EFFECT OF ASTHMA INTERVENTION ON CHILDREN WITH UNDIAGNOSED ASTHMA

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Objective To measure the effect of an asthma intervention on the functional status and morbidity of children with undiagnosed asthma.

Study design Data from a randomized trial were used to compare outcomes at baseline and follow-up for children with undiagnosed and diagnosed asthma. We studied 510 symptomatic children with diagnosed asthma (diagnosed) and 299 children with symptoms but no diagnosis (undiagnosed). Baseline functioning and morbidity were similar for undiagnosed and diagnosed patients classified as moderate-severe.

Results There were fewer undiagnosed reported allergies, seasonal symptoms, and other respiratory diagnoses (all $P < 0.01$). Among the moderate-severe, functional status, for example, symptom-days ($P = .02$), symptom-nights ($P < .01$), and days of restricted activity ($P < .01$), was significantly reduced at follow-up for the undiagnosed in the intervention group but not for undiagnosed control subjects. Findings were similar for children with diagnosed asthma.

Conclusions Children with undiagnosed asthma were generally nonatopic, although some had symptoms at a level comparable to children with a diagnosis. The intervention successfully improved functional status for children with undiagnosed asthma as well as for children with diagnosed asthma. These results can be applied to ongoing discussions related to case detection. *(J Pediatr 2005;146:96-104)*

Estimates for asthma morbidity and mortality in the United States have been highest in low-income, urban communities.[1-4] The unsettling statistics, along with studies showing that asthma can be controlled once appropriately treated, have led researchers and health care providers to explore screening for this condition, especially in communities considered to be at high risk.[5,6] A wide range of activities have fallen under the heading of screening.[5-7] The Centers for Disease Control and Prevention (CDC) apply this term to the use of spirometry to identify individuals who exhibit signs and symptoms of asthma.[7] Case detection is used by CDC to refer to questionnaires that identify people who report asthma symptoms.[7]

One reason that providers and researchers are interested in screening or case detection for asthma is to identify those in need of intervention, including people with symptoms indicative of asthma, but with no formal diagnosis. To accomplish this task, questionnaires have an advantage over spirometry in that they are less expensive and more practical for field work; however, there are limitations to their use. For example, the probability that the children identified do not have asthma (false-positive results) may be high, and the additional resources needed to clinically confirm questionnaire findings can be substantial.[2-6] Another problem is that questionnaires are often administered at one point in time with no additional follow-up. Administering questionnaires more frequently to determine symptom patterns over time can be costly as well as logistically challenging.

Increasing the certainty that resources can be used effectively and efficiently to reduce morbidity in children with asthma symptoms requires case identification methods to gather more information on the symptom experience over time, especially for children classified as having undiagnosed asthma. To date, there are few longitudinal data sets with the ability to

BMI	Body mass index	GEE	Generalized estimating equation
CDC	Centers for Disease Control	NAEPP	National Asthma Education and Prevention Program Expert Panel
ED	Emergency Department		

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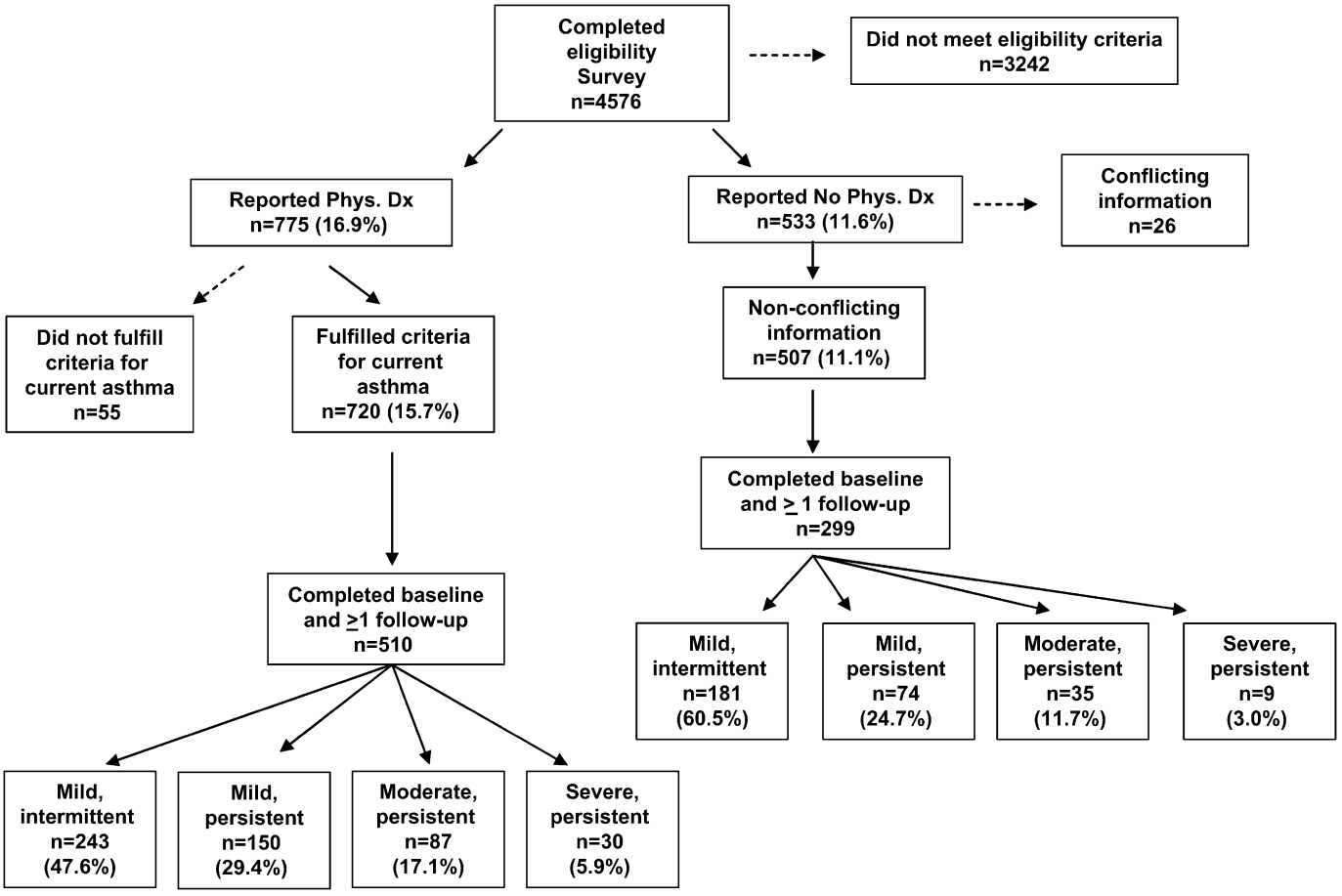

Dx=diagnosis

Figure. Eligibility and exclusion criteria applied to participants used in the analysis: Effect of an asthma intervention on children with undiagnosed asthma.

explore the persistence of asthma symptoms reported by children classified as undiagnosed and the impact of an intervention on their functional status and morbidity.

We used data from a randomized trial to describe and compare characteristics of children fulfilling study criteria for undiagnosed asthma with that of children with a physician diagnosis of asthma.[4] These data have been used previously to describe the feasibility of school-based case detection for asthma and the issues related to this activity.[4] Toward this goal, the data were used to compare changes in symptoms, parent management, grades, and school absenteeism for all children in the intervention group as opposed to the control group.[8] In this study, we present the first attempt to describe changes in functional status and morbidity for undiagnosed children exposed to an asthma intervention. In addition to comparing baseline characteristics for children with undiagnosed and diagnosed asthma, the goals of this analysis were (1) to describe symptom frequency, functional status, and asthma morbidity for children fulfilling criteria for undiagnosed asthma; (2) to examine the functional status and morbidity reported by the undiagnosed over time; and (3) to determine whether an intervention would improve functional status and reduce morbidity in children with undiagnosed asthma. All comparisons were made with children from the same population who reported a physician diagnosis of asthma.

METHODS

The data used in this analysis were from a randomized trial evaluating the effect of a comprehensive school-based asthma program on the functional status and asthma-related morbidity of urban elementary schoolchildren.[4] The goal of the intervention was to promote, teach, and support better self-management of asthma among participating children and their families. The setting for the trial was a geographically defined area in the Detroit Public School System. The average percentage of children <18 years of age meeting federal guidelines for poverty in the six zip codes comprising this area was 44.6%, according to the 1990 Census. The primary outcome variables included improvements in functional status (eg, symptom-days and days of restricted activity) and