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The application of two pain assessment methods in clinical rehabilitation medicine

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Objective: To explore the consistency between two pain assessment methods, namely the revised Wong-Baker faces pain scale revision (FPS-R) and the Peking Opera facial makeup (POFM) expression assessment methods. **Materials and methods:** From March 1 to June 30, 2024, FPS-R and BOFM were used to evaluate and measure pain in 41 hospitalized rehabilitation patients. The pain results measured by the FPS-R and BOFM pain assessment methods showed no statistically significant difference, and the consistency between the two methods was good. **Conclusion:** Peking Opera facial expressions (POFM) are convenient and suitable for Chinese people to use in evaluating patient pain.

Keywords: *pain assessment, Wong – Baker faces pain scale revision (FPS-R), Peking Opera facial makeup (POFM), rehabilitation*

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Сравнение двух методов оценки боли в клинической реабилитационной медицине

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Цель. Исследовать согласованность между двумя методами оценки боли, а именно расширенной рейтинговой шкалой Вонга – Бейкера (FPS-R) и методом грим-маски Пекинской оперы (POFM). **Материалы и методы.** В период с 1 марта по 30 июня 2024 года шкалы FPS-R и POFM использовались для оценки и измерения боли у 41 госпитализированного реабилитационного пациента. Результаты измерения боли с использованием шкал FPS-R и BOFM не показали статистически значимой разницы, подтверждая хорошую согласованность между методами. **Выводы.** Проведенное исследование подтвердило возможность и удобство применения метода грим-маски Пекинской оперы (Peking Opera Facial Make-Up, POFM) для использования китайцами при оценке боли пациента.

Ключевые слова: *боль, оценка боли, расширенная шкала оценки боли Вонга – Бейкера, FPS-R, шкала грим-масок Пекинской оперы, Peking Opera Facial Make-Up, шкала POFM, реабилитация*

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Pain is defined as a subjective experience, and it is one of the main reasons for medical consultations. In 2018, the World Health Organization (WHO) revised the International Classification of Diseases ICD-11, and chronic pain was listed as an independent cause of chronic diseases for the first time [1]. At present, pain is listed as the fifth vital sign after blood pressure, respiration, pulse, and body temperature [2].

Pain is essentially a subjective experience; therefore, in order to achieve a level of objectivity, pain management uses digital systems to evaluate and measure, to provide a quantitative measure of qualitative pain responses. Daily use of pain assessment tools can improve nursing staff's understanding of patient pain, and provide communication tools for nurses and doctors [4].

At present, there are more than twenty types of pain assessment scales in the world, with fourteen internationally-recognized scales commonly used in China [3]. At present, common pain assessment methods include visual analogue scale (VAS); numerical rating scale (NRS) 0–10; and Wong-Baker faces pain scale revision (FPS-R) [4].

FPS was originally developed by Dr. Donna Wong and Dr. Connie Baker for children's pain measurement, and was then revised to form FPS-R. FPS-R requires patients to score their overall pain level from 0 (painless) to 10 (most serious pain), based on cartoon images of six facial expressions (from smiles to tears) designed to convey the degree of pain represented by the score area [5].

Compared with the linear VAS, the FPS-R scale is more suitable for children (three years old and over), the elderly (some researchers have reported that FPS-R is the first choice for elderly patients [6, 7, 8]), and people with a low education level. It can even be used for patients with difficulty in self-expression, unclear consciousness, and cognitive dysfunction [6].

Peking Opera is a traditional Chinese culture. It is an ancient art with a history of over 200 years. It is a product of the combination of drama, music and dance. It is an art form that integrates singing, dancing, reading, and drama performance. It is called Oriental opera. Peking Opera facial makeup (POFM) is a special makeup method with national characteristics, which is recognized as a symbol of Chinese traditional culture [9].

POFM not only has the function of artistically decorating characters, but also of conveying emotions. The curved lines on the Peking Opera face mask indicate sadness or melancholy, while the straight lines or sharp corners indicate pain or anger; round lines and soft colors represent happy emotions [10].

This study used the revised Wong-Baker method (FPS-R) and POFM expressions to evaluate pain in rehabilitation patients. The aim was to explore the consistency of the two methods, and the application value of POFM in pain assessment.

Materials and methods

1. General information

A total of forty-one people were selected to take part in the study. All were rehabilitation patients who were admitted to Dongguan Rehabilitation Hospital for various treatments from March the 1st to June the 30th, 2024, at the Department of Bone and Joint Rehabilitation and the Neurological Rehabilitation Center. The criteria excluded patients suffering from cognitive impairment, aphasia, and other understanding and speech communication disorders.

2. Evaluation methods

The pain research team used both FPS-R and POFM to evaluate the patients' level of pain (Fig. 1, 2).

FPS-R uses six different facial expressions, ranging from very happy (smiling) to very sad (crying). Face 0 means no pain, and face 10 means the most pain imaginable. These six facial makeup expressions correspond to pleasure, discomfort, mild pain, pain, severe pain, and unbearable pain respectively, and are consistent with pain rating scales 0, 2, 4, 6, 8, and 10.

The primary goal for creating the Wong-Baker FACES® Pain Rating Scale was to help children effectively communicate about their pain so staff and parents could more successfully manage their pain. Initially, the numbers 0–5 were used to quantify the pain, but using the numbers 0–2–4–6–8–10 avoids confusion as it is more consistent with the numeric rating scale of 0–10 [17].

During the assessment, patients are asked to choose the face which best expresses their level of pain, using the numbers 0–2–4–6–8–10, consistent with Wong Baker FPS-R.

POFM also uses six pictures. The faces of the characters are outlined in specific patterns, representing different historical figures in the opera. The facial lines of POFM range from thin to thick; the colors from pink to black and red; and the expressions from gentle and happy, to angry and painful. The expressions of the six POFM characters correspond to six scales from 0 (painless) to 10 (most serious pain). During the pain assessment, the patient is asked to choose which POFM image best expresses the degree of pain.

In this study, the pain assessment patients were between 27 and 76 years old, with an average age of 41.2 years. There were thirty-one male patients and ten female patients, as shown in Fig. 2. The patients had various causes of pain, including twenty-nine fractures, five shoulder pain from stroke, four hand traumas, one cervical spondylosis, one lumbar disc herniation, and one knee joint effusion, as shown in Fig. 3.

3. Statistical analysis

SPSS 27.0 statistical software was used to perform a paired *t*-test on the two pain scoring methods. The measurement data were expressed as $X + S$. The paired *t*-test was used for comparison between groups, and $p < 0.05$ was considered statistically significant.

Results

A total of forty-one patients participated in the study, the aim of which was to compare the results of the Wong-Baker FPS-R and the POFM pain assessment methods. A paired t-test was performed on the two assessment methods by SSPS 27 statistical software. The results of the two

Fig. 1. Wong – Baker faces pain scale revision (FPS-R).

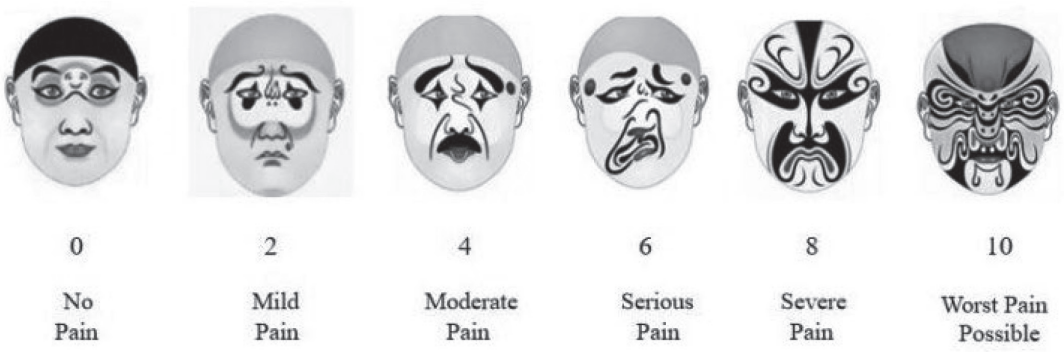

Fig. 2. Peking Opera Facial Makeup (POFM).

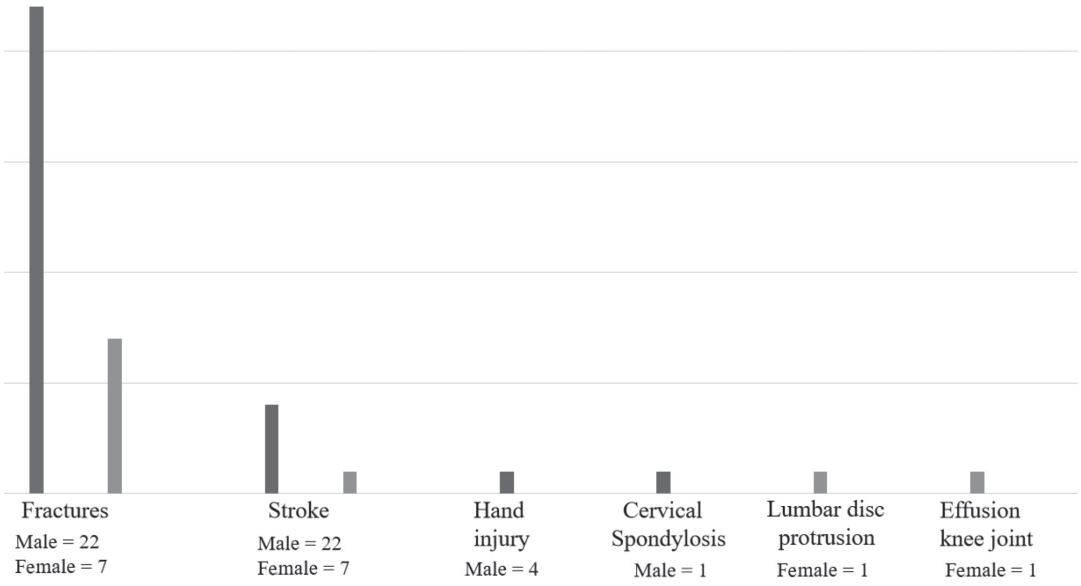

Fig. 3. Gender and disease classification of pain assessment patients.

evaluation methods in patients with pain are shown in the Tables 1, 2.

The results showed that the standard deviation of the first assessment method (Wong – Baker FPS-R) was 1.724, and the mean standard error was 0.269. The standard deviation of the second evaluation method (POFM) was 1.534, and the standard error was 0.240. The t-value measured by the paired *t*-test was 1.817, and the *p*-value was 0.77. According to the test level of $\alpha = 0.05$, there is no statistical difference between the results of the two methods, and the results of the two evaluation methods are consistent, as shown in Table 3.

Table 1

Statistics of age, FPS-R and POFM by subgroup and for total sample

Object of study	Value	Age	FPS-R	POFC
Patients (n = 41)	Minimum	27	2	2
Female = 10	Maximum	77	8	6
Male = 31	Mean	47.8	3.68	3.44

Table 2

The evaluation results of two evaluation methods in pain patients

Pain Assessment	Pain scores		
Method	1–3	4–6	7–10
FPS-R	19	19	3
POFM	25	26	0

Table 3

Paired t-test results of two pain assessment methods

Method	mean	N	Std. Deviation	Std. Error Mean	t	P
FPS-R	3.68	41	1.724	0.269	1.871	0.77
POFM	3.44	41	1.534	0.240	1.817	0.77

Discussion

The different types of pain assessment scales currently used in clinical practice in China are translated into Chinese from English versions of scales used in European and American countries. However, the differences between Chinese and Western cultures, languages, habits, and medical systems, cause errors in the translation process, which directly affect the accuracy of pain assessment results and bring misjudgment to effective treatment [7, 11].

The pain measurement methods developed using samples may only come from one country, and / or from different cultures (for example, Western or Eastern); however, people from different cultural backgrounds speaking different languages may experience different forms of pain, and have different experiences and descriptions of pain [8]. This possible variability is of great significance for evaluating the effectiveness of pain quality measures, which are directly translated into different languages without cultural adaptation. The measurement method developed using patient samples from one country or cultural background, directly translated into one's own language for use, may not necessarily be suitable for evaluating pain quality in other countries or cultures [12].

One disadvantage of FPS-R is that subjects (patients) need to carefully observe and identify cartoon expressions before evaluation [16]. Because patients' pain levels are measured through selection of an image of a facial expression, the evaluation results are affected by cultural and other interference factors [13]. It is worth mentioning that the score of FPS-R is a categorical variable (an integer score of 0 to 10), and there are eleven levels of evaluation, so it can be statistically tested by parameters.

Chinese people of all ages are very familiar with POFM expressions, so find them easy to identify [14]. This study selected six POFM expressions to assess patients' levels of pain. The six expressions correspond to pleasure, discomfort, slight pain, pain, severe pain, and unbearable pain respectively, and are consistent with the pain score scale 0, 2, 4, 6, 8, 10. When using POFM to evaluate pain, the patient selects the POFM expression which best corresponds to the degree of pain they are experiencing, and the assessor records the selection in terms of the scale value of the pain score.

In this study, the main forms of patient pain were limb pain caused by fracture, and shoulder pain caused by stroke hemiplegia. In some patients, pain was caused by hand trauma, cervical spondylosis, and localised pain by lumbar disc herniation.

The research results indicate that for Chinese patients, POFM is a sufficiently valid tool for pain measurement, with significant correlations with another commonly-used internationally-recognized pain scale, Wong – Baker FPS-R.

There were a few limitations to the study. Firstly, patients' preferences of the pain assessment scales were not evaluated. Also, the utility of POFM was only tested in a specific pain model, such as limb pain caused by fractures, and shoulder pain caused by stroke hemiplegia; therefore, the results cannot be generalized for all pain conditions within a given population. Before the formal use of various

functional pain assessment scales is adopted in clinical practice, more in-depth research into the reliability, validity, and sensitivity of the scales needs to be carried out [15].

Conclusions

We provided additional support for the effectiveness of the POFM scale in assessing the severity of pain in rehabilitation patients. Our conclusion is that the POFM scale is a suitable tool, even for patients with low educational levels, as it is easy to use, easy to understand, and does not require reading or writing skills, making it particularly suitable for Chinese patients. The first author of this article declares that there is no potential conflict of interest. The research funding comes from the author's own source.

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