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Hipertansiyon Hastası Yönetimi Konusunda Aile Hekimliği Asistan Eğitiminin Değerlendirilmesi

Evaluation of Hypertension Patient Management During Family Medicine Trainee Education

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Öz

Giriş ve Amaç: Hipertansiyon (HT), yüksek kan basıncı ile ortaya çıkan sistemik bir hastalık olup, toplumda yaygın olarak görülen ve ciddi komplikasyonlara neden olan büyük bir sağlık sorunudur. Kan basıncı düzeylerinin kontrolü, ortaya çıkan komplikasyonları azaltmada önemli bir adımdır. Bu çalışmanın amacı, aile hekimliği asistanlarının HT bilgi ve farkındalığı üzerinde yüz yüze HT eğitiminin etkisini değerlendirmek ve ihtiyaçlarını anlamaktır.

Gereç ve Yöntemler: Çalışmamız, betimleyici-kesitsel araştırma tasarımında planlandı. Yüz yüze eğitimden hemen önce ve sonra, katılımcılara, Türk Hipertansiyon Konsensus Raporları 2019 ve Türkiye Endokrinoloji ve Metabolizma Derneği tarafından 2022 yılında yayınlanan Hipertansiyon Tanı ve Tedavi Kılavuzu temel alınarak araştırmacılar tarafından oluşturulan bir anket verildi.

Bulgular: Çalışmamızda, yüz yüze eğitimin HT ile ilgili 15 alt kategorideki etkisini müdahale araştırma modeli olarak inceledik. Eğitim sonrası değerlendirmede, 15 alt kategorinin 12'si teorik soruları, üçü ise vaka temelli değerlendirme sorularını içeriyordu. Soruların %50 veya daha fazlasını doğru cevaplamak hedeflenmiş olup, eğitim sonrası, 15 alt kategoriden beşinde bu hedefin genel olarak başarıldığı gözlendi.

Sonuç: Yüz yüze eğitim, birincil sağlık hizmetlerinde HT yönetiminin iki önemli unsuru olan bilgi ve farkındalığı artırmada ve değerlendirme kapasitesinde etkilidir. HT ile ilgili 15 alt kategoriye yapılan ayrıntılı inceleme, etki büyüklüğü açısından daha iyi olan kategorileri ortaya çıkardı. Çalışmamız, HT yönetimi ile ilgili alt kategorilere etkileri de ayrıntılı bir şekilde ele alarak (örneğin, birinci basamak HT yönetimine direnç gibi) ilginç ve biraz beklenmedik sonuçlar ortaya çıkmıştır.

Anahtar Kelimeler: Aile Hekimliği Uzmanlık Eğitimi, Hasta Yönetimi, Hipertansiyon.

Abstract

Objective: Hypertension (HT) is a systemic disease manifested by high blood pressure and is a major health problem, common in the community and the cause of serious complications. Control of blood pressure levels is an essential step in reducing omit complications. The aim of the study is to evaluate the impact of face-to-face HT

training on the HT knowledge and awareness of the family medicine resident doctors and to understand their needs.
Materials and Methods: Our study was planned in a descriptive-cross-sectional research design. Just before and after the face-to-face training, participants were given a questionnaire developed by researchers based on two documents: the Turkish Hypertension Consensus Reports published in 2019, and the Hypertension Diagnosis and Treatment Guidelines published by the Turkish Endocrinology and Metabolism Society in 2022.
Results: In our study, we observed the effect of face-to-face education on 15 sub-categories of HT as an intervention research model. In the post-training evaluation, 12 of the 15 sub-categories involved theoretical questions, and three were case-based evaluation questions. The goal was to answer 50% or more of the questions correctly, and it was observed that, after the training, in five of the fifteen sub-categories, this target was generally achieved.
Conclusion: Face-to-face training is effective in increasing knowledge and awareness, and evaluation capacity, which are two important elements of HT administration in primary care. A detailed examination of 15 sub-categories related to HT revealed the categories that were better in terms of effect size. Our study also detailed the effects on sub-categories related to HT management (such as resistance to first-stage HT management), which reveal interesting and somewhat unexpected results.

Keywords: Family Medicine Traininng, Patient Management, Hypertansion

1. Introduction

Hypertension (HT), a systemic disease manifesting as high blood pressure, is a significant and widespread public health problem with serious complications [1]. The World Health Organization (WHO) estimates that 1.28 billion adults between the ages of 30 and 79 suffer from HT worldwide, primarily in countries with lower and middle socioeconomic status. WHO also indicates that only 42% of patients are aware of their HT and are receiving treatment [2]. According to WHO data, one in four men and one in five women have HT [3]. Various studies conducted in Turkey demonstrate that the prevalence of HT in adults is between 30.3% and 36.5% [1,4].

HT is a major cause of early death globally [2]. As the blood pressure increases, the extent of damage to the cardiovascular system rises significantly. Thus, blood pressure control is essential in reducing HT complications. The early detection and initiation of treatment is crucial, as it provides patients with the necessary information to manage their condition, thereby preventing the development of complications [5,6]. Therefore, family medicine specialist students aiming to work in primary education should have up-to-date and accurate information about the illness [6,7].

The curriculum for the training of family physicians specifies the knowledge and skills that physicians need in practice [8,9]. According to WHO, 21st-century diseases should be confronted through primary health care, and better use of existing preventive measures could reduce the global disease burden by up to 70% [9,10]. Therefore, the aim of this study is to evaluate the effect of HT education and to determine practitioners' knowledge levels to identify their requirements.

2. Materials and Methods

This study was planned as an interventional study. Before and after their training, the participant filled out a questionnaire derived from the "Hypertension Diagnosis and Treatment Guidelines", published by the Endocrinology and Metabolism Association of Turkey in 2022, as well as the "Turkish Hypertension Consensus Reports" released in 2019.

The study consisted of 60 medical specialty students from Dokuz Eylül University's (DEU) Department of Family Medicine. These students, who had undertaken an eight-hour in-person Hypertension (HT) course in the university auditorium, participated in this study's Google Survey (distributed via email) both before and after their training. The participants were asked to give themselves a code name, which was used to identify them anonymously in the analyses. The sampling inclusion criteria included students who agreed to take part in the research and who fully completed the online forms sent via email. The items in the survey form were created after an examination of the research literature. In each item, participants were tasked with evaluating the accuracy of data provided by the guidelines regarding the diagnosis, treatment, and management of hypertension, rating each as either correct or incorrect. To guarantee homogeneity, the percentage of items with correct information was calculated. The survey included questions regarding participants' demographic data, as well as queries to assess their understanding of hypertension diagnosis and management.

We perfomed ROC analysis for sensitivity and specifity of age among the educational success groups

Furhermore we performed a Cut-of analysis

Group A; Scores increased

Group B; Scores never changed or worsed

Data analysis

Data analysis was performed using SPSS version 21.0 (IBM Corp., Armonk, NY). Parametric and non-parametric analysis methods were selected according to the number and percentage values, normal distribution, and covariance suitability for sociodemographic characteristics. In the data

analysis, frequency and percentage distributions, chi-square analysis, and t-test were used. A value of $p < 0.05$ was considered statistically significant.

3. Results and Discussion

3.1. Results

This study examined the effect of in-person education on 15 subcategories related to HT as an interventional research model. In the **post-**training questionnaire, theoretical questions were presented for 12 out of 15 subcategories, while the remaining three subcategories contained case-based questions. Status of our hypothesis acceptance is shown in Table 1.

The participants were divided into two groups based on the pre-education scores, the Before Education = 0 group and the Before Education => 1 group (Those with 0 scores prior to training were considered a separate categorical group, as were those with 1 and above).

We investigated the following: "How does education help those who do not know? How does education help those with a score of 1 or higher.

The group was divided into two age groups: 27 years old or under, and those over 27 ". We performed ROC analysis for sensitivity and specifity of age among the educational success groups (Figure 1).

Table 1. Status of our hypothesis acceptance

Hypotheses	Category
H1.a	A.Knowledge about the causes of the HT (not essential HT)
H2.1.a	B. Secondary Causes of Hypertension (HT)
H3.1.a	C. Knowledge about the HT (Neurological) Complications
H4.1.a	D. Out-of-Office Measurement Indications
H5.1.a	E. Ambulatory Measurement Is Indicated
H6.1.a	F. Knowledge about focus history taking of HT
H7.1.a	G. Case 1. Cardiovascular Evaluation
H.8.1.a	H. Evaluating Treatment Failure Administration
H9.1.a	I. Which circumstances indicate suspicion of Secondary HT?
H10.1.a	J. Assessment of the Treatment-Resistant Patient
H11.1.a	K. Management Hypertensive Syndrome
H12.1.a	L. Knowledge of Home Blood Pressure Monitoring Indications
H13.1.a	M. HT Knowledge of Physical Examination
H14.1.a	O. HT Knowledge of Their Examinations
H15.1.a	R. Knowledge of HT Management During Pregnancy

Furthermore, we performed a Cut-of analysis. The effectiveness of the training measured by scores was analysed according to gender, and age. As a result, the effect size and power increased. Since these elements were important, originality was also included (Table 2).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	A	B	TOTAL	Positive if Less Than or Equal To	Sensitivity TPR	1 - Specificity	Specificity TNR	LR+	LR-	TP	FN	TN	FP	DOR	ACC	PPV	NPV	F1 Score	ACC+F1	BA
2	14	46	60	23,00	0,000	,000	1,000	#SAYI/0!	1,00	0	14	46	-	#SAYI/0!	0,77	#SAYI/0!	0,767	#SAYI/0!	#SAYI/0!	0,500
3	14	46	60	24,50	0,000	,043	0,957	- ,0	1,04	0	14	44	2	-	0,73	- ,00	0,759	#SAYI/0!	#SAYI/0!	0,479
4	14	46	60	25,50	0,143	,174	0,826	0,82	1,04	2	12	38	8	1	0,67	0,200	0,760	0,17	0,44	0,485
5	14	46	60	26,50	0,500	,370	0,630	1,35	0,79	7	7	29	17	2	0,60	0,291	0,805	0,37	0,51	0,565
6	14	46	60	27,50	0,571	,500	0,500	1,14	0,86	8	6	23	23	1	0,52	0,258	0,793	0,36	0,47	0,536
7	14	46	60	28,50	,714	,717	0,283	1,00	1,01	10	4	13	33	1	0,38	0,233	0,765	0,35	0,41	0,499
8	14	46	60	29,50	,857	,783	0,217	1,09	0,66	12	2	10	36	2	0,37	0,250	0,833	0,39	0,43	0,537
9	14	46	60	30,50	,857	,913	0,087	0,94	1,64	12	2	4	42	1	0,27	0,222	0,667	0,35	0,36	0,472
10	14	46	60	31,50	,929	,935	0,065	0,99	1,09	13	1	3	43	1	0,27	0,232	0,751	0,37	0,38	0,497
11	14	46	60	33,00	,929	,957	0,043	0,97	1,65	13	1	2	44	1	0,25	0,228	0,666	0,37	0,37	0,486
12	14	46	60	34,50	,929	,978	0,022	0,95	3,23	13	1	1	45	0	0,23	0,224	0,504	0,36	0,36	0,476
13	14	46	60	39,50	1,000	,978	0,022	1,02	- ,0	14	-	1	45	#SAYI/0!	0,25	0,237	1,000	0,38	0,38	0,511
14	14	46	60	45,00	1,000	1,000	- ,0	1,00	#SAYI/0!	14	-	-	46	#SAYI/0!	0,23	0,233	#SAYI/0!	0,38	0,37	0,500
15	TPR= True Positive Rate			LR+= Positive Likelihood Ratio		TP= True Positive			TN= True Negative			DOR= Diagnotic Odds Ratio			PPV= Positive Predictive Value					
16	FPR= False Positive Rate			LR-= Negative Likelihood Ratio		FN= False Negative			FP= False Positive			ACC= Accuracy			NPV= Negative Predictive Value					
17	TNR= True Negative Rate			ns= Nonsignificant																

Figure 1. ROC analysis for sensitivity and specifity of age among the educational success groups

Table 2. Code age, the groups before education encompass the number and demographic characteristcs of the participants.

			Man		Women		General Structure		
			N	DE ± SS, %	N	DE ± SS, %	N	DE ± SS, %	p
Age			28	28.64 ± 3.99	32	27.09 ± 1.82	60	27.82 ± 3.10	0.067
Age group		< 27	9	32.0	15	46.8	24	40.0	0.245
		= > 27	19	68.0	17	53.2	36	60.0	
Before Education (BE) score group	A. Hypertension (HT) Out of Tension High	BE = 0	12	50.0	18	58.1	30	54.5	0.551
		BE = > 1	12	50.0	13	41.9	25	45.5	
	B. Secondary Causes of HT	BE= 0	9	37.5	20	69.0	29	54.7	0.044
		BE = > 1	15	62.5	9	31.0	24	45.3	
	C. Complications	BE = 0	27	96.4	31	96.9	58	96.7	1.000
		BE = > 1	1	3.6	1	3.1	2	3.3	
	D. Out-of-Office Measurement Indications	BE = 0	17	70.8	18	58.1	35	63.6	0.488
		BE = > 1	7	29.2	13	41.9	20	36.4	
	E. Ambulatory Measurement Is Indicated	BE = 0	18	75.0	22	68.8	40	71.4	0.831
		BE = > 1	6	25.0	10	31.3	16	28.6	
	F. Don't Know How to take patient history	BE = 0	12	44.4	6	20.0	18	31.6	0.090
		BE = > 1	15	55.6	24	80.0	39	68.4	
	G. Case 1. Cardiovascular Evaluation	BE = 0	0	0.0	0	0.0	0	0.0	b
		BE = > 1	26	100.0	31	100.0	57	100.0	
	H. Assessing Failure	BE = 0	0	0.0	1	3.3	1	1.7	1.000
		BE = > 1	28	100.0	29	96.7	57	98.3	
	I. Secondary HT Clinic	BE = 0	0	0.0	1	3.3	1	1.8	1.000
		BE = > 1	26	100.0	29	96.7	55	98.2	
	J. Case 2. Resistance of Therapy Evaluation	BE = 0	0	0.0	0	0.0	0	0.0	b
		BE = > 1	27	100.0	30	100.0	57	100.0	

a. Since the data in the analyses differ depending on the suitability of the Cook's and Leverage extreme value study, there are different numbers of groups in the subcategories.

b. Due to some scores of zero, chi-square analysis could not be performed.

Sufficient effect size: 0.5 Enough power: 0.8 and higher accepted.

For these subcategories, the application of education had a significant effect. Sufficient effect was provided in 12 of the 13 subcategories; by the eleventh, enough power had been provided. The highest effect was for J. Case.2. Resistance Evaluation in the evaluation category. Second, E. Ambulatory Measurement is indicated, and as the 3. Case 1.evaluation categories followed.

Regenerate response

After evaluating the additional effect of the gender factor on the outcome of education, the questionnaire scores before and after the education intervention were calculated as the total score for all questions in the HT Knowledge of Physical Examination category. These scores were divided by the total number of questions to obtain the percentage of correct answers. It was also found that the gender factor was significantly effective in this category (F: 209.263; p < 0.001), and Category M (HT Knowledge of Physical Examination); The effect of educational application (Effect Size, Table 3) was higher in the male group (Table 3).

Table 3. The effect of education factor (gender Groups) on scores.

M. Hypertension Knowledge of Physical Examination	% Average Before Education	% Average After Education	F	T	P	R	Effect Size	Power
Female	4.91 ± 12.36	30.36 ± 32.81	16.857	−4.106	<0.001	−0.006	0.724	0.755
Male	2.74 ± 5.74	26.92 ± 31.12	15.172	−3.895	0.001	0.300	0.808	0.738

Considering the additional effect of age on the education evaluation, for category J (Resistance Evaluation), the total questionnaire scores before and after the education intervention were calculated sum the scores for each category group. These scores were divided by the total number of questions to obtain the percentage of correct answers. The age factor was found to be significantly effective (F: 6.373; p = 0.013), and in the hypothesis table, (table 1) category J was accepted. The effect of the educational application in the 27 and over group (Effect Size, Table 4) was higher than that in the under-27 group (Table 4).

Table 4. The effect of age.Code factor (in age groups) on scores.

J.Ability to Evaluate Resistance Clinically	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Code.Age <27	16.45 ± 7.93	44.59 ± 9.92	103.049	-10.151	<0.001	0.085	2.313	1.000
Code.Age=>27	21.97 ± 6.99	45.96 ± 11.89	108.810	-10.431	<0.001	-0.052	1.701	0.999
Management Hypertensive Syndrome	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Code.Age <27	23.81 ± 23.34	89.52 ± 19.61	97.561	-9.877	<0.001	0.004	2.159	1.000
Code.Age =>27	20.55 ± 15.48	41.11 ± 20.81	22.612	-4.755	<0.001	0.034	0.805	0.786
Knowledge of O.HT Tests	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Code.Age<27	11.36 ± 18.10	59.09 ± 35.16	32.045	-5.661	<0.001	0.017	1.215	0.973
Code.Age=>27	48.09 ± 25.49	63.33 ± 30.46	5.150	-2.269	0.027	0.402	0.493	0.819
The-effect-of-age.code--factor-(in-age-groups)-on-scores								

Scores for Category K (Managing Hypertensive Syndrome) were totalled, and the combined questionnaire scores before and after the education intervention were determined. These scores were divided by the total number of questions to obtain the percentage of correct answers. The age factor was found to be significantly effective for this category (F: 16.289; $p < 0.001$), and in hypothesis table (table 1) category K was accepted. The effect of educational application in the 27 and over- group (Effect Size), (Table 4) was higher than that in the under-27 group.
For category O (HT Code Knowledge), the age factor was found to be significantly effective (F: 5.962; $p = 0.017$), and in hypothesis table (table 1) category was accepted. The effect of educational application in the over-27 group (Table 4) was higher than that in the under-27 group. This study also assessed the incremental impact of the educational component, with 'before education = 0' and 'before education => 1', on the results of the education. The total scores for the Knowledge about the Causes of TA Height Other than A.HT group of questions were calculated to determine the questionnaire scores before and after the intervention. In this category (F: 243.977; $p < 0.001$), the education factor was found to be significantly effective, and H1.1.a was accepted. The effect of educational implementation (Effect Size), (Table 5) was higher in the Before Education = 0 group than in the Before Education => 1 group.
Concerning category B (Secondary Causes of HT), the total questionnaire scores before and after the education intervention were calculated by adding the results of the questions that formed the Knowledge about the Reasons group [S.M.1]. These scores were divided by the total number of questions to obtain the percentage of correct answers. In this category (F: 246.423; $p < 0.001$), the education factor was found to be significantly effective, and H2.1.a was accepted. The effect of the educational application (Effect Size), (Table 5) was higher in the Before Education = 0 group than in the Before Education => 1 group.
For category E (End of Ambulatory Measurement in the Knowledge), after totalling the results from the questions in the knowledge group, the combined scores from before and after the education intervention were determined. These scores were divided by the total number of questions to obtain the correct answer percentages. The education factor was found to be significantly effective (F: 307.952; $p < 0.001$), and H5.1.a was accepted. The effect of the educational application (Effect Size), (Table 5) was higher in the Before Education = 0 group than in the Before Education => 1 group.
It was found that the education factor was significantly effective for category F (Knowledge of How to Take an HT Story). The total questionnaire scores before and after the education intervention were calculated by totalling the scores for questions in the Managing Hypertensive Syndrome group. These scores were divided by the total number of questions to obtain the percentage of correct answers (F: 9.231; $p = 0.003$), and H6.1.a was accepted. The effect of the educational application (Effect Size), (Table 5) was higher in the Before Education = 0.group than in the Before Education => 1 group.
For category K (Hypertensive Syndrome Management), the results of the questions in the Managing Hypertensive Syndrome group were summarized and the combined questionnaire scores from before and after the education intervention were determined. These scores were divided by the total number of questions to obtain the percentage of correct answers. The education factor was found to be significantly effective (F: 68.076; $p < 0.001$), and H11.1.a was accepted. The effect of the educational application (Effect Size), (Table 5) was higher in the Before Education = 0 group than in the Before Education => 1 group.
For category L (End of Measurement at the Home Knowledge), the results of the questions comprising the End of Home Measurement: Calculating the combined knowledge group scores yielded the total questionnaire scores before and after the education intervention. These scores were divided by the total number of questions to obtain the percentage of correct answers. The education factor was found to be significantly effective (F: 16.794; $p < 0.001$), and H12.1.a was accepted (Table 5).
The education factor was found to be significantly effective for category M (Physical Examination Knowledge of HT. The total questionnaire scores before and after the education intervention were determined by totalling the scores of the questions in this category (F: 209.263; $p < 0.001$), and H13.1.a was accepted. The effect of the educational application (Effect Size), (Table 5) was higher in the Before Education = 0 group than in the Before Education => 1 group.
For category O (Knowledge About the HT Examinations), the education factor was found to be significantly effective (F: 30.284; $p < 0.001$), and H14.1.a was accepted. The effect of the educational application (Effect Size, Table 14) was higher in the Before Education = 0 group than in the Before Education => 1 group (Table 5).

3.2.Discussion

Using a preliminary and final questionnaire, a previous study reported the effectiveness of small group information literacy instruction for medical students [11]. Another study observed a positive effect for the participatory clinical education model on nursing students' learning perceptions and capacities [12]. In the current study, a similar positive effect on questionnaire scores was found for the HT-related education model.

Table 5. The effect of education factor (in before education groups) on scores

The Effect of Education Factor (Before Education Groups) on Scores								
A. Hypertension (HT) Out of Tension High	% Average Before Education	% Average After Education	F	t	P	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	6.13 ± 9.66	NS	NS	<0.001	NS	0.634	0.238
Before Education => 1	13.09 ± 4.33	15.08 ± 25.87	31.172	– 0.399	0.693	0.213	0.078	0.82
B. Secondary Causes of Hypertension	% Average Before Education	% Average After Education	F	t	P	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	33.10 ± 32.63	NS	NS	<0.001	NS	1.014	0.856
Before Education => 1	30.00 ± 16.68	32.50 ± 5.88	0.223	– 0.473	0.641	0.244	0.153	0.867
E. End of Ambulatory Measurement in the Knowledge	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	16.56 ±11.80	NS	NS	<0.001	NS	1.403	0.999
Before Education => 1	16.40 ± 5.98	21.09 ± 12.68	1.788	– 1.337	0.195	–0.060	0.327	0.804
F. Knowledge of How to Take a Hypertension Story	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	11.61 ±13.87	NS	NS	0.002	NS	0.837	0.901
Before Education => 1	11.19 ± 10.62	9.09 ± 15.22	0.498	0.706	0.483	0.001	0.113	0.010
K. Management of Hypertension Syndrome	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	63.53 ±31.81	NS	NS	<0.001	NS	1.997	1.000
Before Education => 1	31.00 ± 14.28	57.00 ± 30.90	23.331	– 4.830	<0.001	0.286	0.863	0.978
L. Knowledge About End of Measurement At the Home	% Mean Before Education	% Mean After Education	F	t	p	R	Effect Size	Power
Before Education =0	00.00 ± 0.00	23.68 ±13.96	NS	NS	<0.001	NS	1.696	0.999
Before Education =>1	18.02 ± 4.61	19.37 ± 11.46	0.443	– 0.665	0.509	0.075	0.112	0.759
M. Physical Examination Knowledge of Hypertension	% Average Before Education	% Average After Education	F	T	p	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	26.78 ± 32.23	NS	NS	<0.001	NS	0.830	0.991
Before Education => 1	22.86 ± 12.04	38.57 ± 29.39	2.447	– 1564	0.144	–0.269	0453	0.627
O. Knowledge About the Hypertension Examinations	% Average Before Education	% Average After Education	F	t	p	R	Effect Size	Power
Before Education = 0	00.00 ± 0.00	50.00 ±39.44	NS	NS	<0.001	NS	1.785	0.997
Before Education => 1	47.15 ± 23.24	66.26 ± 28.01	11.296	– 3.361	0.001	0.158	0.571	0.636

For problem-based education, positive effects were observed on knowledge, ability, and evaluation scores for standard patients [13]. In this study, similar effects were observed concerning the problem-based training for, and the evaluation of HT cases. Moreover, previously, positive effects on adherence to HT management guidelines resulted from for a structured physician training and feedback system [14]. In one study, education was observed to improve physicians' HT follow-up behaviors [15]. In the current study, the HT evaluation required monitoring and follow-up of hypertensive pregnancy and HT physical examination, focusing on the physicians' adherence to the guidelines, and similar improvement in the post-intervention score was observed.

Hypertension has a fairly high prevalence in society, meaning relatively high personal and social benefits when adequate HT management is performed in primary care. This study found that the educational training given increased the HT-related to HT?? in almost every category, and that significance was achieved in 13 of the subcategories. Therefore, this educational work can be considered to be generally successful. The percentage of correct post-intervention scores could be considered an indicator of HT management adequacy.

This score could be interpreted as an indication of success in the relevant categories. Clearly, if this level were maintained throughout primary care HT management, it would engender positive results in health management not only from the clinical, but also from the patient and social points of view, leading to more effective treatment.

Another research direction emerging from this study is the observation the influence of specific factors; for example, the findings of future research may suggest that priority should be given to those with before education (BE) scores of 0. Observation of the additional effects of gender and age would also be useful in determining appropriate methods for the implementation of such training in practice.

This study had several limitations. The intervention increased the scores in almost every category, significance was achieved in 13 of the 15 subcategories, and following the training, this was typically achieved in five subcategories, exceeding the target score of at least 50%; however, it is difficult to assess the accuracy of this percentage because we did not use a scale,. Although the target of 50% or more correct answers was achieved in 5 subcategories, upon examining particular cases in these categories, there was a clear distinction between those who scored 50% or higher and those who did not. To better ensure competence in terms of HT management in primary care, future research should evaluate individual competence and provide additional complementary education to those who have not yet reached the appropriate standard.

In a previous study, it was observed that online education increases the learning capacities of nursing students [16]. Another stud reported positive results for online occupation therapy training [17]. Moreover, the benefits of continuous training have been emphasized in the case of DM (diabetes mellitus) [18]. Thus, it is beneficial to disseminate HT-related education via widespread and continuous training, and this could also be provided online.

4. Conclusions

This study illustrated that in-person professional education practice is effective at increasing students' knowledge, awareness, and evaluation capacity, which are important elements of HT management in primary care. In relation to HT, 15 subcategories were examined in detail, revealing the categories that benefited from the education given in terms of the effect size. In addition, a review of factors affecting the usefulness of the education identified the most influential. This study also revealed the detailed effects of education on the subcategories related to HT management, leading to the emergence of original results.

Hypertension remains a highly prevalent health condition globally, and a key focus of medical science. Thus, HT monitoring and management in PC (primary care) is of vital importance. This study has the potential to shed light on clinical applications in this field and to guide future research.

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