Available online at www.sciencedirect.com
ScienceDirect
Safety Science 46 (2008) 1078–1090
SAFETY SCIENCE
www.elsevier.com/locate/ssci

Differences in the lethality of occupational accidents in OECD countries

Mariko Nishikitani *, Eiji Yano

Department of Hygiene and Public Health, Teikyo University School of Medicine, 2-11-1 Kaga, Itabashi-ku, Tokyo 173-8605, Japan

Received 1 September 2006; received in revised form 17 April 2007; accepted 19 June 2007

Abstract

International comparisons of the frequency of occupational accidents are rare because figures reported by each country are influenced by factors other than differences in the occurrence of actual accidents. In this study, we performed an international comparison of occupational accidents which distinguishes between fatal cases and all reported accidents, in order to control for the effects of other factors in accident reporting. Annual data on the numbers of fatal and non-fatal occupational accidents in member countries of the Organisation for Economic Co-operation and Development (OECD) between 1993 and 1998 were obtained from the Labour Statistics Database, which is operated by the International Labour Organization (ILO). The average incidence of all accidents across OECD countries ranged from 17 to 4608 per 100,000 persons in the labor force, whereas the incidence of fatal accidents across OECD countries ranged from 1 to 12 per 100,000 persons in the labor force. Lethality rates per 10,000 total accident cases ranged from 9 (Germany) to 3252 (Turkey). When comparing countries using the same statistical definition of accidents, three or more absence days, the difference in lethality of reported accidents within the same industrial sector is reduced to a sixfold difference (49 for the United Kingdom versus 333 for Ireland). Furthermore, the difference in lethality decreased to about twofold (18 for Spain versus 35 for Czech Republic) in the group using definitions with a criteria of one absent day. The results suggest that reported differences in lethality can reflect artificial administrative factors rather than the harmful factors that cause actual occupational accidents. To make more valid comparison of occupational accident between countries, harmonization of accident statistics is required.

Keywords: Occupational accidents; International comparison; Non-fatal accidents; Fatal accidents; Lethality; Workers' compensation

1. Introduction

Establishing an accurate count of accident cases and a fair assessment of their magnitude may be the first step in a causal analysis of accidents and their prevention. The International Labour Organization (ILO) dataset on the incidence of occupational accidents provides potentially useful information (ILO, 2000). ILO tables

* Corresponding author. Tel.: +81 3 3964 3615; fax: +81 3 3964 1058.
E-mail address: makorin@med.teikyo-u.ac.jp (M. Nishikitani).

0925-7535/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.ssci.2007.06.017

summarize the number of persons injured, work time lost, the number of persons fatally injured, the incidence of fatal injuries and the number of days of work lost by injured persons (ILO, 1999).

However, as stated in the ILO table, many factors affect the number of reported accidents and may distort international comparisons of actual accident rates. In this study, we categorized the factors that affect the reported number of accidents into two groups. We called one category, which includes factors directly related to the occurrence of injuries or diseases (Jorgensen, 2000), *harmful factors*. Harmful factors, such as chemical, physical, physiological, biological and psychological exposures to workers, affect the actual occurrence of accidents and may be the primary targets for accident prevention efforts. Also, included in this category are the nature of workers, such as age and experience, and the availability of accident prevention programs.

The other category of factors, *administrative procedures*, are those affecting the number of accident cases documented. Administrative procedures are difficult to measure because they depend on a definition of 'accident' counted and the incentives for detecting and reporting accidents. Much of the difference in reported numbers are thought to result in part from differences in administrative procedures. For example, studies in the United States have shown that the average rate of fatalities in occupational accidents based on death certificates in 10 states was 81%, whereas the corresponding average rate based on workers' compensation reports was 57% (Stout and Bell, 1991; Jenkins et al., 1993; Biddle and Marsh, 2002).

In this context, the workers' compensation system is another typical administrative procedure that affects the number of accident reported, but which varies among countries and organizations. According to the ILO, at least three different categories of workers' compensation systems can be identified: private insurance company schemes, government social insurance schemes (often a ministry of labor program) and governmental agency (sometimes called 'boards') social insurance schemes (Ison, 1998). The type of person and the type of accident covered can differ under the different types of systems. Some systems include self-employed personnel, while others are restricted to employees, and some systems cover commuting accidents, while others do not. Moreover, some only rarely provide coverage for non-specific illness or disease, because it is difficult to establish a causal relationship between work and these illnesses or diseases. In Europe, Prins and de Graaf (1986) investigated this issue from the view point of different types of national social security systems.

These administrative factors can distort the reported number of occupational accidents and prevent an accurate analysis trying to address the real causes or harmful factors. In this study, we propose using the measure of lethality to allow a better comparison of international data on occupational accidents. After controlling for differences in harmful factors and some statistical differences, we investigated the relationship between lethality and the remaining factors including social security expenditure, in order to identify its relationship with the administrative procedures of accident reporting in each country.

2. Materials and methods

2.1. 'Total' and 'fatal' occupational accident cases

In this study, statistics on the annual numbers of 'total' (fatal + non-fatal) and 'fatal' occupational accident cases were obtained from "Cases of Injury with Lost Workdays, by Economic Activity" in the Labour Statistics Database operated by the ILO Bureau of Statistics (LABORSTA) (ILO, 2002). LABORSTA includes information for approximately 200 countries and territories and this study uses data for member countries of the Organisation for Economic Co-operation and Development (OECD), because these countries were of comparable economic status. Each country reported the number of total and fatal occupational accident cases according to its counting methodology, and a summary of the data source and the range of covered subjects were documented in the Sources and Methods Labour Statistics Vol. 8 (ILO, 1999). As data for Austria, Luxembourg and the Netherlands were not available from 1993 to 1998, 27 countries were included in the study. Of these, data was available on specific industrial sectors for 25 countries, but not for Greece or France. The Czech Republic, Denmark, Hungary, Ireland, Japan, Norway, Portugal, the Slovak Republic, Spain, Sweden and the United Kingdom (the 11 eligible countries) reported the number of occupational accident cases excluding commuting accidents and cases of occupational disease. Among these eligible countries, Japan, Ireland, Hungary and the United Kingdom had similar minimum criteria for their definition of absence from work (4 days in Japan and 3 days in the other countries). Denmark, the Czech Republic, Sweden and Spain had a minimum