (24.85%)	46 (14.11%)	20 (6.13%)	19 (5.83%)	62 (19.01%)
Rehab Chronic Pain Patients	341	27 (7.92%)	119 (34.90%)	70 (20.53%)	48 (14.08%)	32 (9.38%)	85 (24.93%)

**TABLE 2.**  
 Phi Correlation Coefficients for APPS (Above the Diagonal) and CPPS (Below the Diagonal)

	Having a Suicide Plan	History of Wanting to Die	History of Suicide Attempt	Wanting to Die Because of Pain	Recent Frequent Suicide Ideation	Wanting to Die Because Life is Hard
Having a Suicide Plan	1	0.257	0.404	0.279	0.494	0.385
History of Wanting to Die	0.287	1	0.440	0.267	0.342	0.499
History of Suicide Attempt	0.254	0.450	1	0.153*	0.388	0.253
Wanting to Die Because of Pain	0.287	0.341	0.191	1	0.318	0.300
Recent Frequent Suicide Ideation	0.390	0.313	0.260	0.419	1	0.413
Wanting to Die Because Life is Hard	0.208	0.474	0.227	0.449	0.396	1

All correlations are significant at  $< 0.001$ , except for \* which is significant at  $< 0.01$

**TABLE 3.**  
 Final Model Logistic Regression Results for Significant Independent Variables with Wanting to Die Because Life is Hard as the Dependent Variable for Acute and Chronic Pain Patients

Step $\chi^2$ (df), p value	% of Cases Predicted Correctly by the Model	Step Nagelkerke R <sup>2</sup>	Variable	Associated BHI-2 Scale	B	Wald, p value	Odds Ratio	Lower 95% CI for Odds Ratio	Upper 95% CI for Odds Ratio
110.8 (1), $<0.001$	81.8	.411	Depression Scale	Not applicable	0.08	9.9, 0.002	1.08	1.03	1.13
25.6 (1), $<0.001$	85.3	.078	History of wanting to die	Not applicable	1.8	21.7, $<0.001$	6.2	2.9	13.4
15.9 (1), $<0.001$	83.9	.045	After setbacks, I still have hope	Perseverance	-1.7	14.6, $<0.001$	0.19	0.08	0.44
14.3 (1), $<0.001$	86.5	.039	Things are bad in my house now	Family dysfunction	1.4	14.3, $<0.001$	4.2	2.0	9.0
12.1 (1), 0.001	88.3	.031	I am mean to people I care about	Borderline	1.3	10.4, 0.001	3.5	1.6	7.5
8.9 (1), 0.003	88.6	.023	Wanting to die because of pain	Not applicable	1.5	8.6, 0.003	4.4	1.6	11.7

**TABLE 4.**  
 Final Model Logistic Regression Results for Significant Independent Variables with Wanting to Die Because of Pain as the Dependent Variable for Acute and Chronic Pain Patients

Step $\chi^2$ (df), p value	% of Cases Predicted Correctly by the Model	Step Nagelkerke R <sup>2</sup>	Variable	Associated BHI-2 Scale	B	Wald, p value	Odds Ratio	Lower 95% CI for Odds Ratio	Upper 95% CI for Odds Ratio
59.1 (1), $<0.001$	85.9	.286	Wanting to die because life is hard	Depression	2.5	32.7, $<0.001$	11.7	5.0	27.2
22.3 (1), $<0.001$	88.0	.096	Disappointed in bad health	Depression	2.1	16.4, $<0.001$	8.1	2.9	22.2
16.8 (1), $<0.001$	90.9	.068	Muscles don't normally relax	Muscular Bracing	2.1	11.2, 0.001	8.3	2.4	28.4
13.3 (1), $<0.001$	89.4	.051	Substance Abuse Scale	Not applicable	0.06	10.0, 0.002	1.06	1.02	1.11
7.3 (1), 0.007	89.4	.028	Maintain health by remaining home	Functional complaints	1.2	7.3, 0.007	3.4	1.4	8.1
8.9 (1), 0.003	88.6	.023	Wanting to die because of pain	Not applicable	1.5	8.6, 0.003	4.4	1.6	11.7

**TABLE 5.**  
 Final Model Logistic Regression Results for Significant Independent Variables with History of Wanting to Die as the Dependent Variable for Acute and Chronic Pain Patients

Step $\chi^2$ (df), p value	% of Cases Predicted Correctly by the Model	Step Nagelkerke R <sup>2</sup>	Variable	Associated BHI-2 Scale	B	Wald, p value	Odds Ratio	Lower 95% CI for Odds Ratio	Upper 95% CI for Odds Ratio
74.9 (1), $<0.001$	77.1	.272	Feeling empty and dead inside	Depression	2.1	33.6, $<0.001$	8.0	4.0	16.2
51.2 (1), $<0.001$	80.4	.154	History of suicide attempt	Borderline	2.4	36.9, $<0.001$	11.0	5.1	24.0
20.2 (1), $<0.001$	79.2	.055	Self-confidence	Perseverance	-1.0	10.2, 0.001	0.36	0.19	0.67
16.8 (1), $<0.001$	81.5	.043	Life is satisfactory	Depression	-1.3	14.4, $<0.001$	0.29	0.15	0.55
9.3 (1), 0.0002	82.7	.023	I cannot stop bad habits	Perseverance	0.96	9.2, 0.002	2.6	1.4	4.8

**TABLE 6.**  
 Final Model Logistic Regression Results for Significant Independent Variables with History of Suicide Attempt as the Dependent Variable for Acute and Chronic Pain Patients

Step $\chi^2$ (df), p value	% of Cases Predicted Correctly by the Model	Step Nagelkerke R <sup>2</sup>	Variable	Associated BHI-2 Scale	B	Wald, p value	Odds Ratio	Lower 95% CI for Odds Ratio	Upper 95% CI for Odds Ratio
46.3 (1), $<0.001$	83.9	.199	Previously, I have physically injured myself	Borderline	2.4	24.2, $<0.001$	11.4	4.3	30.2
28.5 (1), $<0.001$	83.0	.110	Survivor of Violence Scale	Not applicable	0.09	24.7, $<0.001$	1.09	1.05	1.13
8.9 (1), 0.003	85.3	.032	Hearing voices others don't	Somatic Complaints	1.8	11.9, 0.001	6.1	2.2	17.2
5.0 (1), 0.025	84.5	.018	I normally have lots of energy	Borderline	-0.90	6.0, 0.014	0.41	0.20	0.84
6.1 (1), 0.014	85.9	.022	Dizziness	Somatic Complaints	-0.88	5.7, 0.017	0.42	0.20	0.86

**TABLE 7.**  
 Final Model Logistic Regression Results for Significant Independent Variables with Recent Frequent Suicide Ideation as the Dependent Variable for Acute and Chronic Pain Patients

Step $\chi^2$ (df), p value	% of Cases Predicted Correctly by the Model	Step Nagelkerke R <sup>2</sup>	Variable	Associated BHI-2 Scale	B	Wald, p value	Odds Ratio	Lower 95% CI for Odds Ratio	Upper 95% CI for Odds Ratio
61.8 (1), $<0.001$	92.4	.358	Depression Scale	Not applicable	0.08	81.1, 0.004	1.09	1.03	1.15
14.2 (1), $<0.001$	93.3	.073	Hearing voices others don't	Somatic Complaints	2.6	14.7, $<0.001$	12.8	3.5	47.2
9.9 (1), 0.002	93.8	.050	I do not quit	Perseverance	-1.7	10.0, 0.002	0.18	0.06	0.52
9.1 (1), 0.002	94.1	.044	Thinking about painful memories	Somatic Complaints	2.1	8.5, 0.003	7.9	2.0	31.5
7.9 (1), 0.005	93.5	.038	Having lots of violent ideas	Hostility	1.8	8.1, 0.004	6.0	1.7	20.7

**TABLE 8.**  
 Final Model Logistic Regression Results for Significant Independent Variables with Having Suicide Plan as the Dependent Variable for Acute and Chronic Pain Patients

Step $\chi^2$ (df), p value	% of Cases Predicted Correctly by the Model	Step Nagelkerke R <sup>2</sup>	Variable	Associated BHI-2 Scale	B	Wald, p value	Odds Ratio	Lower 95% CI for Odds Ratio	Upper 95% CI for Odds Ratio
36.1 (1), $<0.001$	90.7	.295	Recent frequent suicide ideation	Depression	2.3	13.1, $<0.001$	10.2	2.9	36.0
12.5 (1), $<0.001$	91.1	.091	Hearing voices that others don't	Somatic Complaints	2.9	11.9, 0.001	18.3	3.5	95.4
11.5 (1), 0.001	92.4	.080	History of suicide attempt	Borderline	1.9	10.3, 0.001	6.6	2.1	20.9
5.4 (1), 0.02	92.4	.037	Employment status	Not applicable	-1.7	4.0, 0.045	0.18	0.03	0.96