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Risk Factors to Childhood Burns in the New Juaben Municipality of Ghana

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Abstract
This study was conducted to gain understanding on the risk factors and how much each co-factor is contributing to childhood burns in the New Juaben Municipality of Ghana. This is to serve as the basis for future preventive Interventions. The mixed methods approach was used. Questionnaire was administered to consenting parents/ caretakers of children in the municipality. In addition, key informants interviews were conducted to determine the major risk factors and the underlying practices contributing to these threats. The results were derived from the quantitative and qualitative data gathered from 600 respondents and 24 key informants. It was found that poverty, poor relationship with the child, overcrowding at home, inadequate education on safety precaution and poor cooking behaviour were significant in influencing childhood burns while sex and age of the child and marital status of parents / caretakers were not significant in influencing childhood burns. Children from poor homes are 18.9 times more likely to be victims of burns and those living in overcrowded home are 9.3 times more likely to be victims of burns. To prevent childhood burns at home, interventions should be targeted at reducing household poverty and to increase the socio-economic status of parents / caretakers of children.
Keywords: Risk factors, threats, aetiology, causes of childhood burns.

Introduction

The high incidence of childhood burns is a major public health concern in Ghana due to the high rate of hospitalization, high cost of treatment, long period of recovery, the pain to endure and the fact that many are left with permanent disabilities (Budu 2005, MOH 2004 and Forjourh et al 1995). The 2012 report from the Reconstructive Plastic Surgery and Burns Centre of the Korle- Bu Teaching Hospital in Accra, Ghana indicates that out of the 9,859 fatal burns cases treated at the centre, children aged less than 10 years constituted 37% and were predominantly boys. In the Eastern region of Ghana, acute cases of childhood burns are also reported on regular bases at the Regional hospital with an average number of four admissions per week (Eastern Regional Hospital 2011 report).

Fig. 1 A picture showing one of the fatalities of childhood burns

Many studies in this area have attributed the high incidence of childhood burns among low-income communities to lack of proper education on situations that result in burns (Peck et al 2008, WHO 2008, WRCIP 2008 and Delgado et al 2002). It is however necessary to implement intervention that are sensitive to specific risk factors in order to reduce the burden of burns. To develop effective interventions call for thorough understanding of the risk factors and how they relate to the host, agent or the environment to cause childhood burns (Bishara et al 2008 and WRCIP 2008). Unfortunately, most studies on risk factors are limited to the socio-economic environment of the child leaving other equally important factors such as those that relate to the host (Age, sex and relationship with the child) and the agent: Thermal, mechanical, chemical, electrical and radiation energy (Mashereky et al 2010 and Poulos et al 2007). This paper examines the risk factors taking into consideration the agent, host and the environmental factors contributing to childhood burns in the New Juaben Municipality.

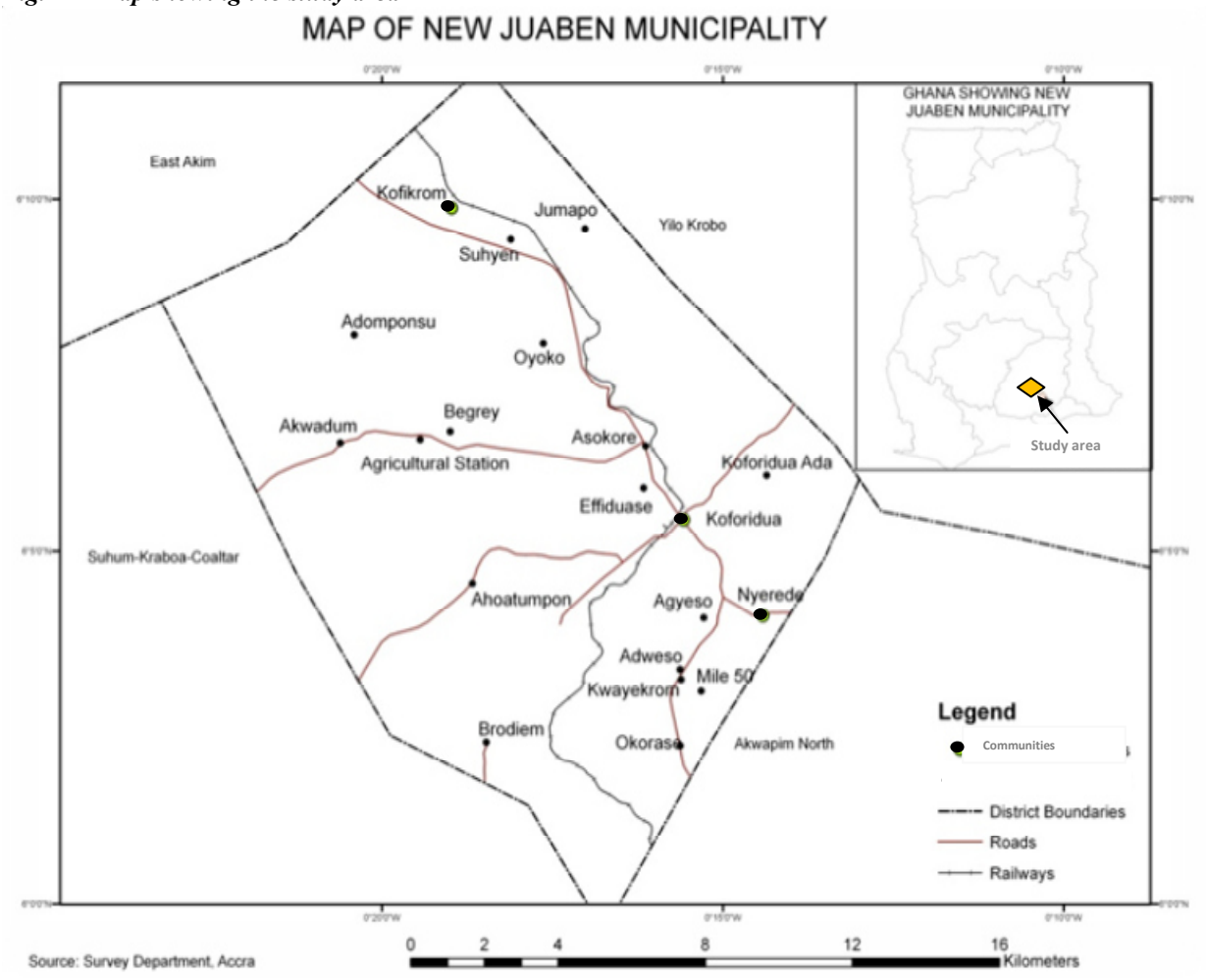
Methods

Study design and location

The study employed the mixed methods approach to collect data from parent/ caretaker of children and other key informant from October 2010 to July 2011. The study period was chosen to coincide with both the rainy and the dry season because people's behaviour and attitudes during these two seasons are known to influence burns situation at home (Delgado 2002).

The municipality is made up of 52 communities. It has a population of 183727 based on the 2010 national population and housing census. It covers an estimated area of 110 square kilometers and it is 85 kilometers away from the national capital Accra, through Accra Mamfe road. Most of the rural and the peri-urban communities have small population sizes that do not measure up to the threshold population of 5000 to quality for the provision of essential services such as police station, hospitals/clinics and higher institution of learning. Nevertheless, Koforidua, the regional and municipal capital performs most of the functions on behalf of the deprived communities. Thus has contributed to the influx of many people into the municipality in order to access such services.

Fig. 2 A Map showing the study area



The study sample and sampling strategies

The simple random sampling method was employed to select twelve out of the 52 communities in the municipality. After the selection of the communities, the simple random sampling method was employed again to select two Enumeration Areas (EAs) from each of the twelve communities selected. There is an average of five (5) EAS in each community. A total of twenty-five (25) parents were randomly selected from each EA to constitute a total sample size of six hundred (600) parents/caregivers used for the quantitative component of the study.

In calculating the sample size for the study, the Godden's (2004) formula for infinite population was used. The main assumption underlying the use of the formula is that the population should be greater than 50,000. The adult population for New Juaben Municipality from the 2010 Population and Housing Census was 83,018,

hence the use of the formula;

$$SS = \frac{Z^2(p) \times (1-p)}{C^2}$$

Where
SS = Sample size
Z = Z statistic for a level of confidence
P = percentage of population picking a choice expressed as decimal
C = Confidence interval, expressed as a decimal
Using the estimates of
Z = 1.96 for 95% confidence level
P = 0.5
1 – P = 0.5
C = 0.04

$$SS = \frac{3.8416 \times 0.5 \times 0.5}{0.0016} = 600$$

$$\therefore SS = 600$$

Data collection
Two main instruments were used for the data collection: a semi-structured questionnaire and an in-depth interview. The questionnaire was administered with question regarding the socio – demographic backgrounds of the parent/caretakers, and risk factors of childhood burns. Key informants interview, such as the parent whose children are on admission for burns and health professionals were interviewed on the circumstances leading to the occurrence, nature of injuries, and the risk factors influencing childhood burns. Pseudo names were given to the key informants for the sake of anonymity.

Data Analysis
Statistical analysis was performed using SPSS version 17. The bivariate and multivariate logistic regression was used to determine the strength of association between childhood burns and the presence of risk factors. The contributions of each co-factor were determined using the Wald χ^2 whiles the likelihood of occurrence of each co-factors was also examined using the Exponential Beta (odds ratio). All analyses were performed at 95% confidence interval.

Findings
As a first step, the significance of all the independent variables as a set was considered using the omnibus test of model coefficient and found that the set of variables was significant in predicting childhood burns (chi= 462.819, P=000 with 12 df). After the test, contributions of each individual independent variable to childhood burns were also analyzed. It was found that each independent variable used was significant in contributing to childhood burns as the variables fell within the confidence interval set. Even though all the independent variables for childhood burns were found to be significant, poverty, relationship with the child, overcrowding, education on safety precaution, and cooking behaviour, were found to be very significant as they all had a p-value of zero.

Using the Wald Chi-Square statistic to test the unique contributions of each independent variable to childhood burns, relationship with the child (49.604) was found to have contributed most significantly. This was followed by poverty (45.636), living in overcrowded home (40.560), education on safety precaution (39.4300 and cooking behaviour (17.075). Reasons to these significant risk factors have been given in the qualitative analysis which follows these survey findings.

The odds ratio (Exp (B)) values indicated that children from poor homes are 18.9 times more likely to be victims of burns. Children living in overcrowded homes are 9.3 times more likely to be victims of burns. Also children aged 0 – 4years are 3.0 times more likely to be victims of burns, while those aged 5-9years are 1.8 times more likely victims than those aged 15 – 17 years [Table 5.2a].

The Wald Chi statistic indicates that there is a linkage between the significant variables that is poverty, overcrowding, relationship with the child and education of parent. Literature also confirms this linkage (Delgado 2002 and WHO 2005). Based on this, there was the need to examine the association between poverty and the other co-factors in order to determine whether such association is statistically significant. The multiple linear regression was conducted and found that there was a statistically significant association between poverty and overcrowding (p – value = .000), poverty and relationship with the child (p – value = .000) and poverty and Education of Parents (p – value = .025).

It was further found that poverty was contributing 0.122 to overcrowding at homes, contributing 0.177

to low parental education and 0.029 to poor relationship with the child. The details are found in table 5.3.

A further test was conducted to check the accuracy of the variables used in the logistic regression in determining the likelihood of occurrence of childhood burns from the model. The classification table was used and found that the model makes a correct prediction of 77.8 of the time overall. Out of the 400 responses which indicated 'Yes' to the risk factors associated with burns, the model correctly identified 327(81.8%) of them as likely to be affected by the risk factors associated with childhood burns. Similarly, out of the 200 responses which indicated 'no' to the risk factors associated with childhood burns, the model identified 140(70%) of them as not likely to be affected by the risk factors associated with childhood burns. The details are presented in [Table 5.2b]

Table 5.2a Showing the Bivariate and Multivariate Logistics Regression on the risk factors associated with childhood burns in the New Juaben Municipality (N = 600)

Variable	Wald χ	Df	Sig.	Odds Ratio	95.0% C.I for EXP(B)	
					Lower	Upper
Sex of Child	.222	1	.637	.847	.425	1.688
Age of Child	4.346	3	.226			
Age(0 – 4)	4.341	1	.037	2.957	1.066	8.200
Age (5 – 9)	1.350	1	.245	1.802	1.802	4.862
Age (10 – 14)	1.628	1	.202	1.860	.717	4.824
Poverty	45.636	1	.000	18.877	8.049	44.270
Marital Status	2.389	3	.496			
Marital Status (Single)	.030	1	.863	.878	.199	3.868
Marital Status (Married)	.043	1	.836	.869	.229	3.289
Marital Status (Divorce)	.814	1	.367	2.188	.399	11.989
Education	9.171	1	.000	1.901	.142	13.021
Relationship with the child	49.604	1	.000	0.22	.008	.064
Overcrowding	40.560	1	.000	9.275	4.673	18.408
Education on safety precaution	39.430	1	.000	.117	.060	.228
Cooking behaviour	17.075	1	.000	.239	.121	.470
Constant	**2.949**	**1**	**.086**	**5.260**		

***Confidence Interval 95%** ***Significant if P – value < 0.05**

Classification table showing the percentage accuracy for risks factors for childhood burns

		Predicted		
		No. of cases		
Observed		Yes	No	Percentage Correct
No. of cases	Yes	327	73	81.8
	No	60	140	70.0
Overall Percentage				77.8

a. The cut value is .500

Table 5.3 Multiple linear regression showing the influence of poverty over other co – factors for childhood burns

Co - factors		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.465	.033		13.920	.000
	Overcrowding	.122	.009	.438	12.979	.000
	Education	.177	.020	.299	8.827	.000
	Relationship with Child	.029	.013	.075	2.241	.025

a. Dependent Variable: Poverty

Findings from the Odds Ratio and the Wald Chi – Square in table 5.2 are consistent with the finding of the qualitative data on the risk factor to childhood burns. The qualitative data also show the interrelationships between poverty and other variables in explaining the risk factors to childhood burns. It was observed that due to poverty, most parents and caretakers are constrained in giving proper care and supervision to their children. For instance, the inability to engage the services of a maidservant to take care of the children while the parents are out for work or the inability of some parents to enrol their children in pre-school. This often results in a situation where younger children are left to the care of older siblings and as a result of poor supervision, avoidable injuries occur.

The problems associated with overcrowding in most homes are as a result of the inability of some low-incomefamilies to rent or acquire spacious and descent accommodation. An interview with a parent revealed that overcrowding at home normally hinders implementation of safety measures, making children in such settings vulnerable to injuries. The parent remarked:

> *Hm, I feel very bad for housing my fairly large family in this small uncompleted apartment. I could not renew my tenancy agreement when it expired due to the exorbitant rent being charged by the landlord. As a result I was compelled to prepare two rooms in my uncompleted building to house my family there. I am not the only one confronted with such a problem. Two of my friends have also moved into their uncompleted building because of the high rent they have to pay. I am worried because I know of the safety hazards associated with keeping children in a congested and above all uncompleted building where children have easy access to the kitchen and hot items, but under this circumstance I have no option than to pray that nothing bad happens to my children.*

An interview with the Nursing officers in charge of the surgical wards of the Eastern Regional Hospital and Saint Joseph's Catholic Hospital both confirmed the situation of poor parental care and poverty. The nurses revealed that over 60% of the cases on childhood burns presented to their facilities were mainly due to avoidable causes associated with poor care and handling. This is what the Nursing Officer at the Regional Hospital had to say:

> *Almost all the cases presented for admission are second to third degree burns which have caused extensive damage to the epidermis and some part of the dermis. The worrying part, however, is that almost all the burn cases are due to negligence and improper care. I wonder why a mother would leave hot soup uncovered and in the reach of a toddler and go to attend to other things. It is regrettable that some children go through such ordeals due to their mother's negligence. The irony of the situation is that most of the affected children come from low-incomefamilies where it is difficult for most of such parents to pay for the health bills of the affected children.*

An interview with one of the mothers whose daughter was on admission for burns confirmed the Nursing Officer's claim of poor parental care and explained that it is not the wish of mothers to be irresponsible toward their children, but that there are circumstances beyond their control. She indicated that it is the wish of every mother that the child grows healthily, live in a well protected environment and have proper care and nurturing. However, according to her, most mothers are constrained by poverty. She recalled how she was unable to enrol her three year old daughter at a near-by nursery, and could also not carry her at her back each day while hawking. She indicated:

> *I have regretted leaving my three year old daughter in the care of my younger sister who could not take good care of her for the few hours I spent each morning selling my wares. If I*

were to have a little money to send her to the nursery, I do not think she would be in the house to suffer from such a burn.

The case of this mother and many others show how poverty and poverty related cases can contribute to childhood burns. There is therefore the need to address such concerns to reduce the incidence of childhood burns in the study area.

Discussion

Burns constitute one of the leading causes of morbidity and mortality among children in developing countries. Risk factors associated with childhood burns are often categorized into child-related, agent-related and environment-related (WRCIP 2008).

In the present study, poverty, relationship with the child, overcrowding, education on safety precautions, and cooking behaviour were all found to be significant risk factors, while sex and age of the child and marital status of parents / caretakers were not significant in influencing childhood burns. Earlier studies from both high-income and low-incomecountries on socio-economic profile of children, parents/caretakers of children as possible risk factors to childhood burns have reported mixed results. For instance, Hippisley-Cox et al (2002) reported a high incidence of burns among children in low-income groups in Sweden. It was found further that the relative risk of being hospitalized for burns was 2.3 times higher for children in poorer socio-economic groups than among those in the most prosperous group. Similar findings were made in New South West Wales in Australia (Poulos et al 2007) but lower than the reported rate in Lima in Peru since the people of Peru are classified among the poorest of the poor and are characterized with many shantytowns without the basic necessities of life (Delgado et al 2002). In the Ashanti Region of Ghana, however, Forjouh et al (1998) observed no significant differences between burn repeaters and non-repeaters based on socio-economic indicators. Notwithstanding Forjouh et al's findings, world reports maintain that childhood morbidity and mortality from burns are strongly associated with poverty (WHO, 2008; and WRCIP, 2008).

In the New Juaben Municipality, there is evidence that children living with parents of low economic status are at high risk of burns. This is based on the fact that the odds of having childhood burns in such a community are very high. For instance, Children from poor homes were found to be 18.9 times more likely to be victims of burns than children from affluent homes. This situation may be attributed to factors including lack or non-use of kitchen in most poor homes, a situation which compels most households in the study area to set open fire for cooking. In addition, mostor parents in the study area are unable to hire house help and as a result, children in such homes are left in the care of older siblings and thus expose them to injuries. This finding is in line with the finding of Delgado et al (2002) that the lack of kitchen in homes increases access of children to cooking areas and cooking appliances such as pot with hot liquids. This situation in the study area offers a clear avenue for household and community-based interventions to improve the awareness of the risk factors as well as to improve on the economic status of parents and caretakers.

Another key factor found influencing childhood burns is overcrowding. Living in an overcrowded home is a general phenomenon in most rural communities in Ghana and not exclusive to the study area as a result of the dominance of the extended family system (Nukunya 2003), high fertility rate (4.9) among rural communities (GDHS 2008) and the high housing deficit of 1,519,262 in Ghana as reported in the 2010 Population and Housing Census (GSS 2012). Children living in overcrowded homes were found to be 9.275 times more likely to suffer from burns. Inability of parents to afford to either rent or build spacious accommodation for the family is among the major factors of overcrowding in the study area. This creates congestion at home with its attendant problems. Degaldo et al 2002 and WHO 2008, have found strong association amongst cofactors such as economic status, type of housing unit, overcrowding and childhood injuries. They found among other things that children living in shanty communities found at the periphery of urban communities are the most vulnerable. Cleland 2002 suggests that in order to reduce fertility and poverty there should be an improvement in maternal education as a way of reducing vulnerabilities in children and improving their quality of life, in general.

A co-factor related to economic status is the relationship between the parents/ caretaker and the child. Results of the current study revealed that due to lack of economic opportunities in most of the rural communities, most parents have migrated to the nearby cities in search of jobs, leaving their children with grandparents or other family members. This implies that most children are not living with their biological parents and most often the quality of care and support needed for such children are compromised. The study found child care situations to be worse in households where the caretakers of children are advanced in age (over 70 years) since most of such caretakers find it difficult to supervise the children in their care. Again, girls living with their grandparents are made to cook earlier than those living with their biological parents, increasing the susceptibility of such girls to burns. This finding is similar to other findings which assert that the predisposition of children to burns increases when they are not the sons or daughters of the household head (Delgado 2002, Bishara et al 2008 and WRCIP 2008).

Furthermore, it was identified in the study that lack of education on safety precautions, and of improper cooking behaviours are significant risk factors to childhood burns. A factor most strongly related to these is the lack of educational campaign to increase awareness on fire safety among children of school going age and parents/caretakers. Burns prevention campaigns have been found to be of fundamental importance as traditionally, burns prevention efforts have leaned on public education which is also considered to be an effective tool to reduce burn injury risk (Razzak et al 2004). Educational institutions can be given this extra mandate to teach school children fire safety and burn prevention strategies since the teachers are already in contact with the children as suggested in Razzak et al's 2004 study.

The current study also found that the different age cohorts of children have different susceptibility levels, with children aged 0-4 years being the most vulnerable to burns. Earlier studies have also acknowledged age and the rate of development of a child to be major factors to childhood burns since burns in very young children often occur from a mixture of curiosity and improper coordination of motor activity. It was further found that in children under 4 years of age, the level of motor development does not march the child's cognitive and intellectual development and injury can thus occur easily (Nguyen et al 2008, WRCIP 2008). However, it was also found that in general, age is not significant in influencing childhood burns. This might be due to the restrictive practices adopted such as the practice of not leaving the child alone at home or keeping the young child at the back of a mother. The culture of entrusting the care and protection of children to responsible adults in indigenous rural communities might explain the underlying factor to this situation as espoused by (Nukunya 2008).

Contrary to expectation, it was found that the sex of a child is not significant in influencing childhood burns. An interview with some mothers indicated that after the age of four years, girls are more prone to burns than boys. This might be as a result of the cultural expectations of mothers to train girls in culinary skills at an early age. This gender difference among younger children has been observed in other injuries in children, and there have been suggestions on the need to sensitize parents and caretakers of children of the risk factors associated with socialization processes of boys and girls (Adesunkanmi et al 1998 and Delgado 2002).

Conclusions

The findings highlight how the major risk factors contribute to childhood burns. Poverty, poor relationship with the child, overcrowding at home, lack of education on safety precaution, and poor cooking behaviour were found to be significant in contributing to childhood burns. Other factors such as age and sex of the child, and marital status of parents /caretakers were not significant in influencing childhood burns. In terms of the unique contributions of each significant risk factor, poor relationship with the child had the highest influence, followed by poverty, overcrowding, lack of education on safety precaution, and poor cooking behaviour. The relationship between poverty and other co-factors were found to be significant and this provides relevant inputs for interventions at all levels since poverty reduction has far more reaching effects on childhood burns.

The finding that poverty is a major risk factor to childhood burns and given that the relationship between poverty and other cofactors increase the susceptibility of children to burns have important implications for programming. The New Juaben Municipality Assembly could ensure the effective integration of institutional, structural and sectoral interventions to reduce poverty in the municipality. In addition, they should ensure that specific actions needed to enable the poor share the benefits from growth, increase their capabilities and well-being and reduce their vulnerability to risk are achieved in order to improve the standard of living for the poor.

The Municipal Assembly in collaboration with NCCE could sensitize the poor to take advantage of poverty reduction interventions in the municipality. NGOs and faith-based organizations could also advice and support community members with low socio-economic status to lessen their economic burden.

The need to educate parents and school age children on the significant risk factors to childhood burns could be carried out by all socialization agents such as the schools, families, religious groups, NGOs and health institutions. Specific educational programmes targeting specific vulnerable groups such as children in the different age cohorts and parents with different socio-economic status are being recommended to the generalized educational programme. The School Health Education Programme (SHEP) could be strengthened and then mandated to include injury prevention and safety in their programme for in-school children.

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