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Psychometric Validation of the Women's Health Questionnaire in Menopausal Women

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The objective of this study was to adapt the Women's Health Questionnaire (WHQ) to women who speak Turkish and are from the Turkish culture, and to assess the validity and reliability of the Turkish version of the scale. A convenience sample of women undergoing the menopausal transition or in the postmenopausal period was recruited at one primary health care center in Erzurum, Turkey. The researchers selected consecutive women who applied to the center for health care services. Three hundred sixty-six women were asked to participate in the study and to complete the WHQ during their appointment at the health care center in 2010. In the assessment of construct validity, nine factors were identified: depressed mood; menstrual symptoms; somatic symptoms; anxiety/fears; attractiveness; sexual behaviour; vasomotor symptoms; memory; and sleep problems. The nine factors explained 56.5% of the total variance. The overall internal reliability coefficient of this scale was 0.80. Evidence of the validity, reliability, and acceptability of the questionnaire was provided in this study. The Turkish version of the questionnaire is easy to understand and allows evaluation of women's quality of life for various purposes.

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This study was conducted to determine whether the scale structure of the Women's Health Questionnaire (WHQ) in women's menopausal transition and postmenopause, in its present form, taps into these culturally salient values, and thus whether it is appropriate for use with Turkish women. The WHQ was developed to evaluate changes experienced by women during the menopause transition (Hunter, 2003). The WHQ is a self-administered questionnaire that measures physical and emotional experience and functioning of women ages 40–65 years (Hunter, 1992a, 2000). It was designed specifically to study possible changes in perceptions of health and well-being during the menopausal transition (Hunter, 1992a, 2000). The WHQ has been used in clinical research projects (Hunter, 1992b), for example, cross-sectional studies to measure the feasibility of the development of alternative treatment for menopausal symptoms in primary care and a cross-sectional postal survey to provide a more detailed examination of psychological and somatic symptoms experienced by climacteric and postmenopausal women (Hunter, 1999). The development of valid scales is a complex procedure. The WHQ is very important because it provides standardized data regarding women's quality of life. The WHQ can aid health professionals in educating women about health-related quality of life.

Even though menopause is a normal physiological state, the menopausal transition can mean changes in health and well-being (Kharbouch & Şahin, 2007), with women reporting physical discomfort, sleeplessness, and embarrassment, and many symptoms such as vasomotor symptoms (hot flushes and night sweating) and vaginal dryness, which can lead to dyspareunia (Kharbouch & Şahin, 2007). These symptoms affect many women during the menopausal transition (Kharbouch & Şahin, 2007). In a study conducted of women aged 45–65 years in Istanbul, the prevalence of sleeplessness and fatigue was 71.3% (Şahin, 1998). In studies on Asian women from different ethnic backgrounds, symptom prevalence rates ranging between 10% and 40% have been reported (Boulet, Oddens, Lehert, & Vemer, 1994). In studies on menopause from Western countries, a higher prevalence of physical and psychological symptoms around menopause have been reported (Zollner, Acquadro, & Schaefer, 2005).

Reasons reported for menopausal sleep disturbance have included night sweats, hot flushes, depression, and difficulty in breathing during sleep (Kravitz, Ganz, Bromberger, Powell, Sutton-Tyrrell, & Meyer, 2003). The four most frequently observed symptoms were muscle and joint problems (80%), depressive mood (73.5%), physical and mental exhaustion (71.3%), and irritability (68%; Wool, Cerutti, Marquis, Cialdella, & Hervié, 2000). This symptomatology is likely to have a major impact on patients' subjective health-related quality of life (HRQoL), and the resolution of these symptoms may play a major role in improving patients' HRQoL (Wool et al., 2000). Sharma and colleagues have reported fatigue and lack of energy as the most frequent menopausal symptoms, whereas Shah and colleagues

reported muscle and joint pains as the common symptoms (Sharma, Tandon, & Mahajan, 2007; Shah, Kalgutkar, Savardekar, Chitlang, Iddya, & Balaiah, 2004). Additionally, Bagga (2004) reported that loss of interest and tightness in the head as the most frequent menopausal symptoms. These symptoms may affect women's quality of life.

The WHQ was developed to evaluate changes experienced by women during the menopausal transition. It has been considered a "disease specific" instrument (Hunter, 2003). Studies have not yet been focused specifically on quality of menopause life in Turkish women, and current scales were not designed specifically for women in Turkey. Health-care researchers who work with culturally diverse communities need to be aware that the measurement of the quality of life in women may vary in different cultural groups. Turkish cultural values may influence the measurement of the quality of life in women. More than fifty-seven percent (57.7%) of Turkish women perceived menopause negatively (Çoban, Nehir, Demirci, Özbaşaran, & İnceboz, 2008). This negative attitude might be explained by the fact that menopause is perceived as the loss of the role of motherhood, the lost of female attractiveness, the end of the marital relationship, changes in body posture, changes in their body, loss of physical energy, loss of pregnancy, and the end of sexual life (Çoban et al., 2008), whereas 42.3% of them perceived changes positively. The main reasons for perceiving menopause changes positively were cited as viewing it as natural (89%), perceiving it as a way of no longer having the risk of becoming pregnant (44.1%), getting rid of the pain and embarrassment during menstruation (39.4%), and not being obliged to use any contraceptive methods (29.9%; Yangin, Kukulu, Ak Sözer, 2010). Thus, this study was conducted to determine whether the scale structure of the WHQ in menopausal transition and postmenopausal women in its present form taps into these culturally salient values, and thus whether it is appropriate for use with Turkish women. Cross-cultural influences affect people's perceptions and health practices, so measurement of the WHQ in the women using a standard instrument was adapted to Turkish women for a women's health survey.

The objective of this study was to adapt the WHQ to women who speak the Turkish language and to assess the validity and the reliability of the Turkish version of the scale.

METHODS

Sample

The sample population for this study consisted of women in Erzurum, Turkey, who were in menopausal transition, which is defined by menstrual cycle and endocrine changes. Inclusion criteria were stages 2 (early) and 1 (late) and encompassing the menopausal transition and the postmenopausal

period, which is defined as 5 years since the final menstrual period. Inclusion criteria was Stages +1 (early) and +2 (late) and encompassing the postmenopausal period. The women's stage was determined according to staging reproductive aging criteria (Soules et al., 2001). Women were not questioned about their menstrual period, and their follicle-stimulating hormone was not measured. They completed menstrual calendars. The eligibility criteria follow: (a) being aged 40 years or older, (b) not having chronic and degenerative illness, (c) not using menopausal hormone therapy, (d) not having a menstrual period in the last year, (e) able to read and understand the Turkish language, and (f) not having a history of psychiatric illness. A convenience sample of such women was recruited at one primary health care center in this town. The researcher approached consecutively appearing women who applied to the health care center for health care services and asked them whether they would be willing to participate in the research. Women who agreed to participate were included in the study. Three hundred sixty-six women were asked to participate in the study and to complete the WHQ during their appointment at the health care center in 2010. The researchers visited the center on five working days every week and conducted interviews with the women. Thus, recruitment continued in this way until the required sample size for the study was achieved. The response rate was 96.8%. We recruited 10 times as many women as the number of scale items to achieve the needed sample size for examining validity and reliability (Akgül, 2003; Davis & Robinson, 1995).

Cross-Cultural Adaptation Process

First, the WHQ was translated into Turkish, and the Turkish version was then translated back into English by two Turkish lecturers, who worked independently on the translation. The lecturers both worked as professors who taught English language at the Atatürk University. The two translated versions were compared by the researchers and consensus was reached regarding the appropriate translation to reflect the initial English version. The translation phase had the purpose of checking for discrepancies between content and meaning of the original version and the translated instrument. The researchers analyzed and compared all versions to achieve the final version. To test item clarity and content validity, the translated version was submitted to a panel of five specialists. The specialists were informed by the author about the measures and concepts involved. This multidisciplinary panel comprised two public health nursing specialists and three experts who had published papers on quality of life. Each of the panel members was asked to evaluate the content of the final translated version of the WHQ compared with the original instrument. As a result of this evaluation, the panel members did not suggest any modification or changes in the scale

and approved the item clarity and content validity. Also, the experts were asked to evaluate each item in the questionnaire using a 4-point Likert scale, with each point on the questionnaire represented by a word anchor. The panel experts were asked to rate each item of the Turkish version of the WHQ based on significance, clarity, and simplicity as 1 (*yes definitely*), 2 (*yes sometimes*), 3 (*no not much*), or 4 (*no not at all*). As the original scale contained positive and negative items, the scoring of the positive items was reversed prior to conducting analyses. The final version of the translated instrument was pretested on a pilot group of 20 women from the center. The pretest was conducted at the primary health care center where the main study was to be performed. To simplify doubts and suggestions about the scale, a questionnaire requesting general information from the interviewee, such as age, monthly income, educational level, and occupation situation, was used. An open-ended question to record doubts and suggestions was provided for each of the items.

Bush (1985) pointed out that content validity refers to the degree that the instrument covers the content that it is supposed to measure. It also refers to the adequacy of the sampling of the content that should be measured (Polit & Beck, 2004). Therefore, content validity measures the comprehensiveness and representativeness of the content of a scale. Thus, a content validity index was used for this study. The mean score of the content validity index based on the experts' rating was 3.68/4 (92%) in the final version. According to Polit and Beck (2004), a content validity index higher than 80% is considered indicative of good content validity.

Data Collection

Three hundred sixty-six women were asked to participate in the study and to complete the WHQ during their appointment at the health care center in 2010. The researchers visited the center on five working days every week and conducted interviews with the women. The questionnaire was explained to the women, who then read it and marked their answers on the sheets. The questionnaire took approximately 20 minutes to complete and could be easily understood by people with minimal reading ability. It was administered in a separate quiet room in the center. All respondents completed the questionnaire.

Ethical Considerations

The study protocol was approved by the ethics committee of Atatürk University, and informed consent was verbally obtained from each woman according to the advice of the ethics committee. The women were informed about the purpose of the research and assured of their right to refuse to participate

or to withdraw from the study at any stage. Anonymity and confidentiality were assured.

Data Analysis

Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. It is often used in data reduction to identify a small number of factors that explain most of the variance that is observed in a much larger number of manifest variables. Before conducting the factor analysis, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test were calculated to evaluate whether the sample was large enough to perform a satisfactory factor analysis. The KMO measures the sampling adequacy, and its p value should be greater than .05 for a satisfactory factor analysis to proceed. Factor analysis was used to establish possible subscales and factor loadings of items of the scale. The eigenvalue was selected to be higher than 1.0.

Cronbach's alpha is a model of internal consistency, based on the average interitem correlation. Cronbach's alpha was calculated to determine internal consistency. Clark and Watson (1995) indicated that internal consistency may be a necessary condition for homogeneity or unidimensionality of a scale, and Cronbach's alpha should be 0.70 or higher. Item-total correlations and mean inter-item correlations were included in the analysis. Clark and Watson (1995) recommended using the item-total correlation as a criterion for internal consistency. This should be 0.15 or higher and 0.30 or above in test–retest correlation. They pointed out that this average value could be biased, and all individual item-total correlations (r) should be between 0.15 and 0.50. Unidimensionality can be assured only if all individual interitem correlations are clustered closely around the mean interitem correlation. Pearson's product-moment correlation was used to determine the correlation of scores of items with the total scale. The WHQ score was obtained by adding the points of all items after reversing the scoring of positive items. The higher the score, the more negative the functioning of the women.

RESULTS

Participant Demographics

The mean age of the women was 57.1 ± 8.1 years, and their mean monthly household income was U.S. $713.48 ± $135.1 (Table 1). A large proportion of the women (44.8%) were literate but had less than a primary school education level; 86.3% of them were unemployed, and 75.4% were married.

TABLE 1 Characteristics of Participating Menopausal Women ($n = 366$)

Characteristic	*N*	%
Woman's education level		
<Primary school/literate	164	44.8
Primary school	147	40.2
Secondary school	17	4.6
High school	25	6.8
University degree	13	3.6
Husband's education level		
<Primary school/literate	51	13.9
Primary school	165	45.1
Secondary school	24	6.6
High school	88	24.0
University degree	36	9.8
Occupation situation		
Employed	50	13.7
Unemployed	316	86.3
Marital status		
Married	276	75.4
Single	90	24.6
	Mean ± *SD*	
Age (years)	57.1 ± 8.0	
Household monthly income (U.S. $)	713.48 ± 135.1	
Number of persons in family	4.7 ± 2.0	
Number of children	4.0 ± 1.9	

Validity and Reliability

The translated questionnaire, consisting of 33 items, was judged by the expert panel for relevance and phrasing of the items. For each item, the experts could suggest possible improvements in phrasing. Subsequent revisions of the Turkish version were made and discussed again by the panel members until agreement was reached about its acceptability for administration. The instruments completed by the 366 women were used for the analyses. The Turkish WHQ had an overall coefficient alpha of 0.80 (Table 2). The corrected item total correlations were acceptable (Munro, 1993). The interitem correlations ranged from 0.14 to 0.56, but they indicated a nonunidimensional scale.

The KMO value was 0.79 with a p value $< .001$, indicating that the sample was large enough to perform a satisfactory factor analysis and that the sample size was sufficient for psychometric testing of a 33-item questionnaire. The first step of the factor analysis was a principal component analysis revealing nine factors with an eigenvalue of higher than 1.0 (Table 2). The nine factors together explained 56.1% of the variance for menopausal women. The internal consistency reliability was 0.80 for the whole scale. For the first factor, with an alpha of 0.78, factor loadings were found for items that dealt primarily with the depressed mood subscale, which explained

TABLE 2 Principal Components Analysis Followed by Varimax Rotation Factor Loadings and Item-Total Correlations of Items of the Scale ($n = 366$)

Items of the scale	Cronbach's alpha	Factor loading	Item-total correlation
Depressed mood	.78		
I am more irritable than usual.		.493	.376***
I am restless and can't keep still.		.636	.154*
I feel miserable and sad.		.603	.487***
I have lost interest in things.		.577	.444***
I have feelings of well-being.		.640	.476***
I feel life is not worth living.		.546	.194***
I still enjoy the things.		.513	.338***
Menstrual symptoms	.71		
My stomach feels bloated.		.405	.466***
My breast feels tender or uncomfortable.		.486	.337***
I have abdominal cramps or discomfort.		.507	.460***
I often have a feeling of pins in hands and feet.		.589	.172**
I need to pass urine more frequently.		.553	
Somatic symptoms	.74		
I feel sick or nauseated.		.614	.316***
I have dizzy spells.		.556	.455***
I feel more tired than usual.		.571	.496***
I suffer from backache or pain in my limbs.		.563	.534***
I have headaches.		.575	.568***
Anxiety/fears	.71		
I feel anxious when I go out of house.		.532	.361***
I get palpitations in my stomach or my chest.		.446	.496***
I feel tense or "wound up."		.533	.418***
I get very frightened.		.680	.464***
Attractiveness			
I feel physically attractive.	.65	.699	.336***
I feel rather lively and excitable.		.586	.455***
Sexual behavior	.75		
Due to vaginal dryness sexuality is uncomfortable.		.670	.383***
I am satisfied with my current sexual relations.		.620	.459***
I have lost interest in sexual activities.		.583	.559***
Vasomotor symptoms	.76		
I suffer from night sweats.		.467	.453***
I have hot flushes.		.688	.413***
Memory	.70		
I have difficulty concentrating.		.419	.463***
My memory is poor.		.603	.462***
I am more clumsy than usual.		.596	.337***
Sleep problems	.68		
I have difficulty in getting off to sleep.		.612	.147
I wake early then sleep badly.		.683	.425***
Total alpha	.80		
Total variance	56.5		

*$p < .05$; **$p < .01$; ***$p < .001$.

variance for 17.3% of the women. For the second factor (alpha = .71), which was the menstrual symptoms subscale, the explained variance for the factor was 7.0% of women. The third factor, with an alpha of 0.74, exclusively referred to items on the somatic symptoms subscale, the explained variance was for 6.5% of the women. The fourth factor, with an alpha of .71, measured anxiety/fears subscale, and this factor explained 5.3% of the total variance for the women. The fifth factor was the attractiveness subscale, which assesses the women's perceptions of their own attractiveness. The internal consistency reliability of this factor was 0.65, and it explained 4.5% of the total variance for the women. The sixth factor, with an alpha of 0.75, was the sexual behavior subscale. This factor explained 4.1% of the total variance for the women. The seventh factor was the vasomotor symptoms subscale, with an internal consistency reliability of 0.76, and it explained 3.9% of the total variance for the women. The ninth factor was memory, and its alpha was 0.70, and it explained 3.6% of the total variance for the women. The ninth factor, with an alpha of 0.68, was the sleep problems subscale, which explained 3.5% of the total variance for the women.

All of factor loadings were above 0.40, and factor loading of the items ranged from 0.40 to 0.69 in the study. All subscales were correlated with other subscales except for sexual behavior, attractiveness, and sleep problems subscales (Table 3).

Anxiety/fears was positive strongly correlated with attractiveness (r: 0.680, $p < .001$). Somatic symptoms was moderately positively associated with depressed mood, menstrual symptoms, anxiety/fears, vasomotor symptoms. Menstrual symptoms was positively correlated with Anxiety/fears and attractiveness.

DISCUSSION

The translated scale, consisting of 33 items, was judged by the expert panel on relevance and phrasing of the instrument items. Experts could suggest possible improvements in wording for each item. Subsequent wording revisions of the Turkish instrument were made and discussed each time by the panel members until agreement about the content was reached. Then, the panel reviewed the content of the Turkish version of the WHQ until they agreed that no further modification of its translation and content was needed. The results of this study showed that the psychometric characteristics of the Turkish version of the WHQ were promising.

The range of individual interitem correlations and the homogeneity of the WHQ seemed to be sufficient. The literature suggests that the acceptable minimum point for individual interitem correlations is 0.15 (Erefe, 2002; Polit & Beck, 2004). Thus, internal consistency correlations were also adequate for

TABLE 3 Correlations Among Women's Health Questionnaire Subscales ($n = 366$)

Subscale	Menstrual symptoms	Somatic symptoms	Anxiety/ fears	Attractiveness	Sexual behavior	Vasomotor symptoms	Memory	Sleep problems
Depressed mood	.282***	.404***	.410***	.178***	.323***	.428***	.191***	.131*
Menstrual symptoms		.442***	.487***	.472***	.185***	.289***	.247***	.233***
Somatic symptoms			.416***	.257***	.334***	.456***	.110*	108*
Anxiety/fears				.680***	.153**	.357***	.319***	.294***
Attractiveness					.093	.175***	.326***	.242***
Sexual behavior						.273***	.196***	.058
Vasomotor symptoms							.320***	.128*
Memory								.186***

*$p < .05$; **$p < .01$; ***$p < .001$.

the WHQ. Translated instruments might have lower reliability scores, altered distribution of scores, and questions of validity.

The sample was large enough to perform a satisfactory factor analysis. With varimax rotation the factor analysis indicated that, with regard to the content, nine factors could be discerned: depressed mood, menstrual symptoms, somatic symptoms, anxiety/fears, attractiveness, sexual behavior, vasomotor symptoms, memory, and sleep problems subscales in this study. The nine factors were the same as the nine factors in the original questionnaire (Wool, Cerutti, Marquis, Cialdella, & Hervié, 2000). In our study, the sum of explained variances of all nine factors was 56.5%. Hunter (2003) reported the total variance of the scale as 55.7%. When the Turkish scale was compared with the original scale, the total scale was found to be similar to Hunter's original scale with respect to the whole scale and the subscales. In this study, internal consistency and explained total variance were adequate (Erefe, 2002; Polit & Beck, 2004).

Factor analysis was used that further validates (factor solution) the study. To attain the best fitting structure and the appropriate number of factors, the following criteria were used: eigenvalues higher than 1.0, factor loadings higher than 0.40, and the so-called elbow criterion for the eigenvalues (De Heus, Van der Leeden, & Gazendam, 1995). Factor analysis yielded that all of factor loadings were above 0.40 in the study, and the acceptable minimum point is 0.40 for factor loading (Polit & Beck, 2004). Hunter (2003) did not report factor loading of items in the original scale. In this study, all items met these criteria and factor loadings were high. Therefore, the construct validity of the scale was adequate.

In the study, Cronbach's alpha was 0.80 for the total scale, and the alpha values of the subscales ranged from 0.65 to 0.78. Wool and colleagues (2000) found that Cronbach's alpha coefficients for the WHQ ranged from 0.56 (vasomotor symptoms) to 0.78 (depressed mood), and four dimensions had a coefficient greater than 0.70. In subscales of original scale, Cronbach's alpha levels were as follows: depressed mood (0.7), anxiety (0.77), somatic symptoms (0.76), vasomotor symptoms (0.84), sleep problems (0.73); for menstrual problems and sexual problems the coefficients were lower, being 0.64 and 0.59, respectively (Hunter, 2003). When the Turkish scale was compared with the original scale, the total scale was found to be similar to the original scale with respect to the whole scale and the subscales. The internal consistency reliability coefficient between a wide range of dimensions of the WHQ Portuguese version showed a Cronbach alpha coefficient ranging from −0.02 (sexual problems and attraction) to 0.73 (somatic symptoms and anxiety), with most ranging between 0.40 and 0.60, which indicate good values (Silva Filho, Baracat, Olivera Contemo, Haidar, & Ferraz, 2005). Girod, de la Loge, Keininger, and Hunter (2006) found WHQ was good: Cronbach's alpha for the total WHQ was 0.88. Additionally, in one study values between 0.7 and 0.9 were found for the depressed mood, somatic symptoms, and

memory/concentration dimensions, while values between 0.5 and 0.7 were found for the anxiety/fears, sleep problems, and attractiveness dimensions. Cronbach's alpha value for the vasomotor dimension was 0.12, and for the WHQ total score it was 0.90 (Borud, Martinussen, Eggen, & Grimsgaard, 2009). It is seen that the alpha coefficients are adequate for all factors in the study groups.

Test–retest reliability of the scale was 0.85. Also, all subscales were correlated with other subscales except for the sexual behavior, attractiveness, and sleep problems subscales. It is possible that the high correlations observed for some subscales were because the scale consisted of menopausal transition and postmenopausal items measuring quality of life and practices, which could well overlap some subscales. In the original scale, test–retest reliability was conducted on a sample of 48 women who completed the WHQ on two occasions. All correlations were above .75, ranging from .96 to .78, suggesting that the WHQ is reliable across a 2-week time interval (Hunter, 2003). When the Turkish scale was compared with the original scale, the total scale was found to be similar to the original scale with respect to the whole scale and the subscales. The among subscale correlation coefficient of each subscale for the WHQ Portuguese version was satisfactory. They ranged from 0.69 to 0.92 and a total of 0.92 (Silva Filho et al., 2005).

According to the results of this study, it is possible that Turkish women have menopause experiences similar to British women and other populations. When this instrument was administered to the women in the study, we obtained results of the Turkish women similar to findings of the British women for WHQ. Both the Turkish women and the British women complained of depression and anxiety in general. These findings are compatible with Turkish culture. The results of this study show that the psychometric characteristics of the Turkish version of the WHQ are promising and the results are similar to findings of Hunter's original scale.

Limitations

The findings must be interpreted cautiously because of the study limitations. The sample was selected by convenience sampling and thus cannot be considered representative, which may limit the generalizability of the findings. The sample also reflected only one area of Turkey and therefore cannot be generalized to all women in the country. This scale should be further evaluated with a large enough sample size in different regions of Turkey and in diverse populations.

CONCLUSIONS

The reliability and validity of the Turkish version of the WHQ was confirmed in this sample of Turkish women. The development of valid scales

is a complex procedure. The WHQ is very important because it provides standardized data regarding women's quality of life. To ensure the quality of adapted instruments, international norms should be followed. The application of a methodology accepted by the scientific literature makes the comparison of the data obtained in different languages possible. In Turkey, the results of this study have to be taken into consideration in related areas. Once a valid and reliable scale is ready, it can be used to measure outcomes in an intervention study, but it first has to be tested in different cultures. The existing Turkish scale can be used for further validation and for outcomes research. The scale has useful implications in clinical practice. The Turkish version of the WHQ will enable identification of menopausal quality of life. Assessment of the WHQ of women should be a part of health care practice. Use of the WHQ can aid health professionals in educating women about health-related quality of life. Nurses and other health care professionals can provide education to women based on this assessment of quality of life.

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