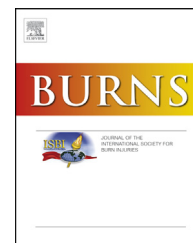


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# Prevalence of preventable household risk factors for childhood burn injury in semi-urban Ghana: A population-based survey

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## ABSTRACT

**Objective:** Childhood burns are a leading cause of injury in low- and middle-income countries; most of which are preventable. We aimed to describe the prevalence of household risk factors for childhood burn injury (CBI) in semi-urban Ghana to inform prevention strategies for this growing population.

**Methods:** We conducted a population-based survey of 200 households in a semi-urban community in Ghana. Households were randomly selected from a list of 6520 households with children aged <18 years. Caregivers were interviewed about CBI within the past 6 months and potentially modifiable household risk factors.

**Results:** Of 6520 households, 3856 used charcoal for cooking (59%) and 3267 cooked indoors (50%). In 4544 households (70%), the stove/cooking surface was within reach of children under-five (i.e., <1 m). Higher household wealth quintiles (OR 0.95; 95%CI 0.61–1.49) and increasing age (OR 0.82; 95%CI 0.68–0.99) were associated with lower odds of CBI. Living in uncompleted accommodation (OR 11.29; 95%CI 1.48–86.18 vs rented room) and cooking outside the house (OR 1.13; 95%CI 0.60–2.14 vs cooking indoors) were also predictive of CBI.

**Conclusions:** This study identified a high prevalence of CBI risk factors in semi-urban households that may benefit from targeted community-based prevention initiatives.

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## 1. Introduction

Burns are the fourth most common cause of injury death and disability worldwide, incurring more than 20 million disability-adjusted life years annually [1,2]. Nearly 95% of burn injuries occur in low- and middle-income countries (LMICs), most of which are preventable [3,4]. Children under five years of age are the most vulnerable group [4].

Poverty, illiteracy, difficulty in providing adequate supervision, and household conditions in urban slums have been cited as reasons for the high rate of burn injury in many LMICs [5]. Additionally, studies have reported that the majority of childhood burns occurs in the home, and may be preventable with better understanding of local risk factors, which can serve as targets for intervention [4,6–8].

While household risk factors for childhood burn injury in urban and rural communities have been well described, household characteristics that pose a risk for childhood burn injuries in rapidly growing semi-urban communities in LMICs are poorly understood [9]. To address this gap, we studied potentially modifiable household risk factors for childhood burn injury in a semi-urban community in Ghana. By doing so, the findings might inform targeted community-based prevention initiatives.

## 2. Methods

### 2.1. Study population

The study was conducted in the Asawase sub-metropolis of Kumasi, Ghana. Asawase is a semi-urban community characterized by inadequate social amenities (e.g., playgrounds, baby-sitting facilities), and poor housing standards. The community is occupied predominantly by households of lower socio-economic status.

In Asawase, most households live in compound homes, which are large buildings with rooms or flats that are rented out to different families. All of the families usually share the same basic utilities. Most of these households are single rooms or flats (i.e. a living room and a bedroom). These accommodation types typically do not have a separate kitchen within the home; thus, cooking is done on the porch, outside, or in an enclosed structure nearby. More than one family often uses enclosed structures designated for cooking.

Other households live in uncompleted structures while saving money to complete them. This accommodation type may have a designated area indoors used for cooking; however, the kitchen might not be completed. Thus, households may also cook on the porch, outside, or in an enclosed structure nearby. Further, uncompleted accommodation may have fewer safety features (e.g. guard rails or bannisters, socket covers, cabinetry for stoves). Thus, results from the parent study documented that children who lived in uncompleted accommodation had more than 3.5 times the odds of any injury compared to those who lived in rented rooms or flats [10].

### 2.2. Sample strategy

The study was nested in the Family Health and Wealth Study (FHWS), which was a community-based survey that examined how family size affected health and wealth [11]. A comprehensive description of the study area and population has been published [12].

Briefly, every household with at least one child aged <18 years in each of the four Asawase study community clusters was enumerated ( $N = 6250$ ). The FHWS randomly sampled 200 households from each of the four community clusters. For the present study, 50 households were randomly selected from the 200 sampled households in each of these four clusters. From each household, one eligible caregiver was randomly selected for interview.

### 2.3. Survey

Caregivers were interviewed with a structured questionnaire regarding household characteristics and potentially modifiable risk factors for childhood burn injuries. Risk factors were generated from the 2008 Ghana Demographic and Health Survey [13]. A household burn was defined as an injury that:

1. Was caused by flame or hot objects or substances;
2. Occurred within 200 m of the house;
3. Prevented the child from going to school or work, or for which treatment was sought; and
4. Occurred within the previous six months.

We considered 200 m as the furthest distance that most children under five years would get away from the house. Recall periods of 1–3 months and 1-year have been proposed for surveys of less severe and more severe/fatal injuries in developing countries, respectively [14]. We used a recall period of six months to capture injuries of all levels of severity.

### 2.4. Data analysis

Analyses were conducted with STATA v11 (StataCorp, College Station, TX). All analyses included sampling weights, and accounted for clustering at community and household levels [12].

The associations between household risk factors and occurrence of burn injury in a child aged less than 18 years were evaluated with bivariate logistic regression. Multivariable regression was not presented given too few burn injuries in each of the potential sub-groups generated by the model.

### 2.5. Ethics

The study was approved by the Kwame Nkrumah University of Science and Technology Committee on Human Research and Publication Ethics, and the University of Washington Institutional Review Board. Informed consent was obtained from each respondent prior to the survey. No identifying information was collected.

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