**Title:** WHAT IS THE IMPACT ON OCCUPATIONAL HEALTH AND SAFETY WHEN WORKERS KNOW THEY HAVE SAFETY REPRESENTATIVES?

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**Highlights**

- We compare workers' OHS results based on their reported existence of SRs.
- The study refers to employees working at small, medium and large work centers.
- Workers reporting to have SRs are better protected by preventive action.
- Workers ignoring SRs' presence perform as poor as those reporting not to have SRs.
- A potential workers' group who would benefit from making SRs known is signaled.

WHAT IS THE IMPACT ON OCCUPATIONAL HEALTH AND SAFETY WHEN WORKERS KNOW THEY HAVE SAFETY REPRESENTATIVES?

**Abstract**

When there are safety representatives (SRs) at the workplace higher levels of preventive action have been observed. However, no study has analyzed workers' health and safety results when workers (do not) know they have SRs. Based on data from the VII Spanish Working Conditions Survey (2011), this paper explores differences in the intensity of self-reported preventive action among workers reporting to have SRs at their workplaces, workers reporting not having them, and workers unaware of SRs' existence. The sample included employees aged 16 to 65 years working at firms with 6 workers or more (n=5,562). A multinomial logistic regression was undertaken to study the association between the reported existence of SRs and levels of preventive action (high, intermediate and non-existent), comparing workers unaware of SRs' existence to those reporting to have SRs and those reporting no SRs. Models were adjusted by socio-demographic and employment-related features. It was found that workers reporting SRs' existence were protected by greater preventive action, both at the intermediate (aOR=2.87, 95% CI 2.39 to 3.44) and high level (aOR=10.26, 95% CI 7.27 to 14.50), and that there were no statistically significant differences between workers reporting not to have SRs and those unaware of SRs. Our results draw attention to a group of workers who might have SRs without being aware of it and remain less protected by preventive action. These workers would benefit from interventions aimed at making SRs known and available to all workers.

**Keywords:** Worker representative participation, Occupational health and safety, Employment conditions, Cross-Sectional Study

## 1. Introduction

The right of worker representative participation in occupational health is recognized in Europe in Council Directive 89/391 EEC. Safety representatives (SRs) constitute the most widespread form of representative participation in occupational health in Europe (1,2). In Spain, according to the Act on Prevention of Occupational Risks, SRs should be present in companies with more than five workers. For companies of 50 or more workers, the establishment of Health and Safety Committees -committees with worker and employers' representatives- is mandatory (3).

Activities performed by SRs refer directly or indirectly to health and safety prevention and surveillance (4). In firms with SRs, workers benefit from higher levels of preventive action than those without, for instance, receiving information and training on occupational health hazards, having written safety guidelines, or having risk assessments conducted (5,6). To the best of our knowledge, no study has yet concentrated on the health and safety results of workers who lack knowledge of SRs' existence. This constitutes an issue of concern as to the SRs' effectiveness: lack of knowledge can deter workers from raising health and safety issues in case of need (7), and it affects a considerable proportion of waged workers (13.8%) in Spain (8). By using data from the Spanish Working Conditions Survey, this study aims to explore what types of preventive action outcomes workers unaware of SRs have, in comparison with workers reporting to have SRs and those reporting lack of representatives.

## 2. Methods

*2.1 Study population*

This study draws on the VII Spanish Survey on Working Conditions (2011), a representative sample of the working population in Spain. The survey was conducted through multi-stage, stratified sampling combined with quota criteria to ensure representativeness according to workers' branch of economic activity and work centers' size (9). Response rate was 53.9%. Our sample was restricted to salaried workers with contract aged 16–65 working at firms with 6 workers or more (n=5,562). This sample restriction is due to the legal criteria for worker representation in Spain: in firms between 6 and 49 workers, workers can designate 1 SR, while all firms or work centers with 50 workers or more should have a Health and Safety Committee with a number of SRs ranging from 2 to 8 depending on the firm size (3). Members of the armed forces were also excluded from our sample.

*2.2 Study variables*

2.2.1 Dependent variable

An overall measure of intensity of preventive action informing about preventive measures associated with SRs' performance was created (4), as reported by workers, and based on the following variables: reception of information and training, implementation of risk assessment, and introduction of measures linked to the risk assessment results. We considered three categories: no preventive action (unawareness or absence of information and risk assessment); intermediate preventive action (reception of information and implementation of risk assessment but without subsequent corrective measures or not knowing if measures were adopted); and, high preventive action (reception of information and risk assessment implementation with subsequent measures).

The cut-off point between intermediate and high prevention action was the implementation of measures following a risk assessment. Thus, intermediate preventive action includes relatively easy and common measures of prevention management (7,10), whereas high preventive action comprises the type of action where worker representatives can mark a turning point (10).

2.2.2 Independent variables

The main explanatory variable was the self-reported existence of SRs in the workplace (yes, no, do not know). We included as adjustment variables socio-demographic characteristics: sex; age (16-24; 25-34; 35-44; 45-54; 55-65); nationality (Spanish; other); educational attainment (without studies or not finished; compulsory education; non-compulsory secondary education; tertiary education); and occupational social class (manual; non-manual). The survey's occupational classification (9), based on the Spanish Population and Housing Census, has been dichotomised adapting the Spanish Society of Epidemiology proposal of social class measure (11). Also, five working and employment-related variables were considered as adjustment variables: type of contract (permanent; fixed-term); weekly working hours (up to 30 hours; 30-40 hours; 41 hours or more); tenure (up to 6 months; 6 months – 2 years; more than 2 years); work center size (6-9 workers; 10-49 workers; 50-249 workers; >=250 workers); and economic sector (agriculture; industry; construction; services).

*2.3 Data analysis*

A bivariate analysis was performed to examine the associations between preventive action and independent variables. P-values were calculated using the Chi-square test. To analyse the association between intensity of preventive action and SR's existence,

we performed a multivariate multinomial logistic regression taking the no preventive action category as the reference. A total of 112 cases out of 5562 were excluded because of missing values in any of the study variables. The model was adjusted by significant predictors ($P < 0.05$), considering a backwards procedure and log-likelihood ratio-adjustment measures. Raw and adjusted odds ratios (OR) were calculated for intermediate vs. no preventive action and for high vs. no preventive action with 95% confidence intervals (CI). Analyses were performed using PASW v. 19.0 and STATA v.11.1.

## 3. Results

Workers unaware of SRs' existence are those with the lowest levels of intermediate (14.7%) and high preventive action (3.8%). Men enjoy higher levels of preventive action than women. High levels of preventive action are more prevalent in work centers with workers employed under "standard" contractual and working time arrangements: higher seniority and permanent contracts, or weekly working time from 30 to 40 hours (Table 1).

INSERT TABLE 1

Workers reporting SRs have greater odds of intermediate and high preventive action than no preventive action compared to workers who are unaware of SRs' existence: intermediate preventive action adjusted OR=2.87 (95% CI 2.39 to 3.44); high preventive action adjusted OR=10.26 (95% CI 7.27 to 14.50). No differences are observed between workers reporting no SRs and those not aware of their existence: adjusted OR of intermediate preventive action was 0.88 (95% CI 0.72 to 1.06), and for high preventive action, 1.35 (95% CI 0.92 to 1.98) (Figure 1).

INSERT FIGURE 1

## 4. Discussion

Previous studies show that in firms with SRs, workers enjoy higher levels of preventive action (5,10,12). This study expands on factors associated with the effectiveness of safety representatives' action and focuses on the role played by workers' knowledge of SRs' existence. We found no differences between workers who are unaware of SRs' existence and those workers reporting no SRs regarding protection by intermediate and high preventive action. Conversely, workers reporting SRs were better protected than workers unaware of SRs.

In this study, we anticipated work center size as a factor facilitating workers' knowledge of SRs' existence. Also, in the literature there is a well established relationship between firm size and occupational health and safety activity (5,10), as well as size and SRs' presence (5,12). However, despite we observed a similar association between work center size and preventive action at a bivariate level, work center size lost significance when knowledge of SRs' existence was introduced in the model. The same result held true when alternative models were tested. A possible explanation for this result is that since our sample did not include the smaller work centers (from 1 to 5 workers) - thus being limited to workers who could have SRs- the impact of size might have diminished.

Rather than work center size, an alternative explanation for unawareness of SRs' existence encompasses employment precariousness. In Spain, workers unaware of forms of collective representation at work (13) share socio-demographic and employment-related characteristics with those most affected by job precariousness (14). Also, the number of company branches could hinder workers' knowledge of SRs. This knowledge, however, might be sensitive to the type of action performed by SRs

and the way they relate to workers, since for example workers' involvement is encouraged when collective representatives are proactive and call for action (15). This would imply not only the need for making SRs known to workers but also serve to highlight the relevance to further examine drivers and constraints of the interaction between workers and SRs, as well as its role as a determining factor of SRs' effectiveness (16). For instance, trained and experienced SRs can develop more preventive action (4), which in turn may indirectly affect workers' awareness of SRs' existence.

*4.1 Limitations*

This study has its limitations mainly arising from the survey data, and results must be interpreted accordingly. First, it relied on a cross-sectional survey that lacked some variables concerning potential confounding factors leading to higher degrees of preventive action at workplaces such as management involvement in occupational health or SRs' training (2,4,17,18). Additionally, our analysis provided a proximal measure of preventive activity that can be limited in scope because the survey – administered to workers- may not capture some of the aspects SRs act upon that remain unbeknownst to workers (e.g. participation in prevention planning, law enforcement, or submission of proposals to stop unsafe work) (4). The survey also lacked information on some relevant measures that workers would have been able to answer such as accident investigation, or more accurate information on personal protective equipment (5,19) . Finally, in the absence of an objective measure on information about SRs' existence at the workplace, the response quality to this question could be sub-optimal (12), for example, being more indicative of the existence of other types of preventive resources rather than SRs' presence.

## 5. Conclusion and implications

On the one hand, this research adds to the body of literature showing that worker representative participation is beneficial to workers. On the other, it shows differential protection by preventive action among waged workers according to their reported existence of SRs. Given the relevance of SRs' in preserving occupational health and safety at work, an implication of this article is that it highlights the need of making SRs known and available to all workers. Future directions for research should include in-depth analysis of factors leading to lack of knowledge of SRs, and its impact on workers' health and SRs' effectiveness.

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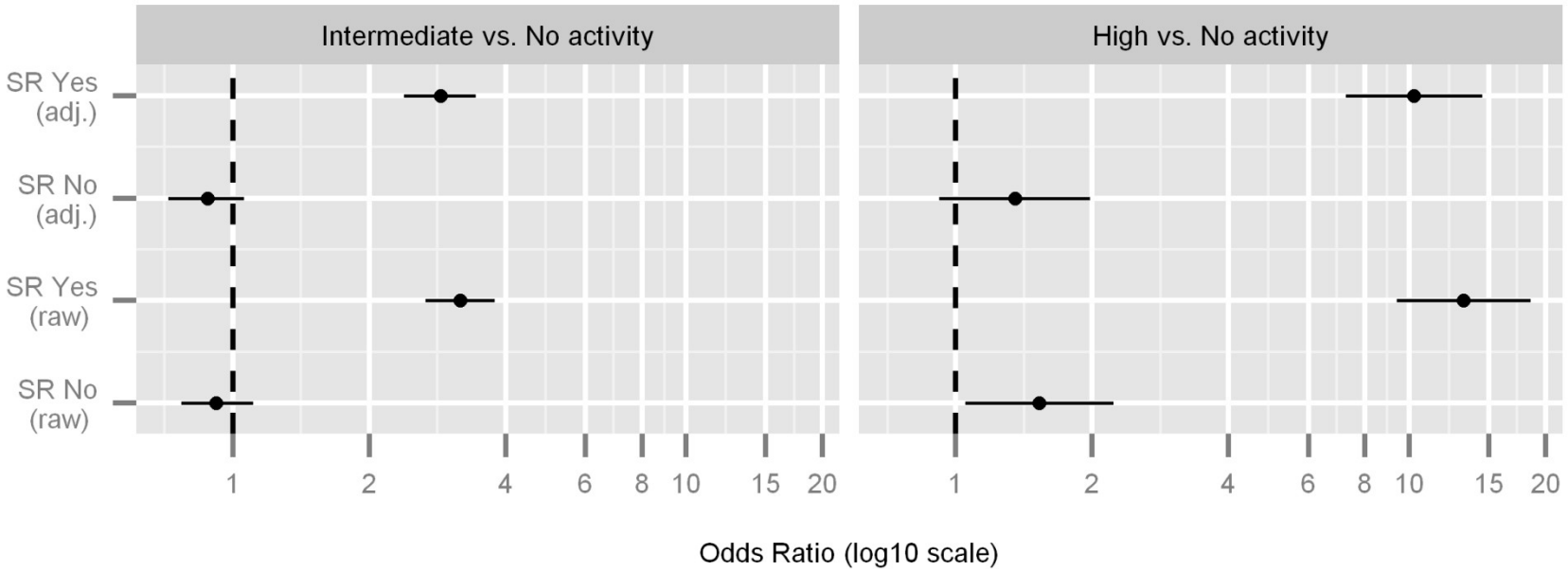
**Figure**

Figure 1. Intensity of preventive action according to reported existence of safety representatives (SR). Spain (2011). Raw and adjusted (adj.)[a] odds ratio and 95% confidence intervals.

[see figure attached]

[a] Model was also adjusted by sex (reference category: women), nationality (reference category: non-Spanish), age (reference category: 16-24), educational attainment (reference category: without studies or unfinished), occupational social class (reference category: non-manual), economic sector (reference category: agriculture), type of contract (reference category: fixed-term), tenure (reference category: up to 6 months), working hours (reference category: up to 30 hours).

**Figure**


Intermediate vs. No activity
High vs. No activity
SR Yes (adj.)
SR No (adj.)
SR Yes (raw)
SR No (raw)
1
2
4
6
8
10
15
20
Odds Ratio (log10 scale)

**Table**

Table 1. Preventive action, reported existence of safety representatives, socio-demographical variables and working and employment-related variables. Spain (2011).

| | | | Preventive action | | | | | | p-value[a] | p-value[b] |
|---|---|---|---|---|---|---|---|---|---|---|
| | All | | None | | Intermediate | | High | | | |
| | n | % | n | % | n | % | n | % | | |
| *Reported existence of safety representatives* [c] | | | | | | | | | <0.001 | <0.001 |
| Do not know | 750 | 13.5 | 176 | 23.5 | 528 | 1 | 46 | 3.8 | | |
| No | 1368 | 24.6 | 367 | 48.9 | 863 | 2 | 138 | 11.5 | | |
| Yes | 3435 | 61.9 | 207 | 27.6 | 2213 | 6 | 1015 | 84.7 | | |
| *Socio-demographical variables* | | | | | | | | | | |
| Sex [d] | | | | | | | | | <0.001 | <0.001 |
| Women | 2616 | 47.1 | 869 | 54.9 | 1337 | 4 | 410 | 37.3 | | |
| Men | 2941 | 52.9 | 715 | 45.1 | 1538 | 5 | 688 | 62.7 | | |
| Age [e] | | | | | | | | | 0.032 | 0.001 |
| 16 – 24 | 188 | 3.4 | 68 | 4.3 | 95 | 3 | 25 | 2.3 | | |
| 25 – 34 | 1281 | 23.1 | 357 | 22.5 | 677 | 2 | 247 | 22.5 | | |
| 35 – 44 | 1846 | 33.2 | 478 | 30.2 | 970 | 3 | 398 | 36.3 | | |
| 45 – 54 | 1552 | 27.9 | 469 | 29.6 | 791 | 2 | 292 | 26.6 | | |
| 55 – 65 | 689 | 12.4 | 212 | 13.4 | 342 | 1 | 135 | 12.3 | | |
| Nationality [f] | | | | | | | | | 0.003 | <0.001 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Other | 411 | 7.4 | 153 | 9.7 | 206 | 7 | 52 | 4.7 | |
| | Spanish | 5140 | 92.6 | 1428 | 90.3 | 2666 | 9 | 1046 | 95.3 | |
| Educational attainment [g] | | | | | | | | | | <0.001 | <0.001 |
| | Without studies or unfinished | 153 | 2.8 | 70 | 4.5 | 67 | 2 | 16 | 1.5 | |
| | Compulsory education | 1554 | 28.1 | 410 | 26.1 | 845 | 2 | 299 | 27.3 | |
| | Non-compulsory secondary education | 2080 | 37.7 | 547 | 34.9 | 1063 | 3 | 470 | 43.0 | |
| | Tertiary education | 1737 | 31.4 | 541 | 34.5 | 887 | 3 | 309 | 28.2 | |
| Occupational social class [h] | | | | | | | | | | <0.001 | <0.001 |
| | Non-manual | 1465 | 26.4 | 329 | 20.8 | 740 | 2 | 396 | 36.1 | |
| | Manual | 4092 | 73.6 | 1255 | 79.2 | 2135 | 7 | 702 | 63.9 | |
| *Working and employment-related variables* | | | | | | | | | | |
| Type of contract [i] | | | | | | | | | | <0.001 | <0.001 |
| | Temporary | 1073 | 19.4 | 397 | 25.2 | 541 | 1 | 135 | 12.4 | |
| | Permanent | 4455 | 80.6 | 1178 | 74.8 | 2323 | 8 | 954 | 87.6 | |
| Weekly working hours [j] | | | | | | | | | | <0.001 | <0.001 |
| | Up to 30 | 748 | 13.5 | 295 | 18.8 | 360 | 1 | 93 | 8.5 | |
| | 30 – 40 | 3883 | 70.3 | 1039 | 66.1 | 2037 | 7 | 807 | 73.7 | |
| | 41 or more | 895 | 16.2 | 238 | 15.1 | 462 | 1 | 195 | 17.8 | |
| Tenure [k] | | | | | | | | | | <0.001 | <0.001 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Up to 6 months | 539 | 9.7 | 212 | 13.5 | 260 | 9 | 67 | 6.1 | | |
| | 7 months - 2 years | 556 | 10.0 | 187 | 11.9 | 278 | 9 | 91 | 8.3 | | |
| | More than 2 years | 4446 | 80.2 | 1177 | 74.7 | 2330 | 8 | 939 | 85.6 | | |
| Sector [l] | | | | | | | | | | <0.001 | <0.001 |
| | Agriculture | 141 | 2.5 | 64 | 4.0 | 62 | 2 | 15 | 1.4 | | |
| | Industry | 960 | 17.3 | 156 | 9.8 | 512 | 1 | 292 | 26.6 | | |
| | Construction | 364 | 6.6 | 79 | 5.0 | 183 | 6 | 102 | 9.3 | | |
| | Services | 4091 | 73.6 | 1285 | 81.1 | 2117 | 7 | 689 | 62.8 | | |
| Work center size [m] | | | | | | | | | | <0.001 | <0.001 |
| | 6-9 | 755 | 13.6 | 266 | 16.8 | 364 | 1 | 125 | 13.6 | | |
| | 10-49 | 2573 | 46.3 | 793 | 50.1 | 1304 | 4 | 476 | 43.4 | | |
| | 50-249 | 1242 | 22.4 | 322 | 20.3 | 658 | 2 | 262 | 23.9 | | |
| | >= 250 | 986 | 17.7 | 202 | 12.8 | 549 | 1 | 235 | 21.4 | | |

[a] Comparison between intermediate preventive action and no preventive action, 95% confidence level.

[b] Comparison between high preventive action and no preventive action, 95% confidence level.

[c]9 missing cases; [d]5 missing cases; [e]6 missing cases; [f]11 missing cases; [g]38 missing cases; [h]5 missing cases; [i]34 missing cases; [j]36 missing cases; [k]21 missing cases; [l]6 missing cases; [m]6 missing cases