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The difference in medical utilization and associated factors between children and adolescents with and without autism spectrum disorders

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ABSTRACT

This study determined differences in health care utilization and health care expenditures between children with and without autism spectrum disorder (ASD) and examined possible reasons for these differences. A retrospective longitudinal study of children aged younger than 18 years both with and without ASD was conducted using the 2008 database of the Ministry of the Interior registry of the disabled persons in tandem with the National Health Insurance Research Database. Propensity score matching for the covariates of age, sex, and parental monthly salary was used to match children at a ratio of 1:3 for observing health care utilization among children with and without ASD from 2008 to 2011. Generalized estimating equation analysis was performed to determine factors that affect health care utilization, such as physician visits, emergency room (ER) visits, hospitalizations, and health care expenditures. After matching was completed, the sample size comprised 3280 children with ASD and 9840 children without ASD. Among the children in the sample, most were boys (86.68%) between the ages of 6–11 years, and the average age of both samples was 9.8 years. After relevant factors were controlled for, the children with ASD yielded an average of 14.2 more annual physician visits and were more likely to visit the ER (OR = 1.12, $P < .05$) or be hospitalized (OR = 1.48; $P < .05$) compared with the children without ASD. Compared with the children without ASD, the children with ASD exhibited higher annual physician visit expenditures (NT$26,580 more), higher ER visit expenditures (NT$50 more), higher hospitalization expenditures (NT$5830 more), and NT$32,460 more total health care expenditures (all $P < .05$). Significant predictors of health care expenditures among the children with ASD were age, parental monthly salary, and severity of comorbidity. The most common reasons for physician visits or hospitalizations among the children with ASD were psychiatric illnesses, respiratory illnesses, and digestive illnesses. The children without ASD most commonly experienced respiratory, digestive, and nervous system or sense organ illnesses. Health care utilization among children with ASD is higher than that among children without ASD. The results of this study can serve as a reference for governmental agencies enacting relevant health care policies.

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1. Introduction

From 2000 to 2012, the number of Taiwanese people with autism spectrum disorder (ASD) increased by nearly 12,000. The percentage of people with ASD among all people with disabilities increased annually from 0.29% in 2000 to 1.15% in 2012, and thus, ASD is the second most prevalent disability (Welfare, 2014). Most people with ASD (80.62%) are children and adolescents aged younger than 18 years (Welfare, 2014). The ratio of unmet specific health care services is higher among children and adolescents with ASD than among those with other disabilities (Kogan et al., 2008). Thus, the health and medical problems experienced by children and adolescents with ASD should be addressed.

Previous research has shown that the health problems and health care utilization of children with ASD differ from those of other children (Boulet, Boyle, & Schieve, 2009; Gurney, McPheeters, & Davis, 2006; Kogan et al., 2008). The number of children with ASD exhibiting limited physical functioning (including crawling, walking, and running) is 12 times that of other children (Boulet et al., 2009). A health survey of American children aged younger than 18 years revealed that children with ASD experienced more physical and mental health problems, including respiratory disorders and food or skin allergies, and were 9 times more likely than other children to be depressed or anxious (Gurney et al., 2006). Both physician and emergency room (ER) visits are higher among children with ASD than among children without ASD (Gurney et al., 2006). The ratio of children with ASD in Taiwan has exhibited a significant increasing trend in recent decades, and because of inherent inequalities in health care, they are easily overlooked by governmental health policies. The Taiwan National Health Insurance (NHI) program was implemented over 20 years ago, and although the national coverage rate exceeds 99.89% (Welfare, 2014), few studies on the health care utilization of children with ASD have been conducted.

Health care utilization is a form of health behavior, and research into the factors affecting health care utilization has shown that factors other than personal health condition must be considered. Andersen's Behavioral Model is a comprehensive framework of the interactions and dynamic relationships between health behaviors and the factors affecting those behaviors (Andersen, 1995) and is widely used in scientific research on health behaviors (Fontanella, 2008; Frazier et al., 2011). In other words, Andersen's Behavioral Model categorizes factors influencing health care utilization as predisposing characteristics, enabling characteristics, and need characteristics. Predisposing characteristics are personal traits that evoke the tendency to use health care, enabling characteristics refer to the ability to use health care, and need characteristics refer to health care utilization behaviors after a person perceives that medical treatment is necessary (Andersen, 1995).

This study applied Andersen's Behavioral Model as a basis for examining the health care utilization behaviors of children with ASD and for analyzing the possible factors that influence these behaviors. The results can serve as a reference for governmental agencies to enact policies regarding medical treatment of ASD patients.

2. Methods

2.1. Study subjects and source of data

The source of data for this retrospective study was the 2008 database of the Ministry of the Interior registry of the disabled persons and the NHI database of the National Health Research Institutes. The research sample comprised children and adolescents with and without ASD aged from 0 to 17 years. The sample of children with ASD was extracted from the national database of the registry of the disabled persons, and the sample of children without ASD was extracted from the NHI Database. In this sample, the records of children who were also in the national registry of the disabled persons were excluded as well as the records of children who sought medical treatment for ASD, as determined by physician visits coded 299 according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM).

The participants were children with and without ASD, matched at a 1:3 ratio by using propensity scores for the covariates of sex, age, and parental (or provider) monthly salary. After matching was completed, differences in health care utilization (i.e., physician visits, ER visits, hospitalization admissions, and health care expenditures) were observed until the end of 2011 and compared.

2.2. Measures

The dependent variables in this study were defined as health care utilization and health care expenditures. Health care utilization modalities were physician visits, ER visits, and hospitalization. Measured variables were mean number of annual physician visits, whether an ER visit occurred that year, whether a child was hospitalized that year, mean number of annual hospitalizations, and mean duration of annual hospitalizations. Furthermore, health care expenditures included all NHI costs, and measured variables were mean annual physician visit expenditures, mean annual ER visit expenditures, and mean annual hospitalization expenditures.

The independent variables were whether a child had ASD and factors that influenced health care utilization behaviors, which were categorized as predisposing, enabling, and need factors according to Andersen's Behavioral Model. The predisposing characteristics were sex, age, and whether a child was aboriginal. Age was divided into 3 ranges: 0–5 years, 6–11 years, and 12–17 years. Information on whether a child was aboriginal was available only for children with ASD and not