Original Article

Impact of a Parent and School Child Asthma Education Intervention Based on Health Literacy on Disease Management of Children

Esma Guney Kizil, PhD
District Health Directorate of Karabaglar, Turkey

Ayla Bayik Temel, PhD
Professor, T.C. Demiroglu Science University, Florence Nightingale Hospital School of Nursing, department of public health nursing, Istanbul, Tuekey

Corespondece: Esma Guney Kizil , PhD, District Health Directorate of Karabaglar, Turkey e-mail: esmaguney09@gmail.com

Abstract
Background: Asthma is the most common cause of hospitalization in childhood. Health literacy (HL) should be taken into account in asthma management and education as a key factor. Asthma is the most common cause of hospitalization in childhood. Health literacy (HL) should be taken into account in asthma management and education as a key factor. The evidence obtained from this school-based study, which evaluated the impact of asthma education programs for both children with asthma and their parents on disease self-management in children, would address this gap in the literature.
Objective: The aim of the study was to determine the impact of a parent and school child asthma education intervention based on health literacy on disease management of children.
Methodology: This randomized controlled trial was conducted with 88 children and their parents. While education and booklets were given to both children and parents in intervention group 1, only the children were given the education and the booklets in intervention group 2. Post-test was performed 3 weeks after the education and then follow-ups were carried out in the next three months over the phone.
Results: Although the Asthma Control Test and rescue medication use scores increased significantly during the study period ($p<0.05$), no significant difference was found between the groups ($p>0.05$). The education given to the children in the intervention 1 and intervention 2 groups was determined to have a strong effect on asthma control. Although the rescue medication use scores of the children in all groups increased significantly at the 3rd follow-up compared to the 1st follow-up ($p<0.05$), no significant difference was found between the groups ($p>0.05$).
Conclusion: Giving asthma education to children together with their parents or only to children did not make a difference in terms of affecting disease self-management.

Key words: Asthma; child health; disease management; health literacy; nursing

Introduction

Asthma is a heterogeneous disease characterized by chronic airway inflammation and hypersensitivity. Wheezing, shortness of breath, tightness in the chest and/or coughing are some of the symptoms of asthma. It is among the top ten diseases that cause disability-adjusted life years in children aged 5-14 years. In 2019 wheezing has been observed at a rate of 11.8% in the 6-7 age group and 13.8% in the 13-14 age group in the world. While the prevalence of wheezing in children of different age groups in Turkiye in the last year was 3.1%-15.8%, the frequency of asthma was 0.7-21.2% (Celik, 2020, p.38-39,42).

Asthma is the most common cause of hospitalization in childhood and asthma attacks that do not require hospitalization need to be treated at home and with rest. Health-related school absenteeism is more common among asthmatic children (Bruzzese, Evans, Kattan, 2009, p. 195-200; Walter et al. 2016, p.125). School nurses have a pivotal role in monitoring

children with chronic diseases and assisting them to manage chronic health conditions and use prescribed medications (Ulutasdemir et al. 2016, p.123). The use of school-based asthma education programs targeting children with asthma has shown positive health outcomes decreasing the number of attacks, school absenteeism, emergency service visits and physical activity difficulties for students (Walter et al. 2016, p.114).

Health literacy (HL) should be taken into account in asthma management and education as a key factor (Global Initiative for Asthma, 2020, p.43). Children of parents with low HL have worse asthma control and more emergency admissions, school absenteeism, hospitalizations, and rescue medication use of their children (Shone, 2009, p.1; Rosas-Salazar et al. 2012, p. 936; Harrington et al. 2015, p.20; Brigham et al. 2016, p.112). Studies conducted in Turkiye have reported that families had deficiencies in their knowledge about asthma, they had problems adapting to the disease and treatment and needed support in coping with its potential complications and disease stress (Bozkurt, Yildiz, Cokugras, 2012, p.13; Tay, 2012, p. 55; Sozen, 2017, p.63).

Students' asthma knowledge has been reported to increase with the asthma awareness-raising curriculum at schools (Pike et al. 2011, p.61). In Ozsoy's study (2017, p.1), a relationship was found between HL and chronic disease management, the child's daily life, difficulties in life and the effects of the disease. There are a limited number of interventional studies on the self-management of asthma in children in Turkiye (Kackin, 2016, p.58; Kocaaslan, 2021, p.70). While studies on school-based self-management programs for asthma control among children are reviewed in the literature, it is noticed that studies were carried out mostly on children. We did not find any study with both the parents and their children that investigated the impact of school-based asthma educational programs on disease self-management of children by taking their HL levels into account in Turkiye. The evidence obtained from this school-based study, which evaluated the impact of asthma education programs for both children with asthma and their parents on disease self-management in children, would address this gap in the literature and answer the following research questions. The aim of the study was to determine the impact of a parent and school child asthma education intervention based on health literacy on disease management of children.

Study Questions

The questions of the study were as follows: Does school-based asthma education intervention given to asthmatic children and their parents affect children's asthma control and use of rescue medication in self-management of their disease?

Hypotheses of the study:

Hypothesis 1: There is a statistically significant difference between the ACT scores of the students between the groups.

Hypothesis 2: There is a difference between the rescue medication uses by the students between the groups.

Materials and Methods

This study was a randomized controlled trial. This interventional study included two intervention groups and a control group. It used a pretest and posttest randomized controlled design.

Population: The study population consisted of 182 asthmatic children who had a physician diagnosis and were taking medication from the public primary schools in the Karabaglar district. Children in the 2nd, 3rd and 4th grades of 182 primary schools, who had physician-diagnosed asthma and were currently using asthma medication, and whose parents were literate were included in the study.

Sample: The study sample consisted of volunteer students and their parents who met the inclusion criteria of the study. The sample was determined with the support of principals and classroom teachers and data gathering started from the primary schools with the highest number of students in the district. A total of 98 asthmatic children and their parents from the 182 interviewed in 18 primary schools agreed to participate in the study. Four children were excluded from the study due to the literacy problems their parents had. The study was carried out with a total of 94 samples after the sample size was

tested by power analysis. The randomization scheme was developed by a statistician using a random number generator. A stratified randomization method was used to achieve the balance among groups in terms of subjects' baseline characteristics (covariates).

Division of participants: The participants were divided into 3 groups by randomly choosing with the help of SPSS, considering the parents' HL scores, children's HL scores, grade level and asthma control test (ACT) value variables. Intervention 1 (31 children and their parents), Intervention group 2 (31 children) and the Control group (30 children and their parents) were determined by randomization. The study was completed with 88 students and their parents since six children and their parents left the study during the education process. The flow chart of the control and intervention groups prepared in line with CONSORT 2010 (Sunay et al. 2013, p.1-10) is shown in Figure 1.

Power analyses: Power analyses were performed before the education and at the end of the follow-ups. ACT score and frequency of rescue medication use, which are among the criteria showing disease self-management, are the parameters evaluated while determining the sample size. In line with the hypotheses of the study "There is a statistically significant difference between the ACT scores of the students between the groups" and "There is a difference between the rescue medication uses by the students between the groups", the minimum sample size that would be sufficient for 80% power was 67. Children's total ACT mean score was 16.943 before education and 16.4886 after education, and the effect size calculated with these values was 0.3655. The power value obtained with the n=88 sample size, 0.05 significance level and 0.3655 effect size was 92%. The rescue medication use scores of the children were 3.2 before the education and 3.9 after the education, and the effect size calculated with these values was 0.38. The power value obtained with a sample size of n=88, a significance level of 0.05, and an effect size of 0.38 after the study was 94%.

Dependent variables of the study were ACT score and the status of rescue medication. The main independent variable of the study was the asthma education program given by taking HL into account. The intermediate independent variables were the child's HL level and the parent's HL level.

Collection of data: The study was carried out in 16 public primary schools in the Karabaglar district of İzmir between October 2018 and July 2019. The data were collected by face-to-face interviews with children and parents at schools before and after education and by using the questionnaire. Personal information form, the Health Literacy Scale developed by Sorenson et al. (2012, p.1-13) and adapted into Turkish by Aras and Bayik Temel (2017, p.85-94), the Health Literacy for School-Aged Children, developed by Paakkari et al., (2016, p.751-757) and adapted into Turkish by Ozturk Haney (2018, p.97-107), the Asthma Control Test (ACT), and Telephone Interview Form were used as the data collection tools.

The intervention groups were given asthma education in schools at least three weeks after the pre-test. While education and booklets were given to both children and parents in intervention group 1, only the children were given asthma education and the booklets in intervention group 2. The content of the education consisted of asthma disease, its symptoms, diagnosis, treatment, risk factors, use of medication, use of medication apparatus, vaccination treatment, follow-up of the asthmatic child, precautions to be taken in prevention, what to do during an attack, what to do for adaptation to the disease and activities to do in school life. The asthma education program, which was completed in about 40 minutes, was conducted after the lessons of the day finished in the school. In the education of both intervention groups, PowerPoint presentation, lecturing, use of printed materials (booklet), video screening techniques and demonstration methods were used to teach the use of inhalers. In accordance with the self-management support component of the Health Literacy Responsive Care Model, the education was conducted using techniques such as the teach-back (the person receiving the education tells the subject in his/her own words), Interactive education about the student's asthma experiences, helping to develop a personal action plan and asking encouraging questions.

During the education hours, booklets (different ones for parents and children), prepared by the researchers after taking expert opinions, were distributed to parents and asthmatic children. Post-test was conducted 3 weeks after the education, and 1st, 2nd and 3rd follow-ups were performed in the next three months through phone calls. There was no intervention applied for the control group.

Frequency and percentage distributions of the data were carried out. Kolmogorov-Smirnov and Shapiro-Wilks tests were performed for normal distribution. Furthermore, homogeneity tests, two dependent sample t-test, chi-square, McNemar test, chi-square for post hoc analysis, Friedman test, and Wilcoxon test was used for paired groups in post hoc analysis and ANOVA tests were used for comparison between groups. The formula [d= χ^2/n x(category number-1)] and odds ratio were used for effect size. Hypothesis tests were evaluated at a significance level of α=0.05 (Cevahir, 2020, p.67).

Ethical issues: Ethics committee permission from the Clinical Research Ethics Committee of Izmir Bozyaka Training and Research Hospital and institutional permission from Izmir Provincial Directorate of National Education were obtained. Verbal consent was obtained from the children and written permission was sought from the parents via letters sent home explaining the intervention to be used in the study. Since the education planned to be given at the end of the study to the control group could not be carried out due to the COVID-19 pandemic. Education booklets were left at the schools, and a message was sent to the families of the control group informing them that they could pick them up.

Results

A significant difference was found between the mean ACT scores of the children in the intervention 1 group at all measurement times (χ^2=21.140; p=0.000) (Table 3). The ACT scores of the children in the intervention 1 group increased in the 3rd follow-up compared to other measurement times. A significant difference was found between the mean ACT scores of the children in the intervention 2 group at all measurement times (χ^2=29.89; p=0.000). The ACT scores of the children in the intervention 2 group increased in the 3rd follow-up compared to other measurement times. A significant difference was found between the mean ACT scores of the children in the control group at all measurement times (p<0.05). The ACT scores of the children in the control group increased in the 3rd follow-up compared to other measurement times. The ANOVA analysis was performed for the comparison of ACT scores between groups before education. No significant difference was found between the ACT scores of all three groups before the education, after the education and at the 3rd follow-up (p>0.05)(Table 3).

There was a significant difference between the rescue medication use scores of the children in the intervention 1 group at all measurement times (p<0.05)(Table 4). Rescue medication use scores of the children in intervention group 1 before the education were found to be lower compared to the other measurement times. Rescue medication use scores of the children in the intervention 2 group were higher at the 3rd follow-up compared to the other measurement times. A significant difference was found between the rescue medication use scores of the children in the control group at all measurement times (p<0.05). Rescue medication use scores of the children in the control group were higher at the 3rd follow-up compared to the other measurement times. Differences between groups were evaluated with the ANOVA test and no significant difference was found in all three stages (p>0.05)(Table 4).

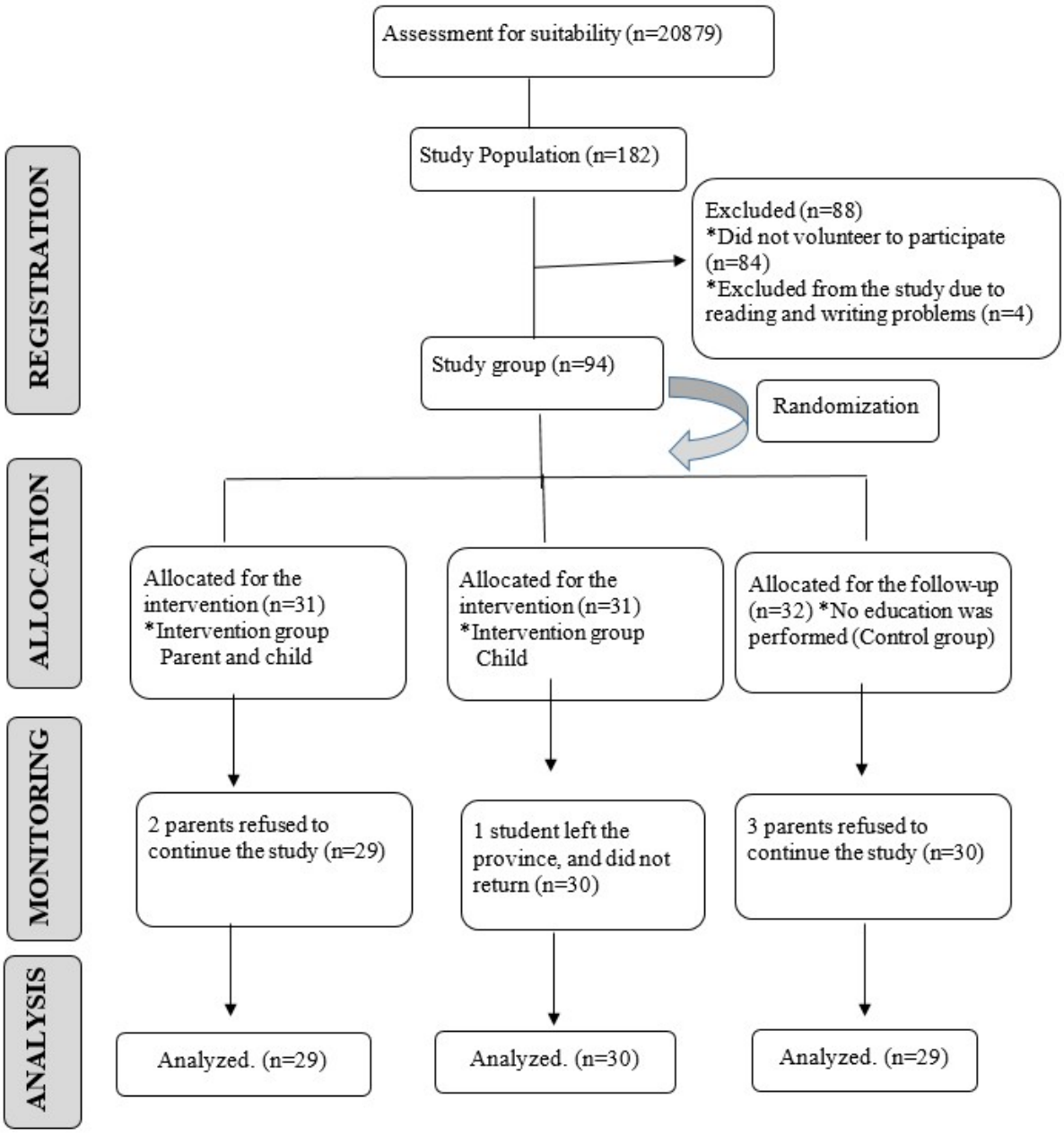

Figure 1

Table 1: Distribution of Socio-Demographic Characteristics of Children with Asthma According to Study Groups

Social-demographic characteristics		Intervention 1 (n=29)		Intervention 2 (n=30)		Control (n=29)		Total (n=88)		Homogeneity test
		n	%	n	%	n	%	n	%	
Age groups	7	6	20.7	6	20.0	3	10.3	15	17.0	χ^2=6.822 p=0.338
	8	10	34.5	6	20.0	14	48.3	30	34.1	
	9	11	37.9	13	43.3	8	27.6	32	36.4	

	10	2	6.9	5	16.7	4	13.8	11	12.5	
Gender	**Girl**	12	41.4	9	30.0	13	44.8	34	38.6	χ^2=1.505 p=0.471
	Boy	17	58.6	21	70.0	16	55.2	54	61.4	
Year	**2**	9	31.0	7	23.3	9	31.0	25	31.0	χ^2=3.478 p=0.481
	3	10	34.5	9	30.0	13	44.8	32	44.8	
	4	10	34.5	14	46.7	7	24.1	31	24.1	
Total		29	100.0	30	100.0	29	100.0	88	100.0	

Table 2: Distribution of Socio-Demographic Characteristics of Parents According to Study Groups

Socio-demographic characteristics		**Intervention 1 (n=29)**		**Intervention 2 (n=30)**		**Control (n=29)**		**Total (n=88)**		**Homogeneity test (χ^2)**
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Parent	Mother	26	89.7	29	96.7	24	82.8	79	89.8	χ^2=4.346 p=0.361
	Father	1	3.4	0	0	3	10.3	4	4.5	
	Grandmother /grandfather	2	6.9	1	3.3	2	6.9	5	5.7	
Education status	Literate	1	3.4	0	0.0	1	3.4	2	2.3	χ^2=3.135 p=0.926
	Primary school	11	37.9	11	36.7	14	48.3	36	40.9	
	Secondary school	8	27.6	7	23.3	5	17.2	20	22.7	
	High school	7	24.1	10	33.3	8	27.6	25	28.4	
	University or higher	2	6.9	2	6.7	1	3.4	5	5.7	
Family type	Nuclear	24	82.8	24	78.6	20	67.9	68	77.3	χ^2=3.679 p=0.451
	Extended	3	10.3	4	14.3	8	28.6	15	17.0	
	Single-parent	2	6.9	2	7.1	1	3.6	5	5.7	
Income perception	Income less than expenses	13	44.8	11	36.7	11	37.9	35	39.8	χ^2=4.349 p=0.361
	Income equal to expenses	15	51.7	19	63.3	15	51.7	49	55.7	
	Income more than expenses	1	3.4	0	0.0	3	10.3	4	4.5	
Total		29	100.0	30	100.0	29	100.	88	100	

Table 3: Comparison of Pre-, Post-Educational and the 3rd Follow-up Period Asthma Control Test Scores of Children with Asthma in Intervention 1, Intervention 2 and the Control Group

Groups	Pre education		Post education		3rd Follow-up		Test value*/p	Effect size
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	n	$\overline{X}$±SD		
Intervention 1 (Parent and Child)	29	18.31±4.68	29	20.24±4.45	29	23.10±3.4	χ^2=21.140 p=0.000	d=1.17
Intervention 2 (Child)	30	17.30±5.31	30	20.07±4.86	30	23.63±2.21	χ^2=29.890 p=0.000	d=1.85
Control	29	16.17±5.20	29	18.65±5.61	29	23.62±2.89	χ^2=25.358 p=0.000	d=0.42
Intergroup Comparison†	F=1.287 p=0.281		F=0.882 p=0.418		F=0.324 p=0.724			

* The Friedman test was performed. †ANOVA test was performed.

Table 4: Comparison of Rescue Medication Use Scores of Children with Asthma in Intervention 1, Intervention 2, and Control Groups during Pre-Education- Post-Education and Pre-Education-3rd Follow-up Periods

Groups	Pre education		Post education		3rd Follow-up		Test value*/p	Effect size
	n	X±SD	n	X±SD	n	X±SD		
Intervention 1 (Parent and Child)	29	3.28±1.51	29	3.93±1.51	29	4.45±1.15	χ^2=11.460 p=0.003	d=0.87
Intervention 2 (Child)	30	3.27±1.60	30	3.97±1.42	30	4.7±0.83	χ^2=18.747 p=0.000	d=1.12
Control	29	3.07±1.53	29	3.83±1.44	29	4.76±0.79	χ^2=20.475 p=0.000	d=1.39
Intergroup Comparison²	F=0.166 p=0.847		F=0.072 p=0.931		F=0.898 p=0.411			

* The Friedman test was performed. †ANOVA test was performed.

Discussion

For controlled asthma, the ACT total score should be 20 points or more. While asthma of the children in all three groups was "not well-controlled" (≤19 points) before education, it was found to be "well-controlled" (≥20 points after education and at the 3rd follow-up ($p<0.05$) (Table 3). This finding is the desired intended output in terms of the effectiveness of the intervention in the study. On the other hand, since there was no difference between the ACT scores between the groups, it can be thought that education had a similar positive effect on all groups, but did not make a difference between the groups.

Similar to our finding, no significant difference was found in terms of ACT scores between the groups that received and did not receive education in the studies of Macy et al. (2011, p.469-474) and Arican Ayyildiz et al. (2016, p.383-388). İnconsistant with our findings in the study of Kackin, the discharge education given to the parents of asthmatic

children was determined to be effective in reducing the symptoms of asthma (Kackin, 2016, p.57). In asthma, symptoms may vary during the day or seasonally (Celik, 2020, p.83). In a study in which children were evaluated in different seasons, the attacks were reported to increase in the autumn and continued in the winter months (Cohen et al., 2014, p.923). The decrease in viral upper respiratory tract infections in the summer months causes children to get better during these months (Celik, 2020, p.194). The fact that the third follow-up was carried out in the summer in this study suggested that seasonal factors may also have had an effect on the increase in the ACT scores of the children in all the groups.

Rescue medication use is a criterion within the ACT and it is scored between 1-5 points. As the score increases, the frequency of the rescue medication use decreases (Celik, 2020, p.100). Rescue medication use scores of the children in the intervention 1 group were lower before the education compared to all other measurement times ($p<0.05$)(Table 4). Rescue medication use scores of the children in intervention group 2 and the control group were higher at the 3rd follow-up compared to the other measurement times ($p<0.05$). No significant difference was found between the rescue medication use scores in all three groups when compared before the education, after the education and at the 3rd follow-up ($p>0.05$). While Dewalt et al. (2007, p.25-31) reported that the children of parents with low levels of HL use rescue medications more frequently, no significant difference was found between the pre-test and post-test in terms of the frequency of using rescue medications in the study of Cevik. (2011, p.55). The decrease in the use of rescue medication by children in this group after education is thought to be the combined result of the education given to parents and children. Furthermore, the use of rescue medication was significantly lower in the 3rd follow-up compared to the 1st follow-up of the children in the Intervention 1 and Intervention 2 groups ($p>0.05$). Besides the effect of education, it was thought that the seasonal factor could also be effective in this situation. The scores of the children in the control group did not change significantly after the education however decreased significantly in the 3rd follow-up. This result might also be related to seasonal factors.

Conducting education in a single session and the fact that the Intervention 1, Intervention 2 and Control groups could not be blinded because the mothers and the children attended the same training session together to achieve the effectiveness of the education due to the fact that the children were at a young age were the limitations of the study.

Conclusions and Recommendations

Main Conclusion: Giving asthma education to children together with their parents or only to children by taking health literacy into account did not make a difference in terms of affecting disease self-management. However, education positively affected asthma control and reduced symptoms with parental asthma knowledge.

- ACT total mean scores of the children in all three groups gradually increased during the study period ($p<0.05$), however, no statistically significant difference was found between groups ($p>0.05$). The education given to the children in the intervention 1 and intervention 2 groups was determined to have a strong effect on asthma control.

- Rescue medication use scores of the children in intervention group 2 were higher at the 3rd follow-up compared to the other measurement times ($p<0.05$), but there was no significant difference between the groups ($p>0.05$). Rescue medication use scores of the children in all three groups decreased significantly at the 3rd follow-up compared to the 1st follow-up ($p<0.05$).

Recommendations: School nurses could train teachers to raise their awareness about asthmatic children, the medications and what needs to be done during an attack. By providing appropriate educational environments, nurses can also conduct school-supported educational programs for parents.

- The educational programs should not be limited to a single session in the studies to be carried out on the subject. In order to examine the seasonal effect, studies with follow-up processes falling into different seasons might be planned. Choosing the control group from different schools in the

studies to be carried out might eliminate the interaction factor. It would be also beneficial to carry out the studies in a larger sample at schools with different socioeconomic levels and to use digital technologies in education programs.

Acknowledgements: We would like to thank Gozde Navruz for contributing to the statistical calculations of the article.

References

Aras Z, Bayik Temel A. (2017). Evaluation of validity and reliability of the Turkish version of health litaracy scale. Florence Nightingale Hemşirelik Dergisi, 25(2); 85-94. doi:10.17672/fnhd.94626

Arican Ayyildiz Z, Isık S, Caglayan Sozmen S, Anal O, Karaman O, Uzuner N. (2016). Efficacy of asthma education program on asthma control in children with uncontrolled asthma. The Turkish Journal of Pediatrics, 58; 383-388. DOI: 10.24953/turkjped.2016.04.006

Bozkurt G., Yildiz S., Cokugras H. (2012). Investigation of triggering factors and clinical characteristics in children with asthma. Journal of Adnan Menderes Unıversity Medical Faculty, 13(3); 13-17.

Brigham EL, Goldenberg L, Stolfi A, Mueller GA, Forbis SG. (2016). Associations between parental health literacy, use of asthma management plans, and child's asthma control. Clinical Pediatrics (Phila), 55; 111-117. doi: 10.1177/0009922815587089. Epub 2015 May 20.

Bruzzese JM, Evans D, Kattan M. (2009). School-based asthma programs. The Journal of Allergy and Clinical Immunology, 124 (2); 195-200.

Cevahir E. (2020). SPSS ile nicel veri analizi rehberi. [Guide to quantitative data analysis with SPSS]. file:///C:/Users/bt/Downloads/SPSS_ile_Nicel_Veri_Analizi_Rehberi_Egem%20(2). Pdf. Date of Access: 12.01.2024

Cohen HA, Blau H, Hoshen M, Batat E, Bralicer RD. (2014). Seasonality of asthma: A restrospective population study. Pediatrics, 133; 923-32.

Celik GF. (2020). Asthma diagnosis and treatment guide 2020 update. Buluş Tasarım ve Matbaacılık Hizmetleri San. Tic., Ankara; https://www.aid.org.tr/wp-content/uploads/2020/12/astim-rehberi-2020.pdf

Cevik U. (2011). The effect on the self-efficiacy and the prognosis of disease of the given training for the children and adolescents who have asthma. [Doktoral thesis, Ataturk University Graduate School of Health Sciences, Erzurum]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=EwYCAGKEaGarB9K8UUuH4A&no=-tgYp1LTeyDFr9keMpjE6w. Date of Access: 12.01.2024

Dewalt D, Dilling MH, Rosenthal MS, Pignone MP. (2007). Low parental literacy associated with worse asthma caremeasures in children. Ambulatory Pediatrics, 7(1); 25-31.

Global Initiative for Asthma. Global strategy for asthma management and prevention, 2020. https://ginasthma.org/wp-content/uploads/2020/06/GINA-2020-report_20_06_04-1-wms.pdf. Date of Access: 12.01.2024

Harrington KF, Zhang B, Magruder T, Bailey WC, Gerald LB. (2015). The impact of parent's health literacy on pediatric asthma outcomes. Pediatric Allergy, Immunology and Pulmonology, 28(1); 20-26.

Kackin O. (2016). The effect of discharge training provided for parents of children with asthma upon the course of disease. [Master thesis, Harran University Graduate School of Health Sciences, Sanliurfa]. https://acikbilim.yok.gov.tr/bitstream/handle/20.500.12812/93083/yokAcikBilim_10110044.pdf?sequence=-1&isAllowed=y. Date of Access: 12.01.2024

Kocaaslan EN. (2021). The effect of video animation education designed for children with asthma on asthma management and quality of life. [Doktoral thesis, Trakya University/ Institute of Health Sciences, Edirne]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp. Date of Access: 12.01.2024

Macy ML, Davis MM., Clark SJ, Stanley RM. (2011). Parental health literacy and asthma education delivery during a visit to a community-based pediatric emergency department: A Pilot Study. Pediatric Emergency Care, 27(6); 469-474. doi:10.1097/PEC.0b013e31821c98a8.

Ozturk Haney M. (2018). Psychometric testing of the Turkish version of the health literacy for school-aged children scale. Journal of Child Health Care, 22 (1); 97-107. doi/10.1177/1367493517738124

Ozsoy H. (2017). The relationship between health literacy and disease management among the mothers whose children have chronic conditions. [Master thesis, Marmara University Institute of Health Sciences, Istanbul]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp. Date of Access: 12.01.2024

Paakkari O, Torppa M, Kannas L, Paakkari L. (2016). Subjective health literacy: Development of a brief instrument for school-aged children. Scandinavian Journal of Public Health, 44; 751-757.

Pike EV, Richmond CM, Hobson A, Kleiss J, Wottowa J, Sterling DA. (2011). Development and evaluation of an integrated asthma awareness curriculum for the elementary school classroom. Journal of Urban Health: Bulletin of the New York Academy of Medicine, 88(1); 61-67.

Rosas-Salazar C, Apter AJ, Canino G, Celedon JC. (2012). Health literacy and asthma. The Journal of Allergy and Clinical Immunology, 129; 935-42. doi:10.1016/j.jaci.2012.01.040

Shone L. (2009). The role of parent health literacy among urban children withpersistent asthma. Patient Education and Counseling, 75(3); 368-375.

Sorensen K, Broucke SV, Fullam J, Doyle G, Pelikan J, Slonska Z, Brand H. (2012). Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health, 12: 80; 1-13.

Sozen A. (2017). Parental disease and treatment knowledge for children with asthma [Expertise in medicine, Maltepe University Faculty of Medicine, Istanbul]. https://acikbilim.yok.gov.tr/bitstream/handle/20.500.12812/101289/yokAcikBilim_10171748.pdf?sequence=-1&isAllowed=y Date of Access: 12.01.2024

Sunay D, Sengezer T, Oral M, Akturk Z. (2013). The CONSORT Statement: Revised Recommendations for Improving the Quality of Reports of Parallel Group Randomized Trials. https://ejfm.trakya.edu.tr/archive/show/volume2/number1/263102 Date of Access: 12.01.2024

Tay S. (2012). Anxiety levels in mothers of children with asthma and evaluation of methods of coping with stress. [Expertise in medicine, Dicle University Medical School, Diyarbakır]. https://acikerisim.dicle.edu.tr/xmlui/handle/11468/959?locale-attribute=tr Date of Access: 12.01.2024

Ulutasdemir N, Balsak H, Ozturk Copur E, Demiroglu N. (2016). A branch of public health nursery: School Health Nursing. Turkiye Klinikleri J Public Health Nurs-Special Topics, 2 (1); 121-124.

Walter H, Sadeque-Iqbal F, Ulysse R, Castillo D, Fitzpatrick A, Singleton J. (2016). Effectiveness of school-based family asthma educational programs on quality of life and asthma exacerbations in asthmatic children aged five to 18: A systematic review. The Joanna Briggs Insitute. JBI Database of Systematic Reviews and Implementation Reports, 14(11); 113-138. DOI: 10.11124/JBISRIR-2016-003181