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ORIGINAL ARTICLE

# Psychosocial Screening for Cancer Patients: Turkish Validity and Reliability Study of the Basic Documentation for Psycho-oncology (PO-BADO)

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**OBJECTIVE**

Cancer is a systemic disease caused by many different factors that negatively affect people's lives and may substantially reduce the quality of life. The Basic Documentation for Psycho-Oncology (PO-BADO) is an expert rating scale for assessing distress in cancer patients. The main aim of this study is to evaluate the validity and reliability of this scale in Turkish.

**METHODS**

151 patients with oncologic diagnoses were included in the study. Sociodemographic Data Form, The Basic Documentation For Psycho-Oncology (PO-BADO), Hospital Anxiety and Depression Scale (HADS), Perceived Stress Scale (PSS), Karnofsky Performance Scale (KPS), and Cancer Coping Questionnaire (CCQ) were conducted.

**RESULTS**

The PO-BADO scale demonstrated a high level of internal consistency, with Cronbach's alpha of 0.826 for the overall scale, 0.792 for the physical symptoms subscale, and 0.749 for the mental symptoms subscale. PO-BADO scores showed strong positive correlation with HADS and PSS scores (r=0.657, 0.769, 0.763 and 0.685), and moderate negative correlation (r=-0.527) with KPS scores. Confirmatory factor analysis yielded an x2/sd value lower than 3, a CFI of 0.97, and an RMSEA of 0.034.

**CONCLUSION**

Our results indicate that the Turkish version of PO-BADO is a valid tool for evaluating mental health issues, as well as the medical challenges experienced by Turkish cancer patients.

**Keywords:** Cancer; mental health; PO-BADO; psyhooncology; validation.


*This study was produced from Ulvıyya Baghirova Nas's medical specialty thesis (No: 899841). Dr. Baghirova Nas worked at the Department of Psychiatry, Istanbul University, Istanbul Faculty of Medicine during the data collection, analysis, and final writing of this research.*

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## INTRODUCTION

Cancer, which is documented as the second leading cause of death worldwide, is a multifactorial systemic disease that and significantly reduces the quality of life. In 2022, cancer caused the deaths of approximately 10 million people. It is estimated that one in six deaths is due to cancer.[1] In Turkiye, cancer is the second leading cause of death after circulatory system diseases.[2] Studies have reported that 47% of cancer patients experience mental disorders at a diagnosable level.[3,4]

The prevalence of psychiatric disorders in cancer patients highlights the importance of routine psychiatric evaluations when considering the impact of these disorders on disease progression, quality of life, and treatment adherence.[5,6] In this context, it becomes clear that cancer treatment should not solely focus on physical recovery; addressing psychosocial issues is also essential for improving patients' quality of life. Therefore, screening for mental health is mandatory for oncology centers.[7] Although the symptoms of distress are often manageable, they remain inadequately under-identified and underreported.[8] By incorporating the Psychosocial screening tools into clinical oncology clinics, healthcare professionals can reduce the percentage of unrecognized distress and improve the health and outcomes of patients.[9,10] Hence, it has been found essential to use early screening for mental health to meet psychosocial needs in oncology patients.[10]

Psychosocial screening aims to identify at-risk individuals early and facilitate timely interventions. Morover, this tailored approach can lead to more effective psychosocial interventions that directly address the individual's needs.[11] Although various self-report scales exist, tools that comprehensively assess patients' psychosocial and physical conditions remain limited. The Basic Documentation For Psycho-Oncology (PO-BADO) is an expert-rated scale developed to evaluate cancer patients' psychosocial and physical distress comprehensively. Expert-rated scales complement the data provided by self-report measures.

Distinguishing between physical and psychological distress is crucial in clinical practice. PO-BADO aims to determine whether a patient's distress is primarily physical or psychological. Rather than replacing screening tools, it functions as an instrument that enhances initial assessments made with such tools. When a patient is identified as high-risk through a screening questionnaire, the PO-BADO provides a more detailed evaluation that complements self-report scales. With its structured format, this form can be used by healthcare professionals from different disciplines, fostering communication and a shared language among professionals from various fields.[12]

To the best of our knowledge, no screening scale in Turkish allows for the simultaneous evaluation of the physical and psychological issues of cancer patients by an expert. The primary objective of this research is to adapt and validate the PO-BADO for assessing psychosocial issues specific to cancer patients, thereby addressing a critical gap in comprehensive cancer care of Turkish cancer patients. By utilizing this tool, healthcare professionals can efficiently assess the psychosocial needs of cancer patients, allowing for more targeted and personalized care.

## MATERIALS AND METHODS

### Participants

The study included outpatients and inpatients referred for psychiatric consultation at the Division of Consultation-Liaison Psychiatry, Department of Psychiatry, Istanbul Faculty of Medicine, Istanbul University, and Oncology Institute, Istanbul University between March and December 2023.

The sample size was determined based on the commonly used 10:1 case-to-variable ratio in the literature, by using the data of the original scale as the reference. [12] Considering potential data loss, the study was conducted with 151 participants for the 12-item scale. Participants were randomly selected from individuals 18 years or older, had no intellectual disability or active psychotic disorder, were at least literate, had a general medical condition suitable for the interview, and consented to participate in the study.

During the interviews with 75 patients, a second evaluator was present as an observer, independently scoring responses without interfering with the application. Aiming for the inter-rater reliability testing, the primary interviewer and the second evaluator recorded their responses separately on different forms.

Before commencing the study, ethical approval was obtained from the Clinical Researches Ethics Committee of Istanbul University Istanbul Faculty of Medicine on March 8, 2023, with decision number 1672709. The study was conducted following the principles of the Helsinki Declaration. Informed consent was obtained from all participants before they completed the forms.

### Measures

Volunteers who met the inclusion criteria were administered a sociodemographic data form, Basic Docu-

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mentation For Psycho-Oncology (PO-BADO), Hospital Anxiety and Depression Scale (HADS), Perceived Stress Scale (PSS), Karnofsky Performance Scale, and Cancer Coping Scale (CCS).

1. **Sociodemographic Data Form:** This is a semi-structured interview form generated by the investigators to collect detailed demographic information such as age, gender, marital status, and educational background. It also gathers data on patients' psychiatric and medical history, family history, and subjective experiences related to their illness. Cancers classified as stage 3–4 and/or grade 2–4 were categorized as advanced-stage cancers.[13]
2. **The Basic Documentation For Psycho-Oncology (PO-BADO):** PO-BADO was developed by the PO-BADO Working Group between 2000 and 2006, with the support of DAPO (German Psycho-Oncology Working Group) and PSO (German Cancer Society Psycho-Oncology Working Group).[14] It is used to assess the psychosocial status of individuals diagnosed with cancer. This tool is valid for various cancer diagnoses and stages. PO-BADO can be used to monitor cancer patients' health status, compare their outcomes with those of other cancer patients, and/or determine and justify care needs.[12] PO-BADO can be used multiple times throughout the treatment process. It includes the patient's sociodemographic and medical records, physical distress (4 items), psychological distress (8 items), additional stress factors (3 items), and a question that characterizes the treatment indication.[15] Empirically determined threshold criteria based on PO-BADO for identifying cancer patients in need of psycho-oncological care include:
   - If the patient scores at least 4 on one of the physical or psychological distress or at least 3 on two different items,
   - If the scores for physical and psychological distress are below these criteria but there are at least two "yes" answers on the additional distress items,
   - If the score is at least 3 on one of the physical or psychological distress and at least one "yes" answer on the additional distress items, it can be said that the patient requires psycho-oncological support.[15]
3. **Hospital Anxiety and Depression Scale (HADS):** Developed in 1983 by Zigmond and Snaith, this scale is used to detect anxiety and depression symptoms in non-psychiatric clinical settings.[16] It consists of two subscales: Anxiety (HADS-A) and depression (HADS-D), each containing seven items.[17] The Turkish adaptation and the validity and reliability analyses of the scale were performed by Aydemir et al.[18]
4. **Perceived Stress Scale (PSS):** The PSS is a tool measure the degree to which individuals perceive various situations they encounter in their lives as stressful.[19] Each item on the scale is rated on a 5-point Likert scale ranging from "Never (0)" to "Very often (4)". Higher scores indicate higher perceived level of stress. Turkish adaptation and validation study was done by Eskin et al.[20]
5. **Karnofsky Performance Scale (KPS):** Developed by Karnofsky and Burchenal in 1949,[21,22] this scale assesses cancer patients' ability to perform daily activities, symptoms, independence, and need for medical care. Scores range from 100 (normal health) to 0 (death), with 10-point decrements indicating worsening function. The Turkish validity and reliability study of the KPS was conducted by Çeltek et al.[23]
6. **Cancer Coping Scale (CCS):** Based on cognitive-behavioral therapy principles, the CCS is designed to reflect patients' coping methods.[24] The Turkish validity and reliability study of the CCS was conducted by Bahçivan.[25]

## Translation Process

The validity and reliability study of the PO-BADO scale was conducted according to international standards after obtaining written permission from the authors of the original scale. In the first phase, the translation of the scale into Turkish was carried out by a Turkish consultant psychiatrist working in Germany over 10 years, who was proficient in German language. The Turkish translated form was evaluated by the two acamicians of the reseach team, for its linguistic and cultural eligibility. In the following phase, the form was back-translated by an other Turkish physician who was fluent in the original language and blind to the original document. In the third phase, the back-translation was compared with the original by Dr. Birgitt Marten-Mittag, one of the developers of PO-BADO, and the Turkish form was revised based on her suggestions. The Turkish form was found to be understandable by patients, and the final version was created based on feedback from the pilot application on 10 randomly selected participants. Prof. Dr. Peter Herschbach and Dr. Birgitt Marten-Mittag approved the final form.

## Data Analyses

For descriptive statistics, mean, median, and standard deviation values were calculated. The internal consistency of the scale was assessed using Cronbach's alpha (α) value

**Table 1** Sociodemographic and clinical characteristics of participants

| Variable | n (151) | % | Variable | n (151) | % |
|---|---|---|---|---|---|
| Gender | | | Treatments in the last 2 months | | |
| Female | 85 | 56.3 | Chemotherapy | 125 | 82.8 |
| Male | 66 | 43.7 | Radiotherapy | 17 | 11.3 |
| Marital status | | | Surgery | 20 | 13.2 |
| Married | 92 | 60.9 | Psychiatric history | | |
| Single | 59 | 39.1 | Yes | 58 | 38.4 |
| Education level | | | No | 93 | 61.6 |
| Primary education | 36 | 23.8 | Psychiatric treatment history | | |
| High school | 66 | 43.7 | Yes | 54 | 35.8 |
| Higher education | 49 | 32.5 | No | 97 | 64.2 |
| Employment status | | | Cancer type | | |
| Employed | 32 | 21.2 | Breast cancer | 50 | 33.1 |
| Unemployed | 119 | 78.8 | Bone and soft tissue tumors | 32 | 21.2 |
| Functionality | | | Gastrointestinal system tumors | 18 | 11.9 |
| Good | 83 | 55.0 | Female genitourinary system tumors | 13 | 8.5 |
| Impaired | 68 | 45.0 | Male genitourinary system tumors | 10 | 6.7 |
| Presence of metastasis | | | Head and neck tumors | 8 | 5.3 |
| Yes | 86 | 57.0 | Lung cancer | 7 | 4.6 |
| No | 65 | 43.0 | Hematologic cancers | 5 | 3.4 |
| Advanced stage cancer | | | Central nervous system tumors | 4 | 2.7 |
| Yes | 88 | 58.3 | Skin cancers | 4 | 2.6 |
| No | 63 | 41.7 | | | |

and item-total item correlation analysis. The suitability of the Turkish form for the original factor structure was evaluated through Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) sample adequacy measures. The reliability of the PO-BADO scale was analyzed in terms of item-total score correlations and internal consistency by calculating the Cronbach α coefficient. The homogeneity between evaluators was analyzed using the intra-class correlation coefficient (ICC). Confirmatory factor analysis (CFA) was performed to determine the construct validity of the PO-BADO. For CFA, the following fit indices were used: x2/df, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Tucker Lewis Index (TLI). Convergent validity was assessed by analyzing the correlation between PO-BADO scores and HADS, PSS, KPS, and CCS scores. Statistical analyses were performed using the Jamovi Version 2.2.5.0 and SPSS Statistics Version 26.0.[26,27]

## RESULTS

56.3% of the participants (n=85) are women, and 43.7% (n=66) are men. The age range of the participants is between 18 and 64 years, with an average age of 40.9±13.5. The sociodemographic and oncological characteristics of the participants are presented in Table 1.

Cronbach's α reliability analysis was conducted to determine the internal consistency of the PO-BADO. The test results from 151 patients were used to calculate the internal consistency coefficient. The overall Cronbach's α coefficient was found to be 0.826, indicating high internal consistency for the PO-BADO. The item-total score correlation ranged from a lowest value of 0.235 to a highest value of 0.628. The Cronbach's α for the physical symptom subscale was 0.792, while the Cronbach's α for the psychological symptom subscale was 0.749. The item-total score correlations and the changes in the Cronbach's α reliability coefficient after removing items from the scale are presented in Table 2. Inter-rater agreement was evaluated using the ICC. For the physical items, the ICC ranged from 0.93 to 0.99, and for the psychological items, it also ranged from 0.93 to 0.99. The ICC for the total score of the physical items was 0.93, while for the total score of the psychological items, it was 0.98 (Table 2).

The KMO test value was found to be 0.839, indicating that the data is suitable for factoranalysis. The results of the CFA revealed that the factor loading values for all items were greater than 0.30. It was determined that the factor loading values for all items were above 0.30, the error variances were below 0.90, and all items were statistically significant ($p<0.001$) (Table 3).

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**Table 2** PO-BADO physical distress and psychological distress items' ICC values and item-total score correlations with cronbach's α coefficient

| Scale items | Intraclass correlation coefficient (ICC) | Item-total score correlation | Cronbach's α coefficient |
|---|---|---|---|
| PO-BADO physical distress 1 | 0.995 | 0.568 | 0.806 |
| PO-BADO physical distress 2 | 0.971 | 0.556 | 0.807 |
| PO-BADO physical distress 3 | 0.936 | 0.587 | 0.805 |
| PO-BADO physical distress 4 | 0.939 | 0.502 | 0.812 |
| PO-BADO psychological distress 1 | 0.984 | 0.308 | 0.827 |
| PO-BADO psychological distress 2 | 0.979 | 0.468 | 0.815 |
| PO-BADO psychological distress 3 | 0.941 | 0.235 | 0.830 |
| PO-BADO psychological distress 4 | 0.970 | 0.614 | 0.802 |
| PO-BADO psychological distress 5 | 0.992 | 0.505 | 0.811 |
| PO-BADO psychological distress 6 | 0.955 | 0.417 | 0.818 |
| PO-BADO psychological distress 7 | 0.982 | 0.628 | 0.800 |
| PO-BADO psychological distress 8 | 0.985 | 0.338 | 0.824 |

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**Table 3** PO-BADO psychological distress and physical distress items' factor load values

| Scale items | Error variance | Factor load | p |
|---|---|---|---|
| PO-BADO psychological distress 1 | 0.0985 | 0.356 | <0.001 |
| PO-BADO psychological distress 2 | 0.0989 | 0.570 | <0.001 |
| PO-BADO psychological distress 3 | 0.0874 | 0.338 | <0.001 |
| PO-BADO psychological distress 4 | 0.0922 | 1.009 | <0.001 |
| PO-BADO psychological distress 5 | 0.1050 | 0.729 | <0.001 |
| PO-BADO psychological distress 6 | 0.0859 | 0.710 | <0.001 |
| PO-BADO psychological distress 7 | 0.0996 | 1.124 | <0.001 |
| PO-BADO psychological distress 8 | 0.1036 | 0.404 | <0.001 |
| PO-BADO physical distress 1 | 0.1164 | 1.028 | <0.001 |
| PO-BADO physical distress 2 | 0.1137 | 1.100 | <0.001 |
| PO-BADO physical distress 3 | 0.0933 | 0.702 | <0.001 |
| PO-BADO physical distress 4 | 0.1069 | 0.607 | <0.001 |

The results of the CFA showed that for the scale administered by the other evaluator, the factor loadings for all items were above 0.30, and the error variances were below 0.90. Additionally, all items were found to be statistically significant ($p<0.001$).

When examining the CFA results, the $x^2/sd$ value was 1.17, the CFI was 0.97, the TLI was 0.973, and the RMSEA was 0.034. Based on these indices, it can be concluded that the model showed good fit to the data. In the French validity and reliability study of the PO-BADO, the CFI was 0.950, the RMSEA was 0.055, and the SRMR (Standardized Root Mean Square Residual) was 0.057, all of which were found to be within acceptable fit ranges.[28] These results suggest that the model fits well with the data and aligns with the findings from other studies in the literature.

In the convergent validity analysis, the correlation between PO-BADO scores and the Hospital Anxiety and Depression Scale (HADS), Perceived Stress Scale (PSS), Karnofsky Performance Scale (KPS), and Cancer Coping Questionnaire (CCQ) scores was evaluated. Both HADS-D, HADS-A and HADS-Total scores showed strong correlation with PO-BADO Psychological and PO-BADO Total scores; and moderate correlation with PO-BADO Physical scores. PSS scores were strongly correlated with PO-BADO Psychological and PO-BADO Total scores and weakly correlated with PO-BADO Physical scores. While KPS scores showed moderate negative correlation with PO-BADO Physical subscale and PO-BADO total scores; the correlation between PO-BADO Psychological scores were found to be weak. CCQ scores did not show significant correlation with PO-BADO

**Table 4** Correlation between PO-BADO scale scores and HADS (HADS-D and HADS-A), PSS, KPS, and CCQ scores

| | PO-BADO physical | PO-BADO psychological | PO-BADO total |
|---|---|---|---|
| HADS-D | 0.471** | 0.657** | 0.657** |
| HADS-A | 0.447** | 0.769** | 0.719** |
| HADS-total | 0.491** | 0.763** | 0.736** |
| PSS | 0.389** | 0.685** | 0.636** |
| KPS | -0.527** | -0.276** | -0.435** |
| CCQ | -0.128 | -0.225** | -0.209** |

**: p<0.01. PO-BADO: The Basic Documentation For Psycho-oncology; HADS: Hospital anxiety and depression scale; PSS: Perceived stress scale; KPS: Karnofsky performance scale; CCQ: Cancer coping questionnaire

Physical scores and only showed weak negative correlation with PO-BADO Psychological and PO-BADO Total scores. The correlation coefficients (r values) and the significance evaluations are presented in Table 4.

## DISCUSSION

In this study, we conducted the Turkish translation, adaptation and validity-reliability analysis of the PO-BADO, the first scale to assess the psychosocial challenges of oncology patients by a specialist. To our knowledge, by the time of our research this scale has been used only in German, English, and French.

The homogeneity of the scales was demonstrated through internal consistency. The internal consistency coefficient is one of the key parameters in determining the reliability of a scale.[29] In research, a Cronbach α value ≥0.70 is considered to meet the standard reliability criteria.[30] For PO-BADO scores, Cronbach α was found to be 0.826 in this study. Cronbach α for the physical symptoms subscale was 0.792, and for the psychological symptoms subscale, it was 0.749, indicating that PO-BADO has a high internal consistency and reliability.

The reliability of the PO-BADO was assessed using ICC. The ICC values for the total score of physical symptoms were 0.93, and for psychological symptoms, it was 0.98. The excellent range of the intra-class correlation coefficient indicates that the evaluators had a high level of agreement and that PO-BADO was rated similarly among different practitioners. In a study by Knight et al.,[12] the total score for the psychological items of the PO-BADO was 0.84, and for the physical items, it was 0.88. In the French validity and reliability study of the PO-BADO, the average ICC for inter-rater reliability was 0.71.[30] Therefore, the intra-class correlation coefficient values in our Turkish version of PO-BADO align well with the literature and show high reliability.

The KMO test was found to be 0.839, indicating that our data is suitable for factor analysis. In our study, all items had factor loadings above 0.30, and error variances were below 0.90 (p<0.001). When examining the factor loadings for the 12 items in our study, eight items showed high factor loadings, while four items had moderate loadings. In the psychometric evaluation of the original German version of PO-BADO by Knight et al.[12] and the French validation study of the PO-BADO scale, all factor loadings were above 0.50.[28] Therefore, the factor loadings in the Turkish version of PO-BADO are consistent with the original psychometric data.

In our study, the TLI value was calculated to be 0.97, suggesting that the model has a good fit. Upon examining the results of the confirmatory factor analysis (CFA), the $x^2$/df ratio was found to be below 3, with CFI=0.97 and RMSEA=0.034. According to these indices, it can be concluded that the model fits the data well. In the French validity and reliability study of PO-BADO, CFI=0.950, RMSEA=0.055, and SRMR=0.057 were within acceptable ranges.[28] Therefore, our findings show that PO-BADO is consistent with studies where the scale has been used previously.

In the convergent validity analysis, we evaluated the correlation levels between PO-BADO total and subscale scores and HADS, PSS, KPS, and CCQ scores. HADS scores showed a strong correlation with PO-BADO psychological and total scores, while showing moderate correlation with physical scores. This is an expected outcome because HADS is not a scale that focuses specifically on physical parameters. However, the strong correlation with psychological and total scores shows that PO-BADO is a valid tool for assessing psychological difficulties such as anxiety and depression.

Similarly, PO-BADO physical scores showed weak correlation with PSS scores, however the psychological and total sections showed strong correlation. This result is thought to stem from PSS not being a suitable test for measuring physical parameters, but it shows that both scales are similar in measuring psychological parameters.

The KPS is a test used to measure physical condition, and it showed moderate correlation with the physical section of PO-BADO, indicating that PO-BADO can also provide an acceptable insight into physical difficulties experienced by oncology patients in their current medical condition. However, the correlation between KPS and the psychological section of PO-BADO was weak, which can be explained by the fact that KPS does not focus on psychological parameters.

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The CCQ scale did not show a significant correlation with the physical section of the PO-BADO and showed a weak correlation with the other sections. Although the p-value appears statistically significant, the low r-value indicates that PO-BADO does not provide an adequate assessment of coping with cancer. From this perspective, it can be said that BADO is a tool that focuses on patients' recent psychosocial status and physical difficulties, but is not a suitable tool for assessing coping skills.

The developers of the scale have not established a cut-off score for referring patients for psychiatric evaluation. However, as previously stated in the methods section, they have identified three key criteria that indicate a patient's need for psycho-oncological support. Likewise, we believe that as a screening tool, the same criteria indicate a need for psychosocial support in Turkish cancer patients, but do not point to a need for the assessment of psychiatric disorders. In our opinion, psycho-oncological support can be provided by mental health professionals such as psychologists, psychological counsellors, or psychiatric nurses who have received specialized training in this field, and referral to psychiatry departments may be considered in clinical situations where mental disorders are suspected.

There are some limitations of our study. The first limitation is conducting a single-center study, which may affect the generalizability of our results. Secondly, we obtained data from patients in stable stages of the disease since many of the patients in the terminal stage did not consent to participate in the interviews. When the psychosocial status of patients with severe medical conditions is not assessed, their needs may not be fully understood. Finally, the scale administrators were a fourth-year psychiatry resident and a psychologist with a master's degree in psycho-oncology. Both of these practitioners have extensive experience in interviewing oncology patients. However, PO-BADO is described as a tool that can be used by all healthcare professionals involved in the treatment process of oncology patients with just basic training.

## CONCLUSION

The results of our study indicate that the Turkish version of the PO-BADO is a reliable tool for comprehensively assessing the psychosocial and physical distress of cancer patients. For future research, we recommend the PO-BADO to be applied in different centers and different socio-cultural settings with Turkish-speaking patients, also with patients in various clinical conditions (e.g., palliative care units), and by healthcare professionals outside the psychiatry and psychology fields.

**Ethics Committee Approval:** The study was approved by the Istanbul University Istanbul Faculty of Medicine Clinical Researches Ethics Committee (no: 1672709, date: 08/03/2023).

**Informed Consent:** Participants gave written informed constent.

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