

## Perceived health status in chronic pain patients: a cognitive behavioural therapy intervention

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### ABSTRACT

Perceived Health Status (PHS) describes the overall health status, self-perception, self-assessed physical condition and self-rated wellbeing of an individual. A person with slightest of problems may have very poor Perceived Health Status, while a person with severe problems may have a fairly healthy perception about his health. Many researchers have proved that can be modified drastically, depending on the life situations and health. The adverse life and health conditions affect PHS negatively. **Objectives-** This study investigates how patients' Perceived Health Status changes with chronic pain, assesses the improvement in the Perceived Health Status in patients suffering from various conditions, and impact of intervention through Cognitive Behavioural Therapy and comparing the perception of patients before and after providing cognitive behavioural therapy. **Research Design-** In this study, Randomized Control-Group Pretest -Posttest Design was used that measured Perceived Health Status of the subjects. **Sample-** For the present study, 80 patients, 19- 65 years of age (Early adulthood- 19- 34 years, Middle adulthood- 35- 65 years), suffering from chronic pain, visiting hospitals and pain clinics for the treatment, were included. The sample with extreme health problems and their impact on cognition were excluded from the study. **Sampling Method-** The snow ball sampling method was used to reach the patients and the references given by the patients, doctors and care takers were explored to be included as the subjects. **Statistical Analysis-** Mean, SD, Z- test and ANOVA was calculated using the statistical package SPSS 21. **Results-** Cognitive behavioural therapy was considered significantly impactful on the patients with chronic pain. Although, the significant impact could not be studied on the overall PHS but positive impact of CBT was studied on the various domains of PHS. It is the need to include CBT in general pain management so as to help the patients to cope with pain and enhance their Perceived Health Status.

**Keywords:** Chronic Pain, Perceived Health Status, Cognitive Behavioural Therapy, Pain intervention, CBT

Perceived health is a condition of the brain, together with, positive attitude towards life, socialization and physical well-being. A positive attitude in the direction of life and health can make it possible to understand the symptoms of sickness as a part of

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physical condition (Idler, 1993), hence, with the change in health conditions, the perceived health status is sure to change. The patients who suffer from chronic pain have different threshold for pain and this leads to difference in their perceived health status. Sometimes it becomes utmost important to approach treatment, whether pharmacological or non-pharmacological. Various psychological therapies have been tested that can have a significant impact on the physical as well as mental well-being of individuals. Amongst these is, Cognitive Behavioral Therapy (CBT), which has been stated to be effective in identifying the links between thoughts, emotions (feelings) and behavior and is based on cognitive model of mental problems.

Cognitive Behavioural Therapy (CBT) is a well-structured and action-oriented psychotherapy which is focused on goals and agenda set collaboratively by patient and the therapist together (Hawley, Padesky, Hollon, Mancuso, Lapos, Brozina, & Segal, 2017) and works on finding the triggering and continuation factors arranged to change the thoughts and behavior of an individual, helpful for all ages, from early childhood to older adults, and for people of different levels of education and income and a mixture of cultural backgrounds, when used in an individual or group arrangements (Beck, J.S.,1995). Many researches have shown that Cognitive Behavioral Therapy can moderate or reduce the underlying factors of health problems, more, as compared to few other treatments that are unable to relieve and improve the perception and quality of life of the patients.

CBT can be helpful in many health conditions including pain. A person with slightest of problems may have very poor Perceived Health Status, while a person with severe problems may have a fairly healthy perception about his health. Many researchers have proved that PHS can be modified drastically, depending on the life situations and health. The adverse life and health conditions affect PHS negatively.

The present research focuses on studying the impact of Cognitive Behavioral Therapy on Perceived Health Status (PHS) of the patients suffering from chronic pain, so as to establish the need of Cognitive Behavioral Therapy as the routine treatment process in various clinical and non-clinical settings with the objectives to compare the Perceived Health Status of the patients prior to, and post Cognitive Behavioural Therapy (CBT) intervention and association to age and gender with Perceived Health Status.

The Hypothesis of the research being 1) There is no significant difference between the Perceived Health Status of the patients before and after providing Cognitive Behavioural Therapy, 2) There is no significant gender difference in the Perceived Health Status of the patients, 3) There is no significant age difference in the Perceived Health Status of the patients, 4) There is no Domain wise differences in Perceived Health Status prior and post CBT intervention.

## **METHODS**

*Research Design-* Randomized Control-Group Pre-test and Post-test Design was used for the study as it measured both the quantity (duration of pain) and the quality (Pain and Perceived Health Status) before and after intervention.

### *Sampling Design*

The snow ball sampling method was used to reach the patients and the references given by the patients/ doctors/ care takers were contacted to reach the other patients, keeping the

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record of other demographic variables i.e. gender and age. The data was obtained prior to and post intervention of CBT technique.

### ***Inclusion and Exclusion Criteria***

Their inclusion in the study depended on the scores of Short Portable Mental Status Questionnaire (SPMSQ).

### ***Sample and Sample size***

This study was based on 80 patients, 19- 65 years of age (Early adulthood- 19- 34 years, Middle adulthood- 35- 65 years), suffering from chronic pain and visiting hospital, due to various reasons.

### ***Tools and Techniques***

The dependent variable, Perceived Health Status was assessed using Short Form (36) Health Survey by RAND, Research and Development Corporation as a Medical Outcomes Study. The gathered data was put to statistical analysis using SPSS version 21 to compute the mean, SD, Z test and ANOVA.

CBT sessions were planned as per the individual need of the patients. The general format of the CBT session consisted of 1) Interview and Assessment to share their chronic pain condition and converse how it had affected their lives. This important meeting established the first face-to-face contact with the patient and was vital in setting the value for the rest of treatment, 2) Treatment Orientation to deliver an orientation to the CBT treatment model as well as education about the complex nature of chronic pain, 3) Assessment Feedback and Goal Setting to reflect back the pain-related impairments in their lives, and perhaps drawn attention to the individualized Patients-centric goals, 4) Exercise and Pacing to understand avoidance related to activities, anxiety of movement, and a series of negative significances, clarifying this pattern and highlighted the need for physical stimulation, 5) Relaxation Training for specific techniques: diaphragmatic or deep breathing, progressive muscle relaxation, and guided imagery 6) Pleasant Activities 1 to patients living with chronic pain and avoiding engaging in activity, including enjoyable activities, 7) Pleasant Activities 2 for solidifying the activities that they wish to pursue and developed a concrete plan for accomplishment, 8) Cognitive Coping 1 for understanding the self-motivated relationship between their thoughts and pain, and identifying to multiparty cognitive distortions to increase awareness about how their thoughts were related to their pain or negative mood, 9) Cognitive Coping 2 to monitor their negative thoughts and have increased their awareness of such thoughts' power and frequency, 10) Sleep to understand that pain may make falling and staying asleep more difficult and disturbed, and inadequate sleep increased next day pain and ways to get sound sleep, 11) Discharge Planning for developing a discharge plan, which included anticipating obstacles that was arise including increases in pain, 12) Booster Session focused-on patients' implementation of the CBT skills so that accessing the most relevant topics based on the pain experienced person's feedback was easy.

### ***Data Collection***

The patients suffering from chronic pain were provided CBT sessions of different duration, and frequency as per need, introducing SF- 36, prior and post intervention. The CBT were introduced as per need of an individual and the sessions were halted when, the patient reported actual reduction in pain.

## **RESULTS AND DISCUSSIONS**

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The subjects' perception about their own health showed differences in scores before and after CBT intervention but showed not statistically significant, most probably due to small sample size. The details of the same is being presented in Table 1-

**Table 1 Perceived Health Status prior and post CBT intervention**

	Mean	SD	Z-value	p-value
Perceived Health Scores Prior Intervention	831.790	84.245	-2.071	0.9808
Perceived Health Scores Post Intervention	1402.30	121.496		

The mean scores of Perceived Health Status using SF- 36 (Short Form Health Survey) for pre intervention and post intervention when compared for the significance in difference using Z- test, the p- value of 0.9808 for the mean pre- intervention scores (831.790), SD= 84.25 and mean post- intervention scores (1402.30), SD= 121.496 with the z- value -2.071 shows no significant difference between the two groups. The Perceived Health Status was not found to be significantly different prior to intervention and post intervention. Hence, the hypothesis failed to be rejected.

To study the differences between various age groups and gender categories, One- way ANOVA was carried on and F- statistic of 17.3025, p-1.1102e-16 was observed.

**Table 2 Comparative PHS among groups**

Source	sum of squares SS	degrees of freedom	mean square MS	F statistic	p-value
Treatment	22,381.1087	7	3,197.3012	17.3025	1.1102e-16
error	28,087.8110	152	184.7882		
total	50,468.9197	159			

The scientific notation of e-16 stated that null hypothesis at  $p < 0.05$  data was found to be statistically significant (Table 2) suggesting that the mean scores of the different groups were significantly different.

Another set of gender differences via  $H_0$ , "There is no significant gender difference in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy' are being mentioned below-

**Table 3 Gender difference in the Perceived Health Status of the patients after providing Cognitive Behaviour Therapy**

Domains	Post						t	p	z
	Male			Female					
	Mean	SD	df	Mean	SD	df			
Physical Functioning	39.88	11.35	78	45.38	8.27	78	2.4766	0.0154*	-2.467
Role limitations due to physical health	34.38	23.81	78	38.75	23.99	78	0.8187	0.4154	-0.819
Role limitations due to emotional problems	30.802	23.105	78	34.132	23.228	78	0.6428	0.5222	-0.715
Energy/fatigue	52.38	14.50	78	47.75	14.54	78	1.4244	0.1583	1.417
Emotional well-	44.70	17.04	78	48.50	12.36	78	1.1417	0.2571	-1.142

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Domains	Post						t	p	z
	Male			Female					
	Mean	SD	df	Mean	SD	df			
<b>being</b>									
<b>Social functioning</b>	43.250	24.926	78	44.688	25.926	78	0.2567	0.7981	-0.25
<b>Pain</b>	53.750	21.963	78	44.375	20.983	78	1.9520	0.0545	1.939
<b>General health</b>	50.265	14.489	78	49.235	15.330	78	0.3088	0.7583	0.309

To assess the gender differences in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison show i.e. Males ( $M = 25.5, SD = 35.40$ ) and females ( $M = 24.62, SD = 39.19$ ) of Perceived Health Status indicate that the Physical Functioning was not significantly different in both the genders,  $t$  value = 0.40015,  $p = .345071, p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = 0.06$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M = 39.88, SD = 8.27$ ) and females ( $M = 45.38, SD = 8.27$ ) of Perceived Health Status indicate that the Physical Functioning was not significantly different in both the genders,  $t$  value = 2.4766,  $p = 0.0154, p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = -2.467$ . This z-score too supports the  $t$  results, depicting no difference between the two groups.

Similarly, to assess the gender differences in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison show i.e. Males ( $M = 15.63, SD = 16.69$ ) and females ( $M = 18.75, SD = 17.68$ ) of Perceived Health Status indicate that the Role limitations due to physical health was not significantly different in both the genders,  $t$  value = 0.8130,  $p = 0.4187, p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = 0.001$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M = 34.38, SD = 23.81$ ) and females ( $M = 38.75, SD = 23.99$ ) of Perceived Health Status indicate that the Role limitations due to physical health was not significantly different in both the genders,  $t$  value = 0.8187,  $p = 0.4154, p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = -0.819$ . This z-score too supports the  $t$  results, depicting no difference between the two groups.

To assess the gender difference in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison show i.e. Males ( $M = 14.153, SD = 18.298$ ) and females ( $M = 27.935, SD = 17.222$ ) of Perceived Health Status indicate that the Role limitations due to emotional problems was not significantly different in both the genders,  $t$  value = 3.4690,  $p = 0.0009, p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = -3.471$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M = 30.802, SD = 23.105$ ) and females ( $M = 34.132, SD = 23.228$ ) of Perceived Health Status indicates that the Role limitations due to emotional problems were not significantly different in both the genders,  $t$  value = 0.6428,  $p = 0.5222, p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = -0.715$ . This z-score too supports the  $t$  results, depicting no difference between the two groups.

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To assess the gender differences in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison shows i.e. Males ( $M=41.00, SD=10.57$ ) and females ( $M=30.00, SD=10.80$ ) of perceived Health Status indicate that the Energy/fatigue was significantly different in both the genders,  $t$  value =4.6027,  $p=0.0001^*$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=-4.604$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M=52.38, SD=14.50$ ) and females ( $M=47.75, SD=14.54$ ) of Perceived Health Status indicate that the Energy/fatigue was not significantly different in both the genders,  $t$  value= 1.4244,  $p=0.1583$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=-1.417$ . This z-score too supports the  $t$  results, depicting no difference between the two groups.

The gender differences in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison shows i.e. Males ( $M=31.10, SD=10.11$ ) and females ( $M=26.30, SD=13.82$ ) of perceived Health Status indicate that the Emotional well-being was not significantly different in both the genders,  $t$  value =1.7728,  $p=0.0802$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=1.773$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M=44.70, SD=17.04$ ) and females ( $M=48.50, SD=12.36$ ) of Perceived Health Status indicates that the Emotional well-being was not significantly different in both the genders,  $t$  value= 1.1417,  $p=0.2571$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=-1.142$ . This z-score too supports the  $t$  results, depicting no difference between the two groups.

The gender difference in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison show i.e. Males ( $M=20.625, SD=14.026$ ) and females ( $M=35.563, SD=16.354$ ) of Perceived Health Status indicate that the Social functioning was not significantly different in both the genders,  $t$  value =4.3850,  $p=0.0001^*$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=-4.387$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M=43.250, SD=24.926$ ) and females ( $M=44.688, SD=25.926$ ) of Perceived Health Status indicate that the Social functioning was not significantly different in both the genders,  $t$  value=0.2567,  $p=0.7981$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=-0.25$ . This z-score too supports the  $t$  results, depicting no difference between the two groups.

To assess the gender differences in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison shows i.e. Males ( $M=20.000, SD=15.453$ ) and females ( $M=25.313, SD=15.108$ ) of Perceived Health Status indicate that the Pain was not significantly different in both the genders,  $t$  value =1.5547,  $p=0.1241$ ,  $p<.005$ . Similarly, Z-scores were computed for raw scores 95%,  $z=-1.554$ . This z-score too supports the  $t$  results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M=53.750, SD=21.963$ )

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and females ( $M = 44.375$ ,  $SD = 20.983$ ) of Perceived Health Status indicate that the Pain was not significantly different in both the genders,  $t$  value = 1.9520,  $p = 0.0545$ ,  $p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = 1.939$ . This z-score too supports the t results, depicting no difference between the two groups.

To assess the gender difference in the Perceived Health Status of the patients before and after providing Cognitive Behaviour Therapy, the comparison was made in the pre-intervention scores and post-intervention scores. The results from the pre-test comparison shows i.e. Males ( $M = 26.003$ ,  $SD = 12.077$ ) and females ( $M = 34.342$ ,  $SD = 16.552$ ) of perceived Health Status indicate that the General Health was significantly different in both the genders,  $t$  value = 2.5743,  $p = 0.0119^*$ ,  $p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = -2.575$ . This z-score too supports the t results, depicting no difference between the two groups along with the results from the post-test comparison shows i.e. Males ( $M = 50.265$ ,  $SD = 14.489$ ) and females ( $M = 49.235$ ,  $SD = 15.330$ ) of Perceived Health Status indicate that the General Health was not significantly different in both the genders,  $t$  value = 0.3088,  $p = 0.7583$ ,  $p < .005$ . Similarly, Z-scores were computed for raw scores 95%,  $z = 0.309$ . This z-score too supports the t results, depicting no difference between the two groups and both the groups were uniformly benefited by CBT.

The age-wise differences for the quality of pain of the patients before and after providing Cognitive Behaviour Therapy have been presented in the below mentioned table-

**Table- 4 Pre and Post Intervention Perceived Health Status among chronic pain patients in various age groups**

Category	Perceived Health Status	Pre-Intervention	Post-intervention	t value	p-value
Early Adulthood (Males)	Mean	218.750	396.895	9.9246	.0001*
	SD	45.662	66.022		
	SEM	10.210	14.763		
Middle Adulthood (Males)	Mean	169.26	301.89	10.5897	0.0001*
	SD	35.42	43.39		
	SEM	7.92	9.7		
Early Adulthood (Females)	Mean	206.73	432.33	10.5897	0.0001*
	SD	41.45	36.9		
	SEM	7.92	8.25		
Middle Adulthood (Females)	Mean	237.05	271.62	2.5390	0.0153*
	SD	31.65	51.02		
	SEM	7.08	11.63		

Similarly, the age differences in Early and Middle Adulthood showed extremely significant differences i.e. Early Adulthood (Males) Mean (218.750, 396.895), SD (45.662, 66.022),  $t = 9.9246$ ,  $p = .0001$ ; Middle Adulthood (Males) Mean (169.26, 301.89), SD (35.42, 43.39),  $t = 10.5897$ ,  $p = 0.0001$ ; Early Adulthood (Females) Mean (206.73, 432.33), SD (41.45, 36.9),  $t = 10.5897$ ,  $p = 0.0001$ ; Middle Adulthood (Females) Mean (237.05, 271.62), SD (271.6, 51.02),  $t = 22.5390$ ,  $p = 0.0153$  depicting significance of differences pre and post CBT intervention.

**Table 5 Domain wise differences in Perceived Health Status prior and post CBT intervention**

Domain	Source	sum of squares SS	degrees of freedom vv	mean square MS	F statistic	p-value
Physical Functioning	Treatment	13,809.8438	7	1,972.8348	20.9682	1.1102e-16
	Error	14,301.2500	152	94.0872		
	Total	28,111.0938	159			
Role limitations due to physical health	Treatment	27,125.0000	7	3,875.0000	10.5061	9.8268e-11
	Error	56,062.5000	152	368.8322		
	Total	83,187.5000	159			
Role limitations due to emotional problems	Treatment	13,543.5047	7	1,934.7864	4.7297	7.9000e-05
	Error	62,178.6930	152	409.0703		
	Total	75,722.1977	159			
Energy/Fatigue	Treatment	13,418.5938	7	1,916.9420	12.5222	1.2859e-12
	Error	23,268.7500	152	153.0839		
	Total	36,687.3438	159			
Emotional Well being	treatment	17,597.5000	7	2,513.9286	17.2854	1.1102e-16
	Error	22,106.4000	152	145.4368		
	Total	39,703.9000	159			
Social Functioning	treatment	38,914.2188	7	5,559.1741	19.7934	1.1102e-16
	Error	42,690.6250	152	280.8594		
	Total	81,604.8438	159			
Pain	treatment	42,242.0233	7	6,034.5748	21.2618	1.1102e-16
	Error	40,302.7250	142	283.8220		
	Total	82,544.7483	149			
General Health	treatment	22,381.1087	7	3,197.3012	17.3025	1.1102e-16
	Error	28,087.8110	152	184.7882		
	Total	50,468.9197	159			

To estimate the differences between the groups, a one-way between subject's ANOVA was conducted to study the impact of CBT on the various PHS domains of the subjects. A significant impact of CBT on the *Physical Functioning* at  $p < .05$  level for the pre and post intervention [ $F(7, 152) = 20.9682, p = 1.1102e-16$ ]. It indicates that CBT has a positive impact on the Physical Functioning of the patients. Significant impact of CBT on the *Role Limitations Due to Physical Health* at  $p < .05$  level for the two conditions [ $F(7, 152) = 10.5061, p = 9.8268e-11$ ]. It indicates that CBT has a positive impact on the role limitations due to physical health of the patient.

CBT's significant impact on the role limitations due to *Emotional Problems* at  $p < .05$  level for the two conditions [ $F(7, 152) = 4.7297, p = 7.9000e-05$ ]. It indicated that CBT has a positive impact on the role limitations due to emotional problems at of the patient. While CBT on *Energy/ Fatigue* have significant impact  $p < .05$  level for the two conditions [ $F(7, 152) = 12.5222, p = 1.2859e-12$ ], indicating that CBT has a positive impact on the energy/fatigue of the patient.

A significant impact of CBT on *Emotional Well-Being* at  $p < .05$  level for the two conditions [ $F(7, 152) = 17.2854, p = 1.1102e-16$ ] indicated that CBT has a positive impact on emotional well-being of the patient. And significant impact of CBT on *Social Functioning* at  $p < .05$  level for the two conditions [ $F(7, 152) = 19.7934, p = 1.1102e-16$ ]. It indicates that CBT has a positive impact on the social functioning of the patient. Similarly, significant impact of CBT on the pain at  $p < .05$  level for the two conditions [ $F(7, 152) = 21.2618, p = 1.1102e-16$ ]. It indicates that CBT has a positive impact on the pain of the patient. Also. significant impact of CBT on *General Health* at  $p < .05$  level for the two conditions [ $F(7, 152) = 17.3025,$

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p=1.1102e-16]. The test statistic for general health domain also indicated that CBT has a positive impact on the General Health of the patient.

### CONCLUSIONS

It can be well understood that the pain management needs to include psychological therapies on the regular basis to combat its effects on PHS. A close communication with the patients, being a guiding force to make them understand their pain origin, effects and make them feel better shall surely prompt them to lead a normal life and improve the quality of life.

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### Conflict of Interest

The author declared no conflict of interest.

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