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# Study on the clinical application of pain treatment efficacy evaluation and the nursing of patients with chronic non-cancer pain

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**Abstract: Objective:** To evaluate the pain degree of the patients with chronic non-cancer pain by using the evaluation model constituted by heart rate variability, anxiety and depression scale and quality of life rating scale, and to evaluate the efficacy after treatment and nursing intervention. **Methods:** 100 patients with chronic non-cancer pain treated in our hospital from February 2016 to April 2017 were selected to compare their heart rate variability, score of anxiety and depression, score of quality of life and NRS score before and after treatment and nursing intervention. **Results:** After treatment and nursing intervention, the heart rate variability time domain SDNN increased and the difference is significant (P<0.05); the score of anxiety and depression was lower than that before intervention (P<0.05); the scores of various dimensions of quality of life were higher than those before intervention (P<0.05); the NRS score was lower than that before intervention (P<0.05). **Conclusion:** The evaluation model constituted by heart rate variability, anxiety and depression scale and quality of life rating scale can be used to evaluate the pain degree of the patients with chronic non-cancer pain and to evaluate the efficacy after treatment and nursing intervention, which is worthy of clinic application.

**Key words:** Evaluation model; Patients with chronic non-cancer pain; Pain

Pain is a kind of painful experience in sensory, emotional, cognitive and social dimensions related to tissue damages or potential tissue damages [1], which is clinically divided into acute pain and chronic pain. Among which, chronic pain refers to continuous or intermittent pain for 3 months or over. [2] Due to long duration and lack of attention, most of the patients suffering from chronic pain are not treated effectively; they often suffer from the pain silently and are tortured physically and mentally for a long time, causing severe depression and anxiety, which affect the patients' quality of life and bring great loss to the society. [3] With the changing of people's living concept, unhealthy phenomena caused by symptoms of pain have gradually attracted the attention of the medical field. [4]

At present, the incidence of chronic pain in the general population in China is increasing year by year, [5] and more and more attention has been paid to the study of chronic pain. However, there is still no a comprehensive and accurate testing system used for judging the grade of pain. In this Study, an evaluation model constituted by heart rate variability, anxiety and depression scale and quality of life rating scale was used to evaluate the pain degree of the patients with chronic non-cancer pain and the efficacy after treatment and nursing intervention.

## 1 Data and methods

### 1.1 Clinical data

100 patients with chronic non-cancer pain treated in our hospital from February 2016 to April 2017 were selected as objects of the study, with the age from 35 to 78 years old and the average age of (50.4±1.3) years

old, including 46 male patients and 54 female patients. All of the patients participating in this study were well-informed and there was no new and death case before and after the treatment.

1.2 Inclusion and exclusion criteria

Inclusion criteria: all kinds of symptoms of chronic non-cancer pain caused by strain or degeneration, nerve injury, chronic inflammation, ischemia, blood stasis and emotion. Exclusion criteria: tumor-related patients, such as those suffering from neoplasm invasiveness or accepting antitumor therapy; patients with incomplete data.

## 1.3 Treatment and nursing

**1.31 Treatment:** Doctors developed personalized treatment programs according to patients' conditions and treated them through oral drug administration, nerve block, minimally invasive surgery, etc.

**1.32 Nursing intervention:** Firstly, listen to carefully and trust the expressions of the patients: pain is the subjective feeling of patients and has great physiological and psychological efficacy on them, but it has no obvious physical sign. Therefore, the evaluation of pain mainly relies on the patients' chief complaint; meanwhile, verify in time by communicating with their families. Secondly, comprehensive evaluation: fully understand the medical history, degree, medication and the degree of interference in life. Finally, dynamic evaluation: evaluate the onset of pain, the treatment efficacy and the specific improvement; closely monitor the pain changes, efficacies and adverse reactions; add or reduce the dose of the analgesics according to the actual condition of the patients.

When analgesics are given, try to minimize the drug toxicity under the premise of guaranteeing efficacy, so as to avoid lowering the patients' quality of life as much as possible. Provide the patients with timely and correct health education, and explain to them the drug effect, the correct drug administration method and time and the adverse reactions. Provide the patients with psychological nursing; relieve their anxiety through cognitive behavioral therapy, relaxation training and suggestive therapy, so as to alleviate the pain and enhance analgesic efficacy. Combine rehabilitation training and other means to realize both relief of symptoms and reduction of physical and mental damages, as well as the improvement of quality of life of the patients.

## 1.4 Evaluation methods

### 1.4.1 Heart rate variability (HRV)

In this Study, ZXY-1 HRV detector was adopted by pasting the electrode patch on the arm in a fixed position. Detection and analysis can be done when the patients are relaxed. After collecting the pulse or heartbeat signals after 5 minutes' quiet-sitting, the function pointer of the autonomic nervous function was obtained immediately. Heart rate variability adopted the time domain index SDNN (standard deviation of N-N intervals): standard deviation of normal sinus RR intervals. The larger the value of SDNN is, the higher the HRV will be.[6]

### 1.4.2 Anxiety and depression scale

The self-rating depression scale (SDS)[7]: 1 (no or very little time) – 4 (most or total time) four grades were used to express the score. Add the scores of the 20 items together to get the raw total score, and then multiplied by 1.25 to get the integer part to get the standard total score. According to Chinese norms results, if the standard total score $\geq 53$, the patient is suffering from depression; the higher the score is, the severer the depression will be.

The self—rating anxiety scale (SAS) [7]: The scoring method is same as that for SDS. Add the scores of the 20 items together to get the raw total score, and then multiplied by 1.25 to get the integer part to get the standard total score. According to Chinese norms results, if the standard total score $\geq 50$, the patient is suffering from anxiety; the higher the score is, the severer the anxiety will be.

### 1.4.3 SF-36 (the MOS item short from health survey, SF-36) Health survey scale

Quality of life rating scale SF-36 was developed by the Institute of Health, New England Medical Center, Boston, USA. [8] In this Study, the Chinese version translated by the Institute of Social Medicine, Zhejiang University School of Medicine was used to evaluate 8 aspects of the health-related quality of life: physiological function (PF), role physical (RP), body pain (BP), general health (GH), vitality (VT), social function (SF), role emotional (RE) and mental health (MH).

Likert sum method was adopted to add the scores together to calculate the raw score (Table 1), and then calculate the transmuted score by using the standard formula. [8]

Table 1 Calculation of the scores of various dimensions used in SF-36 scale

| Dimensions | Actual score of each item | Possible lowest score and possible highest score | Possible average score |
|---|---|---|---|
| Physiological function (PF) | 3a+3b+3c+3d+3e+3f+3g+3h+3i+3j | 10, 30 | 20 |
| Role physical (RP) | 4a+4b+4c+4d | 4, 8 | 4 |
| Body pain (BP) | 7+8 | 2, 12 | 10 |
| General health (GH) | 1+11a+11b+11c+11d | 5, 25 | 20 |
| Vitality (VT) | 9a+9e+9g+9i | 4, 24 | 20 |
| Social function (SF) | 6+10 | 2, 10 | 8 |
| Role emotional | 5a+5b+5c | 3, 6 | 3 |
| Mental health (MH) | 9b+9c+9d+9f+9h | 5, 30 | 5 |

$$\text{Transmuted score} = \frac{(\text{Raw score} - \text{Possible lowest score})}{\text{Possible average score}} \times 100$$

## 1.4.4 Pain score

Numeric rating scales (NRS) [9] was used to obtain the pain score. On a 10-points scale, the patients assessed the degree of pain by themselves according to their feeling of pain: 0 means painless; 1-3 means mild pain, which is tolerable and does not affect sleeping; 4-6 means moderate pain, which is intolerable and drug-dependent, and has effect on sleeping; 7-10 means severe pain, which is intense and intolerable; analgesics are needed; patients can not fall asleep and may suffer from nervous disorders and other symptoms.

## 1.5 Statistical processing

Statistical method: the data was processed by using SPSS 16.0 statistical software; the data was expressed by the mean $\bar{x} \pm s$; t-test was adopted; P<0.05 means the difference is statistically significant.

## 2 Results

### 2.1 Comparison of the heart rate variability time domain SDNN of the patients before and after treatment and nursing intervention

After treatment and nursing, the value of SDNN increased and the difference was significant (P<0.05). See Table 2 for details.

Table 2 Comparison of HRV time domain of patients

| Group | SDNN |
|---|---|
| Before intervention | 20.91±6.71 |
| After intervention | 28.22±8.57 |
| P | 0.000* |

* indicates P<0.05

## 2.2 Improvement of depression, anxiety and other clinical manifestations of the patients before and after treatment and nursing

Clinical observation showed that the scores of depression and anxiety after intervention were lower than those before intervention and the difference was statistically significant (P<0.05). See Table 3 for details.

Table 3 Comparison of the scores of depression and anxiety of patients before and after treatment and nursing intervention

| Group | Score of depression | Score of anxiety |
|---|---|---|
| Before intervention | 58.50 ± 12.52 | 50.15 ± 13.56 |
| After intervention | 40.12 ± 10.23 | 38.54 ± 10.34 |
| P | 0.000* | 0.000* |

* indicates P < 0.05

## 2.3 Comparison of the scores of various dimensions of quality of life of patients before and after treatment and nursing intervention

After treatment and nursing intervention, the scores of various dimensions of quality of life of patients were higher than those before intervention, and the difference was statistically significant (P<0.05). See Table 4 for details.

Table 4 Comparison of the scores of various dimensions of quality of life of patients before and after treatment

| Dimensions | Before intervention | After intervention | P |
|---|---|---|---|
| PF | 51.40 ± 10.61 | 78.90 ± 11.44 | 0.000* |
| RP | 34.75 ± 10.45 | 48.75 ± 12.37 | 0.000* |
| BP | 30.38 ± 13.45 | 60.08 ± 14.85 | 0.000* |
| GH | 39.75 ± 15.41 | 64.30 ± 12.18 | 0.000* |
| VT | 47.65 ± 11.27 | 75.90 ± 12.51 | 0.000* |
| SF | 45.25 ± 12.69 | 78.25 ± 14.55 | 0.000* |
| RE | 42.33 ± 14.39 | 66.33 ± 14.65 | 0.000* |
| MH | 52.44 ± 15.85 | 72.04 ± 14.61 | 0.000* |

* indicates P < 0.05

## 2.4 Comparison of the NRS scores of patients before and after treatment

After treatment and nursing intervention, the NRS score was lower than that before intervention, and the difference was statistically significant (P<0.05). See Table 5 for details.

**Table 5 Comparison of NRS scores of patients before and after treatment**

| Group | NRS score |
|---|---|
| Before intervention | 6.71±1.92 |
| After intervention | 1.80±1.24 |
| P | 0.000* |

* indicates P < 0.05

## 3 Discussion

With the changing of people's consciousness, pain has become the fifth important vital sign, following blood pressure, breath, pulse and temperature. The management research on pain is also getting deeper and deeper. [10] At present, the evaluation of pain is mainly based on the subjective feelings of patients, and their physiological reactions, social expectations, unhealthy emotions and other factors have constrained the objective evaluation of pain. In addition, there is no comprehensive clinical pain detecting system. All of the above seriously affect the definite diagnosis of diseases and subsequent treatment and nursing. Thus, this Study tries to evaluate the pain degree of the patients with chronic non-cancer pain by using the evaluation model constituted by heart rate variability, anxiety and depression scale and quality of life rating scale, and to evaluate the efficacy after treatment and nursing intervention.

The results of this Study showed that after treatment and nursing intervention, SDNN increased and the difference was significant, indicating the patients returned to sympathia from para-sympathia; the scores of depression and anxiety were lower than those before intervention; the scores of various dimensions of patients' quality of life were higher than those before intervention; the NRS score was lower than that before intervention. All the results indicate that the evaluation efficacy of the evaluation model constituted by heart rate variability, anxiety and depression scale and quality of life rating scale is consistent with the result of NRS, which further indicate that the evaluation model can truly reflect the patients' pain and pain degree, based on which the pain can be rated, so as to develop targeted treatment and nursing programs for the patients and improve their quality of life.

In conclusion, the establishment of an evaluation model of pain judgment and treatment efficacy on the patients with chronic non-cancer pain can greatly increase the accuracy and timeliness of pain judgment; meanwhile, targeted multi-directional treatment and nursing can significantly reduce the patients' pain degree and improve their quality of life; thus, it is worthy of widely clinical application.

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