

# Prevalence of asthma-like symptoms and assessment of lung function in schoolchildren born with low birth weight

Nik Zainal<sup>1</sup>, MMed, Andy Rahardja<sup>2</sup>, MMed, Che Yusoff Faris Irfan<sup>1</sup>, MSc, Ariffin Nasir<sup>1</sup>, MMed, Wan Ibrahim Wan Pauzi<sup>1</sup>, MMed, Ilias Mohamad Ikram<sup>1</sup>, MMed, Hans Van Rostenberghe<sup>1</sup>, MD

**INTRODUCTION** This study aimed to determine the prevalence of asthma-like symptoms among schoolchildren with low birth weight (LBW), and to compare the lung function of these children with that of children with normal birth weight.

**METHODS** This was a comparative cross-sectional study. We recruited children aged 8–11 years from eight primary schools in Kota Bharu, Kelantan, Malaysia. The children were divided into two groups: those with LBW (< 2,500 g) and those with normal birth weight (≥ 2,500 g). Parents of the enrolled children were asked to complete a translated version of the International Study of Asthma and Allergies in Childhood questionnaire. Lung function tests, done using a MicroLoop Spirometer, were performed for the children in both groups by a single investigator who was blinded to the children's birth weight.

**RESULTS** The prevalence of 'ever wheezed' among the children with LBW was 12.9%. This value was significantly higher than that of the children with normal birth weight (7.8%). Forced vital capacity (FVC), forced expiratory volume in one second, and forced expiratory flow when 50% and 75% of the FVC had been exhaled were significantly lower among the children with LBW as compared to the children with normal birth weight.

**CONCLUSION** LBW is associated with an increased prevalence of asthma-like symptoms and impaired lung function indices later in life. Children born with LBW may need additional follow-up so that future respiratory problems can be detected early.

Keywords: asthma, child, low birth weight, lung function test, prevalence

## INTRODUCTION

Low birth weight (LBW) has been defined by the World Health Organization as a weight of less than 2,500 g at birth.<sup>(1)</sup> LBW has been reported to be associated with reduced lung function and respiratory illness in children.<sup>(2,3)</sup> It has also been associated with lower lung function in adults, although symptoms of wheezing were not reported in adults.<sup>(4)</sup> Although a few studies have found evidence that LBW is associated with asthma in children,<sup>(5,6)</sup> other studies did not observe such an association.<sup>(7,8)</sup> These findings seem to indicate some relationship between LBW and lung function; however, there is less consensus concerning the relationship between birth weight and respiratory symptoms.

About 10% of Malaysian children are born with LBW.<sup>(9)</sup> At the time of writing, there was a lack of available data on the outcome of LBW infants in Malaysia or their health status when they reached childhood or adolescence. Hence, this study was conducted to investigate the prevalence of asthma-like symptoms among schoolchildren who had LBW, as well as to compare the lung function of schoolchildren who had LBW with that of schoolchildren who were born with normal weight.

## METHODS

This was a comparative cross-sectional study. Approval for the study was obtained from the Education Department of Kelantan, Malaysia, and the Research and Ethics Committee of the School of Medical Sciences, Universiti Sains Malaysia, Malaysia.

We recruited children aged 8–11 years from eight primary schools in Kota Bharu, Kelantan, Malaysia. Random sampling with Microsoft Excel (Microsoft, Redmond, WA, USA) was used to select these eight schools from the 96 primary schools in Kota Bharu.<sup>(10)</sup> Letters explaining the purpose of the study, along with a form for written consent, were distributed by class teachers to the parents of children aged 8–11 years in the eight schools. In Malaysia, schools keep a copy of the child's 'home-based immunisation card', which contains basic health information including birth weight, details on infant development and immunisation records. Schools regularly request for these records from parents and keep copies as part of their database of records.

To identify the children with LBW and those with normal birth weight, we reviewed the database of records of the eight schools. Children who were born with weight < 2,500 g at birth were included in this study, and made up the LBW group. Children who were born with weight ≥ 2,500 g at birth were randomly selected from class lists and invited to be included in the study; those who agreed to participate made up the normal birth weight group, which also served as the control group. Based on the children's medical history and notes in the school's database of records, children with obvious clinical syndromes, congenital malformations or a history of neonatal complications that required intensive care treatment were identified and excluded from the study.

<sup>1</sup>Department of Paediatrics, Universiti Sains Malaysia, Kelantan, <sup>2</sup>Department of Paediatrics, Faculty of Medical and Health Sciences, Universiti Malaysia Sarawak, Sarawak, Malaysia

**Correspondence:** A/Prof Nik Zainal Abidin Nik Ismail, Department of Paediatrics, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia. nzainal@usm.my