

The Impact of Quarantine Restrictive Measures on Gifted Students' Academic Achievement and Behavior During COVID-19 Outbreak, in Saudi Arabia: Educational and Psychological Aspects

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ABSTRACT

Background: Quarantine is used worldwide to interfere with COVID-19 transmission. It had a negative effect on the scholastic performance and behavior of regular students.

Objective: The study strived to investigate such parameters on gifted students.

Methods: A self-administered questionnaire was distributed to the parents of 378 gifted students all over Saudi Arabia, through their schools. These students were represented by Mawhiba Foundation, Saudi Arabia.

Results: The findings showed that 70.4 % of the gifted students had an increase in their academic achievement at the end of the second semester. Moreover, 50.3% of the participants had experienced major behavioral changes during quarantine. Also, 56.9% of students suffered from annoying dreams and difficult sleeping. More than half of the participants faced distant learning problems. The correlation analysis indicated a significant and positive correlation between gifted students' academic achievement, entertainment hours, and parenteral help, while it was significant and negative between the academic achievement and the number of sleeping hours.

Conclusion: Quarantine had a great psychological burden on the parents of the gifted students that was reflected on their behavior. However, most students faced different problems during the online distance learning, but their academic achievement had increased that might explain their unique mental ability.

Keywords: Academic performance, Behavioral changes, COVID-19, Gifted students, Quarantine

INTRODUCTION

Quarantine is the isolation and limitation of movement, which could be introduced at a simple level to include an individual or group of peoples such as those exposed during travelling abroad or may extend to include a wider population or geographic-level basis⁽¹⁾.

During COVID-19 outbreak, almost all countries worldwide used quarantine as a tool to control the transmission of the virus⁽²⁾.

Limitations on travel, social constraints, forbidding public meetings, and voluntary home arrest were different forms of the applied quarantine⁽³⁾. Kingdom of Saudi Arabia (KSA) has taken many precautions to cope with this epidemic. KSA announced lockdown and curfew on March 23, 2020 to interfere with the disease cycle⁽⁴⁾.

Social interaction is essential for human psychological development, mental health and creativity of children, in particular⁽⁵⁾. One of the consequences of the current quarantine situation was the suspension of the social and public events and face-to-face learning and academic activities that have great influence on the

physiological aspects of students' life and have given rise to many psychological and educational issues⁽³⁾. To the authors' knowledge, the current study is the first such attempt that was applied on a wide scale of private category of gifted students, Mawhiba students.

Each community determines giftedness according to its needs, interest, values, and culture, which are progressively changing over time⁽⁶⁾. In KSA, the term "gifted" has been applied to anyone who has exceptional academic capabilities and whose needs and educational requirements exceed those available in the regular classrooms⁽⁷⁾.

Gifted education has started since several years and has expanded with the establishment of the King Abdul-Aziz and his Companions Foundation for Giftedness and Creativity (Mawhiba), which supervises the creative and gifted educational program⁽⁸⁾. Mawhiba students are particular sector of students and are provided with several enrichment programs, competitions, in addition to the gifted classes supported by the school partnership that enable these students to enhance their higher thinking and talent⁽⁹⁾.

Therefore, the current study aimed to investigate the putative impact of such quarantine restrictive measures on the behavior changes of Mawhiba students during the lockdown period of COVID-19 crisis (March-May, 2020) and to correlate these changes, if any, with their academic and scholastic achievement. The work included 378 male and female students, selected from Mawhiba institute, KSA as a representative sample of gifted students all over the Kingdom of Saudi Arabia that made our study distinct from other studies ⁽¹⁰⁾ that used a smaller sample.

MATERIAL AND METHODS

The current observational cross-sectional study included children, adolescent, male, and female gifted students in the age range 10-18 years; selected from all KSA gifted students represented by Mawhiba Institute. The minimum sample size (376 male and female students) was determined within ± 0.05 of the total population with a 95% confidence level. The sample size was then increased by 0.5% to account for missing data.

A self-administrated questionnaire was used to collect the data, which was introduced to the students' parents via social media (Whatsapp groups covering at least the calculated sample size 376 students). 378 responses were obtained (100.5%) so, the total number of participants was 378 distributed as 202 males (53.4%) and 176 females (46.6%). For validity of the questionnaire, face to face validation was done. Also, a pilot sample of 36 participants (24 parents, 6 academic experts, and 6 students' teachers) was performed to develop, revise and validate the questionnaire. Furthermore, a biostatistician's view-points were considered during questionnaire preparation. The questionnaire was divided into sections; the first section included demographic data, the second section evaluated the psychological status, and the third one assessed the academic performance of the gifted students quarantined during COVID-19 outbreak in KSA

Ethical considerations:

The proposal of the study was reviewed and approved by the Institutional Review Board (IRB) at King Saud University (Code #: E-20-5623). A front page for informed consent was included in the questionnaire and an opening

sentence showed that they were completely free whether to participate or not in the study. The participants were provided with the option to choose whether to participate by clicking on their answer in the relevant box. After that, the parents were directed, if agreed, to different sections with various questions. The participants were given no motivation of any kind and the data collected was kept secret. Furthermore, participants' confidentiality and anonymity were assured by assigning each participant with a code number for the purpose of analysis only. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

All data obtained were analyzed by a biostatistics expert, using SPSS software, version 24 (IBM SPSS Statistics for Windows, Armonk, NY, USA). Descriptive analysis was performed, which included frequency and percent. Pearson's correlation was used to find the association between variables. P value less than 0.05 was considered statistically significant.

RESULTS

Sociodemographic data (Table 1)

The survey questionnaire was distributed among the 378 gifted students through their schools. The total number of participants who responded were 176 (46.6%) females and 202 (53.4%) males. The participants who responded were exclusively either father or mother of the gifted students (45.5% fathers and 54.5% mothers). Thirty-seven percent (37.6%) of the respondents were bachelor degree holders, twenty-three percent (23.8%) were postgraduate degree holders and the rest (38.6) had only an upper secondary educational level. The majority of the students lived with their both parents (60%) whereas, the remaining samples (40%) lived with the mother alone. In addition, our results show that our sample came from families in which the number of their children varies from one to three (represented by 44.2%) or from four to six (represented by 55.6%). The participants' places of residence were spread over the entire Kingdom of Saudi Arabia.

TABLE 1. Gifted students' sociodemographic characteristics

<i>Sociodemographic Data</i>	Male		Female		Total	
	No	%	No	%	No	%
<i>Gender</i>	202	53.4	176	46.6	378	100
<i>Level of study (Gifted student's school grade)</i>						
Grade 4	39	19.3	41	23.3	80	21.2
Grade 5	11	5.4	0	0	11	2.9
Grade 6	46	22.8	46	26.1	92	24.3
Grade 7	24	11.9	30	17	54	14.3
Grade 8	79	39.1	53	30.2	132	34.9
Grade 12	3	1.5	6	3.4	9	2.4
<i>Your kinship with the gifted student</i>						
Father	119	58.9	53	30.1	172	45.5
Mother	83	41.1	123	69.9	206	54.5
<i>Parent's / legal guardian educational level</i>						
Upper secondary	93	46	53	30.1	146	38.6
Bachelor or equivalent level	55	27.3	87	49.4	142	37.6
Postgraduate	54	26.7	36	20.5	90	23.8
<i>Current status of the gifted student</i>						
Living with father	0	0	0	0	0	0
Living with mother	61	30.2	90	51.1	151	40
Living with father and mother	141	69.8	86	48.9	227	60
<i>Parent's / legal guardian place of residence</i>						
Central Region	26	12.9	35	19.9	61	16.1
Northern Province	39	19.3	25	14.2	64	16.9
Southern Province	91	45	28	15.9	119	31.5
Western Province	20	9.9	58	17	78	20.6
Eastern Province	26	12.9	30	33	56	14.9
<i>Number of children in the family</i>						
1-3	89	44.1	78	44.3	167	44.2
4-6	112	55.4	98	55.7	210	55.6
More than 6	1	0.5	0	0	1	0.2
<i>The order of the gifted student among the sons</i>						
The elder	30	14.9	36	20.5	66	17.5
The middle	114	56.4	92	52.2	206	54.5
The youngest	58	28.7	48	27.3	106	28

The student behavior and coexistence with the family (Table 2):

In this section, the questions are oriented to know the student behavior and coexistence with his / her family before and during the quarantine period related to the COVID-19 disease.

Before the onset of COVID-19 quarantine period:

Only 23% of the all participants have confirmed a troubled family relationship before the confinement period. In fact, this family disagreement is noticed among the families of boys (36.6%) more than the families of girls (8%). Likewise, almost 81% of parents

indicated that their gifted children (100% of female samples and 63.3% of male samples) had no behavioral disorders before the quarantine. Moreover, more than half of the samples (54%) did not have any chronic medical condition. Otherwise, the rest of the gifted students suffered from obesity, chest allergy and some other chronic diseases.

During COVID-19 quarantine period:

Near 42% of the parents had the competent governmental sources as main source of information about COVID-19 outbreak. Social media, families or friends and scientific articles were used by 29.1%,

28.3% and 0.8% of parents. The results show that the majority of male and female parents (67.5%) felt that they provided the gifted student enough information about COVID-19 in a way that suits his age. On the one hand, as an overall, 83.9% of respondents encouraged the gifted student to carry out preventive measures at home. On the other hand, we noticed that this encouragement was higher in the parents of females than in males (96.6% and 72.8% respectively). In addition, all the female gifted students shared recreational activities with their guardians at varying frequencies (often, sometimes) but 43.6% of male students had activities rarely. The data also reflect that seventy-four percent (74%) of the parents of the male gifted students and seventy-one percent (71%) of guardians of the female gifted students suffered from stress during the quarantine period. Concerning the entertainment side during the period of confinement, 78% of children spent between two and four hours in front of screens (TV, tablets, smartphones or video games). Seven percent (7.7%) of

children were only boys who spent between 5 and 7 hours of electronic games. However, there was no gifted student in our samples who spent more than seven hours of entertainment. At the same time, the respondents confirmed that their children slept between four and six hours during this period (44.2 % less than 4 hours and 55.8% from 4 to 6 hours). In the same context, 56.9% of parents also noticed disturbances in the quality of sleep in their gifted children. These disturbances were more accentuated in boys than in girls; difficulty of sleeping was noted in 31.6% of boys and 15.9% of girls.

While, some boys and girls had disturbing dreams, 14.4% and 14.2% respectively. In summary, the parents answered that 50.3% of gifted students had behavioral problems as exorbitant motor fidgeting, aggressiveness towards animals, tantrums, opposing and provocative behaviors throughout the confinement. Nevertheless, an improvement was reported at the end of the quarantine period by 83.6% of participants.

TABLE 2. The gifted student behavior and coexistence with the family during the quarantine period

Survey statement	Male		Female		Total	
	No	%	No	%	No	%
<i>Did you (as a parent/ legal guardian) suffer from stress during the quarantine period?</i>						
Yes	150	74.3	125	71.6	276	73
No	52	25.7	50	28.4	102	27
<i>Does the gifted student have a chronic medical condition? (You can select more than one option)</i>						
Obesity	27	13.4	25	14.2	52	13.8
Diabetes	0	0	0	0	0	0
Chest allergy	14	6.9	53	30.1	67	17.7
Others	49	24.3	6	3.4	55	14.5
None	112	55.4	92	52.3	204	54
<i>How was the family relationship before the quarantine period?</i>						
Good	129	63.9	162	92	291	77
Troubled	73	36.1	14	8	87	23
<i>Did you (as a parent/ legal guardian) suffer from psychological stress during the quarantine period?</i>						
Yes	150	74.3	126	71.6	276	73
No	52	25.7	50	28.4	102	27
<i>Is there any improvement in the family relationship after the quarantine period?</i>						
Yes	202	100	176	100	378	100
No	0	0	0	0	0	0
<i>Did the gifted student have any behavioral disorders (major motor disorder, opposition, provocation, aggression, etc...) prior to the start of the quarantine period?</i>						
Yes	73	36.1	0	0	73	19.3
No	129	63.9	176	100	305	80.7
<i>Your main sources of information about Covid-19 outbreak are:</i>						
Competent government sources (Ministry of Health, Ministry of Interior)	82	40.6	76	43.2	158	41.8
Social media	38	18.8	72	40.9	110	29.1

Survey statement	Male		Female		Total	
	No	%	No	%	No	%
<i>Did you (as a parent/ legal guardian) suffer from stress during the quarantine period?</i>						
Yes	150	74.3	125	71.6	276	73
No	52	25.7	50	28.4	102	27
<i>Does the gifted student have a chronic medical condition? (You can select more than one option)</i>						
Obesity	27	13.4	25	14.2	52	13.8
Diabetes	0	0	0	0	0	0
Chest allergy	14	6.9	53	30.1	67	17.7
Others	49	24.3	6	3.4	55	14.5
None	112	55.4	92	52.3	204	54
<i>How was the family relationship before the quarantine period?</i>						
Good	129	63.9	162	92	291	77
Troubled	73	36.1	14	8	87	23
<i>Did you (as a parent/ legal guardian) suffer from psychological stress during the quarantine period?</i>						
Yes	150	74.3	126	71.6	276	73
No	52	25.7	50	28.4	102	27
(Facebook, Instagram, Twitter, etc...)						
Families / friends	79	39.1	28	15.9	107	28.3
Scientific articles	3	1.5	0	0	3	0.8
<i>Have you provided the gifted student enough information about Covid-19 in a way that suits his age?</i>						
Yes	138	68.3	117	66.5	255	67.5
No	64	31.7	59	33.5	123	32.5
<i>Have you encouraged the gifted student to carry out preventive measures at home? (Disinfection / hand washing, etc...).</i>						
Yes	147	72.8	170	96.6	317	83.9
No	55	27.2	6	3.4	61	16.1
<i>Did you share recreational activities with the gifted student during the quarantine period?</i>						
Yes often	39	19.3	89	50.6	128	33.9
Yes, sometimes	75	37.1	87	49.4	162	42.9
Yes, rarely	88	43.6	0	0	88	23.2
<i>How many hours of entertainment did the gifted student spend in front of the screens during the quarantine period? (TV / computer / tablets / smartphones / video games).</i>						
Less than an hour	51	25.2	0	0	51	13.5
From 2-4 hours	122	60.4	176	100	298	78.8
From 5-7 hours	29	14.4	0	0	29	7.7
More than 7 hours	0	0	0	0	0	0
<i>How many hours does the gifted student sleep before the starting of the quarantine period?</i>						
Less than 4 hours	76	37.6	58	33	134	35.4
From 4-6 hours	126	62.4	118	67	244	64.6
From 7-9 hours	0	0	0	0	0	0
From 10-12 hours	0	0	0	0	0	0
<i>How many hours does the gifted student sleep after the starting of the quarantine period?</i>						
Less than 4 hours	91	45	76	43.2	167	44.2
From 4-6 hours	111	55	100	56.8	211	55.8
From 7-9 hours	0	0	0	0	0	0
From 10-12 hours	0	0	0	0	0	0
<i>Have you noticed sleep disturbances concerning the gifted student during the quarantine period?</i>						

Survey statement	Male		Female		Total	
	No	%	No	%	No	%
<i>Did you (as a parent/ legal guardian) suffer from stress during the quarantine period?</i>						
Yes	150	74.3	125	71.6	276	73
No	52	25.7	50	28.4	102	27
<i>Does the gifted student have a chronic medical condition? (You can select more than one option)</i>						
Obesity	27	13.4	25	14.2	52	13.8
Diabetes	0	0	0	0	0	0
Chest allergy	14	6.9	53	30.1	67	17.7
Others	49	24.3	6	3.4	55	14.5
None	112	55.4	92	52.3	204	54
<i>How was the family relationship before the quarantine period?</i>						
Good	129	63.9	162	92	291	77
Troubled	73	36.1	14	8	87	23
<i>Did you (as a parent/ legal guardian) suffer from psychological stress during the quarantine period?</i>						
Yes	150	74.3	126	71.6	276	73
No	52	25.7	50	28.4	102	27
He / she wakes up very early in the morning	44	21.8	25	14.2	69	18.3
Disturbing dreams	29	14.4	25	14.2	54	14.3
Difficulty of sleeping	64	31.6	28	15.9	92	24.3
Never	65	32.2	98	55.7	163	43.1
<i>Have you noticed behavioral disorders of the gifted student during the quarantine period? (Exorbitant motor fidgeting, aggressiveness towards animals, tantrums, opposing and provocative behaviors).</i>						
Yes	137	67.8	53	30.1	190	50.3
No	65	32.2	123	69.9	188	49.7
<i>Have you noticed any improvement in the gifted student behavior during the quarantine period?</i>						
Yes, all the time	0	0	30	17.1	30	7.9
Yes, near the end of the quarantine period	191	94.6	125	71	316	83.6
No	11	5.4	21	11.9	32	8.5

Academic Achievement (Table 3):

Our samples are known for their excellence in the educational field as we have already pointed out at the beginning of our study; they were gifted students who were listed in an official list of the Saudi Ministry of Education. For that, the impact of the period of quarantine on their academic achievement was not neglected. Indeed, the 378 parents replied that 37.8% of their children have not encountered any problems during online education. The rest of the gifted students had other problems related to the technics (34.9%) and the

non-suitability of the lessons time (27.3%). Moreover, 56.9% of parents declared that their children were independent and did not have help during the online lessons. Lastly, despite of the lifestyle for parents as for their gifted children throughout this period of confinement, the academic achievement level during the second semester, which coincided with the period of quarantine was increased in comparison with the first semester.

TABLE 3. The academic achievement level of the gifted students

Survey statement	Male		Female		Total	
	No	%	No	%	No	%
<i>Has the gifted student experienced any problems with distance learning?</i>						
Technical problems	79	39.1	53	30.1	132	34.9
Lessons time is not suitable	58	28.7	45	25.6	103	27.3
No problems	65	32.2	78	44.3	143	37.8
Others	0	0	0	0	0	0
<i>Did you help the gifted student to get his / her lessons?</i>						
Yes	71	35.1	92	52.3	163	43.1
No	131	64.9	84	47.7	215	56.9
<i>Has the academic achievement level of the gifted student increased at the end of the second semester 2020-2021 (the quarantine period)?</i>						
Yes	140	69.3	126	71.6	266	70.4
No	62	30.7	50	28.4	112	29.6

Regression analysis (Table 4 and Table 5):

Some multiple regressions are presented in the following tables (4 and 5). Our results show a significant and negative correlation between the improvement in the attitude of the gifted child at the end of the quarantine period and the stress that their parents suffered during that same period. The more the stress was managed, the more the child showed an improvement in his behavior. The statistical analysis also showed a significant and positive correlation between the improvement of the behavior of the child during COVID-19 curfew period

and the educational level of the legal guardian living with him. It was also observed that a significant and negative correlation was noted concerning the quantity and the quality of information provided by the parents about COVID-19 to these children qualified as gifted. In other hand, the academic achievement of the gifted student was significant and negatively correlated with the student's sleeping hours. Also, the correlation between the academic performance and the gifted child's entertainment hours and the parental help to get the lessons were significant and positive.

TABLE 4. The correlation between the improvement in gifted student behavior during the quarantine period and parenteral education, stress, and students' information

		Have you provided the gifted student enough information about Covid-19 in a way that suits his age?	Did you (as a parent/ legal guardian) suffer from stress during the quarantine period?	Parent's / legal guardian educational level
Have you noticed any improvement in the gifted student behavior during the quarantine period?	Pearson Correlation	-0.009	-0.449	0.523
	P	0.86	0.05	0.05
	N	378	378	378
Have you noticed sleep disturbances concerning the gifted student during the quarantine period	Pearson Correlation	0.135	0.449	-0.310
	P	0.008	0.05	0.05
	N	378	378	378

TABLE 5. The correlation between the academic achievement at the end of the second semester 2020-2021 (online semester in the quarantine period) and parenteral help, sleep hours, entertainment hours, and problems of distant learning

		Did you help the gifted student to get his / her lessons?	How many hours does the gifted student sleep after the starting of the quarantine period?	How many hours of entertainment did the gifted student spend in front of the screens during the quarantine period? (TV / computer / tablets / smartphones / video games).	Has the gifted student experienced any problems with distance learning?
Has the academic achievement level of the gifted student increased at the end of the second semester 2020-2021 (the quarantine period)?	Pearson Correlation	0.565	-0.122	0.168	-0.355
	P	0.05	0.017	0.05	0.05
	N	378	378	378	378

DISCUSSION

The current study has investigated the effect of COVID-19 precipitated-quarantine on this private sector of students, gifted students. The sample size used here was unique and representative to the gifted population all over the Kingdom of Saudi Arabia that can made the current study distinct from other studies that used a smaller sample as done by **Aboud** ⁽¹⁰⁾. Various sociodemographic characteristics of the population were explored to be used in the analysis and further statistical correlations were implemented between different items/variables of the questionnaire.

Our results revealed that the COVID-19-provoked quarantine has led to mental stress in more than 70% of the parents of the gifted students, which in turn was reflected on their children in the form of behavioral changes and sleep disturbances. About 50 % of gifted students had behavioral problems as exorbitant motor fidgeting, aggressiveness towards animals, and tantrums throughout the confinement that improved near the end of the quarantine period. In accordance, **Saurabh and Ranjan** ⁽¹¹⁾ reported greater psychological distress in quarantined children and adolescent more than non-quarantined ones. Furthermore, **Aboud** ⁽¹⁰⁾ ensured that the quarantine and its consequences of school closure resulted in a higher psychological burden than normal and more mental stress for parents of gifted students. Also, more than half of students had experienced disturbances in the quality of sleep that was more accentuated in boys than in girls; difficulty of sleeping was noted in 31.6% of boys and 15.9% of girls. However, disturbing dreams were approximately equally experienced by both boys and girls (14.4% and 14.2% respectively). In consistent, **Dellagiulia et al.** ⁽¹²⁾ reported changes in sleep quality due disturbance of sleep habits

and duration. Regarding sleeping hours, the current result revealed that all gifted students slept up to 6 hours before and after the quarantine period. In agreement, **Geiger et al.** ⁽¹³⁾ concluded that children with higher intelligence scores showed a shorter nighttime sleep duration. In contrast, the usual sleeping hours of regular students of the same age cohort ranges between 8.5-9.25 hours as indicated by **Blair et al.** ⁽¹⁴⁾. In correlation with the academic achievement, the gifted student showed an increase in their GPA at the end of the second semester 19-20 in spite of few sleeping hours. In explanation, sleep efficiency is important in cognitive functioning of the brain. The intelligent children have less stage 1 sleep, and have more rapid eyes movement (REM) sleep that could be advantageous for learning and could partially explain their giftedness ⁽¹⁵⁾. According to the result, these students showed the same sleeping hours that were not affected by quarantine period, which reflects the efficiency of their nighttime sleep that enables them to get benefit from least sleeping hours. However, small percentage (38.6%) of the gifted students had experienced difficulty of sleeping and disturbing dreams. Such percentage could be significantly correlated with the educational level of the parents and their main source of information about COVID-19. A significant positive correlation between gifted students' behavior and parent's educational level was also noted in the current investigation. This means that the gifted students of postgraduate parents had more improved behavior than those students of less qualified parents.

Although the gifted students received minimal information from their parents, their behavior changes were almost normal without any forms of aggressiveness or violence near the end of quarantine. This result can be

explained by that these students have other potential sources of information other than their parents.

Our study showed a significant and positive correlation between gifted students' academic achievement level and entertainment hours and parenteral help to get their lessons. It can be inferred that mental rest could lead to mental refreshment. Despite the use of smartphones and tablets for fun and entertainment, their level of academic achievement was not affected. However, in regular students, the use smart devices for social networking had a positive impact on the academic performance when they used it for educational purposes such as sharing of the academic material⁽¹⁶⁾. We could conclude that mental well-being is a backbone in the creativity and higher thinking of the gifted students.

Our result indicated that most of the gifted students (62.2%) faced online learning obstacles during quarantine period represented by technical issues and unsuitability of the timetable, however the academic achievement of them increased. This push us to focus on the virtual learning for these students as a favorable environment for learning, which was recommended in a previous study⁽¹⁰⁾.

CONCLUSION

The findings indicated that about half of the participants has experienced major behavioral changes during quarantine. Furthermore, more than half of students suffered from disturbed sleep quality. As well, most of the participants have faced online learning problems. This result might provide the stakeholders with evidence regarding the psychological and emotional effect of quarantine on gifted students and their academic achievement, so that they might improve the educational requirements for online distance learning. It is recommended to emphasize the development of distance educational system, in the form of innovating advanced teaching strategies, updating methods of assessments and introduction of high technological resources for these students.

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Conflict of interest

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Author contribution

Authors contributed equally in the study.

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