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RESEARCH

Validation of a coping scale in the context of the SARS-CoV2 pandemic

Validación de una escala de afrontamiento en el contexto de la pandemia por SARS-CoV2

Validação de uma escala de enfrentamento no contexto da pandemia SARS-CoV2

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Abstract

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Introduction: Coping is a relevant psychological construct in situations where there is ongoing danger, such as occurs in the context of the SARS-CoV2 pandemic both in Mexico and in the world. However, there are no specific scales to measure and study coping in this global health situation. **Objective:** Adapt and validate a scale to measure coping with the risk of infection in a sample of Mexican adults during the SARS-CoV2 pandemic confinement. **Methodology:** Instrumental study, in which a sample of 1132 participants was used. The scale was adapted and submitted to expert judgment to adapt its items to the context and situation of the SARS CoV2 pandemic. The psychometric analyses were carried out using exploratory and confirmatory factor analysis techniques, invariance, and reliability tests. **Results:** The exploratory factor analysis allowed finding a structure with three factors corresponding to active coping strategies, emotion-focused passive coping, and cognition-focused passive coping. The confirmatory factor analysis allowed proving the adequate adjustment of the data to the proposed structure, as well as its invariance. The reliability values found were also adequate ω = .80, .70 and .70, respectively. **Conclusions:** The SARS-CoV2 coping strategies scale has a three-factor structure and adequate reliability to characterize coping styles in the face of pandemics such as SARS-CoV2.

Key words: Coping; SARS-CoV2; Measurement; Scale; Validation (DeCS).

Resumen

Introducción: El afrontamiento es un constructo psicológico relevante en situaciones en las que existe un peligro continuado, tal como ocurre en el contexto de la pandemia por SARS-CoV2 en México y el mundo. **Objetivo:** Adaptar y validar una escala para medir el afrontamiento frente al riesgo de infección en una muestra de adultos mexicanos durante el confinamiento por la pandemia por la SARS-CoV2. **Metodología:** estudio de tipo instrumental, en una muestra no probabilística de 1132 participantes mexicanos, mayores de 18 años que aceptaran participar por medio de una encuesta en línea previo consentimiento informado. Se recolectaron datos sociodemográficos y aplicación de Escala de afrontamiento frente a COVID-19, la cual fue sometida a jueceo de expertos para adaptación al contexto y situación de pandemia por SARS CoV2. Todos los procedimientos fueron aprobados por un comité de ética. Los análisis psicométricos fueron mediante técnicas de análisis factorial exploratorio, confirmatorio, pruebas de invarianza y confiabilidad. **Resultados:** El análisis factorial exploratorio permitió encontrar una estructura con tres factores que corresponden con estrategias de afrontamiento activo, afrontamiento pasivo centrado en la emoción, y afrontamiento pasivo centrado en la cognición. El análisis factorial confirmatorio permitió comprobar el adecuado ajuste de los datos a la estructura propuesta, así como su invarianza. Los valores de confiabilidad encontrados resultaron adecuados con ω= 0,80, 0,70 y 0,70 respectivamente. **Conclusión:** La escala de estrategias de afrontamiento ante SARS-CoV2 presenta una estructura de tres factores y una adecuada confiabilidad que permiten caracterizar los estilos de afrontamiento ante pandemias como la de SARS-CoV2.

Palabras clave: Afrontamiento; SARS-CoV2; Medición; Escala; Validación (DeCS).

Abstrato

Introdução: O enfrentamento é uma construção psicológica relevante em situações de perigo permanente, como acontece no contexto da pandemia de SARS-CoV2 no México e no mundo. No entanto, não existem escalas de mensuração específicas para medir e estudar o enfrentamento nessa situação de saúde global. **Objetivo:** Adaptar e validar uma escala para medir o enfrentamento do risco de infecção em uma amostra de adultos mexicanos durante o confinamento devido à pandemia de SARS-CoV2. **Metodologia:** Estudo do tipo instrumental, no qual foi utilizada uma amostra de 1132 participantes. A escala foi adaptada e submetida ao julgamento de especialistas para adequar seus reagentes ao contexto e situação da pandemia de SARS CoV2. As análises psicométricas foram realizadas por meio de técnicas de análise fatorial exploratória e confirmatória, testes de invariância e confiabilidade. **Resultados:** A análise fatorial exploratória permitiu encontrar uma estrutura com três fatores que correspondem às estratégias de enfrentamento ativo, enfrentamento passivo focado na emoção e enfrentamento passivo focado na cognição. A análise fatorial confirmatória permitiu verificar o ajuste adequado dos dados à estrutura proposta, bem como sua invariância. Os valores de confiabilidade encontrados também foram adequados ω= 0,80, 0,70 e 0,70 respectivamente. **Conclusão:** A escala de estratégias de enfrentamento para SARS-CoV2 possui características psicométricas adequadas e pode ser utilizada em estudos e para verificar a eficácia de abordagens terapêuticas, diagnósticos e avaliações.

Palavras-chave: Enfrentamento; SARS-CoV2; Adaptação; Test; Validade (DeCS).

Introduction

The term coping refers to the cognitive and behavioral efforts a subject makes to manage environmental demands that he or she has cognitively appraised as surplus or threatening [(1)]. In general, coping is divided into two: action-directed coping, consisting of behaviors aimed at modifying the problem, and emotion-directed coping, which refers to the implementation of actions to regulate emotional responses derived from the problem or threat [(2)]. In nursing theory, a difference is made between effective and ineffective coping, based on the idea that the former leads to adaptation of the subject and the latter does not [(3)].

Coping is the result of a learning process resulting from the interaction between the subject and his or her environment, and it may be considered adaptive when its implementation succeeds in reducing stress levels [(4)]. Therefore, each stressful situation will be faced by the subject according to his

learning experiences and the environmental, instrumental and personal possibilities he has to cope with the demands of the environment [1,5,6].

Currently, the SARS-CoV2 (Severe Acute Respiratory Syndrome Coronavirus 2) pandemic causing COVID 19 (Coronavirus Disease 2019) has brought about important global changes that may persist long after the pandemic [7]. As of January 2022, there were nearly 5 million reported cases and more than 300 thousand deaths from this disease in Mexico [8]. In addition, after the onset of the pandemic, people have had the need to change their daily lives to comply with isolation and social distancing in order to prevent contagion, which leads humans to face new stressors on a daily basis.

In addition, the way of coping with stressors during the pandemic is a fundamental aspect not only for the process of adaptation of the subject to the environment, but also constitutes a way of contributing to community well-being, since it could be associated with compliance with public health guidelines. In this regard, several studies have addressed coping and its relationship to health behaviors, well-being and quality of life in the context of the pandemic, using adapted versions of assessment instruments, for example: Carver, et al. Coping Behavior Questionnaire (COPE) [9], which was used by Savitsky, et al. [10]; Carver's Brief COPE [11] used in the research of Babore, et al. [12], MacIntyre, et al. [13], Mella-Morambuena, et al. [14], Park, et al. [15]; Prentice, et al. [9] and Umucuy and Lee [16]. Moreover, the revised Ways of Coping in the versions of Folkman and Lazarus [17] and Folkman, et al. [18], has been used in the study of Ye, et al. [19] and the Brief Resilient Coping Scale (BRCS) of Sinclair and Wallston [20] in the research of Rahman, et al. [21]. In all cases, the researchers have used these stress coping scales in the context of the isolation and social distancing inherent to the health emergency, but the procedures for adaptation and validation of these instruments have not been published. Furthermore, none of these instruments originally measured a subject's cognitive and behavioral efforts to cope with stressful situations in a pandemic context, and to our knowledge, there is a need for adapted and validated instruments to measure stress coping during a health emergency.

The Extreme Risk Coping Scale of López-Vázquez and Marván [22] is a validated instrument in Mexico whose purpose is to evaluate the coping modes in people exposed to environmental and industrial risks, which was constructed based on the Classical Theory of Tests and has been used in multiple researches in the Mexican context [23,24], but it is not specifically adapted for nursing or for situations such as the SARS-CoV2 pandemic. For nursing, the study of stress and its coping show growing importance, since it is well known that these phenomena are associated with psychophysiological and social responses that meddle with the subject's adaptation to his or her environment. Likewise, it is important to have valid scales to assess the outcome of counseling and education actions for patients and, also, in the context of prevention and care. Therefore, the aim of this study was to adapt and validate the scale to measure coping with the risk of infection in a sample of Mexican adults during the SARS-CoV2 pandemic confinement.

Methodology

Instrumental type study [25]. A non-probabilistic sample of 1132 persons was obtained. The inclusion criteria were: being Mexican, being over 18 years of age, and agreeing to participate in the study through informed consent. Data from participants who did not complete the questionnaires were excluded from the study. Only 59 of the original 1191 participants were excluded for this reason.

A sociodemographic survey was used as an instrument that included the variables age, gender, level of schooling, main activity, number of people with whom the patient lives, income level, current health status, and illness. The COVID-19 coping scale, adapted from the Extreme Risk Coping Scale [22]. The original scale was developed based on the theory of Folkman, et al. [18], to evaluate coping styles related to extreme risks in different scenarios. The scale consists of 26 Likert-type items that are divided into two subscales: active coping (14 items), with a reliability α=0.83, and passive coping (12 items), with a reliability α=0.77. The items are scored on a scale from 1 to 5 according to the

level of agreement with the statements made. For this research, the scale was adapted by two psychologists who are researchers in health psychology and coping styles, so that it can be used to assess coping with stress during the SARS CoV2 pandemic quarantine. The adaptation was carried out in accordance with current guidelines (request for permission to use the instrument from the authors, review of construct relevance, linguistic correction and practical adaptation, and determination of psychometric properties) [26]. Three independent psychologists assessed the wording, content and possible bias of the scale items, adjusting them to the characteristics of the population.

In the procedure, all participants had access to an informed consent in digital format in which the objective of the study was explained and that participation would be voluntary, confidential, free of charge and that they would not receive any direct benefit for answering the questionnaires. In addition, at the end of the study, the e-mail address of those in charge of the study was provided so that they could contact them in case they considered it necessary, as well as a directory of health institutions where they could access free psychological care in case it is required by them. The ethical aspects of this study were reviewed and approved by a research committee with registration number CA-UV-509. The invitation was disseminated through social networks such as Facebook and Instagram using an infographic highlighting the main objectives of the invitation and a link was included to access the survey on the Google Forms platform. This work was carried out between April 15 and 30, 2020.

The data analysis allowed us to perform the discriminative power by comparing the first and fourth quartile scores for each item [27]. The results of the Shapiro-Wilk test [28] determined that the scores of the items did not conform to a normal distribution ($p<0.05$ for all cases). The extraction method used in the exploratory factor analysis (EFA) was unweighted least squares extraction and orthogonal Varimax rotation. The fit of the data to the factor structure obtained was checked using the

confirmatory factor analysis (CFA) technique. Data fit was assessed using the comparative fit indices (CFI), root mean squared error of approximation (RMSEA) and standardized root mean square residual (SRMR) [29]. The degree of invariance of the items according to gender, age and disease status was assessed [30].

Results

The sociodemographic data show that 76.7% of the respondents were female, 73.9% were married 63.8% had a bachelor's degree or higher. 50.4 % were employed and 57.8 % considered their health status to be good. On average, participants reported living with 3 people, (Table 1).

Table 1. Sociodemographic characteristics of the sample, 2020 (n=1132).

Variables	n (%)
Gender	
Male	264 (23.3)
Female	868 (76.7)
Marital status	
Married	836 (73.9)
Single	296 (26.1)
Maximum degree of studies	
Elementary	3 (0.3)
Junior high	37 (3.3)
High school	371 (32.7)
Undergraduate	441 (39)
Master's degree	278 (24.6)
PhD	2 (0.2)
Occupation	
Student	300 (26.5)
Housewife	76 (6.7)
Employee	570 (50.4)
Informally employed	135 (1.9)
unemployed	51 (4.5)
What happened to your income during the pandemic:	
Increased	42 (3.7)
Remained unchanged	554 (48.9)
Decreased	536 (47.3)
Health status	
Excellent	144 (12.7)
Good	654 (57.8)
Acceptable	303 (26.8)
Bad	28 (2.5)

Very bad	3 (0.3)
Illnesses	
No	785 (69.3)
Chronic degenerative	243 (21.5)
Addiction	34 (3.0)
Infectious	2 (0.2)
Multiple	68 (0.6)

Source: Own development.

In the construct validity through EFA, it was obtained that the determinant of the correlation matrix (0.001), the Kaiser-Meyer-Olkin coefficient (0.866) and Bartlett's test of Sphericity (X^2= 3785.4; p<0.001) allowed determining that the correlation matrix of the scale is factorizable and has adequate levels of common variance to use the EFA technique. In the first rounds of EFA, items 1 to 5, 11, 16, 21 and 24 were eliminated from the original list because they had a factor loading of less than 0.40. In subsequent rounds, items 22 (because they had factor loadings <0.40 on more than one factor), 12, 18 and 26 (because they loaded on factors with less than three items each) were removed, thus obtaining the final factor structure (Table 2).

Table 2. Covid-19 Coping Scale. Factor structure, 2020. (n=1132)

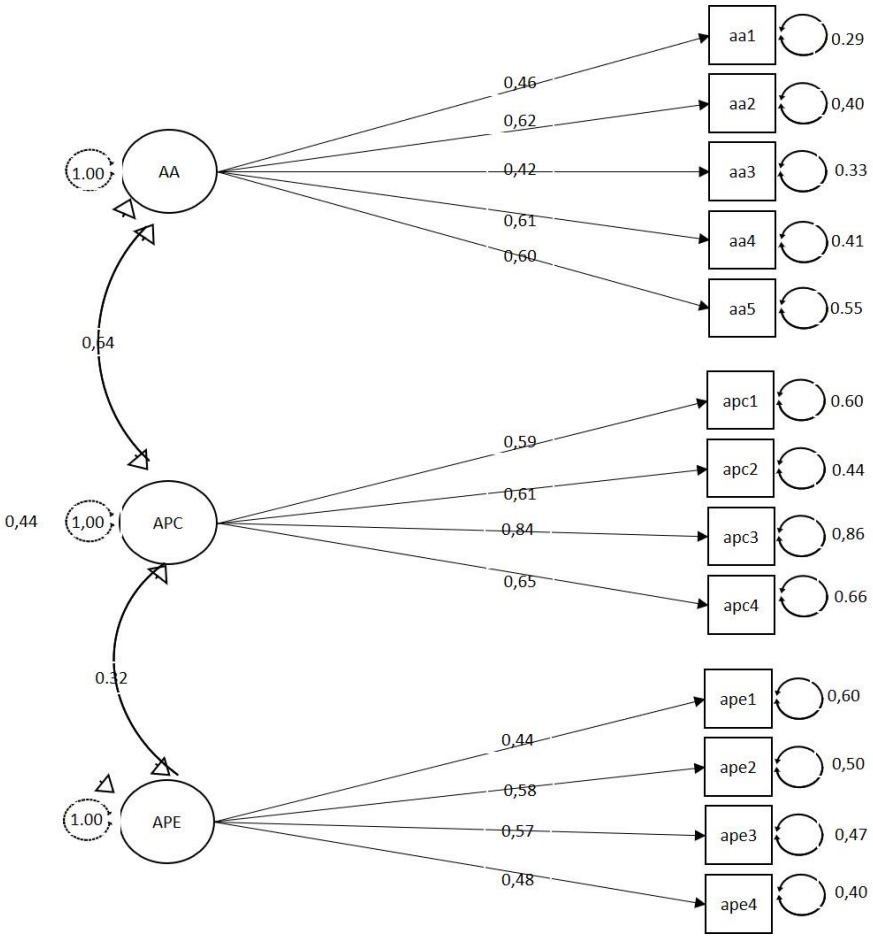
Items	Factorial loads		
	1	**2**	**3**
Factor 1. Active coping			
1. I deal with the problems that stress me out.	.753		
2. I make changes in my life to deal with stress.	.747		
3. I do what I can to solve problems quickly	.671		
4. I actively control my environment	.453		
5. I follow the recommendations of experts (doctors, nurses, etc.).	.437		
Factor 2. Cognition-focused Passive Coping			
6. I share ideas with others		.708	
7. I frequently reflect on the risks involved in the epidemic.		.637	
8. I have talked to doctors and other health specialists		.498	
9. I seek information from reliable sources about the epidemic and its risks		.405	
Factor 3. Emotion-focused Passive Coping			
10. I make jokes and try to laugh			.705
11. I try to do things to distract myself			.622
12. I try to control my emotions			.576
13. I try to stay calm and think about taking care of myself			.437

Source: Own development.

The content of the three factors corresponds to the theory of Lazarus and Folkman [1], and are: Active Coping (5 items), Cognition-focused Passive Coping (4 items), and Emotion-focused Passive Coping (4 items).

When construct validity was performed, the model obtained was confirmed by means of CFA. The factor loadings and model parameters are shown in Figure 1. The fit indices were: CFI = 0.956; RMSEA = 0.053 (CI 90: 0.047 - 0.060), Hoelter= 352 and SRMR = 0.059, which correspond to a good degree of fit of the data to the model. Figure 1 shows the factor loadings and model parameters.

Figure 1. Factor structure of the COVID-19 coping scale showing factor loadings and error variances



Source: Own development. AA: Active coping, APC: Cognition-focused Passive Coping, APE: Emotion-focused Passive Coping.

The reliability coefficients found were, for the Active Coping dimension, ω= 0.80; for the Cognition-focused Passive Coping subscale, ω= 0.70, and for Emotion-focused Passive Coping, ω= 0.70.

Table 3 shows the fit indices and invariance analyses by sex, age, and presence of disease. The change in the fit indices (ΔCFI, ΔRMSEA, and ΔSRMR) did not exceed the accepted critical value of 0.01 in any case [31]. The successive restriction of the factor loadings (metric invariance), the equality of the intercepts (scalar invariance) and the equality of the residuals (strict invariance) provide strong indications regarding the invariance of the measures obtained with the scale, when considering age (younger and older than 40 years), gender and the presence or absence of diseases.

Table 3. Adjustment indexes and invariance assessment, 2020 (n=1132).

	CFI	RMSEA (CI 90%)	SRMR	ΔCFI	ΔRMSEA (CI 90%)	ΔSRMR
Gender						
Configurational	.965	.049 (.041-.056)	.061			
Metric	.959	.050 (.043-.057)	.064	-.006	.001	.003
Scalar	.958	.049 (.042-.056)	.061	-.001	-.001	-.003
Strict	.954	.049 (.043-.056)	.064	-.002	.000	.003
Age (>40)						
Configurational	.958	.052 (.045-.059)	.064			
Metric	.958	.051 (.044-.058)	.065	.000	-.001	.001
Scalar	.953	.052 (.045-.058)	.063	-.005	.001	-.002
Strict	.947	.053 (.046-.059)	.070	-.006	.002	.007
Illness presence						
Configurational	.963	.050 (.043-.057)	.062			
Metric	.962	.048 (.041-.056)	.065	-.001	-.002	.003
Scalar	.961	.047 (.040-0.54)	.060	-.001	-.001	-.005
Strict	.962	.045 (.038-.052)	.062	.001	-.002	.002

Source: Own development.

Discussion

Based on the objective of adapting and validating the scale to measure coping with the risk of infection in a sample of adults during the COVID 19 pandemic confinement, it has been possible to identify that the adapted version of the scale shows adequate levels of reliability and a clear and interpretable factorial structure, similar to that proposed by the theoretical approach of Lazarus and Folkman [(1)]: Active coping (5 items), which are strategies oriented to perform concrete actions to prevent SARS CoV2 infection; cognition-focused passive coping with four items, which includes strategies focused on cognitive reworking and acquisition of knowledge related to the pandemic, without involving direct actions to reduce the risk; and emotion-focused passive coping with four 4 items that are strategies focused on managing emotions and stress during the pandemic. One of its most important characteristics is that, unlike other instruments that have been used to evaluate coping during the SARS COV2 pandemic, its items are specifically adapted to reflect situations specific to this context; that is, in situations where social isolation and distancing are necessary to contain the spread of the virus [(8)]. Since no similar specific scales have been found, it is not possible to compare their structure and properties with those of other instruments.

According to Callista Roy's Adaptation Model [(6)], people learn throughout life habitual reactions to given stimuli, which may or may not be adaptive. When they are adaptive, they produce growth, development, skills and transformation. In this sense, the validation of a questionnaire that measures coping allows a reliable assessment of the ways in which an individual copes with the demands of the environment [(1-2)]. For nurses, the instrument presented here is a tool that can help to better understand how people cope with stressful situations and which strategies are most adaptive. In addition, it can help develop and test theories about how coping in the context of a

pandemic influences adaptation to the health-illness process, and thus the instrument can serve as a basis for understanding the care needs of individuals and communities.

In fact, the factorial structure found reflects differences with the instrument on which it is based, since the passive coping subscale has been subdivided into two dimensions whose content reflects a cognitive and an emotional component. This is of great relevance, as it allows us to recognize whether the efforts aimed at regulating the unpleasant emotions experienced by stress are managed through reflection on the stressful situation (in the case of passive cognitive coping) or whether there is a greater tendency to prevent negative feelings (passive emotion coping).

This novel capability of a psychometric instrument that identifies avoidance or escape from unpleasant private events in one of its dimensions has notable implications for the understanding of experiential stress evasion, e.g., a specific form of coping manifested through the subject's unwillingness to contact unpleasant emotions and feelings arising from environmental demands and a tendency to attempt to alter the form or frequency of these emotions [32]. Analyzing in detail the reactions of a subject in the context of a health emergency facilitates the possibilities of creating intervention plans adapted to contextual needs and promoting adaptation processes to adjust to new situations and challenges.

In this study it was necessary to remove half of the items from the original scale, despite the fact that its language and the situations it reflects were adapted to the context of the SARS CoV2 pandemic. The elimination or modification of items is due to sociocultural differences that influence the way in which stress and its coping is manifested in the subjects [33]. In this regard, the items excluded, due to their low factor load, could reflect coping strategies that are not very relevant in the context of the pandemic, or less appropriate to the sociocultural characteristics of the population surveyed. In addition to its psychometric advantages, the scale presents invariance properties that allow it to be used in populations with different distributions of sex, age or

comorbidity conditions. Finally, as can be seen, the theoretical bases of the present work are centered on both Callista Roy's Adaptation Model and Lazarus and Folkman's Transactional Stress Theory. Both models emphasize the importance of adaptation in the response to environmental demands. In Lazarus' theory, adaptation is achieved through cognitive appraisal and coping strategies, whereas, in Roy's model, adaptation is the result of the interaction between the individual and his or her environment, and is measured in terms of integrity and operation. However, both models emphasize the importance of individual perception in the experience and management of stress. Thus, the questionnaire presented in this paper can be used for the assessment of coping strategies proposed by Lazarus and Folkman to identify and address factors of the cognitive and role systems described in Roy's coping model.

The results of this study should be interpreted in the context of its limitations. Although the sample size allows adequate statistical power to be obtained, due to the limitations imposed by the pandemic it was necessary to resort to electronic application formats and social networks, which could reduce the scope and representativeness of the data obtained, since it was only possible to obtain information from people who had access to the corresponding devices and social networks, despite the wide age spectrum of the respondents, the data obtained may not be representative of the general population. In addition, given that it was an open survey disseminated through social networks, it was not possible to corroborate that all participants met the inclusion criteria (being Mexican and of legal age).

Although data regarding the reduction of social desirability bias in studies using online surveys is available[34], in the context of the current pandemic, evidence has been found on the impact of desirability on the self-report of behaviors considered socially correct [35], and it is likely that coping is affected by this situation. Future studies should also consider the cultural aspects that not only model stress coping behavior, but also those that constitute socially accepted behavior.

Conclusions

The scale can be used for investigative or intervention purposes, as it has been used for such objectives in other studies. As a valid and reliable measure, it can be used in investigation projects related to the SARS CoV2 pandemic, since its questions were specifically adapted to the situations and resources available to individuals in this context.

It can also be used to identify the coping styles of individuals, as well as to establish baselines and assess the effectiveness of interventions to modify coping styles in individuals and their health needs, as it has been seen that the effects of the pandemic on mental health can have detrimental consequences at both the individual and societal levels. Interventions that contribute to improve coping styles can support the adaptation processes for individuals, as well as for the health professional to know the characteristics of their patients.

Ultimately, although the instrument presented in this article is designed based on Lazarus and Folkman's Transactional Stress Theory, we propose that it be used by nurses within the context of Callista Roy's Coping Model to enrich the study of coping processes. By bringing these perspectives together, health and research professionals can work together to develop more effective interventions and strategies to help people cope with and overcome challenges in their lives.

Conflict of interests

Authors stated that there is no conflict of interest.

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