

# The Effect of Self-Care Education With The Telenursing Approach On Health-Promoting Behaviors In Multiple Sclerosis Patients During The COVID-19 Pandemic: A Clinical Trial Study

**Yasaman Pourfarid**

Jahrom University of Medical Sciences

**Ali Dehghani** (✉ [ali.dehghani2000@gmail.com](mailto:ali.dehghani2000@gmail.com))

Jahrom University of Medical Sciences

**Mohsen Hojat**

Jahrom University of Medical Sciences

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## Research Article

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# Abstract

**Introduction:** Chronic conditions of multiple sclerosis (MS) patients are associated with a decrease in health-promoting behaviors and require appropriate nursing interventions. Due to limitations of face-to-face education during the COVID-19 pandemic, telenursing can play an essential role in providing education to patients. Therefore, this study aimed to investigate the effect of self-care education with telenursing approach on health-promoting behaviors in MS patients.

**Materials and methods:** In this clinical trial, 68 patients of the Jahrom MS Society randomly assigned to intervention (n = 34) and control (n = 34) groups. For patients in the intervention group, educational sessions were held three days a week for six weeks. Data were collected using demographic information and Walker's Health-Promoting Lifestyle questionnaires at two stages before and immediately after the intervention. Data were analyzed by Mann-Whitney and Wilcoxon tests using SPSS software (Ver. 21).

**Results:** Based on the findings immediately after the intervention, the mean score of HPBs was significantly higher ( $p = 0.005$ ) in the intervention group ( $145.38 \pm 26.66$ ) than in the control group ( $129.18 \pm 22.35$ ). Significant differences were observed regarding the mean dimensions of nutrition, exercise, health responsibility, and stress management between the intervention and control groups immediately after the intervention ( $p < 0.05$ ).

**Conclusion:** Based on the findings, self-care education with the telenursing approach was effective on HPBs in MS patients. Therefore, it is recommended to utilize self-care education with the telenursing approach to control effective behaviors in MS patients during the COVID-19 pandemic.

## Introduction

Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system (1) with a global prevalence of 35.9 per 100,000 people in 2020 (2) and about 80,000 registered patients in Iran (3). As MS prognosis is unpredictable, it often affects an individual in years when they are expected to be healthy (4). The disease and its long-term problems indicate the need for multi-professional services and the importance of patients' health promotion (5). Health-promoting behaviors (HPBs) have been recognized as an essential strategy for maintaining and promoting the independence, health, and quality of life of people with chronic conditions (6). Chronic conditions are associated with a decrease in HPBs in MS patients (7). People can maintain and control their health with HPBs, a kind of conscious planning and function performed to prevent disease, improve health, increase productivity, and prevent negative consequences (8). Jeon et al. (2020) indicated that patients with chronic diseases showed worse health behaviors than normal people (9). Saadat et al. (2019) reported lower levels of HPBs in MS patients than in healthy individuals (10). Also, Lee et al. (2021) reported moderate levels of HPBs in chronic patients (11).

MS patients need personalized and organized treatment plans that can delay their disease progression and empower them to promote self-care (12). These plans include relaxation and coordination exercises

in physical, sensory, motor, and mental functions, which are highly recommended programs (13). During the COVID-19 pandemic, telehealth is considered an essential tool in safeguarding patients and healthcare providers by reducing person-to-person contact and thus slowing down COVID-19 transmission (14).

Telenursing technology is defined as a means of increasing support in self-care and regulating patient access to medical services anytime and anywhere (15). This technology allows changing care from hospital-centered to community-centered and from care-centered to client-centered (16). Moriyama et al. (2021) emphasized that telenursing could help improve lifestyle-related behaviors in chronic diseases and manage cardiovascular conditions (17). Motl et al. (2020) suggested rapid transmission and coverage of telepsychology services (both video and telephone) in MS patients during the COVID-19 pandemic (18). On the other hand, Kotsani et al. (2018) demonstrated that telenursing in other chronic patients could create more self-care motivation than receiving routine care from the clinic (19). Piscesiana et al. (2020) mentioned helping self-management of chronic patients in outlying areas as another benefit of telenursing (20). In the past, educational programs and continuous telephone follow-up led to increased awareness, health behavior promotion, and self-care (21), but poor self-care behaviors were reported in MS patients (22).

The positive effect of telenursing has been reported in the treatment of chronic diseases, and this technology has reduced both hospitalizations of patients and nursing visits to the homes of chronically ill patients in recent years. However, a standard method has not yet been developed for telenursing (23). Therefore, teletherapy methods are essential in the recovery course of chronic diseases (e.g., MS) and can reduce costs and the patient's need for continuous access to medical centers. Although counseling and telenursing are easy and cost-effective methods, little related research has been done in Iran. On the other hand, the COVID-19 crisis and its global spread can provide a good ground in using tele-education for patients. Therefore, this study aimed to investigate the effect of self-care education with the telenursing approach on HPBs in MS patients.

## **Methods**

### **Study design**

This clinical trial study (with the code IRCT20201112049367N1) was conducted on patients who were members of the MS Society of Jahrom City in southern Iran.

### **Inclusion And Exclusion Criteria**

Inclusion criteria were patients' informed consent for participation, definitive MS diagnosis by a neurologist, an age range of 18-50 years, media literacy, not being in the acute phase of the disease, no disease recurrence in at least the last six weeks, at least a 2-year history of the disease, sufficient ability for self-care, access to mobile phones, and using WhatsApp software. Exclusion criteria included patient

withdrawal from the study for any reason, the patient's inability to implement a self-care program due to the disease complications, acute and critical attacks of the disease during the intervention, and suffering from other acute diseases such as heart, kidney, respiratory, gastrointestinal, and metabolic diseases other than MS, lack of access to a mobile phone, and absence for more than two educational sessions.

## Sample Size And Sampling Method

The sample size was calculated after the intervention in the intervention ( $129 \pm 18.9$ ) and control ( $144.6 \pm 15.9$ ) groups, assuming a first type error of 0.05 and a power of 80% according to Varzo et al. (2016) (24) by the following formula:

$$n = \frac{\left( Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_1 - \mu_2)^2} = \frac{(1.96 + .84)^2 (357.21 + 252.81)^2}{(16744.36 - 20909.16)^2} \approx 30$$

A sample size of 30 individuals was calculated in each group, and the final sample size in each group was considered 35 people considering the possible fall, with a total of 70 subjects.

Patients were sampled using the simple random sampling method. The list of MS patients was prepared from the MS Society of Jahrom City. According to the inclusion criteria and based on the patients' readiness for participation, they were individually assigned a code that was randomly selected using Excel software and random production of data. The selected patients were then assigned a code written on a card that was placed inside the box. Then, the cards were taken out individually, and the patients were randomly assigned to the intervention ( $n = 25$ ) and control ( $n = 35$ ) groups using the random allocation software (25). In this single-blind study, the participants were unaware of patients in the intervention and control groups (Fig. 1).

## Study Instrument

Data were collected using a demographic information questionnaire (containing questions about age, gender, education level, occupation, marital status, disease duration, and the number of hospitalizations) and Walker's Health-Promoting Lifestyle Profile (HPLP).

The main instrument of the study is Walker et al.'s HPLP (1987), the English version of which consists of 52 items answered using a 4-point scale (never = 1, 2 = sometimes, 3 = often, and 4 = usually). This instrument measures HPBs in six dimensions, namely nutrition (9 questions), exercise (8 questions), health responsibility (9 questions), stress management (8 questions), interpersonal relationships (9 questions), and self-actualization (9 questions) (26). In this questionnaire, higher and lower scores indicate higher and lower health-promoting styles, respectively. Morvati Sharifabad et al. (2004) confirmed the validity and reliability of the scale in Iran (27).

# Educational Intervention

The content of educational intervention topics implemented for patients in the intervention group is as follows:

- 1) Nutrition: proper dietary pattern (28)
- 2) Exercise: The type of exercise suitable for MS patients– patients' compliance to points needed during exercise (29)
- 3) Responsibility for health: Personal responsibility and necessary skills for a responsible person (30)
- 4) Stress management: Identifying sources of stress and its reduction methods (31)
- 5) Interpersonal relationships: Interpersonal relationship skills (28)
- 6) Self-actualization: Factors affecting self-actualization – having a sense of purposiveness to achieve self-actualization (32)

At the end of the study, educational materials were implemented for the control group through WhatsApp software in six weeks.

## Implementation Process

The researcher received a written referral letter from the Jahrom University of Medical Sciences, went to the MS Society, and obtained patients' phone numbers (with the coordination of the head of the institute) to receive electronic consent forms from patients meeting the inclusion criteria. Also, the patients were fully explained about the study's objectives and were ensured that non-participation in the study or withdrawal from the study would not disrupt their treatment process. Patients in both intervention and control groups received and completed the questionnaires electronically. Then, the educational intervention was performed three days a week on Saturdays (8-10 am by sending multimedia content to the groups through WhatsApp software), Mondays (education for each patient for 10-15 min through phone calls by the researcher from 8 am to 8 pm), and Wednesdays (evaluation of the patients through phone calls for 10-15 min by the researcher from 8 am to 4 pm) for six weeks. The patients could also call the researcher for 10-15 min from 8 am to 8 pm on weekdays if they felt the need for telephone counseling. Each week the researcher had to make sure that all the patients received the educational content. If WhatsApp software indicated that a patient did not receive the information, the researcher would contact the patient to ask the reason, and the information would be sent to the patient, if necessary. At the end of the six weeks, patients in the intervention and control groups completed HPLP electronically.

## Data analysis

The data were analyzed using SPSS software version 21. The Shapiro-Wilk test examined the normal distribution of data in the study groups. Due to the non-normality of the data, inter- and intra-group comparisons were made using the Mann-Whitney and Wilcoxon tests at a significance level of 0.05.

## Ethical approval

This research was approved by the ethics committee of JUMS (ethics code IR.JUMS.REC.1399.142). All the participants signed written informed consent forms. In addition, they were explained about the study objectives and method and sufficiently ensured about the confidentiality of their information.

## Results

MS patients in the intervention ( $n = 34$ ) and control ( $n = 34$ ) groups participated in this study. After collecting the samples, one subject in each group was excluded from the study as they failed to complete the questionnaire immediately after the intervention.

The Chi-square test results indicated that the control and intervention groups were similar in terms of demographic and contextual variables (Table 1). Based on the Shapiro-Wilk test results, the HPBs variables and their dimensions did not follow a normal distribution. Therefore, the data were analyzed using non-parametric tests.

The results of intragroup comparisons with the Wilcoxon test revealed that the mean score of HPBs increased significantly in the intervention group after the intervention ( $145.38 \pm 26.66$ ) compared to before the intervention ( $119.21 \pm 22.45$ ) ( $p = 0.001$ ). However, this increase after the intervention was not significant in the control group ( $p = 0.521$ ) (Table 2).

The Mann-Whitney test results showed a difference between the intervention and control groups in terms of mean HPBs ( $p < 0.05$ ), which was significant immediately after the intervention but not before the intervention ( $p > 0.05$ ). This result showed that the mean score of HPBs was significantly higher in the intervention group ( $145.26 \pm 38.66$ ) than in the control group ( $129.18 \pm 22.35$ ) ( $p = 0.005$ ) immediately after the intervention (Table 2).

Immediately after the intervention, the intervention and control groups were significantly different in terms of the average dimensions of HPBs (nutrition, exercise, health responsibility, and stress management) ( $p < 0.05$ ), with the mean scores of these dimensions being significantly higher in the intervention group than in the control group. However, the mean scores of interpersonal relationships and self-actualization in MS patients were not significantly different between the intervention and control groups ( $p < 0.05$ ) (Table 2).

## Discussion

Self-management education as an educational and behavioral intervention includes knowledge, ideas, self-regulatory behaviors, and the ability to manage chronic conditions and implement health behaviors (33). The present study results demonstrated that self-care education using telenursing could improve HPBs in MS patients.

Evidence indicates that intervention programs have effectively improved HPBs in patients with different diseases (34, 35); however, such programs have less been implemented in MS patients. In this regard, Shahsavani et al. (2018) reported that educational intervention with a dialysis diet content could improve health behaviors in dialysis patients (35). In a study on cancer patients, nursing interventions were influential in promoting health behaviors in cases that included health education and encouragement of change (36). Moriyama et al. (2021) in a study on islanders in Japan reported that most behavioral changes, such as self-management behaviors, cardiovascular indices, and self-efficacy, were significantly improved using telenursing. They used face-to-face health education in the initial interview, followed by telephone education (two-week calls to the third month and monthly telephone calls in the fourth and fifth months) by trained nurses outside the island (17).

Lee et al. (2021) found that self-control, as one's ability for self-regulation, improved patients' HPBs (11). Sato et al. (2021) observed that the management of postoperative symptoms and complications, as another benefit of telenursing, could be effective in patients with prostate cancer (37).

Contrary to our results, Khosravan et al. (2017) found that educational-supportive intervention was only effective in the physical dimension of HPBs (38). One reason for this discrepancy can be poor levels of HPBs in female heads of households. Other reasons include low education levels of these women and their vulnerability compared to other women. In the present study, approximately half of the participants had academic education.

In a study by Farsi et al. (2019), a face-to-face care intervention program based on Pender's model promoted HPBs in all dimensions except for self-actualization (39), which is in line with the present study findings concerning the non-significant self-actualization dimension. It seems that it is more difficult to change this dimension than the other dimensions, and implementing a care program based on Pender's model probably was not sufficient to make a change in this dimension.

In the current study, improvements were observed in the dimensions of nutrition, exercise, health responsibility, and stress management, but the MS patients were not significantly different in the mean scores of interpersonal relationships and self-actualization. Dashti et al. (2016) claimed the effectiveness of motivational interviews on HPB and its dimensions, except for the self-actualization dimension, in MS patients, which might be due to the presence of patients in motivational interview sessions that exacerbated their anxiety and interfered with the intervention results (34).

Dehdari et al. (2014) presented evidence that an intervention based on Pender's model could improve Iranian students' consumption of nutrients (40). Shahsavani et al.'s study (2015) on hemodialysis patients showed an improvement in adherence to diet in the patients through patient education and

telephone follow-up (telenursing) (35). Zheng et al. (2020) reported that a combination of face-to-face education and quarterly telephone follow-up could improve self-efficacy for nutrition, stress dimension, and the total score of HPBs (41). In the present study, the majority of patients had apparently a moderate income level, and they could afford their expenses, including nutrition. The present study is in agreement with those of Farsi et al. (39) and Nowruz et al. (42) regarding improvements in health responsibility and exercise/physical activity, respectively. In the present study, self-care education could effectively improve stress management in MS patients, which is in line with Zheng et al.'s study (2020) (41).

Our findings revealed that self-care education was not effective on the interpersonal relationship and self-actualization of the MS patients. Shahsavani et al. (2015), on the other hand, found that implementing a care program based on Pender's model increased HPBs in the domain of interpersonal relationships in chronic heart failure patients (35). This inconsistency can be explained by differences in the research population and patients' lifestyles.

It seems that self-care education with the telenursing approach can be an appropriate option to improve the education process of MS patients (43). Face-to-face self-care education is more expensive and time-consuming than telenursing, as the patient may not refer for follow-up sessions. It should be noted based on the current study results that telenursing was more effective on the patients during the intervention (35). Another strong point of this study is the implementation of telenursing during the COVID-19 pandemic, which can eliminate meetings and face-to-face sessions so that patients can receive necessary education electronically and remotely. In the COVID-19 epidemic, a change in the conventional management of patients, particularly those with chronic diseases such as MS, is considered necessary, and telemedicine is introduced as a valid alternative to face-to-face appointments; recommendations are available for using telemedicine in the management of MS patients (44). Telenursing increases immunity and reduces the risk of infection in patients with chronic diseases, particularly MS patients, who have underlying diseases and are at high risk for COVID-19, thereby preventing infection and the spread and transmission of the virus (45).

There were also limitations in this study, including the use of a questionnaire, as it is not known to what extent the questionnaire results could be consistent with real and practical behaviors. Moreover, individual differences of the subjects could probably influence the learning level, the proper implementation of the proposed programs, and, ultimately, the research outcome.

## **Conclusion**

According to the present findings, self-care education with the telenursing approach can influence HPBs in MS patients. This intervention seems to have significant desirable effects on achieving anticipated health outcomes, increasing the self-care ability of MS patients and their independent self-care, and, ultimately, improving their quality of life as a secondary effect. The necessary policies and programs for self-care education using the telenursing approach can help reduce the waste of time and costs incurred

on the healthcare system and the patient. Telenursing can also increase the immunity of patients during the COVID-19 outbreak by eliminating face-to-face visits and person-to-person contact.

## **Abbreviations**

MS multiple sclerosis; HPBs health-promoting behaviors.

## **Declarations**

### **Ethics approval and consent to participate**

This study was approved by the ethics committee of Jahrom University of Medical Sciences (Code of Ethics IR.JUMS.REC.1399.142). We followed the guidelines outlined in the Declaration of Helsinki and patients received information, both written and verbal, stating that completing the questionnaire was voluntary, anonymous, and that study results would be published. Consent to participate was obtained from each patient. Written informed consent was obtained from all patients.

### **Consent for publication**

Not Applicable.

### **Availability of data and materials**

All data generated or analyzed during this study are included in this published article. Further data set could be obtained on request if required through corresponding author with email: ali.dehghani2000@gmail.com.

### **Competing interests**

None of the authors have any conflicts of interest to disclose.

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### **Authors' contributions**

AD and YP contributed to the study conception and design. Material preparation, data collection and analysis was performed by AD and MH. The first draft of the manuscript was written by AD, MH and YP. AD and MH read and approved the final manuscript.

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## Authors' information

<sup>1</sup>Department of Nursing, School of Nursing and Paramedical, Jahrom University of Medical Sciences, Jahrom, IRAN.

<sup>1</sup>MSc in Nursing, Department of Nursing, School of Nursing, Jahrom University of Medical Sciences, Jahrom, Iran.

<sup>2</sup>Associate professor, Department of Community Health Nursing, School of Nursing, Jahrom University of Medical Sciences, Jahrom, Iran. E-mail: ali.dehghani2000@gmail.com. Corresponding Author.

<sup>3</sup>Assistant professor, Department of Nursing, School of Nursing, Jahrom University of Medical Sciences, Jahrom, Iran.

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## Tables

**Table 1. Frequency of demographic variables and disease history in control and intervention groups**

		Intervention group (n = 34)	Control group (n = 34)	p-value
		<b>Frequency (%)</b>	<b>Frequency (%)</b>	0.493
<b>Gender</b>	Male	4(11.8)	6(17.6)	$\chi^2$
	Female	30(88.2)	28(82.4)	
<b>Marital status</b>	Single	8(23.5)	5(14.7)	0.622
	Married	25(73.5)	27(79.4)	$\chi^2$
	Divorced/widowed	0(0.0)	2(5.8)	
<b>Education</b>	Dropout	9(26.5)	11(32.4)	0.543
	Diploma	11(32.4)	7(20.6)	$\chi^2$
	Academic	14(41.2)	16(47.1)	
<b>Disease recurrence in the last year</b>	No recurrence	21(61.8)	19(55.9)	0.663
	Once	8(23.5)	8(23.5)	$\chi^2$
	Twice	3(8.8)	2(5.9)	
	More	2(5.9)	5(14.7)	
<b>Hospitalizations in the last year</b>	No hospitalization	21(61.8)	16(47.1)	0.504
	Once	8(23.5)	13(38.2)	$\chi^2$
	Twice	3(8.8)	4(11.8)	
	More	2(5.9)	1(2.9)	
		<b>Mean <math>\pm</math> SD</b>	<b>Mean <math>\pm</math> SD</b>	
<b>Age (year)</b>		37.24 $\pm$ 8.03	$\pm$ 8.29 34.91	0.245 Ind. t-test
<b>Disease duration</b>		9.09 $\pm$ 5.84	6.74 $\pm$ 4.49	0.074 Mann-Whitney

**Table 2. Comparison of mean scores of dimensions of health-promoting behaviors in MS patients between intervention and control groups before and immediately after intervention**

Variable	Time	Intervention group		Control group		p-value	Test
		Mean	SD	Mean	SD		
Health-promoting behaviors	Before intervention	119.21	22.45	126.00	22.69	0.219	Ind. t-test
	Immediately after intervention	145.38	26.66	129.18	22.35	0.005	Mann-Whitney
	p-value	0.001		0.521			
Nutrition	Before intervention	21.44	4.02	21.50	4.34	0.954	Mann-Whitney
	Immediately after intervention	24.68	4.24	19.68	3.82	0.001	Mann-Whitney
	p-value	0.002		0.051			
Sport	Before intervention	12.85	5.00	14.18	3.62	0.072	Mann-Whitney
	Immediately after intervention	19.76	7.12	16.32	5.60	0.029	Mann-Whitney
	p-value	0.001		0.066			
Health responsibility	Before intervention	21.00	5.34	21.44	6.71	0.765	Mann-Whitney
	Immediately after intervention	25.59	5.88	22.00	6.62	0.016	Mann-Whitney
	p-value	0.001		0.787			
Stress management	Before intervention	17.76	4.84	18.97	5.16	0.287	Mann-Whitney
	Immediately after intervention	22.15	4.83	19.76	4.77	0.025	Mann-Whitney
	p-value	0.001		0.341			
Interpersonal relationships	Before intervention	23.18	5.07	24.53	5.02	0.273	Mann-Whitney
	Immediately after intervention	26.76	5.06	25.06	4.82	0.081	Mann-Whitney
	p-value	0.001		0.738			
	Before intervention	22.97	5.41	25.15	5.51	0.105	Mann-

							Whitney
Self-actualization	Immediately after intervention	26.44	4.86	26.35	4.97	0.749	Mann-Whitney
	p-value	0.003		0.261			

## Figures

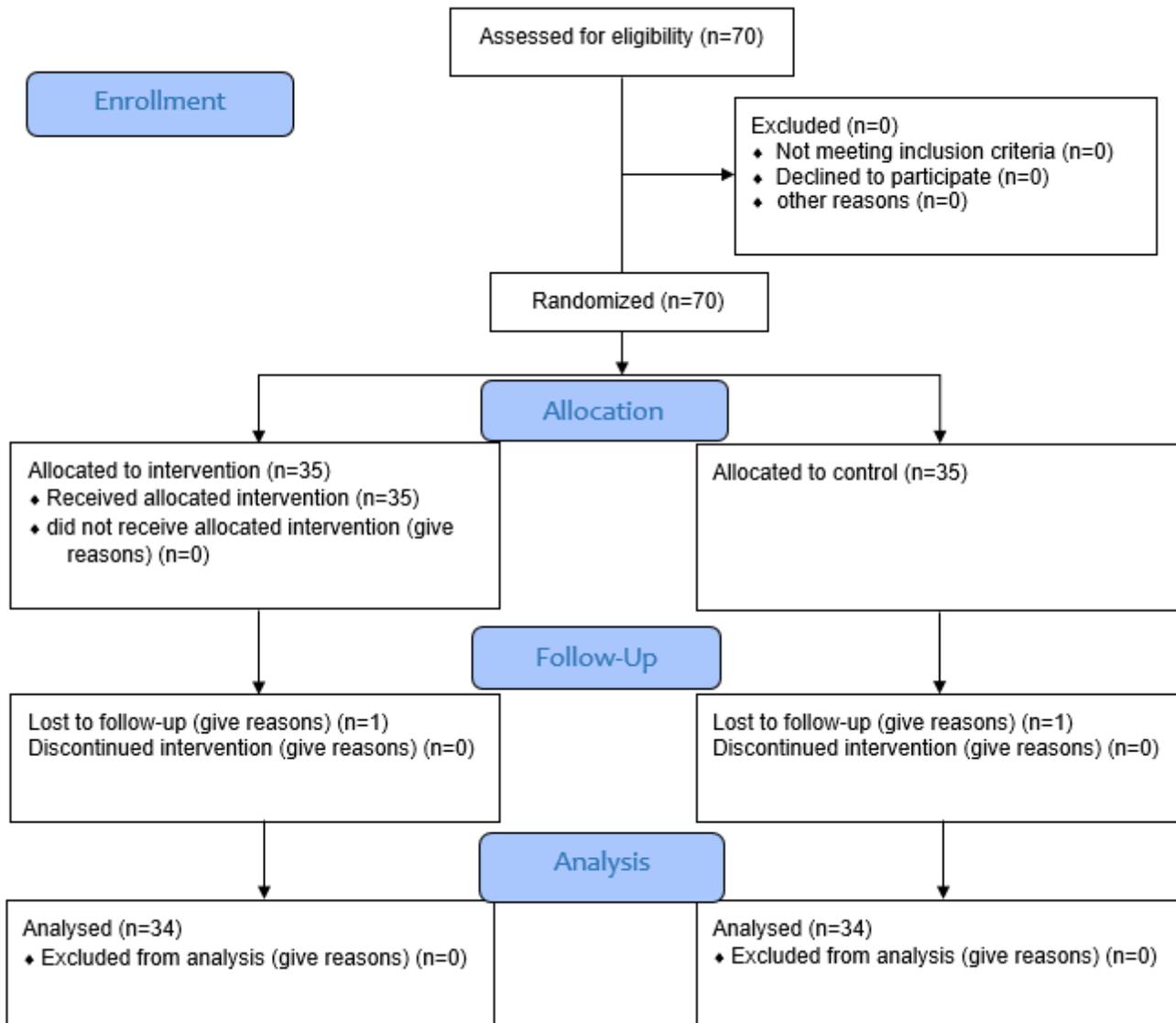


Figure 1

CONSORT 2010 Flow Diagram