

Development and Validation of Psychological Contract Scale for Hospital Pharmacists

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Ting Zhang^{1-4,*}
Chengchen Yin^{1-3,*}
Yongchen Geng¹⁻³
Yan Zhou¹⁻³
Shusen Sun⁵
Fushan Tang¹⁻³

¹Department of Clinical Pharmacy, School of Pharmacy, Zunyi Medical University, Zunyi 563006, People's Republic of China; ²Key Laboratory of Basic Pharmacology of Ministry of Education and Joint International Research Laboratory of Ethnomedicine of Ministry of Education, Zunyi Medical University, Zunyi 563006, People's Republic of China; ³The Key Laboratory of Clinical Pharmacy in Zunyi City, Zunyi Medical University, Zunyi 563006, People's Republic of China; ⁴Department of Pharmacy, Guiyang Hospital of Stomatology, Guiyang 550000, People's Republic of China; ⁵College of Pharmacy and Health Sciences, Western New England University, Springfield, MA 01119, USA

*These authors contributed equally to this work

Objective: To set up a psychological contract scale for hospital pharmacists to strengthen the management of pharmacists and improve the occupational health of pharmacists.

Methods: A psychological contract scale for hospital pharmacists with structured questionnaires was designed according to the professional characteristics of hospital pharmacists and validated through the investigation of pharmacists in 77 public medical institutions in Zunyi, China, which were included through stratified random sampling. Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were used to assess the suitability of the sample for factor analysis. Validity of the dimensions was investigated with exploratory factor analysis. The principal component analysis and varimax rotation methods were used to identify the factor structure. The internal consistency was assessed by the Cronbach's alpha coefficient.

Results: The psychological contract scale for hospital pharmacists was composed of pharmacists' perceptions regarding the hospital, pharmacists themselves, and government/society responsibility. The KMO values of the three perceptions were 0.957, 0.930 and 0.917, respectively, all greater than 0.6. The significance probability of the Bartlett spherical test was 0.000, indicating good structural validity. The Cronbach's alpha coefficient and half coefficient of the responsibilities in three sub-scales were all greater than 0.6, indicating good internal reliability of the scale. The average scores of the pharmacist responsibility, the hospital responsibility and the government/society responsibility in the pharmacists' perception were 5.42±0.637, 4.64±1.069 and 4.49±1.134, respectively. In the pharmacists' perception, their own responsibility has been better fulfilled than those of hospitals and government/society.

Conclusion: The psychological contract scale for hospital pharmacists can be a useful tool to evaluate the psychological contract of hospital pharmacists for research and occupational health assessments and management in the area of hospital pharmacy.

Keywords: pharmacist, psychological contract, questionnaire

Introduction

A psychological contract, first proposed by Argyris, is used to describe the objective understanding and cognition of the mutual obligations in the exchange relationship between organizations and individuals.^{1,2} These consist of a series of unwritten expectations between employees and managers.³ Compared to written contracts, a psychological contract can better reflect mutual expectations between employees and organizations. The realization of these expectations affects inner feelings, work attitude, and performance of employees.^{4,5} Maintaining a satisfactory psychological contract can not only promote internal communication between employers and

Correspondence: Fushan Tang
Department of Clinical Pharmacy, School of Pharmacy, Zunyi Medical University, Zunyi 563006, People's Republic of China
Tel/Fax +86 851 2864 2334
Email fstang@vip.163.com

employees, but improve working atmosphere, employee performance and management efficiency.

Most of the existing studies on the management of medical professionals are based on psychological contracts focusing on nurses and doctors. It is believed that the violation of the psychological contract can be negatively related to job satisfaction and emotional organizational commitment, and positively related to the willingness to leave.⁶ An unsatisfactory psychological contract can make nurses feel disappointed and frustrated, eventually leading to turnover.⁷ When doctors perceive high levels of fulfillment based on their psychological contract, they are more committed and more active in contributing to their work.⁸ A high level of agreement on a psychological contract has an essential impact on reducing turnover.^{9,10} Organizational managers should minimize the negative impact of violating a psychological contract while working to maximize positive opportunities.^{11–14} This positive utilization of the psychological contract includes recognizing the importance of social exchange within the organization, building trust to ensure that staff are staying,¹⁵ and managing expectations through greater participation and leadership. These strong relationships can enhance reciprocity to achieve better management and service.^{16,17}

Hospital pharmacists are unique and growing members of the healthcare team with an indispensable role in rational drug use. The medication intervention of the hospital pharmacists on the patients can not only effectively reduce the medication costs and the incidence of irrational medication use and adverse drug reactions, also significantly increase the medication adherence of the patients.^{18–22} In our previous study, it was found that maintaining the patients' psychological contract with the pharmacists can effectively improve patients' medication adherence and promote the harmonious pharmacist-patient relationship.²³ However, reform in the medical care system, suboptimal pharmacist-employer relations and fierce competition inside and outside the hospital pharmacy profession have been adding increasing stress and role-confusion to hospital pharmacists. Thus, hospital pharmacists can also benefit from a well-maintained healthy psychological contract. If the psychological contract of hospital pharmacist is violated, their job burnout and low work motivation may negatively affect patients' health outcomes. The research and management on a psychological contract for hospital pharmacists is urgently needed for hospital pharmacy administration. Though there were already some

psychological contract scales in studies to assess the psychological contract of doctors and nurses,^{24–26} there is still a lack of research on the psychological contract of hospital pharmacists.

In this paper, we aimed to develop an evaluation scale of the psychological contract for hospital pharmacists and test the validity and reliability of the scale (the scale can be found in the [appendix](#), both in English and Chinese).

Methods

Study Participants

According to the stratified random sampling method, 77 public hospitals at different levels in Zunyi City, China were included in this study. The investigation was carried out from July to September 2018. Pharmacists were invited to participate in an anonymous survey by cluster sampling for each medical institution. Inclusion criteria were 1) a pharmacist qualification certificate, 2) a background in pharmacy and currently working in a pharmacy, and 3) voluntary participation. Pharmacists who were trainees at the institutions were excluded.

Evaluation Tools

The preliminary draft of the hospital pharmacist psychological contract scale was developed by referring to some content in similar scales used for doctors in public hospitals,²⁷ with changes according to professional characteristics of hospital pharmacists after consulting five specialists in the area of hospital pharmacy. The final draft was formed based on the survey feedback conducted at three hospitals. The scale consists of four sub-scales: Pharmacist Basic Information Questionnaire (including 10 items), Hospital Responsibility Questionnaire (17 items), Pharmacist Responsibility Questionnaire (14 items) and Government/Society Responsibility Questionnaire (9 items). There are a total of 50 items in the entire questionnaire. The following seven-level scoring system was adopted in the 3 responsibility questionnaires (a higher score from 0 to 6 means that a perceived responsibility has been better fulfilled in the pharmacists' perception): "Not the responsibility of the hospital or pharmacist" (0), "the responsibility has not totally been fulfilled" (1), "the responsibility has basically not been fulfilled" (2), "a small part of the responsibility has been fulfilled" (3), "half of the responsibility has been fulfilled" (4), "most of the responsibility has been fulfilled" (5), and "all the responsibility has been fulfilled" (6).²⁸

Statistical Analysis

Epidata 3.1 and SPSS (IBM Statistical Product and Service Solutions) 18.0 were used for data entry and statistical analysis. Both reliability and validity analysis was conducted. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy value was used to judge the number of factors extracted, validity of the dimensions were investigated with exploratory factor analysis. The principal component analysis and varimax rotation methods were used to identify the factor structure.²⁹ Reliability analysis was carried out to verify internal consistency among items of the scale by using Cronbach's alpha coefficient and half coefficient.^{30,31}

Results

606 respondents' questionnaires were collected from 77 medical institutions and evaluated. The demographics of pharmacists are listed in [Table 1](#).

Validity Analysis

Before the exploratory factor analysis, KMO measurement, and the Bartlett spherical test were conducted. The exploratory factor analysis showed that the KMO values of hospital responsibility, pharmacist responsibility, and government/society responsibility were 0.957, 0.930 and 0.917, respectively, all greater than 0.6. The significant probability of the Bartlett spherical test was 0.000, which indicated that factor analysis could be carried out. The explanatory rates of the cumulative variance of hospital responsibility, pharmacist responsibility, and government/society responsibility were 78.406% ([Table 2](#)), 73.451% ([Table 2](#)), and 75.779% ([Table 2](#)), respectively, all greater than 60%, indicating that the analysis results were reliable.

The factor load coefficients of a hospital, pharmacists, and government/society responsibility that pharmacists perceived were 0.515 to 0.839 ([Table 3](#)), 0.434 to 0.815 ([Table 4](#)) and 0.474 to 0.889 ([Table 5](#)), respectively, all greater than 0.4. The sub-scales of hospital and pharmacists' responsibility both included four dimensions: transaction, development, cooperation, and concept responsibility. As shown in [Table 3](#), items 1 to 4, items 5 to 9, items 10 to 12 and items 15 to 17 represent transaction, development, cooperation, and concept responsibility of the hospital perceived by pharmacists, respectively.

Table 1 Pharmacist Demographic Data

Variables		n	Percentage (%)
Sex	Male	228	37.6
	Female	378	62.4
Age	19–29	261	43.1
	30–40	228	37.6
	41–51	82	13.5
	52–62	35	5.8
Professional title	Assistant pharmacist	149	24.6
	Pharmacist	326	53.8
	Pharmacist in charge	110	18.2
	Associate chief pharmacist	16	2.6
	Chief pharmacist	5	0.8
Education	Technical secondary school	56	9.2
	Two (or three) year college	166	27.4
	Undergraduate	343	56.6
	Graduate or above	41	6.8
Marital status	Married	445	73.4
	Unmarried	151	24.9
	Divorce or widowhood	10	1.7
Mode of appointment	Permanent post	326	53.8
	Temporary post	280	46.2
Job type	Clinical pharmacist	63	10.4
	Inpatient pharmacist	146	24.1
	Outpatient pharmacist	387	63.9
	PIVAS ^a pharmacist	10	1.7
Monthly salary (CNY) ^b	<2000	41	6.8
	2000–4000	256	42.2
	4000–6000	230	38
	>6000	79	13
Hospital grade	Grade III Level A hospital	93	15.3
	Grade III Level B hospital	148	24.4
	Grade II Level A hospital	286	47.2
	Grade II Level B hospital	15	2.8
	Grade I hospital	64	10.6

(Continued)

Table 1 (Continued).

Variables		n	Percentage (%)
Employment length (years)	1–5	256	42.2
	6–10	172	28.4
	11–15	41	6.8
	16–20	46	7.6
	21–25	26	4.3
	26–30	37	6.1
	>30	28	4.6

Abbreviations: PIVAS^a, pharmacy intravenous admixture services; CNY^b, Chinese Yuan.

Items 1 to 4, items 5 to 9, items 10 to 12 and items 15 to 17 in [Table 4](#) represent transaction, development, cooperation, and concept responsibility of hospital pharmacists perceived by themselves, respectively. The sub-scale of government/society responsibility included two dimensions: government responsibility and society responsibility in pharmacists' perception. Nomenclature and meaning of the factors are listed in [Table 6](#).

Taking the results mentioned above together, the contents of the questionnaire had good structural validity. This scale can be used to assess the psychological contract of hospital pharmacists.

Reliability Analysis

The results showed that the Cronbach's alpha coefficient for hospital responsibility was 0.961, with half confidence of 0.924 and 0.951 ([Table 7](#)); the Cronbach's alpha coefficient for pharmacists responsibility was 0.908, with half confidence of 0.823 and 0.882 ([Table 8](#)); and Cronbach's alpha coefficient for government/society responsibility was 0.934, with half confidence of 0.879 and 0.932 ([Table 9](#)), indicating good internal consistency among items in the scale.

The Psychological Contract Scores of the Included Hospital Pharmacists

According to the questionnaire survey results, the average total score of psychological contract of the included pharmacists was 4.85 ± 0.785 with the average scores of the pharmacist responsibility, the hospital responsibility and the government/society responsibility in the pharmacists' perception of 5.42 ± 0.637 , 4.64 ± 1.069 and 4.49 ± 1.134 , respectively. The score of the pharmacist responsibility was higher than those of the hospital responsibility and the government/society responsibility and differences between them were both statistically significant ($P < 0.01$). In each dimension, the average score of the hospitals' transaction, development, cooperation and concept responsibility was 4.91 ± 1.046 , 4.53 ± 1.200 , 4.71 ± 1.231 and 4.48 ± 1.250 , respectively; the average score of the pharmacists' transaction, development, cooperation and concept responsibility was 5.58 ± 0.722 , 4.96 ± 0.976 , 5.62 ± 0.608 and 5.44 ± 1.134 , respectively; and the differences between scores of a corresponding dimension were all statistically significant ($P < 0.01$).

Discussion

In many parts of the world, the importance of pharmacists in providing patient care has been emphasized with the new roles and responsibility patterns. Pharmacists have become active participants in primary health care, providing medication and chronic disease management services.^{32–34} The hospital pharmacists' medication intervention on patients has been proved effective in reducing the incidence of irrational medication and adverse drug reactions in hospitals, improving the utilization of medical resources, and exerting a positive impact on the health of patients.^{19,20,35} Many studies have focused on the transformation of pharmacists from traditional practices to patient-centered care practices.^{36–38} However, despite these positive changes, many hospital pharmacists,

Table 2 KMO Measurement in Psychological Contract and Bartlett Spherical Test

Validity Test	Hospital Responsibility in Psychological Contract	Pharmacist Responsibility in Psychological Contract	Government/Society Responsibility in Psychological Contract
KMO sample measure	0.957	0.930	0.917
Approximate chi-square	9343.729	5174.563	4426.007
Degree of freedom	136	91	36
Significant probability	0.000	0.000	0.000
Cumulative (%)	78.406	73.451	75.779

Table 3 Exploratory Factor Analysis of Hospital Responsibility in the Psychological Contract

Factor	Item	Factor Load					Mean±SD
		Factor 1	Factor 2	Factor 3	Factor 4		
Transaction	1		0.606				0.40±0.23
	2		0.839				0.38±0.31
	3		0.810				0.37±0.30
	4		0.720				0.33±0.32
Development	5			0.760			0.35±0.29
	6			0.748			0.39±0.24
	7			0.550			0.35±0.31
	8			0.515			0.32±0.32
	9			0.627			0.37±0.28
Cooperation	10	0.599					0.35±0.26
	11	0.785					0.32±0.35
	12	0.803					0.32±0.38
Concept	13				0.808		0.32±0.35
	14				0.754		0.38±0.28
	15				0.750		0.41±0.24
	16				0.781		0.38±0.27
	17				0.771		0.38±0.26

especially in developing countries, are still ambiguous in their self-worth for the lack of clinical experience and recognition in their work.³⁹ It has been shown that hospital pharmacists and their work were neglected because of the imperfection of hospital policy on pharmacist

licensing, outdated management concepts, insufficient attention from hospital leaders, and lack of public awareness to hospital pharmacy.⁴⁰ With the deepening of the medical system reform, the challenges facing hospital pharmacists are becoming increasingly complex. While

Table 4 Exploratory Factor Analysis of Pharmacists' Responsibilities in the Psychological Contract

Factor	Item	Factor Load					Mean±SD
		Factor 1	Factor 2	Factor 3	Factor 4		
Transaction	1	0.815					0.31±0.35
	2	0.773					0.35±0.30
	3	0.759					0.33±0.31
	4	0.674					0.32±0.27
Development	5			0.619			0.37±0.26
	6			0.528			0.37±0.24
	7			0.872			0.26±0.41
Cooperation	8				0.865		0.36±0.34
	9				0.434		0.38±0.23
	10				0.558		0.35±0.23
Concept	11		0.657				0.36±0.24
	12		0.847				0.33±0.35
	13		0.808				0.35±0.32
	14		0.501				0.35±0.20

Table 5 Exploratory Factor Analysis of Government/Society Responsibilities in Psychological Contract

Factor	Item	Factor Load		
		Factor 1	Factor 2	Mean±SD
Government	1		0.834	0.52±0.44
	2		0.806	0.57±0.33
	3		0.679	0.56±0.17
	4		0.743	0.58±0.23
	5		0.552	0.49±0.09
	6		0.474	0.44±0.05
Society	7	0.866		0.59±0.38
	8	0.889		0.60±0.41
	9	0.843		0.58±0.37

we attach importance to the completion of work tasks and work quality, we need to understand the value of psychological fulfillment. Closer attention should be paid to the psychological needs of hospital pharmacists. Unfortunately, there has been no report on the professional management of hospital pharmacists based on the psychological contract within the scope of the literature we have reached. The current researches on the psychological contract of medical staff were almost all aimed at doctors or nurses.

Although not rigorous enough, our work is still a meaningful pioneering research attempt on the psychological contract of hospital pharmacists. The psychological contract scale for hospital pharmacists was designed according to the professional characteristics of hospital pharmacists in China by referring to the structure and some contents in similar scales used for doctors in public hospitals.²⁷ The quality of the scale was improved through expert consultation and small sample investigation. The exploratory factor analysis and the internal consistency test showed that the psychological contract scale for hospital pharmacists had good reliability and validity. In addition, the factor load coefficients of the scale are all greater than 0.4; most of them greater than 0.7, indicating that the items can represent the related factors. The explanatory rates of the cumulative variance of the three sub-scales are all higher than 60%, indicating that the items of the scale were reliable. The selected hospitals involved multiple subtypes and levels of hospitals in Zunyi city, allowing a sufficient and representative sample size for Zunyi and similar cities. Based on empirical research, it is confirmed that the psychological contract scale for hospital

Table 6 Nomenclature and Meaning of Factors

Factor	Definition
Hospital transaction responsibility	To provide pharmacists with essential working conditions and economic benefits
Pharmacist transaction responsibility	Comply with the rules and regulations of the hospital, obey the management of the hospital, and complete their work
Hospital development responsibility	To provide resource guaranteed for pharmacists' self-development, actively guide and feedback pharmacists' work, and stimulate their strengths and potentials
Pharmacist development responsibility	To improve its serviceability, work performance and scientific research ability, strive to improve its professional level and promote the development of work.
Hospital cooperation responsibility	Create an organizational atmosphere, promote cooperation within pharmacist's hospitals, and provide a harmonious and friendly working atmosphere, so that pharmacists can be supported and recognized.
Pharmacist cooperation responsibility	Actively maintain a close relationship with the organization and create a good atmosphere in the hospital
Hospital concept responsibility	Hospital's efforts for pharmacists to achieve the mission of medical institutions
Pharmacist concept responsibility	Pharmacists defend the concept of the organization, consistent with the recognition of organizational value, and actively contribute to the mission of pharmacist's medical institutions.
Government/society responsibility	Government/society responsibility perceived by pharmacists

pharmacists designed by this research has good reliability and validity. It provides a good tool for researchers and administrators in the hospital pharmacy area to conduct evaluation, maintenance and management of a hospital pharmacist psychological contract. Psychological contracts can provide a valid and reliable tool for hospital pharmacy management to understand the material and intangible needs of hospital pharmacists. Through these results, individualized management can be tailored to each hospital pharmacist for more effective management, improved occupational health and better performance.

From the comparison of scores the three subscales of the psychological contract scale of pharmacists at different

Table 7 Reliability Test for Hospital Responsibility in Psychological Contract

Test Results			Item	Corrected Item-Total Correlation	Cronbach's Alpha After Item Deletion
Psychological Contract $\alpha = 0.961$	Half confidence $\alpha 1 = 0.924$ $\alpha 2 = 0.951$	Transaction $\alpha = 0.884$	1	0.573	0.962
			2	0.694	0.960
			3	0.712	0.960
			4	0.725	0.960
		Development $\alpha = 0.897$	5	0.682	0.961
			6	0.699	0.960
			7	0.815	0.958
			8	0.776	0.959
			9	0.796	0.959
		Cooperation $\alpha = 0.906$	10	0.792	0.959
			11	0.803	0.958
			12	0.818	0.958
		Concept $\alpha = 0.933$	13	0.762	0.959
			14	0.807	0.958
			15	0.787	0.959
			16	0.803	0.958
			17	0.810	0.958

levels of hospitals in Zunyi City included in this study, among the hospital responsibility, the pharmacist responsibility and government/society responsibility, the score of the pharmacist's own responsibility was higher than the scores of hospital responsibility and the government/society responsibility. This indicates that the hospital pharmacists generally believe that they fulfill their responsibilities perceived by themselves to a high degree, and that hospitals

and government/society have not fully fulfilled the responsibilities perceived by the hospital pharmacists compared to the contributions of the pharmacists. This result is basically consistent with the previous survey results for nurses and doctors.^{26,41,42} The persistence of this situation will lead to psychological contract problems and job burnout for the pharmacists. Among them, in terms of hospital responsibility, the score of conceptual responsibility is lower than

Table 8 Reliability Test for Pharmacists' Responsibility in Psychological Contract

Test Results			Item	Corrected Item-Total Correlation	Cronbach's Alpha After Item Deletion
Psychological Contract $\alpha = 0.908$	Half confidence $\alpha 1 = 0.823$ $\alpha 2 = 0.882$	Transaction $\alpha = 0.865$	1	0.673	0.899
			2	0.737	0.897
			3	0.710	0.899
			4	0.672	0.899
		Development $\alpha = 0.676$	5	0.685	0.898
			6	0.718	0.897
			7	0.304	0.929
		Cooperation $\alpha = 0.784$	8	0.558	0.903
			9	0.749	0.898
			10	0.644	0.901
		Concept $\alpha = 0.850$	11	0.710	0.898
			12	0.623	0.901
			13	0.653	0.900
			14	0.705	0.898

Table 9 Reliability Test for Government/Society Responsibility in Psychological Contract

Test Results			Item	Corrected Item-Total Correlation	Cronbach's Alpha After Item Deletion
Psychological Contract $\alpha = 0.934$	Half confidence $\alpha_1 = 0.879$ $\alpha_2 = 0.932$	Government $\alpha = 0.899$	1	0.654	0.934
			2	0.739	0.927
			3	0.731	0.928
			4	0.754	0.926
			5	0.717	0.929
			6	0.813	0.923
	Society $\alpha = 0.934$	7	0.802	0.924	
		8	0.816	0.923	
		9	0.786	0.925	

those of other dimensions, indicating that the pharmacists are less satisfied with the hospital's attention to the career planning and professional value of pharmacists. This may be related to the significant gap between hospital administrators and pharmacists in the understanding of the professional mission and philosophy of the hospital pharmacy; in terms of pharmacist's responsibility, the scores of conceptual responsibility and development responsibility are lower than those of other dimensions, suggesting that the recognition and behavior of the hospital pharmacists on "defending the hospital mission and continuously improving their own abilities in scientific research and pharmaceutical service" need to be improved; in terms of government/society responsibility, the score of "giving pharmacists due social status and respect" is generally low, thus obtaining social recognition and enhancing self-worth are what pharmacists desire most.

Limitations and Considerations on Future Research

The content of psychological contract of hospital pharmacists in different regions may vary and change with time, thus, the scope of the sample should be expanded and more research may still be needed to improve the dimensions and/or items of the scale for future research. Since there is currently no research on scales related to pharmacist psychological contract, exploratory factor analysis is used to study the theory of internal structure first, and confirmatory structural analysis will be used for subsequent analysis in following research. In addition, because pharmacists working in hospitals of different levels may face different requirements and challenges, we will conduct separate studies for pharmacists working in hospitals of different levels and propose effective intervention plans

for the hospital pharmacists' psychological contract related issues.

Conclusion

The psychological contract scale for hospital pharmacists was developed and validated through literature research, expert consultation, small sample pre-investigation, repeated revisions and empirical research. With good reliability and validity, the scale can be used as a useful tool for researchers and administrators in the area related to hospital pharmacy management to objectively evaluate the quality of the psychological contract of hospital pharmacists. Hospital pharmacists generally believe that hospitals and government/society have not fully fulfilled the responsibilities perceived by the hospital pharmacists. The psychological contract of the hospital pharmacists needs certain timely maintenance and moderate intervention. Hospitals, governments, and relevant parties in society need to make effective efforts to enhance the social identity and professional value of hospital pharmacists.

Ethical Approval

The study was approved by the Medical Ethics Committee of Zunyi Medical University (ZMCER[2018]1-153). Through the explanation letter at the front of the questionnaire and the explanation work at the investigation site, all the pharmacists involved in the investigation clearly understood the purpose of the study. Participation in the study was voluntary and anonymous. Written informed consent was obtained.

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Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed on the journal to which the article will be submitted; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Disclosure

The authors have declared no potential conflicts of interest.

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