Archivos de Prevención de Riesgos Laborales
D. L.: B-14.661-1988 · ISSN: 1138-9672 · ISSN electrónico: 1578-2549
Edita: Associació Catalana de Salut Laboral

Sickness absence, medical and workplace conditions during pregnancy in a cohort of healthcare workers

Ausencia por enfermedad, condiciones médicas y de trabajo durante el embarazo en una cohorte de profesionales sanitarias

Rocío Villar Vinuesa[1,2,3] 0000-0002-1890-4441
Consol Serra[1,2,3] 0000-0001-8337-8356
Laura Serra[3,4] 0000-0002-8835-6890
Fernando G. Benavides[2,3] 0000-0003-0747-2660

[1]Occupational Health Service, Parc de Salut Mar, Barcelona, Spain.
[2]Center for Research in Occupational Health, IMIM- Hospital del Mar Medical Research Institute/University Pompeu Fabra, Barcelona, Spain.
[3]CIBER of Epidemiology and Public Health (CIBERESP), Madrid, Spain.
[4]Research Group on Statistics, Econometrics and Health (GRECS), University of Girona, Girona, Spain.

Fechas · Dates

Recibido: 30/12/2021
Aceptado: 22/03/2022
Publicado: 15/04/2022

Correspondencia · Corresponding Author

Rocío Villar Vinuesa
rvillar@psmar.cat

Resumen

Objetivo: Evaluar la asociación entre trayectorias de ausencia por enfermedad (SA) según diagnóstico y exposición a factores de riesgo laborales durante el embarazo.

Métodos: Estudio de cohortes (367 trabajadoras sanitarias embarazadas). Se identificaron trayectorias de ausencia por enfermedad según los diagnósticos más frecuentes mediante análisis de secuencias (2010-2014). La trayectoria 1 incluía SA principalmente por trastornos musculoesqueléticos (58,86%), la 2 por trastornos relacionados con el embarazo (25,07%) y la 3 incluía ausencias por la prestación por riesgo durante el embarazo (POR) y pocas SA (16,08%). La exposición a factores de riesgo laborales fue evaluada por expertos y se analizó la asociación con las trayectorias mediante regresión logística. Los riesgos relativos (RR) y sus intervalos de confianza (IC95%) se ajustaron por edad, contrato y turno.

Resultados: La trayectoria 1 se asoció negativamente con la exposición a riesgos de seguridad y ergonómicos (RR=0,56, IC95%=0,35-0,90; RR=0,50, IC95%=0,33-0,77) y con índice de riesgo global más bajo (RR=0,68, IC95%=0,49-0,96). La tercera se asoció a riesgos de seguridad y ergonómicos (RR=2,75, IC 95 %=1,59-4,75; RR=3,64, IC 95 %=2,18-6,06) y con el riesgo más alto (RR=2,69, 95 % IC=1,43-5,01). El personal de enfermería tuvo mayor probabilidad de pertenecer a la trayectoria 3 (RR 5,58, IC95%=2,09-14,95 y RR 5,00, IC95% 2,18-6,06).

Conclusiones: Los trastornos musculoesqueléticos y por trastornos relacionados con el embarazo son los grupos diagnósticos de SA más frecuentes. Bajos niveles de exposición a riesgos laborales se relacionaron con ausencias cubiertas principalmente por SA. Las prestaciones sociales parecen utilizarse complementariamente para equilibrar el trabajo y la salud.

Palabras clave: embarazo; enfermedad; ausencia por enfermedad; factores de riesgo laborales; diagnóstico médico; prestación por riesgo durante el embarazo; condiciones de trabajo; estudio de cohorte.

Abstract

Objectives: To assess the association between sickness absence (SA) trajectories by medical diagnoses and exposure to occupational risk factors during pregnancy.

Methods: SA trajectories were identified in a cohort of 367 pregnant workers from a healthcare institution (period 2010-2014), based on most frequent diagnosis using sequence analysis. Trajectory 1 included SA episodes due mainly to musculoskeletal disorders (58.86%), trajectory 2 included SA episodes due to pregnancy-related disorders (25.07%) and trajectory 3 included absences mainly covered by pregnancy-related occupational risk benefits (POR) and few SA episodes (16.08%). Exposure to occupational risk factors was assessed by experts and their association with trajectories was analysed using logistic regression. Relative risks (RR) and their 95% confidence intervals (95%CI) were adjusted for age, type of contract and work shift.

Results: Trajectory 1 was negatively associated with exposure to safety and ergonomic risks (RR=0.56, 95%CI=0.35-0.90; RR=0.50, 95%CI=0.33-0.77, respectively) and with the highest global risk index (RR=0.68, 95%CI=0.49-0.96). Trajectory 3 was associated with safety and ergonomic risks (RR=2.75, 95%CI=1.59-4.75; RR=3.64, 95%CI=2.18-6.06, respec-

tively) and with the highest global risk index (RR=2.69, 95%CI=1.43-5.01). Nursing aides and nurses had a higher probability of belonging to trajectory 3 (RR 5.58, 95%CI=2.09-14.95 and RR 5.00, 95%CI 2.18-6.06, respectively).

Conclusions: Pregnancy-related and musculoskeletal disorders are the most frequent sickness absence diagnosis during pregnancy. Low levels of occupational risk factors exposure were related to absences from work covered mainly by sickness absence. Current social benefits seem to be used as a complementary way to balance work and health during pregnancy.

Keywords: pregnancy; sickness; sickness absence; occupational risk factors; medical diagnosis; pregnancy occupational risk benefit; working condition; cohort study

Introduction

Pregnant women undergo important anatomical, physiological and psychological changes that often challenge job demands, especially at the end of pregnancy[1,2]. The transition from active work to maternity license after delivery depends on a delicate balance where many factors intervene, both work and non-work related[3,4]. In Spain, as in other countries with a consolidated social protection benefits scheme[5], two optional types of social benefits have been developed to protect pregnant women and their foetus's health. These benefits are aimed at guaranteeing the continuity of women's labour relationship and to cover their salary if absences from work due to health issues are needed. One of them is the sickness absence (SA) benefit, applied when the absence is due to a health problem not related to working conditions. The other one is the pregnancy occupational risk (POR) benefit, available in only a few countries[6,7] and applied when absence from work is needed to prevent exposure during pregnancy to occupational risk factors that cannot be avoided by job adjustments or other measures.

Sick leave among pregnant workers is a frequently discussed issue as their SA rates are usually high[8,9]. According to previous studies, three out of four pregnant women had at least one episode of SA[10,11,12]. Other studies have tried to identify predictors of SA during pregnancy and factors that could increase the probability of returning to work after a SA episode, such as job adjustments, among others[13,14]. Some studies have pointed out that there are not clear medical explanations for this phenomenon[15,16,17]. However, health related problems such as musculoskeletal pain before[18] or related to pregnancy[19], overweight[20], and other factors including sedentary lifestyle[21], tobacco, alcohol or other drugs consumption [22,23,24], women's "double burden"[17] and attitudes towards SA[25] have been associated with SA during pregnancy. Furthermore, despite SA is a specific benefit to cope ill-health non-work related, exposure to some occupational risk factors, such as heavy load handling, forced postures or high psychosocial demands, have shown a significant influence on SA in workers during pregnancy[26, 27, 28,29].

In line with this situation, the study about sickness absence diagnoses and occupational risk factors influences on pregnant workers disability are needed to help women to stay at work in a sustainable, healthy and productive way.

Our hypothesis was that absences due to SA are not influenced by exposure to occupational risk factors but to factors not related to work, mainly to the pregnancy itself. The aim of the present analysis was to assess the association between SA and POR benefit according to information on medical diagnoses and exposure to occupational risk factors in a cohort of pregnant healthcare workers.

Methods

Study population

We selected 367 pregnancies with at least one episode of SA from a cohort of 428 women who worked at a public university hospital, *Parc de Salut Mar (PSMAR),* (3,841 workers including 74.6% women, 67% of them between 21 and 50 years old) and who started a pregnancy between 2010 and 2014. Among the 61 excluded women, 56 took only the POR benefit without any SA episode and 5 worked during the whole pregnancy. For each pregnant woman, we had a daily employment status record, where they could alternate three different statuses: active work, absences due to SA and absences due to POR. There were 68 pregnant workers (18.53%) who took both POR benefit and SA during the whole pregnancy.

Assessment of health conditions and exposure to occupational risk factors and covariates

The health status of each pregnant worker in relation to her workplace was assessed by an occupational physician. Furthermore, an occupational health safety specialist carried out the workplace risk assessment collecting detailed information about job tasks, equipment, use of personal protection equipment and other existing preventive measures. This risk assessment evaluated six types of risks: biological, chemical, physical, ergonomic, psychosocial and safety. All this information was summarised and a proposal of preventive measures to avoid or reduce exposure was reported. Risks were classified into trivial, tolerable, moderate, substantial or intolerable, taking into account the probability of exposure and its potential consequences on health[30]. The methodology applied in this study reproduces the one used in a previously published work over the same cohort[31]. These risk categories were grouped into a dichotomous variable (yes/no), being "yes" when the risk assessment report had qualified them as substantial or intolerable, and "no" for moderate, tolerable or trivial. In addition, each level of risk exposure was scored from 1 to 3: trivial and tolerable risks (one); moderate (two); and substantial and intolerable (three). A global risk exposure index was developed as the sum of the scores for each risk. The risk exposure index was grouped into tertiles: 6-9 (low risk), 10-11 (medium risk) and 12-18 (high risk).

Finally, the occupational physician, in coordination with the worker's manager, established the conclusion considering the risk assessment report, the feasibility of job adjustments and the pregnant woman individual characteristics. When there was a risk (qualified as substantial or intolerable) that could not be eliminated or adjustments be implemented, POR benefit was managed with the Occupational Health Insurance Company.

Medical diagnoses of each SA episode were collected from the medical records of each worker and coded according to ICD-10. Maternal age (≤30, 31-35, ≥36), occupation (administrative/technical support, nursing aide, nurse, physician), type of contract (temporary, permanent), working shift (morning, afternoon, split-shift, night, others), and weekly work hours (<30, 30-35, 36-40) were also recorded.

Analysis

Firstly, we calculated the frequency of SA episodes and their percentages, the total duration and median duration (MD) and cumulative days of absence (DA) for each ICD-10 major diagnostic categories and grouping specific diagnosis codes. Secondly, using sequence analysis, we identified three trajectories of SA episodes in combination with active work and POR benefit episodes, and SA major diagnostic categories. The final number of trajectories was based on the dendrogram, a tree diagram that illustrates the arrangement of the clusters produced by hierarchical clustering and informs about how data are grouped together indicating the distance between them[32]. For each SA trajectory we calculated the frequency, the percentage of the total accumulated days of absence (AD), and the median duration (MD) of SA and POR according to occupational risk factors, age and other workplace variables. We conducted a $\chi 2$ test to assess statistical differences among trajectories and these variables.

Finally, the crude and adjusted relative risks (RR) and their 95% confidence intervals (CI 95%) were estimated to assess the association between each trajectory and exposure to occupational risk factors using logistic regression models with a robust variance. To calculate the RR for each occupational risk factor we considered those not exposed to that same risk factor (although exposure to the other risk factors could be present) as the reference category. Furthermore, for the global risk exposure index we considered the lowest tertile value as the reference category. A sensitivity analysis to confirm the relationship between exposure to occupational ergonomic risks and belonging to SA trajectory 1 and SA trajectory 2 by occupational categories was carried out. The statistical software RStudio and STATA 13 were used.

Confidentiality of personal data was preserved by anonymization of all processed information. The research project was evaluated and approved by the ethics committee of the hospital.

Results

A total of 655 episodes of SA were recorded among the 367 included pregnant workers, amounting a total of 28,313 AD and a median duration of 19 days (Table 1). The most frequent medical diagnosis group was health problems related to pregnancy (232 episodes, 35.4%), including mainly excessive vomiting (71 episodes, 2,641 AD), risk of abortive outcome (62 episodes, 3,644 AD) and risk related to delivery (39 episodes, 2,524 AD), accounting for a total of 12,039 AD (42.5%). The second most frequent group was musculoskeletal disorders (199 episodes, 30.4%), being low back pain the leading cause (178 episodes, 9,906 AD).

Table 1. Sickness absence (SA) episodes (N=655) during pregnancy, absence days (AD) and median duration (MD) by major diagnostic categories and diagnosis codes (ICD-10) among the sample of the pregnant workers cohort with at least one SA episode (N=367), Parc de Salut Mar 2010 - 2014.

ICD-10	DIAGNOSTIC GROUP	N	(%)	AD	(%)	MD
O00-O9A	PREGNANCY, CHILDBIRTH AND THE PUERPERIUM	232	(35.42)	12039	(42.52)	22
O09.0, O20.0, O20.9	Risk of abortive outcome / haemorrhage in early pregnancy	62	(9.47)	3644	(12.87)	25
O60-O75	Complications of labour and delivery	39	(5.95)	2524	(8.91)	49
O21	Excessive vomiting in pregnancy	71	(10.84)	2641	(9.33)	6
O16.9, O26.5, Z39.9	Other health problems related to pregnancy	60	(9.16)	3230	(11.41)	18
M00-M99	DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE	199	(30.38)	10471	(36.98)	45
M54.3-M54.5	Low back pain	178	(27.18)	9906	(34.99)	48
M25.5, M53.9, M54.2, M54.9, M75.0, M77.0, M79.1	Other health problems related to musculoskeletal system	21	(3.21)	565	(2.00)	12
J00-J99	DISEASES OF THE RESPIRATORY SYSTEM	70	(10.69)	450	(1.59)	3
J02.9	Acute pharyngitis	42	(6.41)	286	(1.01)	3
J03.9, J11.1, J20.9, J32.9, J45.9	Other health problems related to respiratory system	28	(4.27)	164	(0.58)	5
R00-R99	SYMPTOMS, SIGNS AND ABNORMAL CLINICAL ANB LABORATORY FINDINGS NEC[a]	58	(8.85)	1993	(7.04)	7
R53.1, R53.8	Malaise and fatigue	17	(2.60)	1097	(3.87)	54
R00.0, R10.9, R19.7, R50.9, R60.0	Other symptoms or signs NEC[a]	41	(6.26)	896	(3.16)	4

ICD-10	DIAGNOSTIC GROUP	N	(%)	AD	(%)	MD
Z00-Z99	FACTORS INFLUENCING HEALTH STATUS AND CONTACT WITH HEALTH SERVICES[b]	24	(3.66)	736	(2.60)	7
F01-F99	MENTAL AND BEHAVIOURAL DISORDERS	16	(2.44)	862	(3.04)	32
K00-K95	DISEASES OF THE DIGESTIVE SYSTEM	14	(2.14)	261	(0.92)	4
N00-N99	DISEASES OF THE GENITOURINARY SYSTEM	7	(1.07)	206	(0.73)	21
—	OTHER GROUPS*	16	(2.44)	527	(1.86)	5
—	MISSING/UNREGISTERED	19	(2.90)	768	(2.71)	28
TOTAL		655	(100.00)	28313	(100.00)	19

[a] NEC: Not Elsewhere Classified; [b] Includes persons encountering health services in circumstances related to reproduction; * Includes: diseases of the nervous system, infectious and parasitic diseases, circulatory system diseases, eye and adnexa diseases, injury, poisoning and other external causes, ear and mastoid diseases and skin and subcutaneous tissue diseases.

SA trajectories are shown in Figure 1. Trajectory 1 includes women with SA due to musculoskeletal medical diagnoses as the main cause of absence from work, whereas women in trajectory 2 were absent from work because of SA due to pregnancy-related disorders. POR was the main cause of work absence in those women included in trajectory 3, combined with some SA mainly due to pregnancy-related medical diagnoses.

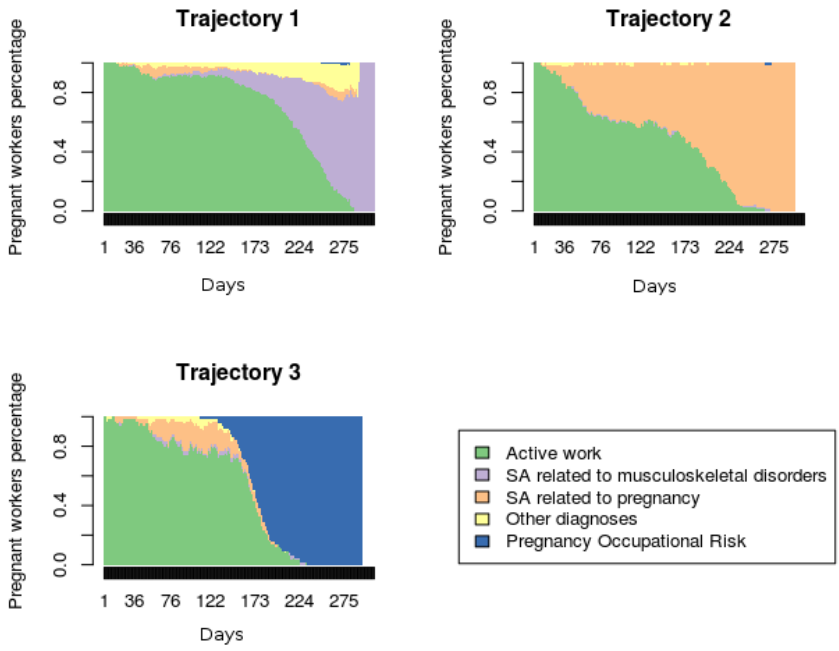

Figure 1. Sickness absence (SA) trajectories among a cohort of pregnant workers with at least one sickness absence episode during pregnancy (N=367), 2010-2014.

Most women are fitted in trajectory 1, where 216 pregnant workers (58.9%) accounting for 14,942 days of SA (389 episodes) with a median duration of SA episodes of 15 days. Trajectory 2 included 92 pregnant workers (25.1%), with 12,414 days of SA (171 episodes) and a median duration of 24 days. There were only 59 women (16.1%) in trajectory 3 accounting for 6,403 days of absence due to POR (58 episodes) and only 957 days of SA (95 episodes), with a median duration of 112 and 4 days, respectively. Active work accounted for 75%, 48% and 55% of pregnancies time in trajectory 1, 2 and 3, respectively (Table 2).

Almost half of pregnancies in trajectory 3 (47.5%) had the highest score (12 to 18) of exposure to occupational risk factors. Conversely, this percentage was 22.7% and 33.7% for pregnancies in trajectories 1 and 2, respectively, and more than 40% of these women showed a low level of exposure to occupational risk factors (6 to 9). Statistically significant differences were observed between the three trajectories for the occupational risk score, occupation and working shift (Table 2).

The association between exposure to occupational risk factors and each trajectory separately is shown in Table 3. Pregnant workers in trajectory 1 had a negative association with safety and ergonomic risk factors (RR 0.56, 95% CI 0.35-0.90; RR 0.50, 95% CI 0.33-0.77, respectively), and with the highest global risk exposure index (score 12 to 18) (RR 0.68, 95% CI 0.49-0.96). Trajectory 3 was associated with safety (RR 2.75, 95% CI 1.59-4.75) and ergonomic risks (RR 3.64, 95% CI 2.18-6.06). The highest score of occupational risk factors exposure (score 12 to 18) was associated with trajectory 3 (RR 2.69, 95% CI 1.43-5.01). Trajectory 2 did not show any association with exposure to risk factors at work nor with any exposure score.

Regarding occupation and taking physicians as the reference category, nursing aides and nurses had a higher probability of belonging to trajectory 3 (RR 5.58, 95% CI 2.09-14.95 and RR 5.00, 95% CI 1.95-12.81, respectively) and less likely than physicians to belong to trajectory 1 (RR 0.55, 95% CI 0.36-0.86; RR 0.57, 95% CI 0.41-0.81, respectively). Split-shift, compared to morning shift, was associated with trajectory 1 (RR 1.42, 95% CI 1.03-1.97) and negatively associated with trajectory 2 (RR 0.47, 95% CI 0.28-0.79), and both the afternoon and the night shifts were associated with trajectory 3 (RR 2.26, 95% CI 1.14-4.45; RR 2.53, 95% CI 1.11-5.78, respectively). No differences were observed for maternal age, type of contract and number of weekly work hours.

Table 2. Description of sickness absence (SA) trajectories accordin to risk exposure, age and workplace variables among the sample of pregnant workers cohort with at least one SA episode (N=367), Parc de Salut Mar 2010 - 2014.

	PREGNANCIES		TRAJECTORY 1 ACTIVE WORK / MUSCULOSKELETAL DISORDERS					TRAJECTORY 2 ACTIVE WORK / SA PREGNANCY-RELATED DIAGNOSES					TRAJECTORY 3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT								
	N	(%)	N	(%)	EP[a]	AD[b]	MD[c]	N	(%)	EP	AD	MD	N	(%)	SA EP	AD SA	MD SA	POR[d] EP	AD POR	MD POR	$p^{\chi 2}$
Risk factor exposure																					
Biological	167	(45.50)	88	(40.74)	142	6984	16	48	(52.17)	88	5911	29	28	(47.46)	39	374	3	28	3102	113	-
Physical	10	(2.72)	5	(2.31)	9	521	7	1	(1.09)	1	204	204	4	(6.78)	8	57	5	4	374	98	
Chemical	25	(6.81)	12	(5.56)	15	588	15	9	(9.78)	13	1456	77	4	(6.78)	6	40	4	4	407	100	
Safety	54	(14.71)	19	(8.80)	44	2383	13	16	(17.39)	21	1377	36	19	(32.20)	27	181	3	19	2076	114	
Ergonomic	73	(19.89)	24	(11.11)	53	1877	11	21	(22.83)	43	2802	12	28	(47.46)	39	374	3	28	3102	113	
Psychosocial	95	(25.89)	52	(24.07)	85	3469	23	22	(23.91)	43	2768	24	21	(35.59)	32	287	3	21	2348	114	
Non exposed	126	(34.33)	94	(43.52)	161	5337	17	27	(29.35)	50	3780	29	5	(8.47)	11	114	3	4	510	132	
Risk level exposure																					
6 - 9	161	(43.87)	107	(49.54)	189	6366	16	37	(40.22)	76	5252	15	15	(25.42)	29	406	6	14	1567	123	
10 - 11	98	(26.70)	60	(27.78)	111	4767	15	24	(26.09)	39	2999	33	16	(27.12)	24	173	5	16	1809	108	0.003
12 - 18	108	(29.43)	49	(22.69)	89	3809	13	31	(33.70)	56	4163	24	28	(47.46)	42	378	4	28	3027	110	
Maternal age (years)																					
≤ 30	71	(19.35)	42	(19.44)	76	3733	16	20	(21.74)	48	2144	8	9	(15.25)	15	220	7	9	958	107	
31 - 35	174	(47.41)	95	(43.98)	174	6692	17	41	(44.57)	77	5660	24	38	(64.41)	62	486	4	38	4243	114	0.068
≥ 36	122	(33.24)	79	(36.57)	139	4517	13	31	(33.70)	46	4610	50	12	(20.34)	18	251	4	11	1202	110	
Occupation																					
Physician	97	(26.43)	74	(34.26)	114	3263	21	18	(19.57)	33	2005	22	5	(8.47)	10	144	9	5	470	94	
Administrative and technical support	76	(20.71)	58	(26.85)	111	3426	14	16	(17.39)	39	2190	9	2	(3.39)	2	14	7	2	160	80	0.000
Nursing aide	66	(17.98)	28	(12.96)	70	3298	12	19	(20.65)	29	2995	68	19	(32.20)	36	543	6	18	2012	113	
Nurse	128	(34.88)	56	(25.93)	94	4955	14	39	(42.39)	70	5224	29	33	(55.93)	47	256	3	33	3761	112	
Type of contract																					
Temporary	126	(34.33)	83	(38.43)	142	4691	14	28	(30.43)	57	2630	16	15	(25.42)	25	299	6	14	1418	103	0.116
Permanent	241	(65.67)	133	(61.57)	247	10251	16	64	(69.57)	114	5592	25	44	(74.58)	70	658	4	44	4985	114	
Shift work																					
Morning	102	(27.79)	54	(25.00)	101	4240	15	35	(38.04)	57	4487	33	13	(22.03)	24	121	5	13	1453	108	
Afternoon	80	(21.80)	34	(15.74)	74	3476	9	23	(25.00)	37	3359	57	23	(38.98)	37	373	4	22	2405	111	0.000
Split-shift	154	(41.96)	116	(53.70)	193	5963	21	25	(27.17)	57	3179	16	13	(22.03)	18	239	7	13	1298	108	
Night and others*	31	(8.45)	12	(5.56)	21	1263	38	9	(9.78)	20	1389	29	10	(16.95)	16	224	4	10	1247	120	
Weekly work hours																					
36-40	246	(67.03)	147	(68.06)	261	9201	21	60	(65.22)	126	8236	17	39	(66.10)	63	611	3	39	4260	108	
30-35	59	(16.08)	32	(14.81)	65	2649	9	15	(16.30)	18	2018	58	12	(20.34)	20	121	6	12	1375	119	0.826
<30	62	(16.89)	37	(17.13)	63	3092	15	17	(18.48)	27	2160	44	8	(13.56)	12	225	8	7	768	116	
Total	**367**	**(100,00)**	**216**	**(58.86)**	**389**	**14942**	**15**	**92**	**(25.07)**	**171**	**12414**	**24**	**59**	**(16.08)**	**95**	**957**	**4**	**58**	**6403**	**112**	

[a]EP: Episodes; [b]AD: days of absence; [c]MD: median duration; [d]POR: pregnancy occupational risk; *includes weekend shift.

Table 3. Relative risk of the three clusters by risk exposure, age and workplace variables of the subsample of workers with at least one NWSA episode (N=367) of the pregnant workers cohort (N= 428), Parc de Salut Mar 2010 - 2014.

	TRAJECTORY 1 ACTIVE WORK / MUSCULOSKELETAL DISORDERS		TRAJECTORY 2 ACTIVE WORK / SA PREGNANCY-RELATED		TRAJECTORY 3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT	
	cRR[a]	(CI 95%)[b]	cRR	(CI 95%)	cRR	(CI 95%)
Risk factor exposure[c]						
Biological	0.82	(0.63-1.08)	1.31	(0.87-1.97)	1.33	(0.79-2.21)
Physical	0.85	(0.35-2.05)	0.39	(0.05-2.82)	2.6	(0.94-7.16)
Chemical	0.80	(0.45-1.44)	1.48	(0.75-2.95)	0.99	(0.36-2.75)
Safety	0.56	(0.35-0.90)	1.22	(0.71-2.09)	2.75	(1.59-4.75)
Ergonomic	0.50	(0.33-0.77)	1.19	(0.73-1.94)	3.64	(2.18-6.06)
Psychosocial	0.91	(0.66-1.24)	0.9	(0.56-1.45)	1.58	(0.93-2.70)
Non exposed	1.47	(1.13-1.93)	0.79	(0.51-1.24)	0.18	(0.07-0.44)
Risk level exposure						
6 - 9	1		1		1	
10 - 11	0.93	(0.68-1.26)	0.97	(0.58-1.62)	1.59	(0.79-3.22)
12 - 18	0.68	(0.49-0.96)	1.2	(0.75-1.94)	2.69	(1.43-5.01)
Maternal age (years)						
≤ 30	1		1		1	
31 - 35	0.92	(0.64-1.33)	0.84	(0.49-1.43)	1.72	(0.83-3.56)
≥ 36	1.09	(0.75-1.59)	0.9	(0.51-1.58)	0.78	(0.33-1.84)
Occupation						
Physician	1		1		1	
Administrative and technical support	1,00	(0.71-1.41)	1.13	(0.58-2.22)	0.51	(0.10-2.63)
Nursing aide	0.55	(0.36-0.86)	1.55	(0.81-2.96)	5.58	(2.09-14.95)
Nurse	0.57	(0.41-0.81)	1.64	(0.94-2.87)	5,00	(1.95-12.81)
Type of contract						
Temporary	1		1		1	
Permanent	0.84	(0.64-1.10)	1.19	(0.77-1.86)	1.53	(0.85-2.76)
Shift work						
Morning	1		1		1	
Afternoon	0.8	(0.52-1.23)	0.84	(0.49-1.42)	2.26	(1.14-4.45)
Split-shift	1.42	(1.03-1.97)	0.47	(0.28-0.79)	0.66	(0.31-1.43)
Night and others*	0.73	(0.39-1.36)	0.85	(0.41-1.76)	2.53	(1.11-5.78)
Weekly work hours						
36-40	1		1		1	
30-35	0.91	(0.62-1.33)	1.04	(0.59-1.83)	1.28	(0.67-2.45)
<30	0.99	(0.70-1.43)	1.12	(0.66-1.93)	0.81	(0.38-1.74)

[a] cRR: Crude Relative Risk; [b] CI 95 %: Confidence interval 95%; [c] cRR: calculated taking non-exposed as the reference category; *includes weekend shift.

After adjusting for maternal age, type of contract and working shift, most associations there are some changes (Table 4). In particular, trajectory 1 was negatively associated with exposure to safety (RR=0.67, 95% CI 0.46-0.97), ergonomic (RR=0.59, 95% CI 0.42-0.82) and psychosocial (RR=0.77, 95% CI 0.62-0.95) risks. Trajectory 2 did not show any association, except for exposure to psychosocial risks (RR=2.56, 95% CI 1.47-4.46).

Table 4. Risk of belonging to one of the sickness absence (SA) trajectories according to risk exposure among the sample of the pregnant workers cohort with at least one NWSA episode (N=367), Parc de Salut Mar 2010 - 2014.

	TRAJECTORY 1 ACTIVE WORK / MUSCULOSKELETAL DISORDERS		TRAJECTORY 2 ACTIVE WORK / SA PREGNANCY-RELATED		TRAJECTORY 3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT	
	aRR[a]	(CI 95%)[b]	aRR	(IC 95%)	aRR	(IC 95%)
Risk factor exposure[c]						
Biological	0.92	(0.76-1.12)	1.25	(0.83-1.89)	2.36	(1.54-3.61)
Physical	0.82	(0.44-1.54)	0.38	(0.05-2.69)	3.27	(1.58-6.77)
Chemical	0.78	(0.51-1.17)	1.75	(0.96-3.19)	0.84	(0.32-2.19)
Safety	0.67	(0.46-0.97)	1.08	(0.68-1.73)	1.83	(1.16-2.88)
Ergonomic	0.59	(0.42-0.82)	1.1	(0.71-1.71)	2.36	(1.54-3.61)
Psychosocial	0.77	(0.62-0.95)	2.56	(1.47-4.46)	2.56	(1.47-4.46)
Non exposed	1.32	(1.40-1.59)	0.83	(0.52-1.31)	0.29	(0.10-0.81)
Risk level						
6 - 9	1		1		1	
10 - 11	1.04	(0.85-1.27)	0.89	(0.54-1.45)	1.14	(0.58-2.24)
12 - 18	0.73	(0.57-0.94)	1.11	(0.69-1.77)	2.16	(1.19-3.92)

[a] aRR: Adjusted Relative Risk for age and workplace variables; [b] CI 95%: Confidence Interval 95%; [c] aRR: calculated taking non-exposed as the reference category.

The stratified analysis by occupation (Table 5) showed that for physicians trajectory 2 was significantly associated with exposure to chemical and safety risks (RR=3.40, 95% CI 1.39-8.34 and RR=2.59, 95% CI 1.03-6.49, respectively); for nursing aides trajectory 3 was significantly associated with exposure to ergonomic risks (RR=6.15, 95% CI 1.99-19.03); and for nurses trajectory 3 was significantly associated with exposure to physical (RR=3.10, 95% CI 1.11-8.66), safety (RR=1.99, 95% CI 1.12-3.54), ergonomic (RR=1.79, 95% CI 1.03-3.11) and psychosocial risks (RR=3.19, 95% CI 1.58-6.43).

Table 5. Risk of beloging to Sickness Absence Trajectories (SAT) according to risk exposure by occupatiion among the sample of the pregnant workers cohort with at least one sickness absence (SA) episode (N=367), Parc de Salut Mar 2010-2014.

	PHYSICIAN						ADMINISTRATIVE AND TECHNICAL SUPPORT					
	SAT1 ACTIVE WORK / SA MUSCULOSKELETAL DISORDERS		SAT2 ACTIVE WORK / SA RELATED TO PREGNANCY		SAT3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT		SAT1 ACTIVE WORK / SA MUSCULOSKELETAL DISORDERS		SAT2 ACTIVE WORK / SA RELATED TO PREGNANCY		SAT3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT	
	aRR[a]	(95% CI)[b]	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)
Risk factor exposure[c]												
Biological	0.95	(0.77 - 1.18)	0.97	(0.42- 2.22)	2.65	(0.31 - 22.89)	0.69	(0.14 - 3.34)	2.33	(0.25 - 21.70)	-	-
Physical	0.75	(0.37 - 1.54)	1.26	(0.18 - 8.68)	5.02	(0.65 - 38.51)	-	-	-	-	-	-
Chemical	0.54	(0.27 - 1.10)	3.40	(1.39 - 8.34)	2.28	(0.28 - 18.43)	0.88	(0.48 - 1.59)	-	-	-	-
Safety	0.73	(0.40 - 1.34)	2.59	(1.03 - 6.49)	-	-	0.41	(0.07 - 2.38)	1.42	(0.36 - 5.63)	-	-
Ergonomic	1.03	(0.72 - 1.47)	1.22	(0.34 - 4.44)	-	-	0.64	(0.29 - 1.43)	1.53	(0.41 - 5.75)	5.10	(0.27 - 94.55)
Psychosocial	0.86	(0.70 - 1.07)	1.16	(0.49 - 2.73)	-	-	0.67	(0.18 - 2.47)	2.90	(0.54 - 15.49)	-	-
Global risk index												
6 - 9	1		1		1		1		1		1	
10 - 11	0.99	(0.76 - 1.26)	1.14	(0.34 - 4.02)	0.84	(0.44 - 1.60)	0.68	(0.36 - 1.26)	1.91	(0.50 - 7.33)	5.10	(0.27 - 94.55)
12 - 18	0.78	(0.59 - 1.04)	1.43	(0.46 - 4.46)	-	-	1.65	(0.17 - 2.33)	-	-	0.13	(0.01 - 1.36)

	NURSING AIDE						NURSE					
	SAT1 ACTIVE WORK / SA MUSCULOSKELETAL DISORDERS		SAT2 ACTIVE WORK / SA RELATED TO PREGNANCY		SAT3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT		SAT1 ACTIVE WORK / SA MUSCULOSKELETAL DISORDERS		SAT2 ACTIVE WORK / SA RELATED TO PREGNANCY		SAT3 ACTIVE WORK / PREGNANCY OCCUPATIONAL RISK BENEFIT	
	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)	aRR	(95% CI)
Risk factor exposure												
Biological	1.15	(0.67 - 1.98)	1.24	(0.55 - 2.75)	0.59	(0.25 - 1.39)	1.00	(0.66 - 1.51)	1.28	(0.67 - 2.44)	0.72	(0.38 - 1.36)
Physical	-	-	-	-	2.22	(0.77 - 6.37)	0.91	(0.33 - 2.50)	-	-	3.10	(1.11 - 8.66)
Chemical	1.50	(0.61 - 3.68)	1.40	(0.44 - 4.41)	-	-	1.00	(0.44 - 2.26)	1.21	(0.44 - 3.35)	0.71	(0.26 - 1.91)
Safety	0.93	(0.48 - 1.81)	0.71	(0.27 - 1.90)	1.45	(0.65 - 3.19)	0.59	(0.31 - 1.13)	0.96	(0.51 - 1.82)	1.99	(1.12 - 3.54)
Ergonomic	0.14	(0.02 - 1.00)	0.62	(0.21 - 1.81)	6.15	(1.99 - 19.03)	0.65	(0.40 - 1.07)	1.02	(0.58 - 1.80)	1.79	(1.03 - 3.11)
Psychosocial	0.46	(0.13 - 1.63)	1.44	(0.37 - 5.52)	1.59	(0.46 - 5.57)	0.53	(0.25 - 1.14)	0.63	(0.32 - 2.90)	3.19	(1.58 - 6.43)
Global risk index												
6 - 9	1		1		1		1		1		1	
10 - 11	1.40	(0.82 - 2.40)	0.52	(0.17 - 1.62)	0.91	(0.33 - 2.49)	1.11	(0.66 - 2.19)	1.06	(0.48 - 2.31)	0.87	(0.37 - 2.02)
12 - 18	0.64	(0.22 - 1.89)	0.70	(0.26 - 1.86)	2.03	(0.85 - 4.85)	0.80	(0.44 - 1.60)	1.25	(0.56 - 2.78)	1.13	(0.53 - 2.44)

[a]aRR: relative risk adjusted for age, type of contract and shift work; [b] 95% CI: 95% confidence interval; [c]aRR: calculated taking non-exposed as the reference category.

Discussion

Pregnancy-related health problems and musculoskeletal disorders represented up to 80% of absence days due to SA in our cohort of pregnant women, being low back pain, excessive vomiting and risk of abortive outcome the most frequent particular medical diagnoses and showing a negative or no association with exposure to occupational risk factors, respectively. Logically, we also found that women who were highly exposed to occupational risk factors, mainly biological, ergonomic, safety, hygiene and/or psychosocial, had absences from work covered predominantly by POR benefit, with one or more previous SA episodes mainly attributed to pregnancy-related medical conditions early in the pregnancy.

Our results could be explained because the POR benefit was correctly used to prevent health problems that could be caused or aggravated by adverse working conditions, such as musculoskeletal disorders in women exposed to high exposure to ergonomic risk factors. These patterns were confirmed after adjusting by age, occupation, type of contract and working shift. Those women belonging to the trajectory with SA episodes caused mainly by musculoskeletal disorders where not associated to ergonomic and psicosocial risk factors, as it would be expected. A hypothesis is that these SA episodes due to musculoskeletal disorders could be directly consequence of the pregnancy or/and non-work ergonomic risk factors. No previous study has to our knowledge included this information.

An important result from our study is that absences from work covered by SA during pregnancy were not associated to exposure to occupational risk factors. However, for physicians, we found an association between exposure to chemical and safety risks with the SA trajectory with episodes due to health problems related to pregnancy. A possible explanation to these findings is that working conditions may play a role in worsening symptoms or diseases related to pregnancy.

The frequency of SA shown in our cohort (85%) was higher in comparison with other previous studies, where reported SA during pregnancy varies from 29% to 72%[33,34,35]. A possible explanation may be due to differences in SA definition since some authors only consider SA episodes as those lasting more than one week or just consider those that occur only in certain weeks of pregnancy. We have registered all episodes from the first day and during the whole pregnancy period.

The main medical diagnosis of SA were pregnancy-related health problems, which confirms their important role contributing to the observed increase of SA during female reproductive age[36]. Previous studies had also shown that other diagnosis such as pelvic girdle pain and fatigue/sleep problems as the main reasons of SA[11,37]. Musculoskeletal complaints contributed substantially to SA during pregnancy in our study, being the second most frequent cause of absences from work. In fact, this is similar to the frequency of musculoskeletal disorders in the whole working population, for both men and women[38,39]. As reported in several studies[11,40-42], low back pain was the most frequent reason of SA in our sample.

Another important implication from our results is the importance of the two current social benefits in Spain to cope with imbalances between work and health

during pregnancy. On the one side, SA benefit is mainly used when pregnant workers suffer from health problems mainly related to pregnancy and/or other no-work related risk factors; on the other, POR benefit is applied when they are exposed to occupational risks before health effects occur. Our results show the suitable complementarity of the two benefits, and suggest that SA seems to be used also as a complementary way to assess the balance between work demands and physiologic changes.

This study has several strengths. First, it is based on a detailed follow-up throughout pregnancy with a precise daily register of active work and absences by SA, with or without POR. In addition, for each pregnancy we obtained detailed information on medical diagnoses of all SA from medical and SA records and a comprehensive occupational risk assessment. However, the interpretation of our results should be done with caution because of some limitations. The main one is related to the sample size and the characteristics of the study population, reducing the external validation of our results. Our sample corresponds to pregnant workers of a public university hospital who maintained their full salary during either of the two benefits as a result of an agreement with the unions. There is a need to reproduce the study in other companies with difference SA benefits schemes (usually only 70% for salary in SA benefits unless otherwise complemented, and 100% for POR benefits in Spain). In addition, most pregnant workers (76%) included in our study had a permanent contract. Nonetheless, we did not observe any differences of the magnitude of the association by type of contract in our sample. In any case, it would be interesting to analyse the same trajectories in companies of other sizes and different workforces and sectors, and with a higher proportion of temporary contracts.

In summary, a provisional conclusion is that current social benefits seem to be adequate for protecting pregnant workers from exposure to occupational risk factors, and to cope with imbalances between working conditions, health-related problems and pregnancy. Nevertheless, a great majority of pregnant women in our cohort had absences covered by SA benefit, some of them before initiating the POR benefit towards the third trimester of pregnancy. A great majority of women in our cohort had absences covered by SA benefit that could not be caused by pregnancy itself, but also, as we have seen, to working conditions[43]. Maybe a better management of occupational risk assessment and information provided to pregnant workers, stressing the need of POR benefit when occupational exposures are high, could reduce episodes of SA. Further research therefore needs to focus on the effects of working conditions improvement and the role of specialized preventive interventions that may help pregnant workers to ensure an adequate balance between motherhood and active work.

Bibliografía

1. Tan EK, Tan EL. Alterations in physiology and anatomy during pregnancy. Best Pract Res Clin Obstet Gynaecol. 2013;27(6):791-802.

2. Ouzounian JG, Elkayam U. Physiologic Changes During Normal Pregnancy and Delivery. Cardiology Clinics. 2012; 30(3):317-29.

3. Palmer KT, Bonzini M, Harris C, Linaker C, Bonde JP. Work activities and risk of prematurity, low birthweight and pre- eclampsia: an updated review with meta-analysis. Occup Env Med. 2013;70(4):213–22.

4. Hansen ML, Thulstrup AM, Juhl M, Kristensen JK, Ramlau-Hansen CH. Predictors of sickness absence in pregnancy: a Danish cohort study. Scand J Work Environ Health. 2015;41(2):184–93.

5. Esping-Andersen G. The sustainability of welfare states into the 21st century. Int J Heal Serv. 2000;30(1):1–12.

6. USA Social Security Administration (SSA). Social Security Programs Throughout the World: Europe, 2016. [Internet]. 2016 [cited 2017 Jan 31]. p. 246. Available from: https://www.ssa.gov/policy/docs/progdesc/ssptw/2016-2017/europe/index.html

7. Croteau A, Marcoux S, Brisson C. Work activity in pregnancy, preventive measures, and the risk of preterm delivery. Am J Epidemiol. 2007;166(8):951–65.

8. Hansen ML, Thulstrup AM, Juhl M, Kristensen JK, Ramlau-Hansen CH. Occupational exposures and sick leave during pregnancy: results from a Danish cohort study. Scand J Work Environ Health. 2015;41(4):397–406.

9. Kaerlev L, Jacobsen L, Olsen J, Bonde J. Long term sick leave and its risk factors during pregnancy among Danish hospital employees. Scand J Public Health. 2004;32(2):111–7.

10. Mogren I. Perceived health, sick leave, psychosocial situation, and sexual life in women with low-back pain and pelvic pain during pregnancy. Acta Obstet Gynecol Scand. 2006;85(6):647–56.

11. Dørheim SK, Bjorvatn B, Eberhard-Gran M. Sick leave during pregnancy: A longitudinal study of rates and risk factors in a Norwegian population. BJOG An Int J Obstet Gynaecol. 2013;120(5):521–30.

12. Henrotin J-B, Vaissière M, Etaix M, Dziurla M, Malard S, Lafon D. Exposure to occupational hazards for pregnancy and sick leave in pregnant workers: A cross-sectional study. Ann Occup Environ Med. 2017;29(1).

13. Sabbath EL, Melchior M, Goldberg M, Zins M, Berkman LF. Work and family demands: Predictors of all-cause sickness absence in the GAZEL cohort. Eur J Public Health. 2012;

14. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: A three month prospective study of nurses' aides. Occup Environ Med. 2003;60(4):271–8.

15. Sydsjö A, Sydsjö G, Wijma B. Increase in sick leave rates caused by back pain among pregnant Swedish women after amelioration of social benefits. A paradox. Spine (Phila Pa 1976). 1998;23(18):1986–90.

16. Vigoureux S, Blondel B, Ringa V, Saurel-Cubizolles M-J. Occupational, social and medical characteristics of early prenatal leave in France. Eur J Public Health. 2016;26(6):1022-1027.

17. Rieck KME, Telle K. Sick leave before, during and after pregnancy. Acta Sociol (United Kingdom). 2013;56(2):117–37.

18. Seglem KB, Ørstavik R, Torvik FA, Gjerde LC, Røysamb E, Reichborn-Kjennerud T, et al. Pre-pregnancy mental distress and musculoskeletal pain and sickness absence during pregnancy – a twin cohort study. Eur J Public Health [Internet]. 2017;27(3):477–81. Available from: https://academic.oup.com/eurpub/article-lookup/doi/10.1093/eurpub/ckw267

19. Alexanderson K, Hensing G, Carstensen J, Bjurulf P. Pregnancy-related sickness absence among employed women in a Swedish county. Scand J Work Environ Health. 1995;21(3):191–8.

20. Sydsjö A, Claesson I-M, Ekholm Selling K, Josefsson A, Brynhildsen J, Sydsjö G. Influence of obesity on the use of sickness absence and social benefits among pregnant working women. Public Health. 2007;121(9):656–62.

21. Eriksen W, Bruusgaard D. Physical leisure-time activities and long-term sick leave: A 15-month prospective study of nurses' aides. J Occup Environ Med. 2002; 44(6):530-8.

22. Pinto SM, Dodd S, Walkinshaw SA, Siney C, Kakkar P, Mousa HA. Substance abuse during pregnancy: effect on pregnancy outcomes. Eur J Obstet Gynecol Reprod Biol. 2010; 150(2):137-41.

23. Patra J, Bakker R, Irving H, Jaddoe VW V, Malini S, Rehm J. Dose-response relationship between alcohol consumption before and during pregnancy and the risks of low birthweight, preterm birth and small for gestational age (SGA)-a systematic review and meta-analyses. BJOG. 2011; 118(12):1411-21.

24. Banderali G, Martelli A, Landi M, Moretti F, Betti F, Radaelli G, et al. Short and long term health effects of parental tobacco smoking during pregnancy and lactation: A descriptive review. J Transl Medicine. 2015;13:327.

25. Sydsjö G, Sydsjö A. Newly delivered women's evaluation of personal health status and attitudes towards sickness absence and social benefits. Acta Obstet Gynecol Scand. 2002;81(2):104–11.

26. Bonde JP, Jørgensen KT, Bonzini M, Palmer KT. Miscarriage and occupational activity: A systematic review and meta-analysis regarding shift work, working hours, lifting, standing, and physical workload. Scand J Work Environ Health. 2013;39(4):325–34.

27. Lee LJ, Symanski E, Lupo PJ, Tinker SC, Razzaghi H, Chan W, et al. Role of maternal occupational physical activity and psychosocial stressors on adverse birth outcomes. Occup Env Med [Internet]. 2017;74(3):192–9. Available from: http://dx.doi.org/10.1136/

28. Bonzini M, Palmer KT, Coggon D, Carugno M, Cromi A, Ferrario MM. Shift work and pregnancy outcomes: A systematic review with meta-analysis of currently available epidemiological studies. BJOG. 2011;118(12):1429–37.

29. Villar R, Benavides FG, Serra L, Serra C. Prestación por riesgo durante el embarazo e incapacidad temporal en una cohorte de trabajadoras del Parc de Salut Mar (Barcelona, España). Gac Sanit. 2019 Sep-Oct;33(5):455-461.

30. Ministerio de empleo y seguridad social. Directrices Para La Evaluación De Riesgos Y Protección De La Maternidad En El Trabajo. Inst Nac Segur e Hig en el Trab [Internet]. 2012;1–134. Available from: www.insht.es/InshtWeb/Contenidos/Instituto/Noticias/Noticias_INSHT/2011/ficheros/2011_11_23_DIR_MATER.pdf

31. Villar R, Serra L, Serra C, Benavides FG. Working conditions and absence from work during pregnancy in a cohort of healthcare workers. Occup Environ Med. 2019 Apr;76(4):236-242. doi: 10.1136/oemed-2018-105369. Epub 2019 Jan 23. PMID: 30674607.

32. Gabadinho A, Ritschard G, Mueller NS, Studer M. Analyzing and Visualizing State Sequences in R with TraMineR. J Stat Softw. 2011; 40(4):1–37.

33. Kristensen P, Nordhagen R, Wergeland E, Bjerkedal T. Job adjustment and absence from work in mid-pregnancy in the Norwegian Mother and Child Cohort Study (MoBa). Occup Env Med. 2008;65(8):560–6.

34. Strand K. Work load, job control and risk of leaving work by sickness certification before delivery, Norway 1989. Scand J Soc Med. 1997;25(3):193–201.

35. Alexanderson K, Sydsjö A, Hensing G, Sydsjö G, Carstensen J. Impact of pregnancy on gender differences in sickness absence. Scand J Soc Med. 1996;24(3):169–76.

36. March A. Can reproductive age explain sickness absence in trends in women? A cohort study in Catalonia, 2012-2014 [Final Report] Pompeu Fabra University, Barcelona, Spain; 2018. Barcelona; 2018.

37. Malmqvist S, Kjaermann I, Andersen K, Økland I, Larsen JP, Brønnick K. The association between pelvic girdle pain and sick leave during pregnancy; a retrospective study of a Norwegian population. BMC Pregnancy Childbirth. 2015;15(1).

38. Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, Abdulkader RS, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet. 2017;390(10100):1260–344.

39. Olanre Okunribido; Tony Wynn. Ageing and work-related musculoskeletal disorders. A review of the recent literature. Research Report. Norwich: Health and Safety Executive. 2010.

40. Stafne SN, Vøllestad NK, Mørkved S, Salvesen KÅ, Stendal Robinson H. Impact of job adjustment, pain location and exercise on sick leave due to lumbopelvic pain in pregnancy: a longitudinal study. Scand J Prim Health Care. 2019 Jun;37(2):218-226

41. Backhausen M, Damm P, Bendix J, Tabor A, Hegaard H. The prevalence of sick leave: Reasons and associated predictors – A survey among employed pregnant women. Sex Reprod Healthc [Internet]. 2018;15:54–61. Available from: https://doi.org/10.1016/j.srhc.2017.11.005

42. Tophøj A, Mortensen J. Pregnancy-related and work-related sick leave of pregnant women. Ugeskr Laeger. 1999;161(36):5009–13.

43. Larsson C, Sydsjö A, Alexanderson K, Sydsjö G. Obstetricians' attitudes and opinions on sickness absence and benefits during pregnancy. Acta Obstet Gynecol Scand. 2006;85(2):165–70.