Cross-Cultural Validation of the Arabic Short-Form McGill Pain Questionnaire (SF-MPQ): Libyan Version in Patients With Musculoskeletal Pain

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ABSTRACT

BACKGROUND: The Short-form McGill Pain Questionnaire (SF-MPQ) is a widely used tool for assessing musculoskeletal pain, both in research and clinical practice. However, a culturally appropriate Arabic version for the Libyan context has not been available. This study aims to translate the SF-MPQ, and to examine its reliability and validity for assessing musculoskeletal pain in Libya.

METHODS: The SF-MPQ was cross-culturally adapted into Arabic using a forward-backward method. A total of 151 patients (Mean age ± SD = 40.66 ± 14) with musculoskeletal pain completed the SF-MPQ and other measures. Of these, 148 patients completed the second round of questionnaire completion two days after the first visit. The intraclass correlation coefficient (ICC) was used to examine relative test-retest reliability and Bland-Altman plots was performed to examine absolute agreement between the two assessments. Spearman's correlation was applied to assess construct validity.

RESULTS: The Arabic translation of the SF-MPQ was linguistically equivalent, without significant discrepancies. All but two of the Arabic descriptors were used by more than 33% of the participants, indicating good item measurement equivalency. The results showed a satisfactory Cronbach's α (0.74 for the total score), which indicates good internal consistency. The ICC for the total score revealed a high correlation for the test-retest (0.91), suggesting excellent relative reliability. Bland-Altman analyses showed no significant systematic bias between the repeated measurements. There were positive statistically significant correlations among the SF-MPQ, the Visual Analog Scale, and the Fatigue Severity Scale ($P < 0.001$), demonstrating good construct validity.

CONCLUSION: These results suggest that the Arabic SF-MPQ is reliable, valid, and cross-culturally equivalent to the original SF-MPQ for evaluating musculoskeletal pain among Arabic-speaking patients in Libya. Clinicians and researchers may therefore consider using this scale, as it is easy to use and understand by different age groups. Further research is needed to confirm our findings and to test the developed Arabic version of the SF-MPQ on different patient populations.

KEYWORDS: Musculoskeletal pain, Arabic language, McGill Pain Questionnaire, reliability, validity, psychometric properties

Introduction

Pain is an unpleasant sensory and emotional experience that can be caused by a variety of sources, such as injury, illness, infection, or emotional distress.[1] Epidemiological studies suggest that about one-third (30%) of pain happens in the musculoskeletal system.[2,3] Pain can affect both physical and mental health, and can have a significant impact on an individual's quality of life.[4,5] Therefore, it is important to assess pain using valid measures in order to develop effective interventions to reduce the burden of pain on individuals and society.

Although pain is a subjective experience, effective management strategies require the assessment of several factors, such as pain intensity, frequency, quality, and other related factors.[6] Pain assessment typically includes both quantitative (ie, objective) and qualitative (ie, subjective) perspectives. Quantitative measures are well-established in the literature and have been in use for several decades worldwide.[7] However, qualitative measures are still under development, especially with regard to developing countries, and their application in clinical and research settings is limited.[8]

After over 40 years of research on pain physiology, pathophysiology, and psychology, pain specialists agree that pain is a multidimensional experience that includes sensory-discriminative, affective-motivational, and cognitive components.[9] This understanding of the concept of pain has largely contributed to the development of assessment tools that examine the different dimensions of pain experiences. Ideally, all the above-mentioned aspects of pain can be assessed, for example by using the McGill Pain Questionnaire.[10]

The short-form McGill Pain Questionnaire (SF-MPQ), is a widely used and validated instrument for measuring the severity and quality of pain experienced by patients.[11] Developed in 1987,[10] the SF-MPQ is a self-report questionnaire comprising 15 questions that measure both sensory and affective dimensions of pain. It has been translated into several languages, including Japanese,[12] Chinese,[13] Swedish,[14] Greek,[15]

and Portuguese,[16] yet a valid and reliable Arabic version of the SF-MPQ appropriate for use in Libyan patients has not been developed.

There have been some efforts in the literature to culturally validate the SF-MPQ with regard to the Arabic language, but their applicability in the Libyan scenario is questionable due to the cultural diversity in how the language is used and understood in different Arabic-speaking countries. A study by Terkawi et al[17] translated and validated the SF-MPQ in Saudi Arabia; however, Libyan patients might not completely understand the words used in the Saudi culture to describe pain. A study in Morocco by Bourzgui et al[18] developed a cross-cultural version of the SF-MPQ for that particular context and provided some psychometric evidence of the cultural suitability of the questionnaire. However, they reported negative Cronbach's alpha ($\alpha = -6.2$) which indicate little or no internal consistency of the questionnaire.[18] Tashani et al[19] translated the SF-MPQ into a mix of classical Arabic and the Libyan dialect, but they were unable to get an acceptable reliability value for the questionnaire (Cronbach's $\alpha = 0.15$). They highlighted the difficulty of an included sample in understanding the language used in a questionnaire by different patient groups (eg, highly educated vs. less-educated patients). The authors also acknowledged several limitations, including the small sample size, that hindered the validation of the SF-MPQ in Libya.

Despite the previous efforts, there is a need to develop an Arabic version of the SF-MPQ specific to Libya that embraces the uniqueness of Libyan culture. Libyan society is a diverse tapestry of ethnic groups that contribute to the nation's rich cultural heritage.[20] The predominant ethnic group in Libya is the Arab-Berber population, which has deep historical roots in the region.[21] The Arab population is the largest and most prominent ethnic group in the country. Arabs have a deep historical and cultural presence in Libya, with their roots tracing back centuries. The Amazigh (Berber) people, with their distinct linguistic expression and traditions, are an integral part of Libyan society.[22] Additionally, there are significant Tuareg communities in the southwestern desert regions. Libya's ethnic mosaic also includes smaller groups, such as the Tebu in the southeast and various sub-Saharan African communities that have migrated to the country over the years.[23] This ethnic diversity has shaped Libya's unique cultural landscape, with each group contributing to the nation's traditions and way of life.

The influence of the various ethnic groups within Libyan society has had a significant impact on the spoken Arabic language in the country.[24] While Standard Arabic is the official language, the diversity of ethnic groups has resulted in a unique linguistic landscape. The Arab-Berber population has contributed to the integration of Berber words and expressions into everyday Arabic speech.[25] The Tuareg influence can also be observed in the southern regions, where Tuareg languages have influenced local Arabic dialects.[22] Additionally, interactions

with sub-Saharan African communities have introduced African linguistic elements into Libyan Arabic.[26] These cross-cultural interactions have enriched the Arabic language in Libya, making it a vibrant and diverse linguistic tapestry that reflects the country's multicultural heritage.

Previous research documented adequate psychometric properties of the SF-MPQ in patients with musculoskeletal pain;[14-16] however, as noted above, there has previously not existed any reliable version for use by Arabic-speakers in Libya. In order to implement this questionnaire for clinical practice in Libya, a rigorous process of cross-cultural validation is needed, and therefore the current study attempts to address the methodological limitations of previous research and translate and culturally validate the SF-MPQ for the Libyan context by using a rigorous design and a representative sample size.

Methods

This study involved two steps.

Translation and cross-cultural adaptation

Translation of the SF-MPQ into the Arabic language was performed by two independent professional translators by using the forward-backward method.[27] Once the initial forward translation was completed, two other professional translators translated the questionnaire back to English. An independent translator (not associated with the ones who translated the questionnaire) then reviewed the two translations and submitted their comments to the experts' committee for discussion. The expert committee included one professional translator, one pharmacist, two physicians, and one university professor specializing in Arabic-language literature. The committee reviewed all the translations (forward and backward versions), discussed possible discrepancies, and developed the final Arabic version of the SF-MPQ.

Psychometric evaluation of the Arabic version of the SF-MPQ

Research design and participants. To examine the psychometric properties of the Arabic-language SF-MPQ, a longitudinal observational study with repeated measures was conducted. This study recruited patients from outpatient clinics at physiotherapy facilities in Libya. To be included, patients had to be at least 18 years old, have had diagnosed musculoskeletal pain, were able to speak and understand the Arabic language, and were able to sign the consent form. Patients were excluded if they had diagnosed neuropathic or visceral pain, cognitive, or intellectual impairment, were unable to understand the Arabic language, or refused to sign the consent form.

Sample size estimation. The required sample size for this study was estimated based on previous similar studies.[12,13] Generally, the minimum sample size required for cross-cultural validation studies should be at least 100 participants.[13] For this study, the

intention was to recruit more than this number to fulfill the minimum sample size requirements.

Data collection. In this study, a convenience sample of 151 patients was recruited from outpatient physiotherapy clinics in Misrata, and Tripoli, Libya in the period from March to July 2022. Participants were first interviewed with a research assistant to confirm their eligibility and to sign the consent form. Next, they were handed the study packages, which included the demographic questionnaire and the outcome measures, as described below.

Demographic information. Demographic variables included the participants' age, gender, marital status, occupation, pain duration, diagnostic condition, self-rated overall health, and current medication use.

The Short-form McGill Pain Questionnaire (SF-MPQ). The SF-MPQ is a self-administered questionnaire that measures the intensity and impact of pain.[28] The SF-MPQ consists of 15 descriptors of pain, of which 11 are derived from the sensory construct of the MPQ and 4 from the affective section. Each of these descriptors is scored on an intensity scale of 0 = no pain, 1 = mild pain, 2 = moderate pain, and 3 = severe pain. The total score is calculated by adding the scores of the 15 descriptors. The total score for the SF-MPQ can range from 0 to 45, with higher scores indicating more intense pain.[10] The SF-MPQ is widely used in research and clinical settings and is considered to be a reliable and valid measure of pain, and has been found to be sensitive to small changes in pain intensity.[12]

The Visual Analog Pain Scale (VAS). The visual analog pain scale (VAS), a subjective scale used to measure pain intensity, was first used by Hayes and Patterson in 1921.[29] It uses a straight line marked from 0 to 100, with 0 representing no pain and 100 representing the worst possible pain, and patients were asked to make a mark on the line to indicate the severity of their pain. The left end of the line is labeled "no pain" and the right end is labeled "worst possible pain." The patient's score is calculated by measuring the distance from the left-hand end to the patient's mark. It is commonly used in medical research and assessment, and is one of the most widely used tools for evaluating pain.[30]

The Fatigue Severity Scale (FSS). The Fatigue Severity Scale (FSS) is a commonly used tool for the measurement of fatigue in a variety of patient populations.[31] It is a 9-item questionnaire that assesses the severity of fatigue in a patient over the past week. Each item is rated on a scale of 1 to 7, with 1 representing the least and 7 representing the greatest severity of fatigue. The FSS showed good correlations with musculoskeletal pain scores,[32] and it has been found to be reliable and valid in measuring fatigue in both research and clinical settings.[33] In this study, the validated Arabic version of the FSS was used.[34]

Statistical analysis. Descriptive statistics were calculated for all the participants' characteristics and questionnaire responses. The internal consistency of the SF-MPQ was examined using the Cronbach's α coefficient, and a value $\geq$0.70 was considered satisfactory.[35,36] Internal reliability was assessed by using the intraclass correlation coefficient (ICC). The ICC value ranges between 0 and 1, where values below 0.5 are considered to reflect poor reliability, between 0.5 and 0.75 moderate reliability, between 0.75 and 0.9 good reliability, and any value greater than 0.9 is considered excellent reliability.[37]

Furthermore, Bland-Altman plot analysis was performed to assess the absolute agreement between the two assessments. This analysis was used to detect any systematic bias in repeated measurements.[38] Through Bland-Altman plot, the agreement between the two test occasions (time 1 and time 2) was visually depicted, aiding in the identification of potential outliers. The 95% confidence interval (CI) of the mean difference was used to determine systematic bias. In cases where zero falls within the 95% CI, it indicates the absence of statistically significant systematic bias between measurements.[38] The 95 % limits of agreement (LOA) were used to investigate the natural variation over time, with a narrow LOA indicating higher stability.[39]

Finally, the construct validity of the scale was examined by using the Spearman's correlations. It is anticipated that the total scores of the SF-MPQ would be positively correlated with the VAS, and the FSS, respectively. Correlations were considered statistically significant when correlation coefficient values were >0.40 and *P*-values <0.05.[40] All statistical analyses were performed using the SPSS software version 28.

Ethical statement. This study was approved by the research ethical committee at the researchers' institution. Also, informed consent was obtained from all patients before completion of the study questionnaire.

Results

Translation of the SF-MPQ

Translation of the SF-MPQ was conducted by independent translators who were not familiar with the original questionnaire. There was discrepancy between the translators regarding two terms: namely, "gnawing" and "sickening." Therefore, experts' validation was necessary to cut through the confusion.

The consensus was first required to decide on using the classical Arabic language or the Libyan dialect. A decision was made to use the commonly spoken Arabic language in Libya, which includes the official Arabic and some dialectical nuances, to enhance the generalizability and clinical value of the translated questionnaire. The second round of consensus-building concerned the word choices in terms of semantics (word meaning), idiomatics (expression), and appropriateness of the concept between the Arabic language and the original questionnaire The final list of translated terms compared to the original English items can be found in Supplemental File #1.

Table 1. Baseline characteristics of the study sample (N = 151).

VARIABLE	RESPONSES	N	%
Age			
Mean ± standard deviation = 40.66 ± 14			
Range = 18-73			
Gender	Male	70	46.4
	Female	81	53.6
Marital status	Single	55	36.4
	Married	75	49.7
	Divorced/separated	8	5.3
	Widowed	13	8.6
Occupation	Student	37	24.5
	Public sector	35	23.2
	Private sector	28	18.5
	Unemployed	47	31.1
	Retired	4	2.6
Pain duration	1-3 months	50	33.1
	3-6 months	47	31.1
	6 months to 1 year	24	15.9
	More than 1 year	30	19.9
Diagnostic condition	Lower limb problem	42	27.8
	Upper limp problem	46	30.5
	Low back pain	53	35.1
	Neck pain	10	6.6
Self-rated overall health	Poor	3	2.0
	Fair	70	46.4
	Good	62	41.1
	Very good	16	10.6
Current medication use	Yes	37	24.5
	No	114	75.5

Table 2. Cronbach's α for the Short-Form McGill Pain Questionnaire.

SCALE	NUMBER OF ITEMS	CRONBACH'S α
SF-MPQ (total)	15	0.743
Sensory	11	0.702
Affection	4	0.601

Abbreviations: SF-MPQ, Short-Form McGill Pain Questionnaire.

reported as ranging from 1 to 3 months by 33.1% of the participants, with lower back pain being the most commonly mentioned cause of pain. The total pain mean score was 15.62 (SD = 7.44), while the total mean scores of the Sensory and Affection subscales were 11.62 (SD = 5.81) and 4.00 (SD = 2.84), respectively. The majority of the participants reported their overall health as being fair or good, and only one-quarter of them reported using non-prescription pain medications at the time.

Cross-cultural adaptation of the SF-MPQ

The final Arabic version of the SF-MPQ included the same 15 items as the original English questionnaire. Therefore, the scoring method for the Arabic questionnaire remained the same. Thirteen items out of the 15 in total of the SF-MPQ were obtained with 100% agreement among the translators; however, as noted above, 2 items seemed problematic, namely the terms "gnawing" and "sickening," and therefore it was necessary for experts' consensus to resolve this issue. The descriptive statistics of the SF-MPQ, VAS, and FSS are presented in Supplemental File #2.

Reliability

As presented in Table 2, the results showed acceptable Cronbach's α value (0.74 for the total score), which indicated a good internal consistency for the 15 items of the SF-MPQ. As expected, the Cronbach's α value for the affective subscale was slightly lower than for the sensory subscales due to the number of items included in each subscale (11 for the sensory subscale and only 4 in the affective subscale). Reliability analysis of Cronbach's α "if item deleted" demonstrated that no individual items from the SF-MPQ would result in a higher Cronbach's α value ("if the item deleted" ranged, 0.74-0.71).

Test-retest relative reliability (Reproducibility)

Test-retest reliability was examined by using the retest data (n = 148) obtained two days after the first visit. The ICC for the total score revealed a high correlation between the test-retest, at 0.91, with a 95% confidence interval (CI) ranging from 0.77 to 0.95. Similarly, the ICC scores for the sensory and affective subscales were 0.93 (95% CI: 0.76-0.97) and 0.83 (95% CI: 0.76-0.87), respectively. The complete retest results are presented in Table 3.

Descriptive statistics

Out of 250 invited patients, 151 completed the study questionnaire. A total of 148 participants completed the second round of questionnaire completion two days after their first visit. The baseline characteristics of the study sample are presented in Table 1. The mean age of the study participants was 40.66 years (SD = 13.99), with ages ranging from 18 to 73. The sample was composed of 53.6% (n = 81) females and 46.4% (n = 70) males, with nearly half of them being married (49.7%), and about one-third of the sample were unemployed. Pain duration was

Table 3. Complete retest results.

SCALE	NUMBER OF ITEMS	ICC	95% CI (RANGE)	CRONBACH'S α	P-VALUE
Sensory	11	0.929	0.758-0.968	0.976	<0.001
Affection	4	0.825	0.759-0.874	0.829	<0.001
Total	15	0.908	0.772-0.953	0.965	<0.001

Abbreviations: ICC, interclass correlation; CI, confidence interval.
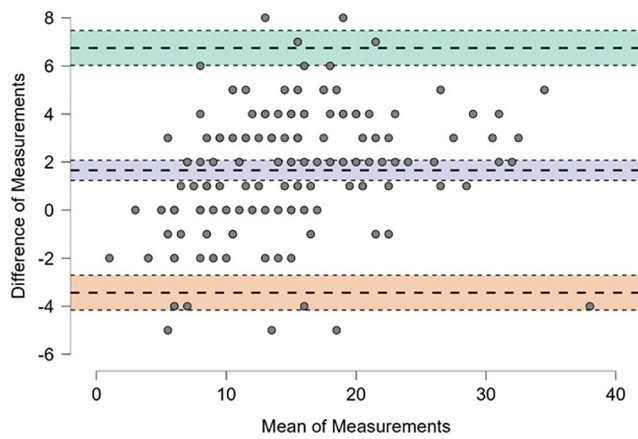

Figure 1. The Bland-Altman plot for the test-retest absolute reliability.

Test–retest absolute reliability (agreement)

As shown in Figure 1, the mean difference (ie, the estimated bias) between the test-retest measures of the SF-MPQ was (1.65) and the standard deviation was (2.59). The 95 % CI for the mean difference included 0 (–3.44 to 6.75), demonstrating that there was no significant systematic bias between test-retest measures in pain scores. The plot also showed the variability between the test-retest measures. The repeatability for most of the test-retest measures was within the 95 % CI. The LOA range was (–3.44 to 6.75), and 5 outliers were detected on the plot.

Construct validity

Table 4 presents the correlation matrix between the SF-MPQ, VAS, and FSS. There are positive statistically significant correlations among these measures, which demonstrates good construct validity. Patients who reported more pain on the SF-MPQ were also more likely to report more pain on the VAS, and more fatigue severity on the FSS.

Discussion

This study aimed to perform a systematic translation and cross-cultural validation of the SF-MPQ into the Libyan Arabic, and to examine its psychometric properties in terms of reliability and validity in order to measure musculoskeletal pain. The findings suggest that the Arabic version of the SF-MPQ shows excellent relative test-retest reliability (Cronbach's α = 0.97) as well as good internal consistency for

the 15 items (Cronbach's α = 0.74). These are interesting findings because previous attempts to validate an Arabic version of the SF-MPQ achieved low Cronbach's α scores. For example, Bourzgui et al[18] conducted a study in Morocco and had a negative Cronbach's α value (Cronbach's α = -0.62), and likewise, Tashani et al[19] conducted a study in Libya to validate a Libyan dialect version of the SF-MPQ and achieved only a low value for Cronbach's α (Cronbach's α = 0.15) that was considered an indicator of poor internal consistency. In our study, however, we attempted to overcome the methodological limitations of previous studies and subsequently achieved a good internal consistency (Cronbach's α = 0.74). Our findings are comparable to the original English questionnaire and are similar to values reported in Sweden[14] (Cronbach's α = 0.73), and Turkey[41] (Cronbach's α = 0.71). The absolute test-retest reliability of the SF-MPQ showed good results, with acceptable agreement, relatively small measurement error, and no evidence of systematic bias was detected. These reliability results of our study indicate that the Arabic version of the SF-MPQ is reliable for the measurement of pain among Arabic speaking patients with musculoskeletal conditions in Libya.

In terms of validity, we found positive statistically significant correlations between the SF-MPQ, VAS, and FSS measures, which demonstrates a good level of construct validity. The SF-MPQ total pain scores were significantly correlated with pain severity as measured by the VAS, and fatigue severity as measured by FSS, which implies that patients who reported more pain on the SF-MPQ would also be more likely to report more pain and more fatigue.[42] This is important because past studies on the validity of SF-MPQ showed mixed results. While some studies[16,43] reported positive, moderate-to-high, and statistically significant correlations between SF-MPQ and the scores of other numerical reference scales, others showed modest-to-weak correlations.[18,44] This inconsistency among studies might be attributable to the various patient groups recruited for validation. Also, it has been reported that SF-MPQ is less sensitive to neuropathic pain due to the lack of descriptive items specific to such pain (eg, numbness),[18] but in our study, we excluded patients who had been diagnosed with neuropathic pain, which may explain why the score for the SF-MPQ was significantly correlated with the VAS score.

Item measurement equivalency was verified in this study by using the low response rate descriptor, which is defined as any

Table 4. Correlation matrix among SF-MPQ, VAS, and FSS.

INSTRUMENTS	SF-MPQ	FSS	VAS
SF-MPQ			
Spearman's rho	1	0.824**	0.753**
Sig. (2-tailed)	–	<0.001	<0.001
N	151	151	151
VAS			
Spearman's rho	0.753**	0.578**	1
Sig. (2-tailed)	<0.001	<0.001	–
N	151	151	151
FSS			
Spearman's rho	0.824**	1	0.578**
Sig. (2-tailed)	<0.001	–	<0.001
N	151	151	151

**Correlation is significant at the 0.01 level (2-tailed).
Abbreviations: FSS, Fatigue Severity Scale; SF-MPQ, Short-form McGill Pain Questionnaire; VAS, Visual Analog Pain Scale.

descriptor used by less than 33% of the study sample with similar diagnoses.[28] All but two of the Arabic descriptors were used by more than 33% of the participants, similar to the original descriptors; however, "gnawing" and "sickening" were each used by less than 33% of the participants, at 21.2% and 24.7% respectively (see Supplemental File #2). The problem of measurement equivalency among pain descriptors is not uncommon. For example, one study in Sweden found that only 8 of the 15 words met this necessary criterion,[14] while in a Moroccan study,[18] the researchers did not find any items that met the 33% rule among the responses. Overall, the results of our study demonstrated that the Arabic descriptors achieved satisfactory patient response rates, confirming measurement equivalency between the pain descriptors in the Arabic SF-MPQ and the original SF-MPQ.[10]

Study limitations

A few limitations in the present study should be noted. First, the study sample included only patients with musculoskeletal pain, and therefore we were unable to compare the findings to those for patients experiencing other types of pain. As a result, to increase the generalizability of our findings, it is advisable to include more diverse samples of patient populations in future research. Second, we did not perform a factor analysis technique to test the construct validity of the Arabic SF-MPQ. Instead, we applied the classic validity procedure using Spearman's correlations. Although the validity of the Arabic SF-MPQ showed promising results, it would be helpful to confirm the findings with a confirmatory factor analysis. Lastly, the SF-MPQ has two subscales; each has a different number of items, so caution

must be taken when interpreting agreement results.[16] In such cases, researchers may opt for alternative measures of reliability and validity. The choice of statistical methods, including Intraclass Correlation Coefficient (ICC) or Bland-Altman plots, hinges on assumptions and limitations, and if these are not met, the reliability of the results may be compromised.

Conclusion

The present study cross-culturally adapted the SF-MPQ in Libya. The findings suggest that the Arabic version of the SF-MPQ is reliable, reproducible, and valid for assessing pain in Arabic-speaking patients with musculoskeletal conditions in the Libyan context. However, more psychometric studies of the SF-MPQ are needed to confirm the findings of this study and to take this work to another level in evaluating the ability of the SF-MPQ to monitor meaningful clinical outcomes.

Ethical Statement

This study was approved by the Institutional Review Board at the College of Medical Technology, Misrata. Also, informed consents were obtained from all patients before completing the study questionnaire. To the best of our knowledge, all study procedures were conducted in agreement with the Declaration of Helsinki. The informed consent in this study was provided in Arabic language.

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Supplemental Material

Supplemental material for this article is available online.

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