

# One-year outcomes of traumatic injuries among survivors in Ethiopia: a cross-sectional study on the employment outcomes and functioning state

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► Additional supplemental material is published online only. To view, please visit the journal online (<https://doi.org/10.1136/tsaco-2023-001209>).

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Received 6 July 2023

Accepted 23 March 2024

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**To cite:** Ahmed AN, Lysaght R, Addissie A, et al. *Trauma Surg Acute Care Open* 2024;**9**:e001209.

## ABSTRACT

**Background** Traumatic injury is one of the top public health challenges globally. Injury survivors often experience poor health and functioning and restricted participation in employment. In Ethiopia, there is a paucity of evidence about the long-term consequences of injuries, particularly about their employment outcomes and disability status. This study characterizes injury survivors by their preinjury status, injury characteristics, postinjury employment outcomes and disability status 1 year post injury.

**Methods** An institution-based cross-sectional study was conducted on injury survivors who received services from a large public hospital in Addis Ababa. Medical records of all emergency room patients who visited the hospital within a 3-month period were reviewed to identify those who were eligible. A structured questionnaire was completed using a telephone interview. Descriptive statistics were used to characterize the outcomes.

**Results** Of the 254 participants, 78% were men, 48% were young adults (age 25–39 years), 41% were injured by road traffic collision, 52% were admitted to the hospital for up to a week and only 16% received compensation for the injury. Before the injury, 87% were working in manual labor. One-year after the injury, the total return to work (RTW) rate was 59%; 61% of participants experienced some level of disability, 33% had at least one type of chronic illness and 56% reported challenges of physical stressors when attempting to RTW. Among the 150 who returned to work, 46% returned within 12 weeks, 78% to the same employer and most received support from multiple sources, including community-level institutions (88%) and families/friends (67%).

**Conclusion** Traumatic injury substantially impacted the employment outcomes of survivors and contributed to increased disability in Ethiopia. This study lays a foundation for future research and contributes crucial evidence for advocacy to improve injury prevention and trauma rehabilitation in low and middle-income contexts.

**Level of evidence** II.

## INTRODUCTION

Globally, traumatic injury is one of the top public health challenges, with a significant portion of incidents happening in low and middle-income countries (LMIC).<sup>1</sup> Similarly, injury is a growing public health concern in Ethiopia.<sup>2,3</sup> Studies indicate that the leading causes of injuries in Ethiopia include

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Studies in Ethiopia report a great number of individuals survive traumatic injuries, and working-age adults are at greater risk of injuries. However, the long-term consequences do not receive enough attention. Survivors' return to work (RTW) and residual impairment are not addressed in the research agenda and service provision efforts.

## WHAT THIS STUDY ADDS

⇒ A significant portion of traumatic injury survivors is not able to RTW within a year after injury. Many survivors remain with some form of residual functioning impairment. Formal support from the health system and workplace is limited, and informal support structures fill the gaps in the recovery and RTW after the injury.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ A focus on improving the long-term outcomes of injury survivors, regarding disability prevention and RTW, is needed within the healthcare system. There is also an urgent need to activate an RTW policy and enhance the support system for injury survivors, including revitalizing informal structures in the community and workplaces.

road traffic collisions,<sup>4</sup> workplace injuries<sup>5</sup> and violence.<sup>2,6</sup> In Ethiopia, individuals of working age, who are often the breadwinners in a family, have a greater risk of injury compared with other age groups.<sup>2,5</sup> A significant portion (>90%) of those injured in Ethiopia survive<sup>2,7</sup> and may experience residual impairments. Their recovery after injury, as evidenced by return to work (RTW), is vital and has social and economic implications.<sup>8</sup>

Injury survivors often experience poor health (eg, ongoing pain and chronic illness) and reduced functioning (eg, impairment in mobility, concentration and managing tasks).<sup>9</sup> These challenges may lead to further participation restrictions, including in the realm of employment.<sup>10</sup> In low-income settings like Ethiopia, the consequences of injuries may be exacerbated due to the poor healthcare infrastructure and weak rehabilitation system.<sup>3,11</sup> In Ethiopia, the state of knowledge about the consequences of traumatic injury often focuses on the prevalence, injury

causation and in-hospital mortality rates.<sup>2-6</sup> This epidemiological evidence represents a limited set of indicators for long-term consequences and fails to recognize residual impairments, specifically those related to employment.

There is a strong link between disability and poverty.<sup>8</sup> The United Nations' sustainable development goal (SDG) 8.5 aims to ensure access to decent work opportunities for all by promoting access to inclusive employment for persons with disabilities.<sup>12</sup> Without the active participation of all in meaningful employment, achieving the 2030 SDG target will be very difficult. When individuals with traumatic injury experience ineffective RTW outcomes, it can have significant socioeconomic implications for survivors, their families and society.<sup>13-14</sup>

RTW after traumatic injury is often an important marker for individuals' recovery from the injury, the effectiveness of rehabilitation services for residual effects and functioning in the real world.<sup>10-15</sup> The outcomes of RTW after injury are mediated by the complex interaction between the biomedical, personal and other contextual factors including employment conditions in a complex ecological or biopsychosocial system.<sup>15-16</sup>

RTW is a well-established field in high-income countries; however, in Ethiopia, it has received little attention as a research agenda or in service provision. In Ethiopia, the common employment conditions are self-employment, and work for the family business and small cottage industries, including working in social organizations, for example, religious institutions and cultural associations, family care and household chores.<sup>17-18</sup> Therefore, the RTW concepts and strategies based on the context of high-income countries may not be effective to facilitate RTW strategies in LMIC.

RTW success rates vary significantly, and estimates span 35–65% in high income countries.<sup>19-21</sup> Findings differ by health conditions, variation in policy frameworks and intervention approaches. In Ethiopia, the labor proclamation provided a guarantee, with various provisions, to preserve a worker's position up to 1 year after the injury.<sup>22</sup> An Ethiopian study among general trauma patients reported a RTW rate of 83% 6 months after the injury.<sup>23</sup> Also, a recent study<sup>24</sup> reported that ~74% of occupationally-injured workers in metal industries returned to work after 45 days, which are likely overestimated given the weak trauma care and rehabilitation system<sup>3-11</sup> and the absence of functional RTW strategies.

In LMIC, particularly in Ethiopia, there is a paucity of evidence about the long-term consequences of traumatic injury, including employment outcomes and disability statuses. To our knowledge, in Ethiopia very few studies have reported work status after injury<sup>23-25</sup> and only one study was identified with a focus on RTW.<sup>24</sup> Also, disability among injury survivors is rarely investigated. The purpose of this paper was to describe the injury characteristics of traumatic injury survivors, characterize their employment outcomes and present their disability statuses 1 year after injury.

## METHODS

### Study design and setting

An institution-based cross-sectional study design was conducted at the Addis Ababa Burn, Emergency, and Trauma (AaBET) hospital. AaBET is a public hospital in the capital city of Ethiopia and is the largest among the national referral centers for accidents and emergencies, including traumatic injuries for specialized trauma care. It has a capacity of nearly 200 inpatient and emergency care beds.<sup>26</sup>

## Population

The study population was all injury survivors who had visited the AaBET hospital emergency department for healthcare services within 3 months of a year before the data collection began (ie, October 11, 2020, to January 8, 2021). Potential participants were identified from hospital records (ie, Health Management Information System (HMIS) and patients' charts), then contacted by telephone to invite them to participate in the study.

## Participant recruitment

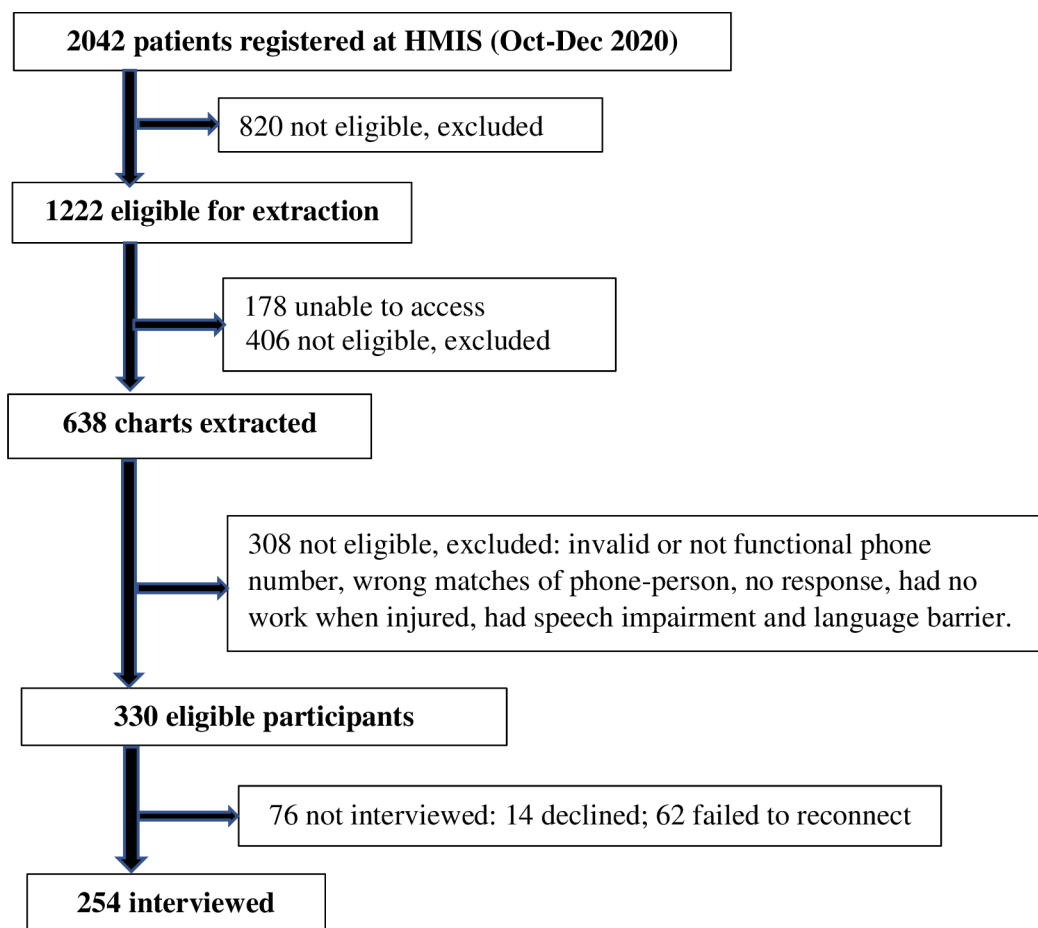
The HMIS database was reviewed to identify potential participants according to the inclusion criteria: patients who reported traumatic injury as a reason for their hospital visit that is, working age group (18 to 60 years), discharged alive and/or referred to another institution, stayed in the hospital for  $\geq 24$  hours and self-identified as they were employed at the time of the injury. Each patient had a unique Medical Registration Number (MRN), a reference number used to locate the charts at any time. The HMIS registration contains many variables, including important variables utilized for this study: MRN, age, sex, reasons for hospital visits, date of arrival, date of discharge, and status at discharge, among others.

Of 2042 patients in the data set, 1222 met initial eligibility requirements. The required information was extracted from 638 charts. This information included injury characteristics and contact information (ie, name and telephone number). The chart extraction used a structured checklist, which was pretested in the same setting among patients who received healthcare 6 months before the data collection. Extractions were conducted by a trained team of two health professionals (ie, a nurse and a health officer). Before the telephone interview, a unique identification code (UIC) was assigned to each eligible participant that was not related to patients' information. A total of 254 participants provided verbal consent to participate in the study and those who were not interested in participating were thanked for their time and was recorded as 'declined to participate' (see figure 1 for details).

## Data collection

The telephone survey was conducted by six trained health professionals with graduate training, who were different from the chart extraction team. The telephone survey was conducted both in Amharic and Afaan Oromo, the dominant local languages, based on participants' preferences. The telephone interview used a structured questionnaire (online supplemental file 1) that included tailored questions designed for this study, informed by existing literature in the field<sup>21-27</sup> as well as standard tools.<sup>28-29</sup> The questionnaire addressed sociodemographic factors (eg, education, living arrangement, and residence), employment characteristics (eg, RTW status, job type and changes after the injury) and injury and health-related information (eg, disability and chronic illness).

The return-to-work status was defined according to participants' self-response to the question 'Are you currently returned to any work?' with response options being either 'yes' for those working at the time of the interview and 'no' for those not working. Furthermore, the disability status was assessed using the WHODAS-2 assessment tool.<sup>28-30</sup> Participants' workability at the time of the interview was assessed using a question based on the Work Ability Index,<sup>29</sup> with a question 'How do you rate your current work ability compared with your ability before the traumatic injury?' The measurement is based on a six-point Likert scale (ranging from '0=can't work at all' to '5=same as



**Figure 1** Participants recruitment process with reasons for exclusions from the study, AaBET, Addis Ababa (December 2021–February 2022). HMIS, Health Management Information System.

preinjury’). The questionnaire was pretested among patients identified for the chart extraction pilot test.

### Data analysis

Data entry and data set standardization were carried out independently. The data sets from the hospital HMIS registration, chart extraction and telephone interview were exported to SPSS software V.28 for further data management and analysis. Then, the Principal Investigator (PI) merged the three data sets into one SPSS file using a UIC and prepared for further analysis. Descriptive statistics were used to compute frequencies and percentages for categorical variables (eg, RTW status, sex, mechanism and types of injury, and job types). Continuous variables were classified into meaningful categories; for example, age was grouped into ‘young, young adult and older adult’ and hospital admission days were classified into ‘<1 week, 1 week to a month, and >1 month’. Results are presented with narrative descriptions, followed by tables.

### RESULTS

The results are presented for 254 participants out of 330 eligible individuals, with a response rate of ~77%. Three participants did not complete the full questionnaire, and small number had incomplete data for some variables; therefore, the number of respondents is reported for those variables where data were missing. The results are presented in three sections: preinjury characteristics, injury characteristics and healthcare services, and post-injury statuses.

### Pre-injury characteristics

#### Sociodemographic profile

Majority of the study participants were men ( $n=199$ ; 78%) and young adults, aged 25–39 years ( $n=123$ ; 48%), with mean 32 years ( $SD=11$ ). A significant number of participants completed primary education ( $n=92$ ; 36%) or high school ( $n=95$ ; 37%). Most participants were urban residents, followed a Christian religion, were married and living with other family members (table 1).

#### Employment characteristics

At the time of the injury, a majority of participants ( $n=57$ ; 23%) were employed in ‘wholesale and retail trade and restaurant and hotels’ sector. Regarding the job type classification, 219 (87%) of participants were working in manual labor (vs professional or managerial) positions. According to the International Standard Classification of Occupations (ISCO-08),<sup>31</sup> most participants ( $n=63$ , 25%) primarily work as plant operator and assembler ( $n=63$ , 25%), followed by elementary occupations (eg, daily laborer and cooks) ( $n=57$ , 23%). Small enterprises with up to 30 workers ( $n=201$ , 80%) and private enterprises were the main employers ( $n=129$ , 51%). Regarding professional skills training, 158 (62%) of participants had not received any formal training; also, 143 (57%) of the participants had up to 5 years of work experience (table 1).

**Table 1** Sociodemographic and employment characteristics of participants included in the RTW study, Addis Ababa, (n=254)

Variables	Categories	Frequency	Percent
Sex	Male	199	78
	Female	55	22
Age	<25 years	67	26
	25–39 years	123	48
	>39 years	64	25
Education	No formal schooling	33	13
	Primary	92	36
	High school	95	37
	College and above	34	13
Current residence	Urban	199	78
	Rural	55	22
Religion	Christian	219	86
	Muslim	35	14
Marital status	Single	93	37
	Married	139	55
	Divorced	14	6
	Widowed	8	3
Family size (n=251)	Only one person	27	11
	More than one person	224	88
Type of job (n=251)	Manual labor (blue collars)	219	87
	Professional/managerial jobs (white collars)	32	13
	ISCO-08*, Occupational group (n=249)		
	Plant, operators and assemblers	63	25
	Elementary occupation	57	23
	Service and sales	39	17
	Agricultural, forestry and fishery	38	15
	Craft and trade	26	10
	Manager and professionals	15	6
	Technician and clerical support	11	4
Employment sectors† (n=251)	Wholesale and retail trade and restaurant and hotels	57	23
	Community, social and personal service	45	18
	Transport, storage and communication	44	18
	Agriculture, hunting, forestry and fishing	44	17
	Manufacturing	34	13
	Construction	27	11
	Employer (n=251)	Private	129
	Self or family	90	36
	Government or public	32	13

\*ISCO: International Standard Classification of Occupations.<sup>31</sup>

†Employment sectors are based on the nine international industrial classifications.<sup>48</sup> RTW, return to work.

### Injury characteristics and healthcare services

Regarding mechanisms of injury, road traffic collision made up the major cause (n=104, 41%), followed by violence (n=61, 24%). Head (n=80, 31%) and lower extremities (n=76, 30%) are the most frequently affected parts of the body, with 64 (25%) participants experiencing injuries to multiple body parts.

**Table 2** Injury characteristics and healthcare service of study participants included in the RTW study, Addis Ababa, (n=254)

Variables	Categories	Frequency	Percent
Mechanism of injury	Road traffic collision	104	41
	Violence (assault and bullet)	61	24
	Falling	48	19
	Contact with external forces	35	14
	Burn and electrification	6	2
Types of injury	Fracture	122	48
	Traumatic brain injury	71	28
	Soft tissue injury	50	20
	Crush and amputation	8	3
	Dislocation, strain and sprain	3	1
Body parts injured	Head and face	80	31
	Lower extremities	76	30
	Upper extremities	59	23
	Spin and pelvic	15	6
	Unspecified body region	13	5
	Chest, trunk and internal organs	11	4
Number of body parts injured	Multiple body parts	64	25
	One body part	190	75
Work-relatedness of the injury	Work-related	166	65
	Not work-related	88	35
Time from injury to admission, n=237	On the same day	147	62
	After a day and beyond	90	38
Length of hospital admission	One week	132	52
	One month	76	30
	More than 1 month	46	18
Hospital revisits (count), n=251	One to six revisits	153	61
	More than six revisits	57	23
	Have no revisit	41	16
RTW, return to work.			

Fractures (n=122, 48%) were the most common type of injury, followed by traumatic brain injury (n=71, 28%). One hundred and sixty-six individuals (65%) sustained a work-related injury.

Regarding participants' needs and access to healthcare, the average number of days between the injury and admission to the hospital was 2 days (SD=4) with the majority (n=147, 62%) arriving the hospital on the same day as the injury. Thereafter, the majority of the participants (n=132, 52%) were admitted to the hospital for up to a week and 46 (18%) of survivors were admitted for more than a month. After hospital discharge, 57 (23%) participants had more than six hospital revisits due to health conditions associated with the injury (table 2).

### Postinjury status

#### Disability and health status

A year after the injury, 154 (61%) participants reported some form of disability while 39% had no restrictions. In addition, 84 (33%) participants reported chronic illnesses diagnosed by healthcare professionals. Furthermore, only 40 (16%) of the study participants had received monetary compensation 1 year after the injury and 42 (17%) were in the process of obtaining compensation. Participants who did not receive compensation described various reasons



**Table 3** Postinjury employment and disability statuses of study participants included in the RTW study, Addis Ababa, (n=254)

Variables	Categories	Frequency	Percent
Return to work status	Yes	150	59
	No	104	41
Time to first return to work, (n=150)	Timely RTW (with 12 weeks)	69	46
	Delayed RTW (13–24 weeks)	43	29
	Late RTW (25–52 weeks)	38	25
Disability status	No significant restriction	100	39
	Mild restriction	49	19
	Moderate restriction	66	26
	Sever restriction	31	12
	Extreme restriction	8	3
Chronic illness	Yes	84	33
	No	170	67
Workability	I can't work at all	29	11
	Very low workability	35	14
	Low workability	49	19
	Medium workability	86	34
	High workability	23	9
	Full workability, same as preinjury	32	13
Motivation to RTW even before full recovery, n=251	Have motivation to RTW	181	72
	Have no motivation to RTW	70	28
Postinjury job type, (n=147)	Same job	114	78
	Different job	33	22
Postinjury sector, (n=147)	Same sector	112	76
	Different sector	35	24
Postinjury employer, (n=147)	To the same employer	115	78
	To different employer	32	22
Employment income difference, (n=147)	No change	78	53
	Decreased	45	31
	Increased	24	16
Support for RTW, workplace, n=147	Not supported	85	58
	Supported	62	42
Support for RTW, healthcare institutions, n=147	Not supported	117	80
	Supported	30	20
Support for RTW, families and friends, n=147	Not supported	49	33
	Supported	98	67
Support for RTW, religious and traditional, n=147	Not supported	18	12
	Supported	129	88%
RTW, return to work.			

including negotiated agreement, being refused and did not apply since the injury was not compensable.

### Employment status

One year after the injury, 150 (59%) of the study participants had successfully returned to work. About the time to first RTW, 69 (46%) of the returned participants had resumed work within 12 weeks, while it took up to a year to resume work for a quarter of the returned survivors. Among the injury survivors who did not resume work after the injury, the majority (n=80, 77%) reported residual impairment and ongoing illnesses as the primary reason affecting their RTW (table 3).

Looking closely at the pattern of participants' employment 1 year after the injury, the majority 115 (78%) of the survivors returned to the same employer, 112 (76%) returned to work within the same sector, and 114 (78%) returned to the same job type. If survivors failed to return to the same employer, they often changed their job type (n=23, 72%). Moreover, 45 (31%) of participants reported reduced employment income as compared with preinjury. Change in employer emerged as a vital indication of income change after injury, since 73 (63%) of those who returned to the same employer had the same employment income; conversely, 56% of those who returned to a different employer had reduced employment income compared with their preinjury, while the rest received either the same or an increased amount.

Survivors who returned to work had received support from multiple sources, where religious and other traditional institutions were the main sources of support (n=129, 88%) followed by social supports from family, relatives, and friends (n=98, 67%). Concerning participants' motivation to RTW, a large proportion of 181 (72%) survivors exhibited a good motivation to resume work even before their full recovery, with a primary reason of restoring financial benefits from work. Participants reported on their experience of work-related challenges when they attempted to resume work after the injury: 141 (56%) experienced physical stressors (ie, barriers related to their workstation, working materials, and mobility); 121 (48%) experienced social stressors (ie, challenges related to information, feedback and relationships at work) and 105 (42%) experienced psychological stressors (ie, demands related to the workflow, control and speed). Moreover, only 32 (13%) of survivors reported very high workability (equal to preinjury status) at one after the injury.

### DISCUSSION

This study presents the characteristics of injury survivors in Ethiopia, with their postinjury employment characteristics, return-to-work and disability status. The discussion addresses injury characteristics affecting working-age Ethiopians, implications of injuries (ie, social, residual impairments and employment outcomes) and the RTW support systems that are accessed by injury survivors.

### Social implications of injury

In this study, the highest rate of traumatic injury was experienced by young, urban dwelling men. This result affirms the finding of earlier studies in Ethiopia<sup>2 4</sup> and other LMIC.<sup>32 33</sup> Men, young people, and urban residents bear the highest burden of traumatic injury, which could be due to their high level of mobility and social interactions. Men are at particular risk because of their role as breadwinners of the family, a typical context in Ethiopia, which makes them more vulnerable than women as they are the primary member of the labor market. The effect of injury on the young male population, the most productive segment of Ethiopian society, has broad socioeconomic implications.

The result indicates that Ethiopia is seriously impacted by road traffic collision, which is a similar finding to earlier studies<sup>4 32 33</sup> and a recent global report.<sup>34</sup> Violence is the second leading mechanism of injury in this study, which reflects unrest and the ongoing war in Ethiopia, particularly during the study period. A high prevalence of violence has been reported in other African countries as well<sup>35</sup>; however, it was the least reported cause in earlier research in Ethiopia.<sup>4</sup> Furthermore, fractures at various body regions and traumatic brain injury were the most recorded types of injuries; head and lower extremities were the

body parts most frequently injured. These injuries may require specialized healthcare and rehabilitation support that may be responsible for delayed recovery.

### Impacts of delayed healthcare after injury

Timely access to healthcare is crucial for recovery and better outcomes after injury. The findings of this study indicate that one-third of participants did not arrive at the hospital on the same day of the injury occurrence. Various factors could contribute for the delay from injury to admission after injury. A study in Africa<sup>36</sup> described important factors that could delay access to healthcare services for patients with trauma: personal factors (lack of awareness of the healthcare), physical barriers (distance and transport access to healthcare) and financial factors related to healthcare costs. A study in Cambodia<sup>37</sup> reported that the longer the time from injury to admission, the longer the length of hospital stay and associated implications. Nonetheless, the length of hospital stay may not necessarily be because of the delay in obtaining healthcare services, it may also be due to the severity of the injury. In our study, nearly half of the participants were admitted to the hospital for more than a week, and 18% of them were admitted for more than a month. Moreover, 23% of the participants had a revisit to health institutions more than six times due to health problems associated with the injury. Higher needs for ongoing healthcare by injury survivors were reported by a previous study in Ethiopia.<sup>23</sup> Experiences of the injured population during the healthcare process and after discharge have not been well investigated; hence, more study is required with in-depth exploration of major barriers to early healthcare access and associated long-term impacts.

### Impairment as a consequence

A year after the injury, 61% of participants had some form of impairment. Recent studies among road traffic injury survivors in Ethiopia<sup>25, 28</sup> and earlier studies in other countries<sup>19, 38</sup> also reported high disability status among injury survivors. Given that most injuries were due to road traffic collisions, it suggests that transport-related injuries are serious enough to lead to disability among survivors. The occurrence of injuries and associated consequences are preventable health problems with due attention from public health and rehabilitation scientists to improve injury prevention and enhance rehabilitation interventions. Furthermore, chronic illnesses can be aggravated or caused by injuries. One-third of the participants had at least one type of chronic illness. Existing health problems, including chronic illnesses, can influence individuals' functioning and may jeopardize their potential to resume preinjury life.<sup>39</sup>

### Implications for participation and economic activity

Employment in general is a proxy measure for functioning in the real world. For injury survivors, work has multidimensional benefits. For example, a recent study in the UK reported on the importance of resuming work after injury for enhancing survivors' sense of purpose in life, nurturing self-identity and encouraging social interaction.<sup>40</sup> The current study reflects a slightly lower return-to-work success rate (59%) than the other two studies in Ethiopia. Tamene and colleagues reported in 2022 that 73.5% of participants returned to work 45 days after the injury,<sup>24</sup> while in an earlier study, researchers found that 83% had returned to their preinjury work 6 months after the injury was reported.<sup>23</sup> The difference could be because of differences in the sources of data, where the Tamene *et al* study extracted the data from the records of employers in manufacturing industries,

and the latter study included interviews from surrogates. The actual success rate of return to work (RTW) might have varied if these studies had interviewed the injury survivors directly, as this is the case with the current study. For example, a very recent study among road traffic injury survivors in Ethiopia reported a 56% RTW rate with a 1-year follow-up after the injury based on telephone interviews with survivors.<sup>25</sup> In addition, our study setting is a referral hospital where more serious and complicated cases of injuries would be referred to, hence their RTW potential could be restrained. Our finding is similar to studies in many other countries with reported RTW success rates up to 65%.<sup>15, 20, 21</sup> However, a study in Uganda<sup>13</sup> reported a much lower RTW rate (35%) 1 year after injury. The variation in RTW rates compared with studies in other countries could be justified by differences in workplace systems, policy frameworks and enforcement as well as differences in data management and reporting.

A closer look into participants' employment conditions and their income revealed that nearly a third of the work-returned participants earn lower employment income compared with their preinjury. The economic implication of injuries with reduced employment income after injury was reported by earlier study in Ethiopia,<sup>14, 23</sup> and also in other countries.<sup>41</sup> The reduction in employment income after injury could be due to the changes in their employment conditions after injury. For instance, our study indicates that injury survivors who fail to return to their preinjury employer had to change their job types. Earlier study also indicates that changes in employer and job types after injury could impact the health outcomes of survivors.<sup>42</sup> Therefore, skills training and building employers' competency on inclusive employment could be vital to consider for a smooth transition to work after injury and to avoid loss of income. Therefore, the preferred goal of RTW planning should be to be with the same employer and job.

Our findings highlighted various challenges to RTW experienced by injury survivors. Some of these challenges may have been avoided had injured parties received timely and appropriate care. The most common challenges were physical stressors (ie, barriers related to their workstation, working materials, and mobility). Challenges related to the presence of physical stressors and unavoidable residual functional loss could be addressed with ergonomics interventions that help to fit the work demands with the needs, capacities and limitations of injury survivors (eg, work design, flow, and materials).<sup>43</sup> Overall, the outcome of RTW after an injury is mediated by a range of factors at various system levels<sup>16, 27</sup>; this calls for research to examine factors that support RTW in LMIC.

### Shift of care and support to informal social systems

Arrangement of a functional RTW support system is vital. According to social capital theory, social resources are crucial in helping individuals to cope with external barriers and access facilitators of necessary supports. Earlier studies indicated the role of social supports during recovery from injury as vital resources for RTW success.<sup>44, 45</sup> Lack of appropriate rehabilitation services and RTW support systems could contribute to long-term consequences of injuries that may leave the injury survivors' recovery on the shoulders of families and other informal support systems. Likewise, this study revealed that members of informal social networks have stepped up in the RTW process to fill the gap left by the healthcare and labor systems. Participants who returned to work after the injury had accessed support mainly from non-professional supports, including religious institutions, family, relative, and friends, while small portion of participants

had access to RTW support from their workplaces (42%) and health providers (20%). This reflects the lack of a formal RTW support system and could be linked to the Ethiopian socio-cultural structure, where supports from family, relatives and neighbors are common, with a foundation in spirituality or religiousness.<sup>46,47</sup> This perspective holds deep societal expectations to support individuals in one's life, including persons with disabilities, and may be the reason for the prevailing lack of expectation that more formalized structures (eg, health, rehabilitation, and worker's compensation systems) should hold responsibility in this regard. Overall, policies are required to vitalize the healthcare and workplace system to respond for the needs of trauma survivors in relation to RTW. In addition, education is key at all levels to improve the role of formal support while nurturing informal resources for RTW support.

Overall, this study employed a rigorous process in participant recruitment and data collection, which is the strength of the study given the poor data recording system in Ethiopia's healthcare system. Furthermore, the method of data collection (telephone interview) is less feasible in the Ethiopian context.<sup>23</sup> Nevertheless, the study has some important limitations to be considered. The trauma data recording system was weak, with a major obstacle being the difficulty reconnecting with former patients due to unavailable or inaccurate contact information. Also, we were not able to trace some patient medical records. Hence, of the 1222 potential participants, only 254 survivors ultimately completed the survey. This study is cross-sectional, with measurements collected at one point in time. The use of data drawn from one study setting and a retrospective analysis, as is the case of this study, introduces limitations such as selection bias, thus impeding the generalizability of the findings. Further investigation is required involving multiple settings to generate a comprehensive understanding.

## CONCLUSIONS

The most prevalent types of injuries encountered by the Ethiopian working age adults are road traffic collision and violence. The implications of these injuries on the socioeconomic well-being of the country are substantial, particularly with high prevalence of disability, low RTW and reduced employment income. The formal support system in resumption of work after injury is poor. The study indicates the potential of social and cultural structures, including religious institutions and social structures, which add value through a culture of caring for vulnerable individuals. Therefore, RTW strategies in low and middle-income settings may benefit by encompassing religious institutions, families, and social relationships, and by nurturing the values to support vulnerable groups. The results are relevant for policy-makers, care providers and researchers. The Ethiopian government should give due attention to injury prevention, reduction of long-term consequences and enhancing the RTW support system for injury survivors. More research is required to explore the factors contributing to long-term outcomes.

**Acknowledgements** We would like to extend our gratitude to our study participants for their time providing the data and for our data collectors at both phases of the chart extraction and telephone interview. Also, special thanks to Mr. Hailemichael Mulugeta, our local support throughout the data collection process as a supervisor (research assistant).

**Contributors** ANA is the lead author and guarantor of the overall content. ANA accepts full responsibility for the finished work and/or the conduct of the study, has access to the data, and controls the decision to publish while working under the supervision of MF. ANA, MF, RL, and AA contributed starting from the conception and design of the study. All authors participated in data collection. ANA, MF, and RL participated in the analysis and interpretation of data. ANA drafted the article

and all authors participated in critical revision and approved the final version of the manuscript.

**Funding** Expenses associated with the research process (i.e., field activity and travel-related expenses) for this article were supported by the Mastercard Foundation Scholars Program at the University of Gondar and Queen's University.

**Competing interests** None declared.

**Patient consent for publication** Not applicable.

**Ethics approval** The research protocol was reviewed, and ethical clearance was obtained from the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board (HSREB)\_ TRAQ #6033129. Also, ethical clearance was obtained from Addis Ababa University College of Health Science Institutional Review Board (IRB). Further, permission was granted from the study setting, AaBET Hospital. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer-reviewed.

**Data availability statement** Data are available upon reasonable request. The data will be readily available upon reasonable request. We anticipate further publications from this dataset, with a distinct focus area.

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## REFERENCES

- Haagsma JA, James SL, Castle CD, Dingels ZV, Fox JT, Hamilton EB, Liu Z, Lucchesi LR, Roberts NLS, Sylte DO, *et al.* Burden of injury along the development spectrum: associations between the socio-demographic index and disability-adjusted life year estimates from the global burden of disease study 2017. *Inj Prev* 2020;26:i12–26.
- Gebru AA, Mosadeghrad AM, Sari AA, Tafesse TB, Kahsay WG. Prevalence, pattern, magnitude and associated factors of trauma in the emergency department at health institutes in Ethiopia: a systematic review. *Hum Antibodies* 2019;27:1–10.
- Hagos AA, Firew T, Gebreyesus A, Sambo BH, Reynolds TA. Ethiopia's quest to champion emergency care systems. *Bull World Health Organ* 2019;97:582.
- Bayissa BB, Alemu S. Pattern of trauma admission and outcome among patients presented to Jimma University specialized hospital, South-Western Ethiopia. *Trauma Surg Acute Care Open* 2021;6:e000609.
- Alamneh YM, Wondifraw AZ, Negesse A, Ketema DB, Akalu TY. The prevalence of occupational injury and its associated factors in Ethiopia: a systematic review and meta-analysis. *J Occup Med Toxicol* 2020;15:14.
- Laytin AD, Seyoum N, Kassa S, Juillard CJ, Dicker RA. Patterns of injury at an Ethiopian referral hospital: using an institutional trauma registry to inform injury prevention and systems strengthening. *Afr J Emerg Med* 2020;10:58–63.
- CSA, ICF. Ethiopia demographic and health survey 2016. Ethiopia, and Rockville, Maryland, USA: Addis Ababa, 2016.
- Banks LM, Kuper H, Polack S. Poverty and disability in low-and middle-income countries: a systematic review. *PLoS One* 2017;12:e0189996.
- Ophuis RH, Janssen MF, Bonsel GJ, Panneman MJ, Polinder S, Haagsma JA. Health-related quality of life in injury patients: the added value of extending the EQ-5D-3L with a cognitive dimension. *Qual Life Res* 2019;28:1941–9.
- Schultz IZ, Gatchel RJ. *Handbook of return to work: from research to practice*. Springer, 2015.
- Geberemichael SG, Tannor AY, Asegahegn TB, Christian AB, Vergara-Diaz G, Haig AJ. Rehabilitation in Africa. *Phys Med Rehabil Clin N Am* 2019;30:757–68.
- United Nations U. Transforming our world: the 2030 agenda for sustainable development; 2016.
- O'Hara NN, Mugarura R, Potter J, Stephens T, Rehavi MM, Francois P, Blachut PA, O'Brien PJ, Fashola BK, Mezei A, *et al.* Economic loss due to traumatic injury in Uganda: the patient's perspective. *Injury* 2016;47:1098–103.



- 14 Debelo MB, Azage M, Deyessa N, Begosaw AM. Economic costs and predictors of occupation-related injuries in Ethiopian sugar Industries from the employer's perspective: top-down approach and friction method. *BMC Public Health* 2022;22.
- 15 Collie A, Simpson PM, Cameron PA, Ameratunga S, Ponsford J, Lyons RA, Braaf S, Nunn A, Harrison JE, Gabbe BJ. Patterns and predictors of return to work after major trauma: a prospective, population-based registry study. *Ann Surg* 2019;269:972–8.
- 16 Hershenson DB. Updating the systemic, ecological model for rehabilitation counseling. *Rehabil Couns Bull* 2020;63:125–7.
- 17 Seid Y, Taffesse AS, Ali SN. Ethiopia: an agrarian economy in transition: WIDER working paper. 2015.
- 18 CSA. Statistical report on the 2020 urban employment unemployment survey. Addis Ababa; Ethiopia: Federal Democratic Republic of Ethiopia central Statistics agency. contract No.587
- 19 Gabbe BJ, Simpson PM, Harrison JE, Lyons RA, Ameratunga S, Ponsford J, Fitzgerald M, Judson R, Collie A, Cameron PA. Return to work and functional outcomes after major trauma. *Ann Surg* 2016;263:623–32.
- 20 Post MW, Reinhardt JD, Avellanet M, Escorpizo R, Engkasan JP, Schwegler U, Leiuflsrud AS, InSCI. Employment among people with spinal cord injury in 22 countries across the world: results from the International spinal cord injury community survey. *Arch Phys Med Rehabil* 2020;101:2157–66.
- 21 Park SK, Lee CK. Pre-injury job characteristics and return to work among injured workers in South Korea: differences by socio-demographic and injury-related characteristics. *Disabil Rehabil* 2019;41:691–8.
- 22 Labour Proclamation. No.1156/2019; 2019.
- 23 Laytin AD, Seyoum N, Azazh A, Zewdie A, Juillard CJ, Dicker RA. Feasibility of telephone-administered interviews to evaluate long-term outcomes of trauma patients in urban Ethiopia. *Trauma Surg Acute Care Open* 2018;3:e000256.
- 24 Tamene A, Habte A, Derilo HT, Endale F, Gizachew A, Sulamo D, Afework A. Time to return to work after an occupational injury and its prognostic factors among employees of large-scale metal manufacturing facilities in Ethiopia: a retrospective cohort. *Environ Health Insights* 2022;16:11786302221109372.
- 25 Denu ZA, Yassin MO, Yesuf M, Azale T, Bikis GA, Gelaye KA. Disability scores rate changes and predictors among road traffic injury victims admitted at Gondar specialized comprehensive hospital Northwest Ethiopia: A prospective follow-up study. *Traffic Inj Prev* 2022;23:40–5.
- 26 Zewdie A. Assessment of trauma care in tertiary center, Addis Ababa Ethiopia: an observational study. *EC Emerg Med Crit Care* 2020;4:01–8.
- 27 Knauf MT, Schultz IZ. *Current conceptual models of return to work*. *Handbook of return to work*. Springer; 2016: 27–51.
- 28 Denu ZA, Yassin MO, Bisetegn TA, Bikis GA, Gelaye KA. The 12 items Amharic version WHODAS-2 showed cultural adaptation and used to measure disability among road traffic trauma victims in Ethiopia. *BMC Psychol* 2021;9:1.
- 29 Ilmarinen J. The work ability index (WAI). *Occup Med* 2007;57:160.
- 30 Üstün TB, Kostanjsek N, Chatterji S, Rehm J. Measuring health and disability: manual for WHO disability assessment schedule WHODAS 2.0: World Health Organization. 2010,
- 31 ILO. International standard classification of occupations ISOC-08. structure, group definitions and correspondence tables. Geneva 2012.
- 32 Edomwonyi EO, Enemudo RE, Okafor IA. Pattern of mortalities among orthopaedic and trauma admissions in Irrua. *OJO* 2015;05:179–85.
- 33 Swarnkar M, Singh P, Dwivedi S. Pattern of trauma in central India: an epidemiological study with special reference to mode of injury. *IJE* 2010;9.
- 34 WHO. World health Statistics 2023: monitoring health for the Sdgs, sustainable development goals. World Health Organization, 2023.
- 35 Maine RG, Williams B, Kincaid JA, Mulima G, Varela C, Gallaher JR, Reid TD, Charles AG. Interpersonal violence in peacetime Malawi. *Trauma Surg Acute Care Open* 2018;3:e000252.
- 36 Locke HN, Randriamarotsiresy V, Chamberlain MA, O'Connor RJ. Delays to accessing healthcare and rehabilitation following trauma in Madagascar—a qualitative study. *Disabil Rehabil* 2021;43:3323–30.
- 37 Barthélemy EJ, Spaggiari R, Corley J, Leopard JR, Staffa SJ, Iv V, Servadei F, Park KB. Injury-to-admission delay beyond 4 hours is associated with worsening outcomes for traumatic brain injury in Cambodia. *World Neurosurgery* 2019;126:e232–40.
- 38 Abedzadeh-Kalahroudi M, Razi E, Sehat M, Asadi-Lari M. Psychometric properties of the world health organization disability assessment schedule II-12 item (WHODAS II) in trauma patients. *Injury* 2016;47:1104–8.
- 39 Nazarov S, Manuwald U, Leonardi M, Silvaggi F, Foucaud J, Lamore K, Guastafierro E, Scaratti C, Lindström J, Rothe U. Chronic diseases and employment: which interventions support the maintenance of work and return to work among workers with chronic illnesses? A systematic review. *Int J Environ Res Public Health* 2019;16:1864.
- 40 Gavin JP, Kettlewell J, Elliott AO, Ammour S, Wareham P. Priorities for returning to work after traumatic injury: a public and professional involvement study. *Br J Occup Ther* 2022;85:974–83.
- 41 Bae SW, Oh SS, Park WM, Roh J, Won J-U. Changes in income after an industrial accident according to industry and return-to-work status. *Int J Environ Res Public Health* 2019;16:2603.
- 42 Jeong I, Yoon J-H, Roh J, Rhie J, Won J-U. Association between the return-to-work hierarchy and self-rated health, self-esteem, and self-efficacy. *Int Arch Occup Environ Health* 2019;92:709–16.
- 43 Paquette S. Ergonomic accommodation in return to work. In: Schultz IZ, Gatchel RJ, eds. *Handbook of return to work: From research to practice*. Springer, 2016: 307–26.
- 44 Farholm A, Halvari H, Niemiec CP, Williams GC, Deci EL. Changes in return to work among patients in vocational rehabilitation: a self-determination theory perspective. *Disabil Rehabil* 2017;39:2039–46.
- 45 White C, Green RA, Ferguson S, Anderson SL, Howe C, Sun J, Buys N. The influence of social support and social integration factors on return to work outcomes for individuals with work-related injuries: a systematic review. *J Occup Rehabil* 2019;29:636–59.
- 46 Hamren K, Chungkham HS, Hyde M. Religion, spirituality, social support and quality of life: measurement and predictors CASP-12 (V2) amongst older Ethiopians living in Addis Ababa. *Aging Ment Health* 2015;19:610–21.
- 47 Jansen-van Vuuren J, Lysaght R, Batorowicz B, Dawud S, Aldersey HM. Family quality of life and support: perceptions of family members of children with disabilities in Ethiopia. *Disabilities* 2021;1:233–56.
- 48 United Nations U. International standard industrial classification of all economic activities (ISIC). New York, 2008.