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Effect of home physical exercise on obesity in social isolation period of Corona virus (COVID-19) pandemic, Ethiopia

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Abstract

Introduction: The purpose of present study was to examine effect of home physical exercise on obesity in social isolation period of corona virus disease (COVID-19) pandemic.

Material & Methods: In this study, participants were a random sample of 150 actively online friends from the entire social medias friends of totaling 200 friends of the researcher. Data were collected in Ethiopia, between April 1 and July 1, 2020. A descriptive statistics was employed. Moreover, a paired sample t-test was used at level of significance set at 0.05 alpha to compare participant obesity before and during COVID-19 pandemic.

Results: The results indicated that, before pandemic 78.8 % of participants and during pandemic period 87.9% of participants had normal body weight. But there was variation of BMI. For instance before pandemic there were underweight subjects but during pandemic there was no a

single individual in underweight category. The reason was majority participants gained 1-5 kg and some individuals gained 6-10kg of body weight during the COVID-19 pandemic. As the result of paired sample t-test analysis, BMI significantly increased after COVID-19 (P=0.003).

Conclusion: Based on the results, 72.8 % participants gained weight during pandemic because people minimized their time to exercise and eating too much without burring calories. Therefore, during COVID-19 pandemic period, people should perform physical exercises regularly at home to avoid excessive body weight.

Keywords: COVID-19, Social isolation, Obesity, Exercise, Weight gain

1. Introduction

The corona virus disease (COVID-19) pandemic was discovered in China in 2019 in the city of Wuhan (1), and now it is spread throughout the world. After March 12, 2020 this corona virus considered as a global pandemic (2). Following this time, most countries in the world have caused significant disruption in their social, health, economic, political affairs. COVID-19 pandemic has presented a main challenge for health-care systems across the globe (3). During this social isolation period of COVID-19 pandemic many people of the world have been suffering in corona virus illness. Due to that most people in the globe were staying home to decrease the spread of the virus. Quarantine and isolation are basic instruments that can avoid or delay the spread of the virus (3). In Ethiopia because of social isolation, COVID-19 is affecting people's social interaction. Social isolation is the manner where human beings voluntarily or involuntarily, pull outs from social interactions, as a result of that those viruses or diseases can decrease its spread (4). But quarantine or self-isolation has negative effects on health such as on cardio-vascular risk and mental disease (3, 5). In the season of COVID-19 pandemic so many people have been affected their personal fitness. In this period many gymnasiums and fitness centres have been closed. As a routine active life is limited for this reason so many people will lose their

fitness. Lack of physical exercise and activities leads people to have non-communicable diseases. People sitting at home without physical exercise will have the greatest risk of developing critical illness and dying. Obesity is one of the non-communicable disease and the most important conditions increase exponentially in such kind of period (6). Therefore, in this pandemic period people need to maintain fitness now more than ever. Moreover, increasing numbers of reports have linked obesity to more severe COVID-19 illness and death (7-9).

The corona virus or COVID-19 pandemic makes many people to stay at home and sitting down more than before people usually do. It's hard for many people to perform physical exercises that they normally do in gymnasium and fitness centres. It's even harder for people who don't usually do a lot of physical exercise. But there is no any best option. Many studies have advised home-based physical exercise programs in the prevention of different diseases among different populations (10). Sitting, sleeping and eating without physical exercise can be causes of weight gain. The COVID-19 pandemic is having a significant impact on people to manage their weight during novel corona virus. Therefore, the purpose of this study was to examine effect of home physical exercise on obesity in social isolation period of COVID-19 pandemic.

2. Material & Methods

Subjects

Participants included in this study were a random sample of 150 (64 male and 86 female) actively online friends from the entire social medias friends of totalling 200 friends of the researcher in Ethiopia. In this study, inclusion and exclusion criteria were designed as part of the study methodology. Participants were included for the study based on the following criteria: having experience in doing physical exercise, having social isolation manner during pandemic, using internet for social media and voluntary. On the other hand, subjects who missed these criteria were excluded from the study. All selected subjects were agreed to receive questionnaires and respond their response electronically online right after reading the Consent Terms. All procedures were in accordance with the Helsinki Declaration.

Data collection instrument

Data were collected in Ethiopia between April 1 and July 1, 2020. This study used a quantitative research design, and collected data through a descriptive total 17-item, 9 items were adapted (11) and the remaining items self prepared to assess the participants' exercise routine in social isolation period of COVID-19 pandemic. In addition, the questions were analysed and modified by a panel of experts within the Sport Science Department at Kotebe Metropolitan University, who had significant backgrounds exercise science.

A Cronbach's Alpha coefficient is used to check internal consistency or reliability. Based on the analysis the result was 0.868, respectively for variables. Hence, the results of the data analysis indicated that the variables had strong internal validity. The questionnaires were distributed through social medias such as face book messenger, telegram, imo and email. The advantage of sending the questionnaires in social media was economic feasibility, timely distribution, and a quicker response rate. These questions were contained multiple-choice options: "Yes" or "No" and blank space as open answer.

After, questions returned to researcher body mass index (BMI) calculation was employed to assess participant obesity. BMI has a similar association with body fat as the height-weight. BMI, also called the Quetelet's index, is used to assess weight relative to height. This technique compares an individual's weight (in kilograms) to their height (in meters, squared) (12).

Statistical analysis

Descriptive statistics was analysed by percentile and mean ± SD. As well, a Paired sample t-test was used to compare participant obesity before and during COVID-19 pandemic.

3. Results

According to Table 1, participants mean and standard deviation age was 35.73±61 years for males and 36.45±26 for females. The mean and standard deviation of body height was 173.3±2.72 cm for males and 168.28±4.09 cm for females. In addition, male participants mean and

standard deviations of weight was 58.99±6.37 kg and females had 65.45±4.22kg as presented in the descriptive Table 1. The average BMI of males and females was fall in the normal scales (12) which was 22.73±1.94 for males and 23.72±.95 for females.

Table 1. Demographic characteristic of participants, (mean ±SD)*

Item	Male (N=64)	Female (N=86)
Age (y)	35.73±61	36.45±26
Height (cm)	173.3±2.72	168.28±4.09
Weight (kg)	58.99±6.37	65.45±4.22
BMI (kg/m^2)	22.73±1.94	23.72±.95

The next Table 2 indicates about participants' health, physical exercise experience and obesity before social isolation period of COVID-19 pandemic. According to participants answer 27.3 % of participants had health problem, whereas 72.7 % respondents had no health problem. The third issue in this table is participants BMI. According to this Table the majority 78.8 % of participants' BMI was in between 18.5 to 24.9. Only 6.1 % of participants' BMI result was <18.5, whereas the rest of 15.2% of participants was from 25 to 29.9. The second issue in Table 2 below is fitness monitor before isolation. In this study, as result of respondents' response large percentages of 60.6% of respondents were monitored in gymnasium. Besides 24.2% of participants were monitored other places, but a few 15.2% of individuals were monitored at home. A third issue in this Table is about respondent's usage of any media sources before social isolation time to exercise. Based on their answer 92% of them stated they have used media to exercise and 8% of them absolutely not. In the Table fourthly types of exercise were asked to participants. As the result of their response 48.5%, 18.2% and 33.3% of participants were practice aerobics, strength, and flexibility or yoga exercises before COVID-19, respectively. Furthermore, to practice these physical exercises 18.2% of individuals used 2 days, 42.4% of individuals used 3 days and 39.4 of participants were practiced for 4 days per week.

Table 2. Physical exercise experience and obesity before COVID-19 pandemic

Item	Percentage						
Do you have health problem?	Yes	NO	Total				
	27.3	72.7	100				
Body mass index (kg/m²) before pandemic (<18.5 under weight, 18.5-24.9 normal, 25-29.9 overweight, 30-34.9 obesity I, 35-39.9 obesity II, >40 hyper obesity)	<18.5	18.5-24.9	25-29.9	30-34.9	35-39.9	>40	total
	6.1	78.8	15.2	0	0	0	100
Were you monitored by a fitness coach before isolation?	Home	Gymnasium	Other	Total			
	15.2	60.6	24.2	100			
Did you use any media source? (i.e., YouTube, Social Media, videos and Tv, smartphone apps, etc.) to exercise before the quarantine?	Yes	NO	Total				
	92	8	100				
What physical activities do you do before isolation? (answered using the following options: "strength training", "functional training", "yoga/pilates", "martial arts/fighting", "walking/running", "dancing/zumba", "bicycle", "swimming" and "other"; participants were instructed to consider the type of exercise you did most frequently)	Aerobics	Strength	Flexibility/Yoga	Other	Total		
	48.5	18.2	33.3	0	100		
How many days you practice exercise or physical activity before isolation?	1 day	2 days	3 days	4 days	5 & above days	Total	
	0	18.2	42.4	39.4	0	100	

According to Table 3, 100 % of participants have been stay home in social isolation period of COVID-19 pandemic. Besides, respondents physical exercise experience during social isolation period of COVID-19 pandemic also asked in this Table 3. The first issue in this Table is about their BMI result. As the result of BMI calculation, during pandemic period 87.9% of participants had normal body weight which is

between 18.5-24.9 but the remaining 12.1% participants were in a position of overweight that is between 25-29.9. The second issue in Table 3 is fitness monitor during isolation. As the result 81.8% of participants said that they haven't been monitored by an online fitness coach but 18.2% of participants have been monitored by an online fitness coach during social isolation period of COVID-19 pandemic. A third issue in this Table is about respondent's usage of any media sources during social isolation time to exercise. Based on their answer all subjects or 100% of the sample stated they have used any media sources to exercise during the isolation period. The forth issue in the Table 3 is about type of exercise for respondents. According to their answer 60.6% of participants were did aerobics, 15.2 of participants were performed strength exercise and 24.2 of participants applied flexibility or yoga exercises during the isolation time. Furthermore, as a fifth issue in the Table 3 participant asked to report how many days per week they spend to exercise during pandemic. Based on their response, 12.1% of participants were practicing for 1day, 42.4% of participants were for 2 days, and 39.4% of participants were for 3 days and 6.1% of participants for 4 days. In this Table the sixth issue was weight gain. As the result during isolation period, 42.4% of participants stated they have gained 1-5kg and 30.3% of participants as well gained 6-10kg of body weight. But 27.3 of participants did not get body weight. The seventh issue was participants feeling during exercise in pandemic. According their response, 72.7% of participants feeling happy, but 27.3 % of respondents were not happy while exercising during COVID-19 pandemic. As eighth issue in the Table 3, during pandemic 100% of the respondents said that they gained health benefit from exercises during isolation.

Table 3. Physical exercise experience during social isolation period of COVID-19 pandemic

Item	Percentage						
Do you stay home in Social Isolation period of COVID-19 Pandemic?	Yes		NO		Total		
	100		0		100		
Body mass index (kg/m) during pandemic (<18.5 under weight, 18.5-24.9 normal, 25-29.9 overweight, 30-34.9 obesity I, 35-39.9 obesity II, >40 hyper obesity)	<18.5	18.5-24.9	25-29.9	30-34.9	35-39.9	>40	total
	0	87.9	12.1	0	0	0	100
Have you been monitored by an online fitness coach during quarantine?	Yes		NO		Total		
	18.2		81.8		100		
Do you use any media source (i.e., YouTube, Social Media, videos and Tv, smartphone apps, etc.) to exercise during isolation?	Yes		NO		Total		
	100		0		100		
What physical activities do you do during isolation? (answered using the following options: "strength training", "functional training", "yoga/pilates", "martial arts/fighting", "walking/running", "dancing/zumba", "bicycle", "swimming" and "other"; participants were instructed to consider the type of exercise you did most frequently)	Aerobics	Strength	Flexibility/Yoga	Other	Total		
	60.6	15.2	24.2	0	100		
How many days do you practice exercise or physical activity during isolation?	1 day	2 days	3 days	4 days	5 & above days	Total	
	12.1	42.4	39.4	6.1	0	100	

Item	Percentage				
How many kg body weights do you got during Isolation?	0 kg	1-5 kg	6-10 kg	11 and above kg	total
	27.3	42.4	30.3	o	100
How many kg body weights do you lose during Isolation?	0 kg	1-5 kg	6-10 kg	11 and above kg	Total
	69.7	27.3	3	0	100
Do you feel happy while exercising in quarantine?	Yes	NO	Total		
	72.7	27.3	100		
Do you get any health benefit from exercises during isolation?	Yes	NO	Total		
	100	0	100		

In this study obesity level of participants was assessed before and during pandemic. Hence, Figure 1 clearly illustrated BMI results in these two occasions. Based on figure BMI was different in these two occasions which is increased during pandemic. Furthermore, the researcher has used paired samples Test t-test to find out if this two situations are different each other. Consequently, as the result of paired sample t-test analysis, the p-value is less than 0.05 which is clearly indicated, there was a statistically significant difference of BMI before and during COVID-19 [t(-3.218), df = 149 and p=.003).

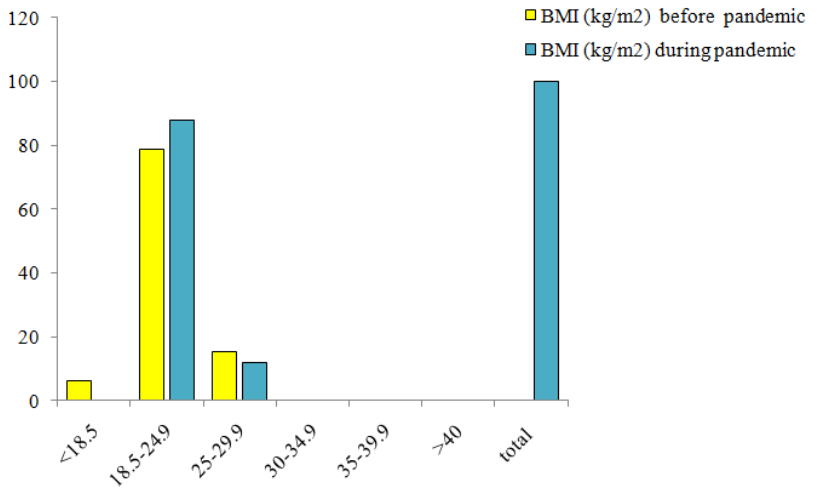

Figure 1. BMI before and during COVID-19 pandemic

4. Discussion

In the current study, 100 % of participants were stayed home in social isolation period of COVID-19 pandemic. In such kind of pandemic viruses stay home is very essential. For example in America in one study people spent approximately between 20–24h per day inside their home for this pandemic (13). As the result of this study with reference to American college of sport medicine (12) majority participants had normal body weight before and during pandemic. But, there was variation of BMI before and during isolation period. For instance before pandemic there were underweight subjects but during pandemic there was no a single individual in underweight category. Probably the reason is underweight individuals slightly go to the next BMI category because of rest and weight gain.

Before COVID-19 pandemic majority participants were monitored by fitness trainer in the gymnasium whereas 15.2% of individuals were monitored in their home and the remaining 24% of participants uses other options to perform exercise before the pandemic. Actually, physical exercises can be performing in gyms, athletic centres, and parks (14). According to this study majority participants were not monitored by online fitness coach but very few participants have been monitored. In Ethiopia online fitness coaching is a new idea because there is lack of awareness. People my plan to exercise. But during pandemic, maintaining physical distancing is vital to exercise because the virus is transmitted from one individual to another through droplets of saliva or mucus, expelled through the mouth or nostrils when an infected person coughs or sneezes (15).

In the current study during the pandemic all participants were used different media sources to exercises despite very few participants were not used any media sources to exercises before isolation period. But during self-quarantine period accessing television channels and screen time would increase to get information among many people's (13). In Ethiopia, people have been spending more time by sitting and sleeping as the result it creates to them an opportunity to assess any media sources to exercise during pandemic. Physical activity is successful to maintain fat-free mass, prevent excess body fat and result in lower rates

of obesity (16). Physical activities include aerobics, strength, flexibility and yoga activities. In this study, aerobics exercise was the dominant exercise for participants before and during pandemic period. Next those activities flexibility/yoga activities were loved by participants in second level. In the third level strength exercise were performed by some participants to preserve their health. Performing all kinds of physical exercise at home is vital for health. More importantly home-based exercise programs become relevant in times of social isolation (14).

People have a number of days per week to perform physical exercise to maintain proper body weight. According to this study majority participants were did exercise for 4 days per week before pandemic. On the other hand during pandemic period majority participants were performed physical exercise for 2 days. Achieving minimum physical activity levels for 150 minutes per week in different days is good for health (12, 14). According to this study there was a variation of number of days per week to exercise in these two occasions. According to this study, majority participants have got 1-5 kg and some individuals as well got 6-10kg of body weight during the COVID-19 pandemic. For example in one research people gained between 5–10 pounds during self quarantine (13). Social isolation due to the COVID-19 outbreak potentially increases physical inactivity (10) that causes gaining body weight. Sedentary life in social distancing time stake holders such as health ministers, public health agencies and sport commission should act together to avoid obesity. Otherwise, Obesity-related health conditions such as heart disease, stroke, Type 2 diabetes, Asthma, and certain types of cancer will be causes of premature death along with COVID-19.

Participants were asked about their feeling while they are performing physical exercise. Based on their response majority were happy but very few individuals were not happy while exercising during pandemic. During pandemic period of COVID-19, exercise is essential for mood and mental state (11). In addition to that, all respondents in this study said that they have got health benefit from exercises during isolation. Performing physical activity in different intensity can enhance over all well-being and health of participants (17).

Within the current study, BMI result of participants was significantly different in two occasions, such as before and during pandemic period.

BMI was slightly increased during the pandemic period. This is due to the consumption of too many calories and decrease in physical activity (18). As it is investigated in this study, majority participant gained weight in pandemic. The reason is people stopped working and going to gyms or parks to do exercise or even doing at home (19). Weight gain can bring obesity. This obesity will be a cause of non communicable diseases. Therefore, this period needs attention to exercise more to prevent overweight or obesity. Because during the quarantine, people are suffering from obesity due to over-eating and sedentary lifestyle, as a consequence they have an opportunity for further weight gain (3). Besides people living with obesity can have pro-inflammatory status and the exposure to COVID-19 (20) this brings them poor immunity. Hence, during quarantine time people has to plan physical exercises at home to maintain desirable body weight. Also, to eradicate deaths related to physical inactivity, stake holders should work together in promoting physical activity during quarantine (10).Therefore, during corona Virus period regular physical exercise is recommended to preserve human health by evade obesity.

5. Conclusion

In conclusion, in the current study majority participants had normal body weight before and during pandemic. But in these two occasions there was a discrepancy of BMI, it increased during pandemic period. Hence, 72.8 % participants gained weight during pandemic. The reason is people minimized or stopped working and going to gyms to do exercise or adapting sedentary life at home as well as eating too much without burring calories. Therefore, during COVID 19 pandemic period, people should perform physical exercises regularly at home to avoid excessive body weight.

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Author contribution
The author identified the problem, collected data through personal online accounts, wrote and approved the final manuscript.

Competing interests

The author declares that he has no competing interests.

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