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Evaluation of a Peer-led Asthma Self-management Group Intervention for Urban Adolescents☆,☆☆

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ABSTRACT

Purpose: This paper describes the acceptability and generalizability of an evidenced-based peer-led asthma self-management program.
Design and methods: Adolescents with persistent asthma (n = 259, ages 12–17 years) from three urban cities participated in a one day camp led by either trained peer leaders (n = 35, ages 16–20 years; intervention group) or healthcare professionals (control group). Participants completed a camp evaluation form, and the peer leader quality survey.
Results: Overall program evaluation showed high acceptability with average score of 4.5 (±0.87) out of 5 and no treatment group differences were found. Campers highly rated peer leaders' qualification, particularly trustworthiness (98%), knowledge (97%), and sense of humor (95%). Participants from low income families (annual income < $30,000) reported higher satisfaction with their camp experience being enjoyable compared to their counterparts from higher income families ($X^2 = 4.23$, $p \leq .04$).
Conclusions: This study supports the acceptability and generalizability of a peer-led asthma self-management program across different urban community locations, seasons and venues.
Practice Implications: Trained peers can be as effective as adult educators in teaching adolescents asthma self-management.

Introduction

One in every ten children in the United States has asthma (Akinbami, Simon, & Rossen, 2016), a chronic inflammatory lung condition that can lead to frequent flare ups and exacerbation without proper management. For young children, parents and caregivers have primary responsibility for management of the disease and are the main recipients of education on the disease (Everard, Wahn, Dorsano, Hossny, & Le Souef, 2015). As children enter into adolescence, they become more independent and increasingly assume the responsibilities of asthma management. Interventions helping adolescents take active roles in managing their asthma have been found to be effective in reducing asthma-related morbidity (Costa Mdo et al., 2008; Guarnaccia et al., 2018; Rikkers-Mutsaerts et al., 2012).

Peer influence can contribute to healthy development by reinforcing positive norms and values in adolescents (Warner, 2000). Talking about asthma with peers has a positive influence on proper self-management in teens (Cohen, Franco, Motlow, Reznik, & Ozuah, 2003; Rhee, Wenzel, & Steeves, 2007). Studies have shown that adolescents who attended asthma self-management programs led by trained peer educators reported significantly improved quality of life, attitudes toward their illness, self-management knowledge and decreased school absenteeism due to asthma compared to those taught by adult educators (Al-sheyab, Gallagher, Crisp, & Shah, 2012; Rhee, Belyea, Hunt, & Brasch, 2011; Shah et al., 2001).

Typically such peer-led interventions have been implemented in academic settings (Al-sheyab et al., 2012; Shah et al., 2001), except for a study by Rhee et al. (2011) in which a peer-led self-management for adolescents (PLASMA) intervention was provided at a camp setting. Asthma camps are a popular venue for asthma education (Buckner et al., 2005; Costa Mdo et al., 2008). Camps provide an opportunity for socialization and an informal setting for instruction on teaching disease self-management skills (Nesvold, Fena, Herman, and Consortium on Children's Asthma Camps Board of Directors, 2006).

In a previous peer-led asthma self-management program held in a camp setting, 112 adolescent participants were randomly assigned to either a peer-led intervention camp (intervention) or the adult-led camp (control) (Rhee, McQuillan, & Belyea, 2012). The peer-led group reported more positive experiences with the camp than the adult-led

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group. This result reflects adolescent's preference for health education led by their own peers over adult educators (Ayaz & Açıl, 2015). The peer-led campers also rated their peer leaders highly on attitude, knowledge and personal skills (Rhee et al., 2012).

This investigation is based on an expanded application of the peer-led asthma intervention conducted by Rhee et al. (2011), specifically targeting adolescents in three urban settings. Despite the current study being the expansion of the earlier study reporting the evaluation of the peer-led intervention based on participants feedback (Rhee et al., 2012), generalizing the earlier results to the current study is not warranted because of several differences. Expanding on the earlier study, the present study was conducted in three states instead of one. Besides, the present study was different from the earlier one in four ways: (1) the current study was conducted in three states; (2) the program was implemented in both indoor and outdoor settings instead of exclusively outdoor camp venue; (3) the size of the adult-led groups (range 8–10 teens) was smaller than in the earlier study (range 15–20 campers); and (4) campers in the peer-led groups were gender mixed while the peer-led groups were gender matched in the earlier study. It remains to be investigated whether these differences in the venues or specific format of the intervention would potentially affect adolescent learners' experience with or acceptability of the program.

The purpose of this study is threefold: (1) to evaluate the acceptability of peer-led asthma self-management intervention in comparison to the program led by adult educators based on participant feedback, (2) to compare the program acceptability by site and sociodemographic characteristics, and (3) to evaluate peer leaders' qualification based on adolescent learners' feedback.

Methods

Sample and setting

This study is based on feedback from adolescents who participated in an asthma self-management training program implemented at a camp setting in three metropolitan areas in New York (NY), Maryland (MD) and Tennessee (TN). Eligibility criteria for program participants (campers) were, 1) teens ages 12–17 years, 2) residing in inner city zip codes, 3) physician diagnosed asthma that has required health service use (preventive or acute) within 12 months prior to enrollment, 4) presence of persistent asthma based on the National Asthma Education and Prevention Program guidelines (National Heart, Lung, and Blood Institute, 2007), 5) ability to understand spoken and written English. Eligibility criteria for peer leaders included teens between 16 and 20 years of age with above criteria, and a nomination from school teachers/nurses or healthcare providers. Exclusion criteria included moderate to severe cognitive or mental health impairment and health conditions affecting respiratory system.

Treatment groups

Intervention participants attended a one day camp where four instructional sessions were offered by peer leaders based on a manualized education and training program. The peer leaders were trained to deliver the manualized self-management content to groups of 5 to 10 adolescents in each small group. Details about peer leader training are reported elsewhere (Mammen, Rhee, Atis, & Grape, 2018). Participants were assigned to a small group based on their age classification (younger, 12–14 years vs. older, 15–17 years) and gender to ensure equal distribution of boys and girls in each group. Pairs of peer leaders assigned to each group led the four training sessions including using slides made into flip chart to facilitate the systematic delivery of the training content as well as to engage campers' attention and promote active interactions between the peer leaders and campers. Each training session was implemented using a manualized instructional material delivered via Power Point or flip chart, hands-on training and group discussion.

The control group also participated in comparable training sessions using the same instructional materials. For the controls, adult educators (asthma educators or nurse practitioners) delivered the program content in average group size of 8 ($\pm$2.4, range 5–15) assigned by age classification (younger vs. older adolescents). In addition to the educational program, throughout the camp day, a variety of recreation activities were offered between the sessions to both treatment groups.

Evaluation measures

Demographic data including teens' age, gender, and race were collected at enrollment. Upon completion of the camp program, all participants completed the Camp Program Evaluation Form and those campers who attended a peer-led session completed the Peer Leader Rating Scale.

Camp Program Evaluation by Campers

This 7-item scale was constructed for the earlier study (Rhee et al., 2012) in which 105 adolescents from diverse racial and economic background attended a similar camp program, and the Cronbach alpha for the scale was 0.84. In the current study, the same evaluation scale was administered to all participants after camp to assess the campers' perceptions about the program. Each item was measured on a 5-point scale (1, strongly agree to 5, strongly disagree). High scores indicate more positive evaluation. Cronbach alpha was 0.95 for this sample. The final item on the scale was an open ended field for campers' written response to a question, “What I liked most about camp.”

Peer Leader Rating Scale

An 8-item scale adapted from Ozer, Weinstein, Maslach, and Siegel (1997) was administered to measure adolescents' perceptions about their peer educators' characteristics essential to a peer-led program. The 4-point scale was completed by the peer-led (intervention) group immediately after camp responding to items ranging from “definitely true” to “definitely not true” for items measuring “positive regard” (i.e. warmth, expertise and credibility) and “perceived similarity”. Lower score indicate more positive ratings of peer leaders. Cronbach alpha was 0.76 for this sample.

Asthma Knowledge Survey

This simple multiple choice survey developed for the current study consisted of 10 multiple-choice questions to assess asthma knowledge reflecting program content. Campers were asked to select a correct answer from 4 choices in each question. Correct responses were recoded as “1” and incorrect responses as “0”, and total scores were computed (range 1–10). Campers completed the survey at the beginning of the camp day prior to any instructional sessions and at the conclusion of the camp day. Reliability of the pre-intervention survey based on the Kuder Richardson Formula 20 (KR20) formula was 0.47. The low internal consistency reflects that the survey captures diverse dimensions of self-management (triggers avoidance, symptom awareness, prevention and management, etc.) and knowledge in one domain does not always guarantee knowledge in other domains.

Procedures

Informed consent from parents of underage teens and older teens ages 18 and older was obtained, and adolescents under 18 years of age provided informed assent at enrollment. The study protocol was approved by the institutional review boards at the coordinating center and each study site. Upon enrollment, participants were randomly assigned to either the peer-led (intervention) or the adult-led (control) group in each site.

Each study site enrolled participants and secured a location to hold the one day 8 hour camp session. The intervention and control camps were held on separate days for a total of 14 camps across the three

study sites. The one day camp schedule comprised four 30–45 minute asthma self-management training sessions covering basics of asthma, symptom monitoring, symptom prevention and management, and managing psychosocial issues related to asthma, and varying recreation activities and meal times which were the same for the intervention and control group.

Several steps were taken to ensure consistent implementation of the intervention across the three study sites. For each site, the Principal Investigator (PI) and Center Coordinator trained site personnel and peer leaders and provided study and intervention materials. The PI and center staff worked closely with each site throughout the planning and implementation phases of the intervention, and attended the camp in each site to supervise and assist with intervention implementation. To facilitate consistent delivery of the program across the sites, a comprehensive checklist of program content was developed and used by peer leaders and adult educators to ensure the covering of the program content. The checklist was also used by trained adult observers who monitored training sessions implemented in each group by either peer or adult leaders to reinforce and assess the leaders' consistent adherence to the program.

Data analysis

Descriptive statistics were conducted to describe the sample and summarize the evaluation responses. Means and SDs were computed for continuous variables, and frequency analysis performed for categorical measures. Written responses to the one qualitative item on the camper program evaluation were coded into categories for content analysis. Comparison of total score of the camp program evaluation between the adult-led and peer-led groups was performed using chi squares or *t*-tests. Comparison of scores across the three study sites was performed utilizing ANOVA F-statistics followed by post-hoc pairwise statistics (e.g., Tukey's HSD). Asthma knowledge test scores were compared using paired *t*-tests.

Results

Sample demographic characteristics

Of a total of 373 enrolled participants, 259 campers and 35 peer leaders attended a camp. The 79 participants who did not attend an intervention either withdrew before camp (n = 25), or were unable to attend one of the one day sessions (n = 54). Campers' average age was 14.3 years (±1.7), 48% male, 80% nonwhite (primarily African American or Black) and 28% living in households earning less than $30,000/year. The average age of the trained peer leaders was 17.1 years (±1.4), 48% male and 77% non-white. Table 1 summarizes the demographic characteristics of participants by study group and site. No group differences were found between the adult and peer-led groups on age, gender, race, household income, and insurance type. There were differences by race between the sites. The NY site had more White campers (30%) than MD (3%) and TN (2%). Likewise, the majority of peer leaders in the NY site were White (57%), while the peer leaders at the MD and TN sites were exclusively non-White. Peer leaders reported higher household income than campers ($F = 4.75$, $p = .009$) in all three sites.

Overall camp program evaluation

Evaluation data collected from a total of 280 of the 294 participants including 133 from the peer-led group, 122 from the adult-led group and 25 peer leaders were analyzed. Surveys from 14 campers were excluded from analysis because they were either incomplete or did not contain identifiers. Overall, campers from all three groups rated the training program highly with an average score of 4.5 (±0.91). When asked "what did you like most about camp" in an open ended question, 54% responded that they enjoyed "good food" and activities such as "playing basketball" and the camp experience in general (e.g., "everything", "well organized", "the environment"). About 25% indicated they enjoyed the teaching sessions (e.g., "learned a lot about asthma", "learning to manage my symptoms") and appreciated socializing with each other (e.g., "I liked that I could interact with other asthma teens like me", "I met new peers").

Comparison of camp evaluation by treatment group

The intervention and control groups were not different ($t = 0.485$, $p = .63$) in the total mean score, 4.49 (±0.98) and 4.54 (±0.82) respectively. Table 2 compares the groups in the mean score of each item for both treatment groups. Each item was rated positively by both groups. No significant differences in the mean scores were found by age ($t = 0.614$, $p = .510$), race ($t = 1.287$, $p = .199$) or gender ($t = 0.006$, $p = .995$). Peer leaders (n = 25) had a significantly higher total mean score (4.82 ± 0.238) than that of the campers (4.51 ± 0.908) ($t = 4.18$, $p < .001$). Specifically, peer leaders rated significantly higher than the campers on the items including getting to know others, satisfaction with the camp and intention to recommend the camp to a friend.

Subsequently, we combined positive responses (somewhat agree or strongly agree) on each item. Participants rated all items positively with 92% to 94% reporting satisfaction. No significant differences were found between treatment groups in the rates of positive responses on all seven items. All but one peer leader rated positively on all items.

Dissatisfaction (strongly disagree or somewhat disagree) in one or more of the seven items was reported by only 8% of campers. No significant differences by age, gender or group were found in campers with negative ratings versus positive ratings. However, campers reporting annual household income >$30,000 were more likely to respond negatively on item "camp was fun" compared to campers with household income <$30,000, 10% and 2% respectively ($X^2 = 4.23$, $p \le .04$). Those who rated negatively on the item about camp being enjoyable (n = 16) were more likely to be the participants of peer-led groups (74%), girls (69%), and younger teens (12–14 years, 63%). Participants who rated camp as disorganized (n = 21) and would not refer a friend to camp (n = 15) were more often from the peer-led campers (62% and 67%) respectively than the adult-led campers.

Table 1
Sample demographics by site for campers and peer leaders.

Site	New York			Maryland			Tennessee		
Group	Adult-led n = 52	Peer-led n = 53	Peer leader n = 14	Adult-led n = 25	Peer-led n = 33	Peer leader n = 10	Adult-led n = 47	Peer-led n = 49	Peer leader n = 11
Age, mean (SD)	14 (1.49)	14 (1.68)	17 (1.51)	14 (1.83)	14 (1.56)	17 (1.51)	14 (1.74)	15 (1.95)	16 (0.67)
Male n (%)	24 (46)	25 (47)	6 (43)	17 (68)	21 (64)	4 (40)	25 (53)	25 (51)	6 (55)
Female n (%)	28 (54)	28 (53)	8 (57)	8 (32)	12 (36)	6 (60)	22 (47)	24 (49)	5 (45)
Non-White n (%)	37 (71)	40 (76)	6 (43)	25 (100)	31 (94)	10 (100)	46 (98)	48 (98)	11 (100)
White n (%)	15 (29)	13 (24)	8 (57)	0 (0)	2 (6)	0 (0)	1 (2)	1 (2)	0 (0)
Family annual income									
<$30,000 n (%)	13 (26)	10 (19)	1 (8)	9 (36)	15 (47)	2 (22)	17 (36)	12 (25)	2 (18)
>$30,000 n (%)	37 (74)	43 (81)	12 (92)	16 (64)	17 (53)	7 (78)	30 (64)	37 (75)	9 (82)

Table 2
Intervention and control group comparisons on program evaluation.

Evaluation items	Peer-led n = 133 Mean (SD)	Adult-led n = 122 Mean (SD)	*t*-Test	p-Value
The camp was well organized.	4.48 (1.17)	4.62 (0.94)	1.04	.299
The camp was fun.	4.33 (1.13)	4.51 (0.89)	1.40	.163
I learned a lot about asthma at the camp.	4.56 (1.1)	4.60 (92)	0.314	.754
I think I can use things learned from the camp in managing my asthma.	4.59 (1.03)	4.62 (0.92)	0.272	.768
I have the opportunity to get to know other teens with asthma at the camp.	4.47 (1.07)	4.43 (1.0)	−0.307	.759
I am satisfied with the camp.	4.53 (1.03)	4.52 (1.0)	−0.045	.964
I would recommend this camp to a friend.	4.47 (1.09)	4.54 (0.93)	0.496	.620

Significant site differences were found on all items of camp evaluation (Table 3). TN campers rated more positively on all evaluation items than NY or MD campers, and no significant differences were found between NY and MD campers. Of the 32 campers reporting dissatisfaction in at least one of seven items, the majority were from the NY site (n = 17), followed by MD (n = 10) and TN (n = 5).

Peer leader quality rating

The Peer Leader Rating Scale was completed by 119 campers who attended the peer-led camps. Responses to items were dichotomized as rated positively (definitely true and probably true) or negatively (probably not true and definitely not true). Campers reported highest agreement on items related to quality of peer leader teaching (i.e., "My peer leader knows a lot about asthma") and sincerity (i.e., "My peer leader believes in what he/she taught us"). The item with the lowest camper agreement was an item on relatability of camper to peer leader, "My peer leader has a life a lot like mine". An additional qualification of peer leaders that was highly rated by campers was having a sense of humor (i.e., "My peer leader has a good sense of humor") and approachability (i.e., "My peer leader seems like someone who I could talk to if I had a problem or question"). No site differences were found on all items rating peer leader quality (see Table 4).

Asthma knowledge test scores

Asthma knowledge tests (pre and post the camp program) were completed by 246 campers including 119 from the adult-led group and 127 from the peer-led group. Knowledge test mean scores improved significantly from pre- (6.21 ± 1.53) to post-tests (6.93 ± 1.84) ($t = 6.13$, $p < .001$). No significant group differences were found between the peer-led and adult-led group in the improvement of the knowledge scores ($t = 1.304$, $p = .193$).

Discussion

This study demonstrates that a peer-led asthma self-management for adolescents (PLASMA) intervention implemented at a day-camp is well received by urban adolescents. Unlike a previous study reporting more positive evaluation for a peer-led camp than an adult-led camp (Rhee et al., 2012), we found no differences in program evaluation ratings between participants instructed by peer leaders (peer-led group) and those instructed by adult educators (adult-led group). Comparable ratings between two treatment groups may be due in part to the small group (average 5–8 members) format for training sessions utilized in both treatment groups in this study. The small group format may have contributed to the overall positive experience for both groups as it can provide a venue for more close and comfortable interactions within the group. Socialization within the intimate group setting offering adolescents a sense of belonging and builds positive self-image (Brorsson, Lindholm Olinder, Viklund, Granstrom, & Leksell, 2017) may have contributed to overall satisfying experience with the intervention.

Consistent with other studies (Ayaz & Açıl, 2015; Breithaupt, Eickman, Byrne, & Fischer, 2017; Chung, Monday, & Perry, 2017), this study confirms the feasibility of trained peer leaders in offering health knowledge and disease management training to adolescents. Indeed, our adolescent peer leaders demonstrated their ability to deliver asthma self-management training content to their peers who demonstrated improved knowledge in asthma management comparable to those taught by healthcare professionals. In addition, peer–led participants reported a high regard for the qualifications of their peer leaders as credible and approachable. This aspect of accessibility of peer leader to learner is a key principle of peer-led interventions and contributes to learners being receptive to the material presented (Foley et al., 2017; Layzer, Rosapep, & Barr, 2014).

We found that relatability of peer leaders to peer-led participants was less robust. About one quarter of the peer-led group felt their lives were not similar to their peer leaders'. This may be in part due to the differences in socioeconomic status. Across the three study sites we found that family annual income reported by peer leaders was significantly higher than that of camp participants. In addition, in NY site, the majority (57%) of peer leaders were White, while Black or African American teens were the majority among campers (73%). Nevertheless, these differences between learner and peer leader did not diminish learning or satisfaction in the peer-led group.

In selecting peer leaders, sincerity and disposition appear to be important attributes rather than matching learners' sociodemographic profiles. Our peer leaders highly rated their experience at camp, indicating that proper preparation and training are also critical components when utilizing peers for health education. Fourteen percent of trained

Table 3
Study site comparisons on camper evaluation.

Evaluation items	New York n = 103 Mean (SD)	Maryland n = 55 Mean (SD)	Tennessee n = 96 Mean (SD)	F	p
The camp was well organized	4.32 (1.26)	4.47 (1.23)	4.84 (0.55)	6.46	.002
The camp was fun	4.17 (1.20)	4.29 (1.08)	4.75 (0.63)	8.98	.000
I learned a lot about asthma at the camp	4.41 (1.67)	4.40 (1.18)	4.88 (0.51)	6.93	.001
I think I can use things learned from the camp in managing my asthma	4.42 (1.17)	4.44 (1.12)	4.89 (0.45)	7.15	.001
I have the opportunity to get to know other teens with asthma at the camp	4.30 (1.18)	4.13 (1.26)	4.79 (0.50)	9.60	<.001
I am satisfied with the camp	4.33 (1.22)	4.33 (1.12)	4.86 (0.48)	8.86	<.001
I would recommend this camp to a friend	4.32 (1.16)	4.25 (1.22)	4.84 (0.53)	9.26	<.001

Table 4
Rates of agreement on peer leader qualifications.

Evaluation items	All sites n = 119 (%)	New York n (%)	Maryland n (%)	Tennessee n (%)	F	p
My peer leader knows a lot about asthma	97	51 (96)	22 (100)	46 (96)	0.449	.64
My peer leader believes in what she/he taught us	98	51 (96)	22 (100)	47 (98)	0.478	.62
My peer leader seems like someone who I could talk to if I had a problem or question	94	49 (92.5)	21 (95.5)	46 (96)	0.295	.75
Before my peer leader was trained, she/he had the same kind of attitudes about asthma as I do	93	51 (96)	19 (86)	44 (92)	1.169	.31
Before my peer leader was trained, she/he had the same kind of attitudes about taking asthma medications as I do	90	48 (91)	19 (95)	42 (87.5)	0.449	.64
My peer leader has a life a lot like mine	76	38 (72)	18 (82)	37 (77)	0.470	.63
My peer leader has a good sense of humor	95	49 (92.5)	22 (100)	46 (96)	0.989	.36

peer leaders (n = 6) either withdrew before camp or did not show up to the camp intervention. Although the withdrawn or no-show peer leaders were similar to those who remained in sociodemographic characteristics, they reported poorer quality of life and lower self-efficacy in asthma self-management than those who remained. This demonstrates that despite passing eligibility screening and the training phase of preparation, some adolescents will need greater support and supervision in order to advance to the implementation phase of their role as a peer leader.

It is also noteworthy that campers from households with income <$30,000 indicated greater acceptability of the program, as they reported the camp experience more positively than those reporting household income >$30,000. Literature on program preference based on income level is scant. Nesvold et al. (2006), in a review of several camp programs, reported a higher proportion of campers from lower income families returned to asthma camp programs making up about 2/3 of the total camper population, indicating their continuing interest in this type of learning venue. Adolescents from low income households may enjoy the camp experience more as they have less access to such group learning combined with recreational opportunities than adolescents from medium to high socioeconomic status.

In NY site, a subgroup of younger participants and girls in the peer-led group reported less satisfaction with the camp for being disorganized or less enjoyable than their older counterparts or girls attending the adult-led group. This may be attributed to several factors. First, in NY site, the peer-led camps were held first, followed by the adult-led camps. Being the inaugural group, they did not have a chance to take advantage of research staff's organizing skills learned from accumulated experience. Based on lessons learned from trial and error at this first camp, the study team was able to run subsequent camps more smoothly and in an orderly fashion. Second, the outdoor camp setting in NY coupled with poor weather conditions during the first peer-led camp may have been perceived as inconvenient by younger campers and girls, thus negatively affecting their general satisfaction with the camp program.

Although all of our participants at all study sites were highly satisfied with the camp experience, adolescent participants in the TN site were more satisfied with all aspects of the program than those attending in either NY or MD sites. The site staff in TN prioritized making a personal connection to participants during enrollment, which may have created a sense of familiarity with the research staff and positively affected their camp experience. Nonetheless, the transferability of the PLASMA program to urban community settings was supported by our findings that the program was equally well received across locations, even with differences in where, how and when the program was implemented. In NY site, the program was offered in an outdoor camp facility conveniently located in the community, while two other sites used indoor venues including a hospital facility (MD site) and a university facility (TN site). Also, the camp program was offered in different seasons, Summer, Fall and Spring. As such, adolescent participants' high satisfaction with the PLASMA program independent of the venue or season of implementation is a compelling indication of the program's generalizability and adaptability.

This study has several limitations. First, a similar number of participants based on age and gender was preassigned to each group, but actual attendance at the camp varied across sessions. The number of no shows resulted in fewer age and gender matched peers in attendance than originally planned which may have negatively affected peer dynamics between peer leader and campers as well as among campers. Second, our sample is rather homogeneous comprised primarily of urban dwelling African American adolescents, limiting the generalizability of our findings to suburban and/or rural settings and adolescents of other race or ethnicity. Third, because the program evaluations were exclusively based on self-reports, it is unclear whether the high satisfaction rating was merely a reflection of the social desirability effect. Fourth, reliability of the Asthma Knowledge Survey used to test pre-and post-intervention asthma knowledge was low. Further refinement and modification of the survey by adding more items for each topic area of asthma self-management is needed for future research. Finally, because the scope of the study being limited to program evaluation, effects of the program on asthma outcomes are not presented here. Program effects on asthma outcomes will be reported in detail in a subsequent paper.

Conclusion

This study provides evidence for adolescent learners' broad acceptance of an asthma self-management program implemented by either peer leaders or healthcare professionals at a camp setting. Our study showed that properly trained peer leaders as an alternative to adult health educators can successfully deliver asthma self-management training to their adolescent peers. Teen learners well regarded their peer leaders' qualifications. Particularly, peer-leader competency and approachability over relatability are highly valued, thus sincerity and pleasant disposition rather than sociodemographic similarities with learners are essential to the success of a peer-led program. Our group-based asthma self-management program implemented at the camp setting appears to be more favorably received by adolescents from lower income families than those from more well-to-do families. This study also demonstrated the adaptability of a peer-led self-management program to a community or clinical venue as well as the program's generalizability across diverse urban community locations in the United States.

Author statement

Annette Grape, PhD, corresponding author, contributed with data analysis, writing, reviewing and editing.

Hyekyun Rhee, PhD, RN, FAAN, contributed with writing, reviewing and editing and data interpretation.

Pauleen Sanchez, BA contributed with data analysis and writing of this manuscript.

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