COVID-19 and stress: An evaluation using Beck's depression and anxiety inventory among college students and faculty members of Jouf University

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Abstract.
BACKGROUND: Individuals might suffer emotional, psychological, and even bodily challenges as a result of any pandemic. The impact of the COVID-19 outbreak on Saudi Arabian University students and faculty members has received little attention.
OBJECTIVE: To assess stress during the COVID-19 pandemic among university college students and faculty members of Jouf University, KSA and evaluate the impact of socio- demographic factors on anxiety and depression levels.
METHOD: Two hundred and seventeen participants from Jouf University completed an anonymous web-based survey that includes questionnaires about anxiety and depression symptoms. Beck's anxiety inventory (BAI) was used to assess the anxiety levels, and Beck's depression inventory (BDI) was used to determine the depression levels due to COVID 19 pandemic. The research was carried out between April 1, 2020, and June 30, 2020. An ordinal logistic regression analysis was performed to explain the odds of observing anxiety and depression.
RESULTS: For "moderate anxiety" (22–35), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 15$, 65%), Saudis ($n = 14$, 61%), female ($n = 15$, 65%),>3 months ($n = 17$, 74%), and students ($n = 15$, 65%) respectively. For "moderate depression" (21–30), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 10$, 50%), Saudi ($n = 15$, 65%), female ($n = 26$, 65%).>3 months ($n = 13$, 65%), and both students and faculty members, each with an observed frequency of 10 (50%) respectively. Ordinal logistic regression analysis suggested that the observed effects of nationality, gender, and duration spent in lockdown period influenced the anxiety levels among participants.
CONCLUSION: The impact of the lockdown duration was more significant in students than in faculty members and females than in males. Authors recommend the critical need for intervention and prevention strategies to address college students' mental health.

Keywords: Psychological factors, apprehension, sorrow, college students

1. Introduction

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Coronavirus Disease 2019 (COVID-19) is thought to have originated and first detected in Wuhan,

China, in 2019 and spread throughout all geographical areas of the globe except Antarctica [1]. On January 30, 2020, the World Health Organization (WHO) declared the coronavirus outbreak of 2019-20 a Public Health Emergency of International Concern (PHEIC).

Any pandemic can lead to emotional, psychological, and sometimes physical hardships for individuals. The effect of the COVID-19 pandemic on Saudi Arabian university's students and faculty members, on the other hand, has not been well reported. The emotional signs of depression are well-known: grief, irritability, emptiness, and exhaustion. These universal interactions can take over and change the body under certain circumstances, sapping motivation and disturbing sleep, appetite, and focus. Our ability to problem-solve, set and accomplish goals, and work efficiently is harmed by depression. Depression is known as a brain disorder by the general public. Although our genes play a role in how quickly we slip into clinical depression, environmental stress significantly affects most of us. The COVID-19 crises' particular environmental stressors suggest that a relatively large proportion of the population could be depressed. This misery would most likely be spread unequally. Recent studies [11, 12] proposed that lockout, isolation, and pandemic catastrophe affect stress and mental well-being. As per a recent study in Austria, mental health problems are more common as indicated by COVID-19. Compared to pre-corona periods, depressive symptoms are five times more common. The frequency of anxiety symptoms increased by a factor of three in comparison to previous eras [1]. Stress is detrimental to human health if it is not handled correctly, even though it is expected between mind and reality. Some people can tolerate tension, while others do not [13]. People in Nepal and India were in a state of stress during the COVID-19 lockdown, which was particularly bad for low-income people.

Currently, since anxiety and depression are rising in students and faculty members, they constitute a section of the worst-hit population. Anxiety and depression often go concurrently. Many people who have experienced one will be affected by the other at some point in their life. There is no doubt that the students and faculty members were subjected to high stress due to COVID-19 lockdown with resultant high rates of depression and anxiety and endured significant stress trigger every day [10, 14–18]. These can lead to emotional, psychological, and sometimes physical hardships for individuals [19, 20]. The effect of the COVID-19 pandemic on Saudi Arabian university students and faculty members, on the other hand, have not been well reported. The current study was designed to assess stress during the COVID-19 pandemic using Beck's Depression and Anxiety level inventory among university college students and faculty members of Jouf University, Kingdom of Saudi Arabia.

2. Materials and methods

2.1. Ethical consideration

The study received ethical approval from the local committee for bioethics (07-08/41) and followed the 1975 Declaration of Helsinki's ethical guidelines. The volunteers were briefed and clarified the study's objectives before being enrolled, and their informed consent was obtained.

2.2. Study design and sample

The present cross-sectional study was conducted among students and faculty members of allied colleges, Jouf University, Aljouf, Kingdom of Saudi Arabia using stratified random sampling to obtain a fair estimation for the prevalence of stress and associated risk factors. College information and the total number of students and faculty members in each college was acquired. A confidence level of 95% and a margin of error of 5% were used to measure the sample size, which came out to be 220 in total, based on the number of enrolled students and employed faculty members working during this period. The inclusion criteria were; healthy individuals, above the age of 18 years, with no chronic illnesses, no syndromes, or continuous use of medication for anxiety and depression, from both genders. Participants suffering from any serious injury, medical or psychological disorder likely to prevent the completion of the survey, and participants undergoing treatment for psychological disorders were excluded. The research was performed within three months, from April 1, 2020, to June 30, 2020 (the first three months of lockdown).

2.3. Survey

A questionnaire composed of items related to socio-demographic data, medical history, year of study [Students], years of experience [Faculty members], Beck's Depression Inventory (BDI) [21] was

used to determine the extent of depression. Dr Aron T. Beck's anxiety inventory (BAI) was used to assess anxiety levels and ensure accuracy, and the document was translated into Arabic and then back to English. Face validity was certified by two dental faculty members. The questionnaire's test-retest reliability was tested on ten students and faculty members who were not part of the main analysis on two separate days. The questionnaire was then distributed to all students and faculty members of selected colleges with the covering letter of informed consent. The students and faculty members completed the surveys in four weeks. Participation was voluntary, and the responses were kept anonymous; serial numbers replaced names. The responses were coded to maintain the confidentiality of the participants.

The BDI was made up of twenty-one multiple-choice questions with four possible answers graded from zero to three to indicate the severity of the symptoms. It was recognized as one of the most commonly used methods for assessing the magnitude of depression. Normal (1– 10), slight mood disorder (11–16), borderline clinical depression (17–20), moderate depression (21–30), serious depression (31–40), and extreme depression (more than 40). BAI was a twenty-one multiple-choice questions self-report inventory with four possible answers, similar to the BDI, that measured anxiety symptoms. The questions were organized in columns, with the participants being asked to choose the most suitable answer. The BAI scores were divided into three categories: very low anxiety (1–21), moderate anxiety (22–35), and extreme anxiety (more than 35).

2.4. Statistical analysis

The exact Fisher test was conducted to determine whether the characteristics of the participants and the level of anxiety were related to each other. An Ordinal Logistic Regression was used to see if differences in nationality, gender, and lockdown time could explain the odds of observing each anxiety and depression response category.

3. Results

3.1. Socio-demographic characteristics

A total of 217 individuals responded to the online survey. The most frequently observed category of age was 20–30 years ($n = 123$, 57%), of nationality

Table 1
Socio-demographic characteristics of participants ($n = 217$)

Variable	N	%
Age		
20–30	123	56.68
31–40	33	15.21
41–50	48	22.12
51–60	13	5.99
Nationality		
Non-Saudis	92	42.40
Saudis	125	57.60
Gender		
Male	97	44.70
Female	120	55.30
Duration in lockdown period		
1 month	9	4.15
1–2 months	76	35.02
>3 months	132	60.83
Profession		
Students	123	56.68
Faculty members	94	43.32

was Saudi ($n = 125$, 58%), and of gender was female ($n = 120$, 55%). At the time of the survey, most of the participants were under lockdown period greater than three months ($n = 132$, 61%), and most of the data was from the students ($n = 123$, 57%). Frequencies and percentages are shown in Table 1.

3.2. Anxiety levels

The anxiety level based on Beck Anxiety Inventory (BAI) score, for "no anxiety" (0–21), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 105$, 55%), Saudis ($n = 114$, 60%), female ($n = 101$, 53%), >3 months ($n = 112$, 59%) and students ($n = 105$, 55%) respectively. For "moderate anxiety" (22–35), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 15$, 65%), Saudis ($n = 14$, 61%), female ($n = 15$, 65%), >3 months ($n = 17$, 74%),and students ($n = 15$, 65%) respectively. For "potentially concerning levels of anxiety" (36 and above), the most observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 3$, 75%), both Saudi and non-Saudi, each with an observed frequency of 2 (50%), females ($n = 4$, 100%), >3 months ($n = 3$, 75%), and students ($n = 3$, 75%). The most frequently observed category of anxiety level was "no anxiety" ($n = 190$, 87.56%).

To see if participant characteristics and anxiety level were independent, the authors used Fisher's exact test. The results of the Fisher exact test were

Table 2
Association of socio demographic characteristics with different levels of anxiety (n = 217)

Variable	No Anxiety n(%)	Moderate Anxiety n(%)	Potentially concerning levels of anxiety n(%)	p^*
Total	190 (87.56%)	23 (10.60%)	4 (1.84%)	
Age				
20–30	105 (55%)	15 (65%)	3 (75%)	
31–40	32 (17%)	1 (4%)	0 (0%)	.213
41–50	41 (22%)	7 (30%)	0 (0%)	
51–60	12 (6%)	0 (0%)	1 (25%)	
Nationality				
Non-Saudis	76 (40%)	14 (61%)	2 (50%)	.142
Saudis	114 (60%)	9 (39%)	2 (50%)	
Gender				
Male	89 (47%)	8 (35%)	0 (0%)	.136
Female	101 (53%)	15 (65%)	4 (100%)	
Duration in lockdown				
1 month	6 (3%)	3 (13%)	0 (0%)	.037**
1–2 months	72 (38%)	3 (13%)	1 (25%)	
>3 months	112 (59%)	17 (74%)	3 (75%)	

not significant for age, nationality, gender, and profession based on an alpha value of 0.05 suggesting that anxiety level could be independent of these variables ($p > 0.05$). The Fisher exact test yielded significant results for duration spent in lockdown based on an alpha value of 0.05, $p = .037$, suggesting that the time spent in lockdown and anxiety level is related to one another. The proportion of respondents and association of socio-demographic characteristics with different levels of anxiety are presented in Table 2.

3.3. Depression levels

The depression level based on Beck depression Inventory (BDI) score, for "these ups and downs are considered normal" (1–10), the most observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 62$, 51%), non-Saudis ($n = 74$, 61%). Male ($n = 62$, 51%), >3 months ($n = 69$, 57%) and students ($n = 61$, 50%). For "mild mood disturbance" (11–16), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 22$, 55%), non-Saudi ($n = 28$, 70%), male ($n = 62$, 51%). >3 months ($n = 21$, 52%), and students ($n = 23$, 57%) respectively. For "moderate depression" (21–30), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 10$, 50%), Saudi ($n = 15$, 65%), female ($n = 26$, 65%). >3 months ($n = 13$, 65%), and both students and faculty members, each with an observed frequency

of 10 (50%) respectively. For "severe depression" (31–40), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 7$, 100%), non-Saudis ($n = 12$, 60%), female ($n = 5$, 71%), >3 months ($n = 6$, 86%), and students ($n = 7$, 100%) respectively. For "extreme depression" (over 40), the most frequently observed category of age, nationality, gender, duration spent in lockdown and profession was 20–30 years ($n = 5$, 83%). Saudi ($n = 4$, 67%), female ($n = 5$, 83%), >3 months ($n = 4$, 67%), and students ($n = 5$, 83%) respectively. The Fisher exact test results for age and gender were not significant at an alpha value of 0.05, indicating that depression levels may be independent of these variables ($p > 0.05$). The results of the Fisher exact test were significant for nationality, duration spent in lockdown and profession based on an alpha value of $p < 0.05$, suggesting that these variables are related with depression levels. The most frequently observed category of depression level was "These ups and downs are considered normal" ($n = 121$, 55.76%). The proportion of respondents and association of socio-demographic characteristics with different levels of depression presented in Table 3.

3.4. Ordinal logistic regression

According to an Ordinal Logistic Regression, variation in nationality, gender, and lockdown period could explain the odds of observing each response category of anxiety and depression level. The VIFs of all predictors in the regression model were less

Table 3
Association of socio demographic characteristics with different levels of depression ($n = 217$)

Variable	These ups and downs are considered normal n (%)	Mild mood disturbance n (%)	Borderline clinical depression n (%)	Moderate depression n (%)	Severe depression n (%)	Extreme depression n (%)	p^*
Total	121(55.76%)	40(18.43)	23(10.60%)	20(9.22%)	7(3.23%)	6(2.76%)	
Age							
20–30	62 (51%)	22 (55%)	17 (74%)	10 (50%)	7 (100%)	5 (83%)	
31–40	20 (17%)	8 (20%)	1 (4%)	4 (20%)	0 (0%)	0 (0%)	
41–50	28 (23%)	10 (25%)	5 (22%)	5 (25%)	0 (0%)	0 (0%)	.202
51–60	11 (9%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	1 (17%)	
Nationality							
Saudi	47 (39%)	12 (30%)	15 (65%)	8 (40%)	6 (86%)	4 (67%)	.010**
Non-Saudi	74 (61%)	28 (70%)	8 (35%)	12 (60%)	1 (14%)	2 (33%)	
Gender							
Male	62 (51%)	14 (35%)	8 (35%)	10 (50%)	2 (29%)	1 (17%)	.208
Female	59 (49%)	26 (65%)	15 (65%)	10 (50%)	5 (71%)	5 (83%)	
Lockdown							
1 month	3 (2%)	1 (2%)	0 (0%)	3 (15%)	1 (14%)	1 (17%)	.004**
1–2 months	49 (40%)	18 (45%)	4 (17%)	4 (20%)	0 (0%)	1 (17%)	
>3 months	69 (57%)	21 (52%)	19 (83%)	13 (65%)	6 (86%)	4 (67%)	
Profession							
Students	61 (50%)	23 (57%)	17 (74%)	10 (50%)	7 (100%)	5 (83%)	.027**
Faculty members	60 (50%)	17 (42%)	6 (26%)	10 (50%)	0 (0%)	1 (17%)	

*Fisher's exact test **Significant p-value.

Table 4
Variance inflation factors for nationality, gender, and lockdown

Variable	VIF
Nationality	1.09
Gender	1.06
Lockdown	1.10

than 10. Table 4 presents the VIF for each predictor in the model.

The model was evaluated based on an alpha of 0.05. The model results were significant ($p < 0.05$), suggesting the observed effects of nationality, gender, and duration spent in lockdown period on anxiety level were unlikely to occur under the null hypothesis. Therefore, the null hypothesis can be rejected.

The regression coefficient for non-Saudis ($B = -0.53$), female ($B = 0.77$) period of lockdown for 1–2 months ($B = -1.77$), and > 3 months ($B = -0.46$) were not significant, implying that a one-unit increase in the aforementioned variables had no significant effect on the odds of observing a higher anxiety level category. Females had 2.17 times more likely to have anxiety levels in comparison to males as well as participants who have been in lockdown for > 3 months had 70% more likely to have higher anxiety levels than the participants who have been in lockdown for < 3months (Table 5).

The model's findings were also significant in terms of depression levels ($p < 0.001$) suggesting the observed effects of nationality, gender, and lockdown period on depression levels were unlikely to occur under the null hypothesis. The regression coefficient for non-Saudis (and lockdown period of > 3 months was not significant. The regression coefficient was significant for the female gender, signifying that females have increased the odds of observing a higher category of depression level by 83.11%. For a lockdown period of 1–2 months, the regression coefficient was also significant, suggesting that increase in the duration of the lockdown period would decrease the odds of discerning a higher category of depression level by 81.93%. Table 6 summarizes the results of the ordinal regression model for depression level.

4. Discussion

Faculty and college students are a vulnerable demographic when it comes to mental health issues. The implications of this study are focused on the impact of pandemic-related changes on this community's levels of anxiety and depression. Our findings indicate that the COVID-19 pandemic significantly influences several demographic characteristics, such as occupation, ethnicity, gender, and lockdown effects. The current study's findings suggest that a

Table 5
Ordinal logistic regression results for nationality, gender, and lockdown predicting anxiety level

Predictor	SE	χ^2	p	OR	95% CI
(Intercept):1	0.82	2.91	0.088	–	–
(Intercept):2	0.93	13.99	<.001	–	–
Non-Saudis	0.46	1.34	0.246	0.59	[0.24, 1.44]
Female	0.47	2.69	0.101	2.17	[0.86, 5.47]
Lockdown period 1–2 months	0.91	3.79	0.051	0.17	[0.03, 1.01]
Lockdown period > 3 months	0.79	0.35	.556	0.63	[0.13, 2.94]

Table 6
Ordinal logistic regression results for nationality, gender, and lockdown predicting depression level

Predictor	SE	χ^2	p	OR	95% CI
(Intercept):1	0.64	1.55	0.214	–	–
(Intercept):2	0.63	0.02	0.888	–	–
(Intercept):3	0.64	1.58	0.209	–	–
(Intercept):4	0.66	8.16	0.004	–	–
(Intercept):5	0.72	14.23	<0.001	–	–
Non-Saudis	0.28	1.58	0.209	0.70	[0.41, 1.22]
Female	0.28	4.71	0.030	1.83	[1.06, 3.16]
Lockdown period 1–2 months	0.66	6.72	0.010	0.18	[0.05, 0.66]
Lockdown period > 3 months	0.64	1.93	0.164	0.41	[0.12, 1.44]

considerable number of participants were in a state of heightened anxiety and distress due to COVID-19 at the time of online sample interviews amid the pandemic. In addition, BAI outcomes showed moderate levels of anxiety correlated with the length of the lockdown time. This finding is in line with the survey of Wang et al. [22] performed during the COVID-19 pandemic to evaluate the mental health status of college students as well as the severity of depression and anxiety, in an extensive university system of the United States, which reported that the unforeseen duration and severity of the outbreak were the issues that need to be further understood and addressed. BDI outcomes also showed moderate levels of depression associated with race, occupation, and duration of the lockdown period. This is in accordance with a recent COVID-19 study conducted in the United States [23] and a survey conducted in the United Kingdom before COVID-19 [24]. Additionally, in both studies, a standard survey instrument such as the Perceived Stress Scale was used as an interview, allowing participants to read and respond to the ten questions that could have introduced prejudice and resulted in underreporting. Liu et al. [25] found some depression in about 19% of the respondents. In contrast to several recent studies in non-pandemic situations, our findings show a higher percentage of respondents among students with depressive symptoms [26–29]. In another study conducted in Cyprus by Ioulia Solomou and Fofi Constantinidou [30] reported 23.1 percent of respondents had moderate-to-severe anxiety symptoms, and

9.2 percent had moderate-to-severe depression symptoms. Our results showed that the percentage of anxiety and depression levels in university faculty members was comparatively low than the students. This finding was consistent with the Spanish University findings [31], which reported that university staff said lower anxiety scores in all actions than students who appear to have had a significant psychological impact during the first weeks of the COVID-19 lockdown. Having a COVID-19-infected family or companion, on the other hand, is a separate risk factor for anxiety. During epidemics, economic stressors, daily life disruptions, and school disruptions are positively associated with Chinese students' anxiety levels, whereas social reinforcement is negatively related to their anxiety [32].

While most participants were concerned about academic success, nearly half of them reported less stress due to increased academic workloads after the pandemic began. This could be due in part to higher university authorities' decisions to switch to distance learning to relieve students' academic burdens. For instance, this university revised the examination scheme by redistributing the formative assessment share to 80% and summative assessment share to 20% of the total marks for all courses in any given program. In comparison, steps taken by teachers, such as decreased course loads, duties, availability of lecture recordings, and other grading condition allowances, may also have led to stress relaxation or elimination. In particular, e-learning means of teaching and assess-

ment greatly relieved the students relevant to their enrolled courses. Students would appear for formative and summative exams at their convenience on the stated date within 24 hours. While participants returning to their parental home may have been relieved from the stress of traveling, specifically during the pandemic and certain unsuspecting and unidentified disturbances, students may have gained from moral support and encouragement of the family members and decreased social obligations. As a result, the pandemic's increased stress may have been compensated to some extent.

In this study, the female gender was found to increase the odds of experiencing a higher level of depression by 83.11 percent. These findings agree with reports of Ioulia Solomou and Fofi Constantinidou [30]. Women, as expected, reported significantly higher levels of anxiety and depression than men, and there were gender differences in the distribution of symptoms. Many epidemiological types of research would confirm this result, reporting that women are at a greater risk of experiencing anxiety and depression [33, 34]. Therefore, during the pandemic, sex patterns in the spread of symptoms were maintained.

In this study, university students made up a large portion of the younger participants. Another important socio-demographic variable was age, with students aged 20 to 30 exhibiting significantly more mental symptoms than faculty. These findings agree with reports of Ioulia Solomou and Fofi Constantinidou [30], and previous studies have found a negative link between age and anxiety and depression symptoms [35]. While some of the increased symptoms may be due to age (most university students are under the age of 30), the increased negative impact on mental health could be due to abrupt lifestyle changes and disruption of regular social activities. Changes in living arrangements and the impromptu substitution of e-learning for face-to-face classes are two additional stressors. One explanation is that as people get older, their maturity levels rise, allowing them to build resilience through exposure to various stressors over time, resulting in better emotional management and fewer anxiety and depression symptoms [36].

There are some advantages and disadvantages to this research. Using ideal stress and depression assessment tools, the study linked the likelihood of effects of nationality, gender, and lockdown period on anxiety and depression levels. Moreover, this is a preliminary study that provides a once-in-a-lifetime opportunity to explore the psychological resonance of the COVID-19 outbreak in a university setting. It offers valuable information on the status applied to similar circumstances at other universities or in future global crises. First and foremost, this is a cross-sectional study conducted in an unprecedented setting at Jouf university. Longitudinal studies are necessary to confirm the long-term impact of this situation on its member nations' psychological well-being and draw any conclusions about the cause-and-effect relationships between the variables. Second, we only used a single university, Jouf university, to conduct a survey, which may have skewed the results. To extend and generalize the findings, larger-scale surveys should be conducted in Saudi Arabia and other universities.

The study has highlighted the importance of proactively managing the situation strategically to reduce stress and anxiety levels in educational institutions. The study effectively identifies the components that contribute to critical issues, which must be handled during any crisis. The research findings open the door for the researcher to undertake more studies and empirically validate the identified elements. The research has also revealed the tremendous potential for improving methods for dealing with psychological issues. Future scholars are encouraged to test the aspects practically and propose adequate theoretical foundations for dealing with such a pandemic. This study serves as a basis for identifying the most significant elements to consider to overcome the problems encountered during any crisis.

4.1. Limitations

Our research did not show that telerehabilitation, which can be applied via digital tools and effectively reduces depression and anxiety problems in individuals when it is not possible to implement preventive rehabilitation programs in person, effectively reduces possible to implement preventive rehabilitation programs in person, effectively reduces working in this sector to apply suitable strategies to protect people from anxiety and depression during pandemics. Furthermore, it should be mentioned that providing this type of training would be effective in preventing psychological difficulties that may arise in employees working

5. Conclusion

The COVID-19 pandemic negatively impacts higher education due to the ongoing pandemic sit-

uation and ongoing measures such as lock-up and home-stay orders. The findings of our study highlight the critical need for intervention and prevention strategies to address college students' mental health. The impact of the lockdown duration was more significant in students than in faculty members and females than in males. The results of our study may provide support for the implementation of some pandemic well-being interventions. Furthermore, it has policy implications, demonstrating the need for effective mental health programs at the university level to provide timely crisis-oriented psychological services and take preventative action in future pandemic situations, with careful monitoring of mental health in university students.

Conflict of interest

The author declare that there were no disclosed possible conflicts of interest relevant to the research.

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