Blood Profiles among Female Undergraduate in Iraq After a 12-Weeks Home-based Intervention Program

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Abstract
The aim of this study is to investigate whether a 12-weeks home-based intervention program could improve blood profiles among female students in Iraq. A 12-week home-based intervention which consisted of physical activity and dietary awareness program was carried out at home. The subjects were 44 sedentary undergraduate female students from Soran University, Iraqi. Both experimental and control groups (n=22 in each group) completed practical tests at baseline pre-test, post-test1, and post-test2, but only the experimental group participants received the 12-weeks intervention program. The blood profiles measured were blood pressure, blood cholesterol, and blood glucose. Results showed that the experimental group demonstrated improvement in diastolic systolic blood pressure after undergone 6 weeks post-test intervention program. The reported f value was ($F_{(2, 84)}$=-6.636, p=.047, η2=0.091). Significant blood profiles results were reported for diastolic blood pressure and blood glucose. However, the significant results were only reported after the subjects had undergone the 12-weeks intervention program. The reported f values were ($F_{(2, 84)}$=-7.000, p=.007, η2=0.163) and ($F_{(2, 84)}$=-16.182, p=.003, η2=0.188), respectively. As the conclusion, a home-based physical activity and dietary intervention program can positively influence sedentary undergraduate female students' blood profiles and the benefits can be achieved as early as after 6-weeks.
Keywords: Home-based Intervention, Blood Profiles, Physical Activity, Physical Activity, Sedentary Female

Introduction

Lifestyle and behavioral factors, such as daily physical activity play an important role in the prevention of chronic diseases, including cardiovascular disease, diabetes, and obesity (Cooper & Hancock, 2011; Rowlands, Eston, & Ingledew, 1999; Strong et al., 2005). Hence, being physically active plays an essential role in increasing health and well-being. However, unstable conditions in one's country for example after a war might hinder their population ability to do

so. The unsuitable conditions which Iraq is currently facing have directly influenced the lifestyle and daily behavior of the peoples especially the women who are not able to enjoy their freedom, economic independence, and social activity. They are usually disappointed because they are shunned from the active lifestyle and being discriminated against by the community and men in particular (Madi, 2007). This concern is confirmed by the World Health Organization (WHO)'s reports indicating that the percentages of physically inactive and overweight females in Iraq are 51.3% and 65.1%, respectively (Al-Tamimi, Armstrong, Cowan, & Riley, 2011).

Poor diet and physical inactivity caused 310,000 to 580,000 deaths per year and are major contributors to disabilities that result from diabetes, osteoporosis, obesity, and stroke (Pribis, Burtnack, McKenzie, & Thayer, 2010). A study by Humairi (2015) revealed that the majority of Iraqi rural women have a weak level of nutrition awareness, which indicated that 55% of them were not educated enough towards dietary behaviour and attitude. In addition, blood pressure, blood glucose and obesity rates among females aged 15 and above in Iraq were reported to be higher as compared to their counterparts in the Eastern Mediterranean Region that was 12.5 vs. 11.6 in blood pressure and 28.7 vs. 29.1 in blood glucose. Report by WHO confirmed that there are close relationships between undesirable blood profiles values with inactive lifestyle and bad dietary behaviour among the Iraqi female (GHO, 2013).

A large number of researchers investigated the benefits of physical activity on many parts of the body like the heart, skeletal muscles, bones, blood (for example cholesterol levels), immune system and the nervous system (Cooper & Hancock, 2011; Soroush et al., 2013; Strong et al., 2005). In order to achieve all these benefits, specific guidelines are recommended to improve physiological variables starting from the minimum amount of physical activity and increasing dietary knowledge (Physical Activity Guidelines Advisory Committee, 2008). The importance of good diet and physical activity offered through a good intervention program to reduce the rates of disease and death from chronic diseases has been clearly stressed (McGinnis & Foege, 1993). The unsafe security situation in Iraq with the low level of the dietary awareness had made it necessary to design an intervention program that can be appropriate for the Iraqi daily life where it can be carried out safely at home.

Good intervention program recommended usually consisted of a combining physical activity and diet. A training program with moderate intensity alone cannot be effective unless it combines with diet to treat overweight and obese individuals. However, there is still a need for further investigation to determine the effects of such interventions on the blood profiles of the individuals who are living a sedentary life, especially intervention with combination of physical activity and dietary awareness tailored to be done at home as a result of unsecured and unsafe outside environment for young female in Iraq. Therefore, the researchers designed a home-based intervention with the combination of physical activity and dietary awareness program to find out its effectiveness to improve blood profiles among undergraduate female students in Soran University, Iraq.

Methodology

Population and Sampling

Prior to the study, approvals were obtained from Research Ethics Committee of University Putra Malaysia, Malaysia and the scientific committee in the college of Education in Soran University located in Kurdistan Regional, Iraq. The target population of the present study was the non-sport freshman female university students in Iraq. Soran University was randomly selected from 14 universities in the Northern Region of Iraq by simple random sampling, and Education faculty was selected out of the five Colleges of Soran University for the academic year 2014-2015. The total population freshmen were 160 and written consents were obtained from all participants prior to the study. Healthy undergraduate female students aged 18-22 years old and free from any disease, not associated with any medication or treatment, not pregnant, and willing and able to adhere to the physical activity program and nutrition knowledge sections were volunteered to participate in this study. In order to ensure that the respondents were not really active, they were asked to answer the physical activity questionnaire of the TTM model (O'Connor, 1994). Only 44 of the population were reported not really active and then they were assigned randomly into two groups which were consisted of 22 subjects in each experiment group and control group, receptively.

Intervention

The intervention program for the undergraduate female students in this study included the combination of physical activities and dietary awareness for 12-weeks. The data were collected at three-time points which were baseline pre-test, post test1, and post test2. The students were required to practise some of the specific physical activities adapted from well-known physical activity guidelines (Physical Activity Guidelines Advisory Committee, 2008). Specifically, the 2008 Physical Activity Guidelines recommend 150 minutes of moderate and/or 75 minutes of vigorous physical activity each week to reduce the risk of obesity, cardiovascular diseases (CVD) and type II diabetes (Hamilton, Healy, Dunstan, Zderic, & Owen, 2008). The students were asked to practice five days a week. The exercises intensity and distance were increased progressively from week 1 to week 12 (Physical Activity Guidelines Advisory Committee, 2008). While, for dietary awareness, the students attended small sections of dietary awareness two times a week to increase the knowledge of the importance of good diet during their free time through the 12-weeks duration of the experiment as suggested. The content of the food awareness program is arranged according to standard guidelines.

Blood Profiles Measures

A reliable and valid field tests were used to measure each blood profiles variable with equipment suitable for each test. The blood profiles included in this study were blood pressure (BP), blood cholesterol (BCH), and blood glucose (BG). BP was measured by an automatic upper arm BP monitor (Model AJ 701 from Japan), while BCH was measured by Accutrend GCT meter (Roche Diagnostics from Germany) and BG was measured by ACCU-CHEK Performa (Blood Glucose meter from USA). Prior to the tests, all instruments were carefully calibrated to ensure the reliability.

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Statistical Analysis

Sample t-test was used to compare the mean scores of the conducted test between the two groups in the pre-test. In order to show the differences between the individuals in each group (experimental, control) at the pre-test, the mean and standard deviation was counted for the physiological variables to ensure that both groups were started at the same level. In addition, repeated measures ANOVA were used to show the interaction between group and test. If the results were significant, Bonferroni post hoc test will be applied to compare the mean scores.

Research Finding

Prior to the data analysis, the independent sample t-test was used to compare the mean scores of the conducted test between the two groups in the pre-test. All the results show that there was no significant difference between the mean scores of the physiological variables for experimental and control groups. These initial tests suggested that the participants in both groups (experimental and control) possessed a statistically equivalent level of measurement of their physiological variables before any treatment was conducted.

Table 1 showed the blood profiles score for the experimental and control groups for baseline pre-test, post test1, and post test2. Based on the results, all the experimental group subjects were reported to improve their blood profiles after they undergone 6-weeks intervention program (baseline pre-test and post test1), and continue to improve after 6 to 12-weeks intervention program (post test1 and post test2). Meanwhile, for the control group, their scores were reported to be not consistent.

Table 2: Blood Profiles Scores for Experimental and Control Group

Blood Profiles	**Experimental group**		**Control group**	
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**
Diastolic BP. Baseline Pre-test	76.32	6.972	75.91	6.171
Diastolic BP. Post1	74.23	9.512	78.73	7.166
Diastolic BP. Post2	73.18	9.359	80.18	6.666
Systolic BP. Baseline Pre-test	110.68	11.639	110.82	9.080
Systolic BP. Post1	108.45	8.809	115.09	12.409
Systolic BP. Post2	108.32	12.264	113.09	8.199
Blood Cholesterol Baseline Pre-test	159.91	27.395	159.86	25.991
Blood Cholesterol Post1	145.55	18.163	146.91	19.081
Blood Cholesterol Post2	140.82	17.759	149.73	21.872
Blood Glucose Baseline Pre-test	109.05	20.006	113.41	18.220
Blood Glucose Post1	103.73	27.459	112.14	18.729
Blood Glucose Post2	96.95	13.855	113.14	20.046

Note: BP=Blood Pressure

The results of repeated measures ANOVA on blood profiles found a significant difference in systolic blood pressure after undergone 6-weeks post-test intervention program. The reported f value was ($F_{(2, 84)}$=-6.636, p=.047, η2=0.091). However, after the 12-weeks post-test2, the result for the systolic blood pressure was found to be not significant. Other significant blood profiles results were reported for diastolic blood pressure and blood glucose. The significant results only reported after the subjects' undergone 12-weeks intervention program. The reported f values were ($F_{(2, 84)}$=-7.000, p=.007, η2=0.163) and ($F_{(2, 84)}$=-16.182, p=.003, η2=0.188), respectively. No significant differences were found for both post-test and post-test2 results for other blood profiles (Table 2).

Table 2: The Blood Profiles Mean Difference between Experimental and Control Groups in Baseline pre-test, post-test1 and post-test2

Blood Profiles	Time	(I) Group	(J) Group	Mean Difference (I-J)	SE	P value	η2
BP Diastolic	Baseline Pre-test	Experimental	Control	0.409	1.985	0.838	0.001
	Post-test1			-4.500	2.539	0.084	0.070
	Post-test2			-7.000*	2.450	0.007	0.163
BP Systolic	Baseline Pre-test	Experimental	Control	-0.136	3.147	0.966	0.001
	Post-test1			-6.636*	3.244	0.047	0.091
	Post-test2			-4.773	3.145	0.137	0.052
Blood Cholesterol	Baseline Pre-test	Experimental	Control	0.045	8.051	0.996	0.000
	Post-test1			-1.364	5.616	0.809	0.001
	Post-test2			-8.909	6.007	0.145	0.050
Blood Glucose	Baseline Pre-test	Experimental	Control	-4.364	5.769	0.454	0.013
	Post-test1			-8.409	7.087	0.242	0.032
	Post-test2			-16.182*	5.195	0.003	0.188

Note: BP=Blood Pressure,

Therefore, it can be concluded that the home-based intervention was effective on the improvement of the blood profiles among sedentary undergraduate female students after 6-weeks for systolic blood pressure. This result is a good indicator to prove that the benefit of the combination of physical activities and dietary awareness intervention program can be achieved as earlier as after 6-weeks. In addition, if the subjects continue their program for 12-weeks, more benefit will be gained especially in improving the diastolic blood pressure and blood glucose among the subjects (Table 2). This showed the combination of physical activities and dietary awareness intervention program is effective in improving blood profiles among sedentary undergraduate female students in Soran University, Iraq.

Discussion

Home-based interventions can improve blood profiles for sedentary adult population from age 18-years and above (Goodpaster et al., 2010; Järvelä et al., 2012), and is especially effective when it includes combination of physical activity and dietary awareness program (Artinian et al., 2010; Loprinzi, Smit, & Mahoney, 2014; Söderlund, Fischer, & Johansson, 2009). A similar finding was also found in this study during the 12-weeks home-based physical activity and dietary awareness combination intervention program proven to improve blood pressure, blood cholesterol, and blood glucose among the sedentary female undergraduate in Iraq. Since the surrounding condition in Iraq is less secure, designing an intervention program that can be easily carried out at home is a challenged. Besides providing the subjects with some useful information pertaining healthy diet, the simple exercises design in this intervention was also easy to be carried out at home with least supervision. This had made the sedentary students who participate in this study feel excited to practice and apply the exercises and dietary awareness knowledge at home. So when they start to exercise regularly, their blood profiles were reported to improve better as compared to the control group (as shown in Table 1). The subjects' diastolic BP, systolic BP, blood cholesterol and blood glucose level were also reported to improve better as compared to the control groups, which shown inconsistent results. The effectiveness of the combination intervention program can be seen as earliest as after 6-weeks, where the systolic blood pressure was reported to reduce significantly. This is in line with the statement given by Wiklund et al. (2014), where a short-term program of 6-weeks regular exercise was found to improve blood profiles even in the absence of weight loss in sedentary women.

On the other hand, when the intervention program is continues up to 12-weeks, more benefits were reported in term of blood profiles. Based on this study results, diastolic blood pressure and blood glucose were reported to be significantly improved. The plausible explanation as the students significantly improved their blood profile was that they were previously sedentary (Wiklund et al., 2014). Hence, when they start to be active and give more attention and care about their diet, their blood profile can be better and improved faster. Normally, physical activity with dietary intervention program can improve blood profile after practicing for at least 10 weeks (Danielsen, Svendsen, Mæhlum, & Sundgot-Borgen, 2013). However, results from this study showed that intervention program that was tailored made to suit the Iraqi sedentary

female undergraduate took lesser time to show a significant improvement. The similar findings were also reported by other studies, where significant improvements were reported when the intervention program was simple and design based on the participants' daily life requirements (Järvelä et al., 2012; Mcmurray et al., 2002). In conclusion, the health benefits achieved when combining physical activity with dietary awareness intervention program in preventing many chronic diseases are well established (Azevedo, Luiz, Rocco, & Conde, 2012; George et al., 2011). However, when the program was develop based on the participants' daily life requirement and is simple and easier to be carried out at home, the benefit of the intervention program can be achieved much earlier. The home-based intervention program design in this study was found to be effective in improving the blood profiles variables among the sedentary undergraduate female in Soran University, Iraq. Hence, targeting positive change in sedentary behavior among sedentary populations must emphasise more on selecting suitable exercise movements that easily done at home (home specific), and should be the key component to be taken into consideration in of future home-based intervention programs. Effective home-based physical activity and dietary awareness intervention program can positively improve sedentary undergraduate female students' blood profiles as early as after 6-weeks.

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