

## Occupational Health Injuries and Safety Management among Internal Migrant Workers in Pakistan: Challenges and Prospects

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### ABSTRACT

*Occupational injuries and safety management at the workplace are among the crucial issues of the developing countries. This study develops index value trends of occupational injuries of internal migrant workers for different characteristics. It used twelve waves of the national representative dataset, Labour Force Survey (LFS), from 2001-02 to 2017-18 for the analysis. The research findings suggest that migrant workers in the labor markets of Pakistan face an ample burden of occupational injuries. Male migrants are more vulnerable to occupational injuries compared to their female counterparts. Similarly, those who migrate to rural areas are more likely to suffer from occupational injuries than those whose destination is urban. Higher education and on-job trainings are likely to reduce the burden of occupational injuries among internal migrants. The analysis calls for the development of synergies among worker's education, on-job training, and safety management at the workplace. This is the first study with an extensive dataset range to analyze the level and trends of occupational injuries and safety management of internal migrants in Pakistan. The study suggests the implementation of existing laws and legislation of new health policies to cope up with the challenges of occupational injuries of migrants.*

**JEL Classification:** I14, I15, I24, I25

**Keywords:** Health, Occupational injuries, Education, Internal migration, Labor force

### INTRODUCTION

Occupational well-being, safety, and the health of workers have always been amongst the decisive subject matters for governments and employers. The distressing statistics of occupational injuries have increased the importance and scope of research in safety and health practices. The recent statistics show more than 374 million annual occupational diseases, illnesses, and accidents that result in more than 2.78 million annual fatalities. The estimated human cost of these injuries was equivalent to 3.94 percent of the global output loss annually. Indeed, the statistics could be more alarming for the developing world (International Labour Organization, 2019). The critical reasons cited in the literature include poor and inadequate safety and health practices (Abbas, 2015).

Similarly, non-fatal occupational injuries are more prevalent among young workers than adults (Salminen, 2004; Breslin & Smith, 2005). The agricultural and construction sectors are amongst the high-risk occupations (Schenker, 2010). Besides direct economic costs and loss of working hours, occupational injuries also impose social consequences on the immediate family members and fellow workers (Dembe, 2001). Several studies have discussed the economic and socio-demographic reasons for occupational injuries of migrants in developing

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countries. Occupational injuries are higher in rural migrant workers than their urban counterparts (Wang, Chan, Peterson & Guo, 2018). Migrants significantly participate in the economic development, so the protection of labor rights and the promotion of secure and safe environment for migrant workers is an essential agenda of Sustainable Development Goals<sup>1</sup>. Occupational injuries among male migrants are more than their female counterparts due to higher working hours of males than females (Liang & Guo, 2015). Fatal and non-fatal injuries tend to be higher amongst migrant workers than the domestic ones. Most of the male migrants work in the dangerous and dirty environment than non-migrants who work in other occupations (Schenker, 2010).

To the best of our knowledge, none of the studies so far has examined the level and trends of occupational injuries and safety management of internal migrants in Pakistan. The objective of this study is to analyze differences in the level and intensity of occupational injuries of internal migrants, which seemingly arise from the economic and socio-demographic characteristics of migrant workers. The study developed index value trends of the level of occupational injuries of internal migrant workers for different characteristics. The structure of the study is as follows; Section 2 presents the review of studies on the status of occupational injuries of internal migrants. Section 3 discusses the socio-demographic and economic characteristics of occupationally injured migrant workers in Pakistan. Section 4 explains the index value trends. Section 5 discusses the results. Finally, Section 6 concludes the study.

### **Occupational Injuries of Internal Migrant Workers in Pakistan: A Review**

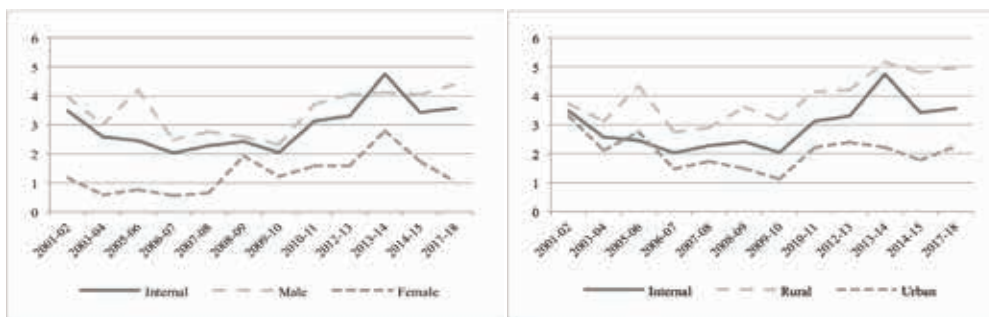
According to the LFS, 2017-18, more than 12 percent of the population (aged 10 years and above) are internal migrants in Pakistan, comprised of 43 percent males and 57 percent females. Around 60 percent of internal migrants are reportedly literate, 70 percent males and 51 percent of females are literate. The majority of the internal migrants are employed in the services sector (46 percent), followed by their working in industrial (31 percent) and agricultural (23 percent) sectors. Half of the female migrant workers (50 percent) are employed in the agricultural sector, while more than half of the male migrant workers (51 percent) are employed in the services sector. The unemployment rate of migrants is 7 percent. About 3.6 percent of migrant workers (out of the total migrant labor force) suffer from an occupational injury or disease; 93 percent of the injured migrants are males, while 7 percent are females. The injury rates are the highest in the industrial sector (40 percent). Male migrant workers suffer more health hazards in the industrial sector (43 percent), while occupational injuries of female migrant workers are the highest in the agricultural sector (89 percent). There are possibilities of single and multiple injuries annually that occasionally need hospitalization, consultancy of medical services, or taking time off work. The minor injuries do not need any medical treatment or taking time off work (LFS, 2017-18).

Occupational injury rates in uneducated workers are exceptional than educated workers. The existing studies establish that education and on-job training reduce occupational injuries. The higher level of educational attainment increases awareness that reduces occupational injuries. It improves the responsiveness of workers in case of an emergency or accident that reduces the cost of occupational injuries (Becker & Morawetz, 2004; Gyekye & Salminen, 2009). Figure 1 compares the trends of occupational injuries of internal migrants by gender (male or female)

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1- Transforming our world: the 2030 Agenda for Sustainable Development, Sustainable Development Goals, <https://sustainabledevelopment.un.org/post2015/transformingourworld>

and current residence (urban or rural) since 2001-02, calculated from the last 12 waves of the LFS. The occupational injuries of male migrant workers in Pakistan remain higher than their female counterparts. The injury rate in male migrants has been on an upward trend since 2009-10 while declining in female migrants since 2013-14. The occupational injuries of workers migrating towards rural areas can be higher than the workers migrating towards an urban area due to health risk factors and socio-demographic and economic differences (Matz, Stieb, & Brion, 2015). The literacy rates in male migrants are higher than their female counterparts. The literacy rates in urban areas remain higher than the rural ones. The higher literacy rates of workers could be a proxy of skill development and can act as an essential reason for injury differentials. This exploration increases the importance of an in-depth analysis of differences in occupational injuries among migrants.



(a) Gender

(b) Current residence

**Figure 1:** Trends of occupational injury rates of internal migrants (percent)

Source: Authors' tabulation from various issues of LFS (2001-02 to 2017-18)

### Occupationally Injured Migrant Workers: By Gender and Current Residence

The four standard categories of migrants' accidents are damage and loss, incident, hazardous condition, and unsafe act (Kjellén, 2000). We can compare the descriptive statistics of occupationally injured migrant workers by gender and place of current residence based on different economic and socio-demographic characteristics; age, duration of on-job training, working hours in main and subsidiary occupations, number of persons engaged in the enterprise, nominal monthly income, and log of monthly income (see Table 1). There are positive differential averages in all characteristics for male workers than their female counterparts. The mean age of injured male migrants is higher than their female counterparts. The working hours in the subsidiary occupation of males are around doubled than the working hours of injured female migrants. The working hours of males are usually higher than their female counterparts, as the latter mostly allocate time to home-making (Liang & Guo, 2015). Therefore, the number of males engaged in an enterprise are higher than their female counterparts. The gender wage differentials show that the wages of males from the injured group are 64 percent higher than their female counterparts; male workers earn 24 percent, 64 percent, and 91 percent higher wages than their female counterparts in the agricultural, industrial, and services sectors, respectively. Studies tried to find reasons and consequences of occupational injuries of migrants like Wang et al. (2018) investigated the occupational injuries of 8,668 Chinese rural migrant workers, aged between 16 and 65 years, from a labor survey conducted in 2012. The study applied three logistic regression models with age, gender,

education, migrant status, and income amongst the independent variables. The study concluded high occupational injuries of rural migrant workers because of their working in vulnerable environments. The occupational injuries are higher in rural migrant workers that could be reduced by controlling occupational risks. Asady et al. (2018) used cross-sectional data set of 6052 injured Iranian workers in 2013. The study employed Chi-squared and Fisher exact tests for univariate analysis while used exact multiple logistic regression to identify independent risk factors of fatal occupational accidents. The empirical tests found current job tenure and occupational injuries responsible for fatal accidents. The study estimated 1289.12 lost years due to occupational injuries.

**Table 1:**

*Summary statistics of occupationally injured migrant workers' differentials by gender and current residence*

Characteristic Differentials	Gender				Current Residence			
	Male	Female	Male- Female	Male/ Female	Urban	Rural	Urban- Rural	Urban/ Rural
Age (years)	39.08	33.57	5.51	1.16	40.44	37.85	2.60	1.07
Training duration (weeks)	70.45	39.91	30.54	1.77	79.80	64.50	15.30	1.24
Working in main occupation (hours/week)	50.34	37.84	12.50	1.33	51.91	48.25	3.66	1.08
Working in subsidiary occupation (hours/week)	16.68	7.99	8.69	2.09	15.61	15.99	-0.38	0.98
Number of persons engaged in the enterprise	5.17	4.99	0.19	1.04	5.32	5.08	0.24	1.05
Monthly nominal income (PKR/month)	17389	8429	8960	2.06	21631	14622	7009	1.48
Agriculture	11843	8836	3007	1.34	10959	10761	199	1.02
Industry	17607	-	17607	-	21956	16015	5941	1.37
Services	19183	6569	12614	2.92	21835	15287	6548	1.43
Log (Monthly nominal income)	9.61	8.98	0.64	1.07	9.84	9.45	0.39	1.04
Agriculture	9.26	9.02	0.24	1.03	9.30	9.17	0.14	1.01
Industry	9.64	-	9.64	-	9.90	9.55	0.35	1.04
Services	9.70	8.79	0.91	1.10	9.81	9.49	0.32	1.03

*Source: Authors' tabulation from LFS, 2017-18*

*Note: Male shows occupationally injured male migrant while Female shows occupationally injured female migrant workers. Urban if the occupationally injured migrant's current residence is an urban area while Rural if the current residence is a rural area.*

The mean age of male workers migrating towards rural areas and suffer from an occupational injury is more than workers' migration towards urban areas. The comparison of training hours of injured migrants shows that workers in urban areas have a larger span of training than the workers migrating towards rural areas. The working hours in the main occupation of migrants in the urban areas are higher, while the working hours in the subsidiary occupation of workers migrating towards rural areas are higher. The occupationally injured migrant workers in the urban areas earn better average monthly income than migrants working in rural areas. The sector-wise classification shows lower average income differentials in the agricultural sector, while higher differentials in the industrial and services sectors. The comparison of wage differentials in the urban and rural areas shows that incomes in the agricultural, industrial, and services sectors of urban areas are higher than migrants in the rural areas by 14 percent, 35 percent, and 32 percent, respectively. This part of the study compares the gender-based and current residence-based economic and socio-demographic characteristic differentials of

occupationally injured migrant workers' proportion; age group, marital status, literacy and educational level, kind of enterprise, periodicity of remuneration, sector of occupation, technical/vocational training, and leading occupational group (see Table 2).

**Table 2:**  
*Proportions of the socio-demographic and economic characteristics of occupationally injured migrant workers by gender and current residence*

Characteristic Differentials	Gender				Current Residence			
	Male	Female	Male- Female	Male/ Female	Urban	Rural	Urban- Rural	Urban/ Rural
<b>Age group (years)</b>								
10-25	20.00	17.75	2.25	1.13	20.91	17.59	3.32	1.19
26-40	34.56	62.40	-27.84	0.55	36.72	36.21	0.51	1.01
40-60	37.04	19.85	17.19	1.87	36.26	34.85	1.41	1.04
More than 60	8.41	-	8.41	-	6.11	11.35	-5.24	0.54
<b>Marital status</b>								
Never married	14.82	-	14.82	-	11.59	14.79	-3.20	0.78
Married	83.10	100.00	-16.90	0.83	86.06	83.48	2.58	1.03
Widowed/Divorced	2.08	-	2.08	-	2.35	1.73	0.62	1.36
<b>Literacy and educational level</b>								
Illiterate	36.92	80.39	-43.47	0.46	35.14	42.35	-7.21	0.83
Literate	63.08	19.61	43.47	3.22	64.86	57.65	7.21	1.13
Primary	29.87	8.41	21.46	3.55	24.52	30.11	-5.59	0.81
Matric	29.02	4.91	24.11	5.91	28.96	26.49	2.47	1.09
Intermediate	3.03	-	3.03	-	6.58	1.05	5.53	6.27
Graduation and above	1.16	6.29	-5.13	0.18	4.80	-	4.80	-
<b>Type of enterprise</b>								
Federal government	1.18	-	1.18	-	2.70	-	2.70	-
Provincial government	2.83	-	2.83	-	5.78	0.53	5.25	10.91
Public enterprise	0.56	-	0.56	-	1.29	-	1.29	-
Public limited company	0.64	-	0.64	-	1.46	-	1.46	-
Private limited company	11.89	-	11.89	-	14.29	9.84	4.45	1.45
Individual ownership	77.55	56.93	20.62	1.36	69.04	83.60	-14.56	0.83
Partnership	3.44	-	3.44	-	4.32	2.70	1.62	1.60
Other	1.91	43.07	-41.16	0.04	1.12	3.33	-2.21	0.34
<b>Periodicity of payment</b>								
Daily	32.77	49.15	-16.38	0.67	19.54	40.46	-20.92	0.48
Weekly	16.28	18.17	-1.89	0.90	8.69	19.89	-11.20	0.44
Fortnightly	2.48	-	2.48	-	-	3.33	-3.33	-
Monthly	41.05	17.93	23.12	2.29	63.92	28.31	35.61	2.26
Piece rate	6.92	14.75	-7.83	0.47	7.85	7.34	0.51	1.07
Other	0.50	-	0.50	-	-	0.67	-0.67	-
<b>Sector</b>								
Agriculture	25.02	88.96	-63.94	0.28	6.02	40.88	-34.86	0.15
Industry	42.92	-	42.92	-	39.65	39.94	-0.29	0.99
Services	32.06	11.04	21.02	2.90	54.33	19.18	35.15	2.83
<b>Technical/vocational training</b>								
On job training	18.09	-	18.09	-	18.08	16.17	1.91	1.12
Off job	27.45	16.92	10.53	1.62	26.71	26.70	0.01	1.00
No	54.46	83.08	-28.62	0.66	55.21	57.13	-1.92	0.97

Main occupational group									
Managers	0.95	-	0.95	-	0.86	0.90	-0.04	0.96	
Professionals	2.32	6.29	-3.97	0.37	5.24	1.35	3.89	3.88	
Technicians and associates	2.56	-	2.56	-	7.35	-	7.35	-	
Clerical support workers	0.57	-	0.57	-	1.62	-	1.62	-	
Service and sales workers	8.89	-	8.89	-	12.83	6.06	6.77	2.12	
Skilled agricultural workers	18.78	38.41	-19.63	0.49	5.93	27.01	-21.08	0.22	
Craft and related trade workers	23.49	-	23.49	-	29.51	18.12	11.39	1.63	
Plant/machine operators	11.66	-	11.66	-	14.35	9.14	5.21	1.57	
Elementary occupations	30.78	55.30	-24.52	0.56	22.31	37.42	-15.11	0.60	

Source: Authors' tabulation from LFS, 2017-18

Note: Male shows occupationally injured male migrant while Female shows occupationally injured female migrant workers. Urban if the occupationally injured migrant's current residence is an urban area while Rural if the current residence is a rural area.

Around the three-fourth proportion of male migrants suffer from an occupational injury or disease in between 25 to 60 years, while most females have an injury in their late 20s and 30s. The injury rate in male migrants, with age more than 60 years, is more than 8 percent. The comparison of the marital status shows that the majority of the occupationally injured male and all injured female migrant workers are married. Further analysis shows that 37 percent of injured males and 80 percent of injured females are illiterate. The occupational injury rates are lower in all workers with higher educational attainment. The majority of the injured males and females have individual ownership. The comparison of the periodicity of payments shows that 41 percent of the occupationally injured workers earn monthly wages while half of the injured female migrant workers are on daily wages. The injuries for male and female migrants are higher in the industrial and agricultural sectors, respectively. Occupational injuries and safety management are related to technical/vocational training, as well. The comparison of technical/vocational training shows that 54 percent of injured males and 83 percent of injured females have never completed any training.

The occupational injuries/diseases in rural areas are more than urban areas (Wang et al., 2018). The comparison of migrants injured due to an injury/disease in rural and urban areas shows no substantial differences in different age groups and marital status, based on the current residence. Occupational injuries/diseases are higher in the second and third age groups. The marital status shows that most of the migrated injured workers are married. The educational status shows that 42 percent of the migrants are illiterate, which have an injury/disease in a rural area. This proportion is lower for workers' migration towards an urban area. The occupational injuries in individual ownership are the highest in all migrants (69 percent and 84 percent in urban and rural areas, respectively). The periodicity of payments of the occupationally injured migrant workers shows that 64 percent of urban areas receive monthly wages, while 40 percent of rural workers are on daily wages. The occupational injuries are the highest in the industrial sectors for migrant workers. The classification of occupational injuries based on the employment in sectors finds the highest injured urban workers in the services (54 percent) and industrial sectors (40 percent) while most of the injured rural workers are employed in the agricultural (41 percent) and industrial sectors (40 percent). There is no ample difference in the technical/vocational training of migrant workers of urban and rural areas. More than 55 percent of occupational injuries of migrants in the urban areas and 57 percent in the rural areas have never completed any training. The

occupational injuries in migrants towards rural areas are the highest in the elementary occupations, while injuries in migrants towards urban areas are the highest in the craft and related trade activities.

There are substantial differentials in the health status and management of occupationally injured migrant workers by gender and current residence (Table 3). Migrant workers mostly suffer due to inadequate safety management. Most of the male migrants suffer due to precarious position, excess speed, and unsafe equipment, while females mostly suffer because of the precarious position. Studies tried to find reasons and consequences of occupational injuries of migrants like Gonzalez-Delgado et al. (2015) investigated the responsible factors of 407,362 injuries; 99.7 percent non-fatal (with or without temporary disability) and 0.3 percent fatal occupational injuries in Mexico in 2012. The study employed a logistic regression model with the Firth approach on data sources from the Mexican Social Security Institute and National Occupational Risk Information System. The study found that workers employed in the same position for a long-time period or they were unqualified, frequently had a fatal injury. The risk factors for fatal injuries are subjected to the companies with maximum risk, workplace conditions, and working environment fatal injuries. The study suggested implementing risk management policies to control occupational injuries.

**Table 3:**  
*Proportions of the work-place characteristics, treatment of occupational injuries, and days to resume work by gender and current residence of internal migrant workers*

Characteristic Differentials	Gender				Current Residence			
	Male	Female	Male-Female	Male/Female	Urban	Rural	Urban-Rural	Urban/Rural
Unsafe act/accident								
Operating without authority	0.53	-	0.53	-	0.51	0.48	0.03	1.06
Excess speed	16.91	6.65	10.26	2.54	20.84	13.95	6.89	1.49
Horseplay	4.61	2.36	2.25	1.95	4.10	4.61	-0.51	0.89
Failure safety device	14.56	-	14.56	-	11.60	14.43	-2.83	0.80
Unsafe equipment	15.24	-	15.24	-	7.39	17.38	-9.99	0.43
Unsafe position	19.78	65.99	-46.21	0.30	28.63	20.45	8.18	1.40
Disobeying instructions	1.26	-	1.26	-	1.01	1.24	-0.23	0.81
Failure to use protective equipment	3.39	-	3.39	-	4.82	2.35	2.47	2.05
Unsafe loading/stacking	3.28	16.50	-13.22	0.20	3.96	4.35	-0.39	0.91
Unsafe act by a fellow employee	1.61	-	1.61	-	0.63	1.90	-1.27	0.33
Unsafe act of outsiders	0.97	-	0.97	-	0.68	1.00	-0.32	0.68
Other	17.86	8.50	9.36	2.10	15.83	17.86	-2.03	0.89
Treatment								
Hospitalized	14.82	6.29	8.53	2.36	22.92	10.05	12.87	2.28
Consulted doctor/nurse/professional	67.24	25.37	41.87	2.65	62.82	64.92	-2.10	0.97
Time off work	12.00	59.77	-47.77	0.20	9.26	18.37	-9.11	0.50
None	5.94	8.57	-2.63	0.69	5.00	6.66	-1.66	0.75
Resume work after an accident								
Not resumed normal activities	2.65	-	2.65	-	3.53	1.95	1.58	1.81
Never able to resume normal activities	0.62	-	0.62	-	0.90	0.42	0.48	2.14
Same day	12.53	8.05	4.48	1.56	7.79	14.32	-6.53	0.54
First day	5.47	10.81	-5.34	0.51	5.57	5.99	-0.42	0.93
Second day	12.67	29.18	-16.51	0.43	12.38	14.55	-2.17	0.85



3-7 days	34.94	43.46	-8.52	0.80	30.36	38.03	-7.67	0.80
8-15 days	11.43	8.50	2.93	1.34	13.73	10.01	3.72	1.37
16-22 days	4.91	-	4.91	-	8.31	2.77	5.54	3.00
23 days -1 month	5.97	-	5.97	-	4.74	5.93	-1.19	0.80
2-4 months	5.21	-	5.21	-	6.29	4.14	2.15	1.52
5-7 months	0.23	-	0.23	-	-	0.31	-0.31	-
8-12 months	1.00	-	1.00	-	1.68	0.57	1.11	2.95
More than 12 months	2.37	-	2.37	-	4.72	1.01	3.71	4.67

Source: Authors' tabulation from LFS, 2017-18

Note: Male shows occupationally injured male migrant while Female shows occupationally injured female migrant workers. Urban if the occupationally injured migrant's current residence was an urban area while Rural if the current residence was a rural area.

Another study of Gransow et al. (2014) analyzed the health issues of migrant workers from manufacturing enterprises in a significant center of the foreign-invested export industry in China. The interviews undertook with injured migrant workers. The socio-demographic and economic transformation and institutional arrangements determined the injuries. The shortcomings in factory safety management and insufficient first-aid facilities at factories were amongst the significant reasons for work injuries. Nevertheless, the study concluded that China would be growing at the health cost of migrant workers. The classification of treatment received finds that 67 percent of injured males consult doctors, nurses, or other medical professional (Table 3). Most of the injured females (60 percent) have time off work. More than 3 percent of injured male migrants are not able to resume normal activities after the injury/disease. The majority of the injured males and females resume working in a week. Most of the urban male workers get an injury due to precarious position, excess speed, and failure of safety devices while migrant workers in rural areas get an injury due to precarious position, unsafe equipment, and failure of safety devices. Around two-thirds of the injured workers, both in the rural and urban areas, consulted doctors, nurses, or other medical professional. The rate of occupationally injured migrants that are unable to resume the routine activities are higher in the urban areas than the rural ones.

Empirical studies in literature tried to analyze the reasons and consequences of occupational injuries. One of the empirical studies in the health literature of Pakistan is Abbas and Mansour (2017) that investigated 10,330 factory accidents in the industrial sector of Pakistan from 1993 to 2009. The index value tabulation method explored accidental trends. The fatal accident increased by an average of 23 fatal accidents per 100,000 factory workers, 74 percent of minor accidents, 18 percent serious, and 8 percent fatal accidents. The decreased trends of index values and accident rates were associated with the increased human development of Pakistan. The study suggested improving the social security system for the exact recording of occupational accidents in Pakistan. Another study by Abbas (2015) used Pakistan's LFS from 2001-02 to 2012-13 to discuss the index value trends of injured employed persons (IEPs). The study found increased IEP in all three sectors and 12 health characteristics. The study concluded that a high risk of occupational injuries of workers in different occupations was highly attributable to inadequate health care facilities.

## INDEX VALUE TRENDS

This study used twelve waves of LFS from 2001-02 to 2017-18, the most recent available and detailed information on the labor force characteristics of Pakistan. The survey has been carried



out by the Pakistan Bureau of Statistics (PBS). The representative sample adopted a stratified two-stage sample design. The index value tabulation method was used to investigate trends of occupational injuries in Pakistan as done by Abbas (2015) for Pakistan, Unsar and Sut (2009) for Turkey, and Rhee et al. (2013) for Korea. In this study, the index value tabulation investigates two types of implications of occupational injuries: the first is the trend of percentage distribution of migrant workers by the status of occupational injury from 2001-02 to 2017-18 using the reference year 2001-02, and the second is the percentage distribution of occupationally injured migrant workers by a reference group. The regression analysis is run to determine the linear trend between the dependent (an economic or a socio-demographic characteristic) and independent (time) variables.

We compare the economic and socio-demographic characteristics of occupationally injured migrants; by age groups, gender, literacy and educational level, and current residence after the migration. The occupationally injured migrants are classified into four age groups; 10-25, 26-40, 40-60, and more than 60 years. The literacy and educational level of migrants with occupational injuries are classified into literate and illiterate groups. The study also explains the index value trends of injured migrants based on different income quintiles, sectors, and main occupational groups. The income groups are classified into five quintiles used by PBS (2012). The different quintiles are based on nominal income, income ranges of less than 8000 PKR, 8001 to 12000 PKR, 12001 to 18000 PKR, 18001 to 35000 PKR, and more than 35000 PKR. The employment of injured migrants is classified into agriculture, industry, and services sectors based on the classification of Pakistan Standard Industrial Classification (PSIC, 2010) of all economic activities. The classification of the leading occupational group is based on the Pakistan Standard Classification of Occupation (PSCO, 2015). Another critical aspect of the study is the index value trend of the migrants' health status based on unsafe acts and treatment received. The unsafe acts of the injured migrants are classified into different acts. The treatment received by occupationally injured migrants are classified into hospitalization, consulted a doctor or medical professional, time off work, and no treatment received.

The results of the index value trend from 2001-02 to 2017-18, by age group, gender, literacy and educational level, and internal migration of injured migrants are reported in Table 4(a). Migrants in the age groups of 10-25 and 26-40 show positive trends of occupational injuries. However, older age groups show a negative trend. The recent statistics show that migrants in 26-40 years had the highest proportion of occupational injuries. The comparative analysis finds an inverse relationship between educational attainment and occupational injuries. The occupational injuries of migrants with higher education decreased sharply. The rate of occupational injuries of migrants in rural areas is more than the injuries in urban areas. The occupational injuries in migrants towards rural areas show a positive trend, while migrants towards urban areas show a negative trend.

The results of the index value trend by monthly income quintile, sector, and leading occupational group are reported in Table 4(b). All quintiles except the first one show a positive trend of occupational injuries. The linear slope of all the trends is significant. The most considerable magnitude of change over time can be seen in the third quintile. The agricultural sector shows a positive trend of occupational injuries, while the industrial and services sectors show negative trends. The managers, clerical support workers, and craft and related trade workers show negative trends while the remaining groups show a positive trend of injuries

over time. The reference group analysis shows that occupational injuries of migrants were initially the highest in the craft and related trade workers that has been shifted to the highest injuries of the migrants in the elementary occupations in the last survey. The results of the index value trend by unsafe act and treatment are reported in Table 4(c). Unsafe equipment has a positive while the unsafe act of outsiders has a negative trend over time. The hospitalization and consultation show a negative while time off work shows a positive trend.

## **DISCUSSION**

The results show that male migrants are more vulnerable to occupational injuries due to their higher working hours. The occupational injuries of male migrants show a slight decrease, while injury rates of females show a positive trend. It is due to an increase in female labor force participation in labor markets over time. The proportion of occupational injuries in males remain more than their female counterparts, as explained in literature by Villanueva & Garcia (2011). The male workers are more vulnerable. They have severe occupational injuries than their female counterparts, while females avoid dangerous employment as they consider to look after the social activities at home as well. The occupational injury for a daily wage-earning migrant is more critical than a monthly wage earner.

The rural-urban injury differential has been widening in Pakistan over time. The occupational injuries are the highest in the first quintile that has been shifted to the fourth quintile in the last survey because of the increase in the nominal income of injured migrants over time. This shows that migrants' occupational injuries have a predisposing trend in Pakistan. The industrial sector shared the highest proportion of migrants' occupational injuries. These acts of accidents raise questions on the issues of safety management in all occupations. The proportions of consultation remain the highest in the group that perceives the severity of occupational injuries. The male and female migrant workers have the highest occupational injuries in the elementary occupations that employed mostly the unskilled workers and employed in the field jobs while lowest for managers and professionals, as most of them, have high educational attainment. The severity of occupational injuries is higher for migrants in urban areas. The majority of the injured rural and urban migrants resumed the normal activities in a week.

## **CONCLUSION**

The objective of this study is to analyze the trends of occupational injuries among migrant workers by their economic and socio-demographic characteristics. It used the last twelve waves of LFS from 2001-02 to 2017-18. The study finds that male migrants are more vulnerable to occupational injuries than their female counterparts. The occupational injuries are on a predisposing trend in Pakistan. The migrants in rural areas show a positive trend of occupational injuries while contrary to the urban areas. The mean age and income of injured males are more than their female counterparts. The mean age and income of workers migrated towards the urban areas are higher compared to those who migrate towards the rural areas. Most of the migrant workers with occupational injuries are married. This shows that the incidence of an occupational injury has economic and social consequences on the immediate family members and the fellow workers, exclusively in case of single migration (without families).

Moreover, migrants with higher education are at a lower risk than uneducated workers. The increase in educational attainment improves the human capital of workers. The occupational injuries are the highest in the industrial sector, higher for males and females in the industrial and agricultural sectors, respectively. The socio-demographic and economic transformation and institutional arrangements determined the injuries. Most of the injured migrants do not complete any training program. Training programs, generally for all and exclusively in the rural areas, can reduce the burden of occupational injury for migrant, their families, and society at the individual and national levels. Educational attainment and training sessions for females can have a positive externality on economic growth as well. The shortcomings in safety management and insufficient first-aid facilities are amongst the essential reasons for work-related injuries. Pakistan also seems to be growing at the health cost of migrant workers like China, as established in a study by Gransow et al. (2014). This study endorsed the findings of Abbas (2015) that the risk of occupational injuries for all skilled and unskilled workers in different occupations are higher due to inadequate health care facilities. The rural migrant workers are more deprived due to lack of health facilities in the rural areas that impose a heavy burden on the national social security system of Pakistan. An increase in working hours can also increase the possibilities of occupational injuries, so a balance in economic and social activities can reduce occupational injury rates.

There are many national and international health laws and regulations that exist in Pakistan, but the implementation needs urgent steps forward. Pakistan, with a population of 197 million, is comprised of 68 million labor force (World Bank, 2019) faces a substantial burden of health cost. The public sector investment in health is quite low. The private sector is costly and unaffordable for workers living below the poverty line. Foreign health assistance can play a significant part in improving the country's health status. Pakistan is one of the largest recipients of foreign health assistance from the Asian Development Bank (ADB), international organizations like the World Health Organization (WHO), United Nations Population Fund (UNFPA), Japan International Cooperation Agency (JICA), and governments of advanced countries. A marginal increase in health assistance from donors can help in reducing the economic and social costs of occupational injuries. The gender- and residence-based discriminations are adversely affecting the health status of migrants (WHO, 2019).

The implementation of existing laws and legislation of new policies are necessary to cope up with the challenges of occupational injuries of migrants. It helps in reducing work-related injuries and improving the health of workers. It has a direct and indirect effect on reducing work-related inefficiencies. The limitations of the study include incomplete and inadequate information provided since LFS, 2007-08. The surveys in the past, till 2006-07, had extended information on occupational injuries, i.e., injured body parts and fatal injuries, should be added in future surveys for an in-depth health cost evaluation of fatal and non-fatal injuries and organizations. ILO (2019) and WHO must extend their programs for migrants' health in Pakistan as well. The detailed analysis and modeling of internal migration towards urban and rural areas are suggested for future research. The endowment and discrimination effects also need investigation for income-based injury differentials.

<b>Table 4(a):</b> <i>Index value trend by age group, gender, literacy and educational level, and internal migration of injured migrants (2001-02 to 2014-15)</i>													
LFS	2001-02	2003-04	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2012-13	2013-14	2014-15	2017-18	Slope
Index value trend by age group (time: 2001-2002=100)													
10-25	100.00	55.95	73.89	93.97	96.73	72.15	82.32	71.08	73.99	93.15	93.15	101.33	1.11
26-40	100.00	113.53	143.71	129.62	122.68	123.82	125.91	121.19	105.26	136.46	136.46	115.81	0.72
41-60	100.00	101.51	81.34	75.74	87.42	87.19	88.25	92.87	104.62	80.88	80.88	81.87	-0.79
More than 60	100.00	171.93	89.67	147.56	80.12	168.81	108.19	140.74	127.49	64.72	64.72	152.24	-1.90
Index value trend by age group (age group: 25-40=100)													
10-25	61.99	30.55	31.87	44.94	48.88	36.12	40.53	36.36	43.58	42.32	42.32	54.24	0.19
26-40	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-
41-60	138.52	123.86	78.40	80.94	98.71	97.54	97.08	106.14	137.68	82.10	82.10	97.92	-1.72
More than 60	16.25	24.61	10.14	18.50	10.61	22.15	13.96	18.87	19.68	7.71	7.71	21.36	-0.32
Index value trend by gender (time: 2001-2002=100)													
Male	100.00	101.69	100.97	99.30	99.19	86.82	90.34	91.65	91.03	84.37	91.84	98.49	-0.99**
Female	100.00	72.35	84.17	111.48	113.22	316.00	258.26	236.87	246.96	356.17	233.74	124.70	16.15**
Index value trend by gender (gender: male=100)													
Male	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-
Female	6.10	4.34	5.09	6.85	6.96	22.20	17.44	15.77	16.55	25.75	15.53	7.72	1.17**
Index value trend by literacy and educational level (time: 2001-2002=100)													
Illiterate	100.00	128.17	106.08	93.71	116.92	124.07	112.62	93.44	114.04	111.77	104.66	91.56	-0.86
Literate	100.00	78.10	95.27	104.89	86.85	81.28	90.19	105.10	89.09	90.85	96.37	106.56	0.67
Primary	100.00	122.91	163.01	163.54	109.43	99.70	159.25	150.06	141.29	135.08	139.26	168.97	2.73
Matric	100.00	63.35	71.15	80.53	85.19	70.40	65.31	85.50	71.55	72.76	82.42	84.72	-0.12
Intermediate	100.00	28.03	76.82	75.78	79.58	124.91	104.50	198.62	48.79	80.28	95.85	97.58	2.83
Graduation and above	100.00	48.30	26.08	78.91	17.91	62.13	-	16.10	45.12	61.68	35.60	34.69	-2.71

Index value trend by literacy and educational level (education: illiterate=100)														
Illiterate	77.75	127.58	86.57	69.46	104.67	118.67	97.08	69.12	99.52	95.66	84.43	66.81	-1.48	
Literate	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-	
Primary	29.79	46.88	50.97	46.45	37.54	36.54	52.60	42.53	47.25	44.30	43.05	47.24	0.51	
Matric	57.23	46.43	42.74	43.94	56.14	49.57	41.45	46.56	45.97	45.84	48.95	45.50	-0.39	
Intermediate	5.14	1.84	4.14	3.71	4.71	7.89	5.95	9.71	2.81	4.54	5.11	4.70	0.13	
Graduation and above	7.84	4.85	2.15	5.90	1.62	5.99	-	1.20	3.97	5.32	2.90	2.55	-0.23	
Index value trend by internal migration (time: 2001-2002=100)														
Rural-Rural	100.00	120.45	115.22	147.93	126.68	159.14	176.84	140.72	140.82	188.54	179.45	133.30	5.02**	
Rural-Urban	100.00	76.03	65.79	67.32	65.62	48.12	51.03	59.41	60.76	38.49	28.70	53.60	-4.11*	
Urban-Rural	100.00	138.14	151.50	108.80	149.54	131.36	124.90	142.63	153.00	114.54	160.69	191.46	4.00**	
Urban-Urban	100.00	86.67	108.89	87.23	90.55	93.43	60.58	87.48	73.97	80.85	77.35	68.46	-2.57*	
Index value trend by internal migration (internal migration: rural-urban=100)														
Rural-Rural	71.85	113.82	125.83	157.88	138.71	237.60	248.99	170.18	166.52	351.95	449.17	178.66	20.72*	
Rural-Urban	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-	
Urban-Rural	38.39	69.75	88.40	62.04	87.49	104.78	93.97	92.17	96.66	114.24	214.91	137.11	9.61*	
Urban-Urban	39.99	45.59	66.18	51.82	55.19	77.64	47.47	58.89	48.68	84.01	107.76	51.07	2.70**	

Source: Authors' tabulation from various issues of LFS.

Note: \*, \*\*, and \*\*\* shows  $p < 0.01$ ,  $p < 0.05$ , and  $p < 0.1$  respectively.

**Table 4(b):**

Index value trend by monthly income quintile, sector, and main occupational group

LFS	2001-02	2003-04	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2012-13	2013-14	2014-15	2017-18	Slope
Index value trend by monthly income quintile (time: 2001-2002=100)													
First	100.00	96.43	98.85	80.95	70.52	71.73	67.10	64.97	32.00	38.87	28.22	14.93	-7.82*
Second	100.00	100.76	66.92	250.66	395.09	384.50	339.89	311.72	391.49	496.79	387.71	353.31	30.73*
Third	100.00	746.15	965.38	2511.54	3426.92	3280.77	6246.15	8211.54	12034.62	8953.85	9123.08	11680.77	1131.59*
Fourth	100.00	373.68	252.63	780.70	301.75	287.72	522.81	236.84	2724.56	2278.95	4336.84	5898.25	431.44*
Fifth	100.00	117.24	-	-	848.28	813.79	-	-	868.97	368.97	1603.45	1155.17	94.48**

Index value trend by monthly income quintile (monthly income quintile: second quintile = 100)													
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
First												-	
Second	5.65	5.91	3.83	17.50	31.67	30.30	28.63	27.12	69.15	72.24	77.66	133.79	9.71*
Third	0.28	2.15	2.71	8.62	13.50	12.71	25.86	35.11	104.47	63.99	89.81	217.39	14.56*
Fourth	0.61	2.36	1.56	5.87	2.61	2.44	4.75	2.22	51.85	35.71	93.60	240.66	13.75*
Fifth	0.31	0.38	-	-	3.73	3.52	-	-	8.41	2.94	17.61	23.98	1.68**
Index value trend by sector (time: 2001-2002=100)													
Agriculture	100.00	116.28	119.92	90.11	117.27	203.01	144.24	167.27	168.97	201.53	184.04	133.09	7.10**
Industry	100.00	116.41	106.18	108.62	108.65	91.81	87.36	105.64	109.13	81.55	102.01	112.93	-0.60
Services	100.00	77.85	84.44	98.02	83.78	52.87	87.34	60.10	56.31	62.17	54.33	71.94	-3.22*
Index value trend by sector (sector: industry=100)													
Agriculture	63.04	62.97	71.20	52.30	68.04	139.39	104.09	99.81	97.61	155.79	113.73	74.30	5.10**
Industry	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-
Services	120.41	80.52	95.76	108.66	92.85	69.34	120.38	68.50	62.13	91.80	64.13	76.71	-3.18**
Index value trend by main occupational group (time: 2001-2002=100)													
Managers	100.00	84.15	107.14	210.80	115.16	74.04	233.97	78.22	30.49	5.57	7.84	15.51	-11.12
Professionals	100.00	-	376.74	397.67	83.72	58.14	-	55.81	613.95	279.07	539.53	606.98	33.67
Technicians and associates	100.00	1022.58	558.06	451.61	1222.58	1041.94	451.61	783.87	480.65	903.23	909.68	767.74	24.42
Clerical support workers	100.00	52.33	22.67	49.33	2.00	12.33	-	-	-	-	-	17.33	-6.31*
Service and sales workers	100.00	50.06	53.16	15.61	35.64	23.24	51.85	29.20	92.85	142.43	78.55	98.33	4.40
Skilled agricultural workers	100.00	122.67	108.79	109.72	115.08	216.43	156.79	179.88	172.96	190.74	164.59	104.99	5.09
Craft and related trade workers	100.00	108.93	98.42	102.17	105.16	85.39	57.87	85.91	87.88	68.08	87.03	71.59	-3.07*
Plant/machine operators	100.00	61.90	72.74	72.74	54.80	42.10	32.95	47.60	62.79	78.86	90.76	96.18	0.63
Elementary occupations	100.00	106.18	124.02	101.93	122.09	83.01	138.46	114.58	90.80	82.30	91.79	153.52	0.51
Index value trend by main occupational group (main occupational group: craft and related trade workers = 100)													
Managers	18.85	14.56	20.52	38.89	20.64	16.35	76.22	17.16	6.54	1.54	1.70	4.08	-1.83
Professionals	1.41	-	5.41	5.50	1.12	0.96	-	0.92	9.87	5.79	8.75	11.97	0.73**
Technicians and associates	1.02	9.56	5.77	4.50	11.84	12.42	7.95	9.29	5.57	13.51	10.64	10.92	0.58**
Clerical support workers	9.85	4.73	2.27	4.76	0.19	1.42	-	-	-	-	-	2.39	-0.58*
Service and sales workers	27.55	12.66	14.88	4.21	9.34	7.50	24.69	9.37	29.11	57.65	24.87	37.84	2.32**
Skilled agricultural workers	63.15	71.12	69.80	67.82	69.11	160.08	171.11	132.22	124.29	176.94	119.43	92.61	6.96*

	2001-02	2003-04	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2012-13	2013-14	2014-15	2017-18	Slope
Craft and related trade workers	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-
Plant/machine operators	36.98	21.01	27.33	26.33	19.27	18.23	21.06	20.49	26.42	42.84	38.57	49.68	1.44***
Elementary occupations	69.59	67.83	87.69	69.43	80.79	67.65	166.52	92.81	71.90	84.13	73.40	149.22	3.67
<i>Source: Authors' tabulation from various issues of LFS.</i>													
<i>Note: *, **, and *** shows p&lt;0.01, p&lt;0.05, and p&lt;0.1 respectively.</i>													
<b>Table 4(c):</b>													
<b>Index value trend by unsafe act and treatment</b>													
LFS	2001-02	2003-04	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2012-13	2013-14	2014-15	2017-18	Slope
Index value trend by the unsafe act (time: 2001-2002=100)													
Operating without authority	100.00	215.79	275.00	77.63	388.16	-	155.26	256.58	103.95	101.32	180.26	64.47	-7.74
Excess speed	100.00	64.74	86.47	80.05	118.96	82.37	55.79	45.70	78.15	67.76	76.53	66.97	-2.25
Horseplay	100.00	167.07	98.37	61.38	173.58	136.59	152.03	253.66	105.28	73.98	214.23	180.89	5.66
Failure safety devices	100.00	7.05	49.38	67.87	51.75	41.88	91.54	59.13	39.29	60.88	42.16	76.16	0.22
Unsafe equipment	100.00	108.23	177.63	217.75	201.88	270.42	248.48	376.91	302.31	321.07	319.19	204.18	17.39*
Unsafe position	100.00	195.67	215.25	170.45	182.06	225.65	149.05	171.84	140.55	188.56	193.93	200.09	-0.27
Disobeying instructions	100.00	-	41.36	223.64	89.09	60.45	114.55	52.27	74.09	54.55	245.91	53.18	0.33
Failure to use protective equipment	100.00	126.67	31.85	62.59	27.78	93.33	132.59	48.52	308.89	134.07	31.11	116.67	4.80
Unsafe Loading/stacking	100.00	341.80	276.95	104.30	248.83	183.20	442.19	388.28	510.55	269.53	162.89	164.84	6.15
Unsafe act of the fellow employee	100.00	824.49	77.55	165.31	202.04	279.59	857.14	71.43	285.71	87.76	383.67	304.08	-3.02
Unsafe act of outsiders	100.00	31.15	44.73	103.98	51.76	36.53	80.56	38.17	1.17	15.46	10.07	21.08	-6.20***
Others	100.00	122.94	72.51	71.23	31.34	53.99	24.31	41.13	37.66	55.48	42.00	71.10	-4.66***
Index value trend by an unsafe act (unsafe act: excess speed=100)													
Operating without authority	3.15	10.49	10.00	3.05	10.26	-	8.75	17.66	4.18	4.70	7.41	3.03	-0.13
Excess speed	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-
Horseplay	10.18	26.28	11.58	7.81	14.86	16.88	27.74	56.52	13.72	11.12	28.50	27.50	1.30
Failure safety devices	73.43	7.99	41.93	62.25	31.94	37.34	120.47	95.02	36.92	65.97	40.45	83.50	2.51
Unsafe equipment	28.68	47.95	58.93	78.02	48.68	94.17	127.74	236.59	110.96	135.92	119.63	87.45	9.06**
Unsafe position	47.76	144.37	118.91	101.71	73.10	130.85	127.60	179.62	85.91	132.93	121.04	142.71	4.09
Disobeying instructions	9.11	-	4.36	25.44	6.82	6.68	18.69	10.42	8.63	7.33	29.26	7.23	0.38
Failure to use protective equipment	11.18	21.87	4.12	8.74	2.61	12.66	26.56	11.87	44.17	22.11	4.54	19.47	0.98
Unsafe Loading/stacking	10.60	55.95	33.94	13.81	22.16	23.57	83.98	90.04	69.23	42.15	22.55	26.08	1.64



Unsafe act of the fellow employee	2.03	25.83	1.82	4.19	3.44	6.88	31.16	3.17	7.42	2.63	10.17	9.21	-0.06
Unsafe act of outsiders	17.67	8.50	9.14	22.96	7.69	7.84	25.52	14.76	0.26	4.03	2.33	5.56	-1.05
Others	100.12	190.15	83.96	89.09	26.37	65.63	43.62	90.13	48.25	81.98	54.95	106.30	-4.19
Index value trend by treatment (time: 2001-2002=100)													
Hospitalized	100.00	57.26	72.62	86.28	38.90	42.99	57.56	39.35	60.75	44.69	66.43	70.87	-1.91
Consulted doctor/nurse/professional	100.00	115.05	120.05	117.63	113.00	120.01	103.14	95.72	91.57	91.55	102.86	112.58	-1.29
Time off work	100.00	231.94	194.45	156.56	255.89	270.77	322.46	467.12	293.10	259.95	276.32	208.80	11.97
None	100.00	36.97	16.58	25.87	56.84	18.65	37.29	19.16	89.74	126.39	48.84	39.48	1.52
Index value trend by treatment (treatment: consulted doctors=100)													
Hospitalized	35.14	17.49	21.26	25.77	12.10	12.59	19.61	14.45	23.31	17.15	22.70	22.12	-0.43
Consulted doctor/nurse/professional	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-
Time off work	12.95	26.11	20.98	17.24	29.33	29.22	40.49	63.20	41.45	36.77	34.79	24.02	1.90***
None	27.16	8.73	3.75	5.97	13.66	4.22	9.82	5.44	26.62	37.50	12.90	9.53	0.57

Source: Authors' tabulation from various issues of LFS.

Note: \*, \*\*, and \*\*\* shows  $p < 0.01$ ,  $p < 0.05$ , and  $p < 0.1$  respectively.

## REFERENCES

- Abbas, M. (2015). The trend of occupational injuries/diseases in Pakistan: Index value analysis of injured employed persons from 2001-02 to 2012-13. *Safety and Health at Work*, 6(3), 218-226. <https://doi.org/10.1016/j.shaw.2015.05.004>
- Abbas, M., & Mansour, B. A. (2017). A retrospective study about the trend analysis of industrial accidents in Pakistan. *International Journal of Occupational Safety and Health*, 5(2), 1-5. <https://doi.org/10.3126/ijosh.v5i2.14281>
- Asady, H., Yaseri, M., Hosseini, M., Zarif-Yeganeh, M., Yousefifard, M., Haghshenas, M., & Hajizadeh-Moghadam, P. (2018). Risk factors of fatal occupational accidents in Iran. *Annals of Occupational and Environmental Medicine*, 30(1), 1-7. <https://doi.org/10.1186/s40557-018-0241-0>
- Becker, P., & Morawetz, J. (2004). Impacts of health and safety education: Comparison of worker activities before and after training. *American Journal of Industrial Medicine*, 46(1), 63-70. <https://doi.org/10.1002/ajim.20034>
- Breslin, F. C., & Smith, P. (2005). Age-related differences in work injuries: A multivariate, population-based study. *American Journal of Industrial Medicine*, 48(1), 50-56. <https://doi.org/10.1002/ajim.20185>
- Dembe, A. E. (2001). The social consequences of occupational injuries and illnesses. *American Journal of Industrial Medicine*, 40(4), 403-417. <https://doi.org/10.1002/ajim.1113>
- Gonzalez-Delgado, M., Gómez-Dantés, H., Fernández-Niño, J. A., Robles, E., Borja, V. H., & Aguilar, M. (2015). Factors associated with fatal occupational accidents among Mexican workers: A national analysis. *PLoS one*, 10(3), 1-19. <https://doi.org/10.1371/journal.pone.0121490>
- Gransow, B., Zheng, G., Leong, A., & Ling, L. (2014). Chinese migrant workers and occupational injuries: A case study of the manufacturing industry in the Pearl River Delta, UNRISD Working Paper (No. 2014-1). [www.econstor.eu/bitstream/10419/148764/1/861317688.pdf](http://www.econstor.eu/bitstream/10419/148764/1/861317688.pdf)
- Gyekye, S. A., & Salminen, S. (2009). Educational status and organizational safety climate: Does educational attainment influence workers' perceptions of workplace safety?. *Safety Science*, 47(1), 20-28. <https://doi.org/10.1016/j.ssci.2007.12.007>
- Kjellén, U. (2000). *Prevention of accidents through experience feedback*. CRC Press, Taylor & Francis Group.
- ILO (2019). International Labour Organization, United Nations [www.ilo.org/global/topics/safety-and-health-at-work/lang--en/index.htm](http://www.ilo.org/global/topics/safety-and-health-at-work/lang--en/index.htm)
- Liang, Y., & Guo, M. (2015). Utilization of health services and health-related quality of life research of rural-to-urban migrants in China: a cross-sectional analysis. *Social Indicators Research*, 120(1), 277-295. <https://doi.org/10.1007/s11205-014-0585-y>
- LFS. Labour Force Survey, various issues, Pakistan Bureau of Statistics, Government of Pakistan. <http://www.pbs.gov.pk/labour-force-publications>
- Matz, C. J., Stieb, D. M., & Brion, O. (2015). Urban-rural differences in daily time-activity patterns, occupational activity, and housing characteristics. *Environmental Health*, 14, 1-11. <https://doi.org/10.1186/s12940-015-0075-y>
- PBS (2012). Methodology of price collection and computing price indices, Pakistan Bureau of Statistics, Government of Pakistan [http://www.pbs.gov.pk/sites/default/files/price\\_statistics/methodology\\_price.pdf](http://www.pbs.gov.pk/sites/default/files/price_statistics/methodology_price.pdf)

- PSCO (2015). Pakistan Standard Classification of Occupation, Pakistan Bureau of Statistics, Government of Pakistan. [http://www.pbs.gov.pk/sites/default/files/PSCO\\_2015.pdf](http://www.pbs.gov.pk/sites/default/files/PSCO_2015.pdf)
- PSIC (2010). Pakistan Standard Industrial Classification, Pakistan Bureau of Statistics, Government of Pakistan [http://www.pbs.gov.pk/sites/default/files/other/PSIC\\_2010.pdf](http://www.pbs.gov.pk/sites/default/files/other/PSIC_2010.pdf)
- Rhee, K. Y., Choe, S. W., Kim, Y. S. & Koo, K. H. (2013). The trend of occupational injuries in Korea from 2001 to 2010. *Safety and Health at Work*, 4(1), 63-70. <https://doi.org/10.5491/SHAW.2013.4.1.63>
- Salminen, S. (2004). Have young workers more injuries than older ones? An international literature review. *Journal of Safety Research*, 35(5), 513-521. [doi.org/10.1016/j.jsr.2004.08.005](https://doi.org/10.1016/j.jsr.2004.08.005)
- Schenker, M. B. (2010). A global perspective of migration and occupational health. *American Journal of Industrial Medicine*, 53(4), 329-337. <https://doi.org/10.1002/ajim.20834>
- Unsar, S., & Sut, N. (2009). General assessment of the occupational accidents that occurred in Turkey between the years 2000 and 2005. *Safety Science*, 47(5), 614-619. <https://doi.org/10.1016/j.ssci.2008.08.001>
- Villanueva, V., & Garcia, A. M. (2011). Individual and occupational factors related to fatal occupational injuries: A case-control study. *Accident Analysis & Prevention*, 43(1), 123-127. <https://doi.org/10.1016/j.aap.2010.08.001>
- Wang, Z., Chan, K., Peterson, M., & Guo, Y. (2018). Are China's rural migrant workers more at higher occupational risks and injury? Evidence from a nationally-representative survey. *The European Journal of Public Health*, 28(1), 89-90. <https://doi.org/10.1093/eurpub/cky047.208>
- WHO (2019). World Health Organization, United Nations. Retrieved from [https://apps.who.int/iris/bitstream/handle/10665/113228/CCS\\_Pakistan\\_2013\\_EN\\_1496.pdf;jsessionid=CE21F5E8E4C63624F8AF30E76EEAC2DD?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/113228/CCS_Pakistan_2013_EN_1496.pdf;jsessionid=CE21F5E8E4C63624F8AF30E76EEAC2DD?sequence=1)
- World Bank (2019). World Development Indicators (WDI) DataBank, The World Bank. Retrieved from <https://databank.worldbank.org/data/source/world-development-indicators>