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# Nationwide web survey of pediatric scalds: Prevalence and the relationship with household vacuum flasks

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## ABSTRACT

**Objective:** To explore the prevalence of pediatric (0–72 months old) scalds, and to clarify its relationship with household vacuum flasks.

**Methods:** A cross sectional online survey based on the largest social media in China. Online questionnaire was pushed twice a day to our target respondents for successive seven days. We were authorized to gain, analyze and publish the information related to this research by the Sina & Weibo data center.

**Results:** Prevalence of pediatric scalds was 5.5%. Gender ratio (boy to girl) was 1.96:1. Toddlers (12–36 months old) were the most susceptible age group (54.5%). Non-intentional water spill was the main causation (77.3%). An extremely low percent (7.1%) of the parents performed first-aid as described by the “RRICH” rule: water rinse — clothes remove — water immersion — clean cover — hospital. Scars developed in 52.7% patients and 14.7% of them underwent reconstructive surgery. There were 75.5% Chinese families using vacuum flasks in daily life, but only 6.1% families used the fastening device to avoid burns.

**Conclusion:** Prevalence of pediatric scalds (0–72 months old) was rather high, which might be related to the extensive insecure usage of household vacuum flasks.

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## 1. Introduction

There are about 170 million preschoolers (0–72 months old) in China based on the population census at 2012. This Chinese generation was raised in an unprecedented munificent social environment, receiving full care from family and society. However, non-intentional injuries, such as traffic injuries and burns, are still huge threats to them. Burn injury at childhood comes with intense pain, long

hospitalization, massive medical cost, unfavorable skin changes, and even multiple reconstructive operations, bringing both temporal and long-term suffering to the victim and its family.

Reported etiology of hospitalized pediatric burns varies in different countries. In China, scald injury was absolutely predominant (81.4%) [1]. In South Wales, scalds (41.0%) and contact burns (40.6%) were almost equivalent [2]. As to the children burned in Mexico treated in US hospitals, flame (51%) and scalds (46%) were the two main causes [3]. In

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Australia, contact burn and scalds accounted for 63.1% and 23.8% respectively in pediatric foot burns [4].

According to epidemiologic research in US, hot drinks, bath and kitchen intrusion were the main causes for children scalds [5,6]. Two surveys in UK and Turkey reported 33.9-55.0% of the scald burns were related to hot drinks [7,8]. Given the high occurrence of pediatric scalds in China, further investigation of specific reasons is necessary and meaningful for future prevention.

Asian people, especially Chinese, have a long tradition to enjoy hot beverages, like tea, hot milk, even hot water, so a container for boiled water is quite common in daily life. For decades, most Chinese family chose vacuum flasks (Fig. 1), assembled by two silvery glass walls with a vacuum between them, to preserve hot water temperature. The vacuum flask was useful, economic and convenient, but, also fragile, unfixed and easy-spilling, making which insecure for toddlers.

According to a retrospective chart review based in our ward (a provincial burn center covering 100 million people)

in 2013, scald injury accounted for 88.7% (578/652) of pediatric burns. Further, 30.8% (178/578) of the scalded cases were directly related to a household vacuum flask [9]. That result might be local and unrepresentative, which inspired us to conduct an investigation to clarify the potential relationship between pediatric scalds and household vacuum flasks.

Therefore, this web survey was designed and performed, assisted by <http://www.weibo.com> (similar website as twitter), the largest Chinese social platform, with more than 500 million real-name registrants. The questionnaire aimed to explore the prevalence and causations of scald injury of Chinese preschoolers (0-72 months old), and to promote the public awareness of the risk of household vacuum flasks.

## 2. Methods

### 2.1. Study design

We designed to perform a cross sectional online survey based on the largest social media in China. We planned to invite no less than 0.5 million respondents, and receive no less than 10,000 valid responses, with a response rate over 2%.

### 2.2. Questionnaire design

Ethics approval was gained from Ethics committee of Shandong Provincial Hospital. The questionnaire was designed by a team of five members (two doctors, two nurses, one online marketing specialist) together. Pilot study was conducted among 50 respondents, and the questionnaire was modified upon their constructive feedbacks.

### 2.3. Technical support and network promotion

This investigation received technical support and network promotion from <http://www.weibo.com> (Sina Corporation). According to our contract, our team were legally authorized to gain, analyze and publish the demographical and geographic information related to this survey.

### 2.4. Users report of Weibo.com (up to 2016.09.30)

The website of <http://www.weibo.com> (Sina Corporation) is the dominant social platform in China, with over 500 million real-name registrants and over 297 million Daily Active Users (DAU, average number of users that log in per day). The gender ratio of its registrants was 55.5% (male) to 44.5% (female). 80.5% of the DAU belong to 18-40 age group.

### 2.5. Target population

About one million users of *weibo.com* were pushed the online questionnaire twice a day successively within a week. The target users were selected automatically through the interest



**Fig. 1 – One kind of household vacuum flask commonly used in Chinese family.**

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