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(RESEARCH ARTICLE)

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Years lived with disabilities of the working-age population owing to injuries

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Abstract

Introduction: Cases of mortality and illness caused by injury in Mongolian population have increased drastically in recent years, and in 2022, 5th cause of illness and the 3rd cause of mortality.

On average, more than 146,000 new cases of accidents and injuries are registered in Mongolia every year. More than 69% of it is a working-age population.

Purpose and objectives: The purpose of the research work is to calculate the number of years lived with disability due to accidents among the working-age population of Mongolia.

Research materials and methods: The study design is a Retrospective Cohort Study. The research work was carried out according to the WHO's burden of disease determination method. We collected quantitative data on disease numbers in Mongolia from the year 2016 to 2020 from the database of the Health Development Centre and National Center for Traumatology. The number of years lived with a disability was calculated using 306,823 quantitative information of the working-age (15-61) population of Mongolia in 2016-2020.

Results: In Mongolia, 61.0% (n=187047) of the causes of accidents and injuries among the working-age population over 5 years were men and 39.0% (n=119776) were women. Considering the causes of accidents and injuries among the working-age population, 49.3% of all illnesses are falls, 25.3% are homicides, 22.9% are road accidents, and the rest are suicides, intoxication/exposure to toxic substances.120469 years of living with disability due to accidents caused by external causes of the working-age population of Mongolia over 5 years. The number of years lived with a disability was 77,135 years (64.0%) for men and 43,334 (36.0%) years for women.

Conclusion: The working-age population of Mongolia has 120,469 years of living with disabilities caused by accidents caused by external causes. 1.8 times more years are lost than men and women.

Keywords: Injury; working age; Years lived with disability; Mongolia

1. Introduction

Extrinsic injuries can occur through a variety of mechanisms, such as road accidents, falls, drownings, fires, etc., all of which can result in injury or even death. Lesions appear within 48 hours or less [1]. Instances of mortality and illness caused by injury in the Mongolian population have increased drastically in recent years, and in 2022 it became the 5th cause of illness and the 3rd cause of mortality. In 2020, 145,497 new accidents were registered in Mongolia, of which over 69% were working age population [2]. The 1990 Global Burden, Injuries, and Risk Factors Study was the first study to develop population-based disease burden studies [3]. DALY is a measure of disease burden. It is an indicator that

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combines the total health loss of a population into a single index by summing the years of premature death (YLLs) and the non-fatal outcomes of health outcomes (YLDs) in years lived with disability [4].

In the 1990 Global Burden of Disease Study, injuries accounted for more than 15 percent of global life years lost (DALYs), and subsequent studies reported that this would increase to 20 percent by 2020 [5] [6].

The purpose of the research work is to calculate the number of years lived with disability due to accidents among the working-age population of Mongolia.

2. Materials and methods

2.1. Study design

Retrospective cohort Study design was performed. The research work was carried out according to WHO's burden of disease method. We collected quantitative data on disease incidence in Mongolia from the year 2016 to 2020, the database of the Health Development Centre and National Center for Traumatology. The quantitative data on the causes of accidents and injuries in Mongolia for 2016-2020 were analyzed.

The working-age population is defined as people aged 15 and over. There were 1.2 million working-age people in Mongolia in 2016, 1.3 million in 2017, 1.3 million in 2018, 1.3 million in 2019, and 1.25 million in 2020. And it accounts for 37-43 percent of the total population [7]. During the survey years, the retirement age for men in Mongolia was 61 and for women was 56 [8].

2.2. Participants

Based on a incidence of diseases reported within the recent five years and according to the international categorization of diseases V01-V99, W00-X59, X60-X84, X85-Y09, Y10-Y34, Y35-36, Y40-Y84, Y85-89, following the diagnosis, we received the relevant information of 306823 diseases caused by external factors/injuries. The statistical data included age, gender, education level, date of birth, employment status, date of injury, date of hospitalization, cause of injury, diagnosis of injury, and other additional information was included.

The following inclusion criteria were used to estimate the data:

- For calculation of the YLD to injuries, the number of diseases due to external factors and injuries in 2016-2020
- The YLD calculation includes the population of women aged 15-56 and men aged 15-61.
- Being injured due to accidental falls, road accidents, harming others, suicide, accidental poisoning, or exposure to toxic substances.
- Exclusion criteria for the study:
- Exclude causes other than the top 5 causes of injury.
- Exclude the population of age groups other than working age.
- Eliminate accidental deaths.

2.3. Data source and measurement

We collected quantitative data on disease incidence in Mongolia from the year 2016 to 2020 from the database of the Health Development Centre and National Center for Traumatology.

Based on the numerical data of 306,823 cases with diagnosis codes V01-V99, W00-X59, X60-X84, X85-Y09, Y10-Y34, Y35-36, Y40-Y84, Y85-89, the years lived with disability were calculated as follows.

$$\boldsymbol{YLD = I \cdot DW \cdot L}$$

I-number of incident cases
DW-disability weight
L-average duration of disability

The disability weight was calculated from 0 to 1 by adjusting the percentage for each injury diagnosis [9] [10].

2.4. Variables

In order to calculate the number of years living with a disability in Mongolia, the leading causes of accidents such as falls, road accidents, accidental poisoning, exposure to toxic substances, suicides, and accidents involving harm to others were selected.

Age group (15-19, 20-24, 25-29..., 55-59, 60-61), gender, duration of the accident, location of the accident, and accident variables such as date of injury were used.

2.5. Statistical analysis

Years lived with disability were calculated by the cause of the injury, the diagnosis of the injury, and the age at which the injury occurred using the disability weighting. Total and average values of the injury burden were calculated per person. The processing of research results was carried out using Microsoft Excel 2017.

2.6. Ethics statement

The research methodology was discussed and approved by the Academic Council of the Mongolian National University of Medical Sciences on June 17, 2021 (meeting No 21/22).

The research methodology was discussed during the meeting of the Research Ethics Review Committee of the Mongolia National University of Medical Sciences on December 24, 2021 (meeting No. 2021-3/13), and the research permission was approved. Considering the retrospective nature of the survey data, all data were obtained from publicly available sources without social registration numbers.

3. Results

In Mongolia, 306,823 new cases of road accidents, falls, accidental exposure to poisonous substances, harming others, and suicides were registered among the working-age population in the 5 years from 2016 to 2020, 61% of were men and 39% were women. In terms of age group, 30.8 percent were 25-34 years old, and the remaining higher percent than other age groups. (Table 1)

Table 1 General information on injuries occurred in 2016-2020

Demographics	Number	Percentage
Total	306,823	
Gender		
Male	187,047	61.0%
Female	119,776	39.0%
Age group		
15-19	34,676	11.3%
20-24	38,806	12.6%
25-29	48,438	15.8%
30-34	46,099	15.0%
35-39	35,549	11.6%
40-44	29,873	9.7%
45-49	25,360	8.3%
50-54	26,965	8.8%
55-59	18,708	6.1%
60+	2,349	0.8%
Location of the accident		
At work	4,144	1.4%

At home	60,590	19.7%
Field, Outdoor, Street	152,957	49.9%
Physical education and sports field	17,678	5.8%
Construction	3,947	1.3%
In other places	67,507	22.0%
Cause of injury		
Random	225,370	73.5%
Suicide	3,755	1.2%
Violence	77,698	25.3%

Considering the location of the accidents, 49.9 percent of all accidents occurred in fields and outdoor streets, and 19.7 percent occurred at home. Accidental injuries accounted for 73.5% of the incidence of accidents, violent injuries for 25.3%, and suicide injuries for 1.2%. (Table 1)

Table 2 Years lived with disability (by age group and gender)

Age/Gender	**Male**		**Female**		**Total**	
	Number	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
15-19	9,542	12.4%	3,714	8.6%	13,256	11.0%
20-24	11,144	14.4%	4,257	9.8%	15,402	12.8%
25-29	13,148	17.0%	5,664	13.1%	18,812	15.6%
30-34	11,658	15.1%	6,056	14.0%	17,714	14.7%
35-39	8,767	11.4%	4,808	11.1%	13,575	11.3%
40-44	7,173	9.3%	4,545	10.5%	11,718	9.7%
45-49	5,862	7.6%	4,142	9.6%	10,004	8.3%
50-54	5,037	6.5%	6,007	13.9%	11,044	9.2%
55-59	3,757	4.9%	4,140	9.6%	7,898	6.6%
60+	1,046	1.4%		0.0%	1,046	0.9%
Total	77,135	100%	43,334	100%	120,469	100%

The Years Lived With Disability (YLD) of the working-age population who were injured during the 5-year study period was 120,469. Considering the number of years lived with disability by gender, men (77,135) lose 1.8 times more years than women (43,334). Considering the age group, 15.6 percent of people aged 25-29 years old and 14.7 percent of 30-34-year-olds lost the most years. (Table 2)

Table 3 Years lived with disability (by age group and gender)

Cause of disease	**Male**		**Female**		**Total**	
	Number	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
Suicide	466	0.6%	304	0.7%	770	0.6%
Homicide	23,916	31.0%	8,060	18.6%	31,976	26.5%
Road accidents	21,119	27.4%	10,409	24.0%	31,528	26.2%
Intoxication/exposure to toxic substances	451	0.6%	310	0.7%	761	0.6%
Falling	31,183	40.4%	24,252	56.0%	55,434	46.0%
Total	77,135	100%	43,334	100%	120,469	100%

Table 3 shows the number of years living with disability in accidents, classified by the cause of the accident. Falls, 26.5% of harming others, and 26.2% of road accidents account for 46% of the total year of living with disabilities. Both men and women lost the most labor force due to the fall.

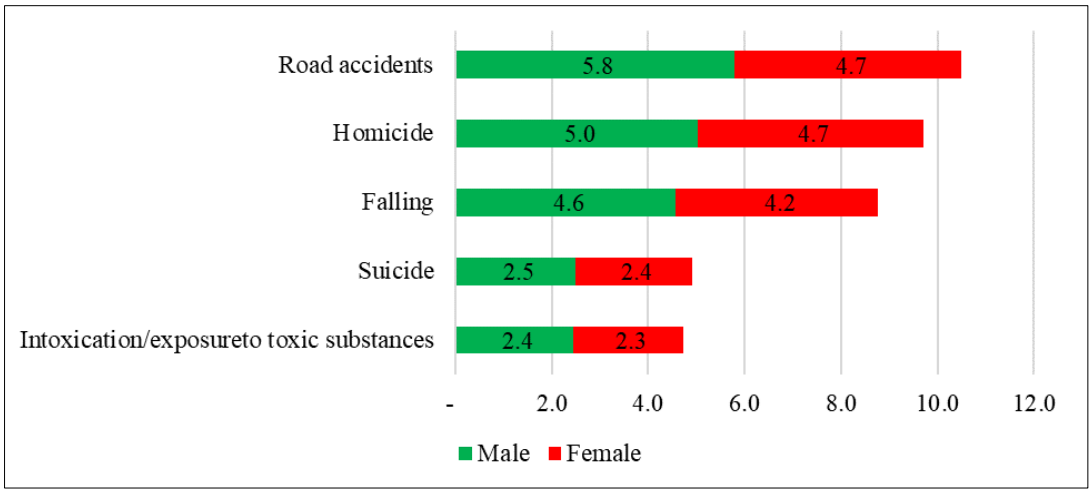

Figure 1 Years of disability per person (months)

In Figure 1, The amount of years of living with disability per person, the number of years of lost work ability is highest for road accidents, injury to others, and falls. Men lose their ability to work for an average of 5.8 months due to road accidents, and women lose their ability to work for 4.7 months due to road accidents or being harmed by others.

4. Discussion

This study shows the number of years of disability caused by injuries in Mongolia over 5 years. According to the results of the research, 120,469 years of living with disability were caused by the five leading causes of injuries: road accidents, falls, accidental poisoning, exposure to toxic substances, harming others, and suicide. Men lose 1.7 times more years than women. Men and women lost more years due to the same decline.

According to the 2013 Global Burden of Disease Survey, 36.8 million years were lost due to injury. Of this, 8.6 million person-years were lost due to road accidents, 12.8 million person-years due to falls, 0.7 million person-years due to accidental poisoning or exposure to toxic substances, and 0.2 person-years due to suicide [11]. However, according to the results of our research, 55,400 people lost their lives in falls and 31,500 people lost their lives in road accidents.

Annemieke C. Scholten and Juanita A. Haagsma's study aimed to estimate the incidence, cost-of-illness, and Disability adjusted Life Years (DALY) of brain injury in the Netherlands. The study included clients who were treated for or died of a traumatic brain injury between 2010 and 2012. According to research, 213.6 brain injury cases per 100,000 population per year and 52,998 years of living with disability. YLD per case: 2.29 for men and 2.05 for women. The average YLD for men and women decreased [12].

Ronan A. Lyons et al., a study of the burden of injury in the United Kingdom. The study was conducted using a cohort study design to estimate disease burden. According to the results of the research, in 2005 in UK, the number of years lived with disability due to accidents was 1,450,765 [13]. According to our research, in 2016-2020, the 5 leading causes of accidents and disability were 120,469 years of life.

According to Keith T. S. Tung and Frederick K. Ho, the injury burden in Hong Kong was 308,799 in 2001-2012. According to this study, men lose more years than women [14].

According to Won Kyung Lee, Dohee Lim, and Hyesook Park's research, based on 22,831 cases of accidents and diseases in Republic of Korea in 2012, the number of years of living with a disability is 976,712. Of these, 44.3 percent were road accidents, 34.5 percent were falls, 0.4 percent were accidental poisonings and exposure to toxic substances, 1.4 percent were suicides, and 3.3 percent were accidents involving harm to others [15]. However, according to the results of our research, 46% of falls, 26.5% of harm to others, 26.2% of road accidents, and 0.6% of suicides and accidental poisoning.

5. Conclusion

In 2016-2020, 306,823 new cases of road accidents, falls, exposure to toxic substances, harm to others, and suicide were registered among the working-age population in Mongolia. The working-age population of Mongolia has 120,469 years of living with disabilities caused by accidents caused by external causes. 1.8 times more years are lost than men and women. 46% of YLDs fall, 26.5% harm to others, and 26.2% traffic accidents.

Compliance with ethical standards

Disclosure of conflict of interest

The authors report no conflicts of interest in this work.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

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