Young, male, road traffic victims: a systematic review of the published trauma registry literature from low and middle income countries

Oliver Boughton1,*, Gareth G. Jones1, Christopher B.D. Lavy2, and Caris E. Grimes3

1 The MSk Lab, Imperial College London, London SW7 2AZ, UK
2 Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, Oxford University, Oxford OX1 2JD, UK
3 King’s Centre for Global Health, King’s College London, London WC2R 2LS, UK

Received 22 February 2015, Accepted 16 April 2015, Published online 15 June 2015

Abstract – Background: Trauma contributes significantly to the global burden of disease. We analysed published trauma registries to assess the demographics of those most affected in low and middle-income countries (LMICs).

Methods: We performed a systematic review of published trauma registry studies according to PRISMA guidelines. We included published full-text articles from trauma registries in low and middle-income countries describing the demographics of trauma registry patients. Articles from military trauma registries, articles using data not principally derived from trauma registry data, articles describing patients of only one demographic (e.g. only paediatric patients), or only one mechanism of injury, trauma registry implementation papers without demographic data, review papers and conference proceedings were excluded.

Results: The initial search retrieved 1868 abstracts of which 1324 remained after duplicate removal. After screening the abstracts, 78 full-text articles were scrutinised for their suitability for inclusion. Twenty three papers from 14 countries, including 103,327 patients, were deemed eligible and included for analysis. The median age of trauma victims in these articles was 27 years (IQR 25–29). The median percentage of trauma victims who were male was 75 (IQR 66–84). The median percentage of road traffic injuries (RTIs) as a percentage of total injuries caused by trauma was 46 (IQR 21–71).

Conclusions: Young, male, road traffic victims represent a large proportion of the LMIC trauma burden. This information can inform and be used by local and national governments to implement road safety measures and other strategies aimed at reducing the injury rate in young males.

Key words: Trauma registry, Low and middle-income countries.

Introduction

In 2010 there were 5.1 million worldwide deaths attributable to injury. This accounts for 9.6% of all global deaths and has been increasing over the last 20 years [18]. To put this in context, injuries account for more deaths than HIV/AIDS (human immunodeficiency virus-acquired immune deficiency syndrome), tuberculosis and malaria combined [24]. In low and middle-income countries (LMICs) there is a greater toll of injury than high-income countries [40], with 90% of world deaths resulting from injury occurring in LMICs [49]. Injury can also result in lifelong disability [49], with significant financial implications for the injured patient and their family [42].

*Corresponding author: o.boughton@imperial.ac.uk

Injuries disproportionately affect males and the young [11, 24].

As a subgroup of injuries, road traffic injuries (RTIs) are the leading injury-related cause of death in males and were the ninth leading cause of death worldwide in 1999 [31]. RTIs accounted for 14% of deaths in males aged 10–24 years and 5% of female deaths in the same age group in 2004 [30]. In 2010, RTIs accounted for 1.3 million deaths worldwide and there was a 46% increase in death due to RTIs compared to two decades earlier [18]. Whereas deaths in high-income countries with road safety programmes have reduced over the last few years, deaths from RTIs in LMICs have increased [18]. RTIs are predicted to become the third or fourth leading cause of death in the world by 2030 [19].

A trauma registry may be defined as "a timely, accurate, and comprehensive data source that allows for continuous
monitoring of the process of injury care” [26]. The data encompasses all hospital trauma-related admissions and is a powerful tool for identifying injury trends and possible solutions [4, 29]. Trauma registry data are particularly valuable in LMICs because other sources of data, which might be available in high-income countries, are less accessible in LMICs [25].

We set out to use published trauma registry data from LMICs to determine the current demographics of trauma patients in LMICs, as a basis for the development of intervention strategies. Specifically, we wanted to answer the questions:

1. Do young, male patients continue to be most affected by trauma?
2. How much do RTIs contribute to the burden of trauma in LMICs?

To answer these questions we performed a systematic review of the published trauma registry literature from LMICs.

Method

We performed a systematic review of the published trauma registry literature from LMICs. Medline, Embase, Cochrane Library, PubMed, CINAHL and Web of Science from design to the 30th May 2014 were searched using single and combinations of the search terms “developing world”, “developing country”, “low income country”, “middle income country”, “trauma database/databank”, “trauma registry/registries”, “injury database/databank” and “injury registry/registries”. We included published full-text articles from trauma registries in low and middle-income countries (as defined by the World Bank [1]) that describe the demographics of their trauma registry patients. Authors were contacted by email if full-text articles were unavailable. Articles from military trauma registries were excluded on the basis that their patient demographics and mechanisms of injury would be different. Articles from high-income countries, articles using data not principally derived from a trauma registry, articles describing patients of only one demographic (e.g. only paediatric patients) or only one mechanism of injury (e.g. only RTIs) were excluded from the final analysis. Trauma registry implementation or design articles describing patients of only one demographic (e.g. only paediatric patients) or only one mechanism of injury (e.g. only RTIs) were excluded from the final analysis. Trauma registry implementation or design articles describing patients of only one demographic (e.g. only paediatric patients) or only one mechanism of injury (e.g. only RTIs) were excluded from the final analysis. Trauma registry implementation or design articles describing patients of only one demographic (e.g. only paediatric patients) or only one mechanism of injury (e.g. only RTIs) were excluded from the final analysis. Trauma registry implementation or design articles describing patients of only one demographic (e.g. only paediatric patients) or only one mechanism of injury (e.g. only RTIs) were excluded from the final analysis. Trauma registry implementation or design articles describing patients of only one demographic (e.g. only paediatric patients) or only one mechanism of injury (e.g. only RTIs) were excluded from the final analysis.

We included articles for the qualitative analysis if they were male was 75 (IQR 66–84). The median percentage of RTIs as a percentage of total injuries caused by trauma was 46 (IQR 21–71). The median percentage of penetrating injuries (stabtings and gunshots) as a percentage of total injuries caused by trauma was 10 (IQR 4–21). The median percentage of blunt force injuries as a percentage of total injuries caused by trauma was 1 (IQR 0–15). The median percentage of falls as a percentage of total injuries caused by trauma was 17 (IQR 8–31). We found four of the articles in the quantitative synthesis of the review used the “Kampala Trauma Score” [13] to calculate the severity of injuries in their patients. Other trauma scoring systems used included the “Abbreviated Injury Scale” (AIS), the “A Severity Characterization Of Trauma” (ASCOT) score, the Glasgow Coma Scale, the “Injury Severity Score”, the “Revised Trauma Score” and the “Trauma and Injury Severity Score”.

Table 3 displays the pre-hospital transfer methods and transfer times. Only a few of the articles reported this data. The median transfer time to hospital was 180 min with a large range of transfer times. Pre-hospital transfer methods varied largely between countries and between the articles. The median percentage of ambulance transfers as a percentage of total...
pre-hospital transfers was 6 (IQR 5–35). The median percentage of private vehicle transfers as a percentage of total pre-hospital transfers was 44 (IQR 0–52). Other less common methods of pre-hospital transfer included walking, taxi, public transport and police.

Discussion

This systematic review of published trauma registry data demonstrates that young, male, road traffic victims represent a large proportion of the LMIC trauma burden. These findings are consistent with a previous systematic analysis of the global burden of disease in young people, which found that RTIs accounted for the most disability-adjusted life years (DALYs) in young males aged 10–24 years [7].

Amongst the global population of all ages RTIs accounted for 75.5 million DALYs in 2010, an increase from 56.7 million in 1990 [23]. RTIs accounted for 53% more of the global burden of disease than tuberculosis in 2010 [23]. Despite this burden, the epidemic of injuries has been described as being “among the most neglected health problems of the late 20th century” [46] with relatively little research conducted into road safety injuries compared to other leading causes of disease [16]. Indeed, investment in injury has fallen behind investments in HIV/AIDS and reproductive health [7]. It is estimated that if injury mortality rates from all causes of injury in LMICs were reduced to those rates seen in high-income countries, over two million lives could be saved each year [15]. Financially, RTIs are estimated to cost LMICs 100 billion US dollars per year according to the World Bank [45], representing 1–3% of their gross national product (GNP) [36].

Improved road safety programmes can result in dramatic reductions in road traffic injury rates, as demonstrated in Australia where there was a 43.7% reduction in road traffic-related mortality following the introduction of road safety...
Table 1. Articles included in qualitative synthesis of systematic review.

| Country  | Author, Year | Methodology                                                                 | Number of hospitals | Number of patients (over study period) | Included in quantitative analysis |
|----------|--------------|------------------------------------------------------------------------------|---------------------|---------------------------------------|-----------------------------------|
| Columbia | Ordóñez et al. 2012 [29] | Electronic trauma data capture in emergency department for trauma patients. | 2                   | 3923 (3 months)                       | Yes                               |
| Fiji     | Wainiqolo et al. 2012 [43] | Paper injury surveillance form using data captured from medical notes (inpatients only). | 12                  | 2233 (1 year)                        | No: injury surveillance data captured from inpatient medical notes only. |
| India    | Roy et al. 2010 [37] | Paper trauma checklist on admission to trauma ward. One hundred and seventy randomly selected patients from a total of 454 patients admitted to trauma ward. Excluded: elderly patients with an isolated fracture of the neck of the femur. | 1                   | 170 (2 months)                       | Yes                               |
| Iran     | Haghparast-Bidgoli et al. 2013 [8] | Validated trauma questionnaire completed for all admitted trauma patients. | 14                  | 17,753 (5 years)                     | Yes                               |
| Iran     | Moini et al. 2000 [22] | Paper trauma registry form completed for all trauma patients in emergency department and followed up daily on the ward. | 3                   | 2663 (1 year)                       | No: Same data as Rabbani/Moini paper. |
| Iran     | Rabbani and Moini 2007 [34] | Paper trauma registry form completed for all trauma patients in emergency department and followed up daily on the ward. | 3                   | 4096 (likely over 7 years but not recorded) | Yes                               |
| Jamaica  | Plummer et al. 2010 [33] | Electronic trauma database. Patients aged 25–29 years selected from the database. | 1                   | 715 (5 years)                        | No: only 25–29 year olds included. |
| Jamaica  | Ward et al. 2010 [44] | Paper injury surveillance form for trauma patients on arrival in hospital or after stabilised if critically unwell. | 9                   | 40,563 (1 year)                     | Yes                               |
| Malawi   | Samuel et al. 2010 [39] | Emergency department trauma registry form filled out for trauma patients on arrival and retrospective review of all hospital ward admissions, discharges and report log books. Combined data. | 1                   | 1474 (6 months)                     | Yes                               |
| Malaysia | Sabariah et al. 2008 [38] | All major trauma patients' details directly entered into electronic database. | 5                   | 933 (1 year)                        | Yes                               |
| Nigeria  | Nottidge et al. 2014 [25] | Paper trauma registry forms obtained prospectively in emergency department for all patients with injuries. | 1                   | 93 (7 weeks)                        | Yes                               |
| Pakistan | Hashmi et al. 2013 [9] | Computerised database of all activated trauma team calls (dead on arrival and burns excluded). | 1                   | 1227 (12 years)                     | Yes                               |
| Pakistan | Mehmood et al. 2013 [20] | Electronic trauma registry of all trauma patients in emergency department (excluding isolated hip fractures and dead on arrival). | 1                   | 542 (3 months)                      | Yes                               |
| Country      | Author, Year          | Methodology                                                                                                                                                                                                 | Number of hospitals | Number of patients (over study period) | Included in quantitative analysis |
|-------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------|----------------------------------|
| Pakistan    | Zafar et al. 2002 [51]| Initial paper trauma form for all patients meeting trauma team activation criteria, converted to online database. Patients operated on in other hospitals excluded.                                                                 | 1                   | 279 (2 years)                        | No: same data as Hashmi et al.’s paper. |
| Rwanda      | Petroze et al. 2014 [32]| Paper trauma registry forms completed for all injured patients transferred from a district hospital, who died in the emergency department or admitted due to injury included. Minor injuries treated as an outpatient excluded. | 1                   | 2227 (1 year)                       | Yes                              |
| South Africa| Laing et al. 2014 [17]| Electronic trauma registry. Inclusion criteria: all trauma-related admissions, all trauma-related mortalities. Exclusion criteria: all orthopaedic trauma cases managed without co-supervision or consultation from trauma surgeons, all trauma cases managed as outpatients, burns patients, attempted suicides by way of poison or caustic substance ingestion, foreign body ingestion, inhalation. | 2                   | 2550 (1 year)                       | Yes                              |
| South Africa| Schuurman et al. 2011 [40]| Paper trauma registry forms filled out for all trauma patients in emergency department.                                                                                                                                 | 1                   | 785 (1 month)                       | Yes                              |
| Turkey      | Squyer et al. 2008 [42]| Medical records of all trauma patients admitted retrospectively reviewed. Compared to US hospital trauma registry data.                                                                                                       | 2                   | 506 (1 year)                        | No: retrospective data collection of admitted patients. No trauma registry. |
| Uganda      | Demyttenaere et al. 2009 [4]| Paper trauma registry forms completed for all trauma patients in emergency department.                                                                                                                                                  | 1                   | 3778 (1 year)                       | Yes                              |
| Uganda      | Hsia et al. 2010 [11]| Paper trauma registry forms completed for all trauma patients in emergency department.                                                                                                                                                   | 1                   | 3750 (1 year)                       | No: same data set as Demyttenaere et al.’s paper. |
| Uganda      | Kobusingye and Lett 2000 [14]| Paper trauma registry forms completed for all trauma patients in emergency department.                                                                                                                                                   | 2                   | 5210 (no study period available in paper) | No: no study period available to assess if same patients in Kobusingye et al. paper from 2002. |
| Uganda      | Kobusingye et al. 2002 [13]| Paper trauma registry forms completed for all trauma patients in emergency department.                                                                                                                                                   | 5 (citywide)        | 4359 (1 year)                       | Yes                              |
| Zambia      | Seidenberg et al. 2014 [41]| Paper trauma registry forms completed for patients if they presented to the Surgical Emergency Centre with evidence of injury. Additional data collected on those brought in dead through the same Emergency Centre. | 1                   | 3498 (6 months)                     | Yes                              |
Table 2. Assessment of quality of articles.

| Author, Year | Data capture | Reported completeness of data (%) | Data collection staff | Trauma data collection methods | Methods to optimise data quality | Overall subjective assessment |
|--------------|--------------|-----------------------------------|----------------------|-------------------------------|----------------------------------|-------------------------------|
| Demyttenaere et al. 2009 [4] | Prospective | 93.5 | Not mentioned | Paper form | Not mentioned | Good |
| Hagharparast-Bidgoli et al. 2013 [8] | Prospective | Not mentioned | Trained physicians | Validated questionnaire then data analysed using IBM SPSS Statistics | Trained physicians doing data collection | Good |
| Hashmi et al. 2013 [9] | Prospective | 90 | Trained personnel | Not mentioned | Data collection by trained personnel | Good |
| Hsia et al. 2010 [11] | Prospective | 93 | Doctors, nurses and clinical officers | Paper form then entered onto computer spreadsheet | Data checked by Senior Doctor | Moderate |
| Kobusingye and Lett 2000 [14] | Prospective | Not mentioned | Staff trained for 1 h | One page paper form then loaded onto Epi Info Version 6 | Crosschecked with hospital registration book | Moderate |
| Kobusingye et al. 2002 [13] | Prospective | 96.5 | Doctors, nurses and clinical officers | One page paper form | Data checked by Senior Doctor | Good |
| Laing et al. 2014 [17] | Prospective | 80 | Trained physicians | Computer questionnaire then analysed using FileMaker Pro 11 | Trained doctors | Good |
| Mehmood et al. 2013 [20] | Prospective | 97 | Trained research assistant | Paper form then analysed using Karachi Trauma Registry Software | Random checks of data collection by Principal Investigator | Good |
| Moini et al. 2000 [22] | Prospective | 95 | Trained physicians | Paper form then Epi Info then analysed using IBM SPSS | Trained physicians | Good |
| Nottidge et al. 2014 [25] | Prospective | Varied completeness of data collection | Not mentioned | Not mentioned | Not mentioned | Moderate-poor |
| Ordóñez et al. 2012 [29] | Prospective and retrospective | 37.6 | Full time staff for data recording | International Trauma Registry web-based form | Electronic retrieval from electronic notes | Good |
| Petroze et al. 2014 [32] | Prospective | Not mentioned | Trained data manager | Paper form then entered into Microsoft Access | Trained data manager | Good |
| Plummer et al. 2010 [33] | Prospective | Not mentioned | Not mentioned | Collected and transferred to Trauma! Software programme | Not mentioned | Moderate-poor |
| Rabbani and Moini 2007 [34] | Prospective | Not mentioned | Trained physicians | Not mentioned | Trained physicians | Moderate-poor |
| Roy et al. 2010 [37] | Prospective | 95 | Medical intern collecting data | Questionnaire then analysed using STATA | Dedicated intern collecting data | Good |
| Sabariah et al. 2008 [38] | Not mentioned | Not mentioned | Not mentioned | Not mentioned | Not mentioned | Moderate-poor |
| Samuel et al. 2010 [39] | Prospective | Not mentioned | Trained registry clerk 24 h/day | Double-sided registry form | Trained registry clerk 24 h/day | Moderate |

(continued on next page)
measures in 1990 [23]. Such safety measures, in combination with road safety education, are urgently required in LMICs [11, 16] and the health sector should champion these measures, as recommended by the World Health Organization [35]. RTIs can be reduced by enforcing speed limits, drink-driving laws, seat-belt laws and helmet use amongst motorcyclists [3].

The need to improve road safety globally has previously been highlighted but there has been limited action taken in LMICs [12]. This led to the initiation of the “Road Safety in 10 Countries Project” being initiated in 2012 [12]. This highly promising road safety project is predicted to save 10,310 lives over 5 years [6]. Positive potential side-effects of improved road safety are an increase in walking and cycling and a reduction in pollution [2].

The young men identified by this review as most affected by trauma are also often the family breadwinners in LMICs [47] and their death or disability from injury may drive these families into poverty [48]. Similarly the cost of care for injured young men can place unsustainable demands on families, especially in the context of underdeveloped social care and security systems [50].

This systematic review utilised data from trauma registries to determine the demographics of trauma patients in LMICs. In a scoping review of world trauma registries in 2012, publications from trauma registries were identified from 35 countries with the majority of publications from the US and Australia [27]. Trauma registries can be used as part of a trauma quality improvement programme [9, 29]. Implementation of trauma quality improvement programmes, which include trauma registries, has resulted in decreased mortality from trauma [9]. By identifying trends in injury, prevention strategies can be designed [4]. Trauma quality improvement programmes may also reduce overall hospital costs [5].

South Africa was identified to have a relatively high rate of penetrating injuries (including stabings and gunshots). In the paper by Laing et al. they reported 40.5% of their injuries to be penetrating [17]. Jamaica also had a relatively high rate of penetrating trauma with 27.4% of the injuries in the paper by Ward et al. attributed to penetrating trauma [44]. This relatively high rate of violent trauma in these countries should be addressed by the local governments. Laing et al. discuss the fact that there is a high rate of interpersonal violence in South Africa [17] and Ward et al. explain that the “Violence Prevention Programme” was set up in Jamaica in 2004 to address the growing problem [44].

Time to hospital varied largely between countries and only a few of the trauma registry articles in this review, contained this information. In LMIC trauma registries in this review pre-hospital transfer times were long and the availability of ambulance transfers was limited. Long pre-hospital transfer times may be associated with worse outcomes [39]. This is an issue that needs addressing by local governments.

The quality of articles analysed in this review was variable. In a review by O’Reilly et al. they devised a tool to analyse data from trauma registries, which they named the “Trauma Registry Assessment Tool” [28]. This tool helps to assess the physical resources, human resources and processes of a trauma registry and is displayed in Table 1 of their paper [28]. We used the tool to assess the overall quality of articles we analysed. Table 2 displays our assessment of article quality using this assessment tool. Most articles reported prospective data but completeness of data collection was often not
reported. Most trauma registries initially collected data on paper forms and then transferred this information to computer. We would like to propose that trauma registries report their data in the format of the “Trauma Registry Assessment Tool”. This would ensure that articles from trauma registries would be of a consistently high standard and that all important data is published. By presenting the data in this way it would allow funding bodies and governments to identify the areas of greatest need of investment and support. Trauma registries are expensive to run and therefore have an ethical obligation to publish data in an easy-to-read and consistent format so that their cost can be justified.

A limitation of this systematic review is that it only includes data from trauma registries and linked data may better estimate the age, gender and mechanism of injury in LMIC trauma patients. Additionally, trauma registry data may suffer from a decreased capture rate of data because busy clinicians may not have the time to record every trauma episode [13, 42]. Trauma registry data will only capture the data of injured patients who attend hospitals with trauma registries and will miss those patients who have their injuries treated in the community or die before reaching hospital [14, 40].

In summary, this trauma registry study has identified that the young, male population is most affected by trauma in LMICs and 46% of all injuries were road traffic injuries. This information can be used by local and national governments to support the case for increased investment in road safety measures and other strategies targeted at injury prevention in this population group.

Table 3. Quantitative synthesis of systematic review.

| Author, Year | Average age (years) | % Male | % Road traffic injuries (RTIs) | % Stabbing or gunshot | % Blunt force | % Fall | % Other cause | Trauma scoring system(s) used (see below for abbreviations) |
|--------------|---------------------|--------|-------------------------------|----------------------|--------------|--------|--------------|-------------------------------------------------------------|
| Demyttenaere et al. 2009 [4] | 26 (mean) | 75 | 50 | 10 | 15 | 10 | 2 | KTS |
| Haghparast-Bidgoli et al. 2013 [8] | 31 (mean), 26 (median) | 78 | 47 | Not mentioned | Not mentioned | Not mentioned | Not mentioned | GCS, ISS |
| Hashmi et al. 2013 [9] | Most patients | 87 | 59 | 19.6 | 0 | 5.6 | 9.1 | GCS, ISS, RTS |
| Kobusingye et al. 2002 [13] | 24 (mean) | 73 | 50 | 16 | 0 | 13 | – | KTS |
| Laing et al. 2014 [17] | 28 (mean) | 82 | Not documented | 40.5 | (includes RTIs) | 0 | 4.8 | ISS |
| Mehmod et al. 2013 [20] | 27 (mean) | 72 | 33 | 7 | 0 | 37 | 16 | GCS, ISS, RTS, TRISS AIS, ISS |
| Nottidge et al. 2014 [25] | Most patients 20–39 | 74 | “Most” | Not mentioned | Not mentioned | Not mentioned | Not mentioned | GCS, ISS, RTS |
| Ordóñez et al. 2012 [29] | 31 (mean) | 67 | 21 | 19.8 | 0 | 33.7 | 20.8 | GCS, ISS, RTS |
| Petroze et al. 2014 [32] | 30 (mean), 27 (median) | 75 | 48 | 4 | 14 | 28 | 6 | GCS |
| Rabbani and Moini 2007 [34] | 28 (mean) | 78 | 46 | 5.1 | 14.9 | 19 | 0 | AIS, ASCOT, ISS, TRISS |
| Roy et al. 2010 [37] | 30 (mean) | 84 | 46 | 0 | 0 | 17 | 29 | Not mentioned |
| Sabariah et al. 2008 [38] | Most patients 15–24 | 84 | 73 | Not mentioned | Not mentioned | Not mentioned | Not mentioned | GCS, ISS |
| Samuel et al. 2010 [39] | 26 (median) | 76 | 43 | 0 | 0 | 13.5 | 29.6 | Not mentioned |
| Schuurman et al. 2011 [40] | Most patients 20–39 | 75 | 22 | 22 | 16 | 0 | 0 | AIS, ISS, KTS |
| Seidenberg et al. 2014 [41] | 24 (median) | 72 | 26 | 3.4 | 2.7 | 26.3 | 25.8 | KTS |
| Ward et al. 2010 [44] | Most under 29 | 64 | 17 | 27.4 | 17 | 44 | 3.6 | Not mentioned |

Abbreviations of trauma scores: AIS: Abbreviated Injury Scale; ASCOT: A Severity Characterization Of Trauma; GCS: Glasgow Coma Scale; ISS: Injury Severity Score; KTS: Kampala Trauma Score; RTS: Revised Trauma Score; TRISS: Trauma and Injury Severity Score.
Conflicts of interest

OB and GGJ declare no conflicts of interest. CBDL and CEG are both Lancet Commissioners on Global Surgery but declare no conflicts of interest related to this work.

Acknowledgements. The authors would like to thank Mr Tim Reeves, librarian, for his assistance with the literature search for this systematic review. The authors would like to thank the UK National Institute for Health Research (NIHR) for funding this research.

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Table 4. Pre-hospital transfer times and methods review.

| Author, Year          | Pre-hospital transfer (PHT) time (minutes) | Ambulance (%) | Private Vehicle (%) | Walking (%) | Public transport (%) | Police (%) | Bike/motorbike (%) | Taxi (%) | Other (%) |
|-----------------------|-------------------------------------------|---------------|---------------------|-------------|----------------------|------------|---------------------|-----------|----------|
| Hsaia et al. 2010 [11]| Not mentioned                             | 5             | 50                  | 10          | 0                    | 22         | 12                  | 0         | 0        |
| Kobusingye et al. 2002 [13]| 66% patients within 60 min   | –             | –                   | –           | –                    | –          | –                   | –         | –        |
| Mehmood et al. 2013 [20]| 83% patients within 360 min          | Not mentioned | 0                   | 98          | 0                    | 0          | 0                   | 0         | 2        |
| Nottidge et al. 2014 [25]| Not mentioned                           | 34.5          | 0                   | 0           | 0                    | 24.4       | 0                   | 39.3      | 0        |
| Roy et al. 2010 [37]   | 201                                       | 15.4          | 43.8                | 14.5        | 12.4                 | 7.8        | 0                   | 0         | 0        |
| Samuel et al. 2010 [39] | 180                                      | 5.8           | 51.8                | 0           | 37.1                 | 0          | 0                   | 0         | 0        |
| Seidenberg et al. 2014 [41]| Not mentioned                           | 78.7          | 21.3                | 0           | 0                    | 0          | 0                   | 0         | 0        |
| Squyer et al. 2008 [42]| 98                                        | 6.4           | 0                   | 0           | 0                    | 0          | 0                   | 93.5      | 0        |

O. Boughton et al.: SICOT J 2015, 1, 10
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