



Factors Influencing the Subjective Health and Physical Fitness Perceptions of Korean Adolescents

Jeonga Kwon¹, *Yeon Taek Kwon²

1. Department of Elementary Education, Korea National University of Education, Cheongju, Korea
2. Department of Sports Science, Hongik University, Sejong, Korea

*Corresponding Author: Email: knight-yt@hongik.ac.kr

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Abstract

Background: Adolescence is an important period of growth and development. We aimed to analyze the factors affecting the subjective health and physical fitness perceptions of Korean adolescents.

Methods: This cross-sectional study used data from 2,599 Korean adolescents who participated in the Korea National Life and Sports Surveys during 2020-2022, along with secondary data analysis. The study included frequency analysis of the demographic variables and chi-square tests to examine the relationship between the variables and subjective health and fitness perceptions. Multivariate logistic regression was also used to explore the factors affecting adolescent subjective perceptions.

Results: The study revealed significant factors influencing health perceptions in Korean adolescents, including male gender, lack of regular physical activity, adequate rest, adherence to a consistent diet, and use of nutritional supplements ($P < 0.05$).

Conclusion: Key factors, such as rest, diet, and nutritional supplements should be considered while developing policies that support adolescent health. Unfortunately, there has been a decline in the physical activity of adolescents in Korea. Therefore, a variety of physical activity programs that consider the characteristics of each student need to be developed to address adolescent health issues.

Keywords: Adolescents; Physical fitness perceptions; Subjective health

Introduction

Adolescence is an important period of growth and development. It is during this period that self-insight evolves, health awareness develops, and lifestyle patterns are established, including physical activity, nutrition, smoking, alcohol consumption, and sleep (1,2). Several factors influence an adolescents' ability to maintain healthy lifestyles in adulthood; these include proper health awareness, healthy diet, personal hygiene,

and developing health-related behaviors such as participation in physical activity, stress relief, smoking cessation and alcohol abstinence (1,3). Therefore, we need to pay attention to adolescents and encourage their appropriate health awareness and behavior. Studies have reported that social isolation influenced people to form negative perceptions of their health and fitness (4,5). Concurrently, changes in the health percep-



tions and behaviors of adolescents have led to problems with their growth and development (5). Subjective health and fitness perceptions refer to the self-assessment of physical, mental, and social health status (6,7). This is not an objectively measured index, such as medical health values or physical fitness test scores, but rather health and fitness levels that an individual perceives. Moreover, such perceptions affect health-related behavior (6,7). Adolescents' subjective health and physical fitness perceptions capture their feelings about their overall health and fitness status. They can be used as health indicators to understand better their actual health and fitness levels (8). Adolescents with poor subjective health and fitness perceptions are likely to continue to be vulnerable to health issues, an important factor in determining the quality of the health life of these adolescents (9). Therefore, to predict the health problems of adolescents and promote ongoing health, we need to explore the various factors that are affecting their subjective health and physical fitness perceptions. The factors influencing adolescents' health and physical fitness perceptions can serve as valuable tools for diagnosing their health levels. This information is instrumental in formulating and implementing effective adolescent health policies.

Studies exploring the factors affecting adolescents' subjective perceptions of their health have been conducted prior to the COVID pandemic (3,10). However, people's subjective health and physical fitness status perceptions have changed since the outbreak of the pandemic (4,11). Therefore, our study aimed to fill the gap in the literature by specifically exploring any changes to the factors affecting the subjective health and physical fitness perceptions of Korean adolescents. Furthermore, adolescents' subjective health and fitness perceptions may influence their health behaviors and continue into adulthood (12). Our study aids in the management of adolescent health by highlighting the significance of subjective health and physical fitness perceptions as key variables for predicting future health problems.

Materials and Methods

Design and participants

We used data collected from the 2020-2022 Korea National Life and Sports Surveys conducted by the Korea Ministry of Culture, Sports, and Tourism and the Korea Institute of Sports Science. The survey consists of questions on health and fitness status, various physical activities and conditions, ongoing participation in physical activities, and personal matters. During this timeframe, 27,000 people participated. Of the 27,000 respondents, we used data from 2,599 adolescents (883 in 2020, 886 in 2021, and 883 in 2022).

Variables

We examined various factors including sex, age, residence area, housing type, subjective average monthly household income, regular physical activity, sufficient rest and sleep, regular diet and nutritional supplementation, abstinence from alcohol and smoking cessation, participation in athletic clubs, exercise prescription, and service counseling.

Demographic and sociological characteristics

The participant demographic characteristics included sex, residential area, dwelling type, age, and average monthly household income. In the raw survey data, gender is entered as male or female, housing type as apartment or non-apartment, and region as either urban or rural. We used these in our study without modifying the original data. In the survey, participants are asked to enter their age. In our study, we categorized the adolescents into the groups 14-16 and 17-19 years of age. The subjective average monthly household income question in the survey is, "What is the average monthly income of all members of your household before paying taxes in the past year?" The researcher enters the answers. In our study, we categorized the participants into those with income <\$2,000 USD, >\$2,000 USD to <\$5,000 USD, \$5,000 USD to <\$8,000 USD, and >\$8,000 USD.

Subjective health and fitness perceptions

The subjective health status perception question in the survey is “What do you think your current state of health is?” The subjective fitness status perception question is “What do you think your current fitness status is?” The possible answers to each are 1 (not healthy at all), 2 (not very healthy), 3 (just so), 4 (healthy), and 5 (very healthy). In our study, we categorized the responses to subjective health status as “good health” and “poor health;” and the responses to subjective physical fitness perception as “good physical fitness” and “poor physical fitness.”

Health behavior

The health behavior variables in the survey are regular physical activity, sufficient rest and sleep, regular diet and nutritional supplementation, abstinence from alcohol and smoking cessation, participation in athletic clubs, exercise prescriptions, and service counseling. Here, we examined the following survey questions. The question about physical activity, “How well do you perform regular physical activity to maintain your health and fitness?” The question about enough rest and sleep, “How well do you get enough rest and sleep to stay healthy and fit?” The question about regular eating and nutrition, “How well do you perform regular eating and supplementation to maintain your health and fitness?” The question about sobriety and smoking cessation, “How well do you practice sobriety and quitting maintaining your health and fitness?” The optional answers to each question are 1 (not performing at all), 2 (not performing very well), 3 (moderate), 4 (performing well), and 5 (performing very well). In our study, we categorized the answers to these questions as “not performing, moderate, or performing.” In the survey, the question about participation in school sports clubs and sports clubs is, “Are you currently working out in athletic clubs?” The optional answers are: 1 (I signed up and am currently exercising); 2 (I did not join); and 3 (I signed up but am not currently active). In our study, we categorized this as “currently

exercising in physical education clubs or not exercising in physical education clubs.” In the survey, the question about exercise prescription and service consultation is, “Do you receive exercise prescription or exercise counseling services based on regular fitness measurements or check-ups to manage your physical fitness?” The optional answers are 1 (yes) and 2 (no). In our study, we used the raw data for this without modification.

Data collection

In the yearly survey process, before collecting information, the Korea Institute of Sports Science explains the intention of the survey to the participants and obtains their personal consent. Additionally, the study has received national ethical approval (approval number: 113003). The survey was conducted between September and November for each year from 2020-2022. Participants filled in their personal address, name, sex, age, and contact information, and answered the aforementioned questions. The Korea Institute of Sports Science publishes the results of the survey on its website for research use, but withholds personal information entered by the participants, ensuring anonymity.

Statistical analysis

We analyzed the data using SPSS for Windows (version 23.0; IBM Corp., Armonk, NY, USA). First, we conducted frequency analysis of the participant demographic characteristics. Next, we conducted chi-square analyses to examine the relationship between the variables and subjective health and fitness perceptions. Finally, we performed a multivariate logistic regression analysis to explore the factors affecting subjective health and physical fitness status perceptions. Statistical significance was set at $P < 0.05$.

Results

The characteristics of the participants are shown in Table 1.

Table 1: Characteristics of the participants (n=2,599)

<i>Variables</i>		<i>Total (%)</i>
Sex	Male	1,338 (51.5)
	Female	1,261 (48.5)
Age	14-16 years	941 (36.2)
	17-19 years	1,658 (63.8)
Residence area	Urban	2,148 (82.6)
	Rural	451 (17.4)
Housing type	Apartment	1,262 (48.6)
	Non-apartment	1,337 (51.4)
Household income	<\$2,000 USD	52 (2.0)
	>\$2,000 USD to <\$5,000 USD	963 (37.1)
	>\$5,000 USD to <\$8,000 USD	1,555 (59.8)
	>\$8,000 USD	29 (1.1)
Regular physical activity	Not performing	854 (32.8)
	Moderate	722 (27.8)
	Performing	1,023 (39.4)
Sufficient rest and sleep	Not performing	334 (12.8)
	Moderate	899 (34.6)
	Performing	1,366 (52.6)
Regular diet and nutritional supplementation	Not performing	134 (5.2)
	Moderate	783 (30.1)
	Performing	1,682 (64.7)
Abstinence from alcohol and smoking cessation	Not performing	112 (4.3)
	Moderate	247 (9.5)
	Performing	2,240 (86.2)
Athletic clubs	Participating	147 (5.7)
	Not participating	2,452 (34.3)
Exercise prescription and exercise counseling services	Yes	126 (4.8)
	No	2,473 (95.2)
Subjective health status perception	Poor health	290 (11.2)
	Good health	2,309 (88.8)
Subjective physical fitness perception	Poor physical fitness	569 (21.9)
	Good physical fitness	2030 (78.1)

The relationship between variables and subjective perception of health are shown in Table 2. The results indicate that subjective health perception is significantly associated with sex ($\chi^2=21.615$, $P<0.001$), regular physical activity ($\chi^2=39.509$, $P<0.001$), sufficient rest and sleep ($\chi^2=88.995$,

$P<0.001$), regular diet and nutritional supplementation ($\chi^2=139.777$, $P<0.001$), abstinence from alcohol and smoking cessation ($\chi^2=15.712$, $P<0.001$), and exercise prescription and service counseling ($\chi^2=5.465$, $P=0.019$).

Table 2: Relationship between variables and subjective perception of health

<i>Variables</i>		<i>Healthy N(%)</i>	<i>Unhealthy N(%)</i>	<i>χ² (P)</i>
Sex	Male	1226 (91.6)	112 (8.4)	21.615 ($<0.001^{***}$)
	Female	1083 (85.9)	178 (14.1)	
Age	14-16 years	840 (89.3)	101 (10.7)	0.269 (0.650)
	17-19 years	1469 (88.6)	189 (11.4)	
Residence area	Urban	1902 (88.5)	246 (11.5)	1.082 (0.324)
	Rural	407 (90.2)	44 (9.8)	
Housing type	Apartment	1127 (89.3)	135 (10.7)	0.526 (0.493)
	Non-apartment	1182 (88.4)	155 (11.6)	
Household income	<\$2,000 USD	46 (88.5)	6 (11.5)	4.511 (0.211)
	>\$2,000 USD to <\$5,000 USD	840 (87.2)	123 (12.8)	
	>\$5,000 USD to <\$8,000 USD	1398 (89.9)	157 (10.1)	
	>\$8,000 USD	25 (86.2)	4 (13.8)	
Regular physical activity	Not performing	741 (86.8)	113 (13.2)	39.509 ($<0.001^{***}$)
	Moderate	611 (84.6)	111 (15.4)	
	Performing	957 (93.5)	66 (6.5)	
Sufficient rest and sleep	Not performing	273 (81.7)	61 (18.3)	88.995 ($<0.001^{***}$)
	Moderate	747 (83.1)	152 (16.9)	
	Performing	1289 (94.4)	77 (5.6)	
Regular diet and nutritional supplementation	Not performing	106 (79.1)	28 (20.9)	139.777 ($<0.001^{***}$)
	Moderate	618 (78.9)	165 (21.1)	
	Performing	1585 (94.2)	97 (5.8)	
Abstinence from alcohol and smoking cessation	Not performing	93 (83.0)	19 (17.0)	15.712 ($<0.001^{***}$)
	Moderate	204 (82.6)	43 (17.4)	
	Performing	2012 (89.8)	228 (10.2)	
Athletic clubs	Participating	135 (91.8)	12 (8.2)	1.410 (0.281)
	Not participating	2174 (88.7)	278 (11.3)	
Exercise prescription and exercise counseling services	Yes	120 (95.2)	6 (4.8)	5.465 (0.019*)
	No	2189 (88.5)	284 (11.5)	

* $P<0.05$, *** $P<0.001$; tested by chi-square

The relationship between variables and subjective fitness perception are shown in Table 3. The results indicate that subjective fitness perception is significantly associated with sex ($\chi^2=88.163$, $P<0.001$), regular physical activity ($\chi^2=68.516$,

$P<0.001$), sufficient rest and sleep ($\chi^2=187.086$, $P<0.001$), regular diet and nutritional supplementation ($\chi^2=266.500$, $P<0.001$), and abstinence from alcohol and smoking cessation ($\chi^2=22.413$, $P<0.001$).

Table 3: Relationship between variables and subjective fitness perception

<i>Variables</i>		<i>Good physical fitness</i> <i>N(%)</i>	<i>Poor physical fitness</i> <i>N(%)</i>	χ^2 (<i>P</i>)
Sex	Male	1144 (85.5)	194 (14.5)	88.163 ($<0.001^{***}$)
	Female	886 (70.3)	375 (29.7)	
Age	14-16 years	736 (78.2)	205 (21.8)	0.010
	17-19 years	1294 (78.0)	364 (22.0)	(0.961)
residence area	Urban	1681 (78.3)	467 (21.7)	0.167
	Rural	349 (77.4)	102 (22.6)	(0.707)
housing type	Apartment	987 (78.2)	275 (21.8)	0.015
	Non-apartment	1043 (78.0)	294 (22.0)	(0.924)
household income	<\$2,000 USD	44 (84.6)	8 (15.4)	1.760
	>\$2,000 USD to <\$5,000 USD	745 (77.4)	218 (22.6)	(0.624)
	>\$5,000 USD to <\$8,000 USD	1219 (78.4)	336 (21.6)	
	>\$8,000 USD	22 (75.9)	7 (24.1)	
Regular physical activity	Not performing	604 (70.7)	250 (29.3)	68.516
	Moderate	545 (75.5)	177 (24.5)	($<0.001^{***}$)
	Performing	881 (86.1)	142 (13.9)	
Sufficient rest and sleep	Not performing	208 (62.3)	126 (37.7)	187.086
	Moderate	613 (68.2)	286 (31.8)	($<0.001^{***}$)
	Performing	1209 (88.5)	157 (11.5)	
Regular diet and nutritional supplementation	Not performing	77 (57.5)	57 (42.5)	266.500
	Moderate	475 (60.7)	308 (39.3)	($<0.001^{***}$)
	Performing	1478 (87.9)	204 (12.1)	
Abstinence from alcohol and smoking cessation	Not performing	76 (67.9)	36 (32.1)	22.413
	Moderate	170 (68.8)	77 (31.2)	($<0.001^{***}$)
	Performing	1784 (79.6)	456 (20.4)	
Athletic clubs	Participating	122 (83.0)	25 (17.0)	2.175
	Not participating	1908 (77.8)	544 (22.2)	(0.151)
Exercise prescription and exercise counseling services	Yes	99 (78.6)	27 (21.4)	0.017
	No	1931 (78.1)	542 (21.9)	(0.998)

*** $P<0.001$; tested by chi-square

We conducted a multivariate logistic regression analysis with the variables, excluding age, residential area, housing type, household income, and participation in athletic clubs, which were not statistically significant in the perception of subjective health status. The factors affecting subjective health perception are shown in Table 4. The Cox and Snell value was 0.072 and the Nagelkerke value was 0.142. The significant factors influencing adolescents' subjective health perceptions were sex, regular physical activity, sufficient rest and sleep, regular diet, and nutri-

tional supplementation. Specifically, in terms of sex, men perceived themselves as 1.670 times healthier than women did. In the case of regular physical activity, adolescents who performed moderate regular physical activity, perceived themselves as 0.720 times healthier than those who did not perform at this level. In the case of sufficient rest and sleep, adolescents who got enough rest and sleep perceived themselves as 1.755 times healthier than those who did not. Regarding regular diet and nutritional supplementation, those who practiced regular eating and sup-

plementation perceived themselves as 2.847 times healthier than those who did not. In other words, male adolescents were more likely than female adolescents to have a higher subjective percep-

tion of their health status if they did not perform regular physical activity, had enough rest and sleep, ate regularly, and supplemented their nutrition.

Table 4: Factors influencing subjective health perception

<i>Variables</i>		<i>Odd ratio</i>	<i>95% confidence interval</i>	<i>P</i>
Sex	Male	1.670	1.285-2.171	<0.001***
	Female	Reference		
Regular physical activity	Not performing	Reference		
	Moderate	0.720	0.532-0.975	0.034*
	Performing	1.384	0.979-1.958	0.066
Sufficient rest and sleep	Not performing	Reference		
	Moderate	0.921	0.645-1.314	0.649
	Performing	1.755	1.145-2.691	0.010*
Regular diet and nutritional supplementation	Not performing	Reference		
	Moderate	0.968	0.603-1.553	0.893
	Performing	2.847	1.704-4.756	<0.001***
Abstinence from alcohol and smoking cessation	Not performing	Reference		
	Moderate	0.791	0.425-1.475	0.461
	Performing	1.181	0.686-2.030	0.549
Exercise prescription and exercise counseling services	Yes	1.971	0.838-4.631	0.120
	No	Reference		
Cox and Snell R ² =0.072, Nagelkerke R ² =0.142				

* $P < 0.05$, *** $P < 0.001$; tested by multivariate logistic regression analysis

We conducted a multivariate logistic regression analysis excluding age, residence area, housing type, household income, participation in athletic clubs, exercise prescription, and exercise counseling services, which were not statistically significant in subjective fitness status perception. The relevant factors affecting subjective fitness status perception are shown in Table 5. The Cox and Snell value was 0.143 and the Nagelkerke value was 0.220. The factors influencing adolescent subjective physical fitness perception were sex, regular physical activity, sufficient rest and sleep, regular diet, and nutritional supplementation. Specifically, in terms of sex, men perceived their physical fitness as 2.395 times better than women did. In the case of regular physical activity, those

who performed regular physical activity perceived themselves to be 1.586 times fitter than those who did not perform at this level. In the case of sufficient rest and sleep, participants who practiced sufficient rest and sleep perceived themselves to be 2.041 times fitter than those who did not. On the other hand, those who followed regular diet and nutritional supplementation perceived themselves as 3.185 times more physically fit than those who did not. In other words, male adolescents who performed regular physical activity had sufficient rest and sleep, regular diet, and nutritional supplementation had higher subjective fitness status perceptions than those who did not.

Table 5: Factors influencing subjective fitness perception

<i>Variables</i>		<i>Odd ratio</i>	<i>95% confidence interval</i>	<i>P</i>
Sex	Male	2.395	1.943-2.953	<0.001***
	Female	Reference		
Regular physical activity	Not performing	Reference		
	Moderate	1.082	0.844-1.386	0.536
	Performing	1.586	1.223-2.056	<0.001***
Sufficient rest and sleep	Not performing	Reference		
	Moderate	0.996	0.744-1.334	0.980
	Performing	2.041	1.463-2.848	<0.001***
Regular diet and nutritional supplementation	Not performing	Reference		
	Moderate	1.011	0.681-1.501	0.955
	Performing	3.185	2.105-4.820	<0.001***
Abstinence from alcohol and smoking cessation	Not performing	Reference		
	Moderate	0.810	0.479-1.371	0.433
	Performing	1.234	0.784-1.943	0.364
Cox and Snell R ² =0.143, Nagelkerke R ² =0.220				

***P<0.001; tested by multivariate logistic regression analysis

Discussion

We examined data on 2,599 Korean adolescents who participated in the 2020-2022 National Life and Sports Surveys to explore the factors affecting subjective health status and physical fitness perceptions among Korean adolescents. We found that during this timeframe, the factors affecting the subjective health perceptions of Korean adolescents were associated with their sex, regular physical activity, sufficient rest and sleep, regular diet, and nutritional supplementation. Specifically, there was a strong association between male adolescents not performing regular physical activity, getting sufficient rest and sleep, following a regular diet and nutritional supplementation, and a higher subjective perception of their health status. Prior to COVID-19, gender, age, school type, subjective economic level, academic achievement, subjective body shape, stress, sleep, smoking, alcohol consumption, physical activity participation, and breakfast were reported as factors influencing the subjective health status perception of Korean adolescents (3,10).

Prior to COVID-19, those adolescents who participated in physical activity and did not eat breakfast had a higher subjective perception of health status, which was different from the re-

sults of this study. The factors influencing the perception of subjective physical fitness status were the same as those affecting that of subjective health status: sex, regular physical activity, sufficient rest and sleep, regular diet, and nutritional supplementation. Specifically, male adolescents engaging in regular physical activity, sufficient rest and sleep, regular diet, and nutritional supplementation were strongly associated with a higher subjective health status perception. For subjective health status perception, not engaging in regular physical activity increased adolescent subjective health status perception, however subjective fitness status perception was higher when regular physical activity was performed.

The results offer the following insights. First, it was interesting to find that a lack of physical activity by adolescents is a factor that positively affects their subjective health status perception. As mentioned, during the 2020-2022 period, many countries, including Korea, imposed distancing or local lockdowns and closed sports facilities as part of COVID-19 prevention measures, limiting participation in physical activity (13). Consequently, in the COVID-19 era, the non-performance of regular physical activity by adolescents is positively related to their higher subjective health perceptions, influenced by this so-

cial background and situation. This pattern of adolescent participation in physical activity has been reported to contribute to the lower health fitness post-COVID-19. Therefore, intervention is needed to help adolescents recover their physical fitness (14). For example, programs that promote physical activity among adolescents inside and outside schools should be encouraged in Korea. Schools can increase the number of physical education classes or provide various physical activity programs before and after school to increase adolescent participation in physical activity. Outside of school, if we can create an environment where physical activity can be practiced in conjunction with school curriculums, we can promote the physical fitness of adolescents and encourage healthy exercise habits.

Second, we confirm that sufficient rest and sleep have a positive effect on the subjective health and physical fitness perceptions of adolescents. This is in line with previous studies that report sleep as a factor in adolescents' subjective perception of their health (11,15). Rest and sleep relax the body and the mind, and, in this process, help one recover from fatigue and restore physical strength (16). Adequate rest and sleep, especially during adolescence, have a significant impact on physical and mental health, while also playing an important role in growth (17). Despite the fact that the optimal amount of sleep for adolescents is 8-10 hours, over the past few decades, adolescents have experienced insufficient sleep, as their sleep time has been shown to be decreasing (18). Before COVID-19, Korean adolescents often lacked rest or sleep because of the need to study for entrance exams. However, the intensity of schoolwork has decreased with biweekly attendance and online classes, offering Korean adolescents more time to rest and sleep. We can assume that less academic stress and more rest and sleep time are factors having a positive effect on their subjective health and physical fitness perceptions. Third, regular diet and nutritional supplementation have a positive effect on subjective health and physical fitness perceptions in adolescents in the COVID-19 era. In many countries, including Korea, as COVID-19 has increased the amount

of time people spend at home, their eating habits have changed; namely, more time is spent cooking at home or ordering food delivery rather than eating out (12,19). In particular, adolescents around the world are consuming more home-cooked meals due to COVID-19, while their intake of fast food and soft drinks has decreased significantly, which is a major trigger for adopting healthy eating habits (12). It can be assumed that Korean adolescents have been more consistent with a regular diet and nutritional supplementation, which can be interpreted as having a positive effect on their subjective health and physical fitness status perceptions.

However, this study has some limitations. Perceptions of subjective health and physical fitness can vary depending on the situation. While these perceptions serve as tools for diagnosing individual health and fitness levels, they rely on subjective judgments. Consequently, the results may fluctuate based on survey methods, an individual's circumstances at the time of the survey, and their physical condition on the survey day. As a result, they may deviate from the actual state of health. Nonetheless, we used data from 2,599 adolescent to ensure representativeness. In addition, our study is the first to explore the factors that affect subjective health and physical fitness perceptions among Korean adolescents.

Conclusion

The factors influencing the subjective health status perception of adolescents were being male, non-performance of regular physical activity, sufficient rest and sleep, regular diet, and nutritional supplementation. The factors influencing subjective fitness status perception were being male, performance of regular physical activity, adequate rest and sleep, regular diet, and nutritional supplementation. This pattern should be sustained in the future through the development of policies that promote adolescent health.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of Interest

The author declares no conflicts of interest.

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