RESEARCH ARTICLE

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A Quasi-Experimental Controlled Educational Intervention for Mothers to Reduce Unnecessary Emergency Department Admissions in Children with Respiratory Tract Infection Symptoms

ABSTRACT

Objective: Although children presenting with respiratory tract infection (RTI) symptoms can be managed by in primary care, these symptoms are the most common reasons for children to present to the emergency department (ED). The aim of this study is to investigate the effect of the education given to mothers by their family physician in reducing the unnecessary admissions of children with RTI symptoms to the ED.

Methods: This study was a quasi-experimental, single-blind, controlled educational intervention conducted with mothers of children aged 6 months-6 years. Family Medicine Units were randomized as control and intervention group. A questionnaire including sociodemographic characteristics, emergency department visits due to RTI symptoms, fever-related practices and knowledge, attitudes and behaviours (KAB) about RTI symptoms (KABaRTIS) was applied to both groups before and after the intervention. Intervention group received one-to-one, face-to-face education focusing on management of acute RTI symptoms and alarm findings, also a booklet was given. No intervention was made to the control group.

Results: Study was completed with 178 mothers (Control:118, Intervention:60). The KABaRTIS scores of the mothers increased significantly in both groups. The median number of admissions to ED due to RTI symptoms decreased for both groups. However, ED admissions due to severity increased in control-group and decreased in intervention-group.

Conclusions: This is the first educational intervention conducted in primary care in Türkiye to reduce unnecessary emergency department admissions with RTI symptoms in children. Nevertheless, population characteristics, interventional properties, contamination bias may have reduced the expected effect.

Keywords: Emergency Medical Services, Family Practice, Health Services Misuse, Respiratory Tract Infections.

Solunum Yolu Enfeksiyonu Belirtileri Gösteren Çocuklarda Gereksiz Acil Servis Başvurularını Azaltmak İçin Annelere Yönelik Yarı Deneysel Kontrollü Bir Eğitim Müdahalesi

ÖZET

Amaç: Solunum yolu enfeksiyonu (SYE) semptomları ile başvuran çocuklar birinci basamakta tedavi edilebilmesine rağmen, bu semptomlar çocukların acil servise başvurmalarının en yaygın nedenidir. Bu çalışmanın amacı, annelere aile hekimleri tarafından verilen eğitimin, SYE semptomları olan çocukların acil servise gereksiz başvurularını azaltma ve SYE hakkındaki bilgi, tutum ve davranışların geliştirilmesine etkisini araştırmaktır.

Gereç ve Yöntem: Çalışma, yarı deneysel, tek kör, kontrollü bir eğitim müdahalesi olup 6 ay-6 yaş arası çocukların anneleri ile yürütülmüştür. Aile Hekimliği birimleri kontrol ve müdahale grubu olarak randomize edilmiştir. Sosyodemografik özellikler, SYE semptomları nedeniyle acil servise başvurular, ateşle ilgili uygulamalar ve SYE semptomları hakkında bilgi, tutum ve davranış (BTD) önermelerini içeren anket, müdahale öncesi ve sonrasında her iki gruba da uygulanmıştır. Müdahale grubuna akut SYE semptomlarının ve alarm bulgularının yönetimine odaklanan bire bir, yüz yüze eğitim ve bir broşür verilmiştir. Kontrol grubuna herhangi bir müdahalede bulunulmamıştır.

Bulgular: Çalışma 178 anne ile tamamlanmıştır (Kontrol: 118, Müdahale: 60). Annelerin BTD puanları her iki grupta da anlamlı olarak artmıştır. SYE semptomları nedeniyle acil servise yapılan başvuruların ortanca sayısı her iki grup için de azalmıştır. Ancak, hastalık şiddeti nedeniyle acil servise başvurular kontrol grubunda artarken müdahale grubunda azalmıştır.

Sonuç: Bu çalışma, çocuklarda SYE semptomları ile gereksiz acil servis başvurularını azaltmak için Türkiye'de birinci basamakta yürütülen eğitim müdahalelerinin ilkidir. Bununla birlikte, popülasyon ve müdahale özellikleri, hatırlama ve bulaşma yanlılığı beklenen etkiyi azaltmış olabilir.

Anahtar Kelimeler: Acil Tıbbi Servisler, Aile Hekimliği, Sağlık Hizmetleri Suistimali, Solunum Yolu Enfeksiyonları.

INTRODUCTION

Admissions to emergency department (ED) in Türkiye constitute 28% of the use of health services, and the annual number of admissions to the ED is higher than the population of the country (1). 'Inappropriate', 'Non-urgent' or 'Unnecessary' admissions to the ED are complaints that do not require ED resources and immediate management (2). Patients use the ED to receive faster access to care without appointment, and for situations that could easily be resolved in Family Health Centers (FHC) (3). There are many studies on the reasons for admissions to the ED, its frequency, and the sociodemographic characteristics of the admissions. Acute upper respiratory tract infections (RTI) are the most common cause of admission to the pediatric ED in Türkiye. According to Türkiye Health Survey 2022 data, among the main health problems seen in the last 6-months in children aged 0-6, upper RTI ranks first with 31.3%, and RTI constitute almost half of all admissions in total (4). In some studies, it is reported that RTI constitute more than 50% of emergency admissions (3,5).

Especially in terms of protecting the health of 0–6-year-old children and fighting against diseases, mothers are in an important position. Factors like low socioeconomic level and low health literacy have been determined to increase the frequency of admissions to the pediatric ED (6). The fact that non-emergency admissions cause overcrowding in the ED, causes patients to wait longer, increases in health costs, low efficiency in emergency personnel, and low service quality (7). ED overcrowding is not a problem limited only to Türkiye. In the United States, Italy, Belgium, and many other countries, approximately half of pediatric emergency visits are non-urgent (8-10). Policies are being developed to solve this problem all over the world. Health education to parents about respiratory tract infection symptoms (RTIS) can make an important contribution to health promotion and resource management. Although there are studies examining the causes of this problem in Türkiye, no similar educational intervention study was found when the Turkish Medicine Index was scanned. However, there are examples of intervention from other countries (11,12).

Family medicine (FM) keeps the gate by providing preventive health services to patients and healthy individuals with a continuous and comprehensive approach and offers person-centered care to empower patients (13). It has been found that in health systems with a strong FM system, unnecessary admissions to the ED are less frequent (12). Family physicians (FP) can play a key role in improving the knowledge, attitudes, and behaviors (KAB) of mothers with healthy child follow-ups and the environment of trust between the physician and the patient. Therefore, a controlled educational intervention for mothers was aimed in a Family Health Center to reduce unnecessary emergency admissions in children with respiratory tract infection symptoms.

MATERIAL AND METHODS

Study Design: The research is a quasi-experimental, single-blinded, controlled educational intervention study. It was carried out at an Educational Family Health Center in İstanbul, Türkiye. The population of the study consists of all mothers with children aged 6-months to 6-years (6m-6y) who are registered to a specific Family Medicine Unit. The sampling of the study is shown in Figure 1.

It is estimated that the frequency of ED admissions will decrease by 50% in the intervention group, the minimum number required was found to be 58 for both the intervention and control groups. It was decided to reach at least 191 mothers (64:127) to increase the power of the analysis and assuming that 10% loss may occur until the completion of the study.

One of the 3-units of the FHC was assigned to the researcher by simple random method to form the intervention group and the other 2-units were accepted as the control group. All mothers who came to the FHC between the specified dates, met the criteria and agreed to participate in the study were included.

Inclusion Criteria in the Study:
• Having at least one child older than 6 months and younger than 6 years old
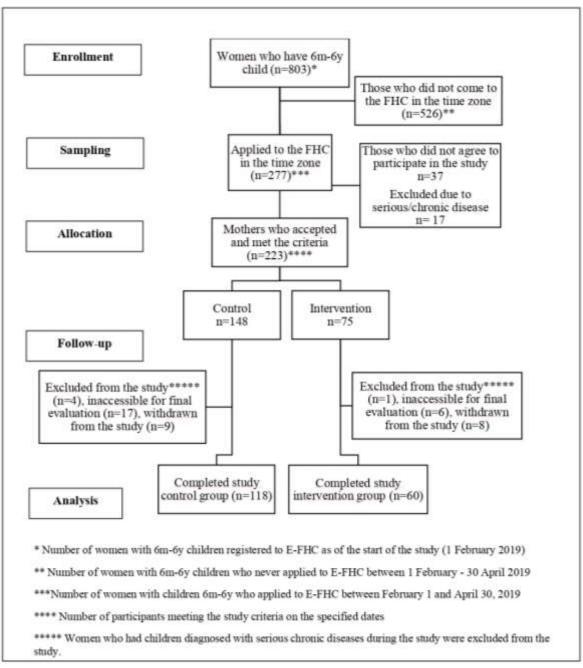• No serious or chronic disease in that child (6m-6y).

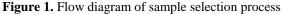**Exclusion Criteria from the Study:**
• Being a healthcare worker
• Serious illness diagnosis in the participant's child during the study

Data Collection

1. Initial Assessment: The participants were asked questions about their sociodemographic features and knowledge, attitude, and behavior (KAB) related to the management of RTIS. KAB was evaluated by a 5-point likert scale (1-"strongly disagree", 5-"strongly agree"), using a 20-sentence proposition formed by examining national and international sources on child health and diseases. Some sentences of the scale (1,2,5,9,14,16,19,20) were coded in reverse. A high score indicates expected positive knowledge, attitude, and behavior. The comprehensibility of the questions and Likert-type items was confirmed by a pilot study of the evaluation form. Educational status regarding childcare, the health institutions preferred, reasons for the preference, approach to the child with fever at home, and the number and the reasons to go to the ED or FHC or outpatient clinics in the last 6-months of the mothers were asked open-ended.

Figure 1. Flow diagram of sample selection process

2. Intervention: Individual Training: After the initial assessment, the intervention group mothers were given a face-to-face, one-on-one, approximately 15-minute standardized training on home management of acute respiratory tract symptoms and alarm findings were stated. A checklist was used for the standardization of education. Also, a leaflet and brochure prepared according to the guidelines were used as educational material (14-17). A pilot study was conducted for the brochure, and it was edited according to the feedback. No intervention was made to the mothers in the control group, and they were not informed about the intervention. The risk of contamination was reduced by training the intervention group in privacy, participants did not know which group they were in, and the final data collected by a blind researcher.

3. Final Evaluation: Six months after the educational intervention; all mothers participating in the study were invited to the FHC by phone by another researcher who was blind to the intervention and did not know which group the participants were in, and the same questionnaire were asked to the same mothers. At no stage of this study were the mothers informed of which group they were in. Thus, the research data was collected single-blind, and the participants were also kept half-blind.

Analysis Methods: The quantitative data of the study were analyzed with SPSS Statistics version 25. Number, percentage, mean, standard

deviation (StD), median, inter quantile range (iqr), minimum (min) and maximum (max) values were used. The assumption of normality of the data was confirmed by Kolmogorov Smirnov and Shapiro-Wilk tests. Independent t-test and paired t-test was used for normally distributed continuous variables, and also Mann-Whitney U test, McNemar test and Wilcoxon test were used for non-normally distributed variables. All open-ended questions were coded by two researchers, combined, categorized, and analyzed with the Chi-square test. Cronbach's alpha, the internal consistency coefficient of the KAB scale in our sample, was 0.68-0.72. Chi-square test and Fisher's exact test were used in the comparison of nominal data. Statistical significance was determined by taking the significance level of <0.05 and the power level of 80% in all analyzes.

Ethics: The study was conducted according to the guidelines laid down in the Declaration of Helsinki. The privacy rights of the participants were and will be always observed. Approval for the study was obtained from the Ethics Committee of Marmara University Faculty of Medicine with the protocol code of 09.2019.037 in 04.01.2019. Also, The Universal Trial Number (UTN) is U1111-1282-0650.

RESULTS

Sociodemographic Characteristics of the Participants: The study was completed with 178 mothers (Control:118, Intervention:60). The sociodemographic characteristics of the mothers were shown in Table 1. There was no difference in terms of sociodemographic characteristics of the participants except the number of mothers with 2-child was higher in the control group.

Table 1. Sociodemographic characteristics of the participants (n=178)

	Control [n=118 (%)]	Intervention [n=60 (%)]	P value*
Age (mean – StD)	32.9±4.7	32.4±4.8	0.481**
Age (min-max)	23-45	24-44	
Number of children [mean – (Std)]	2.10±0.93	1.78±0.80	**0.030****
Number of children [median – (iqr)]	2 (1-3)	2 (1-3)	**0.034*****
Number of children (min-max)	1-5	1-4	
Educational level (last finished)			0.876
Illiterate	1 (0.8)	0 (0.0)	
Primary School	17 (14.4)	10 (16.7)	
Middle School	12 (10.2)	4 (6.7)	
High School	34 (28.8)	18 (30.0)	
University and above	54 (45.8)	28 (46.7)	
Monthly household income			0.513
0-1600	5 (4.2)	1 (1.7)	
1601-5000	79 (66.9)	40 (67.8)	
5001 and above	34 (28.6)	18 (30.5)	
Employment status			0.258
Employed	97 (82.2)	45 (75.0)	
Unemployed - Housewife	21 (17.8)	15 (25.0)	
Marital status			1.000
Married	118 (100.0)	60 (100.0)	
Single	0 (0.0)	0 (0.0)	

*Chi-square test **Independent sample's t-test ***Mann Whitney - U*

The most preferred institution by the mothers for their children in case of RTIS was "Family Health Centers", the most preferred reason was "closeness" and there was no difference between the two groups (p=0.736). Also, there was no difference between the two groups in the reasons for applying to the ED (p=0.352).

Initial Assessment (Before): There was no significant difference between the groups in the reasons for admission to FHC or outpatient clinics, which were collected in 8-categories (RTIS, healthy child follow-up, fever, vaccination, acute gastroenteritis symptoms (AGES), allergy, rash-redness, and other) in the initial assessment (p=0.882). There was no significant difference between the groups in the reasons of admission to ED, which were grouped in 6-categories: fever, RTIS, AGES, rash-redness, trauma and other (p=0.717) at the beginning.

The practices of mothers in case of fever of their 6m-6y children were asked open-ended and were analyzed for coding. They were similar in both groups and there was no significant difference (p>0.05), while antipyretic drug administration was significantly more common in the intervention group (p=0.003).

The responses of the mothers to the scale consisting of 20-sentence Likert-type propositions were evaluated, and the Cronbach alpha coefficient, which shows the internal consistency before the intervention, was calculated as 0.679.

Final Evaluation (After): The preferred healthcare institution for their children was found to be FHC most frequently for both groups after the intervention (69.1%). Moreover, this preference increased significantly for both groups compared to the initial assessment (p<0.001). It was observed that the causes remained similar in the intervention

group but changed in the control group (C: p=<0.001; I: p=0.087).

In the final evaluation, when the factors affecting the child's admission to the ED for any health problem were asked, "24-hour care" (18.0%) was the most common, as in the initial assessment. The reasons for admission to the ED changed for both groups (p<0.001). However, while the number of people who stated that they went to the ED due to the severity of the disease decreased in the intervention group, it increased in the control group. It was observed that both groups preferred the ED less after the intervention, and the rate of decrease was greater in the intervention group (Table 2).

Table 2. Healthcare provider preferences for children of mothers in both groups before and after the intervention

	Intervention (n=60)			Control (n=118)			Between Groups P value
	Before n (%)	After n (%)	P value*	Before n (%)	After n (%)	P value*	
FHC	31 (51.7)	45 (75.0)		62 (52.5)	78 (66.1)		**=0.983 ***0.461
ED	**15 (25.0)**	**5 (8.3)**	<0.001	**28 (23.7)**	**15 (12.7)**	<0.001	
Other	14 (23.3)	10 (16.7)		28 (23.7)	25 (21.2)		

* Comparison of family health center, emergency department and other health services, before and after the intervention (Chi-square test)
** Initial Assessment comparison of the groups (Chi -square test)
***: Final Evaluation comparison of the groups (Chi -square test)

Mothers applied less to FHC, or outpatient clinics compared to the initial assessment; it was observed that when they received care, they mostly went for RTIS and fever. There was a significant difference between the groups before and after the intervention (p<0.001), and there was no difference between the two groups (Table 3).

While there was a significant difference in the number of health services received from ED or FHC and outpatient clinics between the first and final evaluation in both the intervention and control groups, there was no significant difference between the intervention and control groups. The number of admissions per child is given in Table 3.

Table 3. Emergency department versus family health center or outpatient clinics admissions– before and after in intervention and control groups

	Intervention (n=60)			Control (n=118)			Between groups P value
	Before n (%)	After n (%)	p value*	Before n (%)	After n (%)	p value*	
FHC and Outpatient Clinics Admissions							
Mean (±SD)	4.52(±0.62)	2.72 (±0.32)		4.10 (±0.33)	2.76 (±0.22)		**=0.917 ***=0.669
Median (IQR)	3 (IQR:3)	2 (IQR:2)	=0.012	3 (IQR:4)	2 (IQR:2)	<0.001	
Min-Max	0-30	0-11		0-23	0-15		
Emergency Department Admissions							
Mean (±SD)	1.00(±0.16)	0.92 (±0.17)		1.30 (±0.16)	0.69 (±0.10)		**=0.669 ***=0.180
Median (IQR)	1 (IQR:1)	0.50(IQR:1)	=0.676	1 (IQR:2)	0.00 (IQR:1)	<0.001	
Min-Max	0-8	0-6		0-6	0-7		

* Comparison of the group, before and after intervention (*Wilcoxon* test)
** Initial Assessment comparison of both groups (*Mann-Whitney U* test)
***: Final Evaluation comparison of both groups (*Mann-Whitney U* test test)

Reasons for admission were collected in 3-categories (no admission, RTIS and other). Table 4 shows the data comparing the reasons for the intervention and control groups to go to ED or FHC and outpatient clinics in the initial assessment and final evaluation. While applying to the ED due to the severity of the disease increased in the control group, it is decreased in the intervention group. The other reasons are given in Figure 2.

Table 4. Comparison of the reasons for admission to emergency department or family health center and outpatient clinics in both groups before and after the intervention

	Intervention (n=60)			Control (n=118)			Before ** After *** P value
	Before n (%)	After n (%)	p value*	Before n (%)	After n (%)	p value*	
FHC and Outpatient Clinics Admissions							
No admission	2 (%3.3)	8 (%13.3)		7 (%5.9)	16 (%13.6)		**: =0.420 ***:=0.771
RTI Symptoms	44 (%73.4)	45 (%75.0)	0.615	86 (%72.9)	84 (%69.5)	0.348	
Other	14 (%23.3)	7 (%11.7)		25 (%21.2)	20 (%16.9)		
Emergency Department Admissions							
No admission	25 (%41.7)	30 (%50.0)		52 (%44.1)	71 (%60.2)		**: =0.714 ***:=0.413
RTI Symptoms	27 (%45.0)	22 (%36.7)	0.492	55 (%46.6)	33 (%28.0)	0.014*	
Other	8 (%13.3)	8 (%13.3)		11 (%9.3)	14 (%11.9)		

* Comparison of groups before and after intervention (Chi-square test)
** Initial Assessment comparison of both groups (Chi -square test)
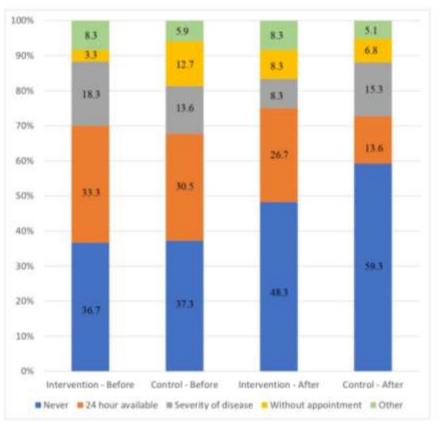***: Final Evaluation comparison of both groups (Chi -square test)

Figure 2. Reasons the mother to apply to the emergency service for her child.

The approach to the febrile child was questioned and the frequency of antipyretic drug administration decreased significantly in both groups after the intervention (Intervention: p<0.001; Control: p=0.007). Table 5 shows the comparisons for both groups before and after the intervention for each approach.

Propositions about how mothers manage RTIS were asked again, and the Cronbach-alpha coefficient, which shows the internal consistency of the scale after the intervention, was calculated as 0.717. Although KAB score changes (delta score) were higher in the intervention group, there was no statistically significant difference (Table 6).

Table 5. Comparison of the practices of mothers for their children in case of fever in the intervention and control groups before and after the intervention

*Number (Percentage)		Intervention (N=60)			Control (N=118)		
		Before n (%)	After n (%)	P value*	Before n (%)	After n (%)	p value*
Take to doctor immediately	Yes	16 (26.7)	1 (1.7)	**<0.001***	45 (38.1)	3 (2.5)	**<0.001***
	No	44 (73.3)	59 (98.3)		73 (61.9)	115 (97.5)	
Put wet cloth on body	Yes	21 (35.0)	16 (26.7)	0.424	46 (39.0)	31 (26.3)	**0.033***
	No	39 (65.0)	44 (73.3)		72 (61.0)	87 (73.7)	
Put cloth with vinegar on body	Yes	10 (16.7)	4 (6.7)	0.070	12 (10.2)	5 (4.2)	0.065
	No	50 (83.3)	56 (93.3)		106 (89.8)	113 (95.8)	
Cover body	Yes	0	0	1.000	0	0	1.000
	No	60	60		118	118	
Take off clothes	Yes	26 (43.3)	28 (46.7)	0.839	50 (42.4)	46 (39.0)	0.607
	No	34 (56.7)	32 (53.3)		68 (57.6)	72 (61.0)	
Give bath	Yes	43 (71.7)	35 (58.3)	0.096	80 (67.8)	70 (59.3)	0.144
	No	17 (28.3)	25 (41.7)		38 (32.2)	48 (40.7)	
Give medication	Yes	57 (95.0)	36 (60.0)	**<0.001***	92 (78.0)	74 (62.7)	**0.007***
	No	3 (5.0)	24 (40.0)		26 (22.0)	44 (37.3)	
Wait without doing anything	Yes	1 (1.7)	0	1.000	2 (1.7)	0	0.500
	No	59 (98.3)	60		116 (98.3)	118	

* *McNemar* test

Table 6. Comparison of the intervention and control groups in terms of knowledge, attitude and behavior scores related to respiratory tract infection symptoms

	Intervention (N=60)		Control (N=118)		p value
	Mean ± StD	Median (IQR)	Mean ± StD	Median (IQR)	
First score	76,91±5,60	77(73-80)	76,88±5,21	76(74-80)	0,670*
Last score	83,58±6,76	84(78-89)	82,16±6,70	83(76-88)	0,193*
p value**	<0,001**		<0,001**		
Delta score	6.27±5.6 (min: -7 max:17)		5.17 ±6.2 (min: -16 max:20)		0.251***

* Mann-Whitney U comparison test in independent groups
** Wilcoxon comparison test in dependent groups
*** T-test in independent groups

DISCUSSION

As the primary outcome of this study, it was aimed to reduce unnecessary emergency department admissions due to respiratory tract infection symptoms in 6m-6y children, with the education given to mothers during their visits to the FHC. However, after the intervention, the frequency of admission to the ED with RTIS decreased for both groups, and also more in control group. The secondary results of the study were aimed to increase the knowledge of mothers about RTIS, to develop their expected attitudes, to change the perception of them preferring ED instead of FHC, and to increase the confidence in the active role of FP in the management of RTIS. At the end of the study, it was observed that the KAB scores of the mothers about RTIS increased significantly in both groups after the intervention. It was observed that trust in FP had increased, especially in the intervention group, and there had been a change in perception regarding the preference of FHC instead of ED for RTIS.

Learning about RTIS alarm findings during the intervention may have had an unexpected stimulating effect on mothers in the intervention group and increased their sensitivity about going to the ED. The scale which was applied to the control group before and after the intervention about KAB about RTIS (KABaRTIS), may have increased the awareness of mothers in the control group and may had an effect that caused the difference between the groups to be erased. This situation is also called the Hawthorne effect in literature (18). This result is also discussed in terms of contamination bias between the intervention and control groups, the content of the evaluation questions, the social spread of the expected change in the people in the same environment, the possibility of accessing the intervention material and peer education (19-21).

The risk of contamination was tried to be minimised with some measurements mentioned in the method section. Nevertheless, the fact that the control group was selected from the same FHC suggests the possibility of contamination risk. However, intervention studies with a similar method have been found in the literature (22,23).

While the frequency of mothers who stated that they applied to the ED due to the severity of the disease in the intervention group decreased, it increased in the control group. This suggests that there should be more than one variable that measures the effectiveness of the intervention, and that effectiveness should not only be measured by the number of admissions. In addition to this sharp quantitative outcome variable, qualitative outcomes may also determine the effectiveness of the intervention. The education method chosen as the intervention is aimed to be simple and easily applicable by every family physician in daily practice. However, the duration and number of the sessions are the most important factors affecting the effectiveness of the education. While such an example of intervention is not encountered in Türkiye, there are studies in other countries with a longer education period. However, there is no certainty about the minimum duration of education that should be planned for the intervention to be effective. For example, an intervention in which parents were given 90-minutes of education, and there was a significant difference in KAB scores in the evaluation made immediately after the intervention, but 6-months later, the attitude difference after the intervention for fever and RTIS management lost its significance. So even when the training is 90-minutes instead of 15-minutes, mothers may not give up on their habits (24). Therefore, it may be necessary to try different methods together for behavior change, such as adding a session in which the education content is reminded by phone call or text messages. In a systematic review evaluating educational interventions in terms of reminders, it is stated that reminders through various means such as letters, telephone calls, messages, and feedback increase the effectiveness of the intervention (25).

Researchers preferred a more cost-effective method in terms of reproducibility and generalizability of the study, and the use of brochures is a common design in previous studies. Moreover, there are other educational interventions in other areas that are considered effective and are conducted just by handing out brochures (26,27).

It was determined that the KABaRTIS score of mothers who were given brochures, increased. However, an increase in the scores measuring KAB does not guarantee a decrease in unnecessary emergency admissions. It is seen that the information is not directly reflected in the behavior.

Similar results were also found in literature (12,24,28).

Another reason may be the high education level of the study population. According to the 2022 data of the Turkish Statistical Institute, the frequency of women with high school or higher education in Türkiye is 37.13%, and in this research is 76.7% for intervention group. While the prevalence of women with 14 years or more education in Türkiye is 17.32%, it was found to be 43.1% in this research population (29). It has been shown that there is an inverse correlation between education level and unnecessary use of emergency services (30). Similar results were found in this study as well. This may have eroded the effectiveness of the intervention.

In some studies, with multiple training sessions, the expected effect was reported (12). However, as the follow-up period or the number of sessions in multi-session intervention studies increased, the number of participants that were reached and continued the study decreased (31).

Considering the findings of this study, mothers seem to be conscious about the management of fever at home. However, the most common reason for applying to the ED is sustained fever outside of the working hours of the FHC. Similar findings are consistent with other studies conducted both in Türkiye and in the world. While some countries are trying to solve this problem with the gatekeeping FM model, in which they add the possibility of 24-hour access to primary care, some health systems use methods such as providing health services by telephone or not covering non-emergency ED admissions by insurance (22,24,32,33). In a systematic review, out of 39 interventions, it was stated that unnecessary visits to emergency services were reduced in approximately two-thirds of the articles scanned (34).

Strengths and Weaknesses: When the Turkish medical literature is examined, no intervention studies were found on reducing unnecessary admissions to ED in children with RTIS. This is the first of all.

The research design was planned as single-blind with a control group. The final evaluation data were collected by a researcher who did not know which participants had the intervention. In addition, the fact that the mothers did not know which group they belonged to, made them semi-blind.

For allocating, the unit randomly assigned to the researcher for the intervention. There was no difference between these two groups in terms of sociodemographic characteristics, data on the use of health services, and KABaRTIS scores in the first evaluation. The data of the study were collected in the same seasons to minimize seasonal effects. However, only people who came to the FHC and

volunteered were included in the intervention and this may have created selection bias.

The number of health care admissions and their reasons depend on the mothers' statements, leading to the possibility of recall bias. However, there are other studies in literature evaluating the results based on the mothers' statements.

There is no Turkish or English scale that measures KABaRTIS, for which validity and reliability studies have been conducted. For this reason, KAB of the intervention and control group participants was compared with the scale prepared by the researchers using expert opinion and guidelines.

In this research, a brochure was used as a visual material. It was not diversified according to the knowledge level of the mothers. Standardization of education was considered as a strength, but mothers' learning needs regarding RTIS may differ. In this case, the probability of benefiting from education may have been lower for some women.

CONCLUSION

The primary result expected in this research is a hard quantitative variable affected by many non-modifiable factors such as FHC working hours, lack of referral chain, increasing knowledge level not being sufficient for behavior change. The secondary outcomes are qualitative variables affected by more modifiable factors. While the frequency of unnecessary visits to the ED with RTIS did not decrease at the expected level in the intervention group, it was observed that it was beneficial in terms of increasing the expected KABaRTIS, and increasing confidence in the FP.

Strengthening FM and the doctor-patient relationship can play a key role in resource management. Healthy child follow-ups provide a great opportunity for mothers to improve their knowledge, attitudes, and behaviors. However, since increasing the level of knowledge is not enough to change habits, it is necessary to use different training methods that can affect attitudes and behaviors.

With a longer intervention, consisting of multiple sessions, including reminders, and regular follow-ups by the FP, it may be possible to reduce unnecessary ED visits and provide a permanent change in behavior. For this purpose, an intervention can be planned with a larger sample, randomly selected mothers from different populations, by allocating a large budget and combining different methods. Considering the characteristics of adult education, more interactive interventions can be planned where the participants are not only listeners.

This study is important in terms of being the first of the educational interventions in Türkiye in order to reduce unnecessary ED admissions with RTIS in children. However, more comprehensive, and long-term studies should be designed in order to see the expected decrease permanently.

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