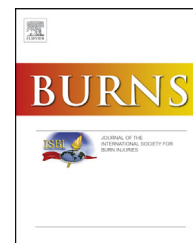


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Household and caregiver characteristics and behaviours as predictors of unsafe exposure of children to paraffin appliances

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ABSTRACT

This study examines adult safety knowledge and practices regarding the use of paraffin cooking appliances. The use of these is common in South Africa with injury risks that are poorly understood. This cross-sectional study was in an informal settlement in Johannesburg, South Africa, where children were reportedly at high risk for burns. This study sought to clarify relationships between key risks and developed individual and composite variables from theoretical constructs and operational definitions of risks for burns. Risks included Child Use of Paraffin Appliances, Child Proximity to Cooking, Risky Stove Use, Caregiver's Burn Treatment Knowledge, Children Locked in House, Children Alone in House. Number of children remains as in proof as this was not a composite scale. Child Proximity to Cooking was associated with more children in the home. Households where children were in greater proximity to cooking were 6 times more likely to be left alone at home, with caregivers with no education over 100 times more likely to lock their children at home. Children locked in were often from homes where caregivers used appliances unsafely. In settings with hazardous energy use, compressed household configurations, and families with multiple children, Risky Stove Use and the practice of locking children in the home may be catastrophic.

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1. Introduction

Burns, as is the case for most causes of injuries, are disproportionately concentrated in low- and middle-income countries (LMICs), most markedly in South-East Asia and Africa [1,2]. The WHO estimates that each year over 300,000 people die from flame or fire-related burns; but this

excludes deaths as a result of scalds, electricity, chemical burns and other forms of burn, of which less is known [3]. In 2001, the rates of death from fires and burns in LMICs were 4 per 100,000 persons and 7 per 100,000 persons for males and females, respectively. Overall, the rates were around 9 times higher than for high-income countries (HICs) (4.53 compared to 0.51 per 100,000) [2]. Fire related mortality rates are highest in South East Asia (11.6 deaths per 100,000), the Eastern

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Mediterranean (6.4/100,000) and African Regions (6.1/100,000) [2,3].

In LMICs, research that accurately describes the magnitude, risks and costs of burns is available for a number of countries, but often more limited in scope, due to factors such as data limitations [4]. South Africa has reported a high rate of burns [5] and is one of a number of LMICs for which there is a platform for burn prevention [6,7]. South African research has described mortality across the life span, child and adult burn morbidity patterns and circumstances of occurrence [7-10]; and perspectives on the aetiology and prevention of burns [11-13]. These investigations have contributed towards increasingly more synthesised descriptions of the circumstances and aetiology of especially child burn morbidity in resource-poor settings. The South African and LMIC descriptions of burns have highlighted selected individual, technological and social risk factors [5,14]. The vulnerability of children, considered to be the result of individual vulnerabilities and an accumulation of exposures to physical conditions and psychosocial circumstances, many of which typically co-vary, have been highlighted [15,16].

1.1. Child vulnerability

The vulnerability of children to burns has been attributed to their exposure to aspects of the physical and domestic environment, and explained in part through the child's limited physical and cognitive vulnerabilities, the dependence of younger children on caretakers, caretaker demands, and the hazardous nature of physical environments, or various interactions between these [5,16]. Burn events are reported to occur in the context of domestic or economic burdens, within the constricting impact of spatially congested homes, through the consequent augmentation of age expected child activities and their own household activities and chores which increase interactions with unsafe domestic appliances, such as paraffin stoves and candles. The characteristics of the caregiver and the adequacy of supervision have been reported as essential to the child's safety environment [17], although such support has been reported to be undermined by the competing demands of necessary social tasks, including chores, child care, unexpected events and crises, and work [17,18].

The impact of the internal spatial arrangements of low-income homes is a neglected research area in the public health arena, but one recently identified as an area of acute concern in impoverished South African settlements [18]. In South Africa, the physical spaces where many burns occur are usually small homes, comprising one or two rooms with further temporary internal divisions made of curtains or tall boards. These rooms are utilised for various functions, depending on the times of day and the family's particular requirements for sleeping, washing, cooking activities, meal-times and in this and other contexts, as a working space [18]. In such living spaces especially children have nearly permanent and unprotected access to thermal equipment [19,20]. Some of this equipment has a documented impact on childhood and adult burn, such as kerosene stoves [21], but others include informal outdoor heating appliances, and stoves and ovens that are unsteady or inappropriately secured. Despite the prioritisation of

electrification in South Africa, many low-income families continue to rely on kerosene, coal or wood-fired stoves for cooking and heating tasks, and low-quality hot water cylinders, because of the cost of both electricity and safe essential electrical appliances [14].

Within such settings, especially in impoverished South African environments, cognisance also needs to be taken of the human attributes and capacity limitations that may be associated with child burn risk. Globally, age and gender have consistently been associated with children's vulnerability to burns [22,23]. Male children have been reported to be at a higher risk of burn injuries in some South African studies [7,23], but not others [10], with an overall excess risk to burns compared with girls. However gender differences tend to decrease after toddlerhood, although only to re-emerge with older, school-going children [23]. Boys have been reported to behave more impulsively and over-estimate their physical abilities [24], while differential socialisation through parental practices that are less likely to restrain the exploratory behaviour of boys [25]. In India and parts of South-East Asia, however females are at higher risk, reportedly due to their involvement in domestic activities near open flames and because of clothing styles [23].

Parent or caregiver sociodemographic factors such as gender, age, and education have also been linked to childhood risk of burns. Studies have found significant associations between young maternal age [26,27] and low maternal education [28,29] and burns in children. Caregiver supervision style and underlying attitudes and beliefs have also been reported to influence children's risk of burns and accidental injuries in general [30]. Increased supervision and closer proximity of caregivers to children (especially when they are younger) are associated with lower risk of unintentional childhood injuries [31]. Moreover, the children of caregivers who are highly conscientious (i.e. vigilant and organised) have a lower risk of unintentional injuries, including burns [32]. Caregiver appraisal of injury risk and what they deem to be more harmful are also indicative of whether or not caregivers may leave their children unattended in potentially harmful situations [31]. In some settings, parents have reported their main concern about their children's safety as being either hit by a car or kidnapped, as opposed to other potential forms of injury, especially those that may occur in the home [33,34]. The home environment may therefore be assessed as less hazardous as opposed to open, public spaces and, as a result, caregivers may allow their children to play out of reach or unsupervised more often when inside the house [35].

This study aims to identify and clarify relationships between key human and appliance-use risks which must be considered and targeted to inform appropriate preventive interventions, especially in adverse physical home environments. This study focuses on risks specific to caregiver and child activities in the home, in particular the use of paraffin cooking appliances by adults as well as children. Despite widespread concerns about such appliances and the protective measures by caregivers, who may warn and educate children about the related risks, the use of such appliances during cooking activities even by children appears common in impoverished South African settings. This study is located in a transient informal settlement in South Africa that comprises

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