

Measuring the occupational balance of people with insomnia in a Chinese population: Preliminary psychometric evidence on the Chinese version of the Occupational Balance Questionnaire

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Abstract

Background: Occupational balance, a fundamental concept in occupational therapy, is the arrangement of right amount and variety of occupations contributes to a person's health and well-being. This study was aimed to investigate the reliability and validity of the Chinese version of the Occupational Balance Questionnaire (OB-Quest) for people with insomnia.

Methods: The OB-Quest was translated into traditional Chinese and reviewed by an expert panel for content validity, cultural relevance and translation accuracy. Internal consistency, factor analysis and convergent validity, as well as test–retest reliability, were explored.

Results: The participants ($n = 205$), 115 adults with insomnia and 90 adults without insomnia, completed a survey of demographic background, the Chinese version of OB-Quest and the Chinese Insomnia Severity Index (C-ISI). The Chinese version of OB-Quest demonstrated excellent test–retest reliability ($ICC = 0.98$) and good internal consistency (Cronbach's $\alpha = 0.80$). Factor analysis indicated that a single-factor solution explained 42% of the variance, and 9 out of 10 items had a factor loading of 0.4 or above. The Chinese version of OB-Quest had significant correlations with C-ISI ($r = -0.88$; $p < 0.001$). A significant difference was found in occupational balance between groups with different levels of insomnia severity and without insomnia ($F = 169.72$; $p < 0.001$). As in a previous study, age, living environment and life role had no significant relationship with occupational balance.

Conclusion: The Chinese version of OB-Quest is a short, easy to understand and culturally relevant assessment for Chinese. It demonstrates satisfactory psychometric properties and had significant correlations with insomnia.

Keywords

Occupational balance, sleep, insomnia, lifestyle

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Introduction

Sleep is one of the major restorative occupations that help a person to recover from a day of work and provide energy for daytime activity. For persons with insomnia, there could be a vicious cycle between sleep and daytime engagement. Restorative occupations, which include sleep and rest, serve to renew depleted energy resources. The restorative nature of sleep as an occupation contributes significantly to occupational balance. However, the relationship between insomnia

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and occupational balance has seldom been examined in the occupational therapy literature.

Sleep is a fundamental component of human health, supporting a wide range of systems including immune function, metabolism, cognition, emotional regulation and promoting feelings of rejuvenation (Howell & Pierce, 2000). People with sleep problems are prone to suffer from a range of medical conditions, such as obesity, heart disease, high blood pressure and diabetes (Wiseman-Hakes et al., 2009), as well as depressive mood (Dinges et al., 1997; Pemberton & Fuller Tyszkiewicz, 2016). It also affects cognitive performance, including alertness, reaction, memory and learning (Alford & Wilson, 2008).

The development of sleep management practice in occupational therapy was hampered by the lack of a clear conceptualisation of how sleep and occupation are linked. Adolf Meyer, an early proponent of occupational therapy, defined sleep as one of the big four factors that a person should balance with work, play and rest for the maintenance of good health long time ago (Meyer, 1922). Recently, the American Association of Occupational Therapy (2008, 2014) reinforced sleep as one of the major occupations, a move that was aimed to advance the development of occupational therapy practice in the area of sleep management. However, there were few evidence-based studies on sleep interventions in occupational therapy practice, and there appeared to be great diversity in the target groups, objectives and components of programmes, and/or in research methodology. A conceptual framework based on occupational balance was proposed for organising occupational therapy practice in sleep management to facilitate future service development (Ho & Siu, 2018).

Occupational balance is a person's engagement in occupations leading to the satisfactory integration of daily activities and life demands, health and well-being (Backman, 2004). Occupational balance contributes to one's physical, mental and social well-being (Wilcock, 2006). There is no specific daily activity pattern that can achieve occupational balance. Occupational balance involves individualised choice and engagement in a range of occupations that could be self-selected or mandatory, active or restful, or doing or being. Wagman et al. (2012) conducted a concept analysis of occupational balance and further refined the definition of occupational balance as an 'individual's perception of having the right number of occupations and the right variation' between active and restful occupations according to personal choice, which together lead to personal happiness.

There is increasing interest in the study of occupational balance among individuals with different health conditions and how occupational therapy interventions

could help people to increase their occupational balance. As research on occupational balance develops, there is increasing evidence showing that occupational balance is important in promoting function and well-being (Backman, 2004; Hammell, 2009; Howell & Pierce, 2000; Llorens, 1984). Several studies have investigated occupational balance in different health conditions (Ahlstrand et al., 2018; Bejerholm, 2010; Eklund & Argentzell, 2016; Stamm et al., 2009; Yu et al., 2018). However, occupational balance has not yet been explored in persons with insomnia.

Several studies have attempted to develop self-report questionnaires for the assessment of occupational balance, and one review identified 20 instruments designed to measure occupational balance (Dür et al., 2015). However, most instruments do not explicitly assess sleep as a restorative occupation in maintaining occupational balance. The Occupational Balance Questionnaire (OB-Quest) is one of the few validated instruments that cover the restorative occupation of sleep (Dür et al., 2014). OB-Quest assesses occupational balance under the following domains: (1) restorative occupations of rest and sleep, (2) occupational accomplishment according to life role, (3) occupation as the determinant of health, (4) balance of time used and (5) balance of ability and challenges. It has demonstrated very good psychometric properties. The 10-item OB-Quest uses a 3-point Likert scale and is efficient to administer. OB-Quest has both English and German versions. OB-Quest could be a potential measurement instrument to assess occupational balance in persons with insomnia.

This study was aimed to translate OB-Quest (Dür et al., 2015) into Chinese and to explore its psychometric properties. The specific objectives were as follows: to translate the English version of OB-Quest into traditional Chinese; to evaluate the translation quality, cultural relevance and content validity of the Chinese version of OB-Quest; to estimate the internal consistency, factor structure and test-retest reliability of the Chinese version of OB-Quest; to examine the discriminant validity of the Chinese version of OB-Quest by exploring the relationship between occupational balance (as measured by the Chinese version of OB-Quest) and insomnia.

Method

The study was divided into two stages, the translation process and the validation process (Tsang et al., 2017). In the first stage, OB-Quest was translated from English into traditional Chinese. An expert panel competent in English and Chinese reviewed the quality of the translation, the content validity and the cultural relevance of the Chinese version of OB-Quest. We

also back-translated the Chinese version of OB-Quest into English and then checked if further revisions were needed. In the second stage, the Chinese version of OB-Quest was completed by a convenience sample of individuals from general outpatient clinics (GOPC) in order to examine its factor structure, internal consistency, test–retest reliability and convergent validity.

Participants

We recruited the participants from two GOPC in the Central Kowloon district of Hong Kong by convenience sampling (Lavrakas, 2008). The participants were aged 18 or above, and they attended the Integrated Mental Health Program. Potential candidates had to be able to read traditional Chinese and to give informed consent. Potential candidates were invited to participate voluntarily in the study by an occupational therapist. Eligible candidates were required to complete the translated version of OB-Quest and the Cantonese version of the Insomnia Severity Index (C-ISI, reference). Participants had the right to withdraw from the study without giving any reason whenever they wished. Participants with a C-ISI score above the cut-off were allocated to the insomnia group and those scoring below the cut-off were allocated to the no insomnia group.

Instruments

Occupational Balance Questionnaire. OB-Quest (Dür et al., 2015) is a 10-item self-report questionnaire for measuring occupational balance. Respondents are requested to use a 3-point ordinal scale ranging from 0 (*completely disagree*) to 2 (*completely agree*) to indicate their opinions on the statements. Higher scores indicate better occupational balance. The Cronbach's α of OB-Quest is 0.57 (Dür et al., 2014).

Cantonese version of the Insomnia Severity Index. C-ISI is a 7-item self-report questionnaire that measures the severity of insomnia (Bastien et al., 2001). The development of the Cantonese version was completed in 2015. The Index uses a 5-point Likert scale ranging from 0 (*no problem*) to 4 (*very severe problem*), the total score ranging from 0 to 28. The cut-off scores of C-ISI are as follows: absence of insomnia (0–7); sub-threshold insomnia (8–14); moderate insomnia (15–21) and severe insomnia (22–28). Previous studies have reported the adequate psychometric properties of both the English and Chinese versions (Baghyahi et al., 2011; Morin et al., 2011). The reliability of C-ISI is excellent ($\alpha = 0.90–0.91$), and its sensitivity and specificity at the cut-off score of 10 were 86.1% and 87.7% for detecting clients with insomnia in the community (Morin et al., 2011).

Procedures

Translation of the instrument. The original English version was first translated into traditional Chinese by a professional translator. An expert panel reviewed the quality of the translation, the content validity and the cultural relevance of the Chinese version of OB-Quest. The Chinese version was back-translated into English to check and improve the quality of the translation.

The authors recruited eight occupational therapists with an average of 25 years of work experience from different hospitals and universities to form an expert review panel. The panel members had specialised in mental health or lifestyle redesign interventions and had experience in validation research. They were asked to review the translation quality, cultural relevance and content validity of the Chinese version of OB-Quest. The expert panel reviewed the equivalence of the English and Chinese versions and the quality of translation using a 4-point rating scale ranging from 1 (*need to rewrite*) to 4 (*no revision needed*). The experts also evaluated the cultural relevance and content validity using a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The content validity index (CVI) was calculated on the basis of the total items rated by the experts, and a CVI score over 80% was considered to indicate good content validity (Lynn, 1986). The translated Chinese version of OB-Quest was field tested on a group of 10 persons with insomnia. The participants were able to complete the Chinese version of OB-Quest without any difficulties in understanding the questions.

Data collection. An occupational therapist explained the purpose and procedures of the study to potential participants and then obtained consents. We collected demographic data, Chinese version OB-Quest and C-ISI from both the insomnia and no insomnia groups at baseline and then collected the Chinese version OB-Quest and C-ISI from both groups after 2 weeks for arrangements for testing test–retest reliability.

Statistical analysis

Several statistical analyses were adopted to evaluate the validity of the Chinese version of OB-Quest. Exploratory factor analysis was used to determine the dimensionality and factor structure of the Chinese version of OB-Quest. We further attempted to fit the items to a unidimensional factor model using Confirmatory Factor Analysis. Cronbach's α and the intraclass correlation coefficient (ICC) were used to examine internal consistency and test–retest reliability, respectively. Analysis of variance (ANOVA) was used to explore the relationship between demographic differences, including gender, age, life role, living environment

and occupational balance. Correlation analysis was used to study the relationship between Chinese OB-Quest and C-ISI. ANOVA was used to compare Chinese OB-Quest scores between groups with different degrees of insomnia. Bonferroni post hoc test was used to further evaluate the relationship between occupational balance and groups of participants with different levels of insomnia severity (classified by C-ISI scores).

Results

Translation quality, cultural relevance and content validity

Overall, the expert panel gave a median rating of 3 (ranging from 1 to 4) for the quality of the translation. The panel provided suggestions to improve the Chinese translation on item 5 'Impact on health' and item 8 'Variety of activity', and we revised the wordings of these two items according to the suggestions. The panel's median rating on the culture relevance of the items was 4 (ranging from 1 to 4), which indicated that the items are culturally relevant for Chinese adults. The median of the panel's rating on the content validity of items was 4 (ranging from 1 to 4), meaning that the content of OB-Quest is relevant in assessing occupational balance. The CVI was calculated on the basis of the items rated by the experts. The CVI scores for the Chinese version of OB-Quest were 100% for items 1, 2, 7 and 8; 96% for items 4, 6 and 9; 93% for item 5, and 89% for items 3 and 10. These results indicated that the Chinese version of OB-Quest has good content validity and is an appropriate tool to assess occupational balance in Chinese population (Appendix I).

Profile of participants

We recruited 205 clients by convenience sampling, including participants with insomnia ($n = 90$) and without insomnia ($n = 115$). The mean age of the participants was 51.5 in the insomnia group and 52.5 in the no insomnia group. There were more female (insomnia group, $n = 62$, 68.9%; no insomnia group, $n = 72$, 62.6%) than male (insomnia group $n = 28$, 31.1%; no insomnia group $n = 43$, 37.4%) participants in both the insomnia and no insomnia groups. The results of the t -test showed that there was no significant difference in age, gender, education level, living environment and life role between the groups (Table 1).

Factor analysis, internal consistency and test-retest reliability

We conducted an EPA with varimax rotation on the items. The scree plot of variance explained suggested a

two-factor solution. We tried to extract two factors but only items 2 and 4 formed a factor, while the rest formed another factor and two items had loadings of less than 0.40. Thus, we adopt the unidimensional solution. The factor loadings of the 10 items ranged from 0.38 to 0.77, i.e. 9 out of the 10 items had a significant factor loading of 0.4 or above (Table 2). The eigenvalue of the single factor was 4.68, which explained 42.5% of the variance. The Chinese version of OB-Quest had good internal consistency for all items (Cronbach's $\alpha = 0.80$). Cronbach's α was 0.81 for the 9 items with a factor loading larger than 0.4 (excluded question no. 2) and this figure is very similar to when all the 10 items were included ($\alpha = 0.80$). With regard to test-retest reliability, the ICC of the scale was high (ICC = 0.91; 95% CI = 0.96–0.99) (Table 3).

We further conducted a confirmatory factor analysis based on one-factor solution using SPSS AMOS 25. After we added covariances between error terms based on the modification index, the one-factor model reached satisfactory model fit (CFI = 0.98, RMSEA = 0.04) (Figure 1). The loading for the paths between latent factor and items ranges from 0.26 to 0.73.

Comparison of Chinese version of OB-Quest scores among participants

Group comparisons showed that there were no significant differences in occupational balance among age ($t = 0.04$, $p = 0.57$), education level ($F = 1.29$, $p = 0.28$), living environment ($F = 2.21$, $p = 0.11$), gender ($F = 0.89$, $p = 0.35$) and life role ($F = 2.42$, $p = 0.07$).

Discriminative validity

OB-Quest total score was highly correlated with C-ISI ($r = -0.88$, $p < 0.01$). Also, ANOVA revealed a significant group difference in occupational balance between participants without insomnia and participants with insomnia ($F = 169.7$, $p < 0.001$). We further conducted a post hoc Bonferroni test to evaluate the difference in occupational balance between participants with different levels of insomnia severity according to the C-ISI in the four groups. There were significant differences in occupational balance among the four groups with different levels of insomnia severity ($p < 0.001$) (Table 4).

Discussion

The aim of present study was to translate OB-Quest into Chinese and to explore its psychometric properties and to evaluate the translation quality, cultural relevance and content validity. In addition, to estimate the internal consistency, factor structure and test-retest

Table 1. Baseline descriptive statistics of demographic data of insomnia group and no insomnia group (n = 205).

Variables	Persons with insomnia (n = 90)		Persons without insomnia (n = 115)		p
Categorical variables ^a	Frequency	%	Frequency	%	
Gender					
Male	28	31	43	37	0.377
Female	62	69	72	63	
Education					
Primary	45	50	47	41	0.138
Secondary	30	33	54	47	
Tertiary	15	17	14	12	
Living environment					
Private	47	53	66	57	0.759
Rent	4	4	5	4	
Public	39	43	44	38	
Life role					
Employed	39	43	70	61	0.055
Homemaker	26	29	29	25	
Unemployed	25	28	16	14	
Continuous variables ^b	M	SD	M	SD	
Age	51.54	9.89	52.52	9.48	0.934
Chinese version of OB-Quest	13.95	2.23	7.98	2.45	0.000**

^a χ^2 was used to compare the baseline difference between two groups of categorical variables, including gender, education level, living environment and life role.

^bIndependent t-test was used to compare the baseline difference between two groups of interval variables, including age, C-ISI and the Chinese version of OB-Quest.

**<0.001.

C-ISI: Chinese Insomnia Severity Index; OB-Quest: Occupational Balance Questionnaire.

Table 2. Rotated factor matrix of Chinese version of OB-Quest.

Item	Component
Do you get enough sleep?	0.77
Do you get enough rest?	0.75
How much are your activities in your everyday life affected by your health?	0.74
How well can you adapt your activities in your everyday life to changed living conditions, such as a changed state of health?	0.63
How well can you adapt your activities in your everyday life to changed living conditions, such as a change in your professional life or employment status?	0.60
Do you have sufficient variety of different activities that you do?	0.56
How often do you feel overstressed in your everyday life?	0.55
Do you generally receive enough appreciation for activities in your everyday life?	0.51
Do you generally find your activities in your everyday life under demanding?	0.44
Do you generally find your activities in your everyday life over demanding?	0.38

reliability and to examine the discriminant validity of the Chinese version of OB-Quest by exploring the relationship between Chinese version of OB-Quest and C-ISI.

On the basis of the results of the expert panel reviews, the translation quality and content validity of the Chinese version of OB-Quest is high, and it is culturally relevant for use with Chinese population. We incorporated some suggestions from the panel to improve the translation of two items.

Concerning the factor structure of the Chinese version of OB-Quest, we found that 9 out of the 10 items had a factor loading higher than 0.44, and this indicated that the OB-Quest scores could be summarised in a single factor. The confirmatory factor analysis of the unidimensional model also had a satisfactory model fit. However, in the validation study of the English version (Dür et al, 2014), the results suggested that OB-Quest is likely to have a multifactor structure. The results showed that items on challenging and relaxing activity

Table 3. Cronbach's α and test–retest reliability of Chinese version of OB-Quest.

Items	Test–retest reliability (ICC) (N = 30)
Do you generally find your activities in your everyday life under demanding?	0.79
Do you generally find your activities in your everyday life over demanding?	0.92
Do you generally receive enough appreciation for activities in your everyday life?	0.94
How often do you feel overstressed in your everyday life?	0.93
How much are your activities in your everyday life affected by your health?	0.95
Do you get enough rest?	0.91
Do you get enough sleep?	0.90
Do you have sufficient variety in the different activities you do?	0.92
How well can you adapt your activities in your everyday life to changed living conditions, such as a changed state of health?	0.87
How well can you adapt your activities in your everyday life to changed living conditions, such as a change in your professional life or employment status?	0.79
Total scores	0.91

ICC: intraclass correlation coefficient.

Table 4. Multiple comparisons by post hoc tests on four groups of insomnia severity.

C-ISI severity	C-ISI severity	Mean difference	Standard error	95% CI	
				Lower bound	Upper bound
Normal	Mild	2.98 ^a	0.38	1.88	3.90
	Moderate	7.30 ^a	0.35	6.36	8.24
	Severe	9.91 ^a	0.81	7.75	12.08
Mild	Normal	-2.89 ^a	0.38	-3.90	-1.88
	Moderate	4.41 ^a	0.34	3.50	5.32
	Severe	7.09 ^a	0.81	4.87	9.17
Moderate	Normal	-7.30 ^a	0.35	-8.24	-6.36
	Mild	-4.41 ^a	0.34	-5.32	-3.50
	Severe	2.61 ^a	0.80	0.49	4.73
Severe	Normal	-9.91 ^a	0.81	-12.08	-7.75
	Mild	-7.02 ^a	0.81	-9.17	-4.87
	Moderate	-2.61 ^a	0.80	-4.73	-0.49

^aThe mean difference is significant at the 0.001 level.

and adaptation of environment may form two or more factors in OB-Quest. Thus, the factor structure of OB-Quest will need further exploration. In the current literature, there are different perspectives on occupational balance, and there is a lack of consensus on the factors that contribute to occupational balance (Dür et al., 2015; Wagman et al., 2012). In general, it is agreed that occupational balance is a subjective concept internally defined by the individual (Backman, 2004) and focused on three themes: mix of occupations, ability and resources to manage occupations, and congruence between occupations and personal values (Eklund and Sandlund, 2014). OB-Quest assesses the key components of occupational balance, including mix of occupations, ability and resources to manage

occupations, and congruence between occupations and personal values, and it is one of few instruments that go through a vigorous process of exploring the theory and construct of occupational balance and measuring it (Dür et al., 2015).

In addition, the results of the present study show that the overall internal consistency of OB-Quest was higher in this study than in a previous study of the original English version (Dür et al., 2014). Test–retest reliability over 2 weeks, which was not explored in previous studies, was excellent for the Chinese version of OB-Quest. In summary, the Chinese version of OB-Quest demonstrates good psychometric properties in assessing occupational balance in persons with and without insomnia. Although the internal consistency

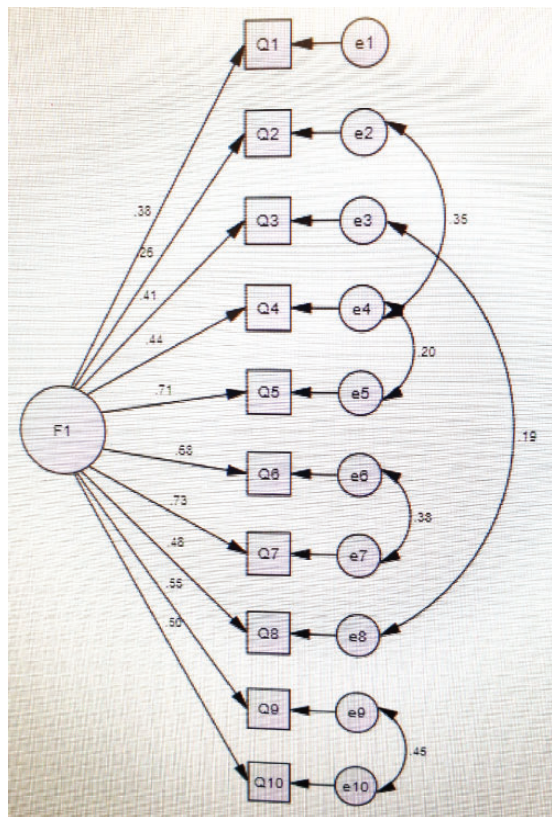


Figure 1. Confirmatory factor analysis of the Chinese version of Occupational Balance Questionnaire.

is satisfactory and the test–retest reliability is good, larger sample sizes and further explorations of the validity and reliability of the measure in different populations including persons suffering from chronic illness or mental illness, is encouraged to widen the application of OB-Quest in Asian populations.

There have been a few studies on the relationship between occupational balance and demographic factors, including age, gender, living environment and life role. The results show that the Chinese version of OB-Quest had no correlation with age, gender, life role, and living environment is consistent with previous findings (Eklund & Argentzell, 2016; Håkansson & Ahlberg, 2017; Wagman & Håkansson, 2014).

This study shows that occupational balance is closely linked to sleep and insomnia. While occupational balance has been applied to many patient groups (Wagman et al., 2017; Yu et al., 2018), this study is one of the first attempts to measure occupational balance in people with sleep problems. The results show that occupational therapists can use occupational balance as a potential indicator of occupational performance in people with insomnia. In conclusion, the Chinese version of OB-Quest demonstrates good psychometric properties, which is a promising outcome for

assessing occupational balance for persons with and without insomnia.

Limitations of the study

This study has several limitations. The sampling could be improved if participants are recruited from different locations/settings. In addition, a larger sample for factor analysis or Rasch analysis could further confirm the factor structure. Furthermore, including measures of mood and mental well-being and checking how they relate to occupational balance could enhance the quality of the study.

Conclusion

Occupational balance is a central concept in occupational therapy. OB-Quest strengthens the evaluation of existing occupational therapy interventions. The Chinese version of OB-Quest is a short, easy to understand and culturally relevant assessment to use with Chinese population. The results of this validation study suggest that the Chinese version of OB-Quest is a unidimensional instrument for measuring occupational balance. The Chinese version of OB-Quest shows a high level of internal consistency and test–retest reliability, which provides a foundation for further studies in different populations. Preliminary data found that the correlation between sleep and occupational balance is strong, which provides a foundation for the further development of occupation-based sleep interventions. The availability of the Chinese version of OB-Quest will be a huge advantage as it will now be possible to reliably measure occupational balance in Chinese. It facilitates research on developing and evaluating interventions to improve the occupational balance of individuals. In summary, the results of this study demonstrate that the Chinese version of OB-Quest can be readily used for research with Chinese population.

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Appendix. Chinese Version of OB-Quest

作業活動平衡-問卷

「作業活動」是指日常生活中的您做的所有事情, 包括非常簡單的事情, 例如洗澡或穿衣服。「活動」的定義不僅包括工作和休閒娛樂活動(例如閱讀或睡覺), 也涵蓋了照顧小孩及受供養的親屬。請就每條問題選擇最合適的答案, 並於答案旁邊加上「×」。

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1. 一般而言, 您是否覺得日常生活中的活動欠缺挑戰?
 - 我不覺得活動欠缺挑戰
 - 我覺得有部份活動欠缺挑戰
 - 我覺得大部份活動欠缺都挑戰
 2. 一般而言, 您是否覺得日常生活中的活動挑戰太大?
 - 我不覺得活動挑戰太大
 - 我覺得有部份活動挑戰太大
 - 我覺得大部份活動都挑戰太大
 3. 一般而言, 您會否在日常生活中的活動獲得足夠的欣賞?
 - 我獲得許多欣賞
 - 我獲得足夠欣賞
 - 我沒有獲得任何欣賞
 4. 您有多經常在日常生活中感到壓力過大?
 - 從來沒有
 - 有時
 - 經常
 5. 您日常生活中的活動被你的健康影響有多大?
 - 完全沒有影響
 - 有少許影響
 - 影響很大
 6. 您有充足休息嗎?
 - 我有充足休息
 - 我有少許的休息
 - 我有很少的休息
 7. 您有充足睡眠嗎?
 - 我有充足睡眠
 - 我有少許的睡眠
 - 我有很少的睡眠
 8. 您的活動種類是否有足夠的多樣性? 例如, 體能活動配以靜態活動 (當坐著時可進行的活動或靜止不動); 有創意的活動配以慣常的活動
 - 我的活動有足夠的多樣性
 - 我的活動有較小的多樣性
 - 我的活動缺乏多樣性
 9. 您有多少能力調整日常生活中的活動以迎合健康狀況變化等的生活轉變?
 - 很有能力
 - 欠缺能力
 - 不能夠
 10. 您有多少能力調整日常生活中的活動以迎合職業生涯或就業狀況等的生活轉變?
 - 很有能力
 - 欠缺能力
 - 不能夠
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