

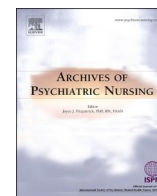


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## The association of gratitude with perceived stress among nurses in Korea during COVID-19 outbreak

Ju-Yeon Lee<sup>a,b</sup>, Mina Kim<sup>b</sup>, Min Jhon<sup>a</sup>, Honey Kim<sup>a</sup>, Hee-Ju Kang<sup>a</sup>, Seunghyong Ryu<sup>a</sup>,  
Jae-Min Kim<sup>a</sup>, Sung-Wan Kim<sup>a,b,\*</sup>

<sup>a</sup> Department of Psychiatry, Chonnam National University Medical School, Gwangju, Republic of Korea

<sup>b</sup> Gwang-ju Mental Health Commission, Gwangju, Republic of Korea

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## ABSTRACT

**Background:** During the COVID-19 pandemic, nurses might experience added emotional stress. This study examined the relationship between gratitude and psychological stress to explore effective psychological support among nurses.

**Methods:** A cross-sectional survey assessed the level of psychological distress in 646 nurses in Gwangju, South Korea, using the Perceived Stress Scale-10 (PSS-10), Gratitude Questionnaire-6 (K-GQ-6), Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), and Maslach Burnout Inventory-General Survey (MBI-GS). Sociodemographic factors and COVID-19-related experiences were also examined. A linear regression model was used to determine the factors influencing perceived stress.

**Results:** The mean PSS-10 score was  $19.0 \pm 4.4$ . Linear regression analyses revealed that the MBI-GS-Exhaustion, PHQ-9, and GAD-7 scores were positively associated with perceived stress, while the MBI-GS-Professional efficacy score was inversely associated with perceived stress. Gratitude disposition using the K-GQ-6 score negatively predicted PSS-10 ( $\beta = 0.829, p < 0.001$ ).

**Conclusions:** Psychological interventions that help cultivate gratitude and professional efficacy among nurses can help promote stress resilience throughout the course of the COVID-19 pandemic.

## Introduction

COVID-19 has caused serious health problems worldwide, including increased mental health burdens in healthcare workers. Up to 80% of healthcare workers (depending on region) have reported high levels of perceived stress (Preti et al., 2020). Healthcare workers, particularly nurses, are at risk for developing psychological distress as a result of direct contact with patients and the increasing work demand during the pandemic (Lai et al., 2020; Rossi et al., 2020). Nurses have the highest levels of distress compared to other healthcare workers when exposed to infectious diseases (Lai et al., 2020). Healthcare workers report higher mental health stress during the COVID-19 pandemic (Yuan et al., 2020). Job burnout in nurses can develop following exposure to work-related stress, which can negatively affect the quality and safety of patient care (Yuan et al., 2020). Stress is an important risk factor for mental disorders, which would also increase the risk for infection (Cattaneo & Riva, 2016; Liao et al., 2017). Therefore, it is paramount to identify the

factors contributing to psychological stress in nurses.

Factors known to protect against stress among healthcare workers during the pandemic include personal variables, such as coping strategies, which indicate resilience for mental health outcomes (Carmassi et al., 2020). However, few studies have examined gratitude and stress among nurses during this pandemic. Gratitude is about realizing benefit from others and being thankful for it, which may help address perceived stress and life dissatisfaction (Kim, 2019; Yildirim & Alanazi, 2018). Gratitude was identified as a positive coping mechanism that can promote mental health following a stressful event (Vieselmeyer et al., 2016). In particular, a previous investigation showed that gratitude was a protective factor against perceived stress among workers at the epicenters of traumatic events, such as firefighters (Lee et al., 2018). The lack of psychological resources could lead to perceived stress of nurses and may have increased their vulnerability to COVID-19. Therefore, this study examined factors associated with perceived stress and the associations between gratitude and psychological stress among Korean

\* Corresponding author at: Department of Psychiatry, Chonnam National University Medical School, 42 Jebong-ro, Dong-gu, Gwangju 501–746, Republic of Korea.  
E-mail address: [swkim@chonnam.ac.kr](mailto:swkim@chonnam.ac.kr) (S.-W. Kim).

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nurses during the COVID-19 pandemic.

## Methods

### Study design, participants, and ethics

A cross-sectional survey was conducted at three nationally designated hospitals in South Korea during the period from April 2 to 10, 2020. The study schedule included the data collection period. The first COVID-19 patient was reported in Korea in January 2020. Early in the COVID-19 outbreak in Korea, 74.9% of all confirmed cases were concentrated in Daegu. Nationwide, the number of confirmed cases increased rapidly in early April 2020 (Suppl. Fig. 1). Although the three hospitals participating in the study were not located in Daegu, which was at the center of the Korean COVID-19 outbreak, they were reclassified as nationally designated hospitals at the time of the study for community confirmed patients. Furthermore, at the time of the study, the government additionally transferred many patients with mild symptoms from Daegu for treatment and quarantine at the three hospitals to help alleviate hospital bed shortages (Kim, Park, et al., 2020).

For the study, 669 nurses working in the three hospitals were sent a self-administered questionnaire. The 646 (96.6%) nurses who completed the questionnaire were included in our analyses; the other 23 nurses had incomplete responses. Informed consent was obtained from all subjects before participation in the study. The study was approved by the Institutional Review Board of Chonnam National University Hospital (Approval number: CNUH-2020-103).

### Measures

Sociodemographic data consisted of sex, age, marital status, religion, education, career, department, and working position. The experiences associated with COVID-19 were also obtained. COVID-19-related work included caring for patients or participating in screening at the participating hospitals. Using a questionnaire that we developed to investigate the psychosocial experiences and distress associated with COVID-19 (Kim, Park, et al., 2020), we examined the factors ‘fear of COVID-19 infection’ and ‘fear of blame for COVID-19 infection.’

Perceived stress was measured using the Perceived Stress Scale (PSS)-10, which consists of 10 items about specific feelings experienced in the last month (Lee et al., 2012). Respondents are asked to rate the items on a 5-point Likert scale with higher scores indicating greater psychological stress. Gratitude disposition was measured using the Korean version of the Gratitude Questionnaire-6 (K-GQ-6), which consists of six items measuring gratitude on a 7-point Likert scale. Total scores range from 6 to 42, with high scores indicating higher levels of grateful disposition (Kwon et al., 2006). The Patient Health Questionnaire-9 (PHQ-9) was used to measure the severity of self-reported depression. The total score ranges from 0 to 27, with a higher score indicating greater self-reported depression (Park et al., 2010). Anxiety was measured using the Generalized Anxiety Disorder-7 (GAD-7). GAD-7 consists of seven items pertaining to GAD according to the DSM-IV criteria. Each item of GAD-7 asks about anxiety symptoms during the preceding 2 weeks and is rated on a 4-point scale (from 0 to 3). The total score ranges from 0 to 21 and higher scores reflect greater anxiety. The Korean version of the GAD-7 has been validated (Seo et al., 2014). Burnout was measured using the Maslach Burnout Inventory-General Survey (MBI-GS), which consists of five questions on exhaustion, four on cynicism, and six on professional efficacy. Each is rated on a 7-point scale (0–6 points) (Shin, 2003). The degree of burnout is determined to be higher when the scores for exhaustion and cynicism are high and the score for professional efficacy is low.

### Statistical analyses

The mean scores for the individual variables for perceived stress

were compared using independent *t*-tests for binomial variables and analysis of variance (ANOVA) for multinomial variables. Pearson's correlation coefficients were used to evaluate relationships among continuous variables. Stepwise regression analyses were used to predict perceived stress. The Statistical Package for the Social Sciences for Windows ver. 21.0 (SPSS, Chicago, IL, USA) was used to conduct the statistical tests. All statistical tests were two tailed and *p*-values <0.05 were deemed to indicate statistical significance.

## Results

Of the 646 nurses, 94.7% were female and 67.5% were single. Their mean age was  $31.5 \pm 7.2$  years. Among the participants, 117 (18.3%) had direct experience with COVID-related work. Table 1 shows the PSS-10 and K-GQ-6 scores according to the participants' characteristics. The mean PSS-10 and K-GQ-6 scores in this study was  $19.0 \pm 4.4$  and  $30.6 \pm 5.8$ , respectively. There were significant differences in the mean PSS-10 scores according to sex, age, marital status, education, department, and working position. No significant difference in PSS-10 scores was noted among the nurses for COVID-19-related variables.

Table 2 shows the correlations among the various scales. The mean scores of the exhaustion, cynicism, and professional efficacy dimensions of the MBI-GS were  $21.7 \pm 7.7$ ,  $12.8 \pm 5.5$ , and  $26.6 \pm 6.7$ , respectively. The mean PHQ-9 and GAD-7 scores were  $4.6 \pm 4.8$  and  $2.2 \pm 3.4$ , respectively. The PSS-10 score was significantly correlated with the MBI-GS exhaustion and cynicism subscales and the PHQ-9 and GAD-7 scores, and negatively correlated with the MBI-GS professional efficacy and K-GQ-6. The PSS-10 score was significantly correlated with fear of COVID-19 infection and fear of blame for COVID-19 infection.

As seen in Table 3, sociodemographic variables explained 3.9% ( $p = 0.001$ ) of the variance in PSS scores. After entering the clinical variables including MBI-GS, PHQ-9, and GAD-7 in Step 2, the total variance explained by the model was 48.1% ( $p < 0.001$ ). The fear of COVID-19 infection and fear of blame for COVID-19 infection explained an additional 0.6% of the variance in the PSS-10 score, after controlling for sociodemographic and clinical variables. In the final model, the MBI-GS exhaustion subscale ( $\beta = 0.829$ ,  $p < 0.001$ ), PHQ-9 ( $\beta = 0.829$ ,  $p < 0.001$ ), and GAD-7 ( $\beta = 0.829$ ,  $p < 0.001$ ) scores positively predicted PSS-10, whereas the MBI-GS professional efficacy subscale ( $\beta = 0.829$ ,  $p < 0.001$ ) and K-GQ-6 ( $\beta = 0.829$ ,  $p < 0.001$ ) score negatively predicted PSS-10.

## Discussion

This is among the first studies to address the psychological stress of nurses during the COVID-19 pandemic in South Korea. According to the World Health Organization, the COVID-19 pandemic has both long- and short-term impacts on mental health (WHO, 2020). Therefore, our study is meaningful in identifying factors related to the stress among nurses, particularly in the early stages of an epidemic. This information may provide evidence of early preventive psychological interventions that help nurses cope with stress throughout an epidemic.

In this study, the mean PSS score was  $19.0 \pm 4.4$  (moderate self-perceived stress), which was about the same level as in frontline nurses treating COVID-19 in Wuhan, China ( $19.3 \pm 7.0$ ) (Leng et al., 2020), and in Medina, Saudi Arabia (19.1) (Pasay-An, 2020). We found that the stress level was higher in nurses who worked in the emergency room, which is consistent with a previous study (Cui et al., 2020). Emergency room nurses in tertiary care hospitals have an additional workload related to identifying suspected COVID-19 patients and are likely to come into contact with confirmed patients as gatekeepers to the healthcare system, which leads to high stress. However, the stress level was lower than the level (range 22–24) reported in a recent Italian study of nurses involved in the care of COVID-19 patients in the immediate wake of the epidemic (Rossi et al., 2020). The variation in the stress score might be due to the diversity of healthcare system backgrounds

**Table 1**  
Comparisons of the scores on the perceived stress and gratitude according to participants' sociodemographic and clinical characteristics (n = 646).

Characteristics	N (%)	PSS-10			K-GQ-6		
		Mean ± SD	t or F	p	Mean ± SD	t or F	p
Gender							
Male	34 (5.3)	17.41 ± 4.30	-2.123	0.035	30.71 ± 4.5	0.131	0.868
Female	612 (94.7)	19.04 ± 4.39					
Age							
20-29 <sup>a</sup>	352 (54.5)	19.39 ± 4.21	6.427	<0.001	29.61 ± 5.29	17.096	<0.001
30-39 <sup>b</sup>	200 (31.0)	18.73 ± 4.65					
40-49 <sup>c</sup>	70 (10.8)	18.63 ± 3.78					
≥50 <sup>d</sup>	24 (3.7)	15.54 ± 4.99					
Marital status							
Single	435 (67.5)	19.32 ± 4.25	3.064	0.002	29.69 ± 5.61	-5.584	<0.001
Married	209 (32.5)	18.20 ± 4.60					
Religion							
No	391 (61.1)	19.02 ± 4.45	0.369	0.692	29.78 ± 5.67	-4.330	<0.001
Yes	250 (38.9)	18.88 ± 4.22					
Education							
Bachelor	540 (83.6)	19.16 ± 4.28	2.590	0.010	30.05 ± 5.60	-5.175	<0.001
Masters and above	106 (16.4)	17.95 ± 4.87					
Career, year							
<5	290 (44.9)	19.22 ± 4.20	1.362	0.174	29.48 ± 5.23	-4.308	<0.001
≥5	456 (55.1)	18.75 ± 4.55					
Department							
Internal medicine <sup>a</sup>	183 (29.1)	19.10 ± 4.53	4.790	<0.001	30.43 ± 5.89	3.372	0.003
Surgical <sup>b</sup>	174 (27.7)	18.43 ± 4.33					
Gynecology-Obstetrics <sup>c</sup>	14 (2.2)	19.00 ± 4.80					
Operating room <sup>d</sup>	3.9 (4.0)	20.08 ± 2.90					
Emergency <sup>e</sup>	29 (4.6)	22.62 ± 3.91					
Intensive care units <sup>f</sup>	155 (24.6)	18.90 ± 3.94					
Other healthcare services <sup>g</sup>	49 (7.8)	17.73 ± 5.66					
(e > a,b,f,g)							
Working position							
Charge nurse	61 (9.4)	17.74 ± 4.45	-2.289	0.022	34.51 ± 6.62	5.657	<0.001
Service nurse	585 (90.6)	19.09 ± 4.38					
COVID-19 related work							
No	523 (81.7)	19.05 ± 4.43	0.996	0.320	30.31 ± 5.86	-3.195	0.001
Yes	117 (18.3)	18.60 ± 4.35					
COVID-19 test status							
No	626 (97.8)	18.93 ± 4.42	1.193	0.233	30.64 ± 5.84	0.412	0.681
Yes	14 (2.2)	20.36 ± 3.97					
Self-isolation by COVID-19							
No	633 (98.9)	18.95 ± 4.41	0.623	0.533	30.62 ± 5.83	1.139	0.255
Yes	7 (1.1)	20.00 ± 4.58					
Others (family or acquaintance) quarantine or confirmed by COVID-19							
No	621 (97.3)	18.98 ± 4.42	-0.423	0.672	30.64 ± 5.86	0.328	0.743
Yes	17 (2.7)	18.53 ± 4.27					

PSS-10: Perceived Stress Scale-10, K-GQ-6: Gratitude Questionnaire-6.

**Table 2**  
Pearson's correlation coefficients among the scores on psychiatric scales and questionnaires.

Variable	1	2	3	4	5	6	7	8	9
1. PSS-10	1								
2. MBI-GS-Exhaustion	0.587***	1							
3. MBI-GS-Cynicism	0.541***	0.705***	1						
4. MBI-GS-Professional efficacy	-0.122**	0.198**	-0.044	1					
5. PHQ-9	0.486**	0.479**	0.508***	0.012	1				
6. GAD-7	0.426**	0.393**	0.406***	0.079*	0.670***	1			
7. Fear of COVID-19 infection	0.225**	0.272**	0.188**	0.166***	0.248***	0.286***	1		
8. Fear of blame for COVID-19 infection	0.258**	0.277**	0.194**	0.062	0.198***	0.211***	0.711***	1	
9. GQ-6	-0.419***	-0.283***	-0.452***	0.320***	-0.310***	-0.273***	0.019	-0.104**	1

PSS-10: Perceived Stress Scale-10, MBI-GS: Maslach Burnout Inventory-General Survey, PHQ-9: Patient Health Questionnaire, GAD-7: Generalized Anxiety disorder-7, K-GQ-6: Gratitude Questionnaire-6.

\* p < 0.05.

\*\* p < 0.01

\*\*\* p < 0.001.

and different evaluation periods, so it may be difficult to compare the scores directly.

In our study there were no differences in stress level depending on whether the participants worked on the frontline, unlike a recent study that found that frontline healthcare workers reported higher stress

(Khamis et al., 2020). Furthermore, the PSS-10 score in our study was similar to the score of 20.6 assessed in a validation study that assessed Korean female nurses during ordinary times (Lee et al., 2012). The stress level in this study was also similar to that of the general population (19.0 ± 4.8) evaluated at a similar time point. A recent study reported

**Table 3**  
Stepwise multiple regression analyses of variables predicting the Perceived Stress Scale-10 score.

	Model 1	Model 2	Model 3	Model 4
Gender (female vs. male)	0.098*	0.009	−0.008	−0.005
Age (20–29 years vs. others)	−0.136	−0.030	−0.031	−0.032
Marital status (single vs. married)	−0.050	−0.061	−0.065	−0.050
Education (bachelor vs. masters and above)	−0.031	−0.017	−0.023	−0.018
Department (internal medicine vs. others)	0.026	0.013	0.018	0.020
Working position (charge vs. service)	−0.016	−0.061	−0.070	−0.078
MBI-GS-Exhaustion		0.481***	0.462***	0.453***
MBI-GS-Cynicism		0.046	0.049	0.002
MBI-GS-Professional efficacy		−0.216***	−0.217***	−0.179***
PHQ-9		0.133**	0.132**	0.125**
GAD-7		0.155***	0.145***	0.122**
Fear of COVID-19 infection			0.011	0.038
Fear of blame for COVID-19 infection			0.078	0.057
K-GQ-6				−0.152***
R <sup>2</sup>	0.039	0.481	0.487	0.502
Adjusted R <sup>2</sup>	0.029	0.471	0.475	0.490
F change	3.929**	98.471***	3.595*	17.447***

PSS-10: Perceived Stress Scale, MBI-GS: Maslach Burnout Inventory-General Survey, PHQ-9: Patient Health Questionnaire, GAD-7: Generalized Anxiety disorder-7, K-GQ-6: Korean Gratitude Questionnaire-6.

- \* p < 0.05.
- \*\* p < 0.01.
- \*\*\* p < 0.001.

that COVID-19 anxiety among frontline nurses was lower than in the general population (Labrague & De Los Santos, 2020), which tends to support our result. We thought that nurses have more knowledge of the nature of COVID-19 and access to more measures to prevent the disease than the general population, so they may tend to cope more positively.

While controlling for sociodemographic and COVID-19-related variables, we found that stress was associated with mental health challenges, particularly burnout, anxiety, and depression. Burnout is a state of emotional exhaustion and negative self-concept resulting in a chronic state of stress at work and dissatisfaction with life (Kelly & Lefton, 2019; Lacy & Chan, 2018). Based on a study during the Middle East Respiratory Syndrome outbreak, nurses tended to develop burnout after a sustained period of exposure to a deteriorating situation (Kang et al., 2018). Due to the nature of nursing work facing unknown disease with a risk of exposure to infection, burnout can increase during the COVID-19 outbreak, which leads to increased stress over time (Maunder et al., 2006). There is evidence that nurses at smaller hospitals who do not do shift work had less exhaustion and greater personal accomplishment. As our subjects worked in a COVID-19-dedicated tertiary hospital, they would experience a heavy workload and increasing demand during the COVID-19 pandemic. Furthermore, our participants were relatively young and less experienced, so they might have less confidence and feeling of professional accomplishment. Consequently, the managers of hospitals should adjust for overload while considering how to prevent exhaustion and building professional efficacy to reduce stress.

We found that perceived stress was significantly associated with the severity of nurses' depression and anxiety, which is consistent with previous findings (Chen et al., 2016; Chen et al., 2020). Many studies have shown that depression and anxiety during an epidemic are common among nurses (Li et al., 2005; Wu et al., 2009). A history of depression and anxiety was also a risk factor for depression and anxiety symptoms in nurses during the COVID-19 outbreak (Zhu et al., 2020). These symptoms may be due to a lack of social support, job stress, social stigma, and other negative experiences related to COVID-19 (Fang et al., 2021; Naushad et al., 2019; Park et al., 2020). A recent meta-analysis

reported that the pooled prevalence of depression and anxiety among healthcare workers during the COVID-19 pandemic was 22.8% and 23.2%, respectively (Pappa et al., 2020). A study in Wuhan, China, documented moderate or worse depression and anxiety in 28.6% of the nursing staff (Kang et al., 2020). The prevalences of depression and anxiety in the present study were lower (19.7% and 8.8%) than in previous studies. A recent study indicated that nursing staff with sub-threshold and mild depression and anxiety may be more likely than those with severe symptoms to be motivated to learn necessary skills (Zheng et al., 2021). These results highlight the need to identify mild symptoms in nurses early and to teach helpful coping skills to adapt in productive ways during an epidemic.

Accordingly, the most noticeable finding of this study was that gratitude as a positive coping disposition significantly predicted lower psychological stress among nurses. This is in line with studies that have shown that gratitude acts independently to protect against stress among emergency service personnel, such as firefighters (Lee et al., 2018). A systematic review reported that maladaptive coping was an important risk factor for developing negative mental health outcomes across all disaster types (Naushad et al., 2019). Gratitude is related to traits such as optimism and adaptive coping is a mechanism through which optimism is related to well-being (Biber et al., 2020). In addition, grateful people were more likely to seek social support, and used coping strategies that were characterized by approaching rather than avoiding the problem. Studies have found evidence that more grateful people may be more resilient following traumatic events, what researchers call 'post-traumatic growth' (Cohen et al., 2015; Kim & Bae, 2019). The COVID-19 pandemic is considered a traumatic event (Dutheil et al., 2020) and the findings highlight the presence of traumatic stress among nurses (Carmassi et al., 2020). Researchers have also found that gratitude may protect against depressive symptoms that may mediate traumatic stress (Van Dusen et al., 2015). Our results suggest that gratitude helps nurses cope with stress and serves to protect against COVID-19-specific trauma by influencing depressive symptoms.

Gratitude is also important for forming and maintaining relationships. Gratitude was strongly related to social bonds and the tendency to behave socially and adapt within an organization (Kim, 2019). Gratitude is also associated with an improved 'relationship with the self' in the form of a more positive way of treating ourselves when things go wrong in life (Petrocchi & Couyoumdjian, 2016). This disposition of gratitude is connected to less self-criticism and more self-reassurance. The COVID-19 pandemic has created significant social stigma, isolation, and self-criticism among nurses, which makes them vulnerable to stress and mental health problems. Therefore, gratitude among nurses may be important coping skill for stress management, not only as a social resource but also for the general appreciation of the positive aspects of one's life.

**Limitations**

Our study had some limitations. First, the cross-sectional nature of the data constrains us from drawing any conclusions about causality among variables. It is necessary to conduct a longitudinal study to understand the psychosocial impact of stress on nurses better. Second, our survey relied only on a self-reported questionnaire, which may lead to a lack of objective data. Third, there is a possibility of multicollinearity among variables, such as perceived stress, burnout, depression, and anxiety. Therefore, it would induce a small amount of bias to curb the effects of small eigenvalues due to multicollinearity. Finally, further research is needed to determine whether gratitude can ameliorate stress and its effects on psychiatric symptoms under the hypothesis that there would be mediating effects between perceived stress, depression, anxiety, and gratitude.

## Conclusions

Our study is the first to show a strong association between gratitude and psychological stress in nurses during the COVID-19 pandemic. As the pandemic becomes more critical with increasing numbers of cases, our findings suggest that a disposition toward gratitude may promote stress resilience and prevent the development of mental health complications among nurses. Therefore, reinforcing positive beliefs, such as gratitude, in nursing programs may have beneficial effects on coping with stress during the COVID-19 pandemic.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.apnu.2021.10.002>.

## Author contributions

Sung-Wan Kim and Ju-Yeon Lee designed the study. Sung-Wan Kim, Ju-Yeon Lee and Mina Kim was analyzed data. Ju-Yeon Lee drafted the manuscript. Seunghyong Ryu and Jae-Min Kim revised the manuscript for intellectual content. Min Jhon, Honey Kim and Hee-Ju Kang have contributed to data collection. All authors read and approved the final version.

## Ethical statement

The study was approved by the Institutional Review Board of Chonnam National University Hospital (CNUH) in Gwangju, South Korea. (CNUH-2020-103).

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## Declaration of competing interest

We declare there is no conflict of interest.

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