

Original Article

Preliminary Psychometric Properties of the Chinese Version of the Work-Related Quality of Life Scale-2 in the Nursing Profession

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Objectives: As quality of work-life (QWL) among nurses affects both patient care and institutional standards, assessment regarding QWL for the profession is important. Work-related Quality of Life Scale (WRQOLS) is a reliable QWL assessment tool for the nursing profession. To develop a Chinese version of the WRQOLS-2 and to examine its psychometric properties as an instrument to assess QWL for the nursing profession in China.

Methods: Forward and back translating procedures were used to develop the Chinese version of WRQOLS-2. Six nursing experts participated in content validity evaluation and 352 registered nurses (RNs) participated in the tests. After a two-week interval, 70 of the RNs were retested. Structural validity was examined by principal components analysis and the Cronbach's alphas calculated. The respective independent sample t-test and intra-class correlation coefficient were used to analyze known-group validity and test-retest reliability.

Results: One item was rephrased for adaptation to Chinese organizational cultures. The content validity index of the scale was 0.98. Principal components analysis resulted in a seven-factor model, accounting for 62% of total variance, with Cronbach's alphas for subscales ranging from 0.71 to 0.88. Known-group validity was established in the assessment results of the participants in permanent employment vs. contract employment ($t = 2.895$, $p < 0.01$). Good test-retest reliability was observed ($r = 0.88$, $p < 0.01$).

Conclusion: The translated Chinese version of the WRQOLS-2 has sufficient validity and reliability so that it can be used to evaluate the QWL among nurses in mainland China.

Key Words: Quality of work life, Nurses, Validity and reliability, Work-Related Quality of Life Scale-2, Chinese version

Introduction

Nurses are an integral part of any healthcare system. Currently, the shortage of nurses is a global healthcare issue. Despite

considerable resources and efforts poured into the training and recruitment of nurses, losses to the profession persist. The effectiveness and efficiency of the healthcare system is hereby under threat and, in the long run, this could be a major obstacle to achieving healthcare development goals - for policy-makers, healthcare institutions, and patients alike [1]. It is, therefore, vital for healthcare systems to improve organizational management, strengthen employee commitment to the organization and reduce nurse turnover.

The quality of work-life (QWL) is an informative index

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to provide clues for organizational management reforms, since it is a broad construct encompassing job satisfaction and other factors related to personal wellness and organizational goals [2]. The key value of the conceptualization was to pursue the twin goals of enhanced effectiveness regarding the organization and improved QWL for employees [3,4]. Thus, assessment and surveillance of nurse QWL could be helpful for healthcare organizations endeavoring to develop strategies and measures to retain nurses, promote their working efficiency, and protect them from excessive occupational pressure (burn-out) and other psychosocial workplace hazards, and eventually to achieve a reduction of costs in human resources procurement and better patient outcomes [2,5,6].

Different occupational workers have different perceptions towards QWL. A number of researchers have made constructive contributions to define the contents of nurse QWL. Smith [7] proposed that nurse QWL should include the dimensions of job satisfaction, job tension, and organizational commitment. O'Brien-Pallas and Baumann [8] suggested that nurse QWL could be explained by internal and external factors: the former being personality, socio-environmental, work properties, and management style, and the latter being patient demands, healthcare policy, and the labor resource market. Brooks and Anderson [9] suggested evaluating the construct with four dimensions; *viz.*, work-home life, work design, work context, and work environment. In a qualitative study on Taiwan nurses, Hsu and Kernohan [10] proposed that nurse QWL could be described as: socio-economic relevance, demography, organizational aspects, work aspects, human relation, and self-actualization. These perceptions of the construct of nurse QWL are very helpful for developing QWL assessment scales for the profession.

In mainland China, the area of our interest - such QWL research on the various professions (including nurses) - is in the developmental and piloting stages [11]. Current QWL research in China is focused on university lecturers and enterprise employees [11-13]. For example, Jia [12] developed a four-dimension QWL evaluation model for university professors, and Chan and Wyatt [13] a five-dimension scale for company employees. Some Chinese nursing researchers have begun investigating the concept of QWL in the nursing profession. For instance, Zhou and colleagues [14] used a job pressure scale and a quality of life scale to study the relationship between work content and personal wellness in the nursing profession. In a review paper, Zhang and Liu [15] suggested that it was appropriate that healthcare organizations in China benefit from the information *vis-à-vis* nurse QWL and that development of reliable QWL assessment tools for application in healthcare

organizations be made a priority.

The Work-related Quality of Life Scale (WRQOLS) was a QWL assessment scale developed in the UK. The constructs for the WRQOLS were partly derived from the findings of Hsu and Kernohan [10]; comprising six subscales, *viz.*, job and career satisfaction, general well-being, home-work interface, stress at work, control at work, and working conditions.

Research has demonstrated that the WRQOLS was a reliable QWL assessment tool for the nursing profession, with appropriate cross-cultural validity and reliability in certain Asian countries. From a validity study in the UK, Van Laar and colleagues [16] suggested that the scale had satisfactory factorial validity and reliability for the overall scale and subscales (Cronbach's alpha 0.91 and 0.75 to 0.86, respectively). In addition, Edwards and colleagues [17] found similar psychometric properties for the scale. Subsequently, Dai et al. [18] suggested in a research among the nurses of Taiwan that the scale had good criterion validity ($r = 0.78$), internal consistency, and test-retest reliability ($r = 0.89$). Zeng et al. [19] found that the scale had applicability among the nurses in Singapore; with good construct validity and reliability (Cronbach's alpha) of 0.66-0.88. This research demonstrated that the WRQOLS had superior psychometric properties. Especially, the cross-cultural researches in Taiwan and Singapore indicated that the scale might have broader utility in the Asian society, particularly in the Chinese cultural context. Thus, it is worthwhile to test the psychometric properties of the scale among the nurses in mainland China, as a specific assessment tool with sufficient validity and reliability is needed for the Chinese nursing profession [11].

The WRQOLS-2 is a recently revised version of the WRQOLS, comprising seven subscales with 34 items, including 12 new items and 22 original ones. The developer labeled the new subscale as 'employee engagement'. The psychometric properties of the WRQOLS-2 had not been researched and published. The intention of this revision might be to omit the problematic items identified in the foregoing validating research and make the scale more comprehensive by adding an employee engagement subscale, as employee engagement was becoming increasingly significant in the contemporary organizational management. It still uses a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), with a possible total score ranging from 34 to 170.

The current research aimed: (a) to translate the WRQOLS-2 into Chinese; (b) to test the validity and reliability of the translated Chinese version; and (c) to determine whether the scale is applicable to the nurses in mainland China.

Materials and Methods

Translation of the Chinese version WRQOLS-2

Our translation mainly referred to the Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures proposed by Beaton and colleagues [20]. Five translators took part in the translation; with backgrounds in translation, nursing, medicine, and teaching; and all were competent in English and Chinese, as some were professional translators and some once studied in overseas countries. Three were responsible for forward translation from English WRQOLS-2 into Chinese; done independently then resolved discrepancies by consensus. The other two translators - who had never before read the original English WRQOLS-2 - were responsible for the back-translation. They were similarly advised to translate the Chinese manuscript into English independently then to resolve discrepancies by consensus. The translating script and a report were sent to the UK via e-mail to the developer of the English WRQOLS-2 (Darren Van Laar) to compare with the original English version and ensure semantic and conceptual equivalence. Meanwhile, four bilingual experts were invited to examine all of the translating outcomes. The researcher (SL) coordinated all the communications during the process.

Due to the potential differences in the QWL parameters *cum* interests between the British and Chinese nurses, content validity assessment for the translated Chinese version WRQOLS-2 was considered necessary to ensure that the items were not alien to Chinese nurses and their occupational reality. Therefore, six nursing experts were invited to assist: all of these experts possessed professional titles, with extensive experiences in nursing and management. They were asked to rate the relevant degree of each item on a four-point evaluating form (1 = not relevant, 2 = somewhat relevant but needs further revision, 3 = relevant but needs minor revision, and 4 = very relevant), and to comment on each item in terms of its clarity, simplicity, and/or ambiguity. After content evaluation, 30 registered nurses (RNs) were organized in order to complete the pretest.

Participants and data collection

Our research was conducted at The First Affiliated Hospital of Guangxi University of Chinese Medicine. The hospital is a comprehensive medical teaching institution with a main hospital, two branches and four community healthcare centers.

Data collection was undertaken between October 18 and November 19, 2011. Prior to collecting data, the researcher made a brief research introduction to the head nurses at their monthly meeting and asked them to disseminate the information within the hospital. Currently employed, full-time RNs

with at least one year of working experience were included in the research. The researcher requested a staff list, which included: staff names, nursing license status, date of employment, and department assignment. After excluding those who did not meet the criteria and those on leave, 500 RNs were randomly selected from the list by systematic sampling. These were then sorted by wards and departments and questionnaires given to them by the head nurse. Along with the translated Chinese WRQOLS-2, a demographic questionnaire was administered requesting: sex, age, marital status and number of children, education background, working age, employment type, professional rank, position, income, health status and night duty. The respondents were asked to seal their completed questionnaires in an envelope before returning it to the researcher. After discarding the incomplete questionnaires, there remained 352 completed questionnaires coded for analysis. Two weeks later, 100 of the 352 respondents were selected by systematic sampling for a retest. Of these, 70 respondents returned completed questionnaires. Using the code numbers and signatures on the written consent form, the test-retest questionnaires were matched for data entry.

Data analysis

The content validity index (CVI) - the number of positive ratings (3 or 4) given by the content experts in the content validity assessment form - determined the CVI for each item. The average item-CVI determined the scale-level CVI [21,22].

Principal components analysis (PCA) with Varimax rotation was employed to analyze the structural validity of the scale. The eigenvalue-greater-than-one rule was followed to decide the number of factors. Loading values > 0.40 decided the assignment of items to factor [23]. Internal consistency was measured by Cronbach's alphas: values > 0.60 were considered acceptable [24].

Both the total and subscale scores were calculated with raw scores after the negative items 7, 9, 18, 22, 30 and 31 were recoded. An independent sample t-test was used to compare the scores of the participants in permanent vs. contract employment; to examine known-group validity. The intra-class correlation coefficient (ICC) was used to analyze the associations between the test and retest scores; in order to examine the test-retest reliability of the scale [25].

SPSS program version 15.0 (SPSS Inc., Chicago, IL, USA) was used in data analysis.

Ethical considerations

This research was reviewed and approved by the Ethics Committee for Human Research at Khon Kaen University. An

information sheet was included with the questionnaires to introduce the purposes of the research and the rights of participants. Written informed consent was obtained from each of the respondents. The entire data-collecting process was conducted under the supervision of the hospital nursing division.

Results

Translation and content validity of the translated Chinese WRQOLS-2

In general, the scale was not difficult to translate, as the words used in the original English scale are relatively common and simple. Nonetheless, the translators doing the forward translation suggested that item 32 (“I have sufficient opportunities to question managers about change at work”) needed to be re-phrased. In China, people are mostly encouraged to be humble and submissive, especially in communications between juniors to seniors. In the workplace, workers are normally tolerant and would not actively express their opinions or discontent to senior staff or management. As a result, active responses or resistance to “change at work” are rare. Moreover, in the Chinese language, using “question” as a verb, to some extent, indicates insubordination. As a result, Item 32 was consequently reworded to, “managers give me sufficient opportunities to express my concerns about change at work”, which sounds more deferential and complies with the cultural context. The scale developer and content experts all agreed with the modification.

The result of the content validity assessment was strongly positive. The calculated CVI for the 30 items was 1.00, with full positive ratings from all six experts; 0.83 for four items, with five positive ratings. Referring to the criteria set up by Lynn [21], all item-CVIs of the 34-item translated scale were acceptable. As a result, the calculated scale-level CVI was 0.98.

Characteristics of the participants

The median age of the participants was 27 years (range, 21-54; mean \pm standard deviation [SD], 28.7 ± 6.2). The median working age was 5.9 years (range, 1-35; mean \pm SD, 7.4 ± 6.6). Of the 352 participants, 344 (97.7%) were female; 46.4% were married and 38.3% had children at home. Most (83.5%) of the participants worked rotations including night shifts. The majority (74.7%) were between 20 and 30 years of age, suggesting that turnover was a serious issue. A smaller albeit significant majority (60.2%) were contract employees, while the remainder (39.8%) was permanent employees. A large proportion (66.2%) had not achieved a bachelor degree level education. The average monthly income was CNY $2,790 \pm 828$ (\approx USD 429 ± 127). More details are provided in Table 1.

Table 1. Characteristics of the participants

Characteristic		Frequency (n=352)	Percent
Gender	Female	344	97.7
	Male	8	2.3
Age (year)	20-30	263	74.7
	31-40	70	19.9
	41-50	16	4.5
	51-55	3	0.9
Marital status	Single	184	52.3
	Married	164	46.6
	Divorce/separated	3	0.9
	Widowed	1	0.3
Children	No	217	61.6
	One child	130	36.9
	Two children	5	1.4
Education	Vocational	18	5.1
	Associate college degree	215	61.1
	Bachelor degree	119	33.8
Working age (year)	5.9 (1-35); 7.4 ± 6.6		
Employed type	Contract worker	212	60.2
	Permanent staff	140	39.8
Professional rank	Junior RN	154	43.8
	Senior RN	142	40.3
	Supervisory nurse	47	13.4
	Associate senior nurse	8	2.3
	Senior nurse	1	0.3
Position	Staff	328	93.2
	Department head nurse	10	2.8
	Ward head nurse	13	3.7
	Deputy nursing director	1	0.3
Income (CNY)	Less than 1,000	6	1.7
	1,001-2,000	138	39.2
	2,001-3,000	141	40.1
	3,001-4,000	58	16.5
	4,001-5,000	9	2.6

Values are presented as number, median (range), or mean \pm standard deviation.

RN: registered nurse, CNY: Chinese Yuan.

Structural validity and internal consistency of the translated Chinese WRQOLS-2

The value of the Kaiser-Meyer-Olkin was 0.932 and the chi-square value of the Bartlett's test of sphericity was 5882.165 ($p < 0.001$). The lowest value of communalities among the 34 items was 0.424, with most being > 0.50 . The initial principal component analysis displayed a seven-factor outcome, accounting for 62.2% of variance. Meanwhile, the respective five-, six-, eight-, and nine-factor models were examined with the same method. After comparisons, the seven-factor model was accepted as the optimal solution.

Among the seven factors, the first accounted for 11.9% of variance, with an initial eigenvalue of 11.930, and the last accounted for 6.3%, with an initial eigenvalue of 1.018. Factor 1 included eight items and most of those described *general well-being*. Factor 2 comprised seven items mainly relating to *working conditions* and *home-work interface*. All items related to *employee engagement* were loaded to Factor 3. Factor 4 included four items with most being relevant to *job and career satisfaction*. Items associated with *stress at work* were clustered in factor 5. Both factors 6 and 7 consisted of three items, representing *working conditions* and *control at work*, respectively. The *job and career satisfaction* dimension - the second largest underlying construct - overlapped with *working conditions* and *control at work*. Compared with the PCA by Zeng et al. [19], the format for loading the 22 original items of the WRQOLS was quite consistent. For instance, factor 6 (items 8, 11 and 12) and factor 7 (items 1, 2 and 3). The detailed outcomes from the PCA are presented in Table 2.

Overall, the seven-factor model generated from the PCA was conformable to the hypothesized construct of the WRQOLS-2. By referring to the representative item(s) in each

factor and the foregoing PCA research on the WRQOLS [16,19], the seven factors were named: (1) *General well-being*, (2) *Home-work interface*, (3) *Employee engagement*, (4) *Job and career satisfaction*, (5) *Stress at work*, (6) *Working conditions*, and (7) *Control at work*. Internal consistency of the overall scale and subscales based on this model was satisfactory. The calculated Cronbach's alpha value for the seven subscales ranged from 0.71 to 0.88, while it was 0.94 for the overall scale (Table 3).

Known-groups validity

In mainland China, permanent employees are likely to enjoy a stronger sense of job security, more opportunities to engage in decision-making, and more benefits from the organization and government. Accordingly, it was hypothesized that nurses in permanent employment would have better QWL scores than those in contract (non-permanent) employment [14]. In the current research, 140 of the 352 subjects were permanent employees while 212 were contract employees (Table 1). If the differences in QWL between the permanent and contract employees were effectively revealed, the known-groups validity regarding the translated Chinese WRQOLS-2 could be established. In the scale results, the mean (\pm SD) of total scores for the permanent group was 105.81 ± 16.55 , and the contract group was 100.28 ± 18.15 . The groups' difference in assessment results was statistically significant ($t = 2.895$, $p < 0.01$), suggesting positive known-group validity of the translated Chinese WRQOLS-2.

Test-retest reliability of the translated Chinese WRQOLS-2

Among the participants in the retest group, 69 were female and one was male. Their median age was 26 years (range, 22-42) and the median working age was 4 years (range, 1-20).

Table 2. Factor analysis of the translated Chinese WRQOLS-2

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
10. I am satisfied with my life	0.762						
16. Generally things work out well for me	0.714						
14. In most ways my life is close to ideal	0.606						
34. I am satisfied with the overall quality of my working life	0.592						
20. Recently, I have been feeling reasonably happy all things considered	0.585						
4. I feel well at the moment	0.567						
24. I am able to achieve a healthy balance between my work and home life	0.513						
9. Recently, I have been feeling unhappy and depressed	0.435						

Table 2. Continued

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	
33. I am happy with the physical environment where I usually work		0.672						
5. My employer provides adequate facilities and flexibility for me to fit work in around my family life		0.658						
32. I have sufficient opportunities to question managers about change at work		0.636						
13. My employer provides me with what I need to do my job effectively		0.633						
15. I work in a safe environment		0.606						
6. My current working hours/patterns suit my personal circumstances		0.568						
21. The working conditions are satisfactory		0.508						
27. I am proud to tell others that I am part of this University			0.795					
28. I would recommend this University as a good one to work for			0.733					
29. I get a sense of achievement from doing my job			0.603					
26. The Hospital communicates well with its employees			0.599					
25. I feel motivated to do my best in my current job			0.495					
17. I am satisfied with the career opportunities available for me here				0.767				
19. I am satisfied with the training I receive in order to perform my present job				0.746				
7. I often feel under pressure at work				0.696				
23. My work is as interesting and varied as I would want it to be				0.688				
30. I am pressured to work long hours					0.813			
31. I have unrealistic time pressures					0.771			
22. I have unachievable deadlines					0.610			
18. I often feel excessive levels of stress at work					0.576			
11. I am encouraged to develop new skills						0.793		
8. When I have done a good job it is acknowledged by my line manager						0.641		
12. I am involved in decisions that affect me in my own area of work						0.625		
2. I feel able to voice opinions and influence changes in my area of work							0.745	
1. I have a clear set of goals and aims to enable me to do my job							0.707	
3. I have the opportunity to use my abilities at work							0.672	
Initial eigenvalues	11.930	2.695	1.497	1.426	1.354	1.217	1.018	
Percentage of variance (rotated)	Total: 62.17	11.95	11.92	9.18	8.18	7.76	6.89	6.30

Factor loadings of the seven-factor solution and total amount of variance explained, percent of variance explained by each factor of the scale. WRQOLS: Work-related Quality of Life Scale.

Table 3. Internal consistency and test-retest reliability of the translated Chinese version WRQOLS-2

Domain	Number of Item	Possible score	Obtained score (n=352)	Cronbach's alpha (n=352)	ICC (n=70)
General well-being	8	8-40	8-39 23.2 ± 5.90	0.87	0.75
Home-work interface	7	7-35	7-35 19.42 ± 5.71	0.88	0.83
Employee engagement	5	5-25	5-25 16.09 ± 3.67	0.82	0.84
Job and career satisfaction	4	4-20	4-19 10.6 ± 2.91	0.82	0.80
Stress at work	4	4-20	4-19 11.1 ± 2.93	0.74	0.62
Working conditions	3	3-15	3-15 9.5 ± 2.28	0.71	0.79
Control at work	3	3-15	4-15 10.0 ± 2.21	0.75	0.76
Overall scale	34	34-170	35-160 99.84 ± 20.67	0.94	0.88

Values are presented as number, range, or mean ± standard deviation.
WRQOLS: Work-related Quality of Life Scale, ICC: intra-class correlation coefficient.

According to the questionnaires, none of the participants indicated any abnormal fluctuation in QWL during the two-week interval. In the scale results, a strong relationship was observed between the first test and the retest ($r = 0.88$, $p < 0.01$), which was comparable to other research findings on WRQOLS [18]. The seven subscales all demonstrated strong reproducibility ($0.62 < r < 0.83$, $p < 0.01$). The *Stress at work* subscale, however, displayed a comparatively weak relationship, probably due to the stress associated with workload and shifts and consequently was more likely to vary in the short-term, compared with the other dimensions (Table 3).

Discussion

The items in an evaluation scale can easily become invalid when translated into another language because of cultural differences and linguistic nuances [26]. The specific Chinese social culture and organizational management style might affect the application of the WRQOLS-2 in the nursing profession in mainland China. Consequently, culture adaptation and content validity assessment were important steps for preparing the WRQOLS-2 for use in China. During forward and back translations, it was discovered that item 32 had to be reworded in order to adapt to the organization management culture in mainland China. Aside from item 32, there were no additional problems vis-à-vis cultural adaptation, possibly because the scale's development was partly already based on QWL research among nurses in Taiwan [16]. Due to the above revisions to phraseology, the content validity of the WRQOLS-2 in Chinese context was also improved.

As a special profession, nursing traditionally has few male

workers; however, the numbers of male RNs has trended upward in recent years [27]. In order to obtain a true representative sample from the study population in the current research, male nurses were not excluded during the process of selecting participants. Similarly, other research on the correlation of job stress and quality of life regarding Chinese nurses included male nurses [28]. Thus, QWL for both male and female nurses might be parallel. In the future, when the translated Chinese WRQOLS-2 is used in large-scale, researchers need to investigate whether there are any differences in QWL between male and female nurses.

The present research set out to examine the structural validity of the WRQOLS-2 in a cross-cultural context after being translated into Chinese. For this purpose, it was determined that for examining structural validity exploratory factor analysis would be more suitable than confirmatory factor analysis [29]. Moreover, the number of subjects in our research was sufficient for conducting factor analysis; that the required ratio of subjects per item should be $> 10 : 1$ [30].

In general, the seven-factor model generated from PCA was consonant with the hypothesized underlying dimensional framework of QWL used in developing the WRQOLS-2. The internal consistency for the subscales based on this model was satisfactory. As our research was the first to examine the structural validity of the WRQOLS-2, no data exists for any direct comparisons. The PCA for the 24-item WRQOLS (i.e., the first version of the scale) yielded a six-factor model from research in the UK and a five-factor model from cross-cultural research in Singapore [16,19]. The last factor, however, comprised only two items, suggesting that the factor structure might be unstable. After some category revisions, the 34-item WRQOLS-2

demonstrated in PCA that the *stress at work* subscale was strengthened and a new subscale for *employee engagement* was formed. The PCA again indicated that *general well-being* was still the most important concern for nurses, accounting for the majority of variance, followed by *home-work interface* and *employee engagement*. These findings provided preliminary evidence for the structural validity of the translated Chinese WRQOLS-2. After evidence for factorial validity of the original English WRQOLS-2 is reported, confirmatory factor analysis can be used to further examine the structural validity of this translated Chinese WRQOLS-2.

The design and items of the translated Chinese WRQOLS-2 were proven effective by the known-group validity and test-retest reliability suggested in the results. From the results of the known-group validity, it can be inferred that the translated Chinese WRQOLS-2 exhibits the ability to correctly detect the potential difference in QWL among the subjects; and the result of the test-retest reliability suggested that the scale would be able to capture legitimate variations in QWL in longitudinal research.

The translated Chinese WRQOLS-2 was adapted to the Chinese organizational cultural context. The scale had the appropriate psychometric properties, evidenced by content validity, structural validity, internal consistency, known-group validity and test-retest reliability. The WRQOLS-2 can therefore be introduced to healthcare organizations in mainland China for assessing QWL for nurses there.

The translated Chinese WRQOLS-2 can be introduced to other professions, but the psychometric properties should be further tested. The validity and reliability evidence from research on the original English WRQOLS-2 and this translated Chinese version would be helpful for future applications and revisions of the scales.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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