

The Efficacy of Virtual-based Nutritional Interventions on Knowledge, Attitude, and Practices of Individuals with Hypertension: A Comparative Study Analysis

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INTRODUCTION

Hypertension (HTN) can be considered as a burden on human quality of life and health-care systems. This is because of its contribution to increased mortality and risk of cardiovascular diseases such as myocardial infarction, angina pectoris, heart failure, and stroke. At present, one-quarter of the world's adult population is known to have HTN, and this number is likely to increase to 29% by 2025. It is an important public health issue for both the economically developed and currently

developing countries.^[1] Research shows that apart from pharmacological treatments, lifestyle improvement also plays an important role in the prevention of high blood pressure. Lifestyle improvement includes

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ABSTRACT

Introduction: Hypertension (HTN) is multifactorial, complex disorder predictable to affect all genders and foremost preventable risk factor for blood pressure and cardiovascular diseases. **Objectives:** The present study was assessing the knowledge, attitude, and practices (KAPs) regarding HTN and creating the awareness of its better management among the hypertensive population through nutrition education intervention. **Methodology:** A total of 82 participants were selected and questionnaire was used to elicit sociodemographic profile and KAP regarding HTN and its management. Nutrition education intervention was carried out through the online mode. **Results and Discussion:** Results observed in preintervention between knowledge with attitude in experimental group and control group ($r = +0.273$ and $r = +0.271$), practice ($r = +0.275$ and $r = +0.263$), and attitude with practice ($r = +0.521$ and $r = +0.186$) were positive correlation similarly postintervention of both group obtained significant positive correlation. The statistical analysis of various sociodemographic factors of pre and postintervention in the experimental group and control group revealed a significant improvement in the mean posttest scores of KAP. Meanwhile, various sociodemographic factors obtained had nonsignificant ($P > 0.005$) in experimental group; a control group of pretest and posttest reported significant differences ($P < 0.05$). The posttest total mean score on nutritional knowledge and practice in the experimental group also showed a large significant ($P < 0.05$) increase when compared to the pretest mean score. There was no significant improvement in the total mean scores in any dimensions of the control group. **Conclusion:** The study therefore helped the experimental group subjects in improving their overall knowledge about the importance of nutrition in HTN and also instilled positive attitude and practices toward the management of HTN through lifestyle modifications.

KEYWORDS: Hypertension, knowledge, attitude and practice, nutrition education

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nutrition monitoring, indulgence in physical activity, stress management, smoking cessation, and weight control.^[2] Therefore, the management of HTN involves the use medication, diet modification, or a combination of both. Dietary modifications can be regarded as the first line of intervention as well as lifestyle modification strategy with enormous potential for preventing HTN at a cost that is less than the other pharmacological interventions.^[3] This diet emphasizes more on the consumption of vegetables, fruits, whole grains, beans, and legumes; it includes low-fat or fat-free dairy products in moderate amounts, fish, poultry, vegetable oils, and nuts; and a very great extent puts a limit on the consumption of added sugars, sugary beverages, sodium, highly processed foods, refined carbohydrates, saturated fats, and processed meats.^[4]

Behavioral interventions that focus on the adjustment of personal practices and habits along with the provision of nutrition education are known to have an impact on both the nutrition and health outcomes of people who have HTN.^[5] Implementation of nutrition education intervention that targets knowledge, attitude, and practices (KAPs) regarding HTN and its management in the hypertensive population can help significantly reduce its prevalence and its associated disability, mortality, and morbidities in the population.^[6,7] The Dietary Approaches to Stop Hypertension diet and the Mediterranean diet are known to reduce blood pressure. Nutrition education intervention on improving KAPs of hypertensive population can help achieve reduction in the prevalence of the condition by better management of the condition by the population.^[8] Nutrition intervention will not only create awareness and impart knowledge about HTN and its management through dietary and lifestyle modification but will also motivate subjects to bring about a change in their lives by applying the knowledge imparted to them in their daily lives^[9] and therefore to conduct the nutrition education intervention and to assess its effectiveness in improving KAPs and correlation between pretest and posttest KAP scores regarding HTN.

METHODOLOGY

Sampling technique and sample size

In this study, purposive sampling technique was adopted in order to select samples. Samples were chosen from all over India. Majority of the subjects included in the study belonged to the following states: Karnataka, Telangana, Maharashtra, Chennai, Gujarat, Delhi, and Uttar Pradesh. Due to the pandemic situation, physical data collection was not feasible; therefore, online mode of data collection was adopted. The tool

used for the collection of data was a self-structured KAP questionnaire which was circulated among 152 hypertensive people. Responses were received from 86 people. On verification, it was found that only 82 candidates could be included in the study as the other 4 did not meet the inclusion criteria. Therefore, the sample size for this study was 82 hypertensive people.

Sample selection criteria

Inclusion criteria

The subjects were HTN patients, aged between 25 and 65 years old, and subjects willing to be a part of the study and wanting to give adequate time to the intervention.

Exclusion criteria

Subject beyond on the required age group, individuals with comorbid conditions such as chronic kidney disease and coronary artery disease, and subjects who are not willing to be a part of the study/intervention.

Evaluation tool

A self-structured KAP questionnaire was designed to elicit information on nutritional KAP from the study samples and done with sociodemographic profile and anthropometric measurement. The study was approved by the Institutional Human Ethical Committee, Mount Carmel College (IHEC-MCC No. 010 MSc/2020–2021). The intervention program was carried out through digital mode. The preintervention of KAP questionnaire was sent to all subjects who met the inclusion criteria of the study and nutrition education intervention was carried out for a period of 70 days. 1–2 aids were sent to the subjects of the experimental group each week and finally, postintervention of KAP questionnaire was circulated again to assess postintervention responses of the subjects.

Analysis of data

The various tests used to analyze the study included as follows: percentage, mean, mean percentage, Pearson correlation, and paired *t*-test. SPSS version 20.0 (SPSS Institute Inc., Cary, USA) was used to analyze the data. The KAP data were analyzed and described in numbers and percentages and also by means of total mean scores and standard deviations. All KAP scores were tested for normality. The data were found to be normally distributed by the Kolmogorov–Smirnov test; therefore, paired *t*-test was used to compare the preintervention and postintervention mean KAP and nutrition knowledge and practice scores of the subjects. One-way analysis of variance was also used to know the level of significant difference between the pretest and posttest observations. Pearson's correlation was also used to find statistically significant correlation

between variables. It was also put to use to determine the strength of the association and the direction of association of the variables.

RESULTS AND DISCUSSION

HTN has been converted into a significant issue in many countries experiencing epidemiological switch from communicable to noncommunicable chronic diseases.^[10] Sociodemographic data help to provide information regarding study participants and are required for the determination of whether or not individuals in a study are a representative sample of the entire target population for the purpose of generalization. Table 1 depicts the sociodemographic profile of the subjects in the experimental and the control group. In the experimental group, it was observed that majority (49%) of the subjects belonged to the age group of 45–55 years and more than

half of the subjects were females (63%). Among the subjects in experimental group, 44% were completed undergraduates and 20% were professional. Most of the subjects were homemaker (46%) and salary-employed (30%). More than half of the subjects in the experimental group had a family history of HTN (male – 58.9% and female – 52%). HTN is rather prevalent in India,^[11] which is supported by the fact that more than half of the respondents had a family history of HTN. This finding was similar to the results of another earlier study.^[12] Anthropometric measurement of the experimental group in both female and male was observed 156.83 ± 10.38 and 164.83 ± 11.8 cm and height and weight was found to be 64.13 ± 8.30 and 74.18 ± 6.32 while control group was found 158.03 ± 10.18 and 168.13 ± 9.28 and height and weight was found 65.52 ± 5.38 and 73.83 ± 5.25 , respectively.

Table 1: Socio Demographic characteristics of study subjects (n=41)

Characteristics	Experimental group (%)		Control group (%)	
Gender				
Male	37		49	
Female	63		51	
Marital status				
Single	7		58	
Married	93		42	
Age distribution				
25–34	7		42	
35–44	17		41	
45–54	49		7	
55–65	27		10	
Education level				
>10 th standard	7		0	
Intermediate	5		12	
Undergraduates	44		27	
Postgraduate	24		19	
Professional	20		42	
Occupation				
Homemaker	46		27	
Pensioner	5		0	
Salary	30		42	
Self-employed	15		27	
Students	2		2	
Unemployed	2		2	
Characteristics	Experimental group (%)		Control group (%)	
	Male	Female	Male	Female
Family history of hypertension				
Yes	58	52	45	42
No	42	48	55	58
Anthropometric measurements, mean±SD				
Height (cm)	164.83±11.8	156.83±10.38	168.13±9.28	158.03±10.18
Weight (kg)	74.18±6.32	64.13±8.30	73.83±5.25	65.52±5.38
BMI (kg/m ²)	27.35±4.05	24.28±3.82	26.53±5.13	25.73±4.32

SD: Standard deviation, BMI: Body mass index

Correlation between knowledge, attitude, and practice among the subjects of the experimental group and control group (preintervention)

In worldwide, HTN is one of the major crucial chronic disease and is considered critical health issue disease.^[13] Table 2 shows that there was a significant positive correlation between knowledge and attitude among the subjects belonging to the experimental group ($r = +0.476$) and control group [$r = +0.625$] in preintervention. This observation suggests that higher knowledge leads to better practices, i.e. subjects who knew more about HTN and its diets had better attitude toward the prevention of HTN. Similar finding was obtained in a study conducted where the results obtained showed that subjects with more awareness and knowledge about their condition had better attitude toward the condition compared to subjects who were less aware.^[14] However, a significant correlation also existed between attitude and practice ($r = +0.508$ and $r = +0.179$) preintervention among the subjects of the experimental group and control group. Similar findings were reported in a study where subjects who had better attitude toward their condition also had better practices. Subjects who had poor practices were found to have poor attitude toward their condition.^[15]

Correlation between knowledge, attitude, and practice among the subjects of the experimental group and control group (postintervention)

Table 3 reports the postintervention of experimental group and control group of correlation factor of KAP. The results observed that positive correlation between knowledge and attitude among the experimental group ($r = +0.263$) and control group ($r = +0.442$) while nonsignificant reported among the subjects in experimental group but control group statistically significant ($P < 0.01$) between knowledge and attitude among the subjects. It is implying that higher the knowledge of the subjects better was their attitude toward the condition. This also suggests that besides knowledge, subjects with better attitude can also have better practices toward HTN and its management.^[16] In the other hand, it can be observed that there was a significant positive correlation between attitude and practice ($r = +0.521$) among the subjects belonging to the experimental group (postintervention). Results suggested that preventive methods depend directly on behavioral intentions and intentions are a function of attitude and that attitude is usually formed on the bases of one’s knowledge and awareness.^[17]

Relationship between knowledge, attitude, and practice scores regarding hypertension and sociodemographic parameters

The average mean scores of KAP [Tables 4-6] were used to be compared pretest and post between

Table 2: Correlations between knowledge, attitude, and practice regarding hypertension of study subjects using Pearson correlation (preintervention) (n=41)

Particulars	Experimental group		Control group		Interpretation
	r	P	r	P	
Knowledge and attitude	+0.476	0.025*	+0.625	0.012*	Positive correlation
Knowledge and practice	+0.245	0.056**	+0.225	0.057**	Positive correlation
Attitude and practice	+0.508	0.018*	+0.179	0.068**	Positive correlation

*Significant at $P < 0.05$ and **nonsignificant $P > 0.05$

Table 3: Correlations between knowledge, attitude, and practice regarding hypertension of study subjects using Pearson correlation (postintervention) (n=41)

Particulars	Experimental group		Control group		Interpretation
	r	P	r	P	
Knowledge and attitude	+0.263	0.052**	+0.442	0.035*	Positive correlation
Knowledge and practice	+0.120	0.064**	+0.201	0.051**	Positive correlation
Attitude and practice	+0.521	0.032*	+0.186	0.072**	Positive correlation

*Significant at $P < 0.05$ and **nonsignificant $P > 0.05$

various sociodemographic parameters such as gender, educational level, age, and family history of the subjects in experimental group and control group.

Impact of nutrition intervention on knowledge, attitude, and practice regarding hypertension

Table 4 depicts the average mean score and standard deviation of various sociodemographic parameters of knowledge regarding HTN of pretest and posttest of control and experimental group. Results obtained that reported nonsignificant difference ($P < 0.001$) between experimental group (65.53 ± 4.15) and control group (63.18 ± 5.32) in pretest and on the other hand, postintervention noted that experimental group (75.53 ± 5.03) and control group (63.18 ± 5.52) were significant ($P < 0.00$), respectively. Therefore, the impact of nutritional intervention results revealed that among the experimental group, there was a significant increase in the mean score of knowledge (75) compared to the preintervention mean score (63). Statistically significant improvement was found in the scores of knowledge in various sociodemographic factors. This finding is consistent with a study conducted by Roopa and Rama Devi, 2014^[1] where higher posttest scores on HTN knowledge than the pretest scores were noted. Among subjects in experimental group, 75.3% and 87.2% got knowledge through nutritional intervention

Table 4: Average score of knowledge regarding hypertension between sociodemographic factors by independent *t*-test after nutrition education intervention

Sociodemographic factors	Knowledge scores			
	Pretest		Posttest	
	Mean±SD	<i>P</i>	Mean±SD	<i>P</i>
Gender				
Experimental group				
Male	65.2±4.23 ^a	0.052*	72.3±3.34 ^b	0.017**
Female	68.6±3.13 ^a		70.2±3.42 ^b	
Control group				
Male	63.7±5.03 ^a		63.7±5.30 ^a	
Female	67.3±5.24 ^a		65.3±6.23 ^a	
Education level				
Experimental group				
>10 th standard	60.2±2.13 ^a	0.058*	72.6±5.36 ^b	0.010**
Intermediate	63.4±5.05 ^a		75.2±4.23 ^b	
Undergraduates	62.5±3.15 ^a		72.3±5.13 ^b	
Postgraduate	61.2±3.03 ^a		73.6±6.15 ^b	
Professional	62.5±5.13 ^a		71.5±6.36 ^b	
Control group				
>10 th standard	68.5±5.23 ^a		64.3±5.25 ^a	
Intermediate	64.6±5.13 ^a		65.2±5.42 ^a	
Undergraduates	62.6±3.03 ^a		62.4±4.41 ^a	
Postgraduate	61.7±4.07 ^a		62.5±6.23 ^a	
Professional	64.2±5.03 ^a		63.5±6.38 ^a	
Age				
Experimental group				
25–34	62.3±2.16 ^a	0.053*	72.6±5.83 ^b	0.013**
35–44	64.4±3.13 ^a		73.2±5.97 ^b	
45–54	60.7±5.07 ^a		76.3±4.44 ^b	
55–65	63.5±3.52 ^a		75.4±5.82 ^b	
Control group				
25–34	65.7±5.14 ^a		63.7±5.83 ^a	
35–44	66.4±4.05 ^a		62.8±5.53 ^a	
45–54	63.7±5.03 ^a		61.6±6.97 ^a	
55–65	64.3±3.40 ^a		63.5±5.48 ^a	
Family history of hypertension				
Experimental group				
Yes	62.2±4.21 ^a	0.051*	71.2±6.67 ^b	0.012**
No	63.6±2.25 ^a		74.3±5.73 ^b	
Control group				
Yes	62.5±3.24 ^a		63.6±3.63 ^a	
No	61.7±4.13 ^a		65.2±5.25 ^a	

*Nonsignificant between experimental group and control group of various sociodemographic factors ($P>0.05$), **Significant difference ($P<0.05$). Values with the same superscripts in a row differ significantly ($P<0.05$) by DMRT between pretest and posttest intervention. All the data were mean±SD of average score. SD: Standard deviation, DMRT: Duncan's Multiple Range Test

that smoking and dietary habits are the risk factors for HTN. Viera *et al.*^[18] result was incompatible that nearly 28% of subjects elder than 65 age group had lesser knowledge about HTN, compared with 16% of those age group of 45–65 and 25% of those younger

Table 5: Average score of attitude regarding hypertension between sociodemographic factors by independent *t*-test after nutrition education intervention

Sociodemographic factors	Attitude scores			
	Pretest		Posttest	
	Mean±SD	<i>P</i>	Mean±SD	<i>P</i>
Gender				
Experimental group				
Male	42.3±1.04 ^a	0.058*	53.3±2.05 ^b	0.021**
Female	40.2±1.12 ^a		55.5±2.08 ^b	
Control group				
Male	40.7±2.10 ^a		40.6±3.03 ^a	
Female	45.3±1.13 ^a		43.7±1.92 ^a	
Education level				
Experimental group				
>10 th standard	42.6±3.06 ^a	0.053*	52.5±2.03 ^b	0.023**
Intermediate	45.2±1.03 ^a		54.6±1.85 ^b	
Undergraduates	42.3±3.03 ^a		53.5±3.03 ^b	
Postgraduate	43.6±2.05 ^a		55.7±2.18 ^b	
Professional	41.5±2.06 ^a		53.2±1.08 ^b	
Control group				
>10 th standard	44.3±3.05 ^a		44.6±2.10 ^a	
Intermediate	45.2±3.02 ^a		45.7±1.08 ^a	
Undergraduates	42.4±1.21 ^a		43.4±2.15 ^a	
Postgraduate	42.5±2.13 ^a		42.9±2.08 ^a	
Professional	43.5±2.08 ^a		44.7±1.92 ^a	
Age				
Experimental group				
25–34	42.6±2.73 ^a	0.057*	55.3±3.10 ^b	0.015**
35–44	43.2±1.27 ^a		53.6±2.13 ^b	
45–54	46.3±3.24 ^a		54.4±1.72 ^b	
55–65	45.4±2.62 ^a		53.8±2.28 ^b	
Control group				
25–34	43.7±2.73 ^a		42.6±1.29 ^a	
35–44	42.8±3.13 ^a		43.8±2.27 ^a	
45–54	41.6±2.07 ^a		42.4±2.15 ^a	
55–65	43.5±1.28 ^a		43.6±1.57 ^a	
Family history of hypertension				
Experimental group				
Yes	41.2±2.27 ^a	0.056*	54.7±2.06 ^b	0.016**
No	44.3±3.13 ^a		53.4±1.94 ^b	
Control group				
Yes	43.6±2.03 ^a		44.3±2.07 ^a	
No	45.2±1.05 ^a		43.5±2.05 ^a	

*Nonsignificant between experimental group and control group of various sociodemographic factors ($P>0.05$), **Significant difference ($P<0.05$). Values with the same superscripts in a row differ significantly ($P<0.05$) by DMRT between pretest and posttest intervention. All the data were mean±SD of average score. SD: Standard deviation, DMRT: Duncan's Multiple Range Test

than 45. Furthermore, 73.8% and 48.3% of the subjects got knowledge about heart disease and memory loss which are connected to HTN, respectively. However, 58.3% subjects assumed cancer was related to HTN. Pereira *et al.* 2010^[19] reported similar findings in a

Table 6: Average score of practices regarding hypertension between sociodemographic factors by independent t-test after nutrition education

Sociodemographic factors	Practice scores			
	Pretest		Posttest	
	Mean±SD	P	Mean±SD	P
Gender				
Experimental group				
Male	23.3±2.05 ^a	0.052*	35.2±2.27 ^b	0.038**
Female	25.5±2.08 ^a		38.6±1.14 ^b	
Control group				
Male	24.6±3.03 ^a	0.053*	23.7±2.02 ^a	0.025**
Female	23.7±1.92 ^a		27.3±2.23 ^a	
Education level				
Experimental group				
>10 th standard	22.5±2.03 ^a	0.053*	30.2±1.17 ^b	0.036**
Intermediate	24.6±1.85 ^a		33.4±2.08 ^b	
Undergraduates	23.5±3.03 ^a		32.5±2.12 ^b	
Postgraduate	25.7±2.18 ^a		31.2±2.09 ^b	
Professional	23.2±1.08 ^a		32.5±2.16 ^b	
Control group				
>10 th standard	24.6±2.10 ^a	0.052*	28.5±2.12 ^a	0.034**
Intermediate	25.7±1.08 ^a		24.6±2.16 ^a	
Undergraduates	23.4±2.15 ^a		22.6±2.04 ^a	
Postgraduate	22.9±2.08 ^a		21.7±3.05 ^a	
Professional	24.7±1.92 ^a		24.2±2.05 ^a	
Age				
Experimental group				
25–34	25.3±3.10 ^a	0.051*	32.3±3.12 ^b	0.037**
35–44	23.6±2.13 ^a		34.4±2.14 ^b	
45–54	24.4±1.72 ^a		30.7±2.08 ^b	
55–65	23.8±2.28 ^a		33.5±2.50 ^b	
Control group				
25–34	22.6±1.29 ^a	0.051*	25.7±2.12 ^a	0.022**
35–44	23.8±2.27 ^a		26.4±2.08 ^a	
45–54	22.4±2.15 ^a		23.7±2.05 ^a	
55–65	23.6±1.57 ^a		24.3±2.42 ^a	
Family history of hypertension				
Experimental group				
Yes	24.7±2.06 ^a	0.053*	32.2±2.25 ^b	0.036**
No	23.4±1.94 ^a		33.6±1.27 ^b	
Control group				
Yes	24.3±2.07 ^a	0.055*	22.5±2.25 ^a	0.022**
No	23.5±2.05 ^a		21.7±3.12 ^a	

*Nonsignificant between experimental group and control group of various sociodemographic factors ($P>0.05$), **Significant difference ($P<0.05$). Values with the same superscripts in a row differ significantly ($P<0.05$) by DMRT between pretest and posttest intervention. All the data were mean±SD of average score. SD: Standard deviation, DMRT: Duncan's Multiple Range Test

cross-sectional evaluation in Portugal countries for 2310 adults.

Table 5 represents that the average mean score of and standard deviation of various sociodemographic parameters

of attitude regarding HTN of pretest of experimental group and control group was 44.62 ± 3.53 and 43.18 ± 3.12 noted and reported nonsignificant difference ($P < 0.001$) between the group. In the same way, postintervention noted that 54.28 ± 2.13 and 43.22 ± 3.27 in experimental group and control group were significant ($P < 0.05$), respectively. On the other hand, the impact of nutritional intervention results revealed that among the experimental group, there was a significant increase in the mean score of attitude (53) compared to the preintervention mean score (42). Statistically significant improvement was found in the scores of attitude in various sociodemographic factors. Results found that the impact of nutritional intervention on attitude regarding HTN, experimental group subjects around 83.5% were nervous about their health condition if they have present HTN. Even so, 70.2% of the subjects opined certainly that they would test blood pressure still if they do not have any related symptoms and 73.5% differ that they would not go for usual medical diagnosis for their blood pressure. Among the subjects, 92.3% decided that blood pressure diagnosis was very significant for prevention and health of HTN was very essential and 89.4% of them decided that it was vital to pay concentration to their blood pressure dimension if they were forever under stress condition, whereas only 64.8% fixed to do that if they were a smoker. Almost all of the subjects after the intervention program (93.6%) contracted that they would be less likely to increase HTN in the prospect if they had enough sleep per day and ate regularly healthy food.

Table 6 depicts that the average mean score and standard deviation of various sociodemographic parameters of practices regarding HTN of pretest of experimental group and control group were 25.52 ± 2.05 and 24.27 ± 1.92 noted and reported nonsignificant difference ($P < 0.001$) between the groups. Similarly, postintervention noted that 35.23 ± 2.13 and 24.28 ± 3.12 in experimental group and control group were significant ($P < 0.00$), respectively. On the other hand, the impact of nutritional intervention results revealed that among the experimental group, there was a significant increase in the mean score of practices (35) compared to the preintervention mean score (23). Approximately all of them also decided that prevention of HTN is very imperative. This result is supported by a previous study (Sharma et al. 2020).^[20] Statistically significant improvement was found in the scores of practices in various sociodemographic factors. The study reported that nutritional intervention program significantly increased practice score regarding HTN. Among the subjects, increased 45.3% for eternity had their year-on-year blood pressure diagnosis, whereas 35.2% of them did examine about HTN. However, 48.4%, 45.4%, 73.2%, 52.6%, and 16.4% of subjects

were forever on healthy food, had food supplements, consumed less salty and cholesterol diet substance, had adequate sleep per daily, and exercised at least twice times per day, respectively. Most (68.2%) of the subjects' work per day was below stress sometimes, whereas 84.5% of them never smoked. None of the subjects ever taken brewers or alcohol item and 32.1% subjects always gets advice from family doctors or other health practices about good nutritional practice. A study observed that majority of the subjects had very poor KAP regarding HTN. It was noted that postintervention, there was an enhancement of the KAP scores (Sharma Sushmita *et al.*, 2014).^[20]

CONCLUSION

This work reported a satisfactory level of KAP regarding HTN among the study subjects by nutritional intervention program. There were also obtained significant positive correlations of experimental group and control group between knowledge with attitude and practice regarding HTN, which earnings that enhanced knowledge will get better the attitude and practice of the subjects. However, statistically significant improvement was found in the scores of knowledge ($t = -15.235$, $P = 0.02$), attitude ($t = -8.737$, $P = 0.04$), and practice ($t = -16.150$, $P = 0.01$) among the subjects of the experimental group from preintervention to postintervention. This suggests that the intervention had helped the subjects in improving their nutritional knowledge and also brought about positive changes in their attitude and practices toward HTN and its management. Therefore, the nutrition education intervention provided was successful in improving in the KAP of the study subjects. Increasing the knowledge, awareness, and control of HTN in the population can help reduce morbidity and mortality to a very great extent.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Roopa KS, Rama Devi G. Impact of intervention programme on knowledge, attitude, practices in the management of hypertension among elderly. *Stud Home Community Sci* 2014;8:11-6.
- Sadeghi M, Shiri M, Roohafza H, Rakhshani F, Sepanlou S, Sarrafzadegan N. Developing an appropriate model for self-care of hypertensive patients: First experience from EMRO. *ARYA Atheroscler* 2013;9:232-40.
- Kim H, Andrade FC. Diagnostic status of hypertension on the adherence to the dietary approaches to stop hypertension (DASH) diet. *Prev Med Rep* 2016;4:525-31.
- Widmer RJ, Flammer AJ, Lerman LO, Lerman A. The Mediterranean diet, its components, and cardiovascular disease. *Am J Med* 2015;128:229-38.
- Meurer WJ, Dinh M, Kidwell KM, Flood A, Champoux E, Whitfield C, *et al.* Reach out behavioral intervention for hypertension initiated in the emergency department connecting multiple health systems: Study protocol for a randomized control trial. *Trials* 2020;21:456.
- Zullig LL, Bosworth HB. Behavioral interventions to improve hypertension control in the veterans affairs healthcare system. *J Clin Hypertens (Greenwich)* 2014;16:827-37.
- Nicoll R, Henein MY. Hypertension and lifestyle modification: How useful are the guidelines? *Br J Gen Pract* 2010;60:879-80.
- Tiong XT, Nursara Shahirah A, Pun VC, Wong KY, Fong AY, Sy RG, *et al.* The association of the dietary approach to stop hypertension (DASH) diet with blood pressure, glucose and lipid profiles in Malaysian and Philippines populations. *Nutr Metab Cardiovasc Dis* 2018;28:856-63.
- Jafari F, Shahriari M, Sabouhi F, Khosravi Farsani A, Eghbali Babadi M. Effects of a lifestyle modification program on knowledge, attitude and practice of hypertensive patients with angioplasty: A randomized controlled clinical trial. *Int J Community Based Nurs Midwifery* 2016;4:286-96.
- Boutayeb A, Boutayeb S. The burden of non communicable diseases in developing countries. *Int J Equity Health* 2005;4:2.
- Narayan KM, Ali MK, Koplan JP. Global noncommunicable diseases – Where worlds meet. *N Engl J Med* 2010;363:1196-8.
- Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, *et al.* Hypertension in India: A systematic review and meta-analysis of prevalence, awareness, and control of hypertension. *J Hypertens* 2014;32:1170-7.
- Verdecchia P, Porcellati C, Schillaci G, Borgioni C, Ciucci A, Battistelli M, *et al.* Ambulatory blood pressure. An independent predictor of prognosis in essential hypertension. *Hypertension* 1994;24:793-801.
- Sabouhi F, Babae S, Naji H, Zadeh AH. Knowledge, awareness, attitudes and practice about hypertension in hypertensive patients referring to public health care centers in Khor and Biabanak. *Iran J Nurs Midwifery Res* 2011;16:34-40.
- Sa'adeh HH, Darwazeh RN, Khalil AA, Zyoud SH. Knowledge, attitudes and practices of hypertensive patients towards prevention and early detection of chronic kidney disease: A cross sectional study from Palestine. *Clin Hypertens* 2018;24:6.
- Buang NF, Rahman NA, Haque M. Knowledge, attitude and practice regarding hypertension among residents in a housing area in Selangor, Malaysia. *Med Pharm Rep* 2019;92:145-52.
- Fisher WA, Fisher JD, Rye BJ. Understanding and promoting AIDS-preventive behavior: Insights from the theory of reasoned action. *Health Psychol* 1995;14:255-64.
- Viera AJ, Cohen LW, Mitchell CM, Sloane PD. High blood pressure knowledge among primary care patients with known hypertension: A North Carolina family medicine research network (NC-FM-RN) study. *J Am Board Fam Med* 2008;21:300-8.
- Pereira M, Azevedo A, Barros H. Determinants of awareness, treatment and control of hypertension in a Portuguese population. *Rev Port Cardiol* 2010;29:1779-92.
- Sharma S, Bhuvan KC, Alrasheedy AA, Kaundinnayana A, Khanal A. Impact of community pharmacy-based educational intervention on patients with hypertension in Western Nepal. *Australas Med J* 2014;7:304-13.