



Original Article

The utilization of fluoride varnish and its determining factors among Taiwanese preschool children

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Abstract

Background: The Taiwanese government considers fluoride varnish to be a major component of preventive dental cares for preschool children. This study aimed to explore the extent of utilization of fluoride varnish and its determining factors among Taiwanese preschool children.

Methods: Using preschool children under the age of 5 years as our participants, this study was conducted based on the 2008 Taiwan database of the Ministry of the Interior, linked with information gathered between 2006 and 2008 on preventive healthcare and health insurance from the Bureau of Health Promotion and the National Health Research Institute. A total of 949,023 preschool children (< 5 years old) were identified to meet the requirement for fluoride varnish services.

Results: The percentage of Taiwanese preschool children that used fluoride varnish was 34.85%. The probability that fluoride varnish would be utilized was higher among children with catastrophic illness/injury or relevant chronic illnesses than those without. In addition, the probability of children with disabilities using fluoride varnish was lower than that of nondisabled children. Finally, parent sex, parent age, urbanization level of residence, and parents' premium-based salary significantly affected the children's utilization probability of fluoride varnish.

Conclusion: In order to increase the utilization of fluoride varnish among preschool children in Taiwan in the future, target groups consisting of females, children < 3 years of age, and disabled children should be prioritized. Parental factors are also important in affecting the utilization of fluoride varnish in children.

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1. Introduction

Tooth decay is the most common chronic childhood disease, which can be easily prevented when preventive dental care is provided in a timely manner.¹ Early prevention planning for children leads to significant improvement in oral

health, increasing the number of caries-free children from 8% to 32%.² The publication *Oral Health Healthy People 2010* clearly identified preventing childhood oral diseases as a policy goal in the future.³ Therefore, improving oral health has become an important objective in the field of preventive health policies for preschool children.^{4,5}

Preventive dental care is not only a cornerstone of oral health, but also is an essential element of dental care of children.⁶ Fluoride varnish has been shown to be very effective in reducing the rate of tooth decay in preschool children among the available preventative dental care.^{7,8} Chen and Lin⁹ found that applying fluoride varnish to the teeth of preschool

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children was associated with a slower rate of growth in the total number of dental visits, treatment for caries, and lower dental care expenditures. Weintraub et al⁸ also concluded that the percentage of children with dental caries decreased linearly as the number of patients given fluoride varnish applications increased. Therefore, fluoride varnish has been widely accepted by dental experts as an important component of preventive dental healthcare in preschool children.¹⁰

Since July 2004, the Taiwanese government has considered fluoride varnish services to be a major component of preventive dental care for preschool children. To this end, the government provides free biannual dental examinations and fluoride varnish for children younger than 5 years. Lewis et al⁶ reported that, in 1996, up to 38% of children in the United States had accessed preventive dental care within the past year. However, since its implementation in Taiwan, the majority of children have not utilized fluoride varnish.¹⁰ In addition, there are great disparities between the access of preventive dental care by children.¹¹ Weng et al¹⁰ found that there is a disparity in the access of preventive dental care between children with and without disabilities, and that children with a greater severity of disability are less likely to utilize preventive dental care. In order to effectively reduce disparities in oral health and to improve the utilization of preventive dental care among preschool children, it is necessary to conduct a large-scale evaluation of utilization rates, as well as to investigate the disparity in usage among disabled children. This study involved the use of Taiwanese preschool children as the individuals for an investigation. We intended to provide a reference for global public health experts to improve the usage of preventive dental care among preschool children.

2. Methods

2.1. Data source and processing

Children younger than 5 years were eligible for the biannual dental examination with fluoride varnish in Taiwan. Using preschool children under the age of 5 years as our participants, this study was conducted based on the database of the Ministry of the Interior, Executive Yuan, R.O.C. 2008, coupled with information gathered between 2006 and 2008 on preventive healthcare and health insurance from the Bureau of Health Promotion and the National Health Research Institute, respectively. The relevant variables include: (1) demographic characteristics: gender and age; (2) health status: catastrophic illness/injury and relevant chronic illnesses (including 15 types of chronic illnesses); (3) disability status: type of disability and severity of disability; (4) utilization of children's preventive health services; and (5) fluoride varnish status: any usage of fluoride varnish, frequency of usage. As parents are pivotal in influencing their children's healthcare utilization, variables pertaining to the parents were also acquired. This includes gender, age, urbanization level of residence, premium-based monthly salary, and low-income household status.

2.2. Participants

According to the “Disability Rights Protection Acts” of Taiwan, disability can be classified into 18 categories (Table 1). Three categories of disability are deemed less suitable or too small in sample size and thus are excluded from this study: persistent vegetative state (18 individuals), dementia (1 individual), and chronic mental illness (4 individuals), all of whom have not utilized fluoride varnish. Severity of disability is classified into four groups: very severe, severe, moderate, and mild. A total of 949,023 preschool children (< 5 years old) were identified to meet the requirement for fluoride varnish services. There were 941,419 children without disabilities and 7604 children with disabilities.

2.3. Ethical approval

In this study, all personal identification information was deleted, and personal privacy was protected during use of the data. This study was approved by the Research Ethics Committee of China Medical University and Hospital, Taichung, Taiwan (Institute Review Board Number: CMU-REC-101-012).

2.4. Statistical analysis

All data were analyzed with the SAS version 8.2 (SAS Institute, Cary, NC, USA). This study first involves a descriptive analysis and χ^2 test of all research variables. Logistic regression analysis was used to examine influencing factors on the usage of fluoride varnish among Taiwanese preschool children.

3. Results

The percentage of Taiwanese preschool children that used fluoride varnish was 34.85% in 2008, with usage rates slightly higher among males than females. The rate of utilization of fluoride varnish was higher in children aged 4–5 years (43.33%) compared to other age groups, and this rate decreased with decreasing age. The rate of utilization was also higher among those with catastrophic illness/injury (36.84%) than those without. Among the relevant chronic illnesses, the rate of usage was the highest among those suffering from diseases of the respiratory system (48.73%) followed by diseases of the ear and mastoid process and cancer. The utilization rates in nondisabled children were considerably higher than in children with disabilities. Among children with disabilities, those with facial injuries had the highest rates of usage; however this rate was only 17.31%. Children with visual impairments had the lowest rates of usage at 5.74%. Moreover, a direct relationship is seen between the increase of severity and the decrease in usage. Among the parents of these children, the children of females showed a greater usage compared to their male counterparts. The use of fluoride varnish was higher in children whose parents were aged 31–40 years compared to other age groups. The rate of

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