

SOCIO-ECONOMIC COSTS OF INJURY IN THE DEVELOPING WORLD

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A. SUMMARY

Injury is a major cause of death and disability in both industrialized and developing nations. The ability of developing nations to decrease the impact of injury is hampered by restricted finances and by limited information. Vital registry data is frequently incomplete or nonexistent in developing nations, especially in rural areas, and hospital based data may not reflect population rates, as a large proportion of the population does not receive modern medical care. The broad objectives of this study will be to determine the burden resulting from injury in terms of mortality, morbidity and economic costs, and to determine the mechanisms of injury contributing the most to these burdens in both rural and urban populations in the developing world. Specific aims will be: (1) to obtain population based estimates of the incidence of injury in the city of Kumasi and the Berekum District in Ghana; (2) to estimate the direct costs of medical care for injury in these settings; (3) to estimate the morbidity costs due to injury, by estimating time lost from work or school; (4) to obtain estimates of the prevalence of major and minor permanent disability due to injury; (5) to estimate the overall incidence of injury related mortality. Estimates of the incidence rates in 1 - 4 will include rates for all injuries, for specific mechanisms, for specific age groups, and for specific anatomic regions of injury. The study will employ a population based survey using stratified, two stage, cluster sampling with probability proportional to size methodology. The data collection questionnaire will be delivered by trained research assistants in the vernacular language and will seek to ascertain injury related information over a one year recall period. The information from this study will be useful: (1) to prioritize injury among other, better studied, disease entities in the developing world; (2) to develop effective primary prevention strategies aimed at the mechanisms of injury leading to the largest social and economic burden; (3) to develop prehospital and hospital based systems of injury care aimed at the specific injuries leading to the largest social and economic burden.

B. RESEARCH DESIGN AND METHODS

1. *Overall study design.* The study will employ a population based survey using stratified, two stage, cluster sampling with probability proportional to size methodology [1, 2]. The population studied will be a rural district (Berekum) and a city (Kumasi) in Ghana. The study instrument will be a questionnaire administered in the vernacular language by research assistants who will be trained specifically for this study.

2. *Sites and institutions.* The study will be coordinated through the Department of Surgery of the University of Washington and the Harborview Injury Prevention and Research Center. Actual field work will be carried out in Ghana and will involve collaboration with two local institutions. For analysis of a rural population, the study will be based at the Holy Family Hospital in the Berekum district. This 200 bed institution is the only hospital in a district of 200,000 people. The hospital also functions as the headquarters for the Ghanaian Ministry of Health in the district. As such, it coordinates the activities of a network of rural health clinics, staffed by village health workers, nurses, and/or physicians assistants. The PI has previously worked as a staff surgeon at this hospital. He and collaborators have carried out hospital based research on injuries and their outcomes at this site [3, 4].

For analysis of an urban population, the study will be based at the University of Science and Technology (UST) in Kumasi, a city of 250,000 inhabitants. UST's hospital, the Komfo Anokye Teaching Hospital, has 1200 beds and is the main hospital for acute care problems, including injury, for the city of Kumasi.

3. *Study instrument.* The survey will employ a questionnaire which will ask participants to recall injury related events over a one year period. The survey will be restricted to injuries which prevent a person from doing their daily activities for at least one day or for which paid treatment was sought [5]. Answers to the following questions regarding injury will be sought:

1. Was anyone in the household injured in the past year? If so, whom: sex, age, occupation.

2. When did it happen? e.g. time of day, season.
3. Where did it occur? e.g. (i) type of location, such as major paved road, secondary dirt road, at home, farm, etc; (ii) exact geographic location if remembered.
4. What was the mechanisms of injury? e.g. motor vehicle crash, pedestrian, bicycle, fall, burn, penetrating (including firearm and cutting instrument), blunt assault, other. If penetrating, what was the intent?
5. What activity was the victim engaged in at the time of the injury? e.g. working (what specific activity), playing (if child), cooking, riding or driving a motor vehicle, assault, etc.
6. What part of the body was injured? (Description of actual injury in respondents own words, to be categorized by specific checklist.)
7. How was the injury treated, by whom (e.g. traditional healer, village health worker, modern hospital) and with what delays? If the injured person was treated at a modern hospital, were they hospitalized, and if so, for how long? For all injuries for which treatment was sought, how much was spent out of pocket?
8. What was the outcome? e.g. mortality, disability - both temporary or permanent. What was the socioeconomic impact - how much time was lost from work or school. If someone else was required to care for the injured person during the time of disability, how much of their time was utilized? Potentially permanent disability will be categorized as to major or minor by the scale developed by MacKenzie et al [6].
9. Does anyone currently living in the household have a major permanent disability which resulted from a traumatic injury? If so, how old are they, how old were they when they sustained the original injury, what was the original mechanism of injury, and in what way are they now disabled? (This will pertain to all such disabilities, whether they occurred during the one year period of the study or earlier.)

The questionnaire will be pilot tested prior to creating its final form for the study itself. The recall period of one year has been found to be a reliable period for major events in health surveys in developing nations [7]. Moreover, as injury is usually a well defined event in comparison to medical diseases, health surveys have been found to be a reliable means of gathering data on both fatal and nonfatal injuries [7]. As a large number of illnesses and injuries in Africa may be treated by traditional healers, who are outside of the modern health care system, question "7" above includes costs of treatment by anyone whom the injured patients had to pay. In Ghana, there is virtually no third party medical insurance. Families pay almost all expenses for medical care out of pocket. While treatment costs of minor injuries may not be accurately remembered, major treatment costs represent a considerable financial burden and are likely to be remembered fairly accurately.

As a back check on the quality of the data, the records of those patients who were hospitalized at the Holy Family Hospital or at the Komfo Anokye Teaching Hospital will be evaluated for details of their injuries and for the charges for the hospitalization.

4. *Logistics.* For field workers, the study will seek paid volunteers from the student bodies of the medical school in Kumasi and the nursing schools located at each hospital. This will give a pool of medically sophisticated individuals bilingual for English and the vernacular. Pay will be the same as for a fully trained nurse or house officer in these locations: \$4-5 per day. With transportation expenses, estimated costs will be \$12 per person-day. Field workers will work in pairs. It is estimated that each pair will be able to survey 30 people per day or \$0.80 per person surveyed.

5. *Sample selection.* The study will employ two stage cluster sampling, with clusters selected using the probability proportional to size (PPS) method. In the PPS method, villages and/or neighborhoods to be sampled are listed by their populations. A "sampling interval" of K people is selected based on sample size calculations. Villages to be sampled are then systematically selected (first stage) at every K interval of population. A cluster of individuals or households are then randomly selected (second stage) from each of the villages or neighborhoods chosen in the first stage. The World Health Organization's Expanded Programme on Immunization uses the PPS method to assess immunization status in developing nations. It has been found to provide the necessary statistical precision while minimizing expenditures of

person-time in the sampling process [1, 2]. In the proposed study, the rural district and the urban area will serve as separate strata. In each village/neighborhood selected in the first stage, a cluster of 30 individuals will be sampled in the second stage.

6. **Sample size.** Sample size calculations are based on the formula:

$N = 4z^2 P (1-P) D / W^2$, where z = the standard normal deviate for alpha where $(1-\alpha)$ is the confidence level (for all subsequent calculations alpha = 0.05, confidence level = 95%, and $z=1.96$); P = the expected proportion of individuals sustaining injuries during the recall period; W = the total width of the confidence interval; and D is the "design effect" of the cluster sampling, which for the proposed method is considered 2.5 [1, 8].

Incidence rates of total injuries have been reported at 23,986/100,000 /year in the USA with 990/100,000/year resulting in hospitalization, and 60/100,000/year resulting in death [5]. Assuming roughly similar rates in the population under study and with a sample size of 12,500, the proposed study would be powered to make the following estimates at the 95% confidence level:

the incidence of overall injuries at:	24,000±2,400/100,000/year
incidence of more serious injuries at:	990±170/100,000/year
lowest mechanism, age, or anatomic specific rate estimated at ±50%:	300±150/100,000/year
mortality at:	60±50/100,000/year.

7. **Analysis.** Incidence rates will be expressed using 95% Confidence Intervals (CI) [9]. CI will be calculated using variances estimated as appropriate for cluster sampling with: $\text{Var}(P) = (1/m(m-1)) \sum (P_i - P)^2$, where P =the estimated proportion injured for the overall sample; P_i =the proportion injured for each cluster; and m =the number of clusters [10]. Rates will be calculated as number of individuals sustaining any injury (hence proportion) and as the actual number of injuries sustained per year (listing each injury per individual as a separate occurrence) per person time at risk in the sample. Incidence rates will be calculated as number of injuries per 100,000 persons per year for the survey sample as a whole, for Berekum and Kumasi strata separately, for specific mechanisms of injury, for specific age groups, and for specific anatomic region of injury. Anatomic region of injury will be categorized based on the groupings of the 1990 Abbreviated Injury Scale: head, face, neck, chest, abdomen, extremity (upper and lower), and skin [11]. Due to the relatively low rate of fatal compared to nonfatal injuries, an overall incidence of injury related mortality will be estimated, but not mechanism, age, or anatomic region of injury specific rates.

Costs of injury. Estimates of the cost of injury will include: (a) Direct cost of treatment for the recall year, as noted above; (b) Indirect acute morbidity costs for the recall year using time lost from work or school on the part of the victim [5, 12]; (c) Indirect person time lost from work or school on the part of people who care for the injured person. Each of the above variables will be regarded as a continuous variable. Direct out of pocket medical costs per patient will be expressed as mean per injury event and mean per base population (with 95% CI) [9]. These measures will be estimated for the survey sample as a whole, for Berekum and Kumasi strata separately, for specific mechanisms of injury, for specific age groups, and for specific anatomic region of injury. Calculations of costs per base population per year will give an indication of which mechanisms are contributing the most to overall economic costs of injury treatment. Calculations of costs per injury event will give an indication of which mechanisms are most costly in and of themselves. Similar analyses will be applied to time lost from work or school on the part of the injured person and time costs of those caring for injured individuals.

Injury related disability. Due to the expected low incidence of injuries resulting in permanent disability, data will be collected on all interviewed subjects who have an injury related disability regardless of when the original injury occurred. These will be classified into major or minor based on a modification of the scale developed by MacKenzie et al [6]. This will give a point prevalence of disability due to injury. This will be expressed as a proportion of all individuals surveyed (with 95% CI). Point prevalences will also be calculated by major and

minor disability, by Berekum and Kumasi strata, by specific mechanism of injury, by anatomic region of injury and by age group.

Care of the injured. Utilization of health services will be categorized as to traditional, modern, or both. The proportion of injury events for which each of these types of health services was utilized will be estimated. These analyses will be repeated for more "severe" injuries alone, defined as those injuries for which the individual was not able to resume usual activities for 1 week. For injured people who utilized modern health services, mean time from injury to initial treatment will be estimated. All estimates will be obtained for the survey population overall, for Berekum and Kumasi strata, by mechanism of injury, by age group, and by anatomic region of injury.

Evaluation of effects of recall bias. Due to the relatively long recall period of one year, there may be some memory decay which would decrease the reporting of less serious injuries occurring a longer period of time before the survey date. In a study of recall of nonfatal injuries in children, Harel et al found a decline in reported rates of injuries from 24 per 100 for a one month recall period to 15 per 100 for a 12 month recall period [13]. The decline was most notable for minor injuries and was minimal for injuries which resulted in a loss of at least one school day or required surgery or hospitalization. It is anticipated that the definition of injury used in the proposed study will select somewhat more serious injuries for which there will be less of a memory decay. To assess the degree to which memory decay may effect the study results, incidence of reported injuries will be graphed vs recall period rounded to the nearest month. If a decline of greater than 20% is found, similar analyses will be applied to mechanism specific rates, region of injury specific rates, and rates by age categories.

C. SIGNIFICANCE OF RESEARCH.

The majority of the human race live in developing nations. In these nations, infectious diseases have traditionally been the major cause of death in all age groups. This pattern has changed in nations where public health measures have decreased the incidence of infectious diseases and where industrialization and increased motorized transportation have increased the incidence of injury. Injury is now the leading cause of death for ages 1 - 44 in many of the more advanced developing nations, including Taiwan, Mexico, Thailand, and parts of China [14].

In the least developed nations of the world, including Africa and parts of Asia, information on causes of death is often limited. Many, perhaps even the majority, of ill or injured patients never receive formal medical care. Vital registry data are usually incomplete with a minority of cases of any cause of death being reported to the government [14]. What information does exist shows infectious diseases continuing to predominate in overall mortality rates because of their high toll among children. However, even in these settings, injury is often a leading cause of death among older children and adults [15, 16]. Injury has been variably reported to account for 8% to 24% of deaths in the 15 - 44 year age group in different African nations, thus making it the first to the third most common cause of death in this age group [15]. Whether injury or infectious diseases are the leading cause of mortality in young adults, actual rates of death due to injury are often higher than in industrialized nations. Injury related mortality rates of 30 - 140/100,000 per year have been reported in various developing nations, in comparison to 60/100,000 per year in the USA [5, 14].

The impact of injury is only partially reflected by mortality rates. Permanent and temporary disability as well as economic costs must also be considered in the evaluation of the effects of this disease. However, information on disability in developing nations is even more deficient than mortality data. In an effort to estimate the burden of both death and disability due to various disease entities, The World Bank has devised a weighting system incorporating both years of potential life lost due to death and years of healthy life lost due to varying degrees of disability. Using this system, The World Bank estimates that 12% of the total "disability adjusted life year" losses world-wide are the result of injuries. In comparison, Acquired Immunodeficiency Syndrome, which has received more attention worldwide, contributes 4% to the total disability adjusted life year losses worldwide [17].

Data on economic costs of injury have been virtually nonexistent in developing nations. In one of the few studies on this topic, deCodes et al found that the indirect costs of illness in rural Brazil were 16 times the direct costs, in comparison with a ratio of 2.5 to 1 in the USA. Injuries contributed more to indirect costs of illness than any other disease entity in deCodes study [12]. Because injury related death and disability primarily affect young adults in their prime working years, the loss of economic potential to the nations involved can be considerable. The loss to the injury victims families can be even more profound, as most developing nations do not have social welfare systems [14].

Efforts to diminish the toll of mortality and morbidity from injuries in developing nations are hampered by lack of information. Even when fairly complete vital registry data exists, there is often little information on specific mechanisms, risk factors for injury, high risk groups, and incidence rates for all injury, including nonfatal injuries. The lack of knowledge about injury, its risk factors and its attendant mortality and disability is most profound for Africa, the least developed continent [14, 15].

Pilot hospital based studies undertaken by the PI in the Berekum district in Ghana [3, 4] showed motor vehicle accidents to be a major cause of injury related mortality (32% of injury related admissions and 30% of injury related deaths), with head injuries being the most common fatal injury (22% of injury related admissions, but 62% of all injury related deaths). Potentially permanent disability was found in 19% of injury survivors and was most frequently caused by motor vehicle accidents (26% of disabling injuries), burns (13%), and farming related injuries (14%), with extremity injuries being the most common disabling injury (66% of disabling injuries). Areas for potential injury prevention work were identified as childhood burns, agricultural injuries, and injuries to pedestrians and bicyclists, which constituted 25% of motor vehicle related injuries. Contributing factors to poor injury care included long delays in presentation and lack of prehospital care, suggesting these to be areas in which injury care could be improved with low cost investments. The reliability of these data were limited by the fact they were hospital based in an area where the majority of the population probably do not receive hospital based care [3, 4]. Similar findings and limitations have been reported in the few other hospital based studies on injury in Africa [16, 18, 19].

Population based studies, such as the one currently proposed, are needed to more accurately delineate incidence rates of injury in the overall populations in such areas, as well as to assess the impact of different mechanisms of injury in terms of morbidity and economic costs. The information from this study will be useful in planning health services and prevention efforts in developing nations for the following reasons:

1. Priority setting in health policy. Estimates of the overall incidence of injury, of the human costs from permanent disability, and of economic impact as reflected by time lost from work and cost of treatment will help to prioritize injury among other disease entities which have been more extensively studied in developing nations.

2. Primary prevention. Many developing nations can afford to spend only \$2 to \$3 per capita per year for health care, in comparison with \$3,000 in the USA [20]. In light of such limited finances, prevention is the most likely cost effective method to approach the problem of injury. In order to address what prevention strategies are needed in developing nations, data is needed as to which mechanisms of injury contribute the most in overall number of injured patients, mortality, disability and economic losses.

3. Prehospital care. Above mentioned hospital based data from the Berekum district showed long delays in presentation to the hospital and lack of prehospital care. Data on geographic location of injuries are needed to help design effective ways of delivering prehospital care within the financial constraints of the developing world. For example, if the most frequent mechanism of injury were motor vehicle injuries occurring along major roads, limited investments in ambulances and telecommunications would be cost effective. If, instead, farming related injuries occurring in widely scattered locations were more common, the most cost effective measures might include increased training of village health workers in early trauma management.

4. Hospital based trauma care. Hospital based data from Berekum as well as from other similar locations indicate a predominance of burns and extremity injuries, with the latter being a major source of disability [3, 4]. Data are needed as to whether these are the needs of the population as a whole. If improvements in prehospital care result in a different spectrum of injuries being delivered to the hospitals (e.g. that spectrum more reflective of injuries in the population at large), planning for increased and/or different utilization of hospital resources would be necessary.

5. Rehabilitation. Very little has been written on the topic of disability in the developing world. In order to plan even rudimentary rehabilitation services, estimations of population wide needs are necessary.

D. REFERENCES

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I. SAMPLING INFORMATION

1. Village/cluster code # _____
2. Which household surveyed within that cluster _____
- 2A. Identifying information for the household _____
3. Which individual surveyed ___ out of how many total injured persons surveyed ___ in that household
4. Which injury ___ out of how many total ___ for that individual.
Separate form to be used for each injury event.

5. Date _____
6. Interviewer _____

II. HOUSEHOLD DENOMINATOR INFORMATION

7-10. How many people live in this household and what are their ages, sexes, and occupations? Record number of individuals in household by age and sex. Write ages as exactly as possible, but at least by 5-10 year grouping. For each individual aged >5, write their occupation. Use occupations from question 16 below as a guideline if necessary.

7. Age	8. M/F	9. Present	10. Occupation	7. Age	8. M/F	9. Present	10. Occupation
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____
7. _____	8. _____	9. Y N	10. _____	7. _____	8. _____	9. Y N	10. _____

III. DID ANY INJURY OCCUR?

11. Have you or any member of your family who live in this house (spend at least 6 months per year living in this house) had any type of injury within the last year? Please limit your comments to those injuries which prevented the victim from carrying out his/her normal daily activities for at least one day or for which you paid for any type of treatment. (Also ask if anyone in the household had tetanus in the past year). *If so, for any of these please check here _____ and get information on Sections III - VIII.*

Has anyone who lived in your household died from an injury or from tetanus within the last year? *If so, indicate injury _____ or tetanus _____ and get information on Sections III - V and VIII. If the deceased survived long enough to get treatment, also answer Section VI. Also, for expired cases, answer: (12. Were the remains of the deceased taken to a morgue before burial? Y N).*

Is there anyone living in your household who has a permanent disability as a result of an injury? *This applies to any permanent disabilities which have occurred from injuries occurring any time in life up to one year ago. If so, check here _____ and get information on Sections III - VIII.*

If no to all of these questions, make sure to get information for section #II (Household Denominator).

13. A. Respondent B. Surrogate (injured person present) C. Surrogate (injured person absent)

14. Age _____

15. Male or female _____

16. What was his usual job or activity?

- A. Employment for cash (or wages) - if so what type of work? _____
- B. Trading
- C. Subsistence farming
- D. Cash farming
- E. Housekeeping
- F. School
- G. Other (specify) _____

IV. DETAILS OF WHEN, WHERE, AND HOW THE INJURY OCCURRED

17. On what date did the injury occur? (as accurately as possible, but at least the season or month and the day of the week). _____ Day of week? _____

18. At what time did the injury occur? (as accurately as possible, but at least day vs night) _____

19. Where did the injury occur (respondent's own words): exact geographic location if possible, otherwise type of location?

20. Circle one:

A. Home - inside

B. Home - outside

C. Other building (Specify _____)

Road - D. paved

E. unpaved

Intersection - F. paved

G. unpaved

H. Farm

I. Other (Specify in #19 above).

21. How did it happen? (respondents own words)

22. Circle one:

Transport related:

A. Motor vehicle crash

B. Motorcycle crash

C. Pedestrian

D. Bicycle

E. Other (specify) _____

Burn:

F. Fire

G. Scald

H. Other (specify) _____

Penetrating:

I. Stab/slash - accidental

J. Stab/slash - intentional

K. Gunshot wound - accidental

L. Gunshot wound - intentional

M. Assault - blunt:

N. Fall

O. Snakebite

P. Other: describe

23. Was the injury occupational:

No

Yes - agricultural

Yes - Non-agricultural (specify _____)

24. Was the injury suicidal in intent? Y N

25. If the victim was injured in or by a motor vehicle, what type of vehicle was involved? (This should include type of vehicle involved in knockdowns/pedestrian injuries). Circle all that apply:

- A. Taxi
- B. Private auto - victim's own
- C. Private auto - other's
- D. Car - not otherwise specified
- E. Public passenger lorry; if so, how many occupants were present (approximately) _____
- F. Commercial cargo lorry; if so, what cargo, if known _____
- G. Motorized vehicle - not otherwise specified
- H. Motorcycle
- I. Other (specify) _____

If the respondent can supply more detail, add this information.

26. If injured in a motor vehicle crash, motorcycle crash, or bicycle crash, was the injured person:

- A. Driver / Rider or B. Passenger.

27. If the injured person was the driver of a vehicle, was he/she a professional driver? Y N

V. WHAT INJURY WAS SUSTAINED

28. What part of the body was injured and how was it injured? (Description of actual injury in respondents own words)

29. Check all that apply:

Region	Penetrating	Blunt	Burn
Head			
Face			
Neck			
Chest			
Abdomen			
Upper extremity (except hand)			
Hand			
Lower extremity			

30. If an extremity injury: was it an obvious fracture? Y N

VI. TREATMENT OF THE INJURY

31. What care was given to the injured person, and by whom? (Brief description in patients own words)

32. Circle all that apply and indicate the order in which treatment was rendered:

Type	Name (if clinic)	Order	Money for treatment	Distance	Travel time	Number of trips	Money for transport (total)
A. Home treatment							
B. Traditional							
B1. Herbalist							
B2. Bone setter							
B3. Spiritual healer							
B4. Other traditional (specify) _____							
C. Primary health care site							
C1. Village health post							
C2. Rural clinic							
C3. Other PHC							
C4. Private MD							
D1. Hospital							
D2. Hospital							
E. Other							

33. For each of the sites of treatment utilized in 32, how much was paid out of pocket for treatment? If the respondent remembers only a general amount, write it here. _____
If they remember amounts per type of site and practitioner, please record it next to the appropriate listings in No. 32.

34. For each site in number 32, what is the distance (estimate if necessary), and time of transport per trip from home to this site. Also indicate how many trips were made for each site.

35. In addition, how much was spent for transportation to get to sites of treatment (cumulative)? If the respondent remembers only a general amount, write it here. _____
If they remember amounts per trip, please record it next to the appropriate listings in No. 32.

36. Why did you go to the first site utilized in #32. Circle all that apply:
- A. Money / cost
 - B. Proximity
 - C. Preference
 - D. Other (specify) _____
37. If a clinic or a hospital was utilized, how long after the injury did the victim first go there?
38. If the injured person was hospitalized, for how long? _____
- 38A. If the injured person was hospitalized at KATH for >1d, get particulars (age, name, date of admission) if person/relatives give permission.
39. Is the injured person still receiving treatment? Y N

VII. DISABILITY RESULTING FROM THE INJURY

40. Did the injured person suffer any disability, that is, was he/she unable to perform his/her usual activities or work or attend school because of the injury? Y N
41. If so, in what way were they disabled? Description in respondents words:
42. Circle all that apply:
- i. inability to use hand or arm or decreased strength or pain on motion of the extremity.
 - ii. walk with a limp or unable to walk at all.
 - iii. loss of vision.
 - iv. weakness or shortness of breath.
43. For how long was he/she not able to perform his/her usual activity or work? _____
44. Was there any reduction of cash wage income? Y N N/A (not engaged in cash making activity)
- 44A. If so, how much? _____
45. Is he/she now able to perform his/her usual activities? Y(able) N (not able)
(If he/she are working at the same place, but in a lesser capacity mark No above and check here _____).
46. Did the injured person return to normal after the injury? Y (normal) N (not normal)
 If not normal, how so? (Respondent's own words).
47. If no to either 45 or 46, what is the level of disability? Circle one:
- Self care: Not able to care for self (bathing, feeding).
 - Mobility: Not able to walk around the house.
 - Major: Able to walk around the house; but not able to walk more than 1/4 mile (*give example from their location*); not able to grasp with a hand; not able to go up or down stairs
 - Minor: A disability, but not as severe as the other categories.
 - Other: Specify _____

VIII. ECONOMIC CONSEQUENCES OF THE INJURY

48. How has this injury affected the family as a whole (including any member of the extended family, whether they are living in the household or not)? (Record any direct response by the respondents in their own words, but also ask the following:)

49. Did the usual household income decline (money coming in, not expenditures)? Y N

50. Did the usual household food production decline? Y N Not applicable

51. Did the usual household food consumption decline? Y N

52. Did the injured person or the family have to borrow any money to pay for medical treatment for the injury or to make up for loss of income of the injured person. Y N

53. If so, how much _____

54. How much did you have to pay back? _____

55. Are you still paying back? Y N

56. Did you pawn anything in order to borrow money? Y N

57. What did you pawn _____

58. Did you lose your pawn? Y N

59. Did the injured person or the family have to sell anything to pay for medical treatment for the injury or to make up for loss of income of the injured person? Y N

60. If so, what _____

61. What value _____

62. Did any member of the family change his/her usual activities to undertake the activities of the injured person (e.g. farming, housekeeping)? (A)

Did any member of the family change his/her usual activities to work to make money to pay for medical treatment for the injury to to make up for loss of income of the injured person? (B)

Did the injured person require the assistance of other individuals for home based care, accompanying them to treatment site, etc? (C)

If yes to any of these questions, what was that persons usual activity which he/she had to stop doing, how many days of this person's time was utilized for this, and did he/she lose wages because of the time off from work (if a student, did he/she miss school)?

Who (relation)	Which one	Usual activity missed	Days	Lost income
_____	A B C	_____	_____	Y N
_____	A B C	_____	_____	Y N
_____	A B C	_____	_____	Y N

Information to be added in later by research assistants (for rural areas):

63. Distance from site of injury to nearest health facility? _____ 64. Type of health facility? _____