

The Effect of School-Based Intervention on Obese and Overweight Students in Urmia, Iran

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Abstract

Objective: Obesity is an important concern for both adults and students. The study evaluates the effect of school-based intervention (SBI) on sedentary life style (SLS), physical activity (PA) and body mass index (BMI) among the students in Urmia, Iran.

Methods: The study was undertaken from 31 December 2013 to 21 June 2014. A total of 80 male students were randomly selected from single-sex junior high schools of the two existing districts in Urmia. They were assigned to two groups of intervention and control (each 40). SBI was performed on intervention group during 6 months. The essential parameters for evaluating the effects of SBI on SLS, ADL and BMI of students were used.

Results: There was a significant difference between the two groups for the cycling ($P<0.001$) and walking ($P=0.003$) in leisure time and TV watching time ($P=0.007$) in the intervention group. After the intervention a decrease was found in the BMI, but it wasn't significant ($p>0.05$).

Conclusions: According to the obtained results, the SBI had a positive effect on the improvement of ADL but the reverse was true about SLS in obese and overweight students. More comprehensive randomized experiments must perform to explain the effects of long time SBI on the BMI of the obese and overweight students.

Keywords: obesity, school-based services, activities of daily living, sedentary lifestyle

1. Introduction

In the present century obesity and overweight are the most important concern in the world. The highest increase in the prevalence of obesity in most countries has been of global concern (Djalalinia et al., 2015). Obesity and overweight are the world's fifth cause of mortality, and 2.6 million people die of this disorder annually (Asghar et al., 2015). According to certain Iranian national studies in people <18 year the prevalence of obesity varies between 5.0-13.5, and 3.2-11.9 in males and females, respectively (Jafari-Adli et al., 2014). The nationwide school-based study which conducted in students of 6-18 years old showed that based on the WHO growth curves, 9.7% and 11.9% were overweight and obese, respectively (Roya et al., 2013). The importance of activities of daily living (ADL) (including walking and cycling in leisure time) in reducing rates of chronic diseases has been proved (Jafari-Adli et al., 2014). Schools must develop PA among students (McKenzie et al., 1996). SBI has shown promise in helping to reduce students' SLS, including TV-watching time, by providing means for parents and students to monitor and budget the time that students spend on TV-watching and increase PA during physical education (PE) classes at high school (McKenzie et al., 1996). Although this issue has been variously studied by different scholars in the context of Iran, there is almost no study which approaches the issue by using the Baecke questionnaire in West Azerbaijan and considered ADL and SLS. Our study aimed at assessing the effect of SBI on ADL and SLS in junior students of high school in Urmia.

2. Methods

2.1 Design and Setting

This study was a quasi-experimental SBI that performed in Urmia, Iran. The ethical code of study was grant No: 393847. Urmia has two education districts. The unit of randomization was school. Four high schools were randomly chosen from two states. Schools were randomly allocated to control or interventional groups. Both parents and students filled out the written consent form before participating in the study. Researcher educated them that all the personal identifiers were confidential. Data was collected in three steps: before intervention, 3 and 6 months after intervention. All seventh-grade students of selected schools completed the baseline questionnaire. All the required information was recorded on questionnaires by the first researcher. The statistical analyses between variables carried out to determine effect of SBI on ADL and SLS and BMI in junior students of high school in Urmia. The intervention group participated in explaining classes.

2.2 Population

A total of 80 seventh-grade male students were randomly selected from single-sex junior high schools of the two existing districts in Urmia, Iran. They were assigned to two groups of intervention and control (each 40). Their ages ranged 12-14 years (13.10 ± 0.81). They were non-diabetic, non-hypertensive, and also overweight or obese according to WHO 2007 table (De, Onyango, Borghi, Siyam, Nishida, & Siekmann, 2007). Those whose were BMI ≥ 85 th percentile regarded overweight and obese. The exclusion criteria included students with visible physical disability, medical disorders like thyroid, renal, diabetes mellitus type II, adrenal disorders and/or unwilling.

2.3 Instrument

The instruments of data collection included tripartite questionnaires: 1. demographic characteristics 2. Basic anthropometric data that included weight measured (kg) to the nearest 0.1 kg using a digital scale (Seca Model, made in Germany); height (m) with light clothes and without shoes, measured to the nearest 0.1 cm using a portable stadiometer 3. Baecke Questionnaire. The components of Baecke questionnaire were: work activity, sport and leisure index (alpha Cronbach was 0.881, 0.726 and 0.675 respectively), included 16 items, that its validity proved in previous studies (Baecke, Burema, & Frijters, 1982; Mirzaee Vishgae, Rahmani Niya, & AR., 2014; Ono et al., 2007; Peter & Bandmann, 2008; Saris, Snel, Baecke, van Waesberghe, & Binkhorst, 1977; Tofighi, Babaei, Eloon Kashkuli, & Babaei, 2014).

2.4 Intervention

SBI carried out to change the school situation and to increase PA among children by practical implementation and oral explanation by collaborative methods, role playing, lectures and group discussions in 6 sessions (held for one hour per session). These educational methods performed to learn the behavioral skills for coping with obesity and overweight by involving students in ADL during school break time. Environmental change activities included preparation sport tools by communication increase between/among students, by sports team and promotion of ADL by parent-teacher association and school health staff.

2.5 Statistical Analysis

In this study data was analyzed using SPSS version 16. Results were analyzed using Analysis of Covariance (ANCOVA). Chi-square test was applied to compare behavior PA (ADL and SLS) between intervention and control groups.

3. Results

The BMI, SBI, TV-watching time, CLT, WLT and SAW of participants in the both control and intervention the group were analyzed by chi-square test (Table 1). Finding showed that TVWT was decreased in the intervention schools at time 6 month after intervention in comparison baseline ($P=0.007$). It was determined that in SAW there was a significant difference between before and 6 months after the SBI in the intervention group ($p=0.022$) (Table1). Also the CLT was higher in the intervention group 6 months after intervention ($P<0.001$). There was no significant difference between students in the demographic variables (such as age, parents' literacy, and job) at the baseline. Table 2 indicates although BMI decreased in 6 months after SBI, there wasn't significant difference between BMI at the baseline and six months after the intervention. Because parents of obese and overweight students worried about their children so they encouraged their children in both groups to do many treatment and physical activities. Furthermore, the BMI of the students in the control group reduced.

Table 1. Distribution of components of ADL and SLS variables at the baseline 3 and 6 months after intervention

Variables	Response	Point	Baseline		3 months after intervention		6 months after intervention	
			Inter*	Control**	Inter	Control	Inter	Control
TVWT	Never or seldom (%)	1-2	16(40)	23(57.5)	19(47.5)	22(55)	34(85)	23(57.5)
	Sometimes or always (%)	3-5	24(60)	17(42.5)	21(52.5)	18(45)	6(15)	17(42.5)
	P-value		0.117		0.502		0.007	
SAW	Never or seldom (%)	1-2	20(50)	22(55)	31(77.5)	25(62.5)	29(72.5)	19(47.5)
	Sometimes or always (%)	3-5	20(50)	18(45)	9(22.5)	15(37.5)	11(27.5)	21(52.5)
	P-value		0.654		0.143		0.022	
CLT	Never or seldom (%)	1-2	26(65)	18(45)	17(42.5)	23(57.5)	7(17.5)	22(55)
	Sometimes or always (%)	3-5	14(35)	22(55)	23(57.5)	17(42.5)	33(82.5)	18(45)
	P-value		0.072		0.180		0.000	
WLT	Never or seldom (%)	1-2	17(42.5)	20(50)	16(40)	19(47.5)	11(27.5)	24(60)
	Sometimes or always (%)	3-5	23(57.5)	20(50)	24(60)	21(52.5)	29(72.5)	16(40)
	P-value		0.501		0.499		0.003	

Inter*= intervention group, control**= control group, TVWT (TV watching in leisure time), SAW (sit at work) CLT (cycling in leisure time) WLT (walking in leisure time).

Table 1 shows the effect of SBI on the components of ADL constructs (i.e., CLT and WLT) and the components of SLS constructs (i.e., SAW and TVWT) 3 and six months after the intervention in the intervention and control group. Chi-square shows that in the intervention group there is a significant increase in the components of ADL six months after intervention whereas there is a significant decrease in the components of SLS at the same time.

Table 2. Mean and SD of BMI in both intervention and control groups in the baseline and 6 months after the intervention

Group	Baseline	6 months after the intervention
	Mean ±SD	Mean ±SD
Intervention	27.70±3.42	27.198±3.04
Control	27.94±3.08	27.65±3.37

The Mean and SD of BMI at the baseline 6 months after intervention is shown in Table 2. The Kolmogorov–Smirnov test showed that the BMI had a normal distribution (P>0.05). The result of Analysis of Covariance (ANCOVA) showed although BMI decreased in 6 months after intervention, there wasn't significant difference in BMI 6 months after the intervention after baseline BMI was adjusted (F (1, 77) = 0.326, P=0. 57, Partial Eta Squares = 0.004, R Squared of model = 0.483).

4. Discussion

Our study described that SBI can promote ADL and decrease SLS among high-school students. Analysis of this study showed that based on SBI; ADL was lower mean before intervention (Table 1). ADL was significantly higher in the intervention group in comparison with the control group after the intervention (p< 0.001). In this research the increase in ADL match with the results of Susi Kriemler, et al. (Kriemler et al., 2010) and Jordan A. Carlson et al. (Carlson et al., 2016), Story Mary et al. (Story Mary, Karen, & French, 2006), Lettlefold et al., Vander Ploeg et al. (Vander Ploeg, Mcgavock, Maximova, & Veugelers, 2014).

It was determined that SLS significantly decreased 6 months after SBI in the intervention group. This is match with the results of Ruanqdaraganon N, et al. (Melkevik, Torsheim, & Iannotti, 2010; Ruangdaraganon, Kotchabhakdi, Udomsubpayakul, Kuananusont, & Suriyawongpaisal, 2002; Patel et al., 2010; Sisson, Church, & Martin, 2009; Swinbur, 2008b). Chi-square test showed significant differences in TVWT after SBI in the

intervention group. This is also match with the results of Neumark-Sztainer et al. 2011, that SBI, at 9-month follow-up, intervention group reduced their SLS by almost one thirty-minute block a day ($p=.050$) (Neumark-Sztainer et al., 2011). Based on research findings over TV watching hours are related with greater BMI (Swinburn & Shelly, 2008; Blanck et al., 2007; Grontved, 2011; Swinburn, 2008a; Zimmerman, 2010). Although body mass index decreased in 3 and 6 months after intervention but there weren't significant differences between interventional and control groups. This is also match with the results of Paulo Henrique Guerra, et al. 2013 (Hong et al., 2016; Park, Bakhet, Karl, Yuan, & Lonn, 2014; Guerra, Nobre, Silveira, & Taddei, 2013; Schwartz, Leardo, Aneja, & Elbel, 2016).

5. Conclusion

The present study determined the effect of SBI on obesity and overweight in students, parents, and school staff to decrease BMI and SLS and inactivity among students. When the performance of students on ADL and the positive effect of SBI on this matter are considered, one may conclude that SBI can pave the ground to boost ADL of the students and the society. They seem to exist enormous potential for schools to develop their role in providing students with extra ADL by building rapport with SBI providers of ADL. Schools can endow community-based organizations with their facilities during weekend, and holidays. Schools can cooperate in develop ADL programs to children and their parents. Considering the positive effect of SBI on the ADL, it seems that this type of intervention as one of the most important influencing factor can supply the necessary grounds for increasing ADL of the students and the society. Because of SLS and inactivity behaviors of the obese and overweight students, the obesity-related problems indicate the possibility of the students be susceptible to future health risks. It seems intervention strategies are warranted to reduce obesity and overweight in all children.

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Author Contributions

BR conceived, designed and did data collection & statistical analyses & editing of manuscript.

FM helped to design the research, conduct the organization and coordination of the study, supervise the implementation process and draft the manuscript and to write the manuscript and conceive of the study.

HK helped to design and carry out the research, conduct the statistical analyses, write and revise the manuscript, advise us on the implementation process, and helped to revise the manuscript and participate in its design and advise us on the manuscript.

Ethical matters have been intended by the authors and there was no conflict of interest about the publication of this article.

Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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