



The Safer Candle Project: preventing fires from fallen candles

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Burns in the paediatric population are an ongoing public health concern that affects many populations across the globe. In South Africa, burn injuries contribute significantly to the annual disease burden across all ages, with an overall burn mortality rate of 4.2 per 100,000 (Matzopoulos et al., 2015). Burn-related paediatric deaths have been estimated at a rate of 2.8 per 100,000 in this country compared to 0.5 per 100,000 in upper middle-income countries (WHO, 2011). Children younger than 4 years are most at risk for all-cause external burns (Albertyn et al., 2006). A recent South African hospital survey concluded that thermal injuries represent the most common external cause of death in children younger than 4, and the third most common external cause in children younger than 18 (Rode et al., 2011).

The Red Cross War Memorial Children's Hospital (RCH) in Cape Town has served as a centre for South African research on the epidemiology and preventability of paediatric burns (e.g. Albertyn et al., 2006; Rode et al., 2011; Van As & Rode, 2006; Wesson et al., 2013). RCH is a paediatric referral hospital that receives an average of approximately 1000 burn admissions per year. Data collected from this cohort indicates that flame-related burns are the second most common cause of burns among children aged 0 to 13 (Wesson et al., 2013) and are responsible for most of the severe injuries and fatalities. Flame-related burns occur at lower rates than hot water scalds; however, because of the associated health and economic impacts, fires and flame injuries have received close and specific attention (e.g. Van Niekerk et al., 2015).

It has been estimated that over 16,000 residential fires occurred in Cape Town between 2009 and 2016, of which 7605 were in informal dwellings (Francioli, 2018). The high prevalence of flame-related burns in Cape Town and other regions in South Africa can be better understood by examining the underlying socioeconomic factors that contribute to the elevated risk. These include disparities in housing, housing structures and materials, spatial arrangements, and energy sources, all of which have placed informal settlement populations at high risk of flame-related burns (Van Niekerk et al., 2006).

In the Western Cape, it was recently estimated that 44% of municipalities had at least 5% of their respective populations living in informal settlements (SSA, 2016). Children living in densely populated informal housing settlements currently represent the highest population of burn victims at RCH (Wesson et al., 2013). In overcrowded and small living conditions, the proximity of open flames, candles, and other heat sources to flammable material poses a hazard. Young children, especially toddlers, may be prone to grabbing at objects to steady themselves, coming into contact with cooking pots, kettles, heating equipment or candles, and harming themselves directly, or indirectly through contributing to a home fire which might have an impact on them (Van Niekerk et al., 2012).

The Fire Prevention Association of South Africa reported 1462 informal settlement fires in Cape Town in 2015 (PFSA, 2018), with such fires reported to result in at least 12 known deaths and hundreds of injuries in 2017 (Tswana, 2018). Investigations into these fires highlight challenges to the control and management of indoor fires and open flames. The lack of consistent electricity access and use within these settlements, sustains the use of 'traditional' energy sources such as paraffin, coal and firewood, and candles, the latter often a primary light source. These are common in poor households, especially those headed by older pre-electrification generations (Panday & Mafu, 2007).

The World Health Organization and other global and regional organisations have emphasised the importance of preventative measures, specifically for use with low income populations that bear the heaviest burden of burn-related morbidity (Forjuoh & Gielen, 2008). Such preventative measures should not only be injury and risk reductive, but should also be cost-effective and capable of reaching individuals at highest risk with relative ease (Peck, 2009).

Childsafe South Africa, a not-for-profit organization based at the RCH, has been active in trying to fill this intervention vacuum and has sought to reduce and prevent intentional and unintentional injuries of all severity through policy and community action and empowerment based on research, education and environmental change, with recommendations for legislation.

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Childsafe South Africa initiated the Safer Candle Project in 2005. It was inspired by the frequent observation of household fires in the informal housing districts surrounding Cape Town, especially those due to primitive or transitional energy sources such as paraffin candles. The primary objective of the Safer Candle Project is to provide an inexpensive, safe alternative to home candle use in homes with limited electricity access.

The preparation of this intervention involves a three-step process using common household items. A large glass jar (approximately 20 cm in height) is first thoroughly cleaned to optimize emission. The jar is then filled with sand up to one-third its volume. A 25 cm household candle is then cut in half, and embedded within the sand with the wick facing the opening of the jar. The candle is safely lit using the cut half of the candle, and the jar is placed where light is needed (Figure 1). At any point, should a child or someone else jostle the jar causing it to fall over, the flame is rapidly and safely extinguished by the sand surrounding the base of the candle.

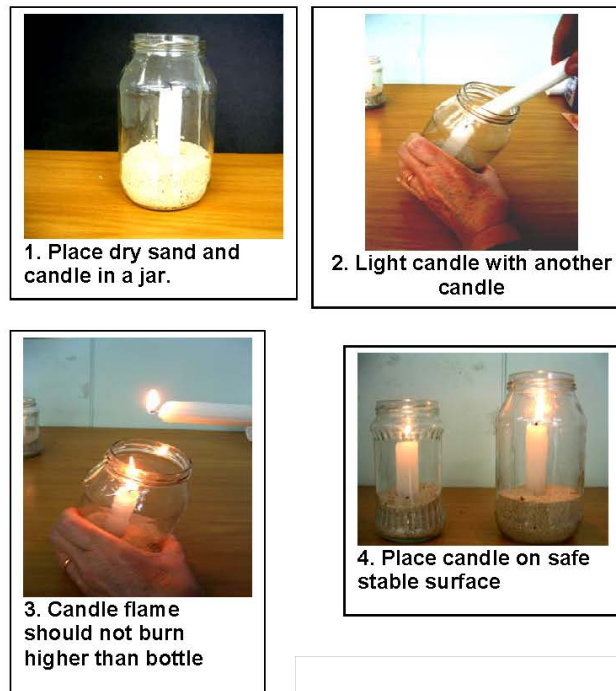


Figure 1. Section of informational leaflet demonstrating assembly of the Childsafe Safer Candle.

This innovative solution is not only affordable, but also provides safe and effective home illumination. If assembled properly, the sand provides a stable base for the apparatus and will safely extinguish the flame following any spill. The safety of the apparatus can be further enhanced by using larger diameter jars, which allow even quicker dissipation of any heat, further reducing the temperature of the glass and allowing for more comfortable handling.

Since its inception, the Safer Candle Project has administered a total of 11,835 Safer Candle kits to families throughout South Africa in addition to 6,800 educational leaflets in two languages, English and Xhosa.

The initial feedback from the families that use the Safer Candle supports the Safer Candle as an economical, safe and practical solution to household candle fires, potentially reducing the risk and incidence of burn injuries to at-risk children. The Safer Candle is cost effective, easy to assemble, and safe to handle, and offers an indigenous, culturally aligned innovation that is able to counter cost and accessibility barriers. It has the potential to play an important role in preventing fires in communities. The Safer Candle Project requires further objective data to quantify its impact, including the number of families regularly using this approach, and qualitative data that elaborates on its reported use and utility within informal settlement homes.

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