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A Comparative Study between Human Development Index and Work Accidents in Turkey and the EU Member Countries

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"*The right to a safe and healthy workplace is a basic human right – a right to be respected at every level of development and in different economic conditions. Respecting this human right is an obligation – as well as a condition for sustainable economic development.*"
 ILO Director-General Guy Ryder
 25 August 2014

Abstract:

Today work accidents constitute a major public health problem in the world. For the last two decades, Turkey has been suffering from the death toll resulting from work accidents and occupational diseases. In this study, the analysis of human development's dimensions gives the picture of reasons why Turkey is ranked as the first in Europe in terms of the number of fatal work accidents. Authors suggest that Turkey should increase the expected years of schooling and put safety and health education/training in school curricula. This will in turn reduce accidents at work and absenteeism caused by health problems; and yield increased productivity, higher quality of work, increased workforce morale and reduced employee turnover.

Keywords: Work accidents; Human Development; Turkey; European Union.

1. Introduction

Being an integral part of the world economy and society, Occupational Health and Safety (OHS) is of great importance to all economies. OHS is directly related to many factors such as the country's level of economic development, social structure, healthcare system, level of industrialization, education level and education system. While OHS is important for all nations, developing nations have certain peculiarities that make the implementation of OHS initiatives a complex issue (Torun, 2014).

According to the World Health Organisation (WHO), a substantial part of the general morbidity of the population is related to work (WHO, 2006). Although preservation and improvement of the human welfare through minimizing work accidents must be an important issue for every nation, occupational health is often seen as a low priority in many nations (Nuwayid, 2004). In this respect, health of the workers is generally ignored, and profit motives always lead the production process for the capitalist entrepreneurs.

On the other hand, workers represent half the world's population and are the major contributors to economic and social development (WHO, 2007). Furthermore, work is a central part of their lives (Warr, 1987). They are entitled to a healthy and productive life in harmony with nature. Health at work and healthy work environments are among the most valuable assets of individuals, communities and countries. Furthermore, the ability to enjoy a safe and healthy working environment is an important part of a sustainable future for an individual (UNCED, 1992).

According to the International Labour Organization (ILO), a work accident is an incident that occurs in the course of work and results in a fatal or non-fatal injury. International comparisons of work accidents can sometimes be difficult, because of differences in record-keeping (Takala, 1999). Comparability among the EU member countries has, however,

improved since the adoption of an ILO Resolution on "statistics on occupational injuries resulting from accidents at work" in 1998, which sets out standards for data collection and presentation (Jacinto and Aspinwall, 2004). Nevertheless, one should mention that strong industrialization and urbanization increase work-related health and safety problem (Hamalainen *et al.,* 2009).

Health and safety at work, in particular issues relating to accidents at work in the European Union (EU), are one of the most important areas of action of the EU's social policy (European Commission, 2009). The improvement of public health is an aspect of social progress which ranks high on the EU's policy objectives. This is firstly reflected in the claim for an improvement of living conditions and quality of life by improving health and safety at work, and the reduction of work accidents and occupational diseases. This is also documented in the objectives of health prevention, the combat with diseases and accidents with a focus on special diseases and an increase in healthy life expectancy.

On the conceptual framework, occupational health refers to public health policies intended to promote and protect workers' health and reduce morbidity and mortality caused by development models and productive processes in health. In this context, occupational health comprises a set of activities aimed to support sustainable human development, taking into consideration social and environmental aspects of labour. Accordingly, Alvarez (2003) stated that producers must organize work to achieve efficiency in such a way that it is compatible with human development. In turn, such an organization sometimes challenges with the motive of profit maximization.

In an attempt to investigate the relationship between human development level and fatal work accidents, Turen *et al.* (2014) found that fatal work accidents are negatively and significantly sensitive to human development level. The authors concluded that if a government had aimed to minimize the risk of lethal occupational injuries would have to find ways to increase its level of human development first. This suggests that fatal work accidents have negative impacts on the dimensions of HDI.

In their attempt to investigate the factors causing work accidents, researchers have focused on two basic causes of accidents: technical work accidents (i.e. due to unsafe working conditions and insufficient or defective equipment); and human sourced work accidents (i.e. because of human error). Generally, human sourced accidents can be caused by psychological factors (e.g. long working hours, shortage of nourishment), worker characteristics (e.g. advanced age, low education level, lack of work experience, income, knowledge, personal or physical health), emotional factors (e.g. low intelligence, slow reaction time) and environmental/managerial factors (lack of an environment health and safety management system, lack of an effective audit, lack of an inspection system) (Arashpour and Arashpour, 2010). The above mentioned factors are found to create an effect either directly or indirectly on OHS. Likewise, Martins *et al.* (2011) investigated that the profile of work accidents might be related to the activity performed, education and injury.

Being traditionally a high priority outcome in OHS, work accidents and occupational diseases are experienced in a wide range of industries. According to Rahmani *et al.* (2013), workers with lower level of education in the electrical industry are more subject to work accidents. This suggests that the number of work accidents can be decreased with increasing education level and/or vice versa.

Ilmarinen (1997) described that the mean age of labour force in many EU member countries was increasing, and therefore, work accidents were caused by the aging of workforce.

James (1987) stated that work accidents tended to occur by workers belonging to lower socio-economic groups whose perception of causation and work experience place them at odds with management. Bhattacherjee and Maiti (2000) observed that training could not reduce accidents when the level of hazards was high and that there were few or no reliable techniques and safe working conditions in organizations.

In another study, Karaguven (1999) showed the relationship between work accidents, stress level and educational background of textile workers. He suggests that 70-90 per cent of all injuries are caused by human factor. According to him, a small percentage of people are at risk for health problems and disproportionately limit the health care system. He stated that those members of the workforce had personal characteristics that predisposed them to be injured at work. Yet, in an earlier study, Grimaldi and Simond (1989) stated that education, engineering, and enforcement are other tools used in managing accident prevention.

Safety and health education/training, which is part of a direct assault on the causes and frequency of work accidents and occupational illnesses, is the process of instructing an individual on how to recognize safety and health hazards in the workplace and perform a specific task while avoiding the safety and health hazards for that task (Kinn, 2000). On the other hand, Rekus (1999) defined safety and health education/training as a process through which learners gain new understanding, acquire new skills, or change their attitudes or behaviour and described safety training as a specialized form of education that focuses on developing or improving skills.

Nonetheless, the type and amount of safety and health education/training should depend on the type, size, and complexity of the organization. In addition, training should be based on the nature of hazards, risks, or the potential exposures (Tweedy, 1997).

The matter of OHS appears as a vital problem all over the world. A wide range of people die or become disabled because of work accidents and professional diseases every year. When we look at work accidents and related deaths at a global scale, there are approximately 313 million work-related accidents and 6,300 deaths every year. Moreover, 153 workers have an accident at workplace and 4 workers die as a result, in every minute worldwide (ILO, 2013; ILO, 2014).

In economic terms, the ILO has estimated that the direct or indirect cost of occupational illness and accidents at work is estimated at US$2.8 trillion worldwide and that more than 4 percent of the world's annual GDP is lost as a consequence of work accidents and diseases (ILO, 2014). High costs have direct negative impacts on the country's social security system (Macedo and Silva, 2005). Treatment costs are brought to the shoulders of society due to work accidents and diseases. The suffering caused by such accidents and illnesses to workers and their families is incalculable, and adversely affects the welfare level of the country as well.

Having reviewed the basic literature and the importance of the topic, it should be stated that the main aim of this paper is to analyse the associations between work accidents and human development performance basing on the recent experience of the EU member countries and focusing especially on the case of Turkey. To do so, a simple descriptive statistical analysis is performed in the following section. Furthermore, the method of comparative analysis is also taken into account to clarify the position of Turkish economy against the EU member countries with respect to both work accidents and human development achievements.

2. Comparative Descriptive Statistical Analysis: Turkey and EU Member Countries

This section attempts to search for a correlation between work accidents and human development by depending on a descriptive statistical analysis for Turkey and EU member countries. Consequently, comparative analysis takes place focusing on the case of Turkey for the last two decades.

Although work-related accidents are the common problems of all countries, however, by taking the necessary measures, it can be reduced in certain proportions. Countries that do not take sufficient preventive measures and heavily restrict themselves on the maximization principle of production and export without really concerning with the health of the workers are more affected by work-related accidents.

The situation in Turkey is unfortunately not quite different. Between 1995 and 2013, approximately 1,592,070 workers had work accidents and 22,226 have lost their lives. With the annual average of 83,793 workers and 1170 deaths, Turkey faces with a vital problem. Every day, there are 230 work accidents, and 6-7 deaths on average. Work accidents and diseases have become a major problem in Turkey (Unsar and Sut, 2009). Although progressive and essential legislation aiming to prevent work accidents has been introduced in Turkey in 2006, the figures show that the number of work accidents and deaths did not considerably decline. Therefore, Turkey should take more solid steps to decrease fatal work accidents to the desired level.

The country exercises one of the lowest performances in job safety among the EU member countries. In Turkey, work related accidents have concentrated in certain sectors as all over the world. Among them mining, metal and construction sectors are leading ones in terms of number of accidents, permanent incapacities and deaths (Colak *et al.,* 2004; Ural and Demirkol, 2008).

During the recent two decades, Turkey has been increasingly considered as an emerging economy through achieving with moderate growth rates, exporting various manufacturing commodities to the global markets and rising political power in its geographical region. Nonetheless, the magnitude and complexity of the workforce required to drive the economic growth makes it imperative for the Turkish economy to focus on OHS to sustain the economic growth. Compared to the EU member countries, Turkey has relatively higher population, lower labour cost and literacy rate.

UNESCO's International Standard Classification of Education (ISCED) is the reference classification for organising education programmes and related qualifications by education levels and fields. According to TUIK (2014), literacy rate (>6 years) in Turkey is 96.13%. The percentages related to the ISCED levels (2011) are given in Table 1 for Turkey.

Table 1: Turkey's Population per ISCED Levels		
ISCED Level	**Education Level**	**Population%**
1	Primary school graduates*	25.81
2	Secondary school graduates	27.09
3	High school graduates	21.92
4	Technical school graduates	n/a
5+6	University graduates	12.95
7	MA, MSc, MPhil graduates	1.01
8	PhD graduates	0.28

*>15 years

In the Turkish economy, there is currently little convergence of OHS with capitalist entrepreneurs. The entrepreneurs' goals are mostly aligned with productivity and maximization of profits. Most organizations fail to recognize OHS as a strategic enabler of sustained economic growth. In addition, performance of the enterprises is not measured with respect to OHS. As a result, there is no incentive for managers and entrepreneurs to improve on the OHS performance. In fact, many organizations and firms view investing in OHS as a luxury or one of those things that are required for compliance. Certain industries also view OHS initiatives to be conflicting purposes with productivity and profit enhancement although a safe and healthy work environment would in fact go hand in hand with increasing the productivity of their employees and in turn that of the company. Similarly, entrepreneurs fail to recognize a good OHS record could not only be a strategic differentiator but also a source of competitive advantage against their rivals.

From this stage onwards, the emphasis is given to the descriptive statistical analysis and consequently, recent trends in both work accidents and human development performance of the EU member countries together with Turkey is comparatively evaluated.

3. Data Set and Comparative Analysis

3.1. Work Accidents

In this study, the statistical yearbooks regularly published by Turkey's Social Security Institution (SSI) have been used as the primary source of data. These data do not include workers in the informal sector, white collars in the government, agriculture, self-employed and seafarers. Employers are obliged to inform SSI about the accident within two days and labour inspectors from the Ministry of Labour and Social Security must conduct an investigation at the accident site (Ergor *et al.,* 2003).

Table 2: Main Statistical Indicators for Work Accidents in Turkey, 1995-2013							
Year	Number of Insured Workers	Number of Work Accidents	Number of Fatal Accidents	General Incidence Rate per 1000 worker	Fatality rate per 1,000,000 worker	Fatality rate per work accident (%)	Accident Frequency rate per worker (%)
1995	4,410,744	87,960	919	19.942	208.4	1.045	1.994
1996	4,624,330	86,807	1,492	18.772	322.6	1.719	1.877
1997	5,066,745	98,318	1,473	19.405	290.7	1.498	1.941
1998	5,558,582	91,895	1,252	16.532	225.2	1.362	1.653
1999	5,832,215	77,955	1,333	13.366	228.6	1.711	1.337
2000	5,254,125	74,847	1,173	14.245	223.3	1.567	1.425
2001	4,886,881	72,367	1,008	14.808	206.3	1.393	1.481
2002	5,223,283	72,344	878	13.850	168.1	1.214	1.385
2003	5,615,238	76,668	811	13.654	144.4	1.058	1.365
2004	6,181,251	83,830	843	13.562	136.9	1.006	1.356
2005	6,918,605	73,923	1,096	10.685	158.4	1.483	1.069
2006	7,818,642	79,027	1,601	10.108	204.8	2.026	1.011
2007	8,505,390	80,602	1,044	9.477	122.7	1.295	0.948
2008	8,802,989	72,963	866	8.288	98.4	1.187	0.829
2009	9,030,202	64,316	1,171	7.122	129.7	1.821	0.712
2010	10,030,810	62,903	1,454	6.271	144.9	2.311	0.627
2011	11,030,939	69,227	1,710	6.276	155.1	2.472	0.628
2012	11,939,620	74,871	745	6.271	62.4	0.995	0.627
2013	12,484,113	191,389	1,360	15.319	108.6	0.709	1.532

Source: Data gathered from the Statistical Yearbooks of Turkey's SSI.

According to data gathered from various statistical yearbooks in Table 2, the number of insured workers, number of work accidents, and number of deaths are given between the years 1995 and 2013. As shown in Table 2, we calculated a general incidence rate per 1,000 workers; a fatal incidence rate per 1,000,000 workers; a death frequency rate per work accident (%) and an accident frequency rate per insured worker (%) as follows:

General Incidence Rate per 1,000 worker = 1,000 x Number of Work Accidents/Number of Workers

Fatality Rate per 1,000,000 worker = 1,000,000 x Number of Fatal Work Accidents/Number of Workers

Fatality Rate per work accident (FRWA) (%) = 100 x Number of Fatal Work Accidents/Number of Worker Accidents

Accident Frequency per worker (%) = 100 x Number of Work Accidents/Number of Workers

Between 1995 and 2013, total number of accidents was 1,592,070 with an annual average of 83,793. Among them, 22,226 (1.39 per cent) were fatal. The average work accident rate was 12.52 per thousand and the fatality rate was 175.7 per million for 19-year period (1995-2013).

During this period, the total number of work accidents and fatal work-related diseases has increased, but general incidence and the fatality rates per 100,000 workers have decreased. Every day more than an average of 230 workers got hurt because of accidents. Each day an average of 3.2 people died because of work-related diseases in Turkey.

Between 2002 and 2004; 2005 and 2007; 2010 and 2013, Turkey suffered from continuously increasing index values of work accidents; whereas between 2001 and 2006; 2008 and 2011; 2012 and 2014, it suffered from continuously increasing index values of fatal work accidents. In 2012, number of fatal incidences was at its minimum.

According to SSI statistics, 24 women and 1336 men, 1360 people died at total in Turkey due to work accidents in 2013. TURKSTAT data demonstrates that the highest rate of occupational accidents in 2013 is observed among the workers with low-educational attainment. Then, reaching a maximum, there were 1,886 fatal work accidents in 2014.

Figure 1 and Figure 2 illustrate the workplace accidents and fatal workplace accidents between 1995 and 2013 according to the statistics of the Turkey's Social Security Institution (SSI), respectively.
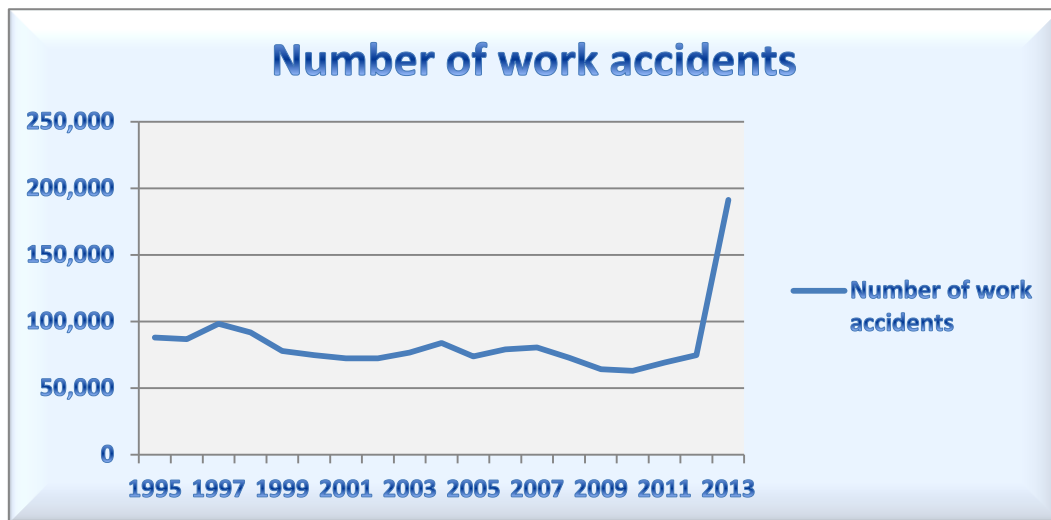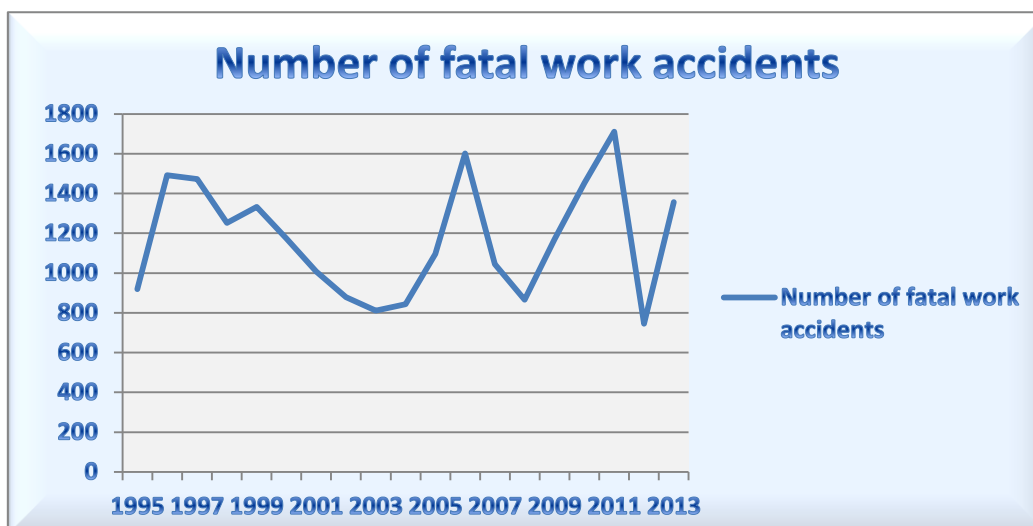
Figure 1: Work Accidents in Turkey (1995-2013)

Figure 2: Fatal Work Accidents in Turkey (1995-2013)

3.2. Human Development Index

The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living (UNDP, 2010). Since 2010, the HDI is calculated from the geometric mean of normalized indices for each of the following three dimensions: the *health dimension* assessed by life expectancy at birth (LE); the *education dimension* measured by mean of years of schooling for adults aged 25 years (MYS) and expected years of schooling for children of school entering age (EYS); and the *standard of living dimension* measured by gross national income (GNI) per capita (2005 PPP$) (UNDP, 2010). Then, the scores for the three dimension indices are then aggregated into a composite index using geometric mean (UNDP, 2010). In this part of the study, we are first of all documenting HDI values of Turkey, and see short-term trend of the
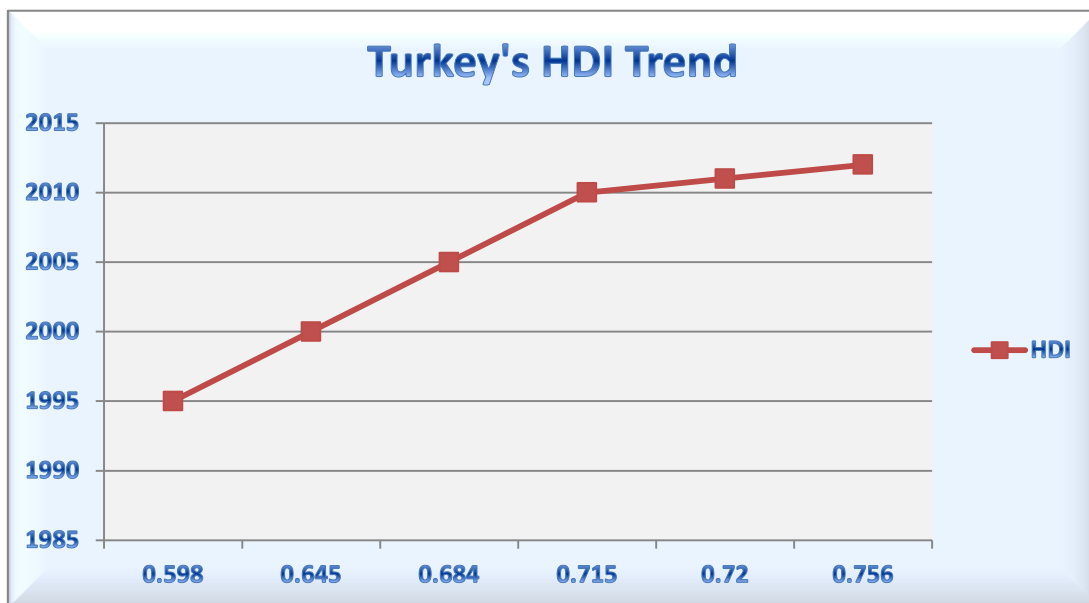
country with respect to human development performance, then construct a table bringing together the latest statistical information on both human development and work accident components for the EU member countries and Turkey.

Table 3: HDI Values and its Dimensions for Turkey: 1995-2012					
Year	LE	EYS	MYS	GNI	HDI
1995	66.1	9.5	4.8	8,539	0.598
2000	69.5	10.6	5.5	9,675	0.645
2005	72.1	11.7	6.1	11,320	0.684
2010	73.7	12.9	6.5	12,440	0.715
2011	74.0	12.9	6.5	13,344	0.720
2012	74.2	12.9	6.5	13,710	0.756

Source: UNDP (2013b, 2014b)

Depending on the statistical information obtained from Table 3, recent trends in Turkey's HDI values are shown on the Figure 3 below.

Figure 3: Trend in Turkey's HDI Values (1995-2012)

Between 1995 and 2012, Turkey's HDI increased by 26.42 per cent, LE increased by 8.1 years (12.25 per cent), MYS increased only by 1.7 years (35.42 per cent) and EYS increased by 3.4 years (35.79 per cent). Therefore, the gap between mean years of schooling and expected years of schooling has widened instead of closing. Hence, we may argue that the most obvious weakness of Turkey's human development performance seems to be its education attainments; and the sluggish improvement of actual means years of schooling should be underlined in that respect. Last but not least, Turkey's GNI per capita increased by 60.56 per cent between 1995 and 2012. Therefore, we may suggest that Turkey's human development performance during the last two decades heavily depended on the rapid growth of its per capita income figures rather than educational and health achievements.

3.3. Comparative Analysis

After reviewing the main trend of the Turkish HDI values for the last two decades, we are now proceeding with the latest position of the EU member countries and Turkey for both human development and work accidents. Consequently, we are attempting to draw some implication depending on the correlation between HDI and work accident indicators of the sample countries.

Table 4: HDI and its Dimensions for Turkey and EU Member Countries, 1995					
Country	LE 1995	EYS 1995	MYS 1995	GNI 1995	HDI 1995
Norway	77.7	15.6	11.1	37,359	0.887
Switzerland	78.5	14.4	9.8	44.318	0.844
Netherlands	77.5	16.6	10.5	28,882	0.874
Germany	76.7	15.6	9.4	27,576	0.842
Denmark	75.5	15.1	9.9	27,751	0.840
Ireland	75.6	13.7	10.9	20,380	0.824
Sweden	78.7	15.9	10.5	28,794	0.849
United Kingdom	76.6	14.9	11.4	26,306	0.834
France	77.9	15.6	8.3	25,196	0.826
Austria	76.7	14.8	8.6	32,038	0.810
Belgium	76.9	17.1	9.7	27,132	0.860
Luxembourg	76.2	11.4	9.3	44,841	0.818
Finland	76.4	16.3	9.2	21,185	0.830
Slovenia	74.4	12.7	11.2	16,115	0.800
Italy	78.0	14.1	7.8	31,073	0.795
Spain	77.9	15.7	7.7	25,004	0.802
Czech Republic	73.1	12.4	11.4	17,622	0.774
Greece	77.8	13.1	8.2	21,545	0.771
Cyprus	77.3	12.5	9.2	23,408	0.781
Estonia	68.7	12.8	10.5	7,943	0.725
Lithuania	70.0	12.0	9.1	7,368	0.702
Poland	71.8	13.1	9.1	8,867	0.732
Slovakia	72.1	12.0	11.2	10.869	0.759
Malta	76.4	12.2	7.4	21,288	0.744
Portugal	75.2	14.9	6.4	17,562	0.757
Hungary	70.0	12.8	10.3	11,305	0.750
Croatia	73.6	11.2	8.5	9,910	0.719
Latvia	67.8	11.8	8.8	8,862	0.677
Romania	69.4	11.0	9.5	7,158	0.694
Bulgaria	70.9	12.1	9.3	6,613	0.705
Turkey	66.1	9.5	4.8	8,539	0.598

Source:UNDP(1998);UNDP (2013b,2014b) ,

At the initial year of the analysis period, Turkey had the lowest HDI value among the thirty-one EU member countries.The main problem with such a relatively low HDI seemed to be education indicators, and especially the lowest mean years of schooling. Among the sample countries, there was no country which performed worse than Turkey in 1995. Again expected years of schooling was the lowest for Turkey. Additionally, LE of the country was the lowest

among EU states but the discrepancy was not too narrow. Furthermore, per capita income performance of Turkey was not too low in comparison with other EU member countries at the beginning of the analysis period. Therefore, the lowest HDI value for Turkey could be directly attributed to its education performance rather than income and health indicators for 1995.

Table 5: HDI and its Dimensions for Turkey and the EU Member Countries, 2012					
Country	**LE 2012**	**EYS 2012**	**MYS 2012**	**GNI 2012**	**HDI 2012**
Norway	81.3	17.6	12.6	64,716	0.943
Switzerland	82.5	15.7	12.2	53,043	0.916
Netherlands	80.8	17.9	11.9	42,849	0.915
Germany	80.6	16.3	12.9	42,965	0.911
Denmark	79.9	16.9	12.1	42,780	0.900
Ireland	80.7	18.6	11.6	34,922	0.901
Sweden	81.6	15.8	11.7	42,902	0.897
United Kingdom	80.3	16.2	12.3	34,604	0.890
France	81.7	16.0	11.1	36,692	0.884
Austria	81.0	15.6	10.8	42,874	0.880
Belgium	80.0	16.2	10.9	39,610	0.880
Luxembourg	80.1	13.9	11.3	58,695	0.880
Finland	80.1	17.0	10.3	38,062	0.879
Slovenia	79.5	16.8	11.9	27,152	0.874
Italy	82.0	16.3	10.1	33,449	0.872
Spain	81.6	17.1	9.6	30,835	0.869
Czech Republic	77.8	16.4	12.3	24,776	0,861
Greece	80.0	16.5	10.2	25,507	0.854
Cyprus	79.8	14.0	11.6	28,797	0.848
Estonia	75.0	16.5	12.0	23,051	0.839
Lithuania	72.5	16.7	12.4	22,871	0.831
Poland	76.3	15.5	11.8	21,156	0.833
Slovakia	75.6	15.0	11.6	25,130	0.829
Malta	79.8	14.5	9.9	26,427	0.827
Portugal	79.7	16.3	8.2	24,848	0.822
Hungary	74.6	15.4	11.3	20,893	0.817
Croatia	76.8	14.5	11.0	19,218	0.812
Latvia	73.6	15.5	11.5	21,246	0.808
Romania	74.2	14.1	10.7	16,806	0.782
Bulgaria	73.6	14.3	10.6	15,178	0.776
Turkey	74.2	12.9	6.5	13,710	0.756

Source: UNDP (2013a, 2014a); UNDP (2013b, 2014b)

The latest Human Development Report reports the 2012 data of HDI dimensions (UNDP, 2014). Thus, in this part of the study, similar to the previous table, annual HDI data belonging to thirty EU member countries and Turkey is used for the terminal year of the analysis period to observe the main improvement of the countries in comparative way.

For 2012, not only HDI rank of the country increased but its absolute value also approached to EU member countries and the country started to be classified as high human development country; but, relative advantage of the country with respect to per capita income figure disappeared for this last year. The country's GNI was the lowest among sample countries. There was slight improvement in the relative position of the country for life expectancy figures. However, the poor education performance continued to depress HDI value of the country. In this terminal year, there was still no country which had lower mean years of schooling than Turkey. Additionally, the discrepancy between mean years of schooling and expected years of schooling continued to remain considerably wide. Consequently, one may argue that relatively poor human development performance of Turkey can be attributable to low mean years of schooling.

Human Development Index (HDI) places Turkey 69th behind the EU member countries in 2012. As it is mentioned above, Turkey has the lowest mean years of schooling and the lowest GNI per capita among EU states.

On the other hand, the International Labour Office (ILO) collects and publishes global accident figures and rates that are based on national recordings. Thus, the data of work accidents related to thirty EU member countries and Turkey are gathered from ILO's official website and portrayed on the Table 6 (ILO, 2014).

Table 6: Accidents at Work Statistics for EU Member Countries and Turkey, 1998 and 2012						
HDI Rank (2012)	Country	Work accidents 1998	Work accidents (*) 2012	Fatal work accidents 1998	Fatal work accidents 2012	FRWA (%) 2012
1	Norway	55,018	14,855	72	34	0.229
3	Switzerland	90,263	72,106	118	60	0.083
4	Netherlands	75,649	116,029	99	31	0.027
6	Germany	982,184	709,940	1287	473	0.067
10	Denmark	68,772	34,245	90	43	0.126
11	Ireland	60,175	9,794	79	42	0.429
12	Sweden	58,456	24,864	77	37	0.149
14	United Kingdom	171,930	143,171	225	149	0.104
20	France	521,237	461,376	683	524	0.114
21	Austria	120,351	56,299	158	137	0.243
21	Belgium	118,632	49,546	155	46	0.093
21	Luxembourg	5,342	6,299	7	13	0.206
24	Finland	49,606	34,821	65	32	0.092
25	Slovenia	85,336	11,505	112	21	0.183
26	Italy	1,059,087	274,040	1,388	469	0.171
27	Spain	898,333	281,045	1,177	273	0.097
28	Czech Republic	452,810	36,013	593	104	0.289
29	Greece	67,053	11,926	88	37	0.310
32	Cyprus	33,963	1,511	45	7	0.463
33	Estonia	n/a	4,993	n/a	11	0.220
35	Lithuania	n/a	2,303	n/a	55	2.388
35	Poland	n/a	67,472	n/a	303	0.449
37	Slovakia	n/a	7,469	n/a	49	0.656

39	Malta	860	2,190	1	7	0.320
41	Portugal	202,877	109,511	266	162	0.148
43	Hungary	n/a	16,717	n/a	60	0.359
47	Croatia	135,884	8,844	178	50	0.565
48	Latvia	n/a	1,213	n/a	33	2.721
54	Romania	n/a	2,889	n/a	257	8.896
58	Bulgaria	n/a	1,768	n/a	90	5.090
69	Turkey	87,960	74,871	919	745	0.995

*Accidents at work involving at least four calendar days of absence from work (EU statistics on accidents at work)
Source: ESAW (2012); Hamalainen *et al*. (2009)

4. Statistical Analysis and Results

Pearson correlation analysis is conducted to find out the strength and the direction of the relationship of HDI, GNI, EYS, MYS and LE with the FRWA (%) for the thirty EU member countries and Turkey.

Table 7: Correlation Analysis Results							
		LE	EYS	MYS	GNI	HDI	FRWA
LE	Pearson Correlation	1	0.404*	0.048	0.730**	0.816**	-0.593**
	Significance (two-tailed)		0.024	0.798	0.000	0.000	0.000
EYS	Pearson Correlation	0.404*	1	0.276	0.336	0.644**	-0.405*
	Significance (two-tailed)	0.024		0.133	0.065	0.000	*.024
MYS	Pearson Correlation	0.048	0.276	1	0.352	0.530**	-0.082
	Significance (two-tailed)	0.798	0.133		0.052	0.002	0.662
GNI	Pearson Correlation	0.730**	0.336	0.352	1	0.864**	-0.444*
	Significance (two-tailed)	0.000	0.065	0.052		0.000	0.012
HDI	Pearson Correlation	0.816**	0.644**	0.530**	0.864**	1	-0.572**
	Significance (two-tailed)	0.000	0.000	0.002	0.000		0.001
FRWA	Pearson Correlation	-0.593**	-0.405*	-0.082	-0.444*	-0.572**	1
	Significance (two-tailed)	0.000	0.024	0.662	0.012	0.001	

´*Correlation is significant at the 0.05 level (two-tailed)
** Correlation is significant at the 0.01 level (two-tailed)

Here are the Statistical Findings:

- Correlation coefficient between HDI and FRWA is (-) 0.572 (Table 7) at the 0.01 significance level (two-tailed), i.e. there is a negative and statistically significant relationship. This negative relationship between HDI value and FRWA is an expected finding since highly developed nations have also higher levels of working conditions.

- Correlation coefficient between GNI and FRWA is (-) 0.444 (Table 7) at the 0.05 significance level (two-tailed), i.e. there is a negative and statistically significant relationship. This suggests that fatal work accidents are considerably more prevalent in low-income countries than in middle- and high-income economies.

- Correlation coefficient between EYS and FRWA is (-) 0.405 (Table 7) at the 0.05 significance level (two-tailed), i.e. there is a negative and statistically significant relationship. This suggests that high number of fatal work accidents is due to lack of effective training and education system. Making information and programmes available throughout the education system can help to combat (fatal) work accidents.

- Correlation coefficient between LE and FRWA is (-) 0.593 (Table 7) at the 0.01 significance level (two-tailed), i.e. there is a strong and negative and statistically significant relationship. This suggests that higher number of fatal work accidents yield to shorter average life expectancy in low-income countries.

- Correlation coefficient between MYS and FRWA is (-) 0.082 (Table 7), i.e. there is no statistically significant relationship. For instance, in the current Turkish education system, there is not even a part of a lesson in the school curricula that can raise student's awareness against work accidents and occupational diseases. As awareness should start at early ages, it is vital that students must be taught that these accidents and diseases can be prevented when necessary measures are taken and when regular checks are performed in their work places in the near future. Thus, inexperienced young workers can avoid high risks of getting involved in a work accident. To achieve this, students should be empowered while learning about safety and risk management. The measures can be integrated step wise into the educational curricula so that students can have a chance to live them and start making health and safety an important part of their lives.

The rate of work accidents in Turkey is far above the average in the EU member countries. As it can be seen from Table 6, Turkey is in the worst in fatal work accidents in 2012 compared to the EU member countries. Furthermore, most of the EU member countries managed to decrease absolute amount of fatal work accidents from 1998 to 2012. Germany, Italy and Spain should be given as striking examples in this respect.

Additionally, most of the EU member countries realized radical declines in their absolute number of work accidents from 1998 to 2012. The decline in Turkey's work accident figures, however, is much more moderate compared to EU member countries (See Table 6).

The wide distribution in fatality rates indicates that work accidents rarely (<0.1) result in death in some countries, such as the Netherlands, Belgium, Switzerland, Spain, Germany and Finland, but often (>1) result in death in other countries, such as Romania, Bulgaria, Latvia and Lithuania.

Table 6 shows that Turkey had the highest number of fatal work accidents in 2012. Although Romania, Bulgaria, Latvia and Lithuania have higher number of fatal work accidents than Turkey, these countries have higher fatality frequency rate per work accident.

The EU fatality rate (0.164 per work accident) was calculated for 2012 on the basis of 30 countries. The resulting rate (0.164 per work accident) was much lower than the calculated rate for the Turkey (0.995 per work accident). Although being significantly lower than that of Turkey; the fatality rate calculated for Norway, Ireland, Austria, Luxembourg, Slovenia, Italy, Czech Republic, Greece, Cyprus, Hungary, Croatia, Poland, Malta, Slovakia and Estonia are higher than the EU average.

5. Conclusion

In this study, the authors investigated that the relationship between Turkey's low HDI level and high number of work accidents. Although some of Turkey's HDI dimensions (e.g. LE and GNI per capita) increased in absolute amounts since 1995, this increase was not enough for it to reach the HDI levels of EU member countries. The authors concluded that Turkey's HDI level and number of work accidents were greatly influenced by low levels of expected years of schooling in Turkey. The authors suggest putting OHS in school curricula and making ISCED level 3 (i.e. corresponding to the completed high school education) should be obligatory to every Turkish citizen.

OHS is also of great importance to the Turkish economy to sustain the high economic growth and for enhancing quality of life. Turkey should overcome the related challenges by incorporating safety and health education/training, awareness, corporate commitment and regulating compliance. These can in turn yield to increased productivity, higher quality of work, increased workforce morale and reduced employee turnover in Turkish industries.

All occupational illnesses and injuries are preventable. Work accidents can be reduced by paying attention to the subject and taking effective and preventative measures. There are surely some tasks which should be fulfilled in order to create a secure workplace by employers, employees and associated public institutes. The most important one among these tasks is that entrepreneurs should give importance to occupational health and safety, take preventative measures and train the employers regularly against work related accidents.

Safety and health education/training is the key to success which Turkey should focus on. Education will serve as a tool to influence effective task performance. Training will allow employees to learn their job properly, bring new ideas into the workplace, reinforces existing ideas and practices, and puts the organization's safety program into action.

Turkey needs a large trained force of OHS professionals. There is still a need to have more professional institutes that can impart the training to create a larger pool of OHS professionals. This can be achieved through governmental and corporate initiatives.

The last but not the least, firms should give more importance to work safety rather than the maximization of their profits. In this context, government should enforce the firms to take precautionary measures and to punish the wide usage illegal employment practices.

To sum up, through considering the recent experience of the EU member countries, Turkey should work on establishing a close link between work accidents, safety precautions and the organization of its educational system in line with the amelioration of its human development performance.

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