

Community Based Participatory Research to Assess the Occupational Childhood Asthma

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Abstract: Community Action Against Asthma is community-based participatory research that assesses the effects of outdoor and indoor air quality on exacerbation of asthma in children, and tests household- and neighbours' interventions to reduce exposure to environmental asthma triggers. The Community Action Against Asthma project grew out of an already existing community-academic partnership, the Detroit Community-Academic Urban Research Centre. For the intervention, we used a staggered randomized research design in which one half of the participants received the household intervention immediately after the collection of baseline data and the other half received the intervention the following year. Annually, we conducted a household environmental assessment and administered questionnaires with the caregivers and children to assess health outcomes e.g., quality of life and asthma symptoms and psychosocial factors and social support to evaluate the impact of the household intervention on childhood asthma outcomes.

Key Words: — *Asthma, Community, Perception, Traditional medicine.*

I. INTRODUCTION

Among the chronic diseases of childhood, asthma continues to be the leading cause of emergency department visits, hospitalizations, and days of missed school. In 2009, asthma prevalence increased to 9.6% among all children [1]. These are generally low-income areas whose residents comprise large percentages of people of color. Asthma prevalence in particular racial and ethnic groups, especially African American and Latino/Hispanic people, is far above average. Asthma attacks and exacerbations pose strain on the health care system and affect school and job performance [2]. In 2007, an estimated 13.9 million physician visits were made for asthma care, 48% of which were among children. Furthermore, 57% of outpatient department and 37% of emergency department visits for asthma were for children.

Health care utilization for asthma is greatest among those under five years of age, although mortality related to asthma is more common among older individuals. Along with increased health care utilization, individuals with asthma experience a greater number of missed school or work days. In 2008, 59% of children with asthma aged 5–17 years were absent from school one or more days as a result of their asthma, totalling 10.5 million annual school days missed [3]. Disruption for families is also common: 34% of employed parents miss at least one day of work per year due to asthma.

The social and environmental problems associated with asthma likely contribute to the disparities in outcome evident between African American and Latino/Hispanic populations compared with the general population of children [4].

II. CONTROL OF BREATH DISEASES AND ASTHMA

Control of asthma and its effects is a complicated matter. Asthma is a label that is given to what is likely a collection of similar but somewhat separate manifestations of disease. It involves reactivity of the airways, the production of excess mucus, and swelling of the lining of the bronchia that produce cough, wheeze, shortness of breath, chest tightness, and related symptoms. Although deaths from asthma are relatively rare (1.1 per 100,000 population), every death is considered unnecessary given recent treatment advances [5]. There is no cure for asthma, but deterioration of the condition and

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disruption of daily life can be controlled through effective management. The causes of asthma are not well understood and, although a number of hypotheses have been offered, none has stood up to serious investigation [6]. Clinical means to control asthma episodes and symptoms have improved over the past two decades. In recent years, sophisticated therapies have evolved that have been effective in reducing the inflammation underlying asthma and modulating the effects of constriction of the airways. A range of explanations for this lack of progress in asthma control has included failure of clinicians to use the recommended therapeutic regimens for asthma, failure of patients to follow recommendations when given, failure of health services to reach and assist those most at risk for complications of asthma, lack of integration and coordination of services within clinics and between clinics and community settings, and mismatch between needed services and financial reimbursement for those services [7].

III. EVALUATION OF COMMUNITY BASED APPROACHES

Investigators have assessed efforts to create more community-based opportunities for asthma control. School programs for children, their parents, and school personnel focused on self-management and on improving the school's physical environment have been a focus of research attention [8]. Home visits from personnel in clinics, health departments, and voluntary organizations have attempted to deliver asthma education and help families improve management and the home indoor environment. Electronic media, primarily in the form of Web-based learning programs and games, have been designed for use at home or school by children and parents. Phone links to provide information and education and/or to connect families to needed care have been explored. Asthma education as part of community-based clinical care has been a focus of evaluation [9]. A few communities have made it their goal to assess outdoor environmental modifications, such as pollution control. Some efforts have tried to change public and/or organizational policies and the systems in which clinicians practice, patients seek care, and people live and work. One example is to assess efforts to mobilize stakeholders in asthma control from across a community into coalitions pushing for change. Most attention to work in schools is focused on asthma self-management and environmental control. More than 30 studies in the past decade and a half have examined these approaches. Interventions have been designed at the elementary-, middle-, and high-school levels; elementary school programs are the most evident. Programs have been initiated in classrooms, at

school-based health clinics where counselling by nurses has been a key feature, in mobile units brought onto the school grounds to provide clinical services, and in attempts to clean the school environment to remove or reduce animal dander or other allergens [10]. Another strategy has been to provide asthma-control medicines and to monitor the children who take these medications on campus. Many of these school-focused interventions have not been adequately assessed owing to small sample sizes and flawed evaluation designs. However, about one-half have employed reasonable assessment methods and included sufficient numbers of children and/or parents in the evaluation [11]. Results of these studies have varied, and not all attempts have had equal success. A few, in fact, have found the impact of work in the schools to be very limited regarding objective outcomes such as symptom control and health care use [12]. However, a number of them serve as examples of the kind of success that can be achieved; the success appears to have been related to deployment of robust interventions. Several observations can be made about school-focused interventions for asthma [13]. In many low-income areas of the country, school systems are at peril, and the priority for school time and attention is academic performance. It can be difficult to capture the attention of officials in these areas for asthma self-management education despite evidence that school grades and absenteeism improve with many interventions. Although school-based clinics have had some success in asthma control, not all schools have these services and staffing them can be an expense that is difficult for school systems to bear [14]. Although enthusiasm is apparent in some communities for mobile units deployed to the schools for care and education of children with asthma (e.g., Breathmobiles), the data supporting their efficacy are not as definitive as we would wish because controls have not been employed in studies. Furthermore, maintenance of the units in terms of the costs of the vehicles, equipment provided in them, and staff to deliver services can be high [15]. Environmental control in schools would seem to be a common-sense approach to help those with asthma, considering that it is important that children have clean, congenial, and comfortable places to learn. However, environmental control as a strategy to reduce asthma must be thought of within a reasonable set of expectations. It is unlikely that animal dander and other allergens can ever be fully removed from the school environment. Most are carried in continuously from the outside from pets residing in students' homes or from external environmental conditions [16]. Work that takes advantage of opportunities for electronic learning related to asthma control appears to be at the very

earliest stages of development. The utility of novel approaches in reaching low-income populations has not been fully demonstrated [17]. New options for delivering interventions and sharing information through personal and social media have yet to be explored and will need careful evaluation. When techniques and strategies have matured, they may show results with greater impact than is evident to date [18].

IV. COMMUNITY STUDY AT HOME

In recognition of the additional help that children in asthma hot spots may need to bring the condition under control, home visits by nurses or community health workers have been an increasing part of community-based approaches [19]. Home visitors are generally deployed from clinics, hospitals, or health departments. They are usually viewed as a form of outreach from clinical services. They focus on education about asthma and how to make modifications to the indoor environment to reduce dust mites, cockroach antigen, animal dander, and other matter considered to be a potential asthma trigger [20]. Often families are encouraged to cover mattresses and wash bedding at high heats to retard mites. Sometimes they are asked to vacuum and care for the house in special ways using specially designed vacuums, humidifiers, or dehumidifiers. Just 18 studies in the past ten years have tried to evaluate the results of home visits as a means to enhance asthma control [21]. Outcomes have been inconsistent. Several questions arise from the extant assessments of home visits to enhance asthma control. By far the most important is which element of the visit, education or environmental modification, produced the results observed [22]. In almost all interventions, the two are so intertwined that the relative advantages of each are impossible to discern. Home visits for environmental control are complicated by several additional factors. One is that not all children are allergic to dust mite or cockroach antigen or animal dander [23]. Even children who are sensitized to these allergens will not all respond with symptoms of asthma. Therefore, making requested changes in the home may not affect the condition for many if not most children. For families, undertaking environmental modifications can be burdensome. However, such modifications are often recommended by clinicians as a general strategy for all children [24]. If the strategies do not produce outcomes of importance to families, such as fewer symptoms, they may have reduced confidence in other clinical recommendations that may be more efficacious (for example, correct use of medicines). There is no question that ridding a house of such offending substances makes it a more pleasant

and generally sanitary place to be, a wish we have for all children [25]. However, the level of evidence from available studies, that is, the link between the presence of these potential triggers, an intervention to reduce them, and ultimate outcomes of improved health status of children, including health care use, have not been adequately demonstrated [26].

V. ASTHMA AWARENESS IN COMMUNITY BASED CLINIC

Recent studies of asthma education, including outreach from primary health care clinics, have been undertaken. They have succeeded with varying results and, in the main, have included relatively small numbers of participants and lacked a comparison group [27]. Although no control was employed, analysis of outcomes over time suggested an association between the health team approach and outcomes related to fewer asthma symptoms and less health care use. Despite few assessments of clinic-based programs and lack of a proven model, patient education for families has become a standard of clinical care [28].

5.1 Telephonic evaluation during Covid 19

Three evaluations of efforts to reach and help families via the telephone have been undertaken. An electronically generated follow-up letter was also sent to parents recommending changes in the child's regimen where indicated. Compared with controls, children in the program were more likely to have increases in the medicines they received from physicians and fewer emergency department visits [29]. Telephone counselling may not have been sufficiently explored as a way to assist families in vulnerable communities. Since the advent of various forms of mobile phones and phone plans, reaching low-income people by phone has become a more viable strategy and likely deserves further attention [30].

5.2 Air pollution and asthma control

A number of studies have shown the relationships between particulate matter and allergens in the outdoor air and increased asthma symptoms. However, studies of outdoor air pollution control as an intervention strategy are very difficult to implement for obvious reasons. Data regarding one of these factors are available [31]. The government made dramatic efforts via regulation, laws, and heavy fines to reduce auto traffic and curtail emissions from industrial plants in areas in and around the site of the games. Common sense dictates that efforts to control air pollution are needed and helpful in reducing the effects of poor air quality on a number of conditions, not only those that are respiratory in nature. Thus,

air pollution control remains a general goal of public health efforts [32]. A range of policy interventions is likely needed to manage this aspect of asthma control. These are efforts by organizations within neighbourhoods or regions, especially in and near asthma hot spots, to bring about changes that will affect large numbers of people with asthma. Many of these coalitions function from the premise that public and organizational policy most influences what families, clinicians, health care facilities, and community organizations can do to control disease. They also usually take the position that policy and system failures occur because the people who directly experience a problem (individuals at the community level) are not involved in determining ways to fix it [33]. Community engagement is often a characteristic of coalition functioning. Coalitions tend to be interested in changes that hold promise for achieving ongoing sustainable improvements in services. They work to develop or modify existing policy and bring about changes in clinical and community systems (for example, health systems and school districts) to enable more effective disease management. The group of children with high-level involvement had significantly lower levels of subsequent health care use than did children with low-level involvement, and their parents had more confidence in the idea that asthma could be managed [34]. Evaluators found that the most socially isolated families were more likely to participate in the Coalition's programs. The nature and type of work initiated by the Coalition appeared effective in engaging the hard to reach and in reducing need for acute care [35-38]. The National Asthma Education and Prevention Program (NAEPP), led by the Lung Division of the NHLBI of the National Institutes of Health, is the premier entity calling attention to, making recommendations for, and supporting activities to increase asthma control. Their efforts to find and promote evidence for effective interventions have led to many of the community-based approaches described here. An important activity of the NAEPP is the National Asthma Control Initiative (NACI), instituted in 2010[39]. NACI comprises a network of organizations with the capacity to disseminate findings from research and communicate with a range of constituencies about means to control the condition. NACI has called attention to the major messages for patients and clinicians contained in the National Guidelines for Diagnosis and Treatment of Asthma [40].

VI. CONCLUSION

With regard to the overall association between child

maltreatment and paediatric asthma, three important methodological issues arise. First, five out of the seven studies investigating the influence of child maltreatment on paediatric asthma outcomes rely solely on cross-sectional data. These designs prohibit conclusions about the direction of causality, and raise questions about whether the observed associations are reflective of maltreatment's effects on asthma, or an alternative scenario involving reverse causality and/or third variables. For example, as described in more detail in the next sections, it is possible that asthma elicits harsh parenting, or that some of the reported associations have their origin in disadvantaged socioeconomic circumstances [11]. Second, a measurement issue for both child maltreatment and asthma is the heavy reliance on self- and caregiver-reports. Not only are there problems with the reliability and accuracy of self- and caregiver-reports of asthma and maltreatment history, but given that in many studies the same individual reports on both, there are additional issues of shared-method variance that may influence findings [23]. Third, the existing studies do not allow for the separation of effects of child maltreatment from effects of other, co-occurring stressors [20]. Although some of the studies reviewed here made an effort to control for some co-occurring stressors e.g., parent mental health.

REFERENCES

- [1]. Dixon P, Hollinghurst S, Edwards L, Thomas C, Gaunt D, Foster A, et al. Cost-effectiveness of telehealth for patients with raised cardiovascular disease risk: evidence from the Healthlines randomised controlled trial. *BMJ Open*. 2016;6(8): e012352.
- [2]. Clark N, Lachance L, Milanovich AF, Stoll S, Awad DF. Characteristics of successful asthma programs. *Public Health Rep*. 2009;124(6):797-805.
- [3]. Clark NM. Community-based approaches to controlling childhood asthma. *Annu Rev Public Health*. 2012; 33:193-208.
- [4]. Cofman JM, Cabana MD, Halpin HA, Yelin EH. Effects of asthma education on children's use of acute care services: a meta-analysis. *Pediatrics*. 2008;121(3):575-86.
- [5]. Sterne JAC, Hernan MA, Reeves BC, Savovic J, Berkman ND, Viswanathan M, et al. ROBINS-I: a tool for assessing risk of bias in non-randomized studies of interventions. *BMJ*. 2016;355: i4919.
- [6]. *Cochrane handbook for systematic reviews of interventions*. The Cochrane Collaboration. 2011.
- [7]. McLean S, Chandler D, Nurmatov U, Liu J, Pagliari C, Car J, et al. Tele healthcare for asthma: a Cochrane review. *CMAJ*. 2011;183(11): E733-42.
- [8]. Review Manager (Rev Man) [Computer program]. Version 5.3. The Nordic Cochrane Centre.

- [9]. Kennedy S, Bailey R, Jafee K, Markus A, Gerstein M, Stevens DM, et al. Effectiveness of evidence-based asthma interventions. *Pediatrics*. 2017.
- [10]. Bird SR, Noronha M, Kurowski W, Orkin C, Sinnott H. Integrated care facilitation model reduces use of hospital resources by patients with pediatric asthma. *J Healthc Qual*. 2012;34(3):25–33.
- [11]. Holder-Niles F, Haynes L, D’Couto H, Hehn RS, Graham DA, Wu AC, et al. Coordinated asthma program improves asthma outcomes in high-risk children. *Clin Pediatr*. 2017;56(10):934–41.
- [12]. Janevic MR, Stoll S, Wilkin M, Song PX, Baptist A, Lara M, et al. Pediatric asthma care coordination in underserved communities: a quasiexperimental study. *Am J Public Health*. 2016;106(11):2012–8.
- [13]. Kercsmar CM, Beck AF, Sauers-Ford H, Simmons J, Wiener B, Crosby L, et al. Association of an asthma improvement collaborative with health care utilization in medicaid-insured pediatric patients in an urban community. *JAMA Pediatr*. 2017;171(11):1072–80.
- [14]. Lara M, Ramos-Valencia G, Gonzalez-Gavillan JA, Lopez-Malpica F, Morales-Reyes B, Marin H, et al. Reducing quality-of-care disparities in childhood asthma: La Red de Asma Infantil intervention in San Juan. *Puerto Rico Pediatrics*. 2013;131(Suppl 1): S26-37.
- [15]. Lob SH, Boer JH, Porter PG, Nunez D, Fox P. Promoting best-care practices in childhood asthma: quality improvement in community health centers. *Pediatrics*. 2011;128(1):20–8.
- [16]. Mansfeld C, Viswanathan M, Woodell C, Nourani V, Ohadike YU, Lesch JK, et al. Outcomes from a cross-site evaluation of a comprehensive pediatric asthma initiative incorporating translation of evidence-based interventions. *Health Promot Pract*. 2011;12(6 Suppl 1):34S-51S.
- [17]. Rapp KI, Jack L Jr, Wilson C, Hayes SC, Post R, McKnight E, et al. Improving asthma-related outcomes among children participating in the head-of environmental asthma in Louisiana (HEAL). Phase II Study *Health Promot Pract*. 2018;19(2):233–9.
- [18]. Woods ER, Bhaumik U, Sommer SJ, Ziniel SI, Kessler AJ, Chan E, et al. Community asthma initiative: evaluation of a quality improvement program for comprehensive asthma care. *Pediatrics*. 2012;129(3):465–72.
- [19]. Dor A, Luo Q, Gerstein MT, Malveaux F, Mitchell H, Markus AR. Cost-effectiveness of an evidence-based childhood asthma intervention in real-world primary care settings. *J Ambul Care Manage*. 2018;41(3):213–24.
- [20]. Findley S, Rosenthal M, Bryant-Stephens T, Damitz M, Lara M, Mansfeld C, et al. Community-based care coordination: practical applications for childhood asthma. *Health Promot Pract*. 2011;12(6 Suppl 1):52S-62S.
- [21]. Fisher EB, Strunk RC, Sussman LK, Sykes RK, Walker MS. Community organization to reduce the need for acute care for asthma among African American children in low-income neighbourhoods: the Neighbourhood Asthma Coalition. *Pediatrics*. 2004;114(1):116–23.
- [22]. Fox P, Porter PG, Lob SH, Boer JH, Rocha DA, Adelson JW. Improving asthma-related health outcomes among low-income, multiethnic, school-aged children: results of a demonstration project that combined continuous quality improvement and community health worker strategies. *Pediatrics*. 2007;120(4): e902–11.
- [23]. Britto MT, Vockell AL, Munafo JK, Schoettker PJ, Wimberg JA, Pruett R, et al. Improving outcomes for underserved adolescents with asthma. *Pediatrics*. 2014;133(2): e418–27.
- [24]. Portnoy JM, Jennings D. Utilization patterns in an asthma intervention. *Ann Allergy Asthma Immunol*. 2006;97(1 Suppl 1): S25-30.
- [25]. Thyne SM, Rising JP, Legion V, Love MB. The yes we can urban asthma partnership: a medical/social model for childhood asthma management. *J Asthma*. 2006;43(9):667–73.
- [26]. Turyk M, Banda E, Chisum G, Weems D Jr, Liu Y, Damitz M, et al. A multifaceted community-based asthma intervention in Chicago: effects of trigger reduction and self-management education on asthma morbidity. *J Asthma*. 2013;50(7):729–36.
- [27]. Krieger JW, Takaro TK, Song L, Weaver M. The Seattle-King County healthy homes project: a randomized, controlled trial of a community health worker intervention to decrease exposure to indoor asthma triggers. *Am J Public Health*. 2005;95(4):652–9.
- [28]. Naar S, Ellis D, Cunningham P, Pennar AL, Lam P, Brownstein NC, et al. Comprehensive community-based intervention and asthma outcomes in African American adolescents. *Pediatrics*. 2018;142(4): e20173737.
- [29]. Clark NM, Lachance LL, Benedict MB, Doctor LJ, Gilmore L, Kelly CS, et al. Improvements in health care use associated with community coalitions: long-term results of the allies against asthma initiative. *Am J Public Health*. 2013;103(6):1124–7.
- [30]. Wagner EH. Chronic disease management: what will it take to improve care for chronic illness? *Ef Clin Pract*. 1998;1(1):2–4.
- [31]. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. *JAMA*. 2002;288(14):1775–9.
- [32]. Valery PC, Masters IB, Taylor B, Laifoo Y, O’Rourke PK, Chang AB. An education intervention for childhood asthma by Aboriginal and Torres Strait Islander health workers: a randomised controlled trial. *Med J Aust*. 2010;192(10):574–9.
- [33]. Wu F, Takaro TK. Childhood asthma and environmental interventions. *Environ Health Perspect*. 2007;115(6):971–5.
- [34]. Bernard-Bonnin AC, Stachenko S, Bonin D, Charette C, Rousseau E. Selfmanagement teaching programs and morbidity of pediatric asthma: a meta-analysis. *J Allergy Clin Immunol*. 1995;95(1 Pt 1):34–41.
- [35]. Harris K, Kneale D, Lasserson T, McDonald VM, Grigg J, Thomas J. School-based asthma self-management

- interventions for children and adolescents with asthma. *Paediatr Respir Rev.* 2019; 31:40–2.
- [36]. Guevara JP, Wolf FM, Grum CM, Clark NM. Effects of educational interventions for self-management of asthma in children and adolescents: systematic review and meta-analysis. *BMJ.* 2003;326(7402):1308–9.
- [37]. Kanchongkittiphon W, Mendell MJ, Gafn JM, Wang G, Phipatanakul W. Indoor environmental exposures and exacerbation of asthma: an update to the 2000 review by the Institute of Medicine. *Environ Health Perspect.* 2015;123(1):6–20.
- [38]. Campbell JD, Brooks M, Hosokawa P, Robinson J, Song L, Krieger J. Community health worker home visits for medicaid-enrolled children with asthma: effects on asthma outcomes and costs. *Am J Public Health.* 2015;105(11):2366–72.
- [39]. Kearney GD, Johnson LC, Xu X, Balanay JA, Lamm KM, Allen DL. Eastern carolina asthma prevention program (ecapp): an environmental intervention study among rural and underserved children with asthma in Eastern North Carolina. *Environ Health Insights.* 2014; 8:27–37.
- [40]. Shani Z, Scott RG, Schofeld LS, Johnson JH, Williams ER, Hampton J, et al. Effect of a home intervention program on pediatric asthma in an environmental justice community. *Health Promot Pract.* 2015;16(2):291–8.