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Point prevalence of burnout in Switzerland: a systematic review and meta-analysis

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Summary

AIMS OF THE STUDY: To estimate the prevalence of occupational burnout among the Swiss working population.

METHODS: We interrogated three international databases (Medline (PubMed), EMBASE, and PsycINFO) and the databases of 15 Swiss universities to identify studies reporting the prevalence of occupational burnout in Swiss workers over the last 10 years, before the COVID-19 pandemic. Data were summarised descriptively and quantitatively using random-effects meta-analysis. We investigated between-study heterogeneity by stratifying results according to the type of burnout measurement tool, by occupation and by cut-off values. Three outcomes were considered: clinical/severe burnout, overall burnout and emotional exhaustion.

RESULTS: We identified 23 studies about workers in Switzerland and estimated the prevalence of clinical or severe burnout at 4% (95% confidence interval [CI] 2–6%). The average prevalence estimates for overall burnout and emotional exhaustion were similar at 18% (95% CI 12–25%) and 18% (95% CI 15–22%), respectively. When stratified by occupation, the clinical or severe burnout rates were higher among the healthcare workers than the general working population.

CONCLUSIONS: These estimates of prepandemic (baseline) prevalence of occupational burnout are comparable with those available in the other countries where it is recognised and treated as a disease. They may prove useful in planning and assessing the effectiveness of interventions for prevention of occupational burnout and in minimising its negative consequences on individuals and on societies during and after the pandemic.

Background

Occupational burnout has become one of the most discussed mental health problems in recent years [1]. However, it is unclear whether this is due to its widespread use in the media and public discourse, a misunderstanding of the term or a genuine increase in the incidence of burnout in the general working population. Currently, there are no data on the incidence of occupational burnout. The reason for this is that the estimation of incidence rates entails following a population for some time and identifying new cases of the health condition (burnout) that occur during that period [2]. In practice, it is not possible to estimate the incidence because burnout has neither a disease status nor clear and recognised diagnosis criteria. This is one of the major research gaps in the current literature and practice. The definition of occupational burnout has been harmonised only recently [3] and the lack of an official diagnosis by the World Health Organization (WHO) – albeit its appearance in the list of the International Classification of Diseases (ICD 11) [4] – may explain why only few European countries recognise burnout as an occupational or occupation-related disease [5]. In scientific papers, occupational burnout has been linked to job dissatisfaction, lower productivity and absenteeism, intentions to leave the job, increased turnover and healthcare costs, as well as other socioeconomic consequences [6–8].

Moreover, a great heterogeneity in the definition and measurement of occupational burnout [9] used in the published literature made a single-point prevalence estimate infeasible, despite an increasing number of studies reporting burnout scores and their changes over time in various occupational groups [8]. For instance, during the COVID-19 pandemic, occupational burnout has frequently been reported among frontline healthcare workers considered as particularly vulnerable to it [10, 11]. Yet other workers from the general active population can burn out as well to a similar extent [12].

Fortunately, several researchers and clinicians have been able to overcome the absence of diagnostic standards for occupational burnout and to dichotomise continuous burnout scores from some measurement tools using either statistical or clinically validated cut-off values [13–16]. Their guidance and the legitimated use of burnout score dichotomisation made it possible to estimate the prevalence of occupational burnout (and sometimes, incidence) from the reported percentage of burned-out people in different study samples. These epidemiological indicators are paramount for understanding the nature of the burnout phenomenon, estimating its magnitude and burden, deciding whether it constitutes a public health and research priority, and, if so, initiating efficient and effective interventions. Unlike Switzerland, some countries such as the Netherlands, Sweden or Belgium consider occupational burnout an established medical diagnosis related to work, which would eventually have contributed to better health

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policies and data availability. In general, any advocacy for national policies and efforts that aim to detect, prevent or treat clinical burnout would warrant the establishment of up-to-date data on the incidence and prevalence of this mental health outcome among the working population.

Therefore, the present study aimed at estimating the prevalence of occupational burnout in the Swiss working population based on the available data over the last 10 years. These estimates could further inform the need and the nature of interventions aimed to prevent occupational burnout in Switzerland.

Methods

We conducted a systematic review and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [17]. The study protocol was previously registered on the international prospective register of systematic reviews (PROSPERO RecordID = 266633) [18].

Literature searches

We designed a systematic search strategy and interrogated the following databases: Medline (PubMed), EMBASE, PsycINFO, and Swiss university databases: ArODES (HES-SO), SERVAL, RERO DOC, BORIS, edoc, LORY, Université St. Gall, ZHAW digital collection, ZORA and SUPSI (see abbreviations in fig. 1). In PubMed, for instance, the search strategy comprised Medical Subject Heading Terms (MeSH) (e.g., "burnout, professional" [Mesh]), free text words (e.g., "emotional exhaust" [tiab]), Boolean terms (e.g., AND, OR) and truncations (e.g., work*) where necessary. In EMBASE, we used EMTREE terms, free text words, Boolean terms, proximity operators (e.g., near/n), and truncations where necessary (see appendix). Besides electronic searches, we manually searched references lists of identified studies, and used the google search engine as well as the Google scholar platform to identify additional eligible studies. We focused our search strategy on the period 2010–2021 in order to consider the most recent, but sufficiently numerous and methodologically robust, studies for providing useful and relevant estimates of the current prevalence of occupational burnout. As the first estimates related to occupational burnout (namely emotional exhaustion) in the general Swiss population have been reported only since 2012 [19], we interrogated the databases from January 2010 to 6 July 2021.

Eligibility of studies

Studies were included if they measured the prevalence of occupational burnout in Swiss workers of any occupation. In our study, we defined the prevalence as the proportion of persons identified as burned-out among the study population. We only included studies that reported such a proportion or provided data enabling its calculation. We excluded studies that failed to report cut-off scores to estimate occupational burnout prevalence in patient-reported outcome measures. Additionally, we excluded systematic reviews after screening their reference lists to identify any additional primary studies. We applied no limitation with respect to study design or publication language, considering three languages officially used in Switzerland (German, French, and Italian) as well as English.

Data abstraction and synthesis

Three reviewers (MA, SB and IGC) were involved in the inclusion of studies and the extraction of the data in a standardised form such that one verified the work of the other intrinsically. One author (IGC) solved any discrepancies in the process of study inclusion. We extracted key characteristics from the studies included, such as study design, type of population, occupational group, sample size, age, gender, work experience (in years) and burnout measuring tools/instruments along with their cut-off scores.

Definitions of the outcomes

Given the high heterogeneity in the measurement of occupational burnout, we attempted to reduce it by grouping the studies using the same measurement methods and cut-off values. For this, we reviewed the construct definition, the measurement method and the cut-off values of burnout severity in each of the included studies and classified them according to the commonality of the outcome measured. This strategy enabled us to consider all homogeneously defined outcomes individually and estimate their respective prevalence.

Quality appraisal (risk of bias)

One author assessed the risk of bias of the included studies while a co-author randomly double-checked the quality appraisal of at least 20%, with any discrepancies being resolved via discussion, and the involvement of a third reviewer when necessary. We assessed the risk of bias using the Methodological Evaluation of Observational Research (MORE) for incidence and prevalence studies [20]. This tool allows appraisal of the quality and reporting of prevalence studies by rating three domains: general (e.g., funding and conflict of interest), external validity, and internal validity. Each item in each domain was rated as low, unclear or high. Finally, each study was rated as having either low, unclear or high risk of bias, based on the overall judgment of the three aforementioned domains. More specifically, we decided to rate the overall quality of included studies as unclear if at least one domain was rated unclear and the other domains were rated low or unclear. If a study had a high risk of bias for any of the three domains, the overall quality was finally judged as high risk of bias. In comparison, studies with low rating on the three domains, the overall quality was finally judged as low risk of bias.

Statistical analysis

We meta-analysed the prevalence data and assessed the statistical between-study heterogeneity using the chi-square test and I-square statistic, using a random-effects model. In our random-effects model, we used the method of DerSimonian and Laird, with the estimate of heterogeneity being taken from the inverse-variance fixed-effect model [21]. To understand the sources of heterogeneity and reduce it, we further produced the prevalence estimates of each outcome stratified by occupational groups. We considered a p-value of ≤0.10 (instead of the conventional 0.05) to indicate statistically significant heterogeneity as

recommended by the Cochrane handbook [22]. We analysed data with STATA version 16.1 (StataCorp LP, Texas).

Missing data

We did not impute missing outcomes when they were missing in the retrieved papers. Instead, we contacted their respective corresponding authors during our study to obtain the missing data. In the case of non-response, we did not consider those studies for further analyses and excluded them from our systematic review.

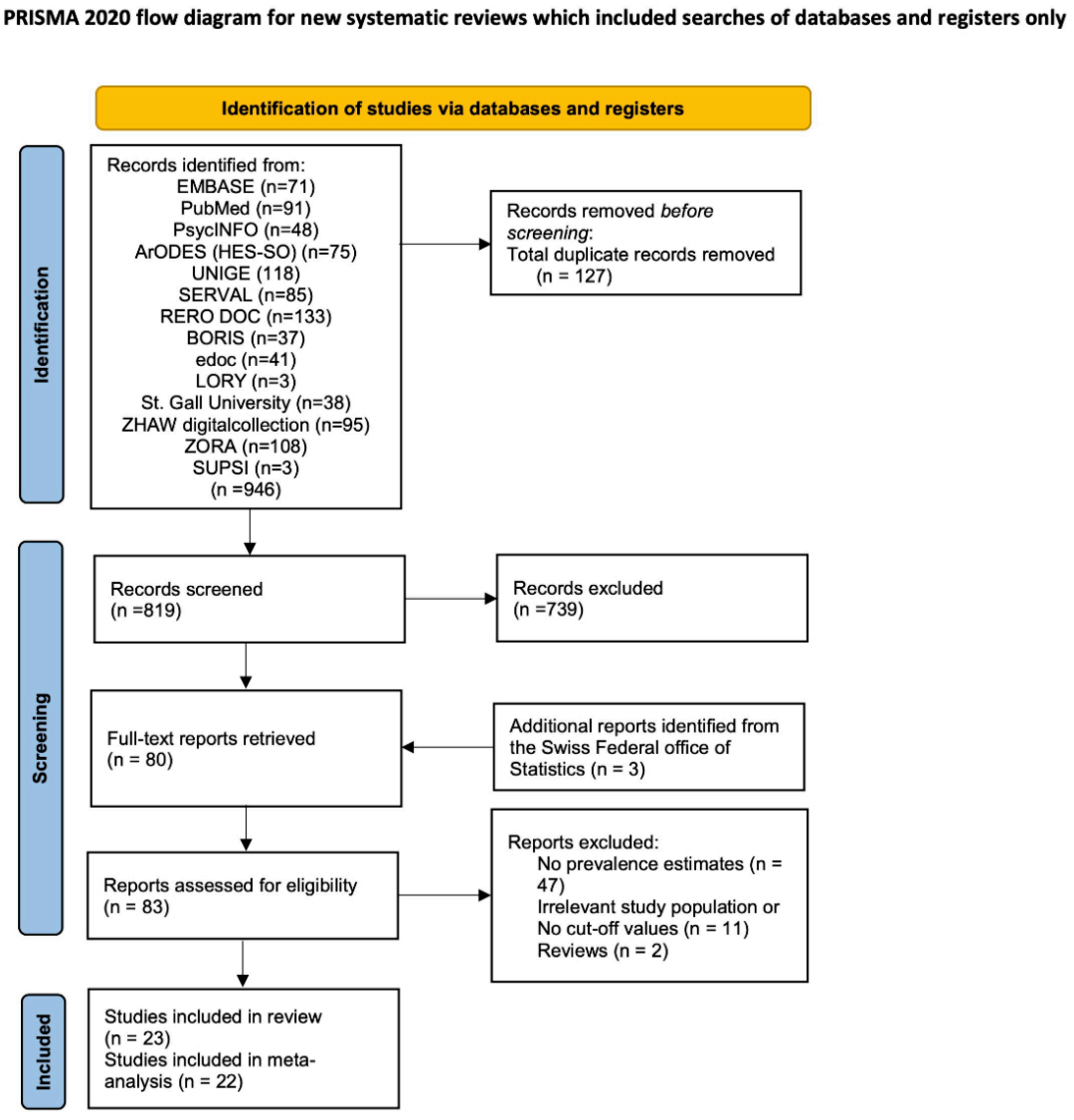
Results

Study selection

From electronic searches of databases, we identified and screened 819 potentially relevant unique records after the removal of duplicates. Of those, 80 records were assessed at a full-text level against inclusion criteria of which 60 were excluded for various reasons (e.g., no prevalence estimates or irrelevant study population, or no cut-off values) (fig. 1).

Thereafter, we identified a further three studies by hand searching and from the screening of the reference list of the eligible articles. Eventually, we included 23 studies [19, 23–44] of which 22 [19, 23, 25–44] were in a meta-analysis.

Figure 1: Flowchart of included studies. ArODES (HES-SO): Archive ouverte des HES de Suisse occidentale; SERVAL: Serveur académique lausannois; RERO DOC: Dépôt institutionnel des institutions membres de RERO; BORIS: Bern Open Repository and Information System; edoc: Institutional Repository University of Basel; LORY: Lucerne Open Repository; Université St. Gall: Plateforme de recherche Alexandria; ZORA: Zurich Open Repository and Archive; SUPSI: La Scuola universitaria professionale della Svizzera italiana



Characteristics of included studies

As shown in table 1, all studies but one [40] used a cross-sectional design where the prevalence of occupational burnout was measured at least once at a specific time.

The sample size of included studies ranged from 36 to 11318 Swiss workers with a median of 523. The female workers ranged from 18% to 93.7%. Eight different measures were used to assess burnout prevalence among the participants in the primary studies: nine used Maslach Burnout Inventory (MBI), five used Copenhagen Burnout Inventory (CBI), three used Emotional exhaustion (EE), two used the Burnout Screening Scale (BOSS), one each used the medical diagnosis, Shirom-Melamed Burnout Measure (SMBM), Physician Well-Being Index (PWBI), and a single-item scale. Ten studies reported on physicians, residents, dentists, medical students, nurses, midwives, medical managers and hospital employees while the remaining studies were conducted on other subpopulations such as education and social workers (4 studies), industrial workers, farmers, or the general population.

Burnout outcomes

As shown in table 2, three outcomes, namely clinical/severe burnout, overall burnout, and emotional exhaustion, were considered in our analysis.

A burnout was considered as clinical or severe when the cut-off values of the three dimensions (emotional exhaustion, depersonalisation and low personal accomplishment) of the Maslach Burnout Inventory (MBI) were met. The diagnosis of burnout cases by physicians was also considered clinical. A burnout was classified as "overall burnout" if the clinical stage or severity of the syndrome were not specified or if the measurement tool used had not allowed its clinical stage or severity to be determined.

Finally, emotional exhaustion was a third possible outcome. emotional exhaustion was measured and reported either as a separate outcome based on the question of how often the person feels emotionally exhausted at work or as a dimension of a more complex measure, most often the MBI. In our study, we considered both options and analysed them as one outcome.

In summary, three types of outcomes were considered: clinical/severe burnout, overall burnout, and emotional exhaustion.

Only one study [45] reported clinical burnout prevalence assessed by physicians. Among the eight studies that used the MBI, five reported the burnout level as high or severe where authors used a combination of high emotional exhaustion, high depersonalisation, and low personal accomplishment. The remaining three studies analysed the three dimensions of the MBI separately. Five studies used the statistical cut-offs based on the American normative sample and three studies used the statistical cut-offs based on the French normative sample (table 2).

Regarding the use of the CBI, the studies either used selected items related to personal burnout, work-related burnout and client-related burnout, or used exclusively one subscale (e.g., personal burnout).

For those that measured the emotional exhaustion, four studies used a one-item Likert-type scale, nine used a dimension of the MBI and one used a single item (yes/no) scale.

Prevalence of burnout among Swiss workers

Overall, we included 22 studies in our quantitative synthesis. One study [24] was not included in the meta-analysis because of unclear cut-off values. Prevalence of burnout among included studies varied from one population to another and by occupation or work setting. Regardless of the occupation, clinical/severe burnout was estimated at 4% (95% confidence interval [95 CI] 2–6%) and overall burnout or emotional exhaustion were relatively similar at 18% (95% CI 12–25%) and 18% (95% CI 15–22%), respectively (fig. 2).

When stratified by occupation, healthcare workers (e.g., physicians, general practitioners, residents, dentists or hospital managers) had rates of severe burnout, overall burnout or emotional exhaustion estimated at 5% (95% CI 3–7%), 18% (95% CI 6–34%) and 15% (95% CI 12–18%), respectively (fig. 3).

In the general working population, clinical or severe burnout and emotional exhaustion rates were estimated at 3% (95% CI 2–4%) and 24% (95% CI 20–29%), respectively (fig. 4).

In education workers, overall burnout and emotional exhaustion were estimated at 22% (95% CI 21–23%) and 9% (95% CI 6–11%), respectively (fig. 5).Overall burnout was estimated at 17% (95% CI 9–27%) in other workers (industrial workers, farmers and residential youth caregivers) (fig. 6).

We also provided the burnout prevalence rates per scale or measurement tool (figure S1 in the appendix).

Between-study heterogeneity was considerable (I-square >90%, $p < 0.001$) for all outcomes and across the studied populations (e.g., healthcare workers or the general working population). In subgroup analyses, heterogeneity was not estimated in the analysis – owing to power issues – except for severe or clinical burnout in healthcare workers (I-square = 92.63, $p < 0.001$).

Risk of bias assessment

Based on MORE risk-of-bias assessment [20], all studies had low risk of bias in general reporting and most of the studies had low risk of bias in external validity. Eleven studies had unclear risk of bias in internal validity mainly due to the reliability of the estimates and the validation of outcome measurement tools. Overall, 9 studies [24, 27, 28, 31–33, 36, 42, 44] were at low risk of bias, 10 studies [23, 25, 26, 29, 35, 37, 38, 41, 43, 45] had unclear risk of bias and four [23, 30, 34, 40] were at high risk of bias (table 1 and table S1 in the appendix). Based on a visual assessment of the funnel plot, we considered that the likelihood for publication bias was low (figure S2 in the appendix).

Discussion

This study aimed to estimate the prevalence of occupational burnout in the Swiss population and searched for primary studies that were published in 2010 and later. We identified 23 studies that assessed the prevalence of burnout among workers in Switzerland. Regardless of oc-

Table 1:
Main characteristics of included studies.

Study ID	Region/Canton	Study design	Sample size (n); population	Mean age (years)	Women (%)	Baseline prevalence rates (%)	Mean work experience (years)	Risk of bias assessment
Arigoni 2010	French-speaking; German- and Italian-speaking	Cross-sectional	In 2002: 1755; in 2004: 365; in 2007: 615; cancer physicians, paediatricians, internal medicine specialists, GPs	NR	29.9	Severe: in 2002: 3.5; in 2004: 6.3; in 2007: 3.7	11 (65% in the year 2004)	Unclear
Businger 2010	German-speaking	Cross-sectional	405; surgical residents and surgeons	Surgical residents, median 31; surgeons, median 46	23.7	EE: 12.6, DP: 29.9; PA: 21.7; Severe: 3.7	~7	High
Divaris 2012	German-speaking	Cross-sectional	36, dental residents	30	51	EE: 17; DP: 8; PA: 36	~4	Unclear
Favrod 2018	NR	Cross-sectional	213; midwives and (neonatal intensive care) nurses	18 – >40 (range)	~93.7	EE: 21.4; DP: 6.0; PA: 3.6; severe[b], nurses: 4.8, Mmdwives: 0.00	≤10 (54.9% for nurses; 39.3% for midwives)	Low
FSO 2019	French-speaking; German- and Italian-speaking	Cross-sectional	11,318; Swiss workers	15–64 (range)	49.6	20	NR	Unclear
FSO 2014	French-speaking; German- and Italian-speaking	Cross-sectional	11,157; Swiss workers	15–64 (range)	48.4	Male: 18; female: 20	NR	Unclear
Gerber 2019	German-speaking	Cross-sectional	309; Swiss workers	42.66 (SD 14.18)	48	EE: 1.8; physical exhaustion: 2.72; cognitive weariness: 2.43; overall: 2.42	21.64	High
Hämmig 2018	German-speaking	Cross-sectional	1840; hospital employees, physicians, nurses	<45 (58%)	88	8.2	NR	Unclear
Hämmig 2014	German-speaking	Cross-sectional	2014; industrial workers	16–69 (range)	18	Men: 6; women: 10	NR	Low
Hämmig 2012	German-speaking	Cross-sectional	456; hospital employees	NR	77.8	16.9	NR	Unclear
Heeb 2014	Western Switzerland	Cross-sectional	449, nursing (57.23%) and medical mangers (42.76%)	46.7	58	Nursing managers: EE: 10.9; DP: 16.7; PA: 28.4; Severe[b]: 2.3 Medical managers: EE: 12.5; DP: 19.3; PA: 38.0; Severe[b]: 3.1	16 (63.8)%	Low
Kind 2020	German-speaking	Longitudinal	159 ; professional caregivers in youth residential care	35.85 (SD 9.68)	57.9	36.7	8.3	High
Lindemann 2019	German-speaking (91.5%)	Cross-sectional	523; medical students, residents, GPs	33.6 (SD 5.7)	75.1	14.9	NR	Unclear
Merlani 2011*	French-,German- andItalian-speaking	Cross-sectional	2987; nurse assistants, nurses, physicians	<40 (70%)	76	EE: 2.93; severe: 29	Median: 7.5	Low
Nguyen Huynh 2021	French-speaking	Cross-sectional	Mean: 558.6**; patients	NR	NR	3.02**	NR	Unclear
Nicolin 2018	French-speaking	Cross-sectional	90; specialised teachers	41.5 (range 24–61)	81	EE 15.6; DP 3.3; PA 31.1	12	Low
Reissig 2019	French-,German-, and Italian-speaking	Cross-sectional	1321; farmers	49	23.9	12	NR	Low
SECO 2017	French-,German-, and Italian-speaking	Cross-sectional	871; Swiss workers	15–65	49.8	35.2	NR	Unclear
Squillaci 2020	French-speaking	Cross-sectional	345; special education teachers	31–40 (range)	>80	EE 7.2; DP 1.2; PA 23.6	NR	Unclear
Steinlin 2017	German-speaking	Cross-sectional	319; social education workers or trainees	36.6 (SD 10.0)	61	18	10 (SD 8.2)	Low
Studer 2017	French-speaking	Cross-sectional	5519; teachers	31–60 (85.4%)	76.2	Personal burnout; work-related burnout; client-related burnout: 42.4; 22.5; 26	≥6 (87.4%)	Unclear
Welp 2019	German-speaking	Cross-sectional	1496; nurses, physicians	39.6 (SD 9.4)	69.6	EE 37.8; DP 35.8; PA 27.2; overall severe[b]: 11.8	12.6 (SD 8.9)	Low
Zumbrunn 2020	German-speaking	Cross-sectional	450; general internal medicine residents	Median 30	61	EE 60; DP 47; EE + DP 32		Low

BOSS: The Burnout Screening Scale; CBI: Copenhagen Burnout Inventory; DP: Depersonalization; EE: Emotional exhaustion; FSO: Federal statistical office; GPs: general practitioners; MBI: Maslach Burnout Inventory; MBI-HSS: Maslach Burnout Inventory-Human Services Survey; NA: not applicable; NR: not reported; PA: Low personal accomplishment; PWBI: Physician Well-Being Index; SBI: School Burnout Inventory; SD: standard deviation; SECO: State Secretariat for Economic Affairs; SMBM: Shirom-Melamed Burnout Measure.

* The study of Merlani 2011 was not considered in the quantitative analysis because it does not provide clear cutoff scores. ** Data provided from authors

cupation, our meta-analysis estimated a prevalence of clinical/severe burnout of 4% and overall burnout or emotional exhaustion prevalences were of 18%. Interestingly, the prevalence of emotional exhaustion was assessed at 20% between 2012 and 2017 in a large representative study of Swiss workers [19]. Although emotional exhaustion is a core dimension of burnout, our results suggest that this dimension is not sufficient to constitute burnout. This is consistent with the harmonised definition of occupational burnout [3]. Therefore, the estimates of emotional exhaustion overestimate the prevalence of clinical burnout. Indeed, clinical/severe burnout estimation of 4% seems robust enough and equates to the proportion of burnout cases that were diagnosed in clinical practice in the cantonal polyclinics in Western Switzerland [45].

In the international literature, a systematic review aimed to evaluate burnout prevalence reported a range of 0 to 80.5% among physicians in 45 countries [8].

In our study, the prevalence of clinical/severe burnout was 5% in healthcare workers compared with 3%–4% in the general working population. Such a high estimate may be explained by the fact that working in a particularly stressful and emotionally demanding setting (e.g., clinics, hospitals) constitutes an independent risk factor for occupational burnout [46, 47]. In addition, our estimate of clinical or severe burnout prevalence is also congruent with findings in several European countries. For example, in Denmark, a 7-year follow-up study reported an incidence rate for moderate or severe burnout of 13.2% and a prevalence rate of 5.3% among general practitioners [48, 49]. In the Netherlands, the prevalence estimate of clinical or severe burnout based on the Dutch clinically valid cut-off values ranged between 4% and 7% of the working population. In some occupations, a 10% prevalence was reported, but the representativeness of the data was not ensured [50]. Kant et al. reported a prevalence estimate of 13.7% in a relatively large Dutch cohort [51]. The burnout definition was based on the MBI for General Services with high scores of exhaustion and either high scores of cynicism or low scores of professional efficacy. This may have overestimated clinical or severe burnout and should instead be considered as an overall burnout, with a prevalence estimate similar to ours. In Germany, 4.2% (women 5.2%, men 3.3%) of the general working population self-reported a lifetime prevalence of a diagnosed burnout by a physician or psychotherapist and many of them had a current mental disorder [52]. In Belgium, 7.14% of long-term disabled persons, who were unable to work or return to work, suffered from burnout and 17% suffered from depression with an increase of 32.53% for burnout cases between 2016 and 2020 [53].

Table 2:
Burnout outcome definitions: measures and cutoffs.

Outcomes				Frequency	References
I. Clinical/severe burnout	Clinical burnout diagnosed by physicians			1	Nguyen Huynh 2021
	High/severe burnout measured by MBI-HSS	Statistical cutoffs based on American normative sample	EE ≥27 (10 items) AND DP ≥10 (5 items) AND PA ≤33 (7 items)	1	Arigoni 2010
			EE ≥27 (9 items) AND DP ≥10 (5 items) AND PA ≤33 (8 items)	2	Businger 2010; Heeb 2014
			EE ≥27 (9 items) AND DP ≥13 (5 items) AND PA ≤33 (8 items)	2	Divaris 2012; Welp 2019
		Statistical cutoffs based on French normative sample	EE ≥30 (9 items) AND DP ≥12 (5 items) AND PA ≤33 (8 items)	3	Favrod 2018; Nicolin 2018; Squillaci 2020
	Clinical/severe burnout according to SMBM				
	Physical fatigue (6 items) AND emotional exhaustion (5 items) AND cognitive weariness (5 items); ≥4.4			1	Gerber 2019
II. Overall burnout	Overall burnout according to CBI	Personal burnout ≥50 (3 items) OR ork-related burnout ≥50 (3 items) OR client-related burnout ≥50 (3 items)		1	Hämmig 2012
		Personal burnout ≥16 (6 items)		2	Hämmig 2014; Hämmig 2018
		Personal burnout (often Or always to ≥4 questions, 6 items)		1	Reissig 2019
		Personal burnout ≥50 (6 items) OR work-related burnout ≥50 (7 items) OR client-related burnout ≥50 (6 items)		1	Studer 2017
	Overall burnout according to BOSS	Work-related burnout ≥60 (10 items)		2	Kind 2020; Steinlin 2017
	Overall Burnout according to PWBI				
	Work-related burnout (yes/no, 1 item) AND emotional hardening (yes/no, 1 item)			1	Zumbrunn 2020
III. Emotional Exhaustion (EE)	FSO (rather yes OR yes, 1 item)			2	FSO 2019; FSO 2014
	SECO (often OR always, 1 item)			1	SECO 2017
	Single-item scale ≥3			1	Lindemann 2019
	MBI-HSS	EE ≥27 (10 items); American normative sample		1	Arigoni 2010
	MBI-HSS	EE ≥27 (9 items)		4	Businger 2010; Divaris 2012; Heeb 2014; Welp 2019
	MBI-HSS	EE ≥30 (9 items)); French normative sample		3	Favrod 2018; Nicolin 2018; Squillaci 2020
	Emotional hardening (PWBI) (yes/no, 1 item)			1	Zumbrunn 2020

BOSS: The Burnout Screening Scale; CBI: Copenhagen Burnout Inventory; DP: Depersonalization; EE: Emotional exhaustion; FSO: Federal statistical office; GPs: general practitioners; MBI: Maslach Burnout Inventory; MBI-GS: Maslach Burnout Inventory-General Survey MBI-HSS: Maslach Burnout Inventory-Human Services Survey; NA: not applicable; NR: not reported; PA: Low personal accomplishment; PWBI: Physician Well-Being Index; SECO: State Secretariat for Economic Affairs; SMBM: Shirom-Melamed Burnout Measure.

In addition to depression, occupational burnout has been linked to other mental health problems and symptoms such as anxiety, anger, feelings of helplessness [54], cognitive functions or impaired sleep [55]. Moreover, a modelling study suggested that depression might be an outcome of occupational burnout rather than a precursor [56]. However, a recent systematic review that investigated the relationship between depression, anxiety and burnout concluded that there is no evidence of overlap and that they seem to have robust constructs [57]. Other authors disagree, believing that "depressive and burnout symptoms often co-occur and develop in tandem," and include depressive mood as a secondary dimension of burnout [58].

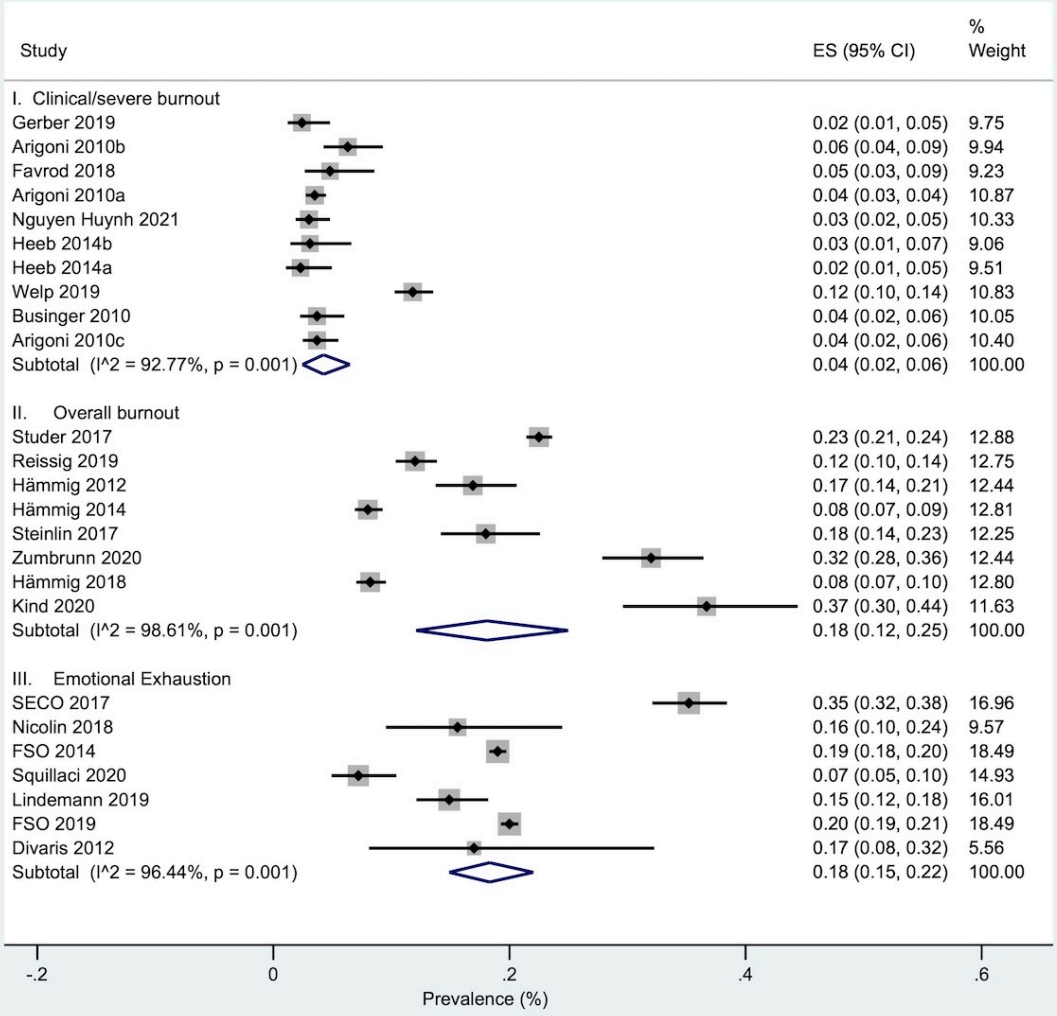
In terms of health economics, the costs related to work-related stress (e.g., healthcare utilisation, work interruption, early retirement, sickness leave or early mortality) are estimated at several billion euros in Switzerland, Germany, the Netherlands, France or the United Kingdom according to the statistics from the European Agency for Safety and Health at Work [59]. More precisely, according to a report about costs of stress in Switzerland, the related prescribed medical costs may exceed 2 billion Swiss francs, which represents approximately 7% of the costs of the Swiss health system for medical costs prescribed by health professionals [60]. Given such negative and costly consequences, addressing occupational burnout and its predictors [61] would have social, economic and mental health benefits.

It is noteworthy to clarify that "point" prevalence refers to the prevalence measured at a particular point in time compared to "period" prevalence where the measures are taken over an interval of time. All studies included in our systematic review estimated point prevalence. Given these results, we did not find it useful to consider this issue in a subgroup analysis or a meta-regression. We did not identify other study characteristic that would have explained the observed heterogeneity by a meta-regression. Moreover, it is important to state that although the between-study heterogeneity in our study was considerable, I^2 or I-square can be imprecise and biased in small meta-analyses [62].

Strengths and limitations

By applying a rigorous assessment of the methods of occupational burnout measurement, our systematic review/meta-analysis is the first to provide the prevalence estimate for occupational burnout in the Swiss working population.

Figure 2: Prevalence of burnout stratified by burnout ouctomes in any occupation.



This study enabled us to distinguish between clinical or severe burnout, overall (unspecified) burnout, and its proxy and core dimension, emotional exhaustion, as three distinct outcomes. The estimated prevalence of clinical/severe burnout is consistent with prevalence estimates reported in the European countries where occupational burnout is recognised as a disease. The study findings are rather alarming and shed light on the importance of addressing such a prevalent mental disorder in the workplace.

Our literature search was conducted up to July 2021, when only a few studies had assessed and published burnout prevalence estimates during the COVID-19 pandemic period. None of these studies was conducted in Switzerland. Therefore, our estimates reflect the prepandemic, baseline, prevalence of burnout. They should enable comparisons with the estimates from studies conducted during the pandemic period and the assessment of the pandemic's impact on mental health, which we believe is very important [63, 64]. Our estimates could be also helpful in assessing the effectiveness of interventions for mental health promotion during the pandemic and postpandemic periods [65].

In our search of the literature, we were able to identify only one study in which physicians reported the number of burned-out patients in their consultations [45]. This was one of the most recent studies included in our review, and in contrast to all other included studies, it was conducted after the release of the harmonised definition of burnout [3], presented by the study's authors to the participating physicians before data collection. Having more studies based on standardised criteria of clinical burnout assessment would increase the quality of the meta-estimates and facilitate straightforward comparisons of prevalence rates between countries where occupational burnout is recognised and treated as a disease.

In this meta-analysis, we observed a considerable heterogeneity of our combined estimates of occupational burnout. This was due to known disagreements in the definition of burnout [3, 13], validity concerns of patient-reported burnout measures [9], and a variety of clinical and non-clinical work settings and occupation types besides regional and linguistic or cross-cultural issues. Having this in mind, we used a random-effects model to run the meta-analysis and judged that the existing heterogeneity is expected given the aforementioned factors and the fact that a high value of I^2 – used here to measure heterogeneity – could be interpreted as substantial but also as a trivial level of heterogeneity or being clinically unimportant [22].

Our overall study sample size was large enough and representative of the Swiss working population although limited by the heterogeneity of burnout measures used and the absence of Swiss clinically valid cut-off values. This latter issue should be addressed in future studies. Finally, there were a few included studies in specific occupations that re-

Figure 3: Prevalence of burnout in healthcare workers.

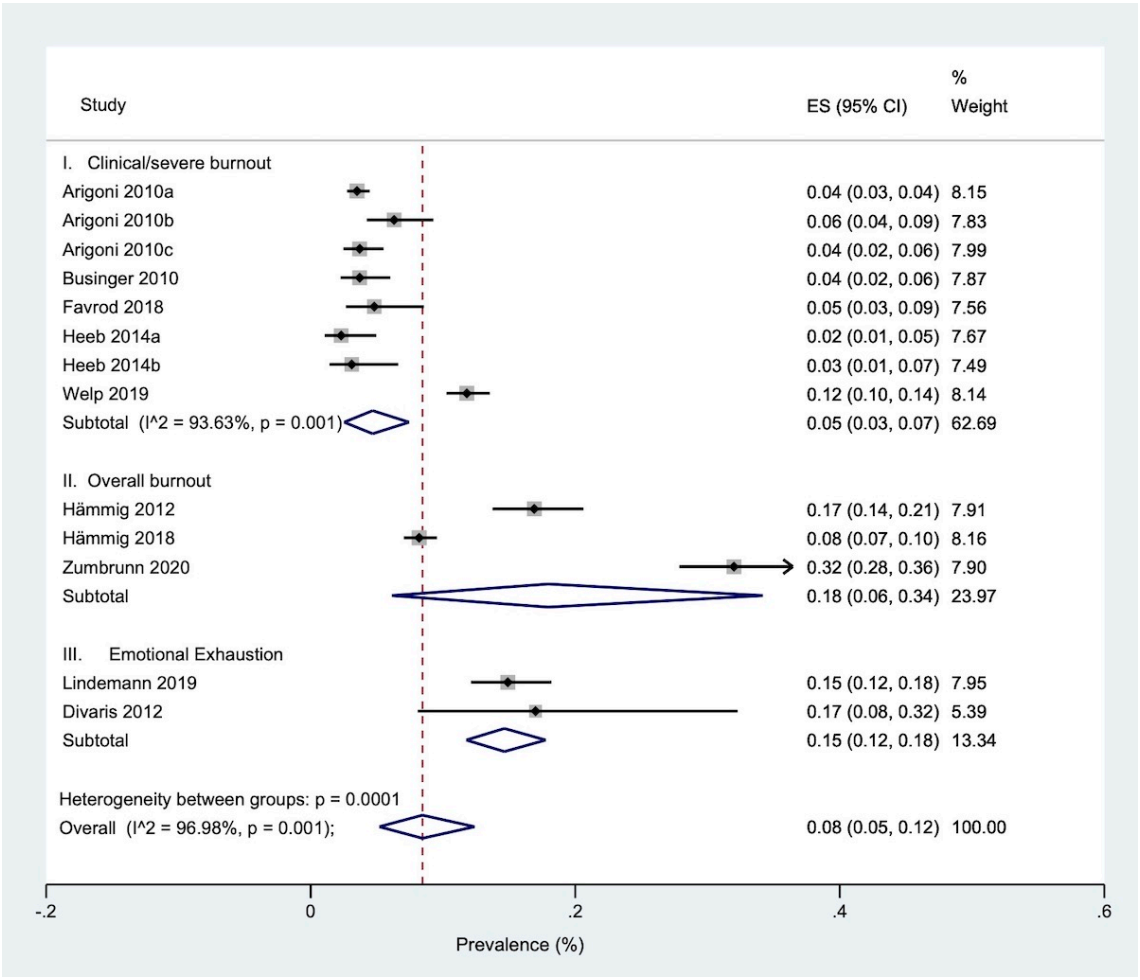


Figure 4: Prevalence of burnout in the general working population.

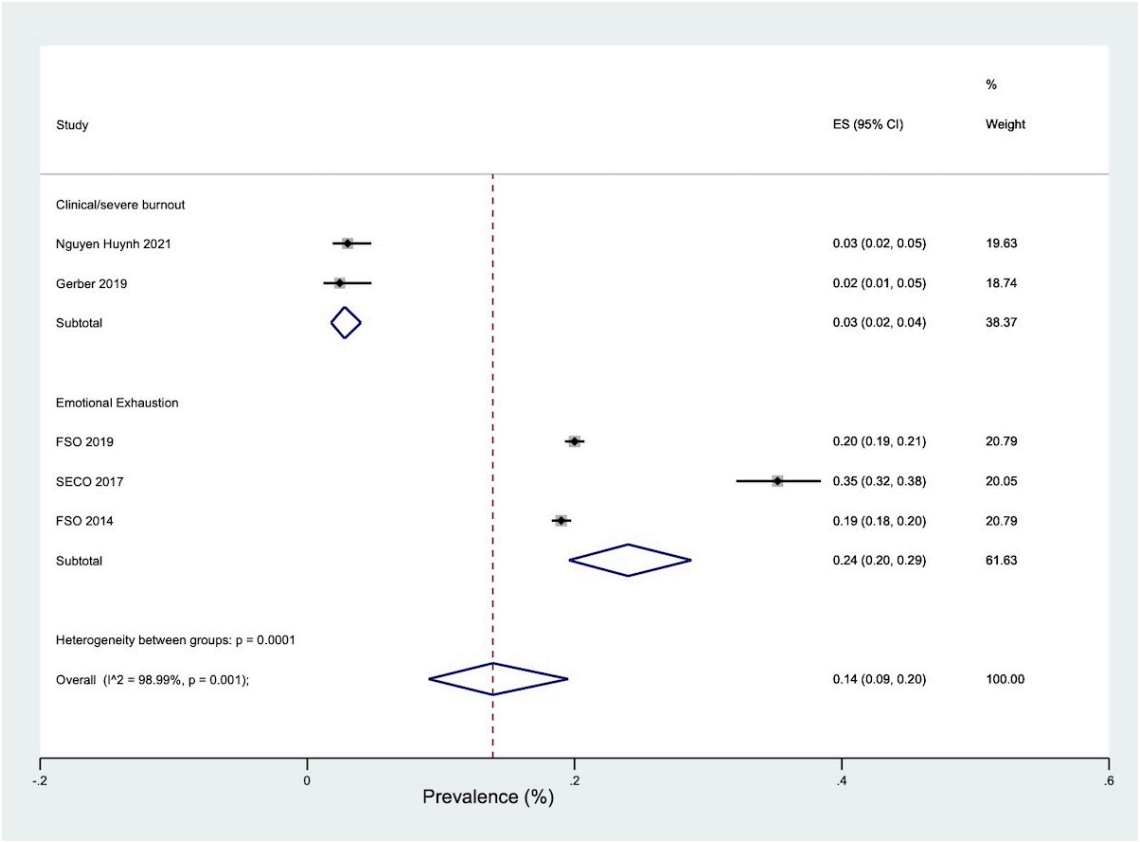


Figure 5: Prevalence of burnout among workers in the education sector.

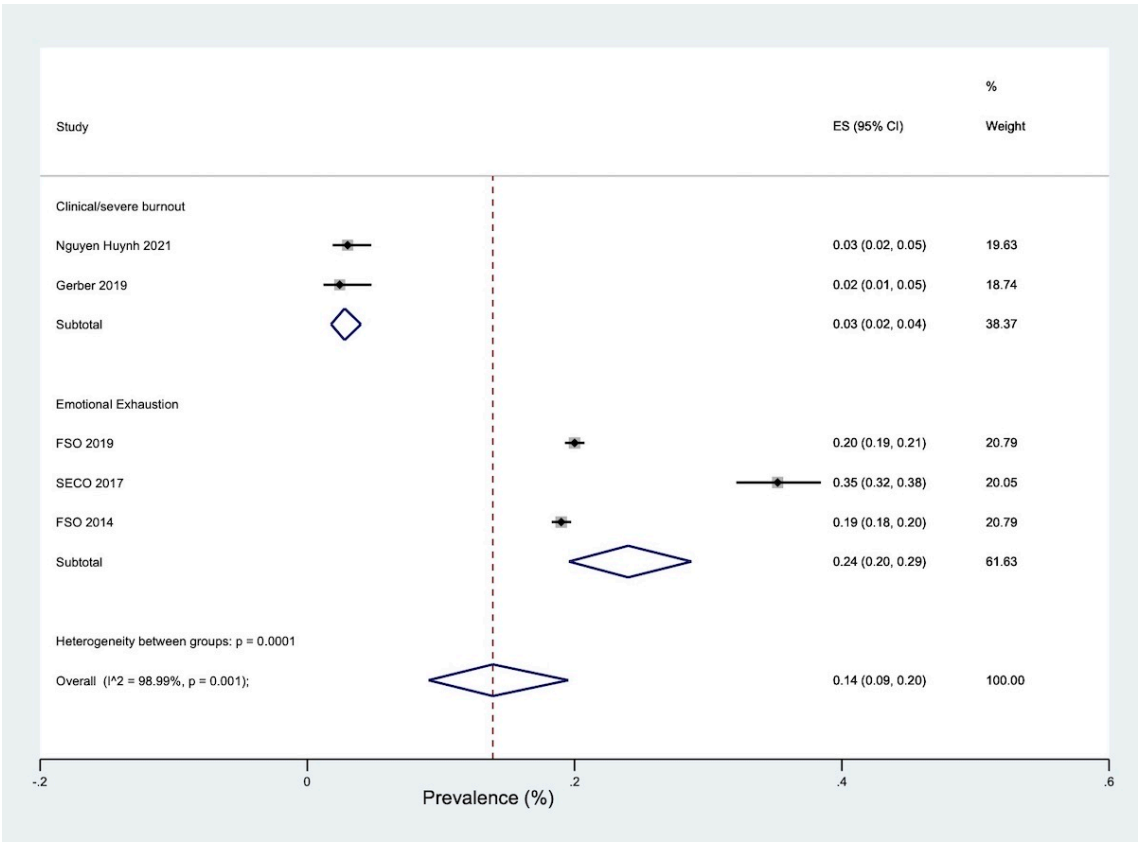
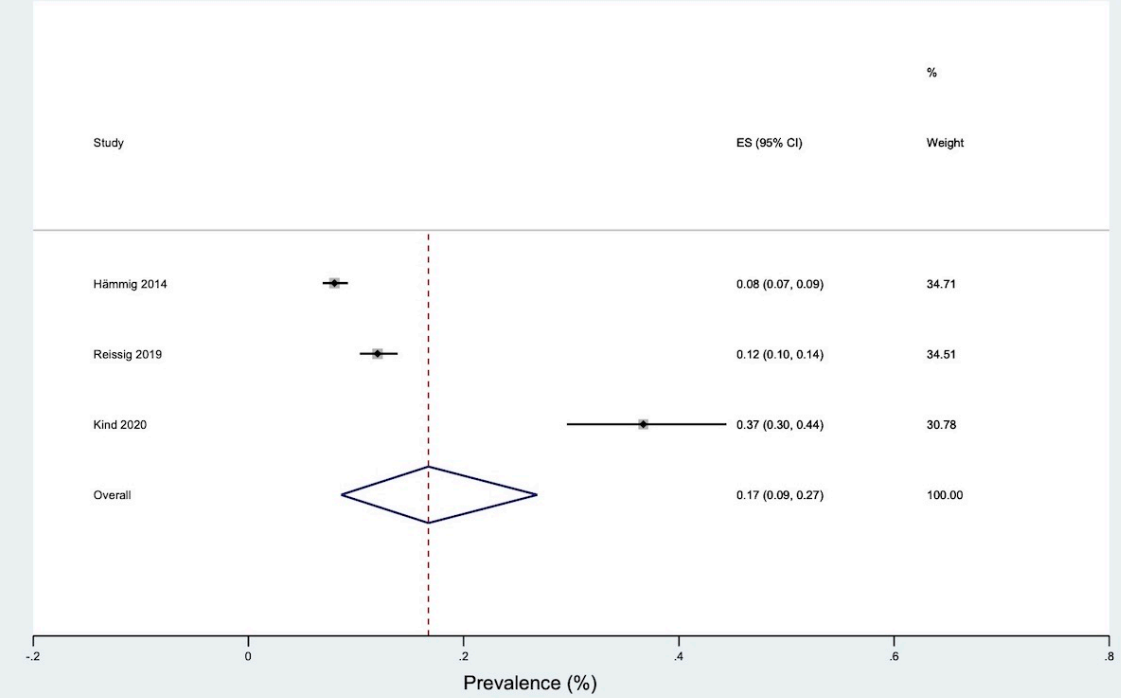


Figure 6: Prevalence of burnout among other workers.



sulted in rough prevalence estimates and should be interpreted with caution.

Implications and conclusions

Clinicians and researchers will need to continue identifying patients with occupational burnout. Newly developed screening and diagnostic tools, once validated, will be helpful in the further screening and diagnosis of patients with this mental disorder as soon as possible. In conclusion, our systematic review and meta-analysis showed that the prepandemic prevalence of occupational burnout in the Swiss working population is comparable to that in other countries where prevalence estimates for occupational burnout are available. As our estimates correspond to the baseline prevalence of occupational burnout, they should be helpful in the assessment of the effectiveness of interventions for mental health promotion during the pandemic and postpandemic periods. As the COVID-19 pandemic had a disastrous impact on all mental health outcomes, including burnout, more efforts to detect it earlier are necessary to reduce its negative consequences on an individual and societal level.

Data sharing statement

All data are available in the manuscript and its supported files. Any more information can be requested from the corresponding author.

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Author contributions: YS, SB, IGC conceived and designed the study. MA drafted the protocol and conducted the statistical analyses. MA and IGC drafted the manuscript. All authors critically revised the manuscript and agreed on the final version.

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Potential competing interests
All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflict of interest was disclosed.

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Appendix

Search of the literature – strategies

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('professional burnout'/de OR "professional exhaustion":ti,ab OR (('burnout'/de OR burnout:ti,ab OR 'burn-out':ti,ab OR (emotion* NEAR/2 exhaust*):ti,ab) AND (job*:ti,ab OR occupation*:ti,ab OR profession*:ti,ab OR staff*:ti,ab OR work*:ti,ab OR employ*:ti,ab OR colleague*:ti,ab))) AND ('switzerland':de,ti,ab OR swiss:ti,ab) AND [2010-2021]/py

71	Date of search	6 July 2021

PubMed

("Burnout, Professional"[Mesh] OR "professional exhaustion"[tiab] OR (("Burnout, Psychological"[Mesh:NoExp] OR burnout[tiab] OR "burn-out"[tiab] OR "emotional exhaust*"[tiab] OR "emotionally exhaust*"[tiab]) AND (job[tiab] OR jobs[tiab] OR occupation*[tiab] OR profession*[tiab] OR staff*[tiab] OR work*[tiab] OR employ*[tiab] OR colleague*[tiab]))) AND ("Switzerland"[tw] OR swiss[tiab]) AND (2010[dp]:2021[dp])

92	Date of search	6 July 2021

APA PsycINFO

((burnout or burn-out or (emotion* adj2 exhaust*)) and (job* or occupation* or profession* or staff* or work* or employ* or colleagu*)).ti,ab. and (Switzerland or swiss).ti,ab.

limit 1 to yr="2010 - 2021"

48	Date of search	6 July 2021

Figure S1. Burnout prevalence rates per scale or measurement tool.

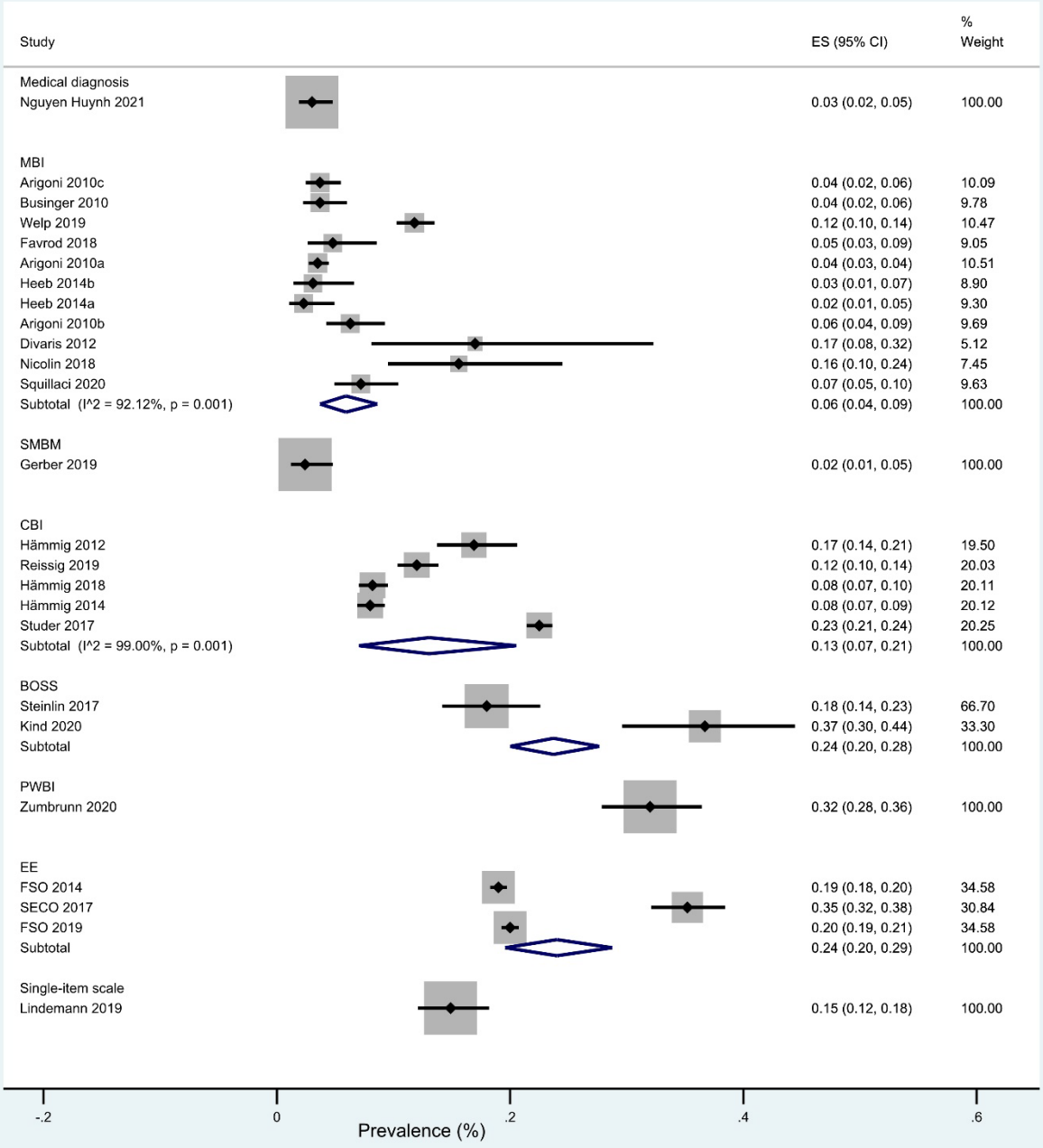

Table S1. Risk of bias assessment for included studies using MORE [20].

Study ID	Arigoni 2010	Businger 2010	Divaris 2012	Favrod 2018	FSO 2014	FSO 2019
General						
Funding	+	?	?	?	?	?
Role of Funding organization	?	?	?	?	+	+
Conflict of interest	?	+	+	+	+	+
Ethical approval	?	+	?	+	?	?
Aim of the study	+	+	+	+	+	+
Total	low	low	low	low	low	low
External validity						
Sampling of subjects	+	?	+	+	+	+
Nongeneral population based sampling method	+	?	+	+	+	+
Nongeneral population based sampling frame	-	-	+	+	+	+
Assessment of sampling bias	+	+	+	-	+	+
Estimation of sampling bias (response rate, %)	+	+	+	+	+	+
Exclusion rate from the analysis	?	?	+	+	+	+
Addressing sampling bias	+	-	+	-	-	-
Total	low	high	low	low	low	Low
Internal validity						
Source of measure of prevalence of burnout	-	-	-	-	-	-
Severity of burnout	+	+	+	+	+	+
Validation of outcomes measurement tools	?	?	?	?	+	?
Reliability of the estimates	?	+	+	+	-	-
Precision of estimate (95% CI/SD)	+	+	-	+	+	+
Adjusted estimate in the total sample/subgroups	-	-	-	+	-	-
Total	unclear	low	unclear	low	unclear	unclear
Overall	unclear	high	unclear	low	unclear	unclear

Study ID	Gerber 2019	Hämmig 2012	Hämmig 2014	Hämmig 2018	Heeb 2014
General					
Funding	?	+	+	+	+
Role of Funding organization	?	+	?	+	+
Conflict of interest	?	+	+	?	+
Ethical approval	+	?	?	+	?
Aim of the study	+	+	+	+	+
Total	low	low	low	low	low
External validity					
Sampling of subjects	-	+	-	+	+
Nongeneral population based sampling method	-	+	+	+	+
Nongeneral population based sampling frame	+	+	+	+	+
Assessment of sampling bias	-	+	+	+	+
Estimation of sampling bias (response rate, %)	+	+	+	+	+
Exclusion rate from the analysis	+	+	+	+	-
Addressing sampling bias	-	+	+	+	+
Total	high	low	low	low	low
Internal validity					
Source of measure of prevalence of burnout	-	-	-	-	-
Severity of burnout	-	-	-	+	+
Validation of outcomes measurement tools	?	+	+	+	?
Reliability of the estimates	+	+	+	+	+
Precision of estimate (95% CI/SD)	+	+	-	-	+
Adjusted estimate in the total sample/subgroups	-	-	-	-	+
Total	unlcear	unlcear	low	unclear	low
Overall	high	unclear	low	unclear	low

Study ID	Kind 2020	Linde-mann 2019	Merlani 2011	Nguyen Huynh 2021	Nicolin 2018
General					
Funding	+	+	+	?	+
Role of Funding organization	+	+	+	?	+
Conflict of interest	+	+	+	+	+
Ethical approval	+	+	+	+	?
Aim of the study	+	+	+	+	+
Total	low	low	low	low	low
External validity					
Sampling of subjects	+	+	+	+	-
Nongeneral population based sampling method	+	+	+	+	+
Nongeneral population based sampling frame	+	+	+	-	-
Assessment of sampling bias	+	+	+	?	+
Estimation of sampling bias (response rate, %)	-	+	+	+	+
Exclusion rate from the analysis	+	+	+	+	+
Addressing sampling bias	+	+	+	?	+
Total	low	low	low	low	low
Internal validity					
Source of measure of prevalence of burnout	-	-	-	-	-
Severity of burnout	?	+	+	?	+
Validation of outcomes measurement tools	?	?	?	+	?
Reliability of the estimates	+	+	+	+	+
Precision of estimate (95% CI/SD)	-	-	+	-	+
Adjusted estimate in the total sample/subgroups	-	-	-	-	+
Total	high	unclear	low	unclear	low
Overall	high	unclear	low	unclear	low

Study ID	Reissig 2019	SECO 2017	Squillaci 2020	Steinlin 2017	Studer 2017	Welp 2019	Zum-brunn 2020
General							
Funding	?	+	?	?	+	+	+
Role of Funding organization	?	+	?	?	+	+	+
Conflict of interest	+	+	+	+	+	+	+
Ethical approval	?	+	?	?	?	+	+
Aim of the study	+	+	+	+	+	+	+
Total	low	low	low	low	low	low	low
External validity							
Sampling of subjects	+	+	+	+	+	+	+
Nongeneral population based sampling method	+	+	+	+	+	+	+
Nongeneral population based sampling frame	+	+	-	+	+	+	+
Assessment of sampling bias	+	+	+	+	+	+	+
Estimation of sampling bias (response rate, %)	+	+	+	+	+	+	+
Exclusion rate from the analysis	+	?	+	?	+	+	?
Addressing sampling bias	-	+	+	+	+	+	+
Total	low	low	low	low	low	low	low
Internal validity							
Source of measure of prevalence of burnout	-	-	-	-	-	-	-
Severity of burnout	+	-	+	+	?	+	+
Validation of outcomes measurement tools	+	-	?	?	+	?	?
Reliability of the estimates	+	?	+	+	+	+	+
Precision of estimate (95% CI/SD)	+	-	-	+	-	+	-
Adjusted estimate in the total sample/subgroups	+	?	-	+	-	?	+
Total	low	high	unclear	low	unclear	low	low
Overall	low	high	unclear	low	unclear	low	low

Figure S2. Funnel plot with pseudo 95% confidence limits.