



Prevalence and quality of workplace risk assessments – Findings from a representative company survey in Germany



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ARTICLE INFO

Article history:

Received 11 June 2015

Received in revised form 17 December 2015

Accepted 21 February 2016

Keywords:

Occupational safety and health

Workplace risk assessment

Prevalence

Quality

Predictors

Company survey

ABSTRACT

Although Workplace Risk Assessments (WRA) are legally required in all EU member states and widely considered to be a core element of occupational safety and health (OSH) management, the state of their implementation at company level is still viewed rather critically, both in quantitative and qualitative terms. In this study, data from a representative company survey ($N = 6500$) were used to estimate the frequency of different patterns (and corresponding quality levels) of WRA practice in Germany and to determine organisational factors influencing the chance of occurrence of these WRA patterns. Results show that only one out of four companies carry out WRAs which not only meet the essential procedural requirements but also take account of potential risk areas in a fairly comprehensive manner. Multinomial logistic regression analysis further revealed that company size is by far the strongest predictor of WRA activity, especially of its more developed forms. Availability of safety specialist assistance, availability of occupational health specialist assistance, affiliation to the production sector, presence of an employee representative body and a good economic situation of the company were each associated with WRA activity as well. The still considerable deficiencies in WRA coverage and quality indicated by this study clearly call for an intensification of WRA-related control and advisory efforts by the OSH authorities, primarily in small companies and in the private services sector. Findings also suggest that reinforcement of worker representation structures at company level and strengthening professional OSH expert utilisation would be beneficial for WRA implementation.

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1. Introduction

The obligation to perform Workplace Risk Assessments (WRA) was introduced into occupational safety and health legislation in 1989 through the European Framework Directive on Safety and Health at Work (Council of the European Communities, 1989). Since then, the related provisions have been transposed into national regulatory frameworks by all EU member states. In Germany, the Occupational Safety and Health Act (“Arbeitsschutzgesetz”) from 1996 made it mandatory for employers to determine the necessary occupational health and safety measures by carrying out an assessment of the risks the workers are exposed to at work. In doing so, all sources of risks, including psychosocial factors, shall be considered, and the measures taken shall be reviewed for their effectiveness. Moreover, the results of the assessment, the measures derived and the evaluation of these must be documented (Bundesministerium der Justiz und für Verbraucherschutz, 2013;

Froneberg and Timm, 2012). Therefore, WRAs are not only required to take a comprehensive perspective on work-related risks but also to be integrated in a clearly structured risk management process (Frick et al., 2000).

The procedures for conducting WRAs are described in numerous manuals published by safety and health authorities, OSH service providers, business and labour associations, or other organisations (e.g., European Agency for Safety and Health at Work, 2007; Health and Safety Executive, 2014). Although varying in detail, the recommendations given in these manuals are basically quite similar. The first steps in carrying out a WRA are to make an inventory of typical workplaces and/or work operations within the company and to check these for the presence of occupational hazards, which may be of physical, chemical, biological, mechanical or psychosocial nature. Each of the identified hazards must then be evaluated for the level of risk it actually poses to the employees. If the risk is unacceptably high according to relevant regulations or established scientific knowledge, control measures must be taken to eliminate it or to minimise it as far as reasonably possible. When planning preventive action, the companies have to obey a hierarchy of control measures which puts the

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complete removal of the hazard by substitution or job redesign before technical and organisational controls to reduce the risk, and these before person-oriented measures such as providing personal protective equipment or behavioural instructions. To obtain the information needed for assessing occupational risks and determining the necessary health and safety measures, companies may draw on various resources such as legal provisions, technical standards, observational methods, internal surveys or focus groups. As workplaces and operations may change over time, employers should also take care of reviewing their WRAs and keeping them up to date.

In view of the experiences made over the years, some concerns have been raised about how WRA is dealt with in company practice. Among other things, it has been pointed out that WRAs are still not being carried out in a substantial part of the companies, especially in small ones and in certain branches; that far too often they are done, if at all, in an unsystematic way or as a purely formal exercise (“paperwork”); and that they frequently neglect relevant risk areas, particularly psychosocial risks (European Agency for Safety and Health at Work, 2008; Vogel, 2008).

However, empirical information which allows for a precise judgement of current WRA practice is rather sparse. Only a few European countries regularly provide representative data on the prevalence of WRAs among companies, figures ranging from 45% in the Netherlands (Inspectie SZW, 2014) to as high as 89% in Denmark (Arbejdstilsynet, 2012). Additional information is more or less confined to prevalence variations according to company size and economic sector, indicating that WRA is being less frequently performed in small establishments (e.g., Vanadzins and Matisāne, 2011) and in the service sector (e.g., Coutrot et al., 2013). Data on qualitative characteristics of WRAs are rarely collected or reported, with Finland (Anttonen and Pääkkönen, 2010), Spain (Instituto Nacional de Seguridad e Higiene en el Trabajo, 2011) and the Netherlands (Inspectie SZW, 2014) as exceptions in this regard. Furthermore, available survey data on WRA often suffer from not covering the entire economy (e.g., the French REPONSE survey, which is restricted to private sector companies with more than 9 employees (Coutrot et al., 2013), or the German PARGEMA-WSI Works Councils Survey, which only covers companies with an employee representative body (Ahlers, 2011)). In other cases, such as the German Labour Force Surveys carried out by the Federal Institutes for Vocational Education and Training and for Occupational Safety and Health (Beck and Lenhardt, 2009), data on WRA are collected from employees, which makes them inappropriate for precisely determining the WRA prevalence among companies. The European Survey of Enterprises on New and Emerging Risks (ESENER) (European Agency for Safety and Health at Work, 2010) could only partly close these gaps, as small companies with less than 10 employees (which make up the vast majority of companies in all countries) were not included and the national subsamples too small for more differentiated statistical analyses.

The purpose of the study reported in this article was to overcome some of the aforementioned empirical limitations by (a) estimating, on a representative basis, the prevalence of WRAs among the entirety of companies at national level, (b) determining different WRA-related activity patterns which indicate variations in the quality of implementation, and (c) identifying organisational factors by which the chance of occurrence of these WRA patterns is influenced.

2. Material and methods

2.1. Data source

The study is based on data from a national company survey carried out in 2011 as part of the evaluation of the German Joint

Occupational Safety and Health Strategy (“Gemeinsame Deutsche Arbeitsschutzstrategie” – GDA). Data were collected from a disproportionate stratified random sample of 6500 companies with at least one employee and were subsequently readjusted by means of design weighting in order to obtain a representative dataset (weighting factors ranging between 0.01 and 14.274). The target persons (i.e., the highest-ranking company members with responsibilities in occupational safety and health coordination) responded to a questionnaire, administered by CATI, on a wide range of safety and health topics, including several aspects of WRA. Even though field work was carried out according to generally accepted procedural standards, the net response rate did not exceed 15% (which will be discussed in Section 4.1 of this article). A more detailed description of the survey methodology (including the questionnaire) can be found in TNS Infratest Sozialforschung (2012).

2.2. Variables

2.2.1. Workplace risk assessment

To determine if there is any WRA activity in a company, the interviewees were asked the following question: “Are risk assessments being carried out at the workplaces in your company (yes; no; do not know; not answered (n/a))?” (Q B306). In case of confirmed activity several questions concerning the completeness of the WRA process were then posed. Respondents were to indicate whether the results of WRAs are being documented (yes; no; partly; do not know; n/a) (Q B309) and whether needs for improvements have been identified in the most recent WRA (yes; no; do not know; n/a) (Q B311). Those who answered the latter question positively were then asked whether measures have been taken in order to realise the necessary improvements (yes; no; not yet, but projected; do not know; n/a) (Q B312). If measures were reported, an additional question on evaluation was posed: “Was the effectiveness of the measures checked at a later date (yes; no; not yet, but projected; partly; do not know; n/a)?” (Q B313). Further, the scope of WRAs (if any) was measured by asking which of the following aspects of work were being routinely examined in this context (yes; no; do not know; n/a): “(A) Layout of the workplace?”; “(B) Physical work environment?”; “(C) Work equipment?”; “(D) Working time arrangements?”; “(E) Psychosocial risks related to dealing directly with difficult clients, e.g., dissatisfied customers or patients?” (not included in our analyses since the item is of major relevance only for parts of the service sector); “(F) Aspects of work organisation, e.g., concerning time/performance pressure?”; “(G) Social relations, e.g., conflicts among colleagues or leadership style?” (Q B308).

Based on the answers to these questions, five patterns of WRA activity were determined as dependent variables which represent different qualities of company practice as regards process and content of WRAs. As far as the available set of items allowed, the construction of these variables followed the criteria for appropriate WRA conduct laid down in the national WRA surveillance guideline which was initially agreed in 2008 (and repeatedly amended since) by the German Ministry of Labour, the regional OSH authorities and the German Statutory Accident Insurance Association (Nationale Arbeitsschutzkonferenz, 2015). The WRA patterns were defined as follows:

- (A) *Inactive*: companies which had not responded positively to question B306.
- (B) *Incomplete process*: companies which had reported WRAs but had not responded positively (i.e., response categories yes, partly, projected) to one or more of the process-related questions B309, B312 and B313 (if applicable).

- (C) *Complete process, clearly limited in scope*: companies not assigned to (A) or (B) which had reported WRAs addressing three or less (out of six) work aspects.
- (D) *Complete process, somewhat limited in scope*: companies not assigned to (A) or (B) which had reported WRAs addressing four or five (out of six) work aspects.
- (E) *Complete process, comprehensive*: companies not assigned to (A) or (B) which had reported WRAs addressing all six work aspects.

2.2.2. Predictors

Several factors which have been previously demonstrated to affect company practice in occupational safety and health were covered in the GDA survey questionnaire and could therefore be included in the present study: company size (Hasle and Limborg, 2006), sector (van Stolk et al., 2012), economic situation (Filer and Golbe, 2003), employee representation (Walters et al., 2012), and specialist occupational safety and health assistance (Hämäläinen et al., 2001).

Company size was determined by the question “How many employees, approximately, are working in your company?”. The information obtained was categorised as follows: 1–9 employees; 10–49 employees; 50–249 employees; ≥ 250 employees.

Sector was measured in two ways: first by the question “Does your establishment belong to the public service sector (yes; no, private business; do not know; n/a)?”, and second by using a dichotomous categorisation of the companies’ branch affiliations (production/agriculture; services).

The economic situation of the surveyed organisations was measured by one question: “How do you rate the current economic situation (public service: ‘budgetary situation’) of your company (public service: ‘of your establishment’) (good; satisfactory; bad; do not know; n/a)?”.

Respondents were also asked about the presence of an employee representative body (“works council”) in their company (yes; no; do not know; n/a). If data analyses related to this variable were carried out, ‘5–9 employees’ was used as the lowest size category, as legal regulations on works councils in Germany do not apply to companies smaller than that.

Further, companies were to indicate if they make use, as required by law, of safety specialist assistance (yes; no; do not know; n/a). Small companies (up to 50 employees) were also asked if they have opted for an alternative model in which company owners may themselves perform the tasks of professional occupational safety and health specialists after finishing special training courses (yes; no; do not know; n/a). If this was the case (or if the respondent himself was a safety engineer), the company was automatically classified as employing safety specialist assistance.

Specialist assistance in occupational health was measured similarly (“Do you make use of an occupational physician’s assistance when carrying out your duties in occupational safety and health (yes; no; do not know; n/a)?”, or: “Do you participate in the alternative assistance model (yes; no; do not know; n/a)?”).

2.3. Statistical analyses

Descriptive analyses of weighted data were carried out by using the CSTABULATE procedure from the SPSS statistical software package 18.0 for Windows. Multinomial logistic regression based on unweighted data was performed to determine odds ratios (OR) for different patterns of WRA activity according to company size, sector, economic situation, employee representation and specialist occupational safety and health assistance. In this context, an OR indicates the chance that a subgroup of companies exhibits a given WRA pattern rather than showing no WRA activity at all, in

relation to the chance found in the reference group. For the multivariate analysis, the NOMREG procedure from SPSS 18.0 was used.

3. Results

As shown in Table 1, the weighted study sample, just like the basic population (European Commission, 2013), largely consists of small companies with up to 50 employees. Together, mid-sized and large companies account for not more than 6%. The vast majority – well over 90% – of the responding organisations belong

Table 1
Statistical overview of sample characteristics.

Variable	n (unw.)	% (w.) (95% CI)
<i>Number of employees</i>		
1–9	1815	71 (69–73)
10–49	1878	24 (22–26)
50–249	1715	5 (4–5)
≥ 250	1092	1 (1–1)
<i>Sector (I)^a</i>		
Private	5456	92 (90–93)
Public	1031	8 (7–10)
<i>Sector (II)</i>		
Services	4279	76 (74–78)
Production/agriculture	2221	24 (22–26)
<i>Economic situation^a</i>		
Bad	554	7 (6–8)
Satisfactory	2210	43 (40–45)
Good	3522	50 (48–53)
<i>Works council^b</i>		
Not yes	3019	84 (82–86)
Yes	2447	16 (14–18)
<i>Safety specialist assistance</i>		
Not yes	1311	41 (39–44)
Yes	5189	59 (56–61)
<i>Occupational health specialist assistance</i>		
Not yes	1800	52 (49–54)
Yes	4700	48 (46–51)
<i>WRA carried out^a</i>		
No	1585	47 (45–50)
Yes	4794	53 (50–55)
<i>Results of WRA documented^c</i>		
No	388	18 (16–21)
Partly	155	6 (4–8)
Yes	4226	76 (73–79)
<i>Needs for improvements identified^c</i>		
No	1561	52 (49–55)
Yes	3115	48 (45–52)
<i>Measures taken^d</i>		
No	38	2 (1–3)
Not yet, but scheduled	73	3 (2–4)
Yes	2995	96 (94–97)
<i>Measures checked on effectiveness^e</i>		
No	352	15 (12–19)
Not yet, but scheduled	336	15 (11–18)
Partly	46	2 (1–4)
Yes	2241	69 (64–73)
<i>Work aspects considered in WRA^c</i>		
Layout of the workplace (yes)	4407	89 (87–91)
Physical work environment (yes)	4379	90 (88–92)
Work equipment (yes)	4569	95 (94–96)
Working time arrangements (yes)	2211	49 (46–52)
Work organisation (yes)	2676	56 (53–59)
Social relations (yes)	1965	45 (42–48)

^a Companies falling within response categories ‘Do not know’ and ‘n/a’ not included, hence $N < 6500$.

^b Only companies with ≥ 5 employees ($N = 5466$).

^c If WRA is being carried out ($N = 4794$).

^d If needs for improvements have been identified ($N = 3115$).

^e If measures have been taken ($N = 2995$).

to the private sector, three out of four are located in the service sector. The companies' economic situation was predominantly rated as either good or, to a somewhat lesser extent, satisfactory, only 7% of respondents regarded it as bad. Just about one out of six companies has an employee representative body, specialist assistance in safety and in occupational health is available in 59% and 48% of the companies, respectively.

A little more than half of the surveyed organisations reported that they perform WRAs, the results of which being documented, at least partly, in roughly eight out of ten cases. Less than 50% of the most recent WRAs resulted in the identification of needs for improvements. In these cases, however, measures to realise the necessary improvements were almost always taken. Furthermore, the vast majority of companies indicated that the measures taken have been subsequently checked for effectiveness. If WRAs are being carried out, considering workplace design, physical work environment and work equipment is virtually standard practice (roughly nine out of ten cases), whereas working time arrangements, aspects of work organisation and social relations at work are notably less often (in a maximum of 56% of cases) taken into account.

3.1. Prevalences of different WRA activity patterns

Table 2 displays the unweighted number of cases and the weighted percentages for each of the five WRA patterns described above. 47% of the companies reported to not perform WRAs (pattern A). 14% carry out WRAs but leave out legally required stages of the process (pattern B). 12% exhibit a complete WRA process, but address a comparatively limited range (≤ 3) of – mostly material/technical – work aspects therein (pattern C). 16% of the companies go through all required process stages while taking 4–5 work aspects into account (pattern D). In one out of ten companies completeness of process is accompanied by full coverage of work aspects (pattern E).

As can be seen from Table 3, there are several differences in WRA activity profiles between subgroups of the sample. Whereas total avoidance of WRA (pattern A) is predominant practice (57%) among micro-companies (1–9 employees) and still fairly common (28%) among establishments with 10–49 employees, it is rarely found in mid-sized and large companies. Especially the more developed forms of WRA practice (pattern D and – to a somewhat lesser extent – pattern E) are distinctly more prevalent in larger

Table 2
Prevalences of five WRA practice patterns.^a

WRA pattern	<i>n</i> (unw.)	% (w.) (95% CI)
A: Inactive (no WRA at all)	1585	47 (45–50)
B: Incomplete process	898	14 (13–16)
C: Complete process, clearly limited in scope (≤ 3 work aspects addressed)	1226	12 (11–14)
D: Complete process, somewhat limited in scope (4–5 work aspects addressed)	1733	16 (14–18)
E: Complete process, comprehensive (all 6 work aspects addressed)	937	10 (9–12)
A–E	6379	100

^a For definitions see Section 2.2.1 of this article.

Table 3
Prevalences of WRA practice patterns^a, by subgroups of the sample.

Variable	WRA pattern A		WRA pattern B		WRA pattern C		WRA pattern D		WRA pattern E	
	% (w.)	95% CI	% (w.)	95% CI	% (w.)	95% CI	% (w.)	95% CI	% (w.)	95% CI
<i>Number of employees</i>										
1–9	57	(54–60)	14	(12–16)	10	(8–12)	13	(10–15)	7	(6–9)
10–49	28	(25–32)	16	(14–19)	17	(15–20)	22	(19–25)	16	(13–20)
50–249	9	(7–11)	14	(12–16)	25	(22–28)	36	(33–40)	16	(14–19)
≥ 250	2	(1–3)	9	(7–12)	22	(19–25)	44	(40–48)	23	(20–27)
<i>Sector (I)^b</i>										
Private	49	(47–52)	15	(13–16)	12	(10–13)	15	(14–17)	9	(8–11)
Public	26	(20–34)	13	(9–18)	19	(14–26)	24	(18–32)	18	(12–26)
<i>Sector (II)</i>										
Services	51	(48–54)	13	(12–15)	10	(9–12)	15	(13–17)	10	(9–12)
Production/agriculture	36	(31–41)	17	(14–22)	19	(15–23)	19	(16–23)	9	(7–13)
<i>Economic situation^b</i>										
Bad	54	(44–63)	16	(10–23)	13	(8–21)	13	(8–21)	4	(3–8)
Satisfactory	50	(46–54)	14	(12–17)	11	(9–13)	17	(14–19)	9	(7–11)
Good	45	(41–48)	14	(12–17)	13	(11–16)	16	(14–19)	11	(9–13)
<i>Works council^c</i>										
Not yes	42	(39–45)	14	(12–17)	14	(12–17)	19	(16–21)	11	(9–13)
Yes	16	(12–21)	16	(12–20)	21	(17–25)	29	(25–34)	19	(15–25)
<i>Safety specialist assistance</i>										
Not yes	76	(72–79)	11	(9–14)	4	(2–6)	6	(4–8)	4	(2–5)
Yes	27	(25–30)	17	(15–19)	18	(16–21)	23	(21–26)	14	(12–17)
<i>Occupational health specialist assistance</i>										
Not yes	69	(66–72)	14	(12–17)	6	(5–8)	7	(5–9)	4	(3–6)
Yes	24	(22–28)	15	(13–17)	19	(16–21)	26	(23–29)	16	(14–19)

^a For definitions see Section 2.2.1 of this article.

^b Companies falling within response categories 'Do not know' and 'n/a' not included.

^c Only companies with ≥ 5 employees ($N = 5466$).

Table 4
Results of the multinomial logistic regression analysis.^a

Variable	WRA pattern B			WRA pattern C			WRA pattern D			WRA pattern E		
	OR ^b	95% CI	<i>p</i>	OR ^b	95% CI	<i>p</i>	OR ^b	95% CI	<i>p</i>	OR ^b	95% CI	<i>p</i>
<i>Number of employees</i>												
5–9 (Ref.)	1.0			1.0			1.0			1.0		
10–49	1.5	1.1–2.0	0.003	2.0	1.5–2.7	0.000	1.8	1.4–2.4	0.000	1.9	1.4–2.7	0.000
50–249	2.6	1.8–3.7	0.000	4.8	3.4–6.8	0.000	4.4	3.2–6.1	0.000	4.4	3.0–6.5	0.000
≥250	6.5	3.3–12.7	0.000	14.5	7.5–28.0	0.000	20.1	10.6–38.0	0.000	19.1	9.8–37.6	0.000
<i>Sector (II)</i>												
Services (Ref.)	1.0			1.0			1.0			1.0		
Production/agriculture	1.7	1.4–2.2	0.000	2.3	1.8–2.9	0.000	2.1	1.7–2.6	0.000	1.6	1.3–2.1	0.000
<i>Economic situation^c</i>												
Bad (Ref.)	1.0			1.0			1.0			1.0		
Satisfactory	1.0	0.7–1.4	0.899	1.0	0.7–1.5	0.819	1.4	1.0–2.1	0.053	1.7	1.1–2.6	0.014
Good	0.9	0.6–1.3	0.461	1.1	0.7–1.5	0.742	1.5	1.1–2.2	0.021	2.1	1.4–3.2	0.000
<i>Works council</i>												
Not yes (Ref.)	1.0			1.0			1.0			1.0		
Yes	1.8	1.3–2.4	0.000	1.8	1.4–2.4	0.000	1.8	1.4–2.4	0.000	2.2	1.6–2.9	0.000
<i>Safety specialist assistance</i>												
Not yes (Ref.)	1.0			1.0			1.0			1.0		
Yes	2.6	2.0–3.5	0.000	7.0	4.8–10.3	0.000	4.5	3.3–6.2	0.000	4.4	2.9–6.5	0.000
<i>Occupational health specialist assistance</i>												
Not yes (Ref.)	1.0			1.0			1.0			1.0		
Yes	2.0	1.6–2.6	0.000	3.1	2.4–4.1	0.000	5.0	3.8–6.5	0.000	4.6	3.3–6.4	0.000

^a *N* = 5198, only companies with ≥5 employees; sector (I) showed no significant effect, therefore not included in the model; Nagelkerke's pseudo-*R*² = 0.318.

^b OR indicates the chance that a subgroup of companies exhibits a given WRA pattern rather than showing no WRA activity at all, in relation to the chance found in the reference group.

^c Companies falling within response categories 'Do not know' and 'n/a' not included.

organisations than in small ones. Both the prevalence and the quality of WRAs are higher in the public sector than in the private economy, where just about 24% of the companies (public: 42%) reported activities conforming to patterns D and E. When comparing the production and the services sector, the former is clearly ahead regarding WRA performance (with the exception of pattern E). Variations in WRA activity according to the companies' economic situation are much smaller, only pattern E shows a fairly pronounced gradient in prevalence from establishments rating their economic situation as 'good' (11%) to those with less favourable appraisals (9% and 4%, respectively). More than four out of ten companies without a works council (compared to only 16% of those with) do not carry out WRAs, or if they do, their WRAs are more often of lower quality (patterns B and C) than in companies where employee representation bodies exist. Finally, organisations making use of safety specialist assistance perform WRAs much more frequently than those which do not. While being rather small in the case of pattern B, the difference is of substantial magnitude when it comes to more developed forms of WRA practice (e.g., pattern D: 23% vs. 6%). A similar picture is to be found when comparing establishments with and without occupational health specialist assistance.

3.2. Predictors of WRA activity patterns

According to the results of our multivariate analysis shown in Table 4, company size strongly predicts WRA activity (regardless of which pattern), the chance of activity being higher the bigger companies are. Moreover, the effect of company size markedly increases when proceeding from pattern B to pattern D, but remains virtually unaltered at pattern E. Odds ratios for large companies (≥250 employees, reference: 5–9 employees) were 6.5 (pattern B), 14.5 (pattern C), 20.1 (pattern D) and 19.1 (pattern E). Availability of safety specialist assistance, availability of specialist assistance in occupational health, presence of a works council and affiliation to the production sector were also positively

associated with WRA activity patterns B–E. As for economic situation, significant effects were confined to WRA patterns D (good vs. bad) and E (both good and satisfactory vs. bad). In contrast, sector variable II (public vs. private) had no effect on any kind of WRA activity in the multivariate model. Accordingly, the goodness of fit of the model did not significantly change when sector variable II was removed (Nagelkerke's pseudo-*R*²: 0.320/0.318).

The predictor variables considered in this study differ not only with regard to their overall effect on WRA activity but also in respect of which types of WRA practice they influence most. Next to company size, safety specialist assistance and occupational health specialist assistance clearly exert the strongest effects, the emphasis being on pattern C with the former (OR = 7.0) but on patterns D (OR = 5.0) and E (OR = 4.6) with the latter. Ranking behind the aforementioned factors, presence of a works council shows no variation in effect sizes according to WRA patterns, except a slightly elevated OR in the case of pattern E (2.2, as against 1.8 for patterns B–D). Affiliation to the production sector is of similar overall importance in predicting WRA as is employee representation, its strongest effect however being that on WRA pattern C (OR = 2.3). As mentioned above, good economic situation is relevant only to patterns D and E, the corresponding effect sizes being the lowest (OR = 1.5) and second-lowest (OR = 2.1) observed, respectively.

4. Discussion

The findings of this study clearly indicate that a large proportion of German companies still abstain from carrying out WRAs. This is quite remarkable in view of the fact that the legal obligation to perform WRAs has existed for almost two decades now. However, as data from other European countries such as the Netherlands suggest, the German situation is not entirely exceptional in this regard.

According to our study results – which are consistent with previous research from Germany (e.g., Beck and Lenhardt, 2009) and

abroad (e.g., [Coutrot et al., 2013](#)) – the WRA “implementation gap” is particularly obvious among small companies. This may be partly due to the lack of OSH expert advice, the scarcity of workers’ representatives with OSH-related co-determination rights and the low rate of inspection visits in this sector, since these circumstances are known to influence the companies’ OSH activity level ([Popma, 2009](#); [Sinclair and Cunningham, 2014](#)). However, given that company size is associated with WRA performance independently of the aforementioned factors, further reasons for low WRA activity in small companies must be taken into consideration. Previous research has pointed out that small companies operate under particularly volatile conditions while management responsibilities are often concentrated on one person. As a result, these organisations not only have comparatively limited resources (in terms of personnel, time, money, skills and knowledge) to devote to seemingly “unproductive” activities such as OSH, but are also more disinclined to formalised systematic management approaches in this area ([Champoux and Brun, 2003](#); [Hasle and Limborg, 2006](#); [Eakin et al., 2010](#); [Micheli and Cagno, 2010](#); [Masi and Cagno, 2015](#)). In this context it is quite remarkable that even among those micro-companies which had carried out a WRA, 43% regarded this procedure as too extensive (authors’ calculations based on unpublished GDA survey data). It should be noted, however, that according to a Danish survey study conducted in 2008 the majority of the companies (54%; micro-companies: 61%) spend a maximum of one day on preparing a written WRA, whereas only 14% (micro-companies: 10%) report a considerably larger time expenditure of four days or more ([TNS Gallup, 2008](#)).

Moreover, small companies were found to exhibit a stronger tendency towards trivialising, or even denying, work-related safety and health risks, which may be partly attributed to accidents being very rare events in individual small establishments ([Hasle et al., 2009](#)). The latter is reflected in another finding of the GDA survey showing that many more small companies than mid-sized or large ones refrain from carrying out WRAs simply because they are convinced of not having any risks at their workplaces ([Nationale Arbeitsschutzkonferenz, 2013](#)). A similar picture is given by recently published initial results of ESENER-2, which are based on data collected in 36 European countries from 49,320 establishments with more than four employees ([European Agency for Safety and Health at Work, 2015a](#)).

To put the aforementioned findings in perspective, it is important to consider that many small businesses are used to handling problems in a very personal and highly pragmatic manner, without deploying predefined and clearly structured procedures and protocols. This will most likely apply to safety and health issues as well. Although very little research has been done on this subject (e.g., [Fromm and Pröll, 2000](#)), it may therefore be assumed that especially small companies quite often resort to rather informal (but not necessarily ineffective) practices of “assessing” and “managing” occupational risks, which remain, at least partly, undetected if respondents are asked about legally prescribed WRA procedures.

The present study further corroborates the observation made in other surveys that WRAs (just as OSH activities in general) are less likely to occur in the service than in the production sector ([Inspectie SZW, 2014](#); [Van Stolk et al., 2012](#)). Again, this might be, at least partly, explained by a risk perception effect: while still being focussed on in OSH practice, the more obvious forms of potentially harmful events and exposures at work – such as accidents or physical workload – are far less prevalent in the service sector, which makes companies from this area more inclined to assume that there are no significant risks to deal with at their workplaces ([Nationale Arbeitsschutzkonferenz, 2013](#)). Even though affiliation to the production sector clearly increases the chance of WRA activity in general, it does not seem to be of particular importance in terms of WRA quality as the sector-related ORS

found for WRA patterns D and E are not higher than those established for patterns B and C.

Other than the sector variable “production/services”, affiliation to the private or the public sector shows no association with WRA activity under multivariate analysis. Therefore, it can be concluded that the markedly elevated WRA prevalence in public companies is largely attributable to average company size being considerably greater ([Ellguth and Kohaut, 2011](#)), employee representation bodies being more frequent ([European Foundation for the Improvement of Living and Working Conditions, 2010](#)) and availability of specialist occupational safety and health assistance being higher there (authors’ calculations, data not shown), with each of these factors independently increasing the chance of WRA activity.

In view of previous research pointing out the significance of available organisational resources for the level of OSH activity, the comparatively weak effect of the companies’ economic situation on WRA implementation is quite astonishing. Whether business is thriving or not seems to be relevant only when it comes to elaborate forms of WRA practice. If done, as is often the case, in a more perfunctory way which is not very costly nor time-consuming, WRAs do not seem to pose substantially greater difficulties for economically challenged companies than for prosperous ones, all other conditions being equal.

The few studies that have addressed the relationship between worker representation at company level and WRA practice give a mixed picture. Analyses of Dutch survey data ([Popma, 2009](#)) indicated that the mere presence as well as the formal consultation of works councils have only marginal effects on the extent and the quality of the companies’ WRA activities. Other survey studies, by contrast, found that the propensity for carrying out WRAs is clearly higher where works councils are present ([Reusch and Lenhardt, 2012](#); [Walters et al., 2012](#)), and also that the quality of WRAs increases with the degree of works council involvement in the process ([Ahlers and Brüssig, 2005](#)). These positive findings are basically corroborated by the results of our own multivariate analysis, although the established effects of works councils are not as strong as might be expected considering the extensive co-determination rights of employee representative bodies in Germany. As some of the aforementioned findings from the Netherlands suggest, works councils actually make a difference with regard to WRA performance if they are able to mobilise sufficient power resources and to fully exploit their statutory rights, but quite often this is not the case ([Popma, 2009](#)). Similar conclusions can be drawn from the results of a qualitative empirical study carried out among German workers representatives ([Blume et al., 2011](#)).

To our knowledge, no research has been undertaken so far which explores the association between the companies’ utilisation of OSH expert assistance and the implementation of WRAs. An earlier survey study, carried out between 2005 and 2011 among several thousand safety engineers, found that WRA is one of the most important fields of activity for these experts. A very large proportion of them are involved with WRA, either by planning it (87%) or by carrying it out themselves (78%). The study further showed that safety engineers are more successful in all areas of OSH the more they personally invest in WRA-related activities. On the other hand, it also revealed several deficiencies in these activities (e.g., lack of cooperation with occupational physicians, difficulties in dealing with psychosocial factors), indicating that there is still considerable room for improvement ([Trimpop et al., 2012](#)). In our own study, contracting safety and/or occupational health specialists turned out to have significant (and rather strong) positive effects on the chance of WRAs being carried out. Interestingly, the influence of safety specialist assistance is by far most pronounced with WRA pattern C, which might reflect the mainly technical expertise of this professional group. Occupational health physicians, in turn,

seem to be slightly more important than safety specialists in facilitating WRAs that are not confined to material/technical work aspects but also take account of organisational and psychosocial factors (WRA patterns D and E). However, these findings do not imply that there is a strictly deterministic relationship between the OSH experts' professional background (i.e., safety engineer vs. occupational health physician) and their respective approach to WRA (i.e., basically "technical" vs. "comprehensive").

As mentioned in the introductory section of this paper, qualitative deficiencies in WRA implementation are a recurrent issue in OSH policy debates. Problems of this kind may be most widespread among small establishments, but our study results show that even one out of three WRAs conducted in large organisations fails to meet certain procedural requirements or to address important work aspects. Apparently, a considerable number of companies are still not prepared to use WRA as a means of systematic risk management and find it also especially difficult (or simply unnecessary) to deal with potential risks of organisational and social origin which are neither easily measurable nor very precisely regulated. This does not only apply to Germany but to other countries as well (e.g., Sweden; Frick, 2014). When carrying out WRAs, the companies' perspective is therefore quite often restricted to material/technical issues such as workplace design, working equipment, or physical work environment, whereas psychosocial risks resulting from work content, work organisation, leadership behaviour or social relationships at work are not being considered in most cases (Ahlers, 2011). Even if done accurately, however, the assessment of work-related risks is not a goal in itself but rather a means to generate necessary, feasible and effective safety and health measures. Although subsequent preventive action was reported by 96% of the companies where a WRA had been carried out and needs for improvements had been identified, it remains unclear which types of measures had been taken and to what extent these were appropriate for reducing the given workplace risks. Therefore, it cannot be taken for granted that preventive action based on a WRA is always up to the safety and health problems identified.

4.1. Strengths and limitations of the study

Concerning strengths it can be pointed out that the study is based on data from a comparatively large sample of companies which not only is representative for the entirety of German companies with at least one employee in regard to establishment size, branch and region but also allows for rather differentiated analyses with statistically meaningful results. The validity of findings clearly benefits from the fact that data were obtained from company managers or functionaries, as these are, due to their decision-making and coordinating responsibilities, likely to be better informed about the organisations' preventive activities than ordinary employees. Furthermore, the study stands out from most of the other survey-based research on WRA for determining configurations of measures which are indicative of WRA comprehensiveness, rather than merely analysing distributional patterns of different individual measures.

There are, however, several noteworthy limitations. Non-enforced business surveys tend to feature rather low response rates (Rasmussen and Thimm, 2009). This problem is particularly pronounced in the survey our study is based on. One possible reason is that the particular subject of this survey – i.e., "safety and health at the workplace" – normally might not attract as much of a company's attention as other subjects which are more closely business-related (e.g., market developments, technological innovations, tax policy issues). Moreover, companies in Germany seem to be less willing to participate in such a survey than companies in most other European countries, as comparisons between national

response rates in the European Survey of Enterprises on New and Emerging Risks (ESENER) show: in this survey, only 5 out of 31 countries had a lower response rate than Germany, where it was 18% (European Agency for Safety and Health at Work, 2010).

The low response rate of the GDA-survey, whatever the reasons may be, certainly brings up the question of non-response bias. Bias effects related to the over-representation of – mostly less WRA-active – small and non-public establishments among non-responders have been compensated for by non-response adjustment of sample weights. Nevertheless, significant residual bias cannot be ruled out as it may be assumed that companies lacking awareness and activity in the field of occupational health (including WRA) were generally more likely to refuse participation in the survey. Therefore, a tendency towards overestimating the prevalence of WRA, especially of its more advanced forms, must be taken into account. While the reported WRA prevalences as such must be treated with caution for methodological reasons, it is unlikely, however, that our findings concerning the relative importance of different WRA patterns and the associations between these and the predictor variables are substantially biased by the low response rate of the survey. It goes without saying that the cross-sectional design of our study prohibits drawing any causal inferences from the associations found.

It must be noted that some aspects of implementation quality which are considered as essential criteria for the adequacy of WRAs (European Commission, 1996) were not – or only roughly – covered by the GDA-survey questionnaire. As no information on the time of their most recent WRA was collected from the companies, no estimation of how many WRAs are up-to-date is possible. Further, no judgement on the correctness of the risk assessments can be made from the data provided, although some doubts about the accuracy of WRAs may arise in view of the remarkably high proportion of companies (52%) reporting that no needs for improvement measures were identified in the process. Also, the work aspects to be taken into account when performing WRAs were defined in rather broad terms which do not allow drawing firm conclusions on whether the much discussed issue of psychosocial risks is dealt with in the context of WRAs. Lastly, the survey questionnaire did not include any items concerning the specific types of safety and health measures taken on the basis of WRAs. Accordingly, this study provides only a rough approximation of WRA practice and its comprehensiveness. However, in the second wave of the GDA-survey scheduled for 2015 an amended questionnaire will be used which avoids several of the previous shortcomings and will therefore allow for a more detailed empirical assessment of WRA practice in the future.

5. Conclusions

In recent years, considerable efforts have been made, both at the European and national level, to promote WRA implementation in companies. These activities comprise, among others, awareness-raising and inspection campaigns (European Agency for Safety and Health at Work, 2009; Committee of Senior Labour Inspectors, 2012), the development and provision of numerous WRA tools and guidance materials (European Agency for Safety and Health at Work, 2015b), and organisational measures to focus regular OSH inspection policies more consistently on the companies' WRA performance, especially regarding psychosocial risks (Cardiff Work Environment Research Centre, 2011).

Their undeniable merits notwithstanding, these efforts have been only partly successful so far, as WRAs still seem to be either neglected or inadequately implemented by many companies. In view of this, establishing WRA as a regular part of company practice certainly remains a challenge for OSH policy. Improving

compliance with WRA-related obligations in small companies and in the service sector, making companies actually use WRA as a means of systematic (but not necessarily intricate) risk management, and promoting the integration of psychosocial factors into WRAs seem to be particularly important issues in this context. Achieving progress in WRA, however, is not simply a matter of quantitatively increasing information, advisory and control activities on the part of the OSH authorities. How things are done is no less critical to success than the question of “how much”. Therefore, the authorities must carefully review, develop further and coordinate their inspection approaches, and take appropriate action (e.g., training and quality management measures) to ensure that these are being consistently implemented within their organisation. As to Germany, the aforementioned challenges are increasingly addressed in multiple ways within the framework of its ongoing “Joint Occupational Safety and Health Strategy” (*Gemeinsame Deutsche Arbeitsschutzstrategie, 2012a, 2012b, 2012c, 2014*).

Besides, it is quite clear that the necessary improvements in the area of WRA cannot be launched by the OSH inspectorates alone, especially as their personnel resources are often rather limited or even in decline (*Cardiff Work Environment Research Centre, 2011*). For example, the urgent need to increase WRAs in small companies strongly calls for a close strategic involvement of sector-based or regional business organisations, which are likely to have good and fairly regular access to this category of establishments and may therefore be valuable partners for disseminating WRA-related information and guidance among the companies and motivating them to use it. Furthermore, our findings indicate the important role of employee representatives, safety engineers and occupational physicians in advancing WRA practice, as the chance of WRAs being carried out proved to be dependent on the presence of works councils and the availability of OSH specialist assistance. Even if not directly connected to, or driven by, WRA concerns, reinforcement of worker representation structures at the company level and strengthening professional OSH expert utilisation would be clearly beneficial for WRA.

Acknowledgements

The survey this paper draws upon was initiated and financed by the Federal Ministry of Labour and Social Affairs, the Committee of the Laender for Occupational Safety and Health and the German Statutory Accident Insurance.

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