

An Investigation of Work-Related Accidents and Its Effects on the Costs of Social Security Organization over the Period of 2012-2016

Ali Sabz Tajari¹, MSc; Iravan Masoudi Asl², PhD; Somaye Hessam¹, PhD

Abstract

Background: Millions of people around the world suffer from occupational accidents each year, many of whom become disabled or die. The purpose of this research was to study work-related accidents and its effects on the costs incurred by Social Security Organization (SSO) of Iran during the years 2012-2016.

Methods: This comparative-descriptive study examined the insurance and medical costs of approximately 96,000 occupational accidents registered in the SSO systems over the period of 2012-16. Data were collected through statistical forms and Medical Commissions Comprehensive System, as well as the data recorded in the SSO systems. The collected data were analyzed using descriptive statistics, Excel software, and SPSS 22. Pearson correlation test was used to investigate the relationship between work-related accidents and the research variables (short-term and long-term medical costs and lost working years).

Results: Findings indicated that an average of 115 people (0.59%) die each year from work-related accidents. Occupational accidents also lead to total disability of 176 people (0.91%) and partial disability of 292 people (1.5%) per year. About 5% of the victims (998 people) receive lump sum payments as compensation for permanent impairment and 92% (17665 people) fully recover from job injuries. Work-related accidents impose an average financial burden of about IIR 147 billion annually on SSO as short-term costs, about IIR 247 billion as inpatient and outpatient treatment costs, and about IIR 497 billion as long-term costs. Overall, the average total annual expenditure incurred by the organization as the short-term, long-term, and medical costs is over 890 billion IIR.

Conclusion: The occurrence of work-related accidents has an incremental effect on the short- and long-term costs of the SSO and imposes considerable costs on the organization annually (more than IIR 890 billion). Given the ever-increasing number of insured individuals in the organization, if there is no solution, these accidents will lead to lower insurance premiums by the insured people and increase the length of death and disability support pensions (long-term support) and short-term costs of the organization. According to the research findings, there is a need to enforce the existing social security laws in order to persuade the employers to modernize industries and develop training programs for workers.

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¹Department of Health Service Administration, South Tehran Branch Islamic Azad university, Tehran, Iran
²Associate Professor of Healthcare Services Management Department of Healthcare Services Management School of Health Management & Information Sciences Iran University of Medical Sciences, Tehran, Iran

Correspondence:

Ali Sabz Tajari, MSc;
 Department of Health Service administration, South Tehran Branch Islamic Azad University, Tehran, Iran
 Tel: +98 919 7835289

Email: tajari2004@gmail.com

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Introduction

Occupational accidents are one of the most important problems in developed and developing countries and have started to increase dramatically for about one hundred and fifteen years.¹ Occupational accidents, in addition to affecting economic indicators, may also result in human losses. Although it is still impossible to measure all aspects of human costs, such as pain and suffering of the victims and their relatives, some of its aspects are measurable.²⁻⁴ Human costs are the most important part of the expenditures of these events. Death from occupational accidents leads to loss of life, lost working years, and other associated costs.⁵⁻⁷ Every year, tens of millions of workers are victims of work-related accidents worldwide, resulting in death, total/partial disability, or permanent impairment of a large number of them.⁵ Around 317 million accidents occur worldwide annually, resulting in approximately 2.78 million deaths. In other words, about 6300 workers die every day due to occupational accidents, i.e. one person dies every 4 minutes.⁸⁻¹⁰ Approximately, 160 million workers suffer from work-related diseases and 313 million workers from non-fatal injuries.^{8, 11} Estimates show that 60% of the world's workforce is protected inappropriately against work-related accidents and diseases and 4% of the world's annual GDP is lost due to work-related injuries and diseases.^{12, 13}

The Social Security Organization (SSO) spends more than one-third of its earnings on medical expenses and more than 50% of its premium income on long-term expenses, including pension payments to the retired individuals, disabled ones, deceased relatives, and survivors, along with allowances (child benefit, housing allowance, New Year rewards, etc.).¹⁴ The SSO also allocates about 2% of its premium income to short-term aids, including funeral allowance, work-related illness lost wage compensation, lump sum compensation for permanent impairment, orthosis/prosthesis costs, and traveling costs for patients and companions.¹⁴

In 2016, around 18522 individuals were injured in work-related accidents in Iran. The SSO, in line with its supportive and legal role, paid approximately IRR 5800 billion in compensation for 332841 days of rest (15379 inpatient days and 317462 outpatient days), permanent impairment, and pensions due to work-related total/partial permanent disability.⁴ Of those affected, about 398 people suffered from total disability (66% and over), 602 from partial disability (33% to 66%), and 1098 from permanent impairment (less than 33%).¹⁵

The present descriptive-comparative study, aiming at examining and estimating the costs of work-related accidents, clearly illustrates that most of these costs are social in nature, which in addition to the SSO, are

imposed on the whole community. The output of this study would be the estimation of human burden cost of work-related accidents leading to death and disability, including the medical costs, short-term costs, and the costs from lost working years imposed on SSO. The findings could encourage the authorities to follow up the cases and invest in preventive activities at the workshops subjected to the Social Security Act, and ultimately by controlling and reducing the costs of work-related accidents, reduce the costs of these accidents. It should be mentioned that the SSO supports all *strata of the society* at times of decline or cut of income, illness, unemployment, disability, retirement, death, and headlessness through two insurance and supportive systems.¹⁶

Materials and Methods

In this descriptive-comparative study, the data on work-related victims registered in the SSO systems during the research period (about 96,000 people) were collected. Then, the basic accident data were analyzed using software such as Excel and SPSS22 as well as descriptive statistics. The Pearson correlation test was used to analyze the data and determine the relationship between the variables (relationship between the rate of work-related accidents with medical costs, short-term costs, long-term costs, and the costs from lost working years).

Results

The results revealed that about 92% of the victims were fully recovered. The compensation for permanent impairment accounts for almost a high percentage. The insured individuals, who suffered partial and total disabilities, had a lower share of deaths (Table 1).

Short-term spending imposed a financial burden of about IIR 738 billion on the SSO over the years under the study, including over IIR 700 billion as sick pay and more than IIR 33 billion as partial disability compensation (on average about IIR 147 billion annually). Work-related accidents in the years under the study imposed more than IIR 1236 billion, an average of approximately IIR 247 billion (about IIR 12781500 per job accident), on the organization as a financial burden from inpatient and outpatient costs. The results of the research showed that the human cost of job accidents resulting in total/partial disability and death during the years studied was about IIR 2480 billion (on average IIR 490 billion per year) (Table 2).

Lost working years was recognized as another influential variable in increasing the financial burden of the organization. The results showed that the total number of days lost due to outpatient treatment and hospitalization of the victims was around 13721 years (an average of 2744 working years per year) over the study period. In addition, the deaths and

Table 1: Outcomes from work-related accidents in the years 2012 to 2016

Outcome	2012		2013		2014		2015		2016	
	%	No.	%	No.	%	No.	%	No.	%	No.
Death	0.55	113	0.60	117	0.63	121	0.57	108	0.63	117
Total permanent disability	0.86	177	1.03	201	0.89	169	0.98	185	0.80	150
Partial disability	1.61	331	1.59	311	1.52	289	1.47	277	1.37	254
Permanent impairment	4.70	967	4.85	946	4.15	786	5.22	981	7.06	1309
Full recovery	92.26	18944	91.91	17902	92.78	17551	91.74	17235	90.11	16692
Sum	100	20532	100	19447	100	18916	100	18786	100	18522

Table 2: SSO spending by the type of cost (values are in Iranian Rials)

Year	Short-term	Long-term	Treatment	Sum
2012	104,818,753,780.	316,841,069,387	123,818,792,800	545,478,615,967
2013	124,107,601,558	437,020,679,513	166,129,609,184	727,257,890,255
2014	148,847,123,698	491,028,093,302	218,730,040,835	858,555,170,457
2015	174,602,315,121	584,847,609,940	436,026,876,312	1,195,476,801,373
2016	186,122,683,280	657,415,944,720	291,453,482,444	1,134,992,211,444
Sum				4461,760,588,496

total disability from work in 2012 to 2016 resulted in the loss of 29,955 working years (an average of 5,991 working years annually). In other words, occupational accidents in the years studied led to the loss of about 43676 years of work.

Discussion

One of the variables that influenced the increase in the short-term costs of the organization was the number of rest days. Based on this variable, the subjects were categorized into two groups of injuries with outpatient treatment (97%) and those leading to hospitalization (3%). The total number of days lost due to accidental hospitalization and outpatient treatment over the study years was approximately 13721 years. The results also showed that short-term expenditures, over the years studied, had imposed a financial burden of about IRR 738 billion on the Social Security Organization, of which about IRR 33 billion was related to the lump sum compensation for partial permanent impairment and about IRR 705 billion to sick pay. Koupal et al. reported that during the two years, the victims used 45912 days of medical rest (an annual average of 22956 days of rest). On average, each victim cost an equivalent of about IRR 8740000 as lump sum compensation for permanent impairment.¹⁷ The results of this study indicated that an average of 52.05 days of medical rest was used for each accident and an average of IRR 6640000 was paid for each victim as lump sum compensation for permanent impairment. Therefore, according to the results of Koupal's study, an average of 50.2 days rest was reported for each occupational accident in the study years, and the cost per year was equivalent to the Rial value of approximately IIR 8740000 per lump sum payment for permanent impairment. Another variable that influenced the increase in organization costs in this study was long-term costs (death, and total and partial disabilities) caused by the occupational accidents. The

results of the study indicated that the work-related deaths and general disabilities during the years studied resulted in the loss of 29,955 working years.

The results also showed that the human cost of the job accidents resulting in deaths and total disability during the study years was about IRR 2480 billion. Koupal et al. claimed that during the two years under the study, approximately IRR 1.9 billion (an annual average of approximately IRR 961 billion) was paid as the financial burden of the accidents leading to death, and general and partial disabilities. Shalini also argued that work-related accidents account for an economic burden of about \$ 168 million.⁹ The results of this study indicated that during the years under the study, the human cost of occupational accidents resulting in death and total disability was approximately IIR 1.67 billion per accident. As Koupal et al. showed in their study, the average human cost per accident resulting in death or disability was IRR 1.65 billion.¹⁷ Another variable that influenced the increase in the organization costs was medical expenses caused by occupational accidents. Work-related accidents in the years under the study generated more than IRR 1236 billion (approximately IRR 247 billion per year and about IRR 12781500 per job accident) due to hospitalization and outpatient costs for the Social Security Organization. Koupal et al. stated that the average medical cost per occupational accident was IRR 5038150.¹⁷ The results of this study showed that the average medical cost per occupational accident was IRR 12781500. As declared by Koupal et al., the average medical cost per accident during the years under the study was estimated to be approximately IRR 5038150.¹⁷ Another variable that contributed to the increase in the organization costs was working years lost due to occupational accidents. The results of this study showed that there was an average of 22.95 years lost per accident, which costs about IRR 727

million per lost year. Atrkar Roshan et al. reported that 95812058 business days were lost over the years under the study (approximately 262499 lost working years), i.e. 24.8 years were lost per job accident.¹⁸ Comparison of the studies show that the results of the present study are close to and in agreement with other studies.

Conclusion

Work-related accidents have led to an increase of IRR 4460 billion in organizational spending over the years studied. In other words, work-related accidents have imposed a financial burden of about IIR 890 billion annually on the SSO and resulted in the loss of 43676 working years. Therefore, given the increasing cost of work-related accidents, if there is no proper planning to prevent and reduce these accidents, early disability/death of the workforce would be likely to occur in the near future, which in turn can lead to lost human cost and financial crisis in the SSO.

Accordingly, in order to reduce the economic losses caused by occupational accidents, it is recommended that we should:

1. float the premium based on the rate of work-related accidents at workshops and determine the premium payments in accordance with the safety and health levels of workplaces
2. determine an indemnity coefficient for pension, compensation, and treatment payments based on the ratings of workplace health and safety
3. award rewards to institutions and workshops that implement appropriate safety measures and to the plans for the mitigation of accidents
4. develop comprehensive and continuous training programs with the aim of preventing accidents and instructions on how to implement them in the workshops

Conflict of Interest: None declared.

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