



Protecting pregnancy at work: Normative safety measures and employees' safety strategies in reconciling work and pregnancy

Alessia Abderhalden-Zellweger^{a,b,*}, Isabelle Probst^a, Maria-Pia Politis Mercier^a, Brigitta Danuser^b, Peggy Krief^b

^a School of Health Sciences (HESAV), University of Applied Sciences and Arts Western Switzerland (HES-SO), Lausanne, Switzerland

^b Occupational Health and Environment Department (OHED), Centre for Primary Care and Public Health (Unisanté), Lausanne, Switzerland

ARTICLE INFO

Keywords:

Pregnant workers
Regulatory and managed safety
Strategies
Qualitative study

ABSTRACT

Background: In Switzerland, occupational risks for pregnant workers are covered by specific maternity protection legislation (MPL); however, studies show significant shortcomings in the implementation of these policies among companies.

Aims: Analyse the gaps between the provisions of Switzerland's MPL, the protective measures companies plan to take and actual protection practices. We also aim to understand how employees develop their own strategies in order to make up for the shortcomings or contradictions of companies' measures.

Methods: Interviews with 46 different stakeholders from organisations in the healthcare sector and the food industry were transcribed and analysed thematically.

Results: Some of the organisations used procedures apparently in line with legislation, while others planned more informal approaches to managing on a case-by-case basis. Normative safety measures within the framework of national legislation served as resources for both managers and their employees. However, implementing these measures ran up against real-world workplace constraints, which sometimes rendered them impracticable. Employees adapted some measures considered insufficient or developed their own strategies to reconcile work and pregnancy.

Conclusions: Being pregnant is challenging to represent in occupational settings; it is not a disease, but it involves important physical and biopsychosocial changes, which affect women's occupational life. The multidimensional, evolving, and yet temporary nature of pregnancy represents a significant challenge to the implementation of MPL within companies. Linking the normative safety measures stipulated in the legislation with pregnant employees' needs—and their job-related knowledge and skills—could be an interesting pathway towards improving maternity protection at work.

1. Introduction

Many countries have implemented specific laws to protect pregnant women and their future children from occupational exposure and arduous activities. Although sharing a common base—i. e. assess occupational risks to pregnancy and take the adequate and necessary measures to avoid the exposure of pregnant workers—the specific regulations protecting the health of pregnant employees from occupational risks vary from one country to the next (Probst et al., 2018). The practices implemented in companies often fall outside their respective legal frameworks (Adams et al., 2016; COWI, 2015; Lembrechts and

Valgaeren, 2010). This is also the case in Switzerland (Rudin et al., 2018). Recent meta-analyses highlighted the impact of various occupational exposures and activities in the occurrence of adverse pregnancy outcomes (Cai et al., 2019a, 2019b; Croteau, 2020; Fowler and Culpepper, 2020), including serious childhood pathologies or malformations (Lafon, 2010). Thus, failure to comply with the protective measures required by law—i. e. the absence of a specific analysis of occupational exposures and the absence, or inadequacy, of workplace accommodation—exposes pregnant workers and their future children to significant health risks.

* Corresponding author at: School of Health Sciences (HESAV), University of Applied Sciences and Arts Western Switzerland (HES-SO), Av. de Beaumont 21, CH-1011 Lausanne, Switzerland.

E-mail address: alessia.zellweger@hesav.ch (A. Abderhalden-Zellweger).

<https://doi.org/10.1016/j.ssci.2021.105387>

Received 9 July 2020; Received in revised form 10 May 2021; Accepted 12 June 2021

Available online 24 June 2021

0925-7535/© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1.1. Theoretical framework

Dekker (2003) presented two models through which to view occupational safety and the regulations governing it. The first is a normative approach to safety, according to which following the rules is the safest way to perform the job. The second model involves a more cognitive concept of safety: “People at work must interpret procedures with respect to a collection of actions and circumstances that the procedures themselves can never fully specify” (Dekker, 2003, p. 235). According to this perspective, procedures represent valuable resources for employees, but they will never be able to cover every situation one might encounter when doing one’s job (Dekker, 2003; Hale and Borys, 2013; Rocha et al., 2015). Thus, safety cannot be guaranteed exclusively by the existence of rules and regulations; it also requires the skills of employees and other actors within the company to adapt these rules in a real-world context in order to make them effective and efficient (Rocha et al., 2015). According to Dekker (2003, p. 235), ensuring progress in the field of occupational health and safety requires that companies understand “the reasons behind the gap between procedures and practice. Additionally, organisations must develop ways that support people’s skill at judging when and how to adapt”.

Ergonomics distinguishes between the concepts of *regulated safety*, which refers to the norms and procedures designed by regulatory authorities, the hierarchy, etc., and *managed safety*, which refers to the strategies adopted by the actors concerned in order to adapt those procedures to a particular context (Cuvelier and Woods, 2019; Morel et al., 2008; Rocha et al., 2015). This distinction echoes the gap—extensively studied in the field of the *ergonomics of activity* (Daniellou, 2005; Leplat, 1990; Wisner, 1995)—between the job prescribed (as described by its designers or managers) and the real job done (as carried out by those employed to do it).

According to Cuvelier and Woods (2019), companies can intervene in an attempt to reduce or eliminate that gap, or they can accept it, even value it, as an established condition of any human activity. These authors suggest going beyond a dichotomous analysis of prescribed work versus real work and recognising the gap “as a source of information about how work is actually done and as an opportunity to improve work.” (Cuvelier and Woods, 2019, p. 50). In the words of resilience engineering, a field which is gaining interest among safety scholars and practitioners (Pillay and Morel, 2020), the analysis of the gap reveals how workers and companies’ representatives struggle “to anticipate paths toward failure, to create and sustain failure-sensitive strategies, and to maintain margins in the face of pressures to increase efficiency” (Woods and Hollnagel, 2006, p. 5). Thus, one measure of resilience is the ability to create foresight in order to help workers and managers to cope with the unavoidable complexity of work activities (Woods and Hollnagel, 2006).

In this sense, the present study sought to analyse the discrepancy between the normative safety regulations and adaptive safety management *vis-à-vis* maternity protection at work by considering the needs and skills of pregnant workers in their work. Taking into account how pregnant employees use elements of the formal maternity protection regulations or develop their own strategies in order to reconcile work and pregnancy will help to consider better means of protecting the health of pregnant employees beyond a dichotomous analysis of prescribed work versus real work.

1.2. The legal protection framework for pregnant workers in Switzerland

As in other industrialised countries, Switzerland has specific policies for the protection of pregnant employees. Just like the International Labour Organization’s Maternity Protection Recommendation (R191 - Maternity Protection Recommendation (No. 191)) and European Union directive 92/85/CEE (The Council Of The European Communities, 1992), Switzerland’s Maternity Protection Ordinance (OProMa) (2001) aims to protect the health of pregnant employees and their future

children while enabling them to pursue their work activities.

OProMa requires that employers must: 1) call on an occupational health and safety specialist to carry out a risk analysis (identification of dangerous tasks, evaluation of risks, planning of preventive measures) before hiring female employees; 2) carry out workstation adjustments (or job reassignment) according to that risk analysis; 3) inform pregnant employees who carry out strenuous or dangerous activities about the risks inherent in their work duties and the planned protection measures. Swiss legislation does not oblige employees to announce their pregnancy to their employers; however, protection measures only can be implemented once that announcement has been made.

A recent study revealed serious shortcomings in the application of the OProMa (Rudin et al., 2018). Internationally, the literature demonstrates that both employers and employees lack knowledge about the legal dispositions for the protection of pregnancy at work. Furthermore, representations of pregnancy and occupational risks can have an impact on how different actors react with regards to maternity protection in the workplace (Probst et al., 2018). Studies in Quebec have shown that organisational hierarchies’ scepticism about occupational risks during pregnancy can impede the implementation of adjustments for pregnant employees (Malenfant, 2009). Adopting terminology from the ergonomics of activity, Gravel, Riel, and Messing (2017) showed that employees put in place strategies, mostly at an individual level (e.g. protesting against the new working conditions or challenging the reassignments if these measures did not respect the recommendations of their medical certificate or their skill set, and discussing these problems with their colleagues and immediate supervisors) in order to remain at a healthy and safe job during their pregnancy. If these individual arrangements failed, pregnant workers appealed to their union representative or, as the last resort, legal action might be taken. Nurses interviewed by Gravel et al. (2017), were able to invoke Quebec’s legislation (i.e. art. 40; Act respecting occupational health and safety, AOHS) in order to challenge unacceptable working conditions.

2. Study aims

The present study aimed to analyse the gaps between the provisions of Switzerland’s maternity protection legislation, the protection measures companies plan to take and actual protection practices. Identifying these gaps—and understanding the reasons for them and their consequences—would inform us about the current limitations to ensure maternity protection as well as the extra resources needed to improve that protection.

We begin by looking at how maternity protection at work is addressed, whether or not companies’ measures follow the legal regulations, why this is so, and what managers points of view are with regards to the usefulness, effectiveness and limitations of a maternity protection system based on regulations. Next, we try to understand how pregnant employees use elements of the formal OProMa regulations or develop their own strategies in order to reconcile work and pregnancy.

3. Materials and methods

This study was part of a research project financed by the Swiss National Science Foundation (Krief et al., 2018). The qualitative part of the research, which we analyse here, took place between January 2018 and December 2019.

3.1. Study population

The research population came from six companies established in French-speaking Switzerland in the healthcare sector and the food industry. These economic sectors were chosen because: 1) they employ significant proportions of women (37% in the food industry and 74% in the healthcare sector in French-speaking Switzerland; according to our calculations made using figures from the Swiss Federal Statistical

Office's Business and Enterprise Register); 2) they entail certain dangers and strenuous activities which require protection measures for maternity at work, notably: scheduling constraints and shift work, long periods of standing, carrying loads, and physical (vibration, radiation, noise, heat and cold,), biological (infectious diseases) and chemical risks (toxic products) (Alex, 2011; Morales-Suarez-Varela et al., 2010; Park et al., 2017).

3.2. Study sample and data collection

Following a preliminary questionnaire sent out to 202 companies (95 in the food industry sector and 107 in the healthcare sector), 68 responded that they would be willing to participate in case studies. According to the research protocol, a convenience sample of six of these were selected because of their diversity in the implementation of maternity protection measures at work. Meetings with companies' management teams were organised to discuss the study and how it would proceed. Information on the companies' organisational chart were collected along with the contact details of the relevant stakeholders within their company responsible for the protection of pregnant employees. In order to collect multiple perspectives and points of views on the ways maternity protection is managed in occupational contexts, we sought to contact diverse roles within the company: decisions makers (i. e. employers, managers and heads of departments) but also other actors involved in the protection of pregnant workers such as occupational health specialists and member of the staff committees. The employees themselves were invited to contact the study team via posters describing the research. Other workers were recruited via the occupational health nurses or human resources departments.

The data were collected via 46 semi-structured interviews with companies' management teams (i.e. employer and HR managers, occupational health physicians and nurses, ward manager/heads of department and member of the staff committees) and employees in each organisation (Table 1).

We developed two interview topic guides which themes were based on our research questions and the literature. The interview guide for employers and HR managers, ward managers and heads of departments, and occupational physicians and nurses investigated the themes of occupational exposures and dangerous or arduous activities faced by pregnant workers, their knowledge of maternity protection legislation, the planned procedures following the announcement of a pregnancy and the subsequent maternity protection measures implemented, difficulties and resources in implementing these measures. Small adjustments were made to adapt these guides to different actors in the companies. Following a general opening question concerning their experience of their pregnancy in the workplace, the interview guide for employees investigated the occupational exposures and dangerous or arduous activities they faced, their knowledge of maternity protection legislation,

the implemented maternity protection measures (if there are) following the announcement of their pregnancy, the difficulties and resources available, and their own actions in reconciling pregnancy and employment.

3.3. Data analysis

Interview transcripts were anonymised and treated using MAXQDA 20 software. We followed Braun and Clarke (2006) recommended steps for qualitative thematic analysis: familiarisation with the interview data, generation of initial codes, development of an initial analytical framework by iteratively grouping codes and refining categories, indexation of themes and sub-themes, and report production (Braun and Clarke, 2006).

The first author inductively labelled extracts from participants' discourses using MAXQDA, and the labels on that first version were agreed on or discussed in a team meeting of the co-authors. The first and second authors reworked the labels and created conceptual themes and sub-themes emphasising how companies' management teams and occupational health specialists follow and apply more or less correctly the legal regulations and how employees negotiated and developed strategies in

Table 2
Themes and sub-themes that emerged from the participants' discourse.

Companies' management teams and occupational health specialists	
Themes	Subthemes
Maternity protection legislation	Knowledge about maternity protection legislation Existence of an established procedure in accordance with the Swiss maternity protection legislation Applicability of legal maternity protection measures within the company
Regulated safety	Protective measures implemented within the company Consequences of the measures implemented The philosophy/logic behind the protective measures implemented Applicability of planned measures within the company Resources and difficulties encountered
Work management, and team planning	Characteristics of the company
Employees	
Themes	Subthemes
Protective measures implemented within the company	
Maternity protection legislation	Knowledge about maternity protection legislation Applicability of legal maternity protection measures in their working activity
Managed safety	Strategies in order to reconcile work and pregnancy Consequences of the strategies adopted Resources and difficulties encountered

Table 1
Participating companies and interviews carried out.

	Healthcare sector organisations			Food industry companies			Total
	H1	H2	H3	F1	F2	F3	
Company code	H1	H2	H3	F1	F2	F3	
Company activity	Rehabilitation hospital	General care hospital	Homecare services	Dairy products	Chocolate manufacturing	Beverage production	
Legal structure	Public institution	Private company	Public institution	Private company	Private company	Private company	
Number of employees in Full-Time Equivalents	> 50 to <250	> 250	> 250	> 50 to <250	> 250	> 10 to <50	
Interviews conducted for each company							
Employer and HR managers	1	1	1	1	3	1	8
Occupational health physicians and nurses	–	2	1	–	1	–	4
Ward manager/Heads of department	2	4	4	2	–	–	12
Members of staff committees	1	–	–	1	–	–	2
Employees who had been employed and pregnant during the past 5 years	4	4	5	3	3	1	20
Total	8	11	11	7	7	2	46

order to reconcile work and pregnancy (Table 2). Finally, all the authors agreed with the conceptual framework proposed.

3.4. Ethical and safety considerations

The Human Research Ethics Committee of the Canton Vaud (CER-VD) certified that this research study protocol fell outside of the field of application of the Swiss Federal Act on Research Involving Humans, as it collected no personal health data. To ensure that ethical principles were followed, participation was voluntary, all the personal data gathered was treated confidentially and anonymised (names of participants and companies); all those interviewed signed written informed consent forms, and data was stored securely and only used for research purposes.

4. Results

4.1. Protective measures planned by organisations and companies

Participating organisations and companies presented with very different real-world implementation of the regulatory protective measures for pregnant employees (Table 3).

The procedures in place in organisations H2, H3 and F2 seemed to comply with the Swiss Maternity Protection Ordinance, including risk analyses carried out in compliance with the regulations, the implementation of adaptations to workstations or job reassignments, information about any occupational risks to pregnancy and the measures planned to deal with them. Those organisations also had occupational health services, made up of an on-site nurse or/and an external

consulting doctor.

Managers in these companies considered risk analyses to be appropriate instruments for dealing with pregnant employees, e.g. the occupational health nurse from H2 used the risk analysis in her interviews with pregnant employees in order to discuss the risks associated with their workstations. A risk analysis may also evolve if employees reveal other potential exposure risks in their work activities.

The managers in these three organisations stated that by following the formal regulatory procedures, they systematically offered employees adjustments to their working hours, less strenuous tasks or job reassignment to a post with no maternity risks.

“[In the out-patient consultations unit], the hours are 11:30–18:30, and with the last pregnant woman I had, I got her to do a few afternoons because it doesn’t finish too late. In the mornings, they can rest, and later on in the pregnancy, it’s still easier to be sitting down.” (Ward Manager, H2)

With regards to the legal obligation to provide information on occupational risks and the protective measures planned to deal with them, organisations H2, H3 and F2 systematically offered a consultation with their occupational health unit as soon as the employee announced her pregnancy. Organisations H2 and F2 provided an initial information session for all staff on occupational risks, including those associated with pregnancy.

On the other hand, the three other organisations interviewed—H1, F1 and F3—did not have established procedures for dealing with the protection of pregnant employees, nor for carrying out a risk analysis.

Table 3
Protective measures planned by organisations and companies participating in the study.

Organisation/ Company	Protective measures linked to the Maternity Protection Ordinance (OProMa)			Other protective measures
	Risk analysis (RA)	Workstation adjustments or job reassignments	Information given to pregnant employees	
H1	<ul style="list-style-type: none"> No RA 	<ul style="list-style-type: none"> Adjustments to working hours and extra breaks Adjustments to tasks Reassignment, administrative work 	<ul style="list-style-type: none"> Informal meetings between the pregnant employee and her line manager Information on which tasks to avoid 	<ul style="list-style-type: none"> –
H2	<ul style="list-style-type: none"> RA Interview with occupational health nurse to adapt the measures suggested in the RA Adaptations to the RA as a function of the risky situations found in the workplace 	<ul style="list-style-type: none"> Adjustments to working hours and extra breaks Adjustments to tasks Reassignment, administrative work 	<ul style="list-style-type: none"> Information session for all newly hired staff, with the head of HR, on the occupational risks to pregnancy and the OProMa A meeting with the HR department Informal meetings between the pregnant employee and her line manager Distribution of documentation by the occupational health nurse and a systematic consultation Information on which tasks to avoid Information about the existence of an RA 	<ul style="list-style-type: none"> Oriented towards external support services A break room
H3	<ul style="list-style-type: none"> RA 	<ul style="list-style-type: none"> Adjustments to working hours and extra breaks Adjustments to tasks Reassignment, administrative work 	<ul style="list-style-type: none"> Information and distribution of documentation by the occupational health nurse and a systematic consultation Information on which tasks to avoid Information about the existence of an RA 	<ul style="list-style-type: none"> Application of a collective labour agreement that is more generous than national regulations Awareness-raising efforts to ensure that pregnant employees are attentive to the risks they may face Consideration of employees’ requests to avoid certain patients
F1	<ul style="list-style-type: none"> No RA 	<ul style="list-style-type: none"> Adjustments to tasks Reassignment, administrative work 	<ul style="list-style-type: none"> Interview with the HR department 	<ul style="list-style-type: none"> –
F2	<ul style="list-style-type: none"> RA 	<ul style="list-style-type: none"> Adjustments to tasks Reassignment, administrative work 	<ul style="list-style-type: none"> Information session for all newly hired staff, with the head of HR, on the occupational risks to pregnancy and the OProMa Information on and distribution of documentation by the occupational health nurse and a systematic consultation Information on which tasks to avoid 	<ul style="list-style-type: none"> Use of additional staff as soon as pregnant employees reduce their work percentage A break room
F3	<ul style="list-style-type: none"> No RA 	<ul style="list-style-type: none"> Adjustments to working hours and extra breaks Adjustments to tasks 	<ul style="list-style-type: none"> Interview with HR department 	<ul style="list-style-type: none"> Oriented towards external support services

Their practices with regard to the protection of pregnancy at work are not compliant with the Swiss Maternity Protection Ordinance. Among the reasons used to explain these shortcomings, managers in organisation H1 thought that it was difficult to carry out adjustments to pregnant employees' tasks because of the unpredictable nature of the activities carried out by their department or unit. Those in company F1 highlighted a lack of resources and the fact that the protection of pregnant employees was not a priority because of the low numbers of pregnancies.

"[we know] that it should exist, that we should put it in place; but it's hard to get the resources, to have the space! Then you tell yourself, so we'll reserve a room. But it might be five years before we use it." (HR Manager, F1)

Maternity protection in these organisations was adjusted on a case-by-case basis via informal practices or measures, with little or no reference to the legislation toward maternity protection at work. Information on occupational risks and their corresponding protective measures were also passed on informally. However, these organisations did offer adjustments to working hours, lightening of the workload and job reassignments, most of which were done via a mutual agreement between the pregnant worker and her line manager. Nevertheless, the informal nature of these actions only seems to participate in maintaining the lack of knowledge among the other staff in the company about the protection measures which should be applied and the information which should be provided to pregnant workers.

The application of maternity protection measures seemed to rely on managers' common sense.

"But let's be pragmatic, [...] when we know that a woman is pregnant, we think about her work as a whole, and then we deal with that situation. [...] that is early enough." (Head of Clinic, H1)

Measures were often applied on a case-by-case basis, founded on an employee's request or medical opinion:

"[...] there's no standard approach. We really do it case-by-case...; I have to say that we do expect a lot from the (sighs), we're not extremely proactive. It's usually the person concerned who comes to ask us questions if she has... That's surely something that we could improve." (HR Manager, F1)

In general, managers perceived the case-by-case approach to be the best way to proceed to ensure that each employee and each pregnancy was treated as a unique situation.

Whether or not companies had established procedures, it is interesting to note that the Swiss Maternity Protection Ordinance does not explicitly mention all the protection measures evoked by the managers interviewed (e.g. orienting employees to external support services).

All the participating organisations and companies, however, did count on pregnant employees' colleagues rallying round to help by taking on certain of her tasks. Managers viewed this support as an essential element in reconciling work and pregnancy, especially for covering unexpected workplace events.

"Managing patient care and pregnant women is pretty complicated. You tell yourself that half the ward's beds are empty at the moment, so you think, 'Oh, we'll plan with the pregnant employee in this ward.' Between the moment you plan your schedule and when your schedule starts, the rest of your ward is guaranteed to fill up. You can't do it that way. On the other hand, you can do it using collaboration." (Ward Manager, H1)

4.2. Regulated safety: The viewpoints of managers and occupational health nurses

Although the maternity protection approaches based on Switzerland's legislation were considered useful overall by the managers and

occupational health nurses interviewed, they nevertheless mentioned the limitations and difficulties in practically applying the norms of regulatory safety requirements. The first type of difficulty, which is not exclusive to pregnancy, is linked to a lack of time and material resources. A recurring theme was the difficulty in replacing pregnant employees who either worked fewer hours or stopped working completely.

"It's very complicated to find replacement staff; it changes the entire organisation. You have to cancel patients' appointments; we don't have enough resources because we can't replace them at a moment's notice. [...], hiring a replacement physiotherapist for three months, is a bit complicated too, because you have to get them up to speed; they have to know how things work, so it's not always very efficient (Head of Department, H2)

Other difficulties were the result of the limitations of normative procedures with regards to the real-world demands of the workplace. The results of risk analyses were sometimes perceived as too constraining.

"It brought in so many restrictions, for protection, that in the end, we couldn't use her as a normal employee anymore." (Occupational Health Nurse, H3)

On the contrary, other actors revealed that risk analyses did not take into account every strenuous or dangerous activity, e.g. stress or work travel.

Managers in the two economic sectors studied were conscious that the inherent activities of some jobs made the application of the adjustments suggested in risk analyses difficult, if not impossible.

"There are some clients who have limited mobility, where you really have to use your strength. There are times [...] there's equipment in the home, so there are patient lifts, things like that for moving the patient. But not everywhere! There aren't electric beds everywhere [...]." (HR Manager, H3)

Organisation H2 considered that limiting pregnant employees to a nine-hour working day complicated the organisation of care teams and affected other colleagues' activities.

"Because we have 12-hour shifts, at least for most of the personnel. Well, it's about what we do for the remaining four hours." (Occupational Health Nurse, H2)

In addition, job reassignments were sometimes perceived as being difficult too, e.g. when the employees concerned had few qualifications, or when the post considered suitable presented with other types of strenuousness.

"[...] they replace the manager, and then they are almost even more stressed!" (Occupational Health Nurse, H2)

Indeed, organisation H2 had difficulties systematically organising meetings to inform pregnant employees about occupational risks and maternity protection measures.

"It's really about trying to match up our diaries with those of the care teams. The problem is that they work weekends... it's really about finding good days or times to meet up! [...] sometimes I don't get to see them before they're almost in their fifth month! Once we've found a date!" (Occupational Health Nurse, H2)

4.3. Managed safety: Employees' strategies

All of the employees interviewed reported that they had implemented their own personal strategies for reconciling work and pregnancy (Table 4).

Table 4
Strategies used by employees during their pregnancy.

Company	Strategies for reconciling work and pregnancy:				
	Invoking the legislation	Adapting measures perceived as inadequate or incomplete	Adapting one's activities or working environment	Acting on other stakeholders	Managing one's pregnancy announcement
H1	<ul style="list-style-type: none"> Struggling for the legislation to be applied appropriately Looking for information about pregnant employees' legal rights 	<ul style="list-style-type: none"> Arrange partial sick leave (50%) by doing whole days in order to reduce the number of commutes Doing overtime because the ward is so busy 	<ul style="list-style-type: none"> Insisting on being provided with clothes adapted for pregnancy Being more vigilant about exposure to biological or chemical risks 	<ul style="list-style-type: none"> Asking for help from colleagues Insisting on being put on sick leave 	<ul style="list-style-type: none"> Announce pregnancy to the person responsible for scheduling first
H2	<ul style="list-style-type: none"> Looking for information about pregnant employees' legal rights 	<ul style="list-style-type: none"> Managing breaks as needed Deciding to only work 50% as of the 6th month Struggling to bring to the attention of their company occupational activities that they perceived as strenuous and hazardous to their health and pregnancy Doing overtime because the ward is so busy 	<ul style="list-style-type: none"> Insisting on being provided with clothes adapted for pregnancy Finding places in the institution to have a lie-down Sitting down to give treatments at the patient's bedside Deciding to no longer carry out certain tasks 	<ul style="list-style-type: none"> Asking for help from colleagues Insisting on being put on sick leave Exaggerating one's symptoms in order to obtain sick leave. 	–
H3	<ul style="list-style-type: none"> Looking for information about pregnant employees' legal rights 	<ul style="list-style-type: none"> Managing breaks as needed 	<ul style="list-style-type: none"> Being more vigilant about exposure to biological or chemical risks Deciding to no longer carry out certain tasks 	<ul style="list-style-type: none"> Asking the gynaecologist to be put on sick leave Insisting on being prescribed sick leave 	<ul style="list-style-type: none"> Announce pregnancy to the person responsible for scheduling first
F1	<ul style="list-style-type: none"> Looking for information about pregnant employees' legal rights 	–	<ul style="list-style-type: none"> Adjusting load carrying Adding extra layers of clothes against the cold 	–	–
F2	<ul style="list-style-type: none"> Looking for information about pregnant employees' legal rights 	<ul style="list-style-type: none"> Managing breaks as needed Skipping breaks in order to finish the working day earlier Not totally respecting planned measures according to one's own representations of risks 	<ul style="list-style-type: none"> Asking to work from home 	<ul style="list-style-type: none"> Asking the gynaecologist to be put on sick leave because of fatigue 	<ul style="list-style-type: none"> Announce pregnancy early because of occupational risks Announce pregnancy early but with the wish to remain at the same post so as not to have to explain an eventual miscarriage Put back the pregnancy announcement
F3	–	–	–	<ul style="list-style-type: none"> Asking the gynaecologist to be put on sick leave so as to prepare to the baby's arrival 	–

4.3.1. Invoking the legislation

Several participants talked about having actively searched for information about their legal rights concerning maternity protection at work (via the internet, trades unions, etc.). For some, this information completed what they had received from their employers or their gynaecologist, but for those from organisation H1, searching themselves was their only source of information about their rights. Access to information is not enough to precipitate action, however. Thus, only some of organisation H1's employees stated that they had invoked Swiss legislation in order to obtain adjustments to their working conditions.

"I had to fight for lots of things. I had to bring in a little document to tell them that after a certain point in the pregnancy, I had the right to sit down every so often. It wasn't at all respected and not at all applied." (Nurse, H1)

One employee from H1 felt that she could not ask for her legal rights to be respected for fear of losing her job.

"My husband and I read the brochure for my first pregnancy, and we said to ourselves, 'Well, what can we do?' Nearly every point corresponded to something risky, but what can I do? You're just an

employee. [...] it crossed my mind, you know? Do I want to risk my job after the pregnancy by telling them that they have to get my work situation analysed to see whether it's too risky for a pregnant woman or not?" (Nurse, H1)

4.3.2. Adapting measures perceived as inadequate or incomplete

Several employees explained how they adapted measures foreseen by their companies as required by normative protective regulations to their real-world needs and their own representations of risks. For example, Swiss Maternity Protection Legislation states that pregnant women who primarily have to work standing up have the right, in addition to the usual legally required breaks, to a break of 10 min after every two hours work (art. 61; [Ordinance No.1 of the Swiss Federal Labour Law \(General Ordinance\)](#)). However, some participants decided to adapt their use of the extra break and thus subvert the legal measures for their own comfort. They perceived this misuse as harmless.

"It was also within my rights to take longer breaks, so I took them when I needed them. [...] I preferred finishing my day earlier and leaving." (Production Supervisor, F2)

Again, according to the Swiss Maternity Protection Ordinance (art. 11), noise exposures greater than or equal to 85 dB(A) on 8 h are not permitted during pregnancy. An interviewee experienced this protective measure implemented by her company as limiting too much her work activities.

“I tried to respect [the maternity protection procedures] as much as possible. But I’d say that for noise, well, for me, in an eight-hour day, only spending two hours on the production line when it’s the core of my job—it wasn’t always easy. So, sometimes, I went over those two hours, but, on the other hand, I never stayed there for more than two hours consecutively. [...] when I’d spent a bit of time in the noise, I went back up to my office, and there you go, I adapted [...]” (Agronomic Engineer, F2)

On the contrary, in organisation H2, some employees felt that the company’s procedure did not cover some strenuous and hazardous activities and they reported trying to bring them to the attention of their company.

“My colleagues and I had a bit of a struggle; [...] we tried to get something on paper about cover shifts. Because I think that at three months, you shouldn’t be doing on-duty shifts anymore, [...] and then these are all things that are still..., the decision is just up to somebody’s discretion.” (Physiotherapist, H2)

This example shows that both the legislation and companies’ established procedures can miss certain situations that employees experience as strenuous in their day-to-day activities.

Some of the adaptations planned by the company in conformity with regulations, however, are experienced as unsuitable for the pressures of real-world activity. In organisations H1 and H2, some employees said that they had done overtime—which is prohibited by Swiss legislation on the protection of pregnant workers—to ensure that their unit could carry out its activities, and thus that they potentially endangered their health and that of their unborn child.

“If somebody is sick... whether or not you are pregnant, you’re asked to stay on two or three hours more.” (Nurse, H2)

Finally, in some cases, pregnant workers adapted the prescription of the medical certificate issued by their gynecologist. Some participants decided to arrange their partial sick leave by working 50% but doing full days in order to reduce the number of commutes to and from work.

4.3.3. Adapting one’s activities or physical environment

Within the healthcare organisations participating in the study, some employees stated that they had adapted their job by sitting down to treat patients at their bedside, had insisted on being provided with clothes suitable for pregnancy, or had been more careful when manipulating chemicals or about exposure to micro-organisms.

Some of these actions are in addition to and complement the measures implemented within the company in conformity with the legislation. However, in other cases, the employee’s actions compensate for the absence of protective measures that the company should have put in place to comply with the legal provisions.

For example, one employee reported that she had found herself places to have a lie down when things were calm, which should have been provided by her employer according to the legal regulations (art. 34; [Ordinance No.3 of the Swiss Federal Labour Law \(health protection\)](#)). In the food company F1, which foresaw few protection measures, employees stated that they had adjusted their manual handling tasks by carrying fewer products or by using a cart. One employee, whose work involved preparing merchandise in walk-in fridges, stated that she wore extra clothing during her pregnancy. Moreover, one employee from organisation H1 stated having to manipulate cytostatic drugs, an activity which should have been identified by a risk analysis and banned via protective measures.

“I really try—something which I don’t do when I’m not pregnant—to wear gloves when I do those little jobs, to protect myself. There you go [...] I try to be more careful.” (Nurse, H1)

In these scenarios, others made conscious decisions to no longer carry out tasks which they perceived as too dangerous.

“In situations where there were cytostatic drugs, well, I refused. It’s true that we have to [make that decision], because the people in charge of the work schedule, they might not necessarily know. But it didn’t cause a problem.” (Nurse, H3)

Employees do not always have a margin for manoeuvre in the application of the protective measures which they would find useful. An employee at company F2 was refused the option to work from home.

“[...] my doctor wanted to reduce my hours because the baby was engaged in the cervix and I had to be careful. So, I said to my manager that I didn’t feel like stopping work—because I love my job—and so I raised the possibility of working from home. That way, I wouldn’t have to commute, etc. and they didn’t agree with that.” (Agronomic Engineer, F2)

4.3.4. Acting on other stakeholders

Employees relied on several other stakeholders, particularly their gynaecologist and their colleagues. Some workers stated that they had negotiated with their gynaecologist for the prescription of total or partial sick leave, notably for reasons of the fatigue due to reconciling work and pregnancy (although their requests were not always granted, partly because of the legal framework surrounding sick leave). In some cases, employees exaggerated their symptoms during consultations with their gynaecologist in order to be prescribed sick leave.

“The gynaecologist will have to write a justification of why he’s signed her off work, and for that, simple fatigue and nausea are not symptoms. I mean, they don’t justify sick leave! [...] I told him that I kept having contractions because I knew that if I said that—it wasn’t completely true—but I knew that if I said that, they’d have to shorten my working hours [...]” (Physiotherapist, H2).

Regarding relationships with colleagues, all the employees stated that the collaboration and practical and moral support of their co-workers was an essential resource in their ability to reconcile work and pregnancy. In the healthcare sector, several women had asked their colleagues for help in carrying out tasks they perceived as dangerous or too strenuous.

“There were just the treatments for feet, [...] where I was standing up, but I managed to arrange it so that it was rather my colleague who took care of the feet.” (Nurse, H1)

However, several employees also evoked the difficulties and embarrassment of having to ask their colleagues for help; some even had the feeling that they had become a burden to their team.

4.3.5. Managing the announcement of the pregnancy

Employees managed the announcement of their pregnancy based on several factors. Some stated that they had wanted to await the three-month mark in order to be sure that the pregnancy was proceeding healthily, whereas others said that they put back the announcement of their pregnancy as a career strategy.

“For the second pregnancy [...] I was working days. I had no reason to announce it very early on, so I announced it at about three and a half months. [...] In addition, I changed job [internally], so I didn’t want to announce it during the recruitment process; I waited.” (Agronomic Engineer, F2)

An employee of company F2 stated that she announced her

pregnancy early on, but that she did not want to be reassigned to a job outside of the production unit for fear of how other people might view her if she had a miscarriage. The taboos linked to miscarriage have resulted in the absence of appropriate protection measures. To avoid this dilemma, some employees in organisations H1 and H3 said that they had first announced their pregnancies to the person in charge of shift scheduling so as to be removed from any dangerous or strenuous activities as rapidly as possible.

In addition, in company F2, a worker stated that she had held back the announcement of her pregnancy to her team in order to avoid sexist remarks:

“I didn’t announce my pregnancy to my team straight away because I didn’t want to. I had to maintain a certain amount of authority. There you go. And from the moment when I did announce my pregnancy, all it took was for me to be unhappy about something in a meeting and the remark from opposite was, ‘Oh, well. You’re pregnant. That? That’s just your hormones making you annoyed!’ (Agronomic Engineer, F2)

It is important to recall that Swiss legislation does not oblige employees to announce their pregnancy to their employers; however, protection measures only can be implemented once that announcement has been made.

4.3.6. Employees’ strategies: Strengths and limitations

In the organisations which did seem to have procedures in conformity with the legislation—organisation H2, for example—employees did evoke the benefits of the protection measures they provided, whether these were adjustments made to working hours or job reassignments. Some employees did not benefit from these protection measures, however, because of the constraints inherent in their job. For example, one employee stated that she only used the break room provided by her employer once during her entire pregnancy: the time it took to get to it and then back to her workstation would have used up her entire 15-minute break. Employees did develop strategies to make up for the absence or inadequacy of protection measures; however, not all of them had the resources or margins of manoeuvre necessary to put those strategies in place, and some of the strategies adopted were costly in terms of their health or career.

5. Discussion

5.1. The limitations to regulatory safety procedures

Interviews showed that there were very contrasting realities with regards to safety measures imposed by regulation. Whereas some organisations apparently used procedures that conformed to Switzerland’s legislation, as described in the Labour Law and OProMa, others gave a preference to a more case-by-case, informal, managed form of protection relying on managers’ common sense. Indeed, several managers believed that this method provided best their pregnant employees with adequate protection. However, although an individualised approach can be very pertinent in some pregnancies, it can also result in inequalities of treatment and somewhat arbitrary decisions taken by the hierarchy if it is not backed up by the basic obligatory regulatory protection measures.

Normative safety measures within the framework of national legislation acted as resources for both managers and their employees as they encourage the identification of risks and strenuous activities, the provision of information on legal rights and the implementation of workstation adjustments or job reassignments. However, some of the constraints imposed by real-life working conditions seem to be significant obstacles to the implementation of protection measures in organisations which have established, fixed procedures, and these same constraints can discourage the implementation of preventive procedures in other organisations:

- (1) Managers claimed that a lack of financial resources and time impeded the application of protective measures or discouraged the introduction of those measures in the first place. In general, in the Swiss context, interventions surrounding occupational health lack visibility (Guillemin, 2011) and they are less well developed and financed than accident prevention. Furthermore, the eternal search for cost savings discourages organisations from implementing formal procedures for maternity protection at work as these require greater short-term investment and planning than reacting on an informal case-by-case basis. Finally, the temporary nature of pregnancy, and the fact that protection measures only concern a minority of employees, can constitute an extra brake on the investments needed in this domain.
- (2) Faced with the real-world constraints on work (Dekker, 2003; Hale and Borys, 2013) or the absence of any regulatory safety measures within their organisation, employees used a diversity of strategies with which to reconcile their work and their pregnancies. These strategies had different consequences on their health and careers. Indeed, those strategies (e.g. doing overtime or exposing oneself to extended periods of noise in order to ensure continued occupational activity) suggest that employees are sometimes obliged to choose between their jobs and their health. Sick leave prescribed by a gynaecologist sometimes becomes a roundabout means of avoiding dangerous or strenuous work. Some employees went so far as to exaggerate symptoms in order to obtain sick leave and thus avoid an occupational activity perceived as having become unbearable. But because it is the pregnant employee who withdraws from work, this strategy also has the consequence that worries about potentially dangerous or strenuous occupational activities remain invisible or unspoken (Malenfant and De Koninck, 2002). Finally, a strategy mentioned frequently by employees from all of the organisations was soliciting the help of colleagues, but this can have negative consequences in terms of relationships at work and overburdened teams.
- (3) Some of the difficulties regarding the implementation of the basic regulatory protection measures are unique to pregnancy. Firstly, pregnancy represents a particular category in occupational health because it can limit the employee’s capacity to fulfil certain occupational tasks, yet it is not a disease. Secondly, it is an event that will only ever concern a proportion of an organisation’s employees and, as such a family-oriented personal event, it is rarely perceived to be an occupational concern. Pregnancy is also an evolving state, and it can entail unforeseen events (partial or total sick leave might be prescribed at any moment) and fluctuations in work activity that make working in a team challenging to organise. Finally, pregnancy is extremely different from woman to woman, which can sometimes render the uniform application of planned protective measures complicated or inefficient. Employees themselves must adapt to the course of their pregnancy, which means that their coping strategies may evolve over nine months. During the interviews with managers, these challenging difficulties with regards to the implementation of protection measures seemed to justify a case-by-case or on-demand approach.

5.2. Bringing together normative safety regulations and adaptive safety management: Pathways towards more effective preventive measures

In all the companies and organisations investigated (with or without safety procedures), the pregnant employee’s colleagues were called upon to take on some of her strenuous or risky occupational activities. They thus represented valuable informal resources for managers and pregnant employees alike. Pregnancy protection relies, to a great extent, on work done by the team, which must compensate for the tasks that the pregnant worker can no longer carry out (Gravel et al., 2017). However,

Gravel et al. (2017) suggest caution before over-soliciting a pregnant employee's colleagues, especially if the responsibility for implementing maternity protection measures falls upon the pregnant employee herself and her team. Organisations should seek to treat teamwork as a valuable resource rather than attempt to exhaust it.

Surprisingly, the employees interviewed had rarely used Switzerland's legislation to back up their demands that their rights be respected. This fact might be explained by a lack of knowledge, but also the fear of being discriminated against, or even being fired (Rudin et al., 2018). These findings were consistent with a study by Gatrell (2011), which demonstrated that despite the existence of specific legislation, a pregnant woman's body seems to be perceived as something incompatible with the workplace. Employees engage in strategies "of secrecy, silence and supra-performance in order to try and blend in" (Gatrell, 2011, p. 158). Thus, pregnant employees should undoubtedly be made more aware of their legal rights. Similarly, their employers should also receive training on the Swiss Maternity Protection Ordinance. Indeed, some studies suggest that the low implementation of some protective measures for pregnant workers is partly due to a lack of knowledge on the part of employers regarding their legal duties (Lembrechts and Valgaeren, 2010). Furthermore, the legal protection they receive against being fired or discriminated against by their employers should be reinforced so that they can announce their pregnancy and their needs without fear of repercussions.

Pregnant employees find themselves confronted with dilemmas opposing their jobs with the protection of their own health and that of their future child. These dilemmas appear very early on in pregnancy. Employees thus sometimes put back the announcement of their pregnancy because of social norms, career strategies or to avoid sexist and discriminatory comments, even when occupational exposure can have severe effects from the earliest months of pregnancy (Salihu et al.). As underlined by King and Botsford (2009, p. 315), "disclosure is a necessary precondition for receipt of resources such as legal protection and social support. Thus, a dilemma exists wherein pregnant workers may fear (and thus delay) revealing their status, but as a result, may be limited in access to genuinely helpful resources." These observations show the importance of instilling a preventive mindset in the concept of maternity protection at work, one which goes beyond the measures which are possible to implement after a pregnancy has been announced (Hansson and Schenk, 2016).

The employees interviewed related how they had often had to adapt the maternity protection measures proposed to them in order to reconcile pregnancy with their occupational activities, as those measures were perceived as insufficient or unsuitable. Making those adaptations frequently requires individual negotiations with employers, the hierarchy and colleagues. Even though the support of colleagues is an essential resource for employees, some may experience feelings of guilt when facing their team. When an employee feels that she is not receiving the support or adjustments she needs from her employer, her only solution may be to leave her job. Gynaecologists can prove to be precious allies in such situations by prescribing sick leave that can make up for the insufficient adjustments made to the employee's workstation. However, the strict legal framework surrounding the prescription of sick leave and different gynaecologists' practices may push employees towards using ruses to obtain sick leave.

Several studies have found that employees can take an active role in occupational health and safety, and in the improvement of safety measures, by identifying some of the risks and proposing new solutions (Baril-Gingras et al., 2006; Judon et al., 2019; Lay et al., 2015; St-Vincent et al., 2000). Champoux and Brun (2010) suggest encouraging the collective and individual participation and interest of employees in health and safety in their companies. The present study observed that employees were indeed able to identify the risks and strenuous tasks inherent in their work activities that were considered in neither the legislation (stress, work travel) nor in their organisations' risk analyses. The policy adopted by organisation H3, which mixed established

procedures with a consideration of the needs and skills of the pregnant workers concerned was favourably perceived by both the employees and the hierarchy. In Quebec, the study by Malenfant, Gravel, Laplante, and Plante (2011) also evoked the importance of flexible management as pregnancies evolved as well as taking into account employees' skills when making adjustments to their tasks and workstations.

We observed very few collective actions on the part of the employees in our sample. However, according to Baril-Gingras et al. (2006, p. 28), the capacity for collective action by employees and the existence of structures representing personnel is "a necessary condition" for the successful development of effective preventive activities in the field of occupational health. With regards to pregnancy, studies conducted in Belgium and Quebec have demonstrated the importance of staff committees, trades unions or other organs representing personnel in order to support the demands of pregnant employees and to ensure that their legal rights are respected (Gravel et al., 2017; Lembrechts and Valgaeren, 2010). Better consideration of pregnancy by organisations representing staff would enable companies to move beyond ideas of pregnancy as an individual, private or family event and thus combat the gender discrimination linked to maternity.

5.3. Study strengths and limitations

By reflecting on the links between normative safety regulations and adaptive safety management for maternity protection, the present study has revealed some pathways towards better preventive interventions and highlighted the very specific nature of pregnancy in the field of occupational health. It does have some limitations, however. The study only interviewed employees who had returned to the same job or workstation after their maternity leave, which may have produced a positive selection bias. Our study population was composed by a majority of qualified employees with full-time, permanent employment contracts and of French mother tongue. However, unqualified employees, with more precarious or atypical contracts and immigrants are more exposed to occupational risks and have access to fewer resources for preventive measures. Furthermore, we did not investigate small companies or organisations (fewer than 50 full-time posts) which often apply maternity protection legislation less diligently (Rudin et al., 2018; Abderhalden-Zellweger et al., 2021). In general, the small companies which represent the majority of Switzerland's economy have more trouble meeting the legal prerequisites in terms of occupational health and safety (Bonafede et al., 2016; Eakin et al., 2010). Finally, the methods used in this study—primarily interviews—present limitations with regard to investigating employees' strategies. It is known that most people have difficulty in describing their occupational activities with precision (Lhuillier, 2010). Observation in the workplace would have enriched the data obtained in interviews, enabled a better understanding of some of the issues evoked (e.g. the role of collective regulations in the protection of pregnant employees) and suggested potential new avenues for intervention.

6. Conclusion and perspectives

The present study's findings are consistent with those of others in the literature which have suggested that occupational health should move beyond the dichotomy of normative safety regulations versus adaptive safety management. The links between compulsory measures in line with the regulations and taking into account pregnant employees' needs and skills with regards to their activities is surely an interesting pathway. In Switzerland's case, companies and organisations must be encouraged to improve maternity protection in the workplace by anticipating the measures which might have to be taken in the future, informing employees about their rights, calling on authorised health and safety specialists to carry out risk analyses, and emphasising the importance of participative and accessible means of protection for all personnel.

The analyses presented here show that pregnancy is a particular case when it comes to the field of preventing occupational risks. Pregnancy is a temporary yet continually evolving condition requiring constant adjustments to the different new needs and difficulties which emerge. Furthermore, each new pregnancy involves each woman in a different bodily and emotional experience. Managing maternity at work cannot be limited to protecting the mother and future child from a list of dangerous or strenuous activities. For some women, even in a low-risk pregnancy, their occupational activities will involve significant modifications or perturbations (Buzzanell and Ellingson, 2005), all of which must be considered and heard by their hierarchies. Finally, the risk of discrimination might influence the strategies which employees adopt, sometimes leading them to unnecessarily or unwittingly endangering themselves. Improving the protection of pregnant employees, therefore, requires action at several different levels.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We would like to thank the employees, managers, companies and institutions who agreed to participate in this study. We also thank the colleagues who transcribed the interviews.

We thank the Swiss National Science Foundation (grant number 162713), the Vaud Public Health Service and the University of Applied Sciences and Arts of Western Switzerland (HES-SO) for supporting this work.

References

- Abderhalden-Zellweger, Alessia, Probst, Isabelle, Politis Mercier, Maria-Pia, Zenoni, Michela, Wild, Pascal, Danuser, Brigitta, Krief, Peggy, 2021. Implementation of the Swiss Ordinance on Maternity Protection at Work in Companies in French-speaking Switzerland'. 1 Jan. 2021: 157 – 172. *Work* 69 (1), 157–172. <https://doi.org/10.3233/WOR-213465>.
- Act respecting occupational health and safety, AOHS. Retrieved from <http://legisquebec.gouv.qc.ca/en/showdoc/cs/s-2.1>.
- Adams, L., Winterbotham, M., Oldfield, K., McLeish, J., Stuart, A., Large, A., Murphy, L., Rossiter, H., Selner, S., 2016. Pregnancy and maternity-related discrimination and disadvantage: experiences of mothers. Department for Business, Innovation and Skills, Equality and Human Rights Commission, London.
- Alex, M.R., 2011. Occupational Hazards for Pregnant Nurses. *Am. J. Nurs.* 1 (111), 28–37. <https://doi.org/10.1097/01.NAJ.0000393056.01687.40>.
- Baril-Gingras, G., Bellemare, M., Brun, J.P., 2006. External interventions in occupational health and safety: The influence of the workplace context on the implementation of preventive measures. *Relations Industrielles-Ind. Relat.* 61 (1), 9–43. <https://doi.org/10.7202/013719ar>.
- Bonafede, M., Corfiati, M., Gagliardi, D., Boccuni, F., Ronchetti, M., Valenti, A., Marinaccio, A., Iavicoli, S., 2016. OHS management and employers' perception: differences by firm size in a large Italian company survey. *Saf. Sci.* 89, 11–18. <https://doi.org/10.1016/j.ssci.2016.05.012>.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qualit. Res. Psychol.* 3 (2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>.
- Buzzanell, P.M., Ellingson, L.L., 2005. Chapter: Contesting Narratives of Workplace Maternity. In: Narratives, health, and healing: Communication theory, research, and practice. Lawrence Erlbaum Associates Publishers; US, Mahwah, NJ, pp. 277–294.
- Cai, C., Vandermeer, B., Khurana, R., Nerenberg, K., Featherstone, R., Sebastiani, M., Davenport, M.H., 2019a. The impact of occupational activities during pregnancy on pregnancy outcomes: a systematic review and meta-analysis. *Am. J. Obstet. Gynecol.* <https://doi.org/10.1016/j.ajog.2019.08.059>.
- Cai, C., Vandermeer, B., Khurana, R., Nerenberg, K., Featherstone, R., Sebastiani, M., Davenport, M.H., 2019b. The impact of occupational shift work and working hours during pregnancy on health outcomes: a systematic review and meta-analysis. *Am. J. Obstet. Gynecol.* <https://doi.org/10.1016/j.ajog.2019.06.051>.
- Champoux, D., Brun, J.-P., 2010. Dispositions, capacités et pratiques de SST dans les petites entreprises : opinions de patrons, d'employés et d'intervenants en SST au Québec. *Perspectives interdisciplinaires sur le travail et la santé* 12 (2) <https://doi.org/10.4000/pistes.2525>.
- Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (tenth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC). The Council Of The European Communities, 1992. Retrieved from <https://eur-lex.europa.eu/legal-content/FR/TXT/HTML/?uri=CELEX:31992L0085>.
- COWI, 2015. Evaluation of the Practical Implementation of the EU Occupational Safety and Health (OSH) Directives in EU Member States. Report by directive: directive 92/85/EEC on the introduction of measures to encourage improvements in the safety and health of work of pregnant workers and workers who have recently given birth or are breastfeeding (pregnant/breastfeeding workers directive). Retrieved from <https://osha.europa.eu/fr/legislation/directives/10>.
- Croteau, A., 2020. Occupational lifting and adverse pregnancy outcome: a systematic review and meta-analysis. *Occup. Environ. Med.* <https://doi.org/10.1136/oemed-2019-106334>.
- Cuvellier, L., Woods, D.D., 2019. Normative Safety and/or Adaptive Safety : How Resilience Engineering Revisits Activity Ergonomics. *Travail Humain*, 82(1), 41–66. Retrieved from <Go to ISI>://WOS:000461442200002.
- Daniellou, F., 2005. The French-speaking ergonomists' approach to work activity: cross-influences of field intervention and conceptual models. *Theoret. Iss. Ergon. Sci.* 6 (5), 409–427. <https://doi.org/10.1080/14639220500078252>.
- Dekker, S., 2003. Failure to adapt or adaptations that fail: contrasting models on procedures and safety. *Appl. Ergon.* 34 (3), 233–238. [https://doi.org/10.1016/S0003-6870\(03\)00031-0](https://doi.org/10.1016/S0003-6870(03)00031-0).
- Eakin, J.M., Champoux, D., MacEachen, E., 2010. Health and Safety in Small Workplaces: Refocusing Upstream. *Can. J. Public Health-Revue Canadienne De Santé Publique*, 101, S29–S33. Retrieved from <Go to ISI>://WOS:000278132300005.
- Fowler, J.R., Culpepper, L., 2020. Working during pregnancy. UpToDate. Retrieved from <https://www.uptodate.com/contents/working-during-pregnancy>.
- Gatrell, C., 2011. Policy and the Pregnant Body at Work: Strategies of Secrecy, Silence and Supra-performance. *Gender Work Organiz.* 18 (2), 158–181. <https://doi.org/10.1111/j.1468-0432.2009.00485.x>.
- Gravel, A.R., Riel, J., Messing, K., 2017. Protecting Pregnant Workers while Fighting Sexism: Work-Pregnancy Balance and Pregnant Nurses' Resistance in Quebec Hospitals. *New Solu.-J. Environ. Occupat. Health Policy* 27 (3), 424–437. <https://doi.org/10.1177/1048291117724847>.
- Guillemin, M., 2011. La santé au travail en Suisse. In: Le Garrec, S. (Ed.), *Le travail contre la santé? L'Harmattan*, Paris, pp. 27–37.
- Hale, A., Borys, D., 2013. Working to rule or working safely? Part 2: The management of safety rules and procedures. *Saf. Sci.* 55, 222–231. <https://doi.org/10.1016/j.ssci.2012.05.013>.
- Hansson, S.H., Schenk, L., 2016. Protection without Discrimination: Pregnancy and Occupational Health Regulations. *Eur. J. Risk Regul.* 7 (2), 404–412. <https://doi.org/10.1017/S1867299X00005808>.
- Judon, N., Galey, L., de Almeida, V.S.D., Garrigou, A., 2019. Contributions of participatory ergonomics to the involvement of workers in chemical risk prevention projects. *Work-J. Prevent. Assess. Rehabil.* 64 (3), 651–660. <https://doi.org/10.3233/Wor-193001>.
- King, E.B., Botsford, W.E., 2009. Managing pregnancy disclosures: Understanding and overcoming the challenges of expectant motherhood at work. *Human Resour. Manage. Rev.* 19 (4), 314–323. <http://www.sciencedirect.com/science/article/pii/S1053482209000345>.
- Krief, P., Zellweger, A., Politis Mercier, M.-P., Danuser, B., Wild, P., Zenoni, M., Probst, I., 2018. Protection of pregnant women at work in Switzerland: practices, obstacles and resources. A mixed-methods study protocol. *BMJ Open* 8 (6). <https://doi.org/10.1136/bmjopen-2018-023532>.
- Lafon, D., 2010. Grossesse et travail : quels sont les risques pour l'enfant à naître?, EDP Sciences ed. Institut National de recherche et de Sécurité (INRS), Les Ulis.
- Lay, E., Branlat, M., Woods, Z., 2015. A practitioner's experiences operationalizing Resilience Engineering. *Reliabil. Eng. Syst. Saf.*, 141, 63–73. <https://doi.org/10.1016/j.res.2015.03.015>.
- Lembrechts, L., Valgaeren, E., 2010. Grossesse au travail. Le vécu et les obstacles rencontrés par les travailleuses en Belgique. Etude quantitative et qualitative. Retrieved from Bruxelles: https://igvm-iefh.belgium.be/sites/default/files/download/40%20-%20Grossesse%20au%20travail_FR.pdf.
- Leplat, J., 1990. Relations between Task and Activity - Elements for Elaborating a Framework for Error Analysis. *Ergonomics* 33 (10–11), 1389–1402. <https://doi.org/10.1080/00140139008925340>.
- Lhuillier, D., 2010. L'invisibilité du travail réel et l'opacité des liens santé-travail. *Sciences Sociales et Santé* 28 (2) <https://doi.org/10.3917/sss.282.0031>.
- Malenfant, R., 2009. Risk, Control and Gender: Reconciling Production and Reproduction in the Risk Society. *Organiz. Stud.* 30 (2–3), 205–226. <https://doi.org/10.1177/0170840608101477>.
- Malenfant, R., De Koninck, M., 2002. Production and reproduction: the issues involved in reconciling work and pregnancy. *New Solu. J. Environ. Occupat. Health Policy* 12 (1), 61–77.
- Malenfant, R., Gravel, A.-R., Laplante, N., Plante, R., 2011. Grossesse et travail : au-delà des facteurs de risques pour la santé. *Revue multidisciplinaire sur l'emploi, le syndicalisme et le travail* 6 (2), 50–72.
- Maternity Protection Ordinance. (2001). Retrieved from <https://www.admin.ch/opc/fr/classified-compilation/20002241/index.html>.
- Morales-Suarez-Varela, M., Kaerlev, L., Zhu, J.L., Llopis-Gonzalez, A., Gimeno-Clemente, N., Nohr, E.A., Olsen, J., 2010. Risk of infection and adverse outcomes among pregnant working women in selected occupational groups: A study in the Danish National Birth Cohort. *Environ. Health* 9. <https://doi.org/10.1186/1476-069x-9-70>.
- Morel, G., Amalberti, R., Chauvin, C., 2008. Articulating the differences between safety and resilience: The decision-making process of professional sea-fishing skippers. *Hum. Factors* 50 (1), 1–16. <https://doi.org/10.1518/001872008x250683>.

- Ordinance No.1 of the Swiss Federal Labour Law (General Ordinance). Retrieved from <https://www.admin.ch/opc/fr/classified-compilation/20000832/index.html>.
- Ordinance No.3 of the Swiss Federal Labour Law (health protection). Bern Retrieved from http://www.admin.ch/ch/d/sr/c822_113.html.
- Park, C., Kang, M.Y., Kim, D., Park, J., Eom, H., Kim, E.A., 2017. Adverse pregnancy outcomes in healthcare workers: a Korean nationwide population-based study. *Int. Arch. Occup. Environ. Health* 90 (6), 501–506. <https://doi.org/10.1007/s00420-017-1213-3>.
- Pillay, M., Morel, G., 2020. Measuring Resilience Engineering: An Integrative Review and Framework for Bench-Marking Organisational Safety. *Safety* 6 (3). <https://doi.org/10.3390/safety6030037>.
- Probst, I., Zellweger, A., Politis Mercier, M.-P., Danuser, B., Krief, P., 2018. Implementation, mechanisms, and effects of maternity protection legislation: a realist narrative review of the literature. *Int. Arch. Occup. Environ. Health* 91 (8), 901–922. <https://doi.org/10.1007/s00420-018-1339-y>.
- R191 - Maternity Protection Recommendation (No. 191). International Labour Organization, Retrieved from https://www.ilo.org/dyn/normlex/fr/?p=NORMLEXPUB:12100:0::NO:12100:P12100_INSTRUMENT_ID:312529:NO.
- Rocha, R., Mollo, V., Daniellou, F., 2015. Work debate spaces: A tool for developing a participatory safety management. *Appl. Ergon.*, 46(Pt A), 107–114. <http://dx.doi.org/10.1016/j.apergo.2014.07.012>.
- Rudin, M., Stutz, H., Bischof, S., Jäggi, J., Bannwart, L., 2018. Erwerbsunterbrüche vor der Geburt. Bern Bundesamt für Sozialversicherungen (BSV). Retrieved from <https://www.bsv.admin.ch/bsv/home.webcode.html?webcode=C814.C165.de>.
- Salihu, H.M., Myers, J., August, E.M., 2012. Pregnancy in the workplace. *Occupational Medicine*, 62(2), 88–97. Retrieved from <http://ocmed.oxfordjournals.org/content/62/2/88.abstract>.
- St-Vincent, M., Toulouse, G., Bellemare, M., 2000. Démarches d'ergonomie participative pour réduire les risques de troubles musculo-squelettiques : bilan et réflexions. Perspectives interdisciplinaires sur le travail et la santé <https://doi.org/10.4000/pistes.3834>.
- Wisner, A., 1995. Understanding Problem Building - Ergonomic Work Analysis. *Ergonomics* 38 (3), 595–605. <https://doi.org/10.1080/00140139508925133>.
- Woods, D.D., Hollnagel, E., 2006. Prologue: Resilience engineering concepts. In: Hollnagel, E., Woods, D.D., Leveson, N. (Eds.), *Resilience engineering: Concepts and Precepts*. Ashgate Publishing, UK, pp. 1–6.