

## Characterization of Work Injuries in a Portuguese Tertiary Hospital From 2012-2021

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### Abstract

**Introduction:** Portuguese legislation defines work-related injuries (WI) as those that occurs at the place and during working hours and produces an injury, functional disorder or illness with reduced work capacity or gain or death. Musculoskeletal injuries are common in health professionals due to frequent tasks and inadequate posture, which is associated with reduced levels of productivity and changes in the quality of work.

**Objectives:** To characterize the WI in a Portuguese tertiary hospital, the distribution over the months and the body region most affected by these accidents. It is also intended to assess the number of work days lost with WI.

**Methods:** A retrospective observational study was carried out based on the analysis of WI of workers in a Portuguese hospital from January 2012 to December 2021. Databases from the Occupational Health Department were used.

**Results:** In this period 4,572 cases of WI were recorded. 11.6% occurred on the way to the hospital. The year 2015 recorded the highest number of accidents and the year 2012 the lowest. There was an increasing trend in the number of accidents over the years, being interrupted in 2020 and 2021. 59% (2,718) accidents resulted in the affection of the musculoskeletal system and 28.22% (1,290) involved contact with biological products. WI resulted in a loss of 68,447 working days (over 187 years).

**Discussion and Conclusions:** WI are very common in hospital practice with significant individual consequences and loss of work productivity. Musculoskeletal injuries are often associated with physical demands at work, which increase the risk of accidents. The COVID-19 pandemic changed the numbers of WI, leading to a decrease in its numbers, explained by the absenteeism due to prophylactic isolation and illness. The loss of productivity makes it important to promote preventive measures to control absenteeism.

**Keywords:** Work accident; Musculoskeletal injury; Health professionals; Absenteeism; Lost years

### Introduction

Portuguese legislation defines Work-related Injuries (WI) as those that occur at the place and during working hours and produce a direct or indirect bodily injury, functional disorder or illness that results reduction in the ability to work or gain or death [1]. The law also specifies that the workplace is any place where the worker is or must go by virtue of his work and where he is, directly or indirectly, subject to the control of the employer [1]. In this sense, it is common to divide WI into those that occur on the institution's premises and those that occur on the way to and from the institution designated as *in itinere*.

WI are associated with serious consequences for the injured person and for the employer. In a recent 2020 report on work-related musculoskeletal injuries (WMSD) in European Union member countries, a cost up to 1 to 3% of the gross domestic product of some countries was estimated [2]. In Portugal, in 2019, 196,202 cases of WI were reported, of which 104 re-

sulted in death [3]. These values show a decrease when we compare with the numbers of the year 1985, which accounted for 233,217 accidents and of these, 348 resulting in death [3]. In the healthcare sector, the overall incidence of WI is often found to be higher than in other professional sectors [4]. According to the Portuguese Central Administration of Health Services, in 2016, 196,600 working days were lost due to WI or occupational diseases [5].

WMSD represent a heterogeneous group of clinical conditions that involve the musculoskeletal system and that result from exposure to different risk factors in the work environment [2,6]. These are frequent in healthcare professionals given the requirement of their daily activity, such as the mobilization of dependent patients, carrying loads and repetitive movements. The lumbar and cervical spine and upper limbs are particularly affected [7]. A recent Portuguese national report indicated that 5,161,343 working days were lost due to WI in 2013 and

21.2% of these episodes led to a period of absence of more than 30 days [8].

It is common knowledge that in recent years there has been a growing trend, by governments and business entities, to the importance of the health and safety of their workers, favouring policies that promote occupational safety and the reduction of WI in number and severity. In this sense, it is important to understand the evolution of these accidents with a Portuguese tertiary hospital as a reference institution.

**Objectives**

The objectives of the study are to characterize the type of WI in a Portuguese tertiary hospital, its distribution over months and years. It is intended to evaluate the body regions most affected as a result of these accidents. It is also intended to assess the number of working days lost with WI.

**Methods**

A retrospective study was carried out including all WI of a Portuguese tertiary hospital in the period from January 2012 to December 2021. These data were extracted from databases from Occupational Health Department. Information was collected on: number of accidents, location (if in the hospital facilities and on the itinerary), type of injury (musculoskeletal diseases, biological agents, chemical agents or others), type of incapacity for work (presence or absence of immediate absolute incapacity), duration of absence from work and body regions mainly affected by the WI. Only cases with absolute incapacity for work immediately after the injury were considered as periods of absence from work. In this absence, the associated work days lost (WDL) as a result of a given accident, include weekends and holidays, provided they are covered by the period of absence, even if the worker was not normally scheduled on those days.

**Results**

4,572 WI were reported from January 2011 to December 2021 (Table 1). In 2015, the highest number of reported accidents occurred (n=572) and in the year 2012, the lowest number (n=363). With regard to the analysis by months of the year, there seems to be a lower global report of accidents in the months of August and December, but that was not consistent in all years of this study.

In the study period, 11.7% of WI, on average, corresponded to in itinere accidents with maximum frequency in 2017 (n=64)

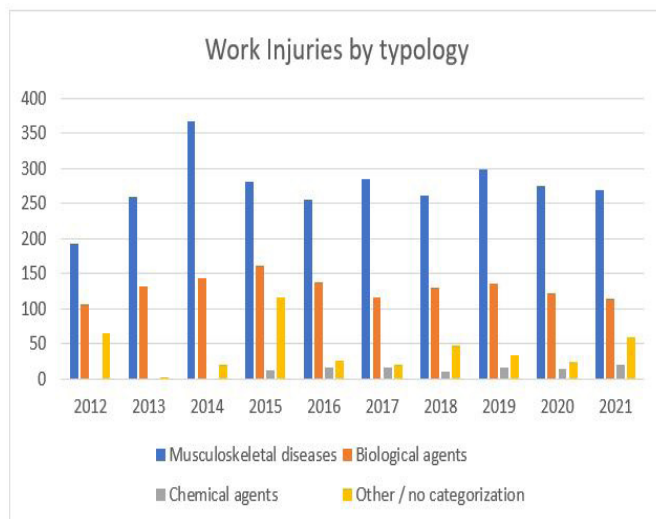
and minimum in 2014 (n=38). WI in the workplace had a higher frequency in 2015 (n=516) and lower incidence in 2012 (n=321) (graph 1).

The proportion of WI in itinere in comparison to WI at the hospital’s premises did not show significant variations over the years.

In the analysis of the type of WI (Graph 2), WMSD stand out as the most frequent during the analysed period (n=2,748,



Graph 1: Number of work injuries by place of occurrence.



Graph 2: Number of work injuries by typology.

Table 1: Monthly distribution of work injuries from January 2012 to December 2021.

| Month     | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|-----------|------|------|------|------|------|------|------|------|------|------|-------|
| January   | 18   | 43   | 43   | 47   | 45   | 43   | 36   | 48   | 48   | 40   | 411   |
| February  | 29   | 28   | 40   | 47   | 48   | 42   | 39   | 46   | 42   | 29   | 390   |
| March     | 44   | 28   | 42   | 52   | 36   | 45   | 41   | 37   | 30   | 41   | 396   |
| April     | 39   | 28   | 44   | 40   | 33   | 41   | 35   | 37   | 25   | 35   | 357   |
| May       | 33   | 38   | 28   | 35   | 39   | 28   | 27   | 52   | 35   | 31   | 346   |
| June      | 31   | 31   | 43   | 54   | 28   | 37   | 56   | 30   | 40   | 47   | 397   |
| July      | 31   | 32   | 44   | 45   | 38   | 39   | 42   | 42   | 41   | 53   | 407   |
| August    | 24   | 20   | 54   | 49   | 36   | 30   | 34   | 32   | 29   | 36   | 344   |
| September | 31   | 36   | 49   | 56   | 47   | 30   | 33   | 46   | 39   | 45   | 412   |
| October   | 29   | 38   | 55   | 61   | 34   | 36   | 33   | 46   | 35   | 28   | 395   |
| November  | 21   | 37   | 57   | 50   | 27   | 33   | 40   | 32   | 36   | 38   | 371   |
| December  | 33   | 33   | 34   | 36   | 25   | 37   | 33   | 37   | 38   | 40   | 346   |
| Total     | 363  | 392  | 533  | 572  | 436  | 441  | 449  | 485  | 438  | 463  | 4 572 |

60.10%), followed by biological agents (n=1,302, 28.48%). The WI caused by chemical agents totalled 105 accidents (2.30%). The year 2014 had the highest number of WMSD reported (n=368) and the year 2015 had the highest number of WI per biological agent (n=161). No WI were reported by chemical agents in the years 2012 to 2014.

During the study period, 68,447 work days were lost (over 187 years) as a direct consequence of WI (Table 2). The year 2015 recorded the highest number of WDL (n=12,870), 293 accidents with at least 1 day of absence. In 2014, 55.23% of the reported WI had at least 1 day of absence. In 2018 only 19.38% of WI had at least 1 day of absence. The number of WDL had its maximum for an isolated accident in 2015 with 1,109 WDL. The median WDL remained relatively uniform across all years.

The anatomical location mainly affected by WI (Table 3) cor-

**Table 2:** Associated work days lost in 2012-2021

| Year  | W D L <sup>1</sup> (n) | W I with W D L (n) | W I with W D L (% in that year) | M a x . W D L with a single WI (n) | Median WDL |
|-------|------------------------|--------------------|---------------------------------|------------------------------------|------------|
| 2012  | 6 107                  | 150                | 41,32                           | 343                                | 19,5       |
| 2013  | 7 380                  | 177                | 45,15                           | 301                                | 18         |
| 2014  | 10 981                 | 296                | 55,53                           | 438                                | 21,5       |
| 2015  | 12 870                 | 293                | 51,22                           | 1 109                              | 22         |
| 2016  | 5 843                  | 156                | 35,78                           | 685                                | 15         |
| 2017  | 5 884                  | 180                | 40,82                           | 338                                | 15         |
| 2018  | 3 235                  | 87                 | 19,38                           | 364                                | 14         |
| 2019  | 4 326                  | 160                | 32,99                           | 182                                | 15         |
| 2020  | 6 022                  | 163                | 37,21                           | 450                                | 15         |
| 2021  | 5 799                  | 197                | 42,55                           | 214                                | 14         |
| Total | 68 447                 | 1 859              | 40,66                           | -                                  | -          |

<sup>1</sup>Work days lost

<sup>2</sup>Work injury

responds to the upper limbs, totalling 1,646 accidents in the analysed period (36% of all WI). Upper limbs were associated with 17,082 WDL (24.96% of all WDL). Even so, lower limb injuries (20.52% of WI) correspond to the anatomical region with the most WDL (n=23,010), totalling more than a third of all lost work days. Cervical spine injuries had the lowest number of WI (n=84, 1.84%) and the lowest number of absences (n=1,613, 2.36%).

In 2015 (graph 3) there was a higher frequency of WI in the upper limbs (n=248), lower limbs (n=125) and head (n=80). In most years, injuries to the upper limbs remain more frequent, except in the years 2020 and 2021, which have more accidents in the lower limbs and in multiple regions / unclassified.

Graph 3: Number of work injuries by anatomical region in 2012-2021.

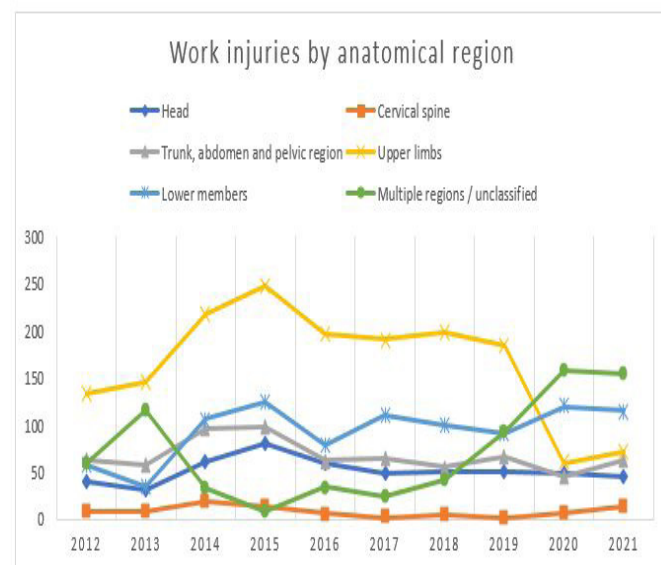
With regard to working days lost (graph 4), the year 2015 stands

**Table 3:** Anatomical location of reported accidents and work days lost in 2012-2021.

| Anatomical location              | W I <sup>1</sup> (n) | WI (%) | W D L (n) | W D L (%) |
|----------------------------------|----------------------|--------|-----------|-----------|
| Head                             | 513                  | 11,22  | 1 752     | 2,56      |
| Cervical spine                   | 84                   | 1,84   | 1 613     | 2,36      |
| Trunk, abdomen and pelvic region | 670                  | 14,65  | 14 139    | 20,66     |
| Upper limbs                      | 1 646                | 36,00  | 17 082    | 24,96     |
| Lower members                    | 938                  | 20,52  | 23 010    | 33,62     |
| Multiple regions / unclassified  | 721                  | 15,77  | 10 851    | 15,85     |
| Total                            | 4 572                | 100,00 | 68 447    | 100,00    |

<sup>1</sup>Work injury

out with the highest frequency of days lost due to lower limb (n = 5,022) and upper limb injuries (n = 4,230). In most years, lower limb injuries remain the main responsible for the loss of working days, with the exception of the years 2012 to 2014, with greater WDL in multiple regions / unclassified (2012 and 2013) and in the trunk, abdomen and pelvic region (2014).

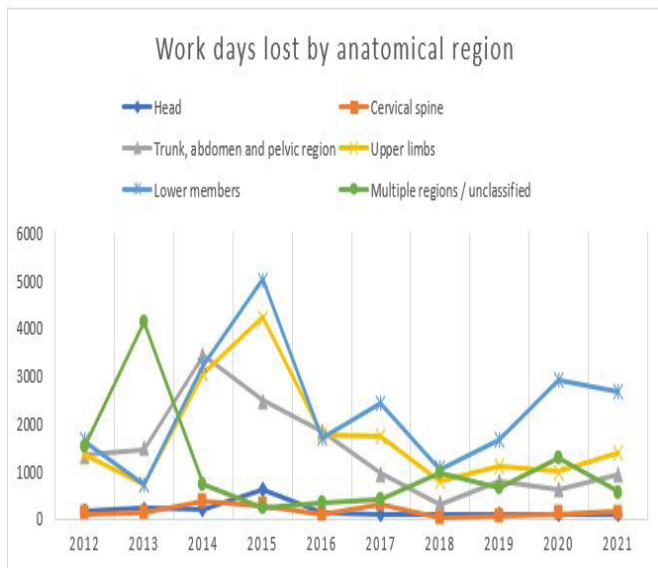


**Graph 3:** Number of work injuries by anatomical region in 2012-2021.

**Discussion**

The vast majority of WI occur in the workplace as opposed to WI in itinere, which corresponds to 11.7% of cases. The analysis of WI in itinere is limited by the difficulty in predicting the cause of accidents and by the complexity of an intervention. The months of August and December had the lowest WI report, although this pattern is not consistent every year. This is probably explained by the fact that they are preferential months for holidays, meaning that with fewer individuals working, it is expected that less WI will occur.

Over the last 10 years, there is a growing trend in the number of WI reported, except for the year 2015, and break in the trend in the years 2020 and 2021. This likely growing trend can be



**Graph 4:** Number of work days lost by anatomical region in 2012-2021.

easily explained by the effort to raise awareness about the WI, carried out by the occupational health and safety department, which empowers the worker for the need to report WI and the advantages of being an active participant in accident prevention. In this regard, it is also important to note the various training courses carried out and which will certainly have contributed to a greater concern about the reporting of injuries. We do not know the explanation for 2015 lower reported accidents, however for the years 2020 and 2021 it is easily explained by the COVID-19 pandemic, whose work evictions due to prophylactic isolation or illness, led to a decrease in the number of hours worked, which was reflected in the WI number.

The type of WI is also relevant to the healthcare context. Musculoskeletal injuries are the most frequent and reflect the nature of work functions such as transfer dependent patients in bed, in manual lifting, vertical transfer or hygiene care. Also noteworthy is the mobilization of loads in various locations, and repetitive movements in the collection of fluids or administration of medication, which are associated with musculotendinous injuries. The high prevalence of accidents with biological agents, which includes blood and other fluids, quite common in the hospital context, stands out.

The WDL median is similar in all years, with slight occasional variations. This fact, together with the presence of accidents that result in hundreds of WDL, seem to indicate that there is a certain number of WI with high severity that contribute significantly to the total values. For example, in 2015, a single accident was responsible for 8.62% of WDL associated to that year. Regarding the anatomical location, the upper limbs are the most affected by WI, but not the main causes of WDL, which occurred in WI with lower limb affection. In the years 2020 and 2021, WI with lower limb disorders had a greater relative importance when compared to upper limbs, at the level of absolute number and WDL.

The number of WDL, 68,447 days, also reflects the loss of productivity associated with WI and the gains that can arise from an accident prevention policy, training and opening by the occupational health and safety department to the needs of the working population.

Some limitations of this study: it is not possible to relate these data to gender, educational qualifications, type of work and professional category, among others. This was due to the type of WI records over the years, which has only recently been corrected. Furthermore, it was not possible to take into account the case of workers with multiple accidents. In the years 2012-2014, accidents caused by chemical agents did not have a category of their own, being included in "Others/undesignated", which explains their absence in this period. Finally, it should be noted that, over the years, the data used were filled in by different people and with different scales, which explains much of the uncategorized data over the years.

## Conclusions

WI are responsible for high costs and a high loss of productivity. The promotion of preventive measures can help control absenteeism and increase hospital productivity. The consequences of WI can be minimized from the identification of hazards and risk assessment that result in preventive measures and intervention programs.

With this study, it is possible to conclude that WI are a serious productivity problem with direct and indirect costs and that it is urgent to adopt a WI prevention and management program, which includes the health and safety department at work, with more power of action in hospital operational management and greater importance in decision-making in all aspects related to working conditions.

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