

## Effects of Regular Walking on Chronic Idiopathic Constipation

Hassan Barololoum<sup>1</sup>

1. Assistant professor, Department of physical education and Sport Science, Shahrood University of Technology, Sahrood, Iran  
[hasan.bahrololoum@gmail.com](mailto:hasan.bahrololoum@gmail.com)

**Abstract:** Considering the insufficient research findings about the effects of physical activity on healing constipation, this research was designed to determine the effects of regular walking on chronic constipation. A total of 31 college students (mean age= 20.3) suffering from chronic constipation were randomly divided into two groups experimental and control condition. McMillan and Broussard constipation scale was employed to collect the data at the beginning and the end of the project. The treatment group participated in a regular walking program for two month every day for duration of one hour at their 60 percent of their maximum heart rate while the control group did not participate in any regular physical activity program. The results of analysis of data indicated that there was a significant difference between the mean score of intensity of constipation before and after the exercise program ( $p=0.0001$ ). In addition, there was a significant difference between the mean score of the treatment group compared to the control group after the termination of the exercise protocol. It was concluded that walking program can be used to treat chronic constipation in inactive individuals who have no history of other diseases.

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### 1. Introduction

There are various types of disease involving the lower part of the gastrointestinal tract; one of the most prevalent disorders that occur in all age groups is constipation. Although this problem is seen more often in the elderly, aging is not the only etiologic factor (Pettigrew M, Watt I, Sheldon T.1997); but there are different predisposing factors including some diseases, use of some drugs and life style. More specifically, adopting hard style of living, stress, irregular consumption of food, inadequate use of fiber, water in daily diet, and lack of physical activity contribute to the occurrence of constipation (Anti M, et al.1998).

The term of constipation is used to describe the difficulty of individuals to defecate on a regular basis and/or do so infrequently or incompletely (Amenta. M, M.T. Cascio, P. Di Fiore, I.Venturin, 2006). Individuals who are inactive during the entire day or sit down for prolonged periods face constipation. Everhart et al. (1989) claimed that low level of physical activity is one of the risk factors for affliction of constipation (Everhart JE, Go VL, Johannes RS, Fitzsimmons SC, Roth HP, White LR. A, 1989) and this danger increases with increase in age (Evans JM, Fleming KC, Talley NJ, Schleck CD, Zinsmeister AR, Melton L J. 1998). Nakaji et al. (2002) conducted a survey of the relationship between the life style habits and defecation from a total of 1699 people in Japan.

They concluded that there was a significant positive correlation between the age and constipation in men but not in women. Also, there was such correlation with the fiber consumption in diet in both genders but walking had effect only on men (Nakaji S, Tokunaga S, Sakamoto J, Todate M, Shimoyama T, Umeda T, Sugawara K, 2002).

Simern e.g. 2003 concluded that moderate regular physical activity decreases the risk of affliction of chronic gastrointestinal symptoms. Also they stated that the improvement in blood flow to this region and neuroendocrine alterations are the cause of such benefits (Simrén M, 2002). Meshkinpour et al. (1998) have studied on a sample of 8 subjects within 31 to 65 years old. The patients participated in 6 weeks of sub-maximal regular exercise one hour per session for 5 times per week; the exercise program included 3 kilometers of walking. The result of this research indicated that such activity did not have a significant effect on chronic constipation (Meshkinpour H, Selod S, Movahedi H, Nami N, James N, Wilson A, 1998). Meshkinpour et al. (1989) also examined the effect of aerobic program on chronic constipation and found no significant association between them (Meshkinpour H, Kemp C, Fairshster R, 1989).

Robertson et al (1993) reported that one hour of daily walking have no effect on the segmental colon transit and they did not observe any

significant improvement on constipation (Robertson G, Meshkinpour H, Vandenberg K, James N, Cohen A, Wilson A, 1993). Coenen et al. (1992) conducted research on 20 healthy men who suffer from chronic constipation; in this study, the subjects required to do jogging for three days and resting for three days a week; as a result they did not find any meaningful effect in both bowel transit and subject's defecation frequency (Coenen C, Wegener M, Wedmann B, Schmidt G, Hoffmann S, 1992). Other investigators also examined the relationship between the participation in physical activity and constipation disease and did not report any significant improvement in constipation (Tuteja Ashok K, Talley Nicholas J, Joos Sandra K, Woehl James V, Hickam David H, 2005; Bingham SA, Cummings JH, 1989).

On the contrary, Schryver et al. (2005) conducted an investigation to assess the effect of regular physical activity program on middle age patients who suffer from chronic constipation. A total 45 patients were divided into two groups of exercise and control group; the exercise group participated in 12 weeks of 30 minutes brisk walking program. An examination of bowel movement through radiology monitoring revealed that the exercise program indeed improve the transit of substances and defecation pattern in the patients; this results mean that frequency of defecation and time of defecation improves with exercise (De Schryver AM et al, 2005). Wald et al. (2007) reported a significant association between the factors associated with life style of healthy and affliction of constipation people (Wald et al, 2007). Brown et al. e.g. 2000 concluded that physical activity leads to improvement of constipation in Australian women (Brown et al, 2000).

A research conducted by Dukas et al. e.g. 2003 assessed the relationship between the consumption of fiber in foods, physical activity habits and other life style factors in female subjects. A total of 62036 women aged between 36 to 61 years old completed questioners from 1980 to 1982; the researchers defined constipation as frequency of defecation less than twice a week. They concluded that the frequency of constipation in women who have been physical activity was considerably low; in addition, the frequency of constipation in individuals who have consumed fiber was low; the prevalence of constipation in respondents who have consumed fiber and have been physical activity was very negligible (Dukas et al, 2003).

Talley et al. (2004) in epidemiological research showed that there is a positive association between constipation and life style (Talley NJ, 2004). Sanjoaquin et al. e.g. 2003 demonstrated that life style and constipation are related and in regard to the bowel movement stated that women have slower bowel movement compared to men and such motions are more in vegetarian individuals; they concluded that there was a positive correlation between the bowel movement and BMI and also a positive correlation between bowel movement with sever exercise especially in women (Sanjoaquin et al, 2003).

Wong et al. (1999) examined the relationship between the sociological characteristics and life style on the affliction of constipation in Asian adults by using an interview method; they concluded that constipation is not associated with gender and cultural factors, but it is associated with diet and ageing (Wong et al, 1999).

G J Oettle (1991) undertook research into the effects of moderate exercise on the defecation habits of 4 women and 6 men between 22 to 41 years old. The authors concluded that moderate exercise by bicycle and jogging for one hour per day at 50 percent maximum oxygen consumption intensity decrease bowl transit time, but it had no effect on the frequency of defecation (Oettle. G J, 1991).

Research in the past 40 years has shown that walking is the best and most preferred physical activity for all age groups. It is anticipated that physical activity can decrease the frequency of constipation and lack of physical activity may increase the risk of constipation. Considering the contradictory findings in regard to the subject, this research was designed to evaluate the effect of regular walking program on the intensity of chronic constipation in college students.

## 2. Methods

Our research was conducted at the Shahrood University of Technology and the subjects of the study were 30 volunteer college students (25 females & 5 males) who suffer from chronic constipation, with mean age of  $20.33 \pm 1.33$  (females  $20.55 \pm 1.92$  and males  $19.5 \pm 1.92$ ).

There were one hundred profile of constipation in infirmary of university. After studying them, twenty cases were omitted according to inclusion criteria and the rest of them were invited to presenting session. In this session, the goals of study and procedures were described

for the students. Moreover, we asked that they volunteer to participate in the study.

The inclusion criteria come as follow:

The subject was facing constipation at the start of project and was experiencing at least two weeks.

- Aged over 18 years old.
- Were confirmed physically and mentally healthy by physician.
- Did not take any medication that induce or aggravate constipation.
- Did not have any drastic change of diet and activity within the last 2 months.
- Did not consume any plantar drug or medicine for treatment of constipation.
- Did not have any history of regular physical activity.
- All lived in college dormitory and therefore consumed similar foods.
- Did not change their diet or if they did, they reported to the researcher.

In another session, details of research protocol were described to the subjects and were asked to follow the prescribed program strictly. Furthermore, all of our subjects were taught the method of evaluation of the heart rate which it was necessary for evaluation of intensity. Before the start of the project, all of the participants completed and signed the personal information and the informed consent forms.

The subjects were then randomly assigned into two groups of experimental (n1=15) and control (n2=15). The experimental group participated in 8 weeks of 60 minutes of walking (3-5 km) at 60% of their maximum heart rate. During the project time, the control group did no any physical activity. The heart rates of subjects were controlled prior, during, and after the termination of the activity program.

Persian version of McMillan and Broussard constipation scale was employed to determine constipation (Broussard 1998). The scores were recorded before and after the walking program.

This scale contains question items that measure eight characteristics related to constipation including frequency of defecation, duration strain, abdominal distention and bloating, feeling of incomplete evacuation, feeling of rectal fullness and pressure, and lack of defecation within the last 24 hours. Every item is scored by using Likert scale method ranging from zero to 4, thus the final score for all eight items may add up to 0 to 32, respectively. In this study, the intensity of constipation was classified as follow:

- 0-8, was considered as no constipation;
- 9-16, was considered as moderate constipation;
- 17-24, was considered as severe; and
- 25-32 was considered as highly severe.

McMillan and Broussard constipation scale is a well validated tool that has been used by previous studies. Also, these studies showed that the reliability of this scale was 0.84% - 0.92% (22, 23, 24, 25). In this study, the reliability of the instrument was calculated with using two methods Split-half and Cronbach which was 0.86 and 0.95 respectively.

Statistical analysis was performed on data by using SPSS-16. Descriptive statistics including means and standard deviation were calculated and Pearson correlation coefficient was used to measure the association between the variables. Independent t-test for comparing the experimental and control group and dependent t-test for comparing the pretest and post test changes were used. All the tests of significances were examined at alpha level set to 0.05.

### 3. Result Analysis

The characteristics of the subjects are presented in table 1. The result of analysis of data indicated that there were no significant differences between the ages of the control ( $19.73 \pm 0.47$ ) and ( $20.65 \pm 1.53$ ) the experimental groups.

**Table 1: personal characteristics of the subjects**

Variables	frequency	minimum	maximum	mean	SD
Age(year)	31	19	24	20.31	1.33
BMI(kgm <sup>2</sup> )	31	16.59	25.56	21.27	2.55
Pre- test weight(kg)	31	40	80	56.71	.07
Post- test weight(kg)	31	40	81	56.90	.21
Height(cm)	31	152	185	162.81	7.45

Table 2 presents the frequency distribution of constipation intensities for the experimental

conditions. The results of analysis showed no significant differences existed between the means

of various factors of constipation before and after the exercise protocol in the control group ( $p < 0.05$ ); while there were significant differences between

the means of various factors of constipation in pre-test and post-test condition in the experimental group ( $p > 0.05$ ).

**Table 2: frequency distribution of different constipation intensities in the experimental and control group in pre and post exercise**

group	time	Mild(1-8)	Moderate(9-16)	hard(17-24)	Very hard(17-24)
experimental	Pre-exercise	3	4	10	3
	Post-exercise	7	9	1	-
control	Pre-exercise	2	4	3	2
	Post exercise	2	4	3	2
total	Pre-exercise	5	8	13	5
	Post exercise	9	13	4	2

The results in table 3 shows that no significant differences existed between the means of various factors of constipation in before training protocol in the control and experimental group ( $p < 0.05$ ), while

there only was a significant differences the means of various factors of constipation in pre and post test condition in the exercise group ( $p > 0.05$ ).

**Table 3: comparing the pretest and post test condition of the experimental and control group after the completion of the walking program**

group	number	stage	mean	SD	t	df	p
experimental	20	Pre training	21	4.93	17.89	19	.000
		Post training	1.52	.87			
control	11	Pre training	21.71	5.41	-2.61	10	.082
		Post training	22.30	6.11			

#### 4. Discussion and Conclusions

The purpose of our study was to evaluate the effect of regular walking program on the intensity of chronic constipation in college students. The results of this research indicated that one hour of walking at 60% of maximum heart rate per day can significantly improve the chronic constipation in healthy individuals who have not physical activity. These results were in agreement with the results of research conducted by Dukas et al. (2003), Nakaji et al. (2002), Brown et al. (2000), De Schryver et al. (2005), Wald et al. (2007), De Schryver (2005), and Simrén (2002). However, the results of this study did not support the findings of studies that reported by Meshkinpour et al. (1998, 1989), Robertson et al. (1993), and Coenen et al. (1992). The research conducted by Meshkinpour (1998) included adult subjects over the age 30, whereas the present research was conducted on subjects with age 25 or less. In the other hand, the research protocol used by Meshkinpour lasted for 6 weeks, while the present research lasted for 8 weeks. Other researcher who did not find similar result with this research employed different types of exercise protocol which might be the main reason for finding contradictory results.

Constipation improvement through walking activity may be due to increase of muscular tone of

digestive track. In human digestive system, increase in the activity of the bowel prevents the incidence of chronic constipation. For this reason, the patients recovering from surgery encourage walking to become capable of tolerating oral food ingestion and avoid constipation.

In addition, Preston et al. e.g. 1985 demonstrated that the action of pelvic muscles can influence the act of defecation (Preston D.M, Lennard- Jones J.E, 1985; Eoff. James C, Pharm D, Anthony J. Lembo, 2008). Since the majority of our subjects adopted a sedentary life style, it seems like that the strengthening of the pelvic muscles following participation in walking program could result improvement in constipation condition. Also, physical activity could influence the density of some of the hormones including vasoactive intestinal polypeptide, secretin, pancreatic polypeptide, somatostatin, gastrin, glucagon, catecholamines, motilin, prostaglandins, and endorphins that are effective in both bowel function and defecation (Oettle G J,1991).

Another factor that is effective in constipation is the psychological status of the person ( Tangen Haug T, Mykletun A, Dahi A, 2003). Our students live far from their parents and face many problems in the dormitories. These conditions may affect the intensity of their constipation. Participation in this

study seems to have alleviated this problem. This may be due to the ecstatic effect of exercise. More especially, when you do exercise, your body produces endorphin and endorphin causes ecstasy and ecstasy in turn lowers the level of constipation (Oettle G J,1991).

The result of research showed that there was no significant correlation between constipation and BMI. This result is not similar to what was reported by Sanjaqueen (2003); in that research middle age and elderly subjects participated whereas in this research subjects were less than 25 years old who also were within the normal range of BMI. Therefore, the type of constipation of our subjects may not be related to obesity factor.

In addition, there was no significant correlation between the age of subjects and constipation ( $r = -0.21$ ). There was no research in this case to compare the finding of this study with them. Our subjects have not any difference in age and it seems that constipation associated with age is related to child and old adult

Some studies have recommended that physical activities and fluid consumption are the first choice for the treatment of constipation (Annells M, Koch T, 2003; Brandt L.J, Prather C.M, Quigley E.M, Schiller L.R, Schoenfeld P, Talley N.J,2005 and Muller-Lissner S.A, Kamm M.A, Scarpignato C, 2005). Our study also found similar result and concluded that regular physical activity (walking one hour per day) at 60 percent of maximum heart rate for sedentary young people who suffer from chronic constipation, leads to improvement in constipation. Since the majority of people may find it difficult to participate in one hour of physical activity every day, the researcher suggests that similar research projects including less duration and every other day frequency be conducted.

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#### Correspondence to:

Address: University Bulv. Po. Box: 316, Shahrood University of Technology, Sport Science Dep. Shahrood, IRAN

Telephone: 00982733392204-9

Emails: [bahrololoum@shahroodut.ac.ir](mailto:bahrololoum@shahroodut.ac.ir);  
[hasan.bahrololoum@gmail.com](mailto:hasan.bahrololoum@gmail.com)

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