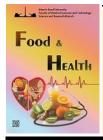# Food & Health

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The relationship between anthropometric indices and constipation in Parkinson's patients

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ABSTRACT

Constipation is a common non-motor problem in Parkinson's patients that affects the quality of life of these patients. Complications of constipation include anal pain and injury, which leads to anal ulcers and hemorrhoids. Many factors are blamed for this matter, which overweight and obesity might affect in these patients as well. Chronic constipation completely affects a person's quality of life. Therefore, the aim of the present study was to find the possible relationship between anthropometric indices and constipation in Parkinson's patients in Iran. The study was performed on 72 Parkinson's patients aged 50-80 years with constipation referred to Hazrat Rasoul Akram Hospital in Tehran. Patients were divided into two groups according to the number of bowel movements per week (<3 and ≥3 respectively). Demographic information was collected by a general questionnaire. Anthropometric data were calculated using Seca scales and meters. Body fat percentage and lean body mass were calculated using valid formulas. Data related to physical activity, food intake, number of excretions were collected by valid questionnaires. Based on the present findings, there is no relationship between anthropometric indices and constipation in Parkinson's patients. There is no significant difference in anthropometric indices between the two groups either. No significant difference in food groups between the two groups was observed as well. Anthropometric indices have no effect on constipation in Parkinson's patients. Future studies on the large-scale samples are recommended.

1. Introduction

Parkinson's disease is a chronic progressive and degenerative neurological disorder that occurs worldwide in both sexes and is the second most common neurodegenerative disease among people after Alzheimer's disease (1). The prevalence of this disease in the world is between 100 and 300 people per one hundred thousand people (2, 3). However, due to the overall aging of the population, the number of these patients is projected to double by 2030 (4). The prevalence of this disease is higher in men than women and the age of onset of this disease is usually 35-65 years (5). Also, the prevalence of this disease in Iran in the general population and people over 50 years is 50.4 and 261.1 per 100,000 people, respectively (6). The disease is usually associated with the gradual loss of dopaminergic neurons in the substantia nigra region of the brain (7). As a result of this disease, 50 to 70% of dopaminergic neurons in this area are destroyed (8), which causes motor defects. Motor complications in these patients include tremor at rest, stiffness, and slowness of movement (9, 10); non-motor problems are also present in these patients such as neurological disorders, cognitive disorders, depression, psychosis, sleep disorders, and gastrointestinal problems (11). Gastrointestinal problems have been reported in more than 80% of patients with Parkinson's and include bloating and constipation (11). Nausea delayed gastric emptying, and prolonged bowel movements (11). Constipation is a common complication of Parkinson's disease (12), but it can be managed to some points with lifestyle changes such as adding extra fiber in the diet, or medical treatment (13). Many people who have Parkinson's disease notice difficulties with constipation before they notice motor symptoms such as

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tremor or stiffness. Constipation with a high prevalence (87%) occurs even before the onset of motor symptoms (14). Due to different treatments, patients pay a lot of money and time, which also affects their quality of life (5). In Iran, the annual cost of constipation for the urban population is estimated at 89.2 million dollars (15). In general, constipation can be considered as one of the main non-motor problems in Parkinson's patients who need treatment to improve their quality of life. Various environmental factors such as diet (16), smoking, physical activity, and alcohol consumption (17) are associated with constipation. On the other hand, some studies have shown that levodopa, which is the main drug used by Parkinson's patients, exacerbates the delay in gastric emptying (18). Studies have shown that body mass index (BMI) above 30 kg/m^2, is also among the factors associated with constipation (17). Obesity impairs gastrointestinal motility and constipation by increasing the secretion of pro-inflammatory cytokines. Although several studies have shown an association between obesity and constipation (19, 20), some studies have not shown an association between obesity and constipation (21–23). Therefore, in order to find a possible relationship between constipation and BMI, the present study was conducted.

2. Materials and methods

This cross-sectional study was performed on 72 Parkinson patients aged 50 to 80 years in Hazrat Rasool Akram Hospital in Tehran. Patients were divided into two groups based on the number of bowel movements per week. The first group consisted of patients who had less than 3 bowel movements per week (Group 1) according to Rome IV criteria and the second group had 3 or more bowel movements per week (Group 2). The weight of patients with minimal clothing was measured using a Seca floor scale (Seca 750, Hamburg, GmbH, Germany) with an accuracy of 0.1 kg. As these patients were not able to stand correctly, the height of the ulna was measured with a meter and then the height of the patients was estimated by the relevant table (24). Body mass index was calculated by dividing patients' weight (in kilograms) by their height (in meters to the power of two) (25). Janma formula was used to calculate the lean mass (26). The Deurenberg formula was also used to measure body fat percentage (27). To control confounding variables in this study, the two groups were matched in terms of age, sex, body mass index, and dose of drugs used at the beginning of the study. The ethical committee has approved the present study under IR.IAU.SRB.REC.1400.011. D'Agostino-Pearson omnibus test was used to find out the normality of the variables (28). The student's sample t-test was used to compare the mean of quantitative variables between the two groups. The Kendall's tau-b correlation test. was used to find the possible relationships. IBM SPSS Statistics for Windows v. 27 (IBM Corp., Armonk, N.Y., USA) was used for all analyses, a p-value of 0.05 or less was considered to be significant with a confidence interval of 95%.

3. Results

According to Table 1, no significant relationship was observed between anthropometric data and constipation in Parkinson's patients (p>0.05).

Table 1. Correlation of anthropometric indices with constipation of the studied samples.

Indices	P- value	CC
BMI	0.624	-0.059
LBM	0.180	0.160
PBF	0.368	-0.108
WT	0.804	-0.030

Based on Kendall's tau-b correlation test.

According to Table 2, there is no significant difference in anthropometric indices between the two groups (p>0.05).

Table 2. Comparison of anthropometric indices of the studied samples by two groups.

Indices	Group 1(40)*	Group 2(32)	P- value
Weight	69.96±12.92	69.83±7.52	0.959
BMI	25.13±3.91	25.30±3.10	0.843
LBM	49.39±7.54	47.37±9.98	0.347
PBF	42.83±4.39	42.66±4.39	0.874

*Group 1: <3 times bowel movement per week, Group 2: ≥3 times bowel movement per week. Based on the independent sample T-test, P-value<0.05 is significant.

According to Table 3, there is no significant difference in food groups between the two groups (p>0.05).

Table 3. Comparison of food intakes of the studied samples by two groups

Food Exchange	Group1(40)*	Group2(32)	P- value
Milk	0.87±1.07	1.16±1.02	0.246
Vegetable	1.55±1.13	1.72±1.38	0.568
Fruit	3.32±2.21	3.39±2.58	0.902
Bread	9.81±5.22	11.87±5.36	0.104
Meat	5.48±3.17	4.77±2.11	0.276
Fat	9.66±4.68	11.51±5.91	0.144

*Group 1: <3 times bowel movement per week, Group 2: ≥3 times bowel movement per week. Based on the independent sample T-test, P-value<0.05 is significant.

4. Discussion

As Table 1 illustrates, no relationship was observed between constipation and anthropometric indices whatsoever. Unlike the present study, in a study conducted in Iran, a significant association was found between obesity and constipation. A study conducted in Italy showed that constipation is more common in obese people (20). A cross-sectional study in Brazil found no association between obesity and constipation (29). In a study of 18,180 adults in Tehran, a link was found between the high prevalence of overweight and obesity and constipation (17). The difference between the results of the present study and previous studies is due to the different design of the study, the different target population, the age of the subjects, and the year studied, followed by differences in lifestyle, racial and cultural differences (30, 31). More

importantly, as all the confounding variables between the two groups were matched at the beginning of the study, it might be one of the main reasons for the differences between the present study and previous ones. Based on Table 2, no significant difference was observed on anthropometric indices which might be another reason for the finding results. Moreover, similarity in food intake, as well as drug of the patients in the present study, might be another explanation for the present findings. As in the present study, all the subjects had similar diseases with similar drug intake, therefore they had similar food intake to some extent as well which might be another reason to find these results. In a review of comorbidities, chronic constipation was regularly related to obesity (20% to 37% of chronic constipation patients) and being overweight (17% to 40% of chronic constipation patients) (32). However, other epidemiological studies have found no strong connotation between BMI and chronic or self-reported constipation (21–23) which the present study is in line with these. As Table 3 shows, despite non-significant differences between food intake of two groups, it shows that patients who had a lower intake of meat group which is similar to the previous studies (33, 34). Red meat may degrade constipation for three main explanations. First, it contains no fiber, which adds bulk to stools and aids them to move along. Second, red meat may also indirectly decrease a person's total daily fiber intake by taking the place of higher-fiber options in the diet (35). Furthermore, red meat generally contains higher amounts of fat, and high-fat foods take more time for the body to digest. In some cases, this may upsurge the probability of constipation even further (36).

5. Conclusion

There is no relationship between anthropometric indices and constipation in Parkinson's patients. Even though the sample size of this study was well enough, in order to have better sight for the conclusion that would be better to run similar large-scale studies on this topic.

Acknowledgment

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