



## Effect of Body Mass Index on Adherence to Physical Activity in Females

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### Abstract

**Background & objectives:** Exercise and physical activity are very important for physical fitness. Exercise could be particularly important for students as the old proverb stated that "Normal brain exists in normal body". This study was conducted to evaluate effect of body mass index (BMI) on adherence to exercise in females. **Subjects & Methods:** Assessment of BMI was done for 3 groups of participants, after taking their informed consent then a questionnaire was self - administered to all participants. Questions were to inquire about demographic, social and behavioral factors that could affect exercise adherence. Other questions were to demonstrate the extent of adherence to exercise. Data were collected then analyzed using graph pad prism software (version, 5; Italy). **Results:** Our study revealed that BMI had a great influence on adherence to exercise, other factors include availability of sports tools, time, social support and exercise trainer. **Recommendations:** We recommended inclusion of exercise in timetables of college students and staff members. Furthermore, we suggest engagement of sport's trainer at the college to increase student's and staff's awareness toward the importance of physical exercise.

**Keywords:** Adherence, exercise, females.

### Introduction

Obesity and poor physical fitness are worldwide health problems (Caban et al., 2005; Hawari et al., 2003). Body weight alone is not diagnostic of obesity; BMI is the single most important indicator of obesity (Pietrobelli et al., 1998; Reilly, 2006). Sports and exercise are very crucial to keep our bodies physically and mentally fit (Thune & Furberg, 2001). There are many benefits of practicing exercise. Physical activity burns calories, accordingly help prevent excess weight gain or maintain weight loss (Kahn et al., 2009; Salindari et al., 2013). In fact, regular physical activity can help prevent many health problems, including

stroke, metabolic syndrome, type 2 diabetes, depression, and arthritis (Pischon et al., 2008; Khan et al., 2009). This is mainly through increasing high-density lipoprotein (HDL), and decreasing the unhealthy low density lipoprotein (LDL) (Knowler et al., 2002). Not only this, but Physical activity stimulates various brain chemicals producing sensation of happiness and relaxation (Armstrong et al., 2009). Furthermore, exercise strengthens muscles and delivers oxygen and nutrients to tissues (Wareham et al., 2005; Lee et al., 2010). Most of the people spend half or more than half of the day in their

workplace, accordingly it is very crucial to have available sport tools in workplaces for all workers (Caban et al., 2007; Sorensen et al., 2011).

In the college campus of College of Applied Medical Sciences, Shaqra University there is a well equipped sport's hall. A variety of training instruments lye there, like a high speed treadmill. However, college students rarely practice sports, and college staff members seldom visit the hall. The main objectives of the current study are to investigate the effect of BMI on adherence to physical activity, also to assess other factors that could hinder exercise practicing, and to suggest solutions for these obstacles.

### Materials and Methods

Obesity and poor physical fitness are worldwide health problems (Caban et al., 2005; Hawari et al., 2003). Body weight alone is not diagnostic of obesity; BMI is the single most important indicator of obesity (Pietrobelli et al., 1998; Reilly, 2006). Sports and exercise are very crucial to keep our bodies physically and mentally fit (Thune & Furberg , 2001). There are many benefits of practicing exercise. Physical activity burns calories, accordingly help prevent excess weight gain or maintain weight loss (Kahn et al., 2009; Salindari et al., 2013). In fact, regular physical activity can help prevent many health problems, including stroke, metabolic syndrome, type 2 diabetes, depression, and arthritis (Pischon et al., 2008; Khan et al., 2009). This is mainly through increasing high-density lipoprotein (HDL), and decreasing the unhealthy low density lipoprotein (LDL) (Knowler et al., 2002). Not only this, but Physical activity stimulates various brain chemicals producing sensation of happiness and relaxation (Armstrong et al., 2009). Furthermore, exercise strengths muscles and delivers oxygen and nutrients to tissues (Wareham et al., 2005; Lee et al., 2010). Most of the people spend half or more than half of the day in their

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### Results

#### 3.1. Description of the study participants

Table (1) shows descriptive characteristics of the study groups, also showed BMI percentages for each group. It showed that the lowest BMI is 17 and it was among group 2 participants, while the highest was 39 and was among group 3.

Description of characteristics of the study participants according to WHO definitions of BMI was done , participants were regarded as underweight if their BMI less than 18.5 , normal weight if their BMI 18.5 - 24.9 while a BMI 25 - 29.9 is considered overweight, a BMI 30 - 39.9 is obesity and above 40 is considered morbid obesity ( WHO, 2011). Results were presented in percentages. Our results showed that 95%, of Group 1 lie within normal weight range, while those of Groups 2&3 65% and 30% respectively. Only 5% of Group 1 were overweight, while Groups 2&3 25% and 40% respectively. Obesity was detected in Groups 2&3 only at percentages 5%&30% respectively, while underweight was in Group2 only at 5%. There was no morbid obesity in any of the participants.

**Table (1): Descriptive characteristics of the study groups (total no= 60).**

	Group 1(n=20)	Group 2 (n=20)	Group 3 (n=20)
Age in years	<18	18-23	24
-BMI values			
Minimum	19	17	21
Maximum	25	31	39
Mean	21	23	29
Std. Deviation	2.0	4.3	4.3
Std. Error	0.45	0.97	0.97
BMI percentages			
Underweight (< 18.5 kg/m <sup>2</sup> )	0%	5%	0%
Normal (< 25 kg/m <sup>2</sup> )	95%	65%	30%
Overweight (25 to <30 kg/m <sup>2</sup> )	5%	25%	40%
Obese (30-39.9 kg/m <sup>2</sup> )	0%	5%	30%
Morbidly obese ( 40 kg/m <sup>2</sup> )	0%	0%	0%

### 3.2. Body mass index differences among the study groups

Figure (1) showed highly significant difference in BMI between groups 1&3, and 2&3 however there was no detectable difference between groups 1&2.

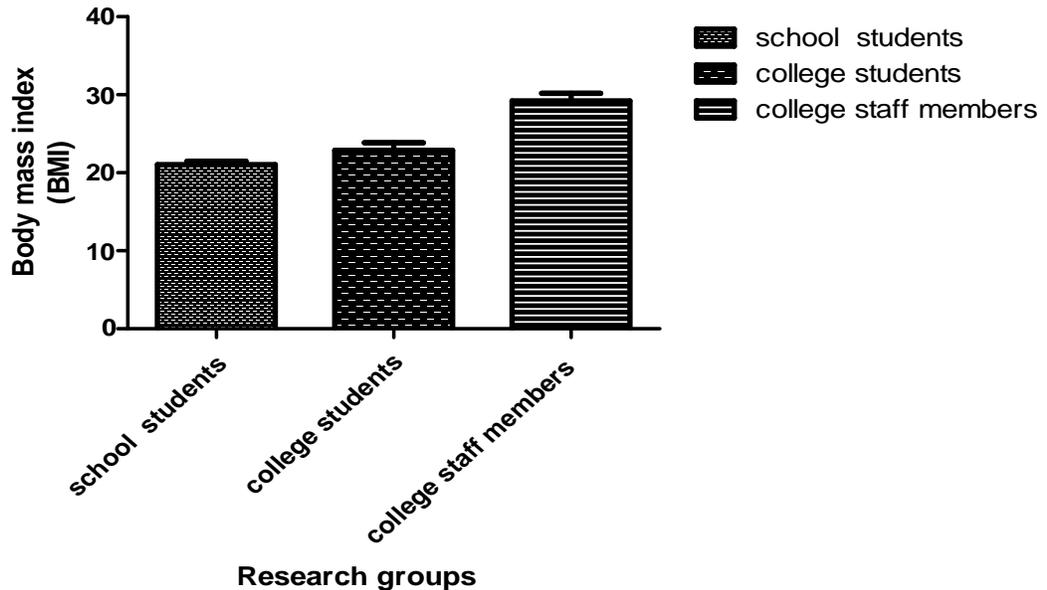


Figure (1) Body mass index differences among the study groups.

### 3.3. Factors that could affect adherence to exercise and sports

Figure (2) showed differences in availability of exercise and sport equipment where participants present. The results demonstrated a highly significant difference between groups 1&2, and 1&3, while insignificant difference between groups 2&3.

Figure (3) showed insignificant difference among the study groups as regarding impact of parent's encouragement on exercise practicing.

Figure(4) showed a highly significant difference between groups 1&2 and 1&3, and insignificant difference between groups 2&3 as regarding time availability for exercise practicing.

Figure (5) showed a highly significant difference among groups 1&2 and 1&3, and insignificant difference among groups 2&3, in one way ANOVA test results of effect of exercise feasibility on exercise practicing.

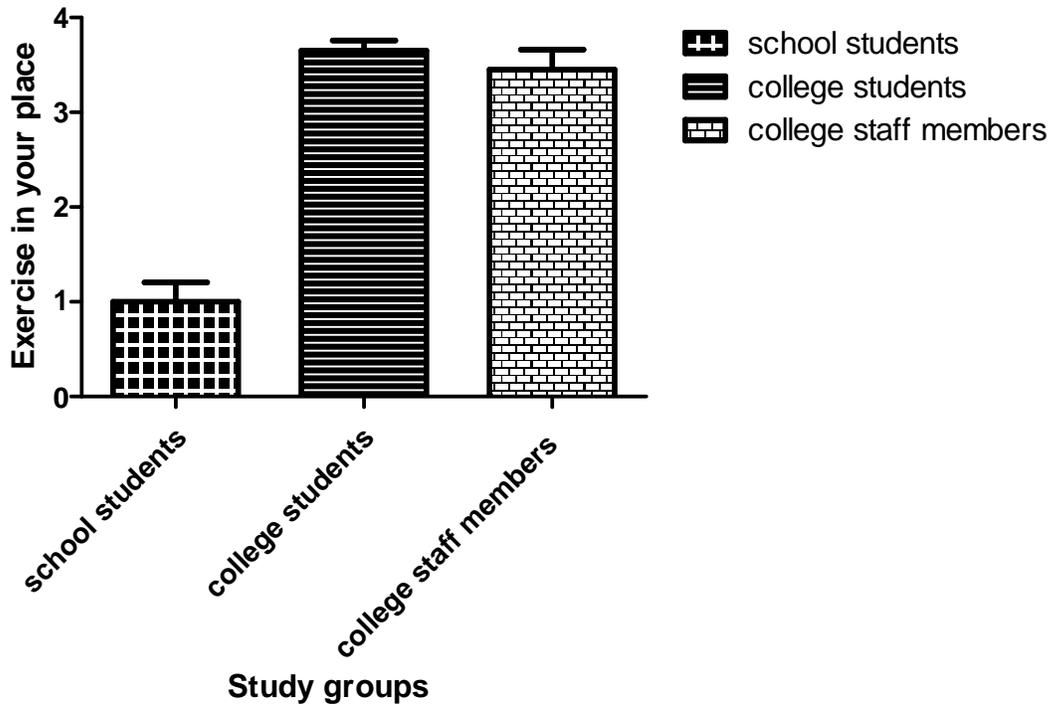


Figure (2) Availability of exercise in place where participant's present.

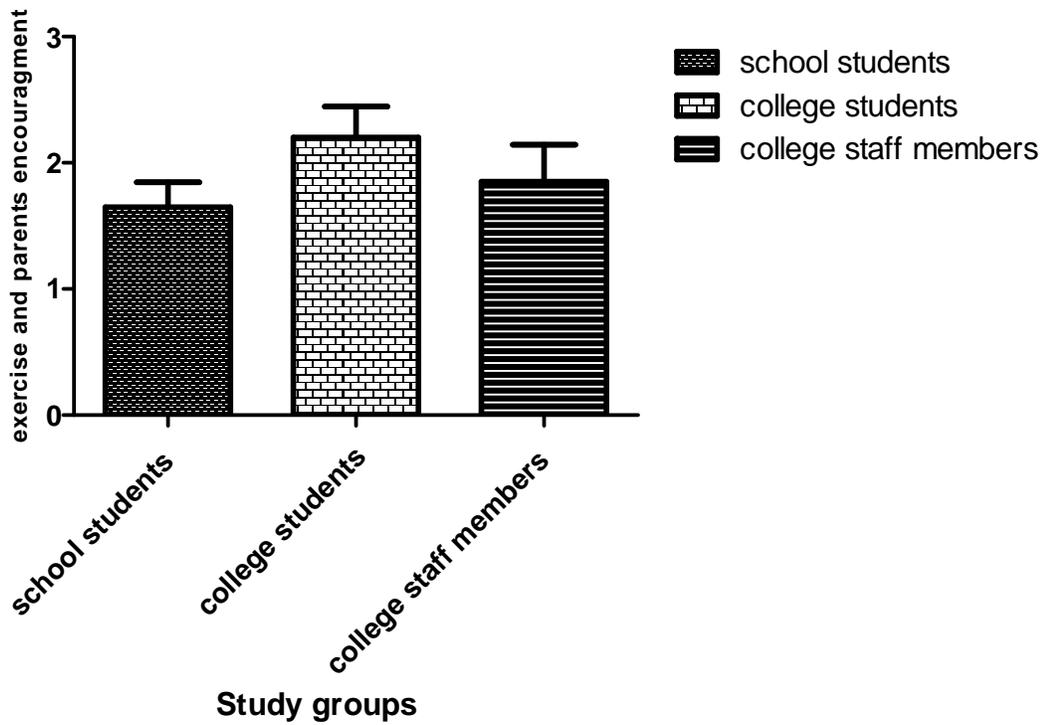


Figure (3) Impact of parent's encouragement on exercise practicing.

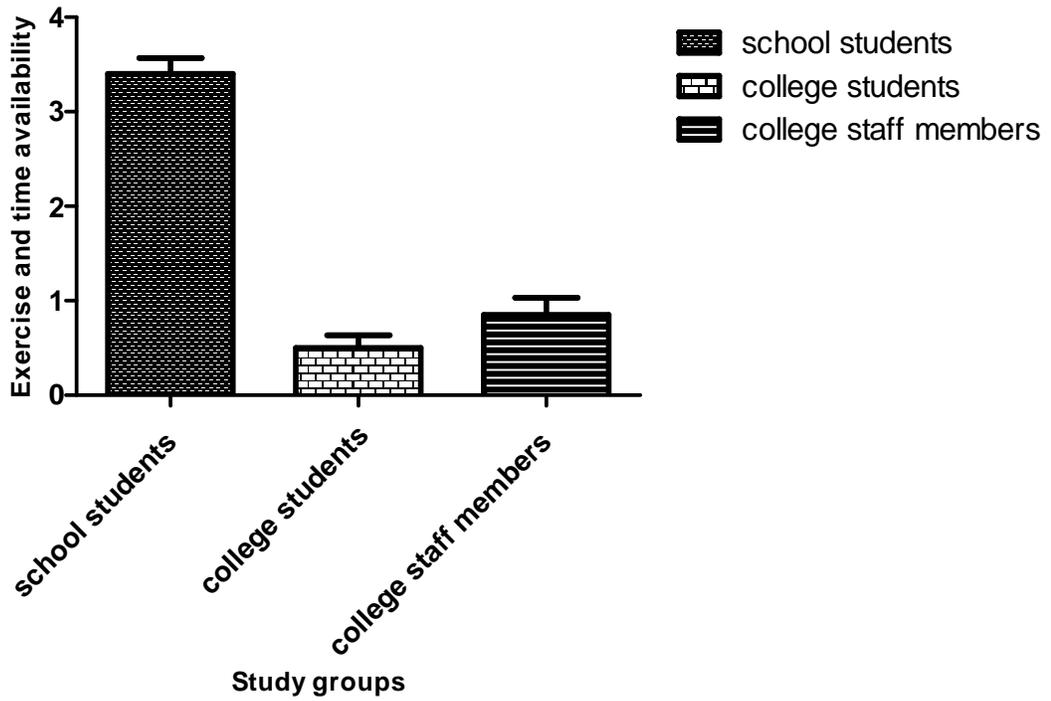


Figure (4) Impact of free time availability on exercise practicing.

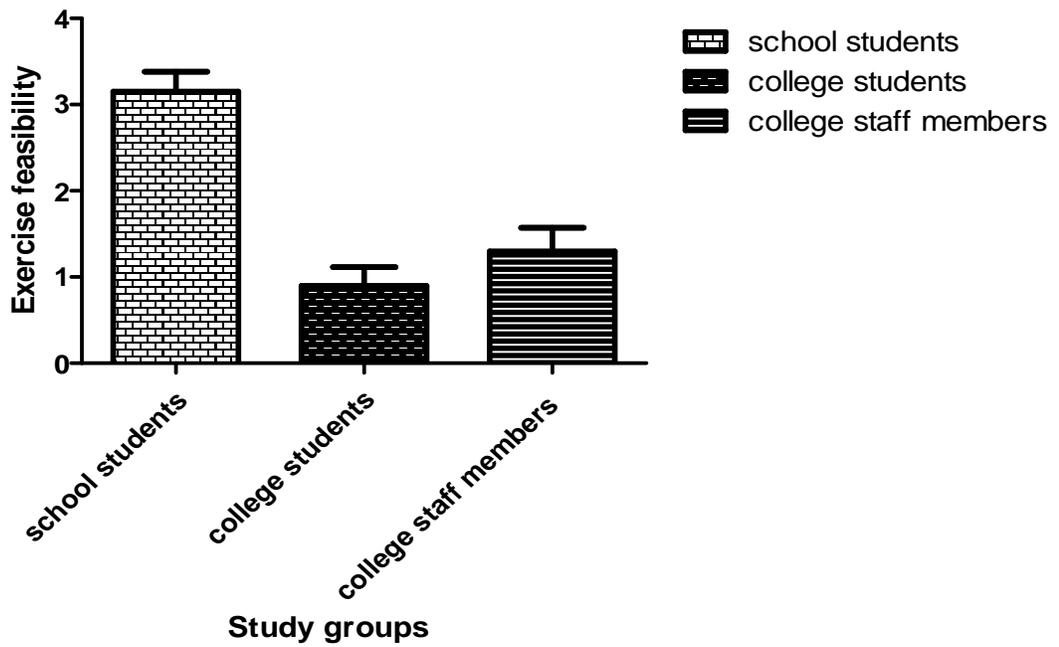


Fig (5) Impact of exercise feasibility on exercise practicing.

### 3.4. Adherence to exercise among the study groups

Adherence to exercise was assessed by investigating practicing physical activity 3-times a week. Figure (6) showed results of physical activity screening

assessment among the study groups; it demonstrated a highly significant differences among groups 1&2, and 1&3 and insignificant difference between groups 2&3, in adherence to exercise 3 times a week.

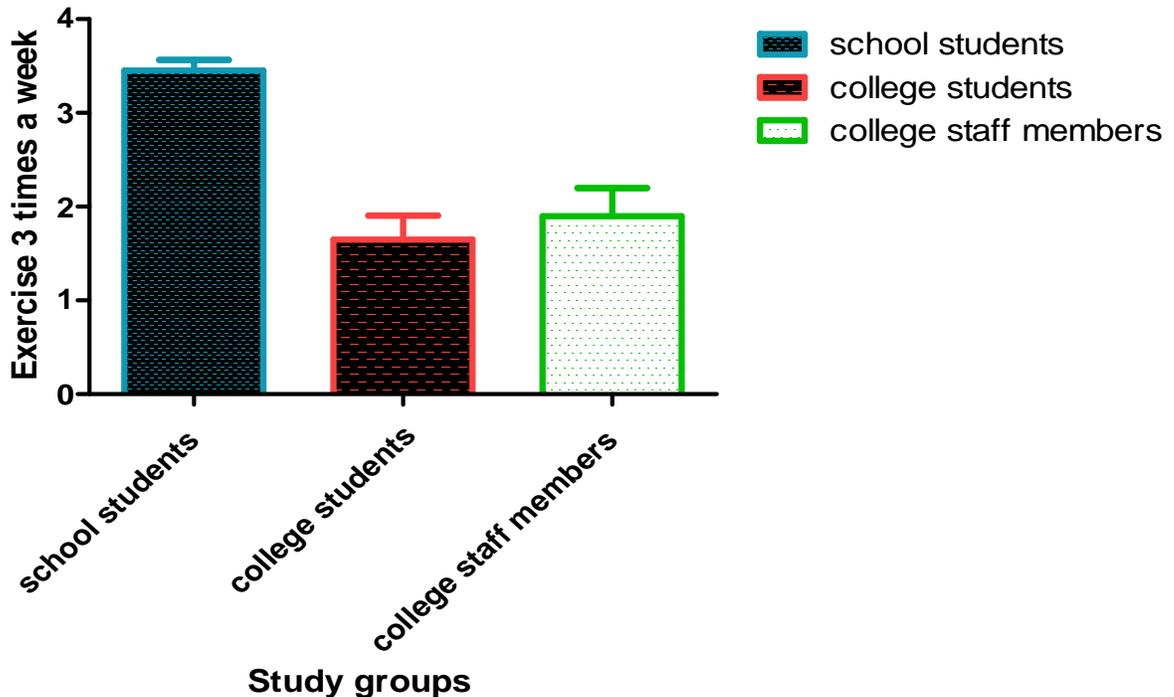


Figure (6) Physical activity screening assessment among the study groups.

### Discussion:

The international guidelines for exercise emphasize that all adults should avoid inactivity, and that some activity is better than none. It should also be noted that physical activity should be performed in a regular manner and that adherence to exercise could be during work, at home, and even in bed (Miller& Dunstan, 2004).In general research shown that women are physically inactive compared to men and that only about 5%&34% of women adopt vigorous and moderate activities, respectively (Salis& Owen, 1999). Furthermore, females' physical activity was found to decreased markedly during pregnancy and lactation (Fell et al., 2009; Hegaard et al., 2011).

In the current study, analysis of demographic characteristics of participants demonstrated a higher BMI values in group 3 females who are involved in both work and family responsibilities. These results are consistent with Vrazel et al, who demonstrated that

women with young children at home are less active than women without young children (Vrazel et al., 2008). Also, the work of Gaston and Cramp who showed that the most important determinants of physical activity in females are lower income and educational level and higher number of children (Gaston & Cramp, 2011).

The current study demonstrated that obesity hindered physical activity. This is consistent with Brownson et al. who found that among a national sample of women in the USA, those who were overweight were significantly less likely to report being regularly active and more likely to report having no leisure time physical activity compared to women who were not overweight (Brownson et al., 2000). Other researchers demonstrated a bilateral relationship between obesity and physical activity particularly of school based physical activities (Spear et al., 2007; Harris et al., 2009; Oude Luttikhuis et al., 2009).

Our results showed that although sport tools are available to groups 2&3 than group1; however group 1 were more adherent to exercise than both groups. This could be explained that sport availability is not an independent factor that affect exercise adherence. These results were inconsistent with other researchers who concluded that accessibility to recreational centers, playgrounds, and parks is very important for adherence to exercise (Veugelers et al., 2008). Meanwhile, our results were consistent with other researchers who concluded that there are many issues that could affect adherence to exercise besides availability of sport tools these include safety, time, economic and BMI issues (Spear et al., 2007; Galvez et al., 2010).

As regarding social support for physical activity, our results showed that although there is insignificant difference in social support among the study groups, group 1 were more adherent to physical activity than other groups. These results were inconsistent with Trost et al, who found that family and friend support for physical activity appear to be influential (Trost et al., 2002). These findings could be explained that their study relied on family support only as a social support. However, in this study group 1 participants were subjected to support by their teachers and their exercise trainers.

Type A behavior has been defined as a behavioral syndrome or style of living characterized by competitiveness, feelings of being under the pressures of time, striving for achievement, and aggressiveness( Pargman & Green, 1990). Studies have indicated that Type A behavior is associated with greater overall levels of physical activity but lower adherence within supervised exercise programs (Vrazel et al, 2008). Our results showed similar results, where participants who are busy are less adherent to exercise than those who had a free time to practice sports in their daily schedule(group 1). These results supported the findings of others who concluded that schools provide encouraging environments for students to practice active lifestyle (Spear et al, 2007).

The current study demonstrated that although sport tools were available to groups2&3 it was difficult to be used which resulted in lack of adherence to exercise in both groups. This was controversial to group (1) where there is a professional trainer that helps students to be more adherent to physical activity.

## **Conclusion**

This study showed that although physical activity and adherence to exercise are very important for management of obesity and overweight however subjects with high BMI were less adherent to physical activity compared to those with lower BMI. Furthermore the current study demonstrated other factors that could affect adherence to physical activity such as availability of time and sport tools, family and social support, and lastly behavioral factors.

Based on the findings of this study we recommend the inclusion of sport time in the schedule of university students and staff members, also for workers in any institution. Moreover we recommend the engagement of an exercise trainer in these institutions to help workers and support adherence to exercise.

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## **Conflict of interest**

The authors declared no conflict of interest.

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