1. INTRODUCTION

A burn is defined as an injury to the skin or other organic tissue primarily caused by thermal or other acute trauma. It occurs when some or all of the cells in the skin or other tissues are destroyed by hot liquids (scalds), hot solids (contact burns) or flames (flame burns). Injuries to the skin or other organic tissues due to radiation, radioactivity, electricity, friction or contact with chemicals are also identified as burns[1].

Human Immunodeficiency Virus (HIV) infection and Acquired Immunodeficiency Syndrome (AIDS) are a global and growing problem[2]. Zambia and other developing countries in the sub-Saharan region have been severely affected. Although only 12% of the world's population lives in this region, more than two out of three (67%) adults and nearly 90% of children infected with HIV live here. More than three out of four (75%) of global deaths due to AIDS-related illnesses in 2007 occurred in sub-Saharan Africa. AIDS is the largest cause of death in sub-Saharan Africa[2].

Zambia's first AIDS case was reported in 1984[3]. By 1985, 17.5% of hospital patients in Lusaka were found to be HIV positive. Zambia is among the countries with the highest HIV prevalence in Africa. At the end of 2006, UNAIDS/WHO estimated that 17% of people aged 15-49 years old in Zambia were living with HIV or AIDS. Children have been much affected by the AIDS epidemic in Zambia. In 2005, there were approximately 710, 000 children living with HIV/AIDS in the country[3].

Significant thermal injuries induce a state of immunosuppression that predisposes burn patients to infectious complications. Despite improvements in the early care of burn patients, systemic inflammatory response syndrome (SIRS), severe sepsis and multi-organ dysfunction syndrome (MODS) remain major causes of morbidity and mortality[4,5,6].

Infections are reported to be the main cause of death following burn injuries[7]. The most common sources of pathogenic microbes are the burn wound and the respiratory tract[8]. Gram-positive bacteria often colonize the burn wound within days after the thermal injury and Gram-negative bacteria follow after approximately one week[9,10]. Bacterial invasion into healthy tissue often results in septicaemia and high mortality[11,12]. The risk of spread into viable tissues and septicaemia is increased by immunosuppression[13,14,15].

Patients with serious thermal injury require immediate specialized care in order to minimize morbidity and mortality[16,17,18]. The survival rates for burn patients have improved substantially in the past few decades due to advances in modern medical care in specialized burn centres. Improved outcomes for severely burned patients have been attributed to medical advances in fluid resuscitation, nutrition support, pulmonary care, burn wound care, infection control practices and early excision and grafting[19,20,21]. However, many of these measures are not available in resource-limited settings. At the University Teaching Hospital (UTH) in Lusaka, Zambia, burn patients are managed in general surgical wards.

Burns can be minor injuries, which can be treated on outpatient basis without a strain on the hospitals' limited bed space and without the patient sustaining permanent disfigurement, dysfunction and even death. However, in some cases, burns can be a devastating form of trauma with patients requiring extended hospital admissions and specialized care in a burns unit, which is not available at the UTH. This results in lengthy and expensive occupation of hospital beds and in overstretching the already crowded wards.

2. LITERATURE REVIEW

Little is found in the literature concerning the treatment and outcome of patients suffering from HIV infection who are treated for burns. Current literature also provides little information on how to manage an HIV positive patient with burns severe enough to warrant hospital admission. In the literature reviewed, there are conflicting results and statements on the clinical outcome of HIV positive patients with burn wounds.

2.1. Worldwide

D Brett et al examined a registry of 31, 338 adult patients admitted with acute burn injury to 70 burn centres throughout the United States of America. They sought to determine whether and to what extent pre-existing medical comorbidities influence mortality risk and length of hospitalization in patients with acute burn injury[22]. This study concluded that a number of pre-existing medical conditions influence outcomes in acute burn injury. Patients with preburn HIV/AIDS, metastatic cancer, liver disease and renal disease have particularly poor prognosis[22]. In this study, not all patients were tested for HIV infection.

2.2. In Africa

T. Sjöberg and associates in Zimbabwe conducted a prospective study to assess the immune response in burn patients in relation to HIV status, clinical signs of sepsis and burn wound size[23]. Twenty burn patients and 10 healthy volunteers were included in their study. Six burn patients were HIV positive. Clinical signs of sepsis were observed in 10 patients. All patients had full thickness burns involving more than 10% of the total body surface area (TBSA). Patients under the age of 12 years were excluded from the study. The researchers found that CD4 counts were lower in burn patients compared to non-injured healthy volunteers, indicating that burn injury results in immunosuppression. HIV infected burn

patients had lower CD4 counts than HIV negative patients. Patients with clinical signs of sepsis had lower CD4 counts compared to patients without sepsis. There was no difference in the mortality rate or length of hospitalization between the patient groups[23]. Their conclusion was that burn injury, HIV infection and sepsis independently result in immunosuppression[23].

Similarly, J. James et al found that both HIV status and the total body surface area burned were independent predictors of CD4 count, supporting the notion that burns induce cellular immunosuppression. They evaluated 342 patients, including both adults and children, in a Malawi burns unit. Forty of the 342 patients tested positive for HIV (11.7%). They found that mortality was higher among HIV positive individuals and HIV positive patients were more likely to die from sepsis compared to HIV negative patients. They also found that HIV positive patients who did not develop infection or recovered from an episode of sepsis had similar hospital stay, need for skin grafting and graft take as HIV negative patients. There was no difference in pathogens cultured from wound swabs taken from HIV positive and negative patients. Patients with TBSA burned greater than 30% had nearly 100% mortality rates irrespective of HIV serostatus. But among patients with 10-30% TBSA burned, HIV positive patients compared to HIV negative patients were twice as likely to die in the hospital.[24].

In contrast, a study at the University of Stellenbosch in South Africa found no significant difference in the outcome between HIV positive and negative burn patients in terms of mortality or morbidity measures. Thirty-three patients formed the HIV positive study group. The study excluded patients below the age of 15 years. They concluded that a HIV positive patient, who suffers from a burn wound and has no stigmata of AIDS, should be treated similarly to an HIV negative patient[25].

2.3. In Zambia

Burn injuries are a common form of trauma in Zambia and are a significant source of morbidity and mortality. Review of the University Teaching Hospital (UTH) Male and Female Surgical Admission Ward records and Mortality and Morbidity Surgical Audits over a period of twelve (12) months, between 1st January 2007 and 31st December 2007, showed that 851 burns patients were admitted to the Male and Female Surgical Wards out of a total of 12, 746 admissions (6.6%). 492 (57.8%) of these patients were below the age of 5 years, 168 (19.7%) aged between 5-14 years and 191 (22.4%) above 14 years of age. Of these, 723 (85%) were discharged and 128 (15%) died (UTH unpublished data).

A comparative and prospective study on the early clinical outcome of HIV seropositive and seronegative surgical patients at the University Teaching Hospital in Lusaka by Odimba et al showed that untreated HIV infected patients stayed longer in hospital than the treated ones. They also found that HIV seronegative surgical patients had less wound infections and faster wound healing than the HIV seropositive patients[26].

3. STATEMENT OF THE PROBLEM

- Zambia has a high HIV/AIDS prevalence[3] and burn trauma is a common cause of admission to the surgical wards at the University Teaching Hospital (UTH).
- The department of surgery at the University Teaching Hospital is the catchment area for burns.
- HIV testing is not routinely done in burn patients admitted to UTH and sepsis is the most commonly reported cause of death (UTH unpublished data).
- No study has been done on the clinical outcome of burns in HIV positive patients in Zambia
- Studies done in other countries have reached conflicting conclusions regarding the association of HIV infection with burn morbidity and mortality[23,24,25].

4. STUDY JUSTIFICATION

- High HIV prevalence in Zambia, the large numbers of burn patients admitted to the UTH, and the conflicting conclusions in the reviewed literature make it necessary to study whether the clinical outcome differs between HIV positive and negative burn patients.
- There is little information in Zambia and in the world literature on these two conditions which both can cause immunosuppression. Information collected from this study can be used when establishing a standard burns management protocol at the University Teaching Hospital.

5. STUDY QUESTION AND HYPOTHESIS

5.1. Study Question

Does HIV infection influence the clinical outcome of burns at the University Teaching Hospital (UTH)?

5.2. Hypothesis

HIV positive patients with burn wounds have a higher in-hospital mortality than those who do not have HIV infection

6. OBJECTIVES

6.1. Main Objective

To investigate whether the clinical outcome of HIV positive patients with burns differs from those who do not have HIV infection at the University Teaching Hospital (UTH), Lusaka, Zambia.

6.2. Specific Objectives

6.2.1. To determine whether in-hospital mortality is higher in HIV positive patients than in HIV negative patients with burns.

6.2.2. To assess the prevalence of HIV infection among burns patients admitted to the University Teaching Hospital, Lusaka, Zambia.

6.2.3. To determine whether in-hospital HIV positive patients with burns are more likely to get wound infections than HIV negative patients with burns.

6.2.4. To correlate HIV serostatus, TBSA, age and burn wound infection with burn mortality

7. METHODOLOGY

7.1. Study Site and Duration

This study was conducted at the University Teaching Hospital (UTH), Lusaka, Zambia, Male and Female Surgical Admission Wards and all General Surgical Wards with burns patients from November 2009 to November 2010.

7.2. Study Design

This study was a Prospective Observational Cohort Study

7.3. Case Definition

In this study, a case referred to a patient with recent burns, i.e. burns less than 24 hours old. Burns were defined as an injury to the skin primarily caused by thermal or other acute trauma such as friction and were confirmed by history and examination by a doctor with the rank of registrar and above.

7.4. Inclusion criteria

- All patients admitted with recent burns (less than 24 hours old)
- Patients with burns with TBSA less than 45%
- Consented patients

7.5. Exclusion criteria

- Patients with old burns (more than 24 hours old)
- Patients with burns with TBSA above 45%
- Non-consented patients
- Patients with other medical conditions such as sickle cell disease, heart disease, renal failure, cancer or other chronic disease.

7.6. Sample Size

Using Open Epi epidemiologic calculator it was determined that the Sample size required was **434**.

Sample size was calculated on the following assumptions:

- The primary outcome of interest was mortality
- Using data from the Malawi study, the mortality in HIV positive people was 14% higher than those in HIV negative individuals (33% Vs 17%), James et al 2003[24]
- The power was 80%
- 95% confidence interval

A total of 452 patients with burns met the inclusion criteria and consented to be included into the study.

7.7. Study Protocol

7.7.1. Recruitment and Consent Process

452 patients presenting to the UTH Male and Female Surgical Admission Wards with recent burns, i.e. burns less than 24 hours old with TBSA less than 45% and below were recruited into the study.

A Study Information Sheet was given to the patient or guardian. For those unable to read, the contents were fully explained to them. After the contents of the Study Information Sheet were understood and all patient's (or guardian's) questions and concerns addressed, a written consent was obtained.

A study questionnaire was then administered. The questionnaire recorded the following information:

1. Socio-demographic data
2. How, when and where the patient was burnt and First Aid given to patient at the scene of the accident.
3. Past Medical and Drug History

Blood samples were collected for HIV serology after pretest counseling was done. For children under the age of 18 months, HIV DNA PCR was done to confirm the HIV diagnosis. Patients who tested positive for HIV had their results communicated to them and further HIV care was provided through routine hospital HIV/ART clinics. Patients whose test results came back negative and those who already knew their HIV status were also included into the study.

Baseline Full Blood Count (FBC) and CD4 counts were done on all HIV positive burns patients. Only FBC was done on HIV negative burns patients.

All HIV positive patients with recent burns were recruited as cases and all HIV negative patients were taken as controls. Patients were grouped by age, size of burn, depth and percentage of burn and this was controlled for. Patients were stratified by age to take those below 15 years and those above 15 years.

7.7.2. Follow Up

Patients were reviewed daily in the first week and then every other day after that and as need arose (e.g. as laboratory test results become available or if condition changed) while admitted in their respective surgical wards. During this review, the general condition of the patient, vital signs, wound healing progress, wound appearance, infection, urine output and other complications were noted and recorded. Wound infection was noted to have occurred when patients developed either fever, burn wound slough or change in burn wound appearance, wound discharge, pallor/anaemia, oedema or deterioration in general condition.

Patients were still under the care of the admitting surgical firm and the method of wound management was noted. The study did not interfer with the routine management of burn wounds by the respective surgical unit.
Specimen analysis was done in the UTH laboratories.

7.7.3. End Point

End of patient follow-up was when the patient was discharged from the hospital or when mortality occurred.

7.7.4. Data Collection

Data was collected on pre-designed Questionnaires and Admission Forms at the time of patient enrolment into the study on admission. Review of patients and review of

case notes and laboratory results was done whilst the patients were admitted to their respective surgical wards and the data was collected on pre-designed Follow Up forms.

7.5.5. Data Entry and Analysis

Data collected was entered into Epi data software and then it was exported to STATA 10 software for analysis.

There was qualitative and quantitative data obtained.

Descriptive data was analysed.

Primary outcome was mortality. Secondary outcome was wound infection rate.

HIV prevalence in burns patients was calculated.

Baseline characteristics of HIV positive and negative patients were assessed using Chi-squared test for categorical variables and student t-test for continuous variables.

In-hospital mortality and wound infection rates were calculated.

7.7.6. Study Limitations

Viral Load (VL) testing was not done due to financial constraints.

Non-standardized criteria for admission: some patients with minor burns were admitted and discharged rapidly.

Since there was no follow up of the patients after discharge, there is no data on those patients who might have had short-term outpatient deaths or wound infections.

8. ETHICAL CONSIDERATIONS

This research project involving human beings was approved by the Biomedical Research Ethics Committee of the University of Zambia (UNZA) (Assurance No. FWA00000338, IRB00001131 of IORG0000774).

All the study participants gave an informed written consent to be included in the study. Even after consenting to participation in the study, all patients were free to withdraw at any time.

HIV testing was only done after written consent had been obtained.

The study did not interfer with the standard routine management of burns patients by the admitting surgical firms.

Results obtained during the study that had an immediate impact on the patient's care were immediately communicated to the Unit doctors taking care of the patient.
The data collected was coded and the patients' identities were kept confidential
Access to the data collected was restricted and kept confidential.
All the study participants were treated with respect and dignity.
No patients were harmed in the study since the study was an observational one.
Compensation was not given to patients to avoid coercion.

9. RESULTS

Results from this study are presented under two headings: Pooled Results and Correlation Results.

The pooled results focus on the general demographics of all the cases studied.

9.1. Pooled Results (Table 1)

9.1.1. Sex Distribution

The total number of burn cases studied for analysis was 452 after the inclusion and exclusion criteria were applied. Of all the 452 burns patients studied, 256 (56.6%) were female and 196 (43.4%) were male representing a ratio of 1.3:1.

9.1.2. Age Distribution

The age range of the study participants was from 6 months to 71 years. 417 (92.26%) of the study cases were under the age of 5 years, 12 (2.65%) patients between 6 – 10 years, 4 (0.88%) between 11 – 15 years and 19 (4.20%) > 16 years. Demographic analysis revealed the mean age to be 2.7 [95% CI 2.10 – 3.32] with a median of 10.5 years

9.1.3. Burn Agents

Of the 452 cases studied, 389 (86.06%) were burnt with Hot Liquids (Scalds), 54 (11.95%) with Flames, 3 (0.66%) each with Chemicals, Electricity and Friction.

9.1.4. %TBSA

298 (65.9%) of the cases sustained 1 – 10% burns, 80 (17.7%) between 11 – 15%, 55 (12.2%) between 16 – 25% and 19 (4.2%) had more than 26%.

9.1.5. HIV Serostatus

Of the total 452 cases recruited into the study, 73 (16.1%) tested positive for HIV while 379 (83.9%) were HIV negative.

9.1.6. Burn Wound Infection

194 ((42.9%) of the study cases developed burn wound infection while 258 (57.1%) patients did not.

9.1.7. Outcome (Mortalities Vs Discharged)

Of the 452 cases studied 388 (85.8%) were discharged and 64 (14.2%) died.

Table 1: Pooled Results. Patient characteristics of 452 patients included in the study

Sex	Males	196	(43.4%)
	Females	256	(56.6%)
Age (years)	0-5	417	(92.26%)
	6-10	12	(2.65%)
	11-15	4	(0.88%)
	>16	19	(4.20%)
Cause of the burn	Hot liquids	389	(86.06%)
	Flames	54	(11.95%)
	Friction	3	(0.66%)
	Electricity	3	(0.66%)
	Chemicals	3	(0.66%)
TBSA (%)	1-10	298	(65.9%)
	11-15	80	(17.7%)
	16-25	55	(12.2%)
	> 26	19	(4.2%)
HIV Status	Positive	73	(16.1%)
	Negative	379	(83.9%)
Mean CD4% if HIV+		18.17%	
Wound Infection	Yes	194	(42.9%)
	No	258	(57.1%)
Outcome	Mortalities	64	(14.2%)
	Discharged	388	(85.8%)

9.2. Correlation Results

This section sets out to correlate and analyse the relationships between HIV status, burn wound infection, age, TBSA and mortality among the cases studied.

9.2.1. Correlation between HIV status and Mortality

Among the 73 HIV positive burn patients studied, 66 were discharged and 7 died. This translates into a 9.6% in hospital mortality rate. Of the 379 HIV negative patients 322 (84.8%) were discharged and 57 (15.2%) died **(Table 2)**. Statistical analysis using chi squares shows that this finding is not statistically significant (P = 0.221). The average CD4 percentage of the HIV positive burn patients who died was 21.23% while for those who were discharged was 17.83%.

Table 2: Correlation between HIV status and mortality

		HIV		
		N	**P**	**Total**
Mortality	**N**	322 (82.99%)	66 (17.01%)	388 (100%)
	Y	57 (89.06%)	7 (10.94%)	64 (100%)
	Total	379 (83.85%)	73 (16.15%)	452 (100%)

9.2.2. Correlation between HIV status and Wound Infection

Of the 73 HIV positive patients with burns, 44 (60.3%) developed wound infection whilst admitted in hospital while 29 (39.7%) did not **(Table 3)**. Statistical analysis shows that this finding is statistically significant (p = 0.001). The average CD4 percentage in HIV positive patients who developed wound infection was 18.88% while the average percentage for HIV negative patients with wound infection was 17.04%.

Table 3: Correlation between HIV status and Wound Infection

		Wound Infection		
		N	**Y**	**Total**
HIV	**N**	229 (60.42%)	150 (39.58%)	379 (100%)
	P	29 (39.73%)	44 (60.27%)	73 (100%)
	Total	258 (57.08%)	194 (42.92%)	452 (100%)

9.2.3. Correlation between Wound Infection and Mortality

A total of 194 (42.9%) patients developed wound infection. Of these 63 (32.5%) died while 131 (67.5%) were discharged **(Table 4)**. Statistical analysis shows that this finding is statistically significant (p = 0.000).

Table 4: Correlation between Wound Infection and Mortality

		Wound Infection		
		N	**Y**	**Total**
Mortality	**N**	257 (66.24%)	131 (33.76%)	388 (100%)
	Y	1 (1.56%)	63 (98.44%)	64 (100%)
	Total	258 (57.08%)	194 (42.92%)	452 (100%)

9.2.4. Correlation between Age and Mortality

64 study patients died. Of these 61 (95.3%) were below the age of 5 years. This translates to 17.1% mortality. In the 6 to 10 years age group, only one patient died (9.1%). There were no mortalities in the 11 to 15 years age range. Two patients (11.8%) above the age of 16 years died **(Table 5)**.

Table 5: Correlation between Age and Mortality

		Mortality		
		N	**Y**	**Total**
Age Range (years)	**0 - 5**	356 (85.37%)	61 (14.63%)	417 (100%)
	6 - 10	11 (91.67%)	1 (8.33%)	12 (100%)
	11 – 15	4 (100%)	0 (0.00%)	4 (100%)
	>16	17 (89.47%)	2 (10.53%)	19 (100%)
	Total	388 (85.84%)	64 (14.16%)	452 (100%)

9.2.5. Correlation between TBSA and Mortality

Of the 64 mortalities which occurred during the study, 2 (3.1%) had TBSA burns between 1 and 10%, 7 (10.9%) had 11 – 15% burns, 38 (59.4%) had 16 – 25 % and 17 (26.6%) had >26% burns.

Table 6: Correlation between TBSA and Mortality

		Mortality		
		N	**Y**	**Total**
TBSA	**1 - 10**	296 (99.33%)	2 (0.67%)	298 (100%)
	11 - 15	73 (91.25%)	7 (8.75%)	80 (100%)
	16 – 25	17 (30.91%)	38 (69.09%)	55 (100%)
	>26	2 (10.53%)	17 (89.47%)	19 (100%)
	Total	388 (85.84%)	64 (14.16%)	452 (100%)

9.3. Logistic Regression Analysis

Adjusted Odds Ratios for inpatient mortality for each of the variable in Tables 2 – 6.

9.3.1. **Table 7**. Logistic Regression of risk factors for death

	Odds Ratio	95%	C.I	P value
Age	0.97	0.86	1.10	0.64
Sex (M/F)	2.07	0.85	5.06	0.11
Hb	0.91	0.75	1.11	0.35
HIV Status (P/N)	0.59	0.16	2.19	0.43
%TBSA	1.52	1.38	1.66	<0.001

The Odds of death decrease by 0.97 for each year of age. This is statistically insignificant. On the other hand, the Odds of death increase by 1.52 for each 1% of body surface area burnt.

9.3.2. **Table 8**. Logistic Regression of risk factors for wound infections

	Odds Ratio	95%	C.I	P value
Age	1.03	0.99	1.07	0.09
Sex (M/F)	1.72	1.13	2.60	0.01
Hb	1.03	0.94	1.12	0.54
HIV Status (P/N)	2.47	1.42	4.29	0.001
%TBSA	1.13	1.09	1.17	<0.001

The Odds of wound infection increases by 1.13 for each 1% of BSA and by 2.47 in HIV positive patients. This is statistically significant ($p < 0.001$ and 0.001 respectively).

10. DISCUSSION

A total of 452 cases were recruited into the study and 73 (16.2%) of these patients tested positive for HIV while 379 (83.8%) were HIV negative. Wound infection occurred in 194 (42.9%) cases while 258 (57.1%) patients did not have any signs and symptoms of wound infection. Sixty four patients died (14.2%) and 388 (85.8%), were discharged.
The study sample was totally of black Africans and mostly of low socioeconomic status.

Sample

The study recruited 452 burn patients between November 2009 and November 2010.
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Age

The age range for the studied sample was from 6 months to 71 years. The median age was 10.5 years while the mode was 1 year.
417 (92.3%) were below the age of 5 years, 12 (2.3%) between the ages of 6 and 10 years, 4 (0.88%) between 11 and 15 years and 19 (4.20%) were above 16 years. When this data is compared to the anecdotal UTH data collected between 1st January 2007 and 31st December 2007, it shows that the majority of burns patients admitted to UTH are below the age of 5 years.

HIV Prevalence

According to a report by AVERT, 17.5% of hospital patients in Lusaka were found to be HIV positive[3]. In this study, 73 recruited cases were HIV positive out of a total of 452 patients. This translates to 16.2%. This shows that the prevalence of HIV in burns patients is essentially the same as in the general population.

HIV infection Versus Mortality

Of the 73 HIV positive cases in the study, 7 (9.6%) died and 66 (90.4%) were discharged. 379 patients were HIV negative with 57 (89.1%) mortalities and 322 (83.0%) discharges. Statistical analysis using chi squares shows that this finding is not statistically significant ($p = 0.221$ at 95% CI) proving that HIV status of a patient does not alter the outcome of burns in terms of mortality. This is in agreement with the study at the South African University of Stellenbosch[25].

HIV infection Versus Wound Infection

A total 194 patients developed burn wound infection. Of these 44 (22.7%) were HIV positive while 150 (77.3%) patients tested negative for HIV. 29 HIV positive patients did not have any signs or symptoms of wound infection. Statistical analysis shows that this finding is statistically significant ($p = 0.001$ at 95% CI). This indicates that among the cases studied at UTH, the occurrence of wound infection was higher in HIV positive patients than those who are negative. The reason for this could be due to the immunosuppression which occurs in HIV infection.

The researchers at the University of Stellenbosch similarly concluded that HIV positive patients had more infections but their analysis revealed that there was no statistical difference between the two groups[25]. In contrast, the study at the University of Malawi showed that the occurrence of sepsis was equal among HIV positive and negative patients[24].

Wound Infection Versus Mortality

Of the 194 patients who developed burn wound infection 63 (32.5%) died while 131 (67.5%) were discharged. Statistical analysis shows that this finding is statistically significant ($p = 0.000$ at 95% CI). This indicates that in patients studied at UTH with burn wound sepsis, mortality is more likely to occur than in those without sepsis.

Correlation of Age to Mortality

Sixty four of the study patients died. Of these 61 (95.3%) were below the age of 5 years. There were a total of 361 burns patients below the age of 5 years and of these 61 died. This translates into a mortality rate of 17.1%. In the 6 to 10 years age group, the mortality rate is 9.1% and 11.8% in patients above the age of 16 years. There were no mortalities in the 11 to 15 years age range. Only 4 patients in this age range were recruited into the study. Since the majority of burns patients are below the age of 5 years, this could explain the high mortality rate.

Correlation of TBSA to Mortality

Of the 64 mortalities which occurred during the study, 2 (3.1%) had TBSA burns between 1 and 10%, 7 (10.9%) had 11 – 15% burns, 38 (59.4%) had 16 – 25 % and 17 (26.6%) had more than 26% burns (See Table 6). This shows that, patients with large TBSA burnt (above 15% in this study) are more likely to die than those with lower TBSA.

Logistic Regression Analysis

Logistic regression analysis of risk factors for mortality shows that TBSA is a significant factor in the clinical outcome (mortality) of burns ($p = <0.001$) and this is confirmed by an odds ratio of 1.52. Odds of death increase by 1.52 for each 1% of burnt surface area. Similarly, the logistic analysis of risk factors for wound infections shows that TBSA and HIV infection are statistically significant factors ($p = <0.001$ and 0.001 respectively). The odds of wound infection increase by 1.31 for each 1% of burnt surface area and by 2.47 in HIV positive patients.

11. CONCLUSIONS

The majority of burns cases admitted to University Teaching Hospital are below the age of 5 years. 92.3% of patients recruited into this study were below age of 5 years. This is in agreement with the anecdotal data of 2007 (UTH) which recorded 57.8% of admitted burns patients below the age of 5 years.

There isn't much difference in the prevalence of HIV infection among burns patients in the study (16.2%) and the general population (17%).

The HIV status of a burns patient does not significantly alter the outcome of burns in terms of mortality. 90.4% of HIV positive with burns were discharged while 9.6% died. Statistical analysis shows that this finding is not statistically significant (P = 0.221 at 95% CI)

HIV positive burn patients are more likely to have wound infections than those who do not have HIV. This is most likely due to the immunosuppression which occurs in HIV infection.

Mortality is more likely to occur in burns patients with wound infection than in those without infection.

The highest mortality rates occur in burn patients below the age of 5 years. This is most likely due to the fact that children in this age group comprise the largest number of burns patients admitted to the University Teaching Hospital.

Burns patients with TBSA greater than 15% are more likely to die than those with TBSA less than 15%.

12. RECOMMENDATIONS

12.1. Considering the high prevalence of HIV and the fact that HIV positive patients are more likely to have burn wound infection and also that mortality is more likely to occur in burns patients with wound infection than in those without infection, it is recommended that all burns patients admitted to the University Teaching Hospital should undergo compulsory HIV testing as part of standard burn management.

13.2. A specialized Burns Unit, in a separate ward, needs to be established at the University Teaching Hospital. This is because, the high burn wound infection rate observed might also be due to the fact that burns patients are nursed in general surgical wards with other surgical patients. Surgeons, nurses and other supporting staff with specialized training in burn management also need to be employed.

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APPENDIX A

UNIVERSITY TEACHING HOSPITAL

Patient information sheet

A. TITLE

A PROSPECTIVE STUDY ON THE CLINICAL OUTCOME OF BURNS IN HIV POSITIVE PATIENTS AT THE UNIVERSITY TEACHING HOSPITAL (UTH), LUSAKA, ZAMBIA

B. PURPOSE

TO COLLECT INFORMATION ABOUT THE POSSIBLE OUTCOME OF YOUR (YOUR PATIENTS') CONDITION

Burns are a very common condition presenting to UTH. Burns can be minor injuries, which can be treated on outpatient basis with rapid recovery. But, in some cases, burns can be severe and result in complications, with the patient spending a long time admitted in hospital and sometimes even in death.

One of the most common complications noted in patients with burns is infection of the burn wounds. This can occur in patients with either small or large burn wounds.

Burns and HIV infection both reduce the body's immunity. This implies that patients with burns who are HIV positive may have more complications than those who are HIV negative.

Unfortunately, little is found in the literature concerning the treatment and outcome of patients suffering from HIV infection who are treated for burns.

It is for this reason that we have decided to learn whether or not the outcome of burns differs between those who are HIV positive and those who are negative in our environment (UTH). Results from this study will enable us learn how to manage patients with burns better.

Your participation in this study will be by answering a questionnaire of simple questions read to you by the doctor on duty. Further participation will be by samples collected from you (your patient) whilst admitted to UTH. These samples will be examined in the laboratory here at UTH at no cost to you at all. Whatever samples are collected and investigations done on them will always be explained to you. The tests to be done include an HIV test, CD4+ count (if HIV positive) and Full Blood Count (FBC). All laboratory results will be communicated to you.

All patients with burns who will consent to the HIV test will receive appropriate counseling.

Your identity and all test results will be kept strictly confidential.

Participation is voluntary. If you decide not to participate or to withdraw from the study at any time, your decision will be accepted and this will not interfer or influence further treatment of your (your patients') condition.

This study is expected to run from November 2009 to November 2010.

The Ethics Committee has approved this study.

If you have any questions not properly answered by the doctor attending to you and you need clarification, please call **Dr Mwinga Sheyo** on **097 7 659046** or the following member(s) of the Ethics Committee: **Chairperson, Biomedical Research Ethics Committee, Ridgeway Campus, P.O Box 50110, Lusaka. Telephone 256067. E-mail: unzarec@unza.zm**

NYANJA

CHIPATALA CIO PHUNZITSA ZA UMOYO (UTH)

Patient information sheet

A. MUTU WANKHANI

KUFUFUZA ZA ZILONDA ZAMOTO KU MUNTHU ALI NDI KADOYO KA HIV PA CHIPATALA CHA UNIVERSITY TEACHING HOSPITAL (UTH), LUSAKA, ZAMBIA

B. CHOLINGA

KUTOLA NKHANI ZIGATHE KUPEZEKA PALI MUNTHU ODWALA

Kupsa kapena zilonda zamoto zili kupezeka kwambili ku UTH. Kupsya kungakhale zilonda zing'ono zing'no zomwe zinga chilitsidwe mwamsanga kuli obwela kuchipatala tsiku ndi tsiku. Koma nthawi zina zilondazo zinkhala zazikulu kwambiri ndizovuta kwabasi kuliza maka-maka nja akhala nthawi itali muchipatala nthawi zina ngakhale kufa.

Chimodzi chodriwika chovuta kuli odwala zilonda zamoto ndi kuvulazidwa ndi zionda. Ichi chingatheke kuli odwala zilonda zing'ono-zing'ono kapenanso zikulu-zikulu.

Zilonda zamoto ndi kadoyo ka HIV zivulaza kulepetsa chitetezo chathupi. Apa chitanthauza kuti munthu ali ndi kadoyo ka HIV akhoza kuvuta kwambiri kupambama amene alibe kadoyo ka HIV.

Mwatsoka, zocepa kwambiri zipeleka zokhudza macilitsidwe kuchokela kumatenda amanthu wa HIV amene ali ndi zilonda zamoto.

Pa chifukwa cha ici taganiza zakuphunzira kufuna kupeza kapena pali kusiya pati pamunthu wa zilonda zamoto amene ali ndi kadoyo ka HIV ndi amene alibe HIV, kuni kuchpatala cha UTH. Zochokera mmaphunziro awa zingatithandize njira yochiritsila matenda amoto mwaubwino.

Pofuna kutengako mbari mumaphunziro awa, muyenera kuyankha mafunso yapafupi yomwe dotolo adzakuwelengerani yemwe ali pa nchito. Zinaso ndi kutengako mbari pakupimitsa mwazi kapena kuti magazi ndizina zocoka mthupi la odwala wanu amene ali m'chipatala ca UTH. Zimenezi zidzapimidwa kuno ku UTH popanda kulipira ndalama iliyonse. Zopezeka mchipimo zilizonse zidzafotokozedwa bwino kwa inu. Zopima zina ndi HIV, CD4+ kuona ngati mu mwazi muli kadoyo ka HIV. Ndipo kuonongeka kuli pati.

Zonse zidzafotokozedwa bwino kwa inu ndizina lanu ndizonse zopezeka pa cipimo ndiza chinsinsi basi.

Kutengako mbari ndi ufulu wanu. Ngati simufuna mungaleke nthawi ili yonse muli ololedwa. Ndipo mukatelo palibe cidzaletsa kusamalira odwala wamu m'cipatala.

Bungwe loyang'ana izi latsimikiza.

Ngati muli ndi mafunso omwe siyanayankhidwe bwino ndi odotolo, ndipo mufuna kumvetsa chonde tu tumilani pa lam'miya iyi dotolo **Mwinga Sheyo 097 7 659046** kapena bungwe talengeza pamwambapa: **Chairperson, Biomedical Research Ethics Committee, Ridgeway Campus, P.O Box 50110, Lusaka. Telephone 256067. E-mail: unzarec@unza.zm**

APPENDIX B:

CONSENT FORM

CONSENT TO PARTICIPATE IN THE PROSPECTVE STUDY ON THE CLINICAL OUTCOME OF BURNS IN HIV POSITIVE PATIENTS AT THE UNIVERSITY TEACHING HOSPITAL (UTH), LUSAKA, ZAMBIA

I have been asked to participate in the above research and give my consent freely and willingly by signing this form after reading and understanding the patient information sheet.

I understand that:

1. Participation is voluntary and that I am free not to participate or to withdraw from the study at any time. My decision will be accepted and this will not influence the continuing management of my (or my patient's) condition.

2. I have read (or) and understood the information that has been read to me in a language that I understand and have had all my questions answered to my satisfaction.

3. I am further aware that any information I divulge will be treated in a confidential manner and I will not be personally identified.

_____ _____

Signature or thumbprint of Patient Signature of Investigator

_____

Signature of Witness

Date: _____ Place: [ ] FSW [ ] MSW

N.B.: In case of any questions, please contact Dr Mwinga Sheyo, Department of Surgery, University Teaching Hospital (UTH), Lusaka. Tel 097-7-659046. Email: mwishe2000@yahoo.ca

NYANJA (Consent)

CHIPATALA CIO PHUNZITSA ZA UMOYO (UTH)

KUVOMERA KUTENGAKO KUFUFUZA ZA MAPHUNZIRO OKHUDZA MATENDA AMOTO KU MUNTHU ALI NDI MATENDA A KADOYO KA HIV KU SUKULU LALIKULU LA ZA UMOYO (UTH), LUSAKA, ZAMBIA

Ndapempedwa kutengako mbari kufufuza za nkhani ili pamwambapa. Ndikudzipeleka mwa ufulu posimdikiza papepala, kapena kusayina pambuyo pakuwelenga ndi kumuetetsa nkhani ya odwala.

Ndivetsa kuti:

1. Kutenga mbari ndi kudzipeleka, ndipo ndili ndi ufulu kuleka kapena kutengako mbari nthawi ili yonse. Maganizo anga adzaloledwa ndipo siyadzaletsa, cili cones pa zathandizo lamwe odwala wanga alandira kusintha ayi.

2. Ndawelenga ndikumvetsa nkani, yomwe kapena ya welengedwa kwa ine mucilankhulidwe comwe ndikumva ndipo mafunso nga ayankhidwa mokwanira.

3. Ndidziwa kuti nkhani ali yonse ndikamba idzasungidwa mwa cinsinsi, ndipo ine sindi dzawika konse.

_____ _____

Kusayina, kaya kudinda chala odwala Kusayina ofufuza

_____

Kusayina mboni

Tsiku: _____ **Malo: [ ] FSW [ ] MSW**

DZIWANI: Ngati pali mafunso chonde lembelani Dotolo Mwinga Sheyo, chigawo co ng'amba sukulu lo phunzitsa za umoyo (UTH), Lusaka. Lamya 097-7-659046. Keyala yakanema: mwishe2000@yahoo.ca

APPENDIX C

A PROSPECTIVE STUDY ON THE CLINICAL OUTCOME OF BURNS IN HIV POSITIVE PATIENTS AT THE UNIVERSITY TEACHING HOPITAL (UTH), LUSAKA, ZAMBIA

QUESTIONNAIRE

(Admission Medical History)

Date: _ _ / _ _ / _ _ _ _

1. SOCIO-DEMOGRAPHIC DATA

ID number: _____

Address: _____

Sex: **[ ] Female [ ] Male**

Date of Birth: _ _ / _ _ / _ _ _ _ Age at last birth day:_____

Level of education: **[ ] None [ ] Primary [ ] Secondary [ ] Tertiary**

Occupation: **[ ] None [ ] School [ ] Working**

Marital status: **[ ] Single [ ] Married [ ] Divorced [ ] Widow(er)**

Social habits: Drinks alcohol: **[ ] No [ ]Yes**

Smoking: **[ ] No [ ] Yes**

Immunizations Record:

Children's Clinic (Under 5) Card available? **[ ] No [ ] Yes**

Tuberculosis (TB) – BCG (at birth): **[ ] No [ ] Yes [ ] Unknown**

If **Yes**, when? **(date)**: _ _ / _ _ / _ _ _

Polio (OPV): **[ ] No [ ] Yes [ ] Unknown**

DPT-HepB-Hib **(Diphtheria, Whooping cough, Tetanus, Hepatitis B, Meningitis, Pneumonia & Hib)**:

[ ] No [ ] Yes [ ] Unknown

Measles: **[ ] No [ ] Yes [ ] Unknown**

Other immunizations:_____

Vitamin A supplementation: **[ ] No [ ] Yes [ ] Unknown**

Deworming done? **[ ] No [ ] Yes [ ] Unknown**

If **Yes**, date when last done: _ _ / _ _ / _ _ _ _

If Children's Clinic (Under 5) card is available, what is the direction of the line showing the child's growth (weight-for-age)?

[ ] Good [ ] Danger sign [ ] Very dangerous [ ] Unrecorded

2. BURN HISTORY

Burning agent: **[ ] Hot liquid [ ] Flame [ ] Chemicals**

[ ] Electricity [ ] Friction

Time when burnt: _____ hours

Time when seen/arrival at UTH: _____ hours

Duration of time from when burnt to admission to hospital: _____

Body areas burnt: **[ ] Head/neck [ ] Trunk [ ] Upper limbs**

[ ] Groin [ ] Lower limbs

History of closed space fire? **[ ] No [ ] Yes**

Anything given to patient or applied to burn wound at scene of accident?

[ ] No [ ] Yes

If **Yes**, what was given? **[ ] Milk [ ] Herbal/Traditional medication**

[ ] Egg [ ] Ash [ ] Sand [ ] Other

If **Other**, what was given or applied to the burn?_____

Was cool/cold-running water applied to the burn? [ ] **No Yes**

Was the patient well before the burn?[ ] **No [ ] Yes**

If **No**, what was the problem?_____

3. PAST MEDICAL AND DRUG HISTORY

Previous burn history? **[ ] No [ ] Yes**

History of HIV testing? **[ ] No [ ] Yes**

If **Yes**, HIV test results: **[ ] Reactive [ ] Non-reactive [ ] Unknown**

If reactive, is the patient currently on ARVs?

[ ] Yes [ ] No [ ] Unknown

If **Yes**, state how long the patient has been on ARVs

[ ] < 1month [ ] 1-6months [ ] >6months

Drug combination:
1. _____
2. _____
3. _____
4. _____

First/Initial CD4+ count: _____**cells/µl** **Date done:** _ _ / _ _ / _ _ _ _

%CD4+: _____ % **[ ] Never been done**

Last CD4+ count: _____ **cells/µl** **Date done:** _ _ / _ _ / _ _ _ _

%CD4+: _____ %

Last Viral Load: _____ **copies/ml** **Date done:** _ _ / _ _ / _ _ _ _

[ ] Never been done

WHO CLINICAL STAGING OF HIV/AIDS FOR CHILDREN (BELOW 15 YEARS) WITH CONFIRMED HIV INFECTION

Clinical Stage 1		Pulmonary tuberculosis	
Asymptomatic		Severe recurrent bacterial pneumonia	
Persistent Generalized Lymphadenopathy (PGL)		Symptomatic lymphoid interstitial pneumonitis	
		Chronic HIV-associated lung disease including bronchiectasis	
Clinical Stage 2		Unexplained anaemia (<8g/dl), neutropaenia (<0.5 x 10^9/lt) and/or chronic thrombocytopaenia (<50 x 10^9/lt)	
Unexplained persistent hepatosplenomegaly			
Papular pruritic eruptions		**Clinical Stage 4**	
Extensive wart virus infection		Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy	
Extensive molluscum contagiosum		Pneumocystis pneumonia	
Fungal nail infections		Recurrent severe bacterial infections (e.g. empyema, pyomyositis, bone or joint infection or meningitis but excluding pneumonia)	
Recurrent oral ulcerations		**Chronic herpes simplex infection (orolabial or cutaneous >1 month duration or visceral at any site)**	
Unexplained persistent parotid enlargement		Extrapulmonary tuberculosis	
Lineal gingival erythema		Kaposi sarcoma	
Herpes zoster		Oesophageal candidiasis (or candidiasis of the trachea, bronchi or lungs)	
Recurrent or chronic upper respiratory tract infections (otitis media, otorrhoea, sinusitis or tonsillitis)		CNS toxoplasmosis (after 1 month of life)	
		HIV encephalopathy	
Clinical Stage 3		CMV infection (retinitis or CMV infection affecting another organ, with onset at age > 1 month)	
Unexplained moderate malnutrition not adequately responding to standard		Extrapulmonary cyptococcosis (including meningitis)	

therapy			
Unexplained persistent diarrhoea (14 days or more)		Disseminated endemic mycosis (Extrapulmonary histoplasmosis, coccidiomycosis)	
Unexplained persistent fever (above 37.5^0C intermittent or constant, for longer than one month)		Chronic Cryptosporidiosis	
Persistent oral candidiasis (after first 6-8 weeks of life)		Chronic isosporiasis	
Oral hairy leukoplakia		Disseminated non-tuberculous mycobacterial infection	
Acute necrotizing ulcerative gingivitis or periodontitis		Cerebral or B-cell non-Hodgkin lymphoma	
Lymph node tuberculosis		Progressive multifocal Leukoencephalopathy	
		Symptomatic HIV-associated nephropathy or HIV-associated cardiomyopathy	

WHO clinical stage: _____

WHO CLINICAL STAGING OF HIV/AIDS FOR ADULTS (15 YEARS OR MORE) WITH CONFIRMED HIV INFECTION

Clinical Stage 1	**(tick)**	Unexplained anaemia (<8g/dl), neutropenia (<0.5 x $10^{9/}$lt), thrombocytopenia (<50 x $10^{9/}$lt)	
Asymptomatic			
Persistent Generalized Lymphadenopathy (PGL)		**Clinical Stage 4**	
		Recurrent non-typhoid salmonella septicaemia	
Clinical Stage 2		Visceral leishmaniasis	
Moderate and unexplained weight loss (<10% of presumed or measured body weight)		Invasive cervical carcinoma	
Recurrent respiratory tract infections (e.g, sinusitis, bronchitis, otitis media, pharyngitis)		HIV wasting syndrome	
Herpes Zoster		Pneumocystis pneumonia	
Recurrent oral ulcerations		Recurrent severe or radiological bacterial pneumonia	
Papular pruritic eruptions		Chronic herpes simplex infection (orolabial or cutaneous >1 month duration)	
Angular cheilitis		Extrapulmonary tuberculosis	
Seborrhoeic dermatitis		Kaposi sarcoma	
Fungal finger nail infections		Oesophageal candidiasis and/or candidiasis of the trachea, bronchi or lungs	
		CNS toxoplasmosis	
Clinical Stage 3		HIV encephalopathy	
Unexplained chronic diarrhoea (30 days or more)		CMV infection (retinitis or CMV infection affecting another organ)	
Unexplained persistent fever (intermittent or constant, for longer than one month)		Extrapulmonary cyptococcosis (including meningitis)	
Severe weight loss (>10% of presumed or measured body weight)		Disseminated endemic mycosis (Extrapulmonary histoplasmosis, coccidiomycosis)	
Oral candidiasis		Cryptosporidiosis	

Oral hairy leukoplakia		Isosporiasis	
Pulmonary tuberculosis (TB) diagnosed in the last 2 years		Disseminated non-tuberculous mycobacterial infection	
Severe presumed bacterial infections (e.g, pneumonia, empyema, meningitis, bacteraemia, pyomyositis, bone or joint infections)		Cerebral or B-cell non-Hodgkin lymphoma	
Acute necrotizing ulcerative stomatitis. gingivitis or periodontitis		Progressive multifocal Leukoencephalopathy	
		Symptomatic HIV-associated nephropathy or HIV-associated cardiomyopathy	

WHO clinical stage: _____

Any history of:

Malaria? **[ ] Yes [ ] No**

If **Yes**, how many times and when?_____

_____

Diabetes Mellitus? **[ ] Yes [ ] No**

If **Yes**, what was the last blood sugar level and what treatment is the

patient on? _____

Cardiac disease? **[ ] Yes [ ] No**

If **Yes**, what? _____

Kidney disease? **[ ] Yes [ ] No**

If **Yes**, what? _____

Cancer? **[ ] Yes [ ] No**

If **Yes**, what? _____

Epilepsy? **[ ] Yes [ ] No**

History of Surgical Procedures: **[ ] Yes [ ] No**

If **Yes**, What and when:_____

_____

APPENDIX D

A PROSPECTIVE STUDY ON THE CLINICAL OUTCOME OF BURNS IN HIV POSITIVE PATIENTS IN THE UNIVERSITY TEACHING HOSPITAL (UTH), LUSAKA, ZAMBIA

ADMISSION FORM

(Physical Examination)

Date: _ _ / _ _ / _ _ _ _

ID number: _____

HIV status: **[ ] Unknown [ ] Negative [ ] Positive**

Temperature: _____ ^{0}**C** Weight: _____ **Kg**

General condition: **[ ] Stable [ ] Ill-looking**

Hair changes **[ ] Yes [ ] No**

Skin rash **[ ] Yes [ ] No**

Lethargic **[ ] Yes [ ] No**

Thin/wasted **[ ] Yes [ ] No**

Dehydrated **[ ] Yes [ ] No**

Pallor **[ ] Yes [ ] No**

Jaundice **[ ] Yes [ ] No**

Cyanosis **[ ] Yes [ ] No**

Oral candidiasis/thrush **[ ] Yes [ ] No**

Lymphadenopathy **[ ] Yes [ ] No**

Nutritional Status: **[ ] Well-nourished [ ] Malnourished**

Respiratory system: Signs of respiratory distress: **[ ] Yes [ ] No**

Chest: **[ ] Clinically clear [ ] Crepitations**

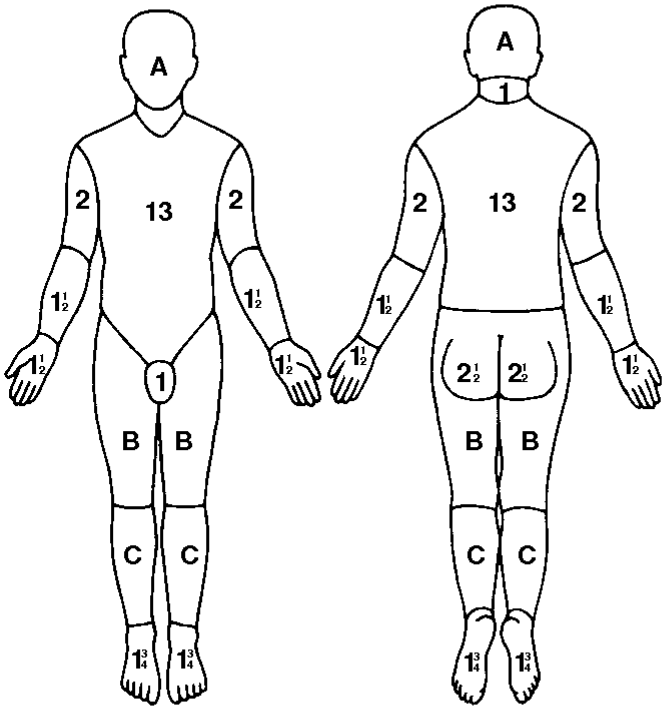
Body areas burnt and percentage (size):

A BURN CHART

NAME_____WARD_____NUMBER_____DATE_____

AGE _____

LUND AND BROWDER CHARTS



Ignore simple erythema.

Superficial

Deep

REGION	%
HAED	
NECK	
ANT. TRUNK	
POST. TRUNK	
RIGHT ARM	
LEFT ARM	
BUTTOCKS	
GENITALIA	
RIGHT LEG	
LEFT LEG	
TOTAL BURN	

RELATIVE PERCENTAGE OF BODY SURFACE AREA AFFECTED BY AGE

AREA	AGE 0	1	5	10	15	ADULT
A = 1/2 OF HEAD	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2	3 1/2
B = 1/2 OF THIGH	2 3/4	3 1/4	4	4 1/2	4 1/2	4 3/4
C = 1/2 OF ONE LOWER LEG	2 1/2	2 1/2	2 3/4	3	3 1/4	3 1/2

Burn wounds:
% TBSA: **[ ] 1-10%** **[ ] 11-15%** **[ ] 15 – 25%** **[ ] > 26%**

Any burns around the mouth and nose? **[ ] Yes** **[ ] No**

Any soot in mouth and/or nose? **[ ] Yes** **[ ] No**

Urine output: **[ ] Adequate** **[ ] Inadequate** **[ ] Nil**

APPENDIX E

A PROSPECTIVE STUDY ON THE CLINICAL OUTCOME OF BURNS IN HIV POSITIVE PATIENTS IN THE UNIVERSITY TEACHING HOSPITAL (UTH), LUSAKA, ZAMBIA

BURN WOUND FOLLOW UP

(Review)

Date: _ _ / _ _ / _ _ _ _ ID number:_____

Date of admission: _ _ / _ _ / _ _ _ _

Review No. (cross):

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**

HIV status: **[ ] Reactive** **[ ] Non-reactive** **[ ] Unknown**

Laboratory results:

- CD4+count: _____**cells/μl**
- Hb: _____**g/dl**
- M/C/S: Microscopy: _____
  Culture: _____
  Sensitivity: _____
- Others:_____

General condition: **[ ] Stable** **[ ] Ill-looking**

[ ] Afebrile **[ ] Febrile**

Feeding well	**[ ] Yes**	**[ ] No**
Well hydrated	**[ ] Yes**	**[ ] No**
Pallor	**[ ] Yes**	**[ ] No**
Oedematous	**[ ] Yes**	**[ ] No**
Vomiting	**[ ] Yes**	**[ ] No**
Diarrhoea	**[ ] Yes**	**[ ] No**
Passing urine	**[ ] Yes**	**[ ] No**

Number of times wound cleaned per day:

[ ] 1 [ ] 2 [ ] 3 [ ] More than 3

Cleaning material used:
[ ] Soap & N/saline only [ ] N/saline only [ ] Wet soaks only

[ ] Sodium Hypochlorite (Jik), N/saline & soap + Wet soaks [ ] Other

If **Other**, state cleaning materials or agents being used:_____

_____

Wound application:

[ ] Nothing [ ] Silver Sulphadiazine [ ] Paw paw

[ ] Honey/Sugar [ ] Other
If **Other**, state what is being applied to the burn wound:_____

_____

Wound appearance:

[ ] No change [ ] Clean and healing well [ ] Slough

[ ] Discharge [ ] Pale [ ] Colour change [ ] Other
If **Other**, state the appearance of the wound:_____

_____

General health of patient since last review:
[ ] Improving [ ] Same [ ] Deteriorating

Is the patient on High Protein Diet?: **[ ] Yes [ ] No**

Current medication:

[ ] Oral antibiotics [ ] IV antibiotics [ ] Topical antimicrobial

[ ] Oral fluids [ ] IV fluids [ ] Blood Transfusion(s)

[ ] Antimalarial [ ] Anticonvulsant [ ] Analgesia

[ ] Other:_____
Discharged: **[ ] Yes [ ] No**

Mortality: **[ ] Yes [ ] No**

Cause of death (as recorded in the patients' file or death certificate): _____

Date of mortality: _ _ / _ _ / _ _ _ _