

# ORIGINAL ARTICLE

## Booklet and Motivational Interviewing to Promote Self-efficacy in Parents/Caregivers of Children with Asthma: A Clinical Trial

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Received: 18 September 2023    Revised: 15 February 2024    Accepted: 24 February 2024

### ABSTRACT

**Background:** Asthma is the most common chronic disease in childhood which accounts for numerous annual hospitalizations due to a lack of management and proper management of the disease. Thus, this study aimed to evaluate the effect of using an educational booklet with or without combination with motivational interviewing (MI) on the self-efficacy of parents/caregivers in the control and management of childhood asthma.

**Methods:** A clinical trial was carried out with 86 parents/caregivers of children with asthma aged between 2 and 12 years who were followed up in primary health care units from March 2019 to December 2020. Participants were randomly assigned to two groups: one of the groups read the booklet and the other read the booklet combined with the MI. The Brazilian version of the Self-Efficacy and Their Child's Level of Asthma Control scale was applied before and 30 days after the intervention for assessment of self-efficacy. Data were analyzed using SPSS version 20.0 and R 3.6.3 software. P values < 0.05 were considered significant.

**Results:** There were 46 participants in the booklet group and 40 in the booklet and MI group. Both groups were effective in increasing total self-efficacy scores after the intervention (P < 0.001). No statistically significant difference was found between the scores of the two groups (P = 0.257).

**Conclusion:** The educational booklet with or without combination with MI can increase the self-efficacy of parents/caregivers of children with asthma. The findings could be considered by healthcare providers for the empowerment of caregivers of children with asthma in the control and management of their children's asthma.

**Trial Registration Number:** U1111-1254-7256.

**Keywords:** Asthma, Children, Self efficacy, Health education, Nursing

**Please cite this article as:** Lima KF, Lima RBS, Ruiz VMT, Mendes ERR, Rocha DMA, Brito LCS, Santos MBL, Ferreira LCC, Gaspar MWG, Melo RCO, Dalcin CB, Barbosa LP. Booklet and Motivational Interviewing to Promote Self-efficacy in Parents/Caregivers of Children with Asthma: A Clinical Trial. IJCBNM. 2024;12(2):76-85. doi: 10.30476/IJCBNM.2024.99428.2304.

## INTRODUCTION

Asthma is considered the most common chronic disease among children.<sup>1</sup> It affects between 1% and 18% of the world population.<sup>2</sup> In 2019, there were 262 million people with asthma and 455,000 deaths were caused by the disease.<sup>3</sup> Asthma is an underdiagnosed and undertreated disease, especially in low- and middle-income countries.<sup>1</sup>

According to the records of the Department of Informatics of the Brazilian Unified Health System from January 2021 to June 2022, there were about 56,809 hospitalizations in the age group of 1 to 9 years, due to asthma. The southeast and northeast regions of Brazil had the highest rates of hospitalizations and deaths, respectively, contributing to about US\$ 34 million of the hospitalization costs for the Unified Health System.<sup>4</sup>

The occurrence of symptoms such as wheezing, shortness of breath, chest tightness, and cough together with variable limitation of expiratory airflow can cause exacerbation of symptoms and/or acute asthma attacks, which may result in hospitalizations and, rarely, in deaths.<sup>2, 5</sup> However, with proper asthma management, it is possible to achieve and maintain clinical control, improving the quality of life of individuals with asthma.<sup>2</sup>

Previous studies have described self-efficacy as one of the modifiable factors that can improve management related to childhood asthma, clinical outcomes, and quality of life for children and families.<sup>6, 7</sup> Self-efficacy is the personal belief that behavior can produce the desired result and can be decisive in the health behavior that should be adopted, how much effort will be invested, and how long it will be maintained in the face of difficulties and unforeseen circumstances.<sup>8</sup> Thus, educational technologies based on the self-efficacy of parents/caregivers in asthma management have been widely used to promote healthy behaviors.<sup>9, 10</sup>

Previous experiences showed that educational intervention for parents/caregivers of children with asthma can

influence self-efficacy beliefs directly related to the subject's motivation and resilience to perform a given task.<sup>11, 12</sup> Motivation is a key component of the behavior change process as it guides and maintains goal-related behaviors.<sup>13</sup> Given this, printed educational technologies combined with motivational interviewing (MI) have been highlighted as the strategies that can increase self-efficacy to promote healthy behaviors.<sup>14, 15</sup> MI is an individual counseling approach that can resolve the ambivalence that the individual may have health behaviors in favor of change.<sup>16</sup> It is a collaborative conversation style, which aims to strengthen the individual's motivation and commitment to behavioral change. In addition, MI favors a horizontal relationship between the professional and the patient as well as qualified and humanized care.<sup>16</sup>

Other studies have related MI and self-efficacy to the management and control of chronic diseases. A study carried out in Turkey in which an intervention was carried out using MI found a significant difference, indicating that the mean self-efficacy scores of patients with chronic obstructive pulmonary disease in the group that received the intervention were superior to those in the control group.<sup>17</sup>

Furthermore, a systematic review analyzed the effectiveness of technological interventions to improve health communication with children with chronic illnesses and included studies with printed, audiovisual, and other types of educational technologies. Most studies demonstrated positive results for self-management behaviors and symptoms, quality of life, and improvement of the individuals' knowledge regarding their health status.<sup>8</sup>

The absence of educational technologies associated with MI to promote parents/caregivers' self-efficacy in controlling childhood asthma indicates the need for more interventional studies and support strategies for parents/caregivers.<sup>8</sup> This population lacks support and guidance in the management of childhood asthma, and the care provided by it is fundamental to effectively improving health conditions and controlling asthma.<sup>5</sup>

Due to the positive effect of MI, we assessed the effect of the use of an educational booklet combined with MI on the self-efficacy of parents/caregivers in the control and management of childhood asthma.

## MATERIALS AND METHODS

This is an uncontrolled clinical trial carried out from March 2019 to December 2020 with 86 parents/caregivers of children with asthma aged between 2-12 years receiving care in two primary healthcare units (PHCUs) in the municipality of Fortaleza, capital of the state of Ceará, which is in the Northeast region of Brazil.

In Brazil, healthcare is provided by the Brazilian Unified Health System (SUS, as per its Portuguese acronym). SUS is organized into health networks, with Primary Care being the first level of care, where the patients have their first contact with health services, through PHCUs that are linked to the territory and are the main gateway to health services. The municipality of Fortaleza has the Program for Comprehensive Care for Children and Adults with Asthma (PROAICA, as per its Portuguese acronym),<sup>18</sup> which is affiliated to SUS and aims to follow up people with asthma in the context of primary care, with children being the main target group. For these reasons, PHCUs were chosen as the setting for the study.

It should be noted that the municipality of Fortaleza is divided into six Regional Executive Secretariats (RES), which account for implementing municipal public policies, including the management of health units in the neighborhoods within their area of coverage. The RES and two PHCUs in the region were selected through a simple random draw using an opaque envelope. The two PHCUs belong to RES 5, where the study was carried out. Eligible participants were assigned randomly to each intervention group.<sup>19, 20</sup>

The clinical trial consisted of two experimental groups, which received the interventions.<sup>19, 21</sup> Thus, experimental group

A received the printed educational booklet for reading as an intervention, while experimental group B received the booklet to read and then participated in the MI. Both groups took the educational booklet home after the intervention.

The main researcher was aware of the allocation of participants because she was responsible for the intervention, and the parents/caregivers were aware of the intervention they were going to receive. However, the team responsible for collecting data by telephone calls was unaware of the groups. At the beginning of the call, the participants were instructed not to mention the interventions held in the PHCUs. The statistical team was also unaware of the participants allocated to the analyzed groups.

The sample size was calculated at 42 patients in each group based on average self-efficacy scores calculated from a previous study,<sup>20</sup> error of 5% ( $\alpha=0.05$ ), power of 80% ( $\beta=0.20$ ),  $\mu_1=68.13$ ,  $\mu_2=64.91$ ,  $\sigma_1=5.23$ ,  $\sigma_2=5.23$ , and use of the comparison formula between the two means. The sample was calculated using the R 3.6.3. software using the following formula:

$$n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 (S_1^2 + S_2^2)}{(\mu_1 - \mu_2)^2}$$

The inclusion criteria in the study were being parents/caregivers of at least one child between 2-12 years old, being diagnosed with asthma and under inhaler treatment as followed up in the PHCUs mentioned above, having a cell phone or landline, being literate parents/caregivers and not having visual and/or hearing impairments. In turn, the exclusion criteria were parents/caregivers who discontinued participating at some point in data collection.

Groups A and B started and remained with 46 and 40 participants, respectively, even after 30 days of follow-up (Figure 1). It should be noted that data collection took place during the social isolation due to the COVID-19 pandemic. In Ceará, during this period,

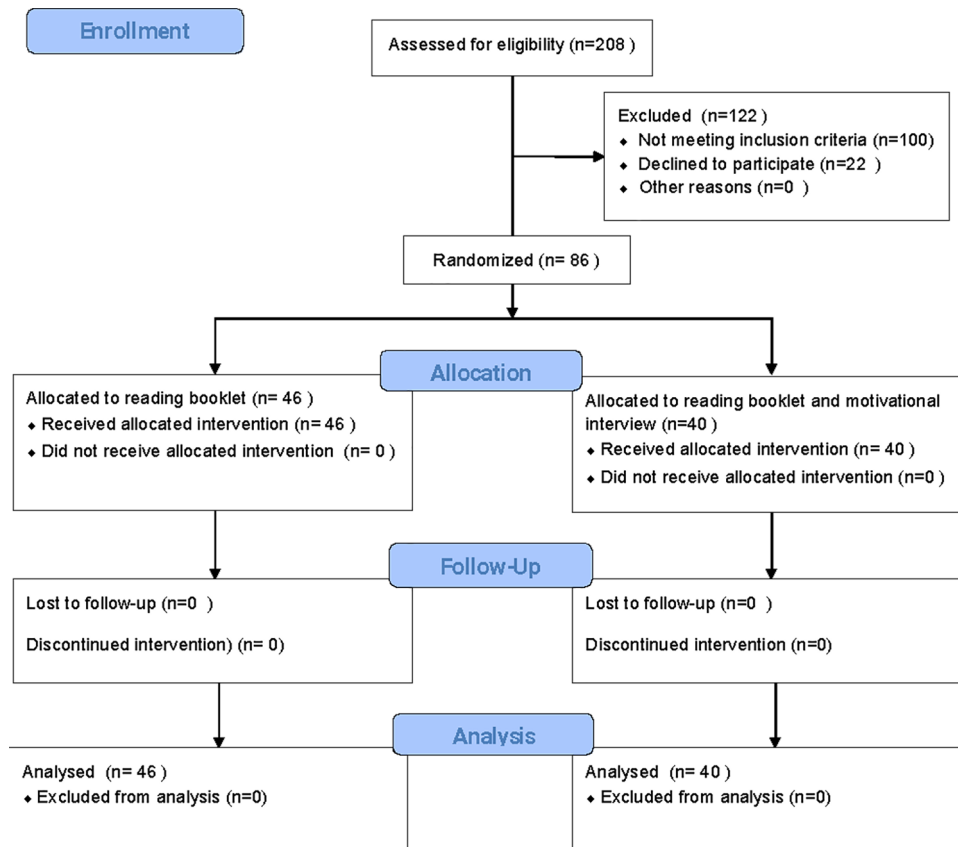


Figure 1: CONSORT flowchart of the study participants

follow-up through PROAICA was suspended due to the elective nature of the program. This made it difficult to complete the sample calculation in group B due to the end of the period determined for data collection.

Two instruments were used to collect the data, which were applied by a trained team. The first covered the sociodemographic and clinical data of the parents/caregivers of children with asthma. The second was the Brazilian version of the STCLA-VB, designed by Wood et al.,<sup>21</sup> which was subsequently translated, adapted, and validated to Brazilian Portuguese by Gomes et al.<sup>22</sup> The Content Validity Index of this scale is 0.8822, and Cronbach's alpha is 0.92.<sup>23</sup> The scale is divided into two domains: expectations of efficacy, with seven items, and expectations of outcome, with ten items. The responses are scored using a five-point Likert scale, in which 1 means "totally disagree" and 5 means "totally agree" with total scores varying from 17 to 85 points; the higher the score, the greater the confidence of parents/caregivers

in terms of management of asthma.

Data were collected through the application of the form and the scale (1<sup>st</sup> assessment); then, groups A and B received the educational interventions, as detailed below; and finally, the scale was applied 30 days after the start of data collection (2<sup>nd</sup> assessment).

Both groups used the educational booklet entitled "Are you able to control your child's asthma: Let us learn together?" The booklet has 40 pages and was developed using Bandura's Self-Efficacy Theory<sup>24</sup> as a theoretical reference, which was validated for content (CVI: 0.93), technical aspects (CVI: 0.96), clear language (CVI: 0.91), practical relevance (CVI: 0.93), theoretical relevance, and validated by the parents/caregivers of children with asthma aged between 2- 12 years old (CVI: 0.99).<sup>10</sup> The booklet content is divided into nine topics: 1. What is asthma?; 2. Let's learn what can cause asthma symptoms; 3. Let's learn how to reduce asthma triggers; 4. Let's learn about the importance of the health service; 5. Let's learn when the child

needs to take medication; 6. Let’s learn when an asthma attack needs to be treated in the emergency room; 7. Let’s learn how to use the asthma pump; 8. Let’s learn how to keep the child’s mouth healthy; and 9. Controlled asthma improves health and well-being.<sup>12</sup> It should be noted that topics 1 to 8 are part of the domain expectations of efficacy and topic 9 is part of the domain expectations of the outcome. In addition, the booklet was based on the four sources of self-efficacy, as shown in Figure 2.

The participants in the groups read the entire booklet in the presence of the researcher, in a room at the PHCU, for approximately 15 minutes, and took it with them after the intervention. The booklet was prepared with simple, clear, and direct language, optimizing the reading process.

After the participants in group B finished reading the booklet, they also received an MI in the same room at the PHCU, lasting for 25-30 minutes, allowing parents/caregivers to express their opinions about the booklet and the covered topics. MI consists of an intervention that can be carried out briefly and in a single session.<sup>25</sup> To ensure the quality of the interview, a script was used that guided the main researcher during the interview, based on a communication style centered on the individual to increase personal motivation and commitment to behavioral change by evoking and intensifying the individual’s reasons for change. Furthermore, the script also sought

to consider Bandura’s theory of self-efficacy to improve expectations of effectiveness and outcome.<sup>11</sup>

MI was conducted by a single and previously trained researcher according to a standard procedure. The interviewing process followed three basic communicative skills: asking, informing, and listening.<sup>15</sup> The communicative skills of listening, asking, and informing were permeated by listening to the participants’ conversations and their personal and vicarious experiences, seeking to evoke the motivations of the parents/caregivers based on the illustrations in the booklet that deals with the care of children in the management and control of childhood asthma.

Telephone calls to follow up the self-efficacy levels of parents/caregivers using the STCLA-VB scale to control childhood asthma took place 30 days after the first assessment with the scale. The same sentence order and voice intonation were followed in all the calls. It should be noted that the telephone follow-up team was unaware of the allocation of the study participants. For participants who did not respond to the first contact, new calls were made on the following days, at the same time as chosen. At least three attempts were made over three consecutive days. After that, a new attempt was made after five more days in the case of participants who did not answer the calls. Thus, there was no loss of segment in this study.

Data were tabulated and analyzed using

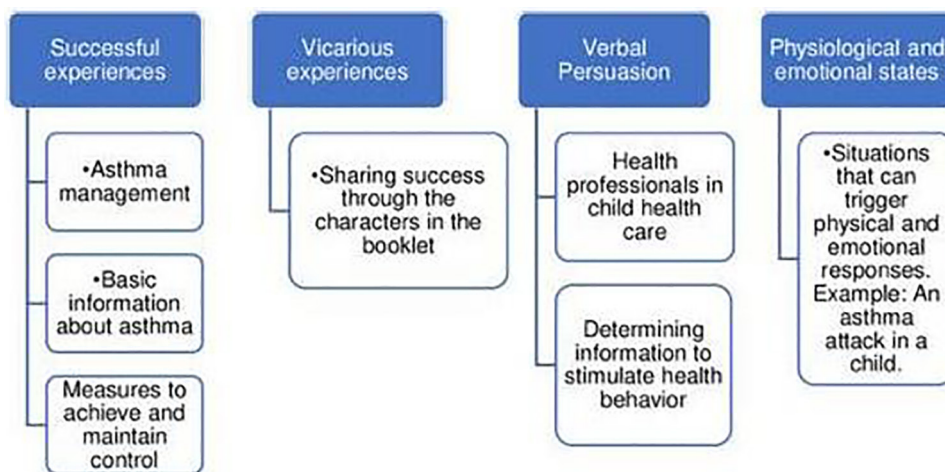


Figure 2: Structure of the content of the booklet according to the sources of self-efficacy

SPSS version 20.0 and R 3.6.3 software. The Shapiro-Wilk test was performed to check the normality of the data. The Bartlett's test was used to check the homogeneity of variances. Mean self-efficacy scores calculated between sociodemographic categories were associated using Pearson's chi-square test. Within-group comparisons of mean self-efficacy scores before and after the intervention were performed using the paired t-test. Between-group comparisons were made using the independent t-test. A significance level of 95% was considered for all tests. P values <0.05 were considered significant.

The present study was approved by the Research Ethics Committee of the Federal University of Ceará (number: U1111-1254-7256). All participants signed a written consent at the beginning of the study and data confidentiality, voluntary participation, and the right to withdraw from the study were guaranteed.

## RESULTS

Eighty-six parents/caregivers met the inclusion criteria. The mean age was 36±9 years. In both groups, most participants were 31 years old or older, worked outside the home, and had a family income of up to R\$ 1.497,00. The chi-square test showed no significant difference between the

groups regarding age, education, occupation, and family income ( $P>0.05$ ) (Table 1). Therefore, the groups were considered homogeneous in terms of baseline characteristics.

The paired t-test showed that both groups revealed a statistically significant increase in the means of the two domains (expectations of effectiveness and expectations of outcomes) and in the mean of the total STCLA-VB scores ( $P<0.001$ ) after the intervention (Table 2).

The independent t-test showed that before the intervention, the participants in the booklet and MI group had higher scores than those in the booklet group on the total scale ( $P=0.033$ ) and in the expectations of outcome domain ( $P=0.032$ ). However, one month after the intervention, the total scores ( $P=0.257$ ), expectations of efficacy domain ( $P=0.105$ ), and expectations of outcome domain ( $P=0.996$ ) had no statistical difference between the two groups. After and before differences of total and domain scores of self-efficacy in each group were compared together and showed no statistically significant difference ( $P>0.05$ ).

## DISCUSSION

The findings of this study showed that the interventions of application of the booklet and application of the booklet plus MI effectively increased the self-efficacy of the parents/

**Table 1:** Sociodemographic characteristics of parents/caregivers according to the educational booklet and motivational interviewing groups

	Booklet group (N=46)	Booklet and motivational interviewing group (N=40)	P value*
	N (%)	N (%)	
<b>Parent/caregiver's age group</b>			
18-30	15 (32.6)	8 (20)	0.283
>31	31 (67.4)	32 (80)	
<b>Education</b>			
Less than 9 years of study	26 (56.5)	19 (47.5)	0.535
More than 9 years of study	20 (43.5)	21 (52.5)	
<b>Parent/caregiver's occupation</b>			
Work outside the home	23 (50)	21 (52.5)	0.988
Perform household activities	23 (50)	19 (47.5)	
<b>Family income (minimum wage)<sup>a</sup></b>			
Up to one and a half minimum wage	35 (76.1)	25 (62.5)	0.257
More than one and a half minimum wage	11 (23.9)	15 (37.5)	

\*Chi-square test; <sup>a</sup>Minimum wage 998,00 BRL

**Table 2:** Comparison of the total and domain scores of the self-efficacy of parents of children with asthma before and after the intervention within and between two groups

Variable	Booklet group		Within booklet group P value*	Booklet and motivational interviewing group		Within booklet and motivational P value*	Between two groups P value**	
	Before the intervention (Mean±SD)	After the intervention (Mean±SD)		Before the intervention (Mean±SD)	After the intervention (Mean±SD)		Before the intervention	After the intervention
Expectations of efficacy domain score	24±5	28±1.9	<0.001	25±4.2	29±1.4	<0.001	0.279	0.105
Expectations of outcome domain score	44±8	49±1.1	<0.001	47±3.8	49±1.3	<0.001	0.032	0.996
Total scale score	68±13	78±2.4	<0.001	73±7.2	78±2.6	<0.001	0.033	0.257

\*Paired t-test; \*\*Independent t-test

caregivers of children with asthma. This effect was not statistically different between the two groups. In general, the results showed that the intervention with the educational booklet was effective in increasing the self-efficacy scores of the parents/caregivers of children with asthma, regardless of the application of MI. The MI technique, despite being very effective in other contexts,<sup>13, 16</sup> in this study did not generate significant differences about the application of it in comparison with the booklet alone.

A study that applied printed educational content and educational videos to patients with asthma found that concerning information about symptoms, the recall performance did not differ significantly between the participants in the printed content and video groups. This is in line with the findings of the present study in which the educational booklet was effective in passing on knowledge to parents/caregivers and increasing self-efficacy.<sup>26</sup>

The booklet has a theoretical basis that aims to raise not only the expectations of outcomes but also the expectations of the effectiveness of parents/caregivers, even in the face of the challenges of asthma management to achieve and maintain the control of the disease.<sup>10</sup> Believing that its action will achieve a satisfactory outcome and feeling able to perform a certain behavior, despite obstacles, means that both expectations of outcome

and effectiveness were achieved, which was demonstrated in this study by the increased scores in the two domains of the scale.<sup>16</sup>

Evidence from previous studies supports self-efficacy as the strongest predictor of health-promoting behaviors, emphasizing the importance of using this theoretical construct in planning and implementing any health intervention for patients with chronic illnesses.<sup>6, 13, 14, 16, 27</sup>

The combination of educational technologies and assessments at different time intervals can support the practice of professionals in the health education process.<sup>14</sup> The technique of MI combined with reading a printed educational booklet, both based on the theory of self-efficacy, can improve self-efficacy and help individuals make behavioral changes to achieve a personal goal.<sup>16</sup> It is known that MI is a technique that has also been implemented by some researchers to change behavior with satisfactory results in health promotion.<sup>28</sup>

The effectiveness of an asthma self-management program based on Bandura's theory of self-efficacy was assessed in a randomized clinical trial with a sample of 83 adolescents.<sup>29</sup> The program offered several strategies based on Bandura's four sources of self-efficacy.<sup>7</sup> In the direct or personal experience, a discussion was promoted

about the desires and objectives that could be achieved in the program. In the vicarious experience, the study sought to achieve the domains of asthma self-management skills according to the models that were presented in the booklet. For verbal persuasion, phone calls and text messages were used; also, in the physiological and emotional states, the study tried to work on the feelings that could be experienced during an asthma attack. The results demonstrated the positive effects of an asthma self-management program with improvements in self-efficacy, outcome expectations, prevention, and asthma management behaviors.

In the present investigation, the content of the booklet used in the intervention was also prepared with the aim of covering the four sources of self-efficacy. Given that parents/caregivers received the booklet, this allows us to infer that easy access made them take ownership of the information, in the long term, through reading without the help of a professional.

The results are consistent with those of an experimental study that analyzed three interventions: booklet, video, and booklet and video combined to promote maternal self-efficacy in preventing childhood diarrhea.<sup>14</sup> Two months after the intervention, the booklet group was the one with the highest average self-efficacy, demonstrating that the printed educational material constructed based on the four sources of self-efficacy is effective in increasing self-efficacy scores. Furthermore, a systematic review recommends the use of strategies to promote self-efficacy to optimize effectiveness in the management of chronic diseases such as asthma.<sup>30</sup>

The results of this study are important, since childhood asthma is responsible for high annual healthcare costs and is one of the main reasons for emergency care, hospitalizations, school absenteeism, and parents' lost workdays.<sup>31</sup> This study was an attempt to make technologies available elaborated based on the Self-Efficacy Theory to promote self-efficacy and improve the control and management of

childhood asthma. Although the difference between the interventions did not present statistical significance, in both groups the educational booklet was able to promote the self-efficacy of parents/caregivers of children with asthma. Therefore, the results of this study allow us to infer that the use of MI becomes optional to increase the effectiveness of parents/caregivers of children with asthma. However, more research is needed to evaluate the effect of MI in promoting self-efficacy and achieving asthma control and management. A randomized clinical trial, carried out in Iran, found that MI was effective in improving self-efficacy, beliefs about medications, and medication adherence among 52 adolescents after three sessions, held individually, one hour per week.<sup>13</sup>

This study is the first to evaluate the use of an educational booklet with or without MI on the self-efficacy of parents/caregivers in the control and management of asthma. The study had limitations related to the difficulty in establishing contact by telephone, carrying out the intervention in a single moment, and sample supervision for only 30 days.

## CONCLUSION

The use of an educational booklet with or without MI increased the self-efficacy of parents/caregivers of children with asthma. The findings can be useful for healthcare providers to promote the empowerment of caregivers of children with asthma in the control and management of their children's asthma.

## ACKNOWLEDGEMENT

We are grateful to all the parents/caregivers who participated in this study. We would also like to thank Postgraduate Program in Nursing at the Federal University of Ceará for research support, and Work Management and Health Education Coordination of Work Management and Health Education for authorization of the research to be carried out in health units. The authors also thank the financial support



of the National Council for Scientific and Technological Development (CNPq) (grant No. 306206/2019-6).

**Conflict of Interest:** None declared.

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