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ORIGINAL ARTICLE

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Efficacy of a Filipino Asthma Action Plan in the Management of Children Aged 6 to 18 with Partly Controlled or Uncontrolled Asthma: A Randomized Controlled Trial

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ABSTRACT

Objectives: The study determined the efficacy of the Filipino written asthma action plan (WAAP) in terms of the number of ER visits for asthma attacks, number of asthmatic attacks, night-time awakenings, school days missed, need for rescue medication, peak expiratory flow rate, level of asthma control, step-down in maintenance medications and quality of life.

Methodology: This prospective randomized open, blinded end-point study was conducted at the Pediatric outpatient and emergency room of a tertiary government hospital and private clinics of an Allergy consultant.

One hundred eighty-six children with partly controlled or uncontrolled asthma aged 6-18 years were randomized into 2 groups: with action plan and without action plan. Among these, 165 participants completed the study. A co-investigator interviewed participants 3 to 5 times over 3 months. She administered the quality of life questionnaire and gave instructions to the intervention group regarding use of WAAP and corresponding peak flow meter. The participants were given access to free asthma medications.

Results: All parameters significantly improved for most patients throughout the study. No statistically significant difference was seen between the two groups in terms of number of ER visits for asthma attacks (p = 1.000), number of asthmatic attacks (p = 0.7678), night-time awakenings (p = 0.8562), school days missed (p = 0.9530), need for rescue medication (p = 0.3487), peak expiratory flow rate (p = 0.5166), level of asthma control (p = 0.9944), step-down in maintenance medications (p = 0.1688) and quality of life scores (p = 0.2118).

Conclusion: The validated Filipino asthma action plan is as equally effective as verbal instructions as adjunct in the management of asthma in the study population.

Keywords: bronchial asthma, written asthma action plan, asthma exacerbation, efficacy

INTRODUCTION

Asthma affects around 300 million people globally, causing 250,000 deaths annually. In 2015, 8.4% of children in the US had asthma.[1] In the Philippines, it is more common among children, with prevalence rates between 9.2% and 27.4%.[2]

Asthma is a complex clinical syndrome characterized by variable airflow obstruction, airway hyperresponsiveness and cellular inflammation.[3] It is defined by a history of respiratory symptoms such as wheezing, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.[4]

Since exacerbation increases morbidity and can lead to fatalities, it is vital to educate patients on recognizing their symptoms early so that they can start timely use of appropriate inhaled asthma medications and seek prompt medical attention to mitigate the acute exacerbation.[5]

Asthma management guidelines recommend giving written asthma action plans (WAAP) to all patients.[6] A WAAP helps patients recognize and respond to worsening symptoms, with instructions for medication changes, oral corticosteroids use, and when to seek medical care.[4]

The Filipino asthma action plan by San Gabriel et al. is the first locally translated and culturally validated WAAP. Our study used this validated Filipino asthma action plan and determined its efficacy.[7] Currently, there are no other validated local asthma action plans available or published studies on their use in Filipino children. Providing comprehensive asthma education to patients is essential for attaining effective asthma control and management.

OBJECTIVES

The study's general objective was to determine the efficacy of a Filipino Asthma Action Plan versus no written instructions as an adjunct to the management of asthma among children aged 6 to 18 years with partly controlled or uncontrolled asthma.

The specific objectives compared the following primary outcomes between the intervention and control groups:

a. number of ER visits for asthma attacks
b. number of asthma attacks
c. number of night-time awakenings
d. number of school days missed
e. need for rescue medication
f. peak expiratory flow rate
g. level of asthma control
h. step-down in maintenance medications
i. quality of life with the use of quality of life questionnaire

METHODOLOGY

Study design

This was a prospective, randomized, open, blinded end-point study.

Study site

The study was conducted at the Pediatric OPD, Pediatric Emergency Asthma Corner of the Philippine General Hospital (PGH), Taft Avenue, Manila and the clinics of an Allergy consultant, located at Medical Plaza Makati, Amorsolo Street, Makati City and Asian Hospital And Medical Center, Alabang, Muntinlupa City.

The study sites were accessible to the principal and co-investigators.

Population

The study population consisted of patients aged 6-18 years with partly controlled or uncontrolled asthma.

Inclusion criteria

- children with partly controlled or uncontrolled asthma upon recruitment
- patients and parents who gave consent for inclusion in the study

Exclusion criteria

- inability of patients and parents to follow written directions
- presence of co-morbid respiratory illness other than allergic rhinitis and upper respiratory tract infections
- children who sought previous enrolment in asthma programs/studies

Withdrawal criteria

- those who were not able to complete at least 50% of the required follow-up consults were withdrawn from the study

Definition of terms

1. Partly controlled asthma was indicated by any of the following measures present in any week for the past 4 weeks: daytime symptoms more than twice per week, any limitation of activities, any nocturnal symptoms/ awakenings, more than twice per week need for reliever/rescue treatment, lung function less than 80% or personal best and one or more exacerbations per year.[4]
2. Uncontrolled asthma was indicated by three or more features of partly controlled asthma present in any week or one or more asthma exacerbations in any week.[4]
3. Attacks or exacerbations of asthma are episodes characterized by a progressive increase in symptoms

of shortness of breath, cough, wheezing or chest tightness and progressive decrease in lung function, i.e. they represent a change from the patient's usual status that is sufficient to require a change in treatment.[4]

Sample size

Prior data from Espinoza-Palma and colleagues indicated that the mean numbers of exacerbations were 5 ± 4 and 7 ± 5 in the control and treatment groups, respectively.[8] Thus, a minimum of 164 patients was needed to reject the null hypothesis that the mean number of exacerbations was equal between the two groups, under a two-tailed test of hypothesis, accounting for an alpha error probability of 0.05 and power of 80%. We enrolled a total of 186 patients. A minimum of 182 patients was computed to account for an attrition rate of 10%.

Randomization

Using a computer-generated table of random numbers, randomization of patients to either the intervention or control groups was ensured.

Obtaining informed consent

The primary investigator obtained the consent forms, assent and parental consent forms from the study participants and their guardians.

Outcomes measured

The primary outcomes measured were the following:

a. number of ER visits for asthma attacks
b. number of asthmatic attacks
c. number of night-time awakenings
d. number of school days missed
e. need for rescue medication
f. peak expiratory flow rate (PEFR)
g. level of asthma control
h. step-down in maintenance medications
i. quality of life using a questionnaire

The primary investigator, who is not the attending physician, recruited the participants in this study. Upon initial consultation/recruitment, thorough history-taking and physical examination were done by the attending physicians/fellows/residents at the study sites. Baseline characteristics, including peak expiratory flow rate (PEFR), were obtained. Throughout the study, participants were provided with access to asthma medications. At each follow-up appointment, these medications were reviewed to verify correct usage and ensure an adequate supply. A single co-investigator administered the Pediatric Quality of Life Questionnaire to all participants. She instructed the patients and guardians of those under the study group (with asthma action plan), regarding the proper use of the asthma action plan, including use of a peak flow meter. She filled-up each patient's data collection form.

Attending physicians were aware of patients' group assignments during follow-up consultations since patients could contact them during asthma attacks as per the asthma action plan. The outcome assessor was blinded to the patient's group assignments. The primary investigator used text messages or calls to remind patients and guardians of their appointments.

The data collection was conducted from March 2018 to May 2019. The participants were asked to follow-up 5 times, ideally twice in the first month then monthly for 2 consecutive months.

Statistical analysis

Analysis of this paper was divided into two parts, that is, summary presentations of the data (descriptive) and validation of objectives using statistical tests (inferential) with level of significance set to 5%. Statistical significance on hypothesis tests were established when p-values of corresponding stats were less than or equal to 0.05. Observations were recorded from baseline to the 2nd to 5th visits of the patients. Descriptive measures used included mean (average) for continuous data and percentage (proportion) for categorical data. Inferential analysis was done on the quality of life scores. Paired samples *t*-test was used to verify statistically significant changes before and after any specific occurrence of visits, while student *t*-test was used to compare the change from baseline-last visit between the two groups. Lastly, chi square and Fisher exact test were used in comparing the two groups for categorical data.

Ethical considerations

This study was conducted in accordance with the National Ethical Guidelines for Health and Health-Related Researches 2017 and the Data Privacy Act 2012. The principal investigator read and explained the nature of the study to prospective subjects. Information sheets with parental consent forms and assent forms were distributed to the target population.

Participation in this study was voluntary. The study participants received a travel allowance of 200 PhP per follow-up visit and were provided with medical care and appropriate management.

There was strict implementation of confidentiality. All identifiable health information and data were assigned an alphanumeric code. These were done on a specified computer with the principal investigator having sole access. Approval of the PGH's Expanded Hospital Research Office (EHRO) was obtained prior to conducting the study.

Dr. Katrina Faith San Gabriel granted permission to use the validated Filipino written asthma action plan. Permission to

use Juniper et al.,'s Pediatric Quality of Life Questionnaire was obtained through email.[9]

RESULTS

A total of 186 participants were enrolled in this study. Ninety-two and 94 patients were randomized to the intervention and control groups respectively. There were 8 dropouts in the intervention group while 13 were dropouts in the control group. The reasons for dropout and inability to follow-up were absence from school, non-compliance with scheduled appointments, patient and guardian schedules (Figure 1).

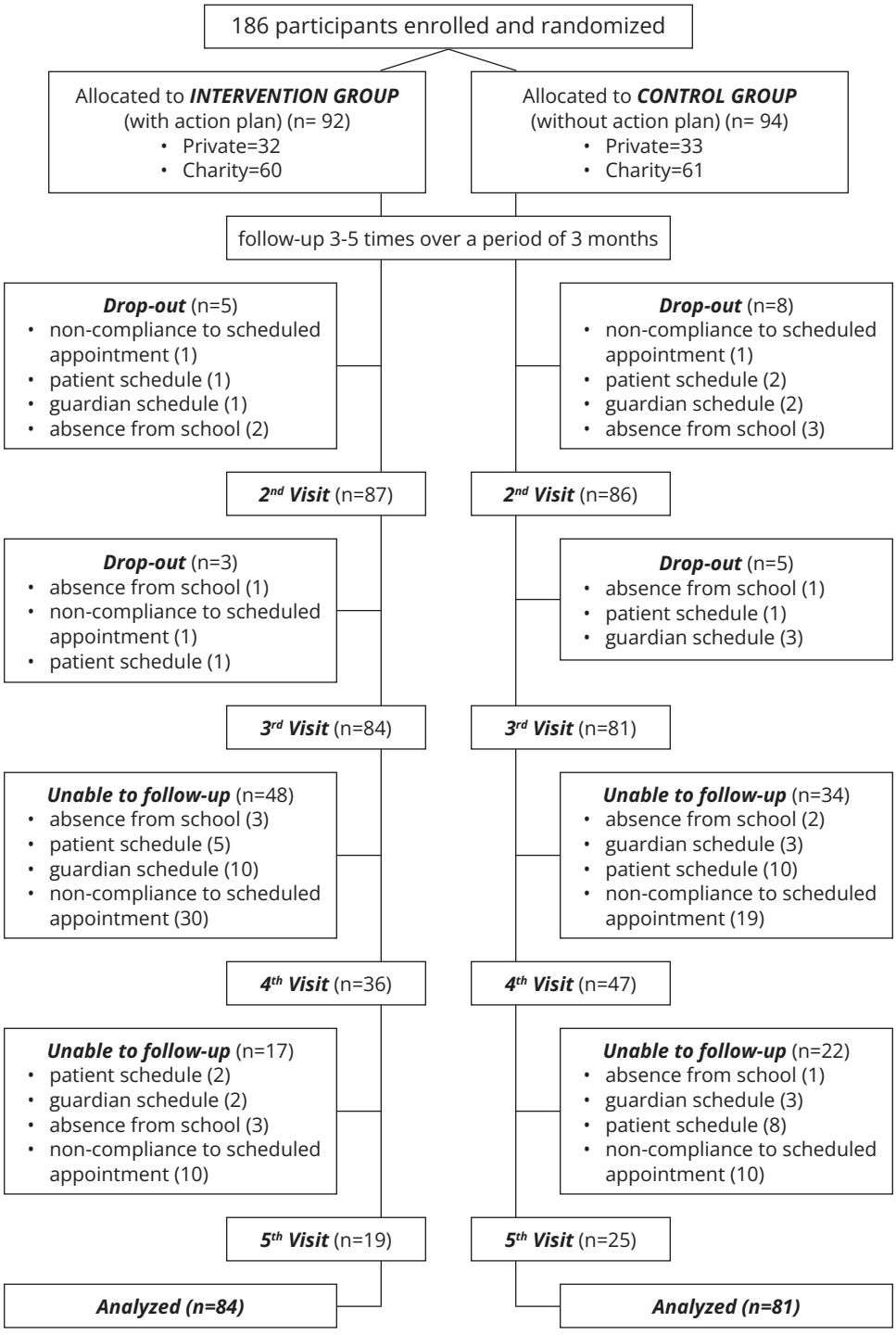

Figure 1. The study's participant flow.

Table 1. Baseline characteristics

	Intervention (n = 84)	Control (n = 81)
Gender n, (%)		
Male	47 (56)	42(51.9)
Female	37 (44)	39 (48.1)
Age, mean ± sd	10.9 ± 3.5	11.0 ± 3.8
Weight (kg), mean ± sd	38.5 ± 12.6	36.8 ± 15.7
Height (cm), mean ± sd	140.2 ± 15.9	140.3 ± 18.3
Duration of asthma (months), mean ± sd	67.9 ± 49.3	61.2 ± 49.2
Patient source, n, (%)		
Private	31 (36.9)	28 (34.6)
Charity	53 (63.1)	53 (65.4)
Level of asthma control at enrollment		
Partly controlled (%)	55 (65.5)	51 (63.0)
Uncontrolled (%)	29 (34.5)	30 (37.0)

Both groups had the same gender distribution (Table 1). The average age of patients under the intervention group was 10.9 years old, while for the control group was 11 years old. The average height of patients in the intervention and control groups were 140.2 cm and 140.3 cm respectively. The average weight of patients in the intervention and control groups was 38.5 kg and 36.8 kg respectively. The mean duration of asthma diagnosis was 67.9 months and 61.2 months for the intervention and control groups respectively. The level of asthma control at enrollment was almost identical, with the majority of patients having partly controlled asthma (65.5% vs 63%) for both groups.

Table 2. Average number of ER visits for the intervention and control groups

	Intervention	Control	*p* value
Number of ER Visits for asthma attacks, mean ± sd	0.11 ± 0.3	0.1 ± 0.3	0.4933^{ns}
Recruitment			1.0000 ^{ns}
0	76 (90.5)	75 (92.6)	
1	7 (8.3)	6 (7.4)	
2	1 (1.2)	0 (0)	
2nd Visit			1.0000 ^{ns}
0	83 (98.8)	79 (100)	
1	1 (1.2)	0 (0)	
2	0 (0)	0 (0)	
3rd Visit			0.3679 ^{ns}
0	79 (95.2)	78 (98.7)	
1	4 (4.8)	1 (1.3)	
2	0 (0)	0 (0)	
4th Visit			1.0000 ^{ns}
0	36 (100)	46 (97.9)	
1	0 (0)	1 (2.1)	
2	0 (0)	0 (0)	
5th Visit			1.0000 ^{ns}
0	19 (100)	25 (100)	
1	0 (0)	0 (0)	
2	0 (0)	0 (0)	

*ns not significant, *significant*

Both the intervention and control groups had the same proportion of patients who consulted at the ER upon recruitment (p = 1.000). Majority had no visits for intervention (90.5%) and control groups (92.6%). Likewise, no significant difference was found on the 2nd visit (p = 1.000), 3rd visit (p = 0. 3679), 4th visit (p = 1.000), and 5th visit (p = 1.000) (Table 2).

At the time of recruitment, the mean number of asthma attacks in the intervention group (1.1) was not significantly different from that of the control group (1.2) (p = 0.6396). No significant difference was found between the two groups across the five visits. Comparing the number of asthma attacks from recruitment to the last visit, both intervention and control groups showed significant reduction (p= 0.0001). The trend of the reduction of asthma attacks from recruitment to their last visit showed no significant difference between the two groups (p = 0.7678). This resulted in an average reduction of one asthma attack for both groups (Table 3, Figure 2).

Table 3. Average number of asthma attacks for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment (mean ± sd)	1.1 ± 0.7	1.2 ± 0.8	0.6396^{ns}
2nd visit	0.1 ± 0.6	0.3 ± 0.9	0.2591^{ns}
3rd visit	0.1 ± 0.3	0.2 ± 0.4	0.1990^{ns}
4th visit	0.1 ± 0.3	0.2 ± 0.4	0.2526^{ns}
5th visit	0.2 ± 0.4	0.1 ± 0.3	0.4279^{ns}
Difference (recruitment – last visit)	0.99 ± 0.72	1.0 ± 0.9	0.7678^{ns}
p value Difference (recruitment – last visit)	0.0001*	0.0001*	

*ns not significant, *significant*

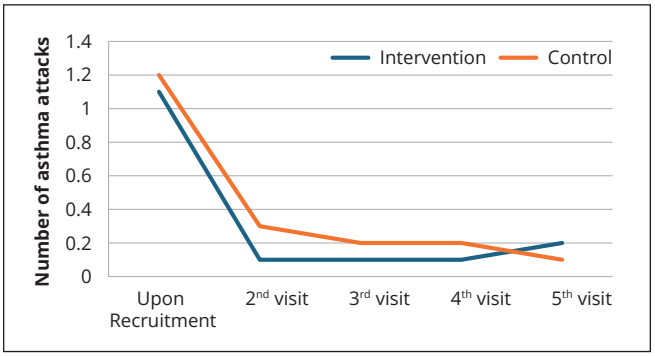

Figure 2. Average number of asthma attacks for the intervention and control groups.

With regards to the mean number of night-time awakenings at the time of recruitment, the intervention (1.0) and control (1.0) groups were similar (p = 0.9043). Likewise, no significant difference was found between the two groups from 2nd to 5th visits. Comparing the average night-time awakenings from the time of recruitment to the last visit, the intervention and control groups both showed significant reduction (p = 0.0001) and (p = 0.0020) respectively. However, there was no statistically significant difference in the rate of reduction of night-time awakenings between the two groups (p = 0.8562). This resulted in a decrease of around 1 night-time awakening (0.8) for both groups (Table 4, Figure 3).

Table 4. Average night-time awakening for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment (mean ± sd)	1.0 ± 1.7	1.0 ± 2.3	0.9043^{ns}
2nd visit	0.1 ± 0.7	0.3 ± 1.2	0.3369^{ns}
3rd visit	0.1 ± 0.7	0.2 ± 1.0	0.4128^{ns}
4th visit	0.1 ± 0.8	0.2 ± 1.1	0.6430^{ns}
5th visit	0.1 ± 0.2	0.2 ± 1.0	0.4340^{ns}
Difference (recruitment – last visit)	0.8 ± 1.7	0.8 ± 2.3	0.8562^{ns}
p value Difference (recruitment – last visit)	0.0001*	0.0020*	

*ns not significant, *significant*

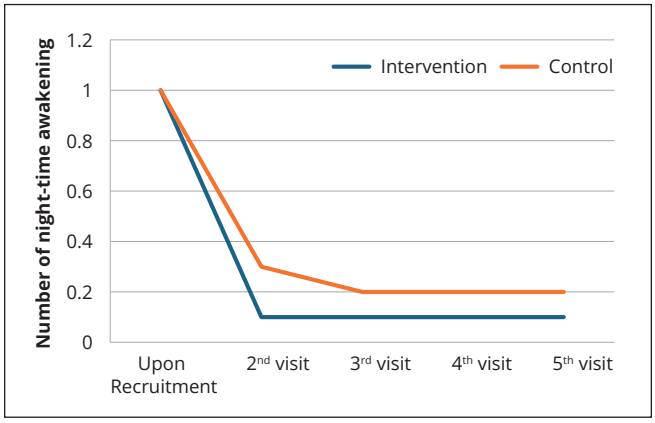

Figure 3. Average number of night-time awakenings for the intervention and control groups.

Upon recruitment, the mean number of school days missed in the intervention group (0.6) was not significantly different from the control group (0.5) (p = 0.7701). Likewise, no statistically significant difference was found between the two groups from 2nd to 5th visits. The mean school days missed upon recruitment decreased significantly from 0.6 to 0 and 0.5 to 0 on their last visit for the intervention (p = 0.0395) and control (p = 0.0001) groups respectively. Comparing the trend of school days missed from the time of recruitment to the last visit, there was no significant difference between the two groups (p = 0.9530). There was an average reduction of half day for both groups (Table 5, Figure 4).

Table 5. Average number of school days missed for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment (mean ± sd)	0.6 ± 2.5	0.5 ± 1.2	0.7701^{ns}
2nd visit	0.1 ± 0.4	0.1 ± 0.6	0.9534^{ns}
3rd visit	0.2 ± 0.7	0.0 ± 0.0	0.0620^{ns}
4th visit	0.02 ± 0.2	0.04 ± 0.3	0.7866^{ns}
5th visit	0.0 ± 0.0	0.0 ± 0.0	1.0000^{ns}
Difference (recruitment – last visit)	0.5 ± 2.5	0.5 ± 1.2	0.9530^{ns}
p value Difference (recruitment – last visit)	0.0395*	0.0001*	

*ns not significant, *significant*

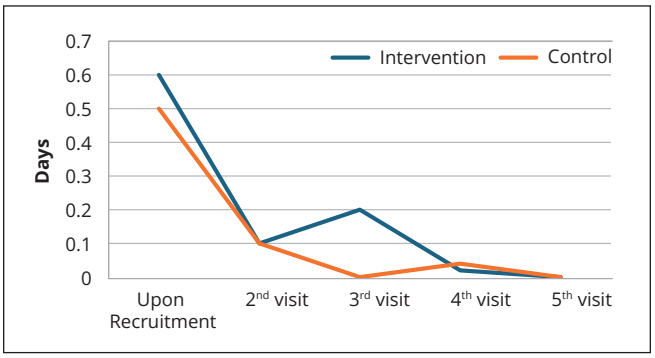

Figure 4. Average school days missed for the intervention and control groups.

At recruitment, the mean number of rescue medication use in the intervention group (1.7) was not significantly different from the control group (2.1) (p = 0.4962). No significant difference was found between the two groups from the 2nd to 5th visit. Comparing the average number of rescue medication use from the time of recruitment to the last visit, the intervention and control groups both showed similarly significant reduction (p = 0.0001) and no significant difference between the two groups (p = 0.3487). There was an average reduction of 1.3 and 1.8 days for the intervention and control groups respectively (Table 6, Figure 5).

Table 6. Average number of rescue medications used for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment (mean ± sd)	1.7 ± 2.6	2.1 ± 4.1	0.4962[ns]
2nd visit	0.8 ± 1.8	1.0 ± 2.0	0.4150[ns]
3rd visit	0.6 ± 1.6	0.6 ± 1.5	0.9487[ns]
4th visit	0.6 ± 1.6	0.2 ± 0.8	0.1972[ns]
5th visit	0.4 ± 1.1	0.5 ± 1.3	0.6415[ns]
Difference (recruitment – last visit)	1.3 ± 2.9	1.8 ± 3.6	0.3487[ns]
p value Difference (recruitment – last visit)	0.0001*	0.0001*	

*ns not significant, *significant*

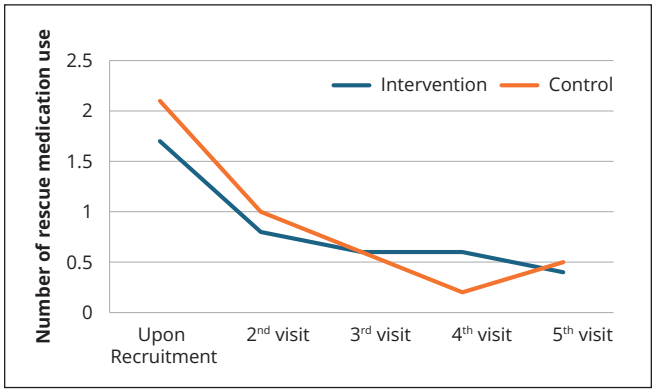

Figure 5. Average number of rescue medications used for the intervention and control groups.

Upon recruitment, the average percentage of peak expiratory flow rate in the intervention group (70.3) was not significantly different from the control group (72.8) (p = 0.3913). Likewise, no significant difference was found between the two groups from the 2nd to 5th visit. Comparing the average percentage of peak expiratory flow rate from the time of recruitment to the last visit, the intervention (p = 0.001) and control (0.002) groups both showed significant increase. The trend of increase from recruitment to their last visit did not show significant difference between the two groups (p = 0.5166). The average increase in percentage of peak expiratory flow rate in the intervention and control groups were 6.2% and 4.4% respectively from the time of recruitment to the last visit (Table 7, Figure 6).

At the time of recruitment, both intervention and control groups had more patients with partly controlled asthma, at 65% and 63% of the enrolled patients respectively. This showed no statistically significant difference between the two groups (p = 0.7371). In terms of improvement in the level of asthma control after their last visits, 83.3% of patients in the intervention group and 82.7% of the patients in the control group had improvement. Around 4% of patients in each group had worsening level of asthma by the end of the study. No significant difference was seen in terms of improvement, worsening and no change in level of asthma control of both groups (p = 0.9944) (Table 8).

Table 7. Average percentage of peak expiratory flow rate for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment (mean ± sd)	70.3 ± 18.1	72.8 ± 19.9	0.3913[ns]
2nd visit	74.1 ± 17.9	77.0 ± 18.5	0.3132[ns]
3rd visit	75.1 ± 18.2	78.2 ± 18.3	0.2788[ns]
4th visit	72.1 ± 19.7	75.8 ± 20.4	0.4074[ns]
5th visit	81.5 ± 33.3	77.2 ± 22.5	0.6136[ns]
Difference (recruitment – last visit)	6.2 ± 17.9	4.4 ± 18.8	0.5166[ns]
p value Difference (recruitment – last visit)	0.001*	0.002*	

*ns not significant, *significant*

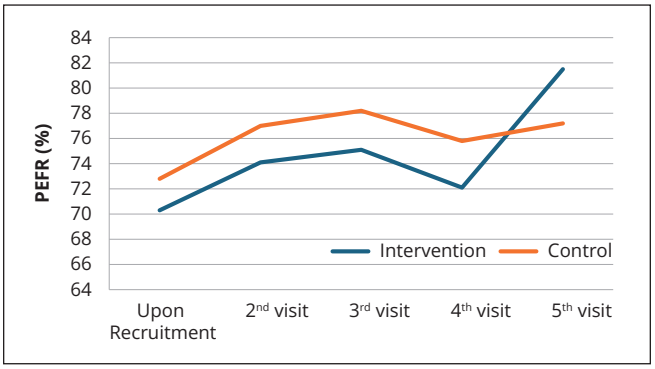

Figure 6. Average percentage of peak expiratory flow rate for the intervention and control groups.

Table 8. Level of asthma control for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment			
Controlled	0 (0.0)	0 (0.0)	0.7371[ns]
Partially Controlled	55 (65.5)	51 (63.0)	
Uncontrolled	29 (34.5)	30 (37.0)	
Upon recruitment to last visit			
Improvement in level of control	70 (83.3)	67 (82.7)	0.9944[ns]
Uncontrolled to controlled	16 (19.0)	18 (22.2)	
Uncontrolled to partial	11 (13.1)	10 (12.3)	
Partial to controlled	43 (51.2)	39 (48.1)	
Worsen			
Partial to uncontrolled	3 (3.6)	3 (3.7)	
Did not change	11 (13.1)	11 (13.6)	

*ns not significant, *significant*

Table 9 showed that the proportion of patients who had step down in maintenance medications was similar for the two groups across all visits. During the last visit, 21.4% of patients in the intervention group had stepped down in maintenance medication. This was not significantly different from 30.9% of patients in the control group (p = 0.1688).

Table 9. Average number of asthma attacks for the intervention and control groups

	Intervention	Control	*p* value
Upon Recruitment (Yes)	0 (0.0)	0 (0.0)	-
1st visit (Yes)	51 (60.7)	44 (55.7)	0.5174^{ns}
2nd visit (Yes)	14 (16.9)	22 (27.8)	0.0939^{ns}
3rd visit (Yes)	13 (36.1)	12 (25.5)	0.3007^{ns}
4th visit (Yes)	1 (5.3)	6 (24.0)	0.0961^{ns}
Last visit (Yes)	18 (21.4)	25 (30.9)	0.1688^{ns}

*ns not significant, *significant*

Both the intervention and control groups had similar mean quality of life scores from the time of recruitment (p = 0.2649) until the 5th visit (p = 0.4541). No statistical significance was seen in the scores between the two groups in terms of the difference from recruitment to the last visit (p = 0.2118). On the other hand, the mean baseline score significantly increased on their last visit, for both intervention (p = 0.0001) and control groups (p = 0.0001) (Table 10, Figure 7)).

Table 10. Average quality of life scores for the intervention and control groups

	Intervention	Control	*p* value
Upon recruitment (mean ± sd)	104.6 ± 34.1	110.3 ± 31.0	0.2649^{ns}
2nd visit	119.0 ± 29.5	118.3 ± 29.0	0.8771^{ns}
3rd visit	126.8 ± 29.2	126.9 ± 29.6	0.9825^{ns}
4th visit	131.1 ± 32.5	126.8 ± 28.0	0.5170^{ns}
5th visit	132.7 ± 28.6	125.8 ± 30.6	0.4541^{ns}
Difference (recruitment – last visit)	23.0 ± 30.7	16.7 ± 34.1	0.2118^{ns}
p value Difference (recruitment – last visit)	0.0001*	0.0001*	

*ns not significant, *significant*

DISCUSSION

Regardless of grouping, all parameters significantly improved for most patients from the time of recruitment to the last visit, namely: average number of ER visits, number of asthma attacks, night-time awakening, missed school days, need for rescue medications, peak exploratory flow rates, level of asthma control, step down in maintenance medications and quality of life scores. However, no statistically significant difference was seen between the two groups.

The results were dependent on the following factors: attending physicians' assessment and management of the patients, the subjects' compliance with medications and follow-up schedule and proper use of the asthma action plan with corresponding peak flow meters. Access to free medications and subspecialty care for all of the enrollees could have contributed to improved outcomes. There may also be increased awareness in patients' symptoms brought about by reiteration of educational tools and recalling these symptoms for use in answering the quality of life questionnaires. There may be improvement due to Hawthorne effect (i.e. the tendency to perform better when being observed).[10] Reminders of their scheduled visits may have increased compliance with the initial follow-up consults. These factors may have contributed to the lack of statistical significance between the two groups.

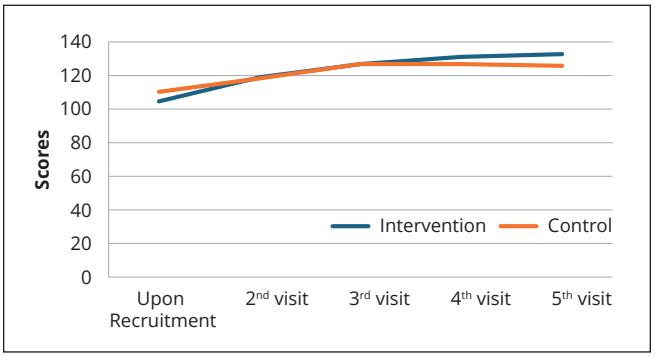

Figure 7. Average quality of life scores for the intervention and control groups.

In 2018, Lakupoch et al., studied 49 asthmatic children aged 5-11 years old, most of whom had controlled asthma. This prospective cohort in Thailand concluded that a peak-flow based WAAP showed efficiency in terms of improvement in asthma outcome, as determined by significant decrease in emergency room visits (p = 0.005) and school absence days (p = 0.022) among all the study subjects, all of whom received asthma action plans. They noted the possible factors that led to reduction of asthma exacerbation after 6 months of using WAAP were presence of well-controlled and mild asthma subgroup, step-up subgroup (increased inhaled corticosteroid dosage, added on montelukast and/or long acting beta2 agonist), enrollment during low season of asthma exacerbation and patient compliance. They noted that use of the WAAP with peak flow meters might have increased the patients' awareness of their symptoms.[11] Likewise, our study used a peak flow-based asthma action plan. However, our patients were randomized into two groups (intervention and control) and had moderate to severely controlled asthma at the time of recruitment.

The qualitative and cross-sectional study by Tan et al., in 2013 determined the effects of a WAAP on caregivers' understanding of asthma symptoms, use of asthma medications for their children, and deciding acute care visits to the public primary clinics. No difference was noted between the two groups of caregivers in terms of their confidence in self-management of their children's asthma at home, likelihood to discontinue asthma medications without consulting their doctor and seeking acute care consultation. This was attributed to routine counseling of patients and their caregivers regarding asthma. However, the educational background and socioeconomic status of the caregivers were considered confounders and could have affected optimal use of their WAAP.[5] Similarly, our study lacked information on the educational status of the parents and guardians.

In a similar study in 2009 by Espinoza-Palma et al., among 77 pediatric patients who were admitted and underwent a randomized controlled trial, they showed that asthma exacerbations, oral steroid use, emergency visits and hospitalizations significantly decreased after using WAAP, but no significant difference was seen when compared to the control group. They attributed this reduction in both groups to educational sessions conducted by a trained nurse. The following contributory factors were also identified: data collection via phone call every 3 months, increased use of inhaled corticosteroids and decreased prevalence of acute respiratory tract infections by 15% compared to the previous year.[8] Comparing this to our study, text messages and phone calls were used as reminders for scheduled visits at the study sites. This may have reinforced patient compliance.

In another study done in 2015 by Sheares et al., after one year it was noted in their randomized, prospective, parallel-group controlled trial of patients 5–80 years old, that there was a significant decrease in emergency department (ED) consults in both control and intervention groups. The control group (no WAAP) had a mean of 1.5 ±_3 ED visits (p = 0.0006) while the intervention group (with WAAP), had a mean of 1.6 ± 3 emergency department consults (p <0.0001). The authors believed that subspecialist physicians provided effective asthma counseling and were more likely to prescribe inhaled and oral corticosteroids, managing asthma exacerbations better than primary care physicians. They also attributed that patients who consulted for subspecialty care may have a higher level of personal organization, were more motivated and followed their appointments.[12] Likewise in our study, the practices of effective communication skills and verbal instructions by the attending physicians may account for the marked reduction in asthma morbidity of both groups.

The results of this study were comparable to a study by Bukhart in 2012, wherein a favorable outcome in quality of life was seen after giving WAAP and peak flow meters to all participants.[13] It resulted in increased monitoring of symptoms among patients and parents, leading to earlier guided-intervention, hence improved quality of life.

The strength of this study is that it is the first local study to determine the efficacy and to utilize the Filipino asthma action plan. WAAP may be a helpful guide in self-management for the patients, their parents and guardians to be more proactive, have increased perception and monitoring of their symptoms at home.

Modern trends include using technology like phone apps, electronic WAAP and online interactive asthma self-management programs. This method of data transmission can be utilized to evaluate the effectiveness of WAAP in prospective studies.[5] Guideline recommendations and numerous studies show a growing interest among researchers and health care providers in using WAAP tools.

CONCLUSION/S AND RECOMMENDATIONS

The authors conclude that the validated Filipino asthma action plan is as equally effective as verbal instructions as an adjunct in the management of asthma among children aged 6 to 18 years with partly controlled or uncontrolled asthma. Despite the non-significance in outcomes between the two groups, all parameters significantly improved for most patients, all of whom had access to free medications and were cared for by specialists. Improving the action plan by integrating pictures may facilitate better comprehension of its use.

The results obtained from this study will serve as baseline local data, and possibly, for use in future research of larger-scale studies with a longer follow-up period. Utilizing different types of WAAP may provide a different outcome. The authors suggest testing the WAAP in various clinical settings. Comparing the ease by which general pediatricians versus subspecialists can incorporate the Filipino WAAP in asthma management of their patients is another point to further investigate. Exploring all possible strategies to determine which are effective in our clinical setting will lessen the burden of asthma among Filipino children.

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