

## OBSTETRICS

# Working conditions in women with multiple pregnancy—the impact on preterm birth and adherence to guidelines: a prospective cohort study



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**BACKGROUND:** Women with multiple pregnancies are at risk for maternal complications such as preterm birth. Hazardous working conditions, such as physically demanding work and long and irregular working hours, might increase the risk of preterm birth.

**OBJECTIVE:** This study primarily aimed to determine whether certain working conditions up to 20 weeks of pregnancy increase the risk of preterm birth in multiple pregnancies. The secondary objective was to evaluate whether the working conditions of Dutch women with multiple pregnancy have been adjusted to the guidelines of the Netherlands Society of Occupational Medicine.

**STUDY DESIGN:** We performed a prospective cohort study alongside the ProTWIN trial, a multicenter randomized controlled trial that assessed whether cervical pessaries could effectively prevent preterm birth. Women with paid work of >8 hours per week completed questionnaires concerning general health and working conditions between 16 and 20 weeks of pregnancy. Univariable and multivariable logistic regression analyses were performed to identify work-related factors associated with preterm birth (32–36 weeks' gestation) and very preterm birth (<32 weeks' gestation). We analyzed a subgroup of participants who worked for more than half of the week (>28 hours). We calculated the proportion of women who reported work-related factors not in accordance with guidelines.

**RESULTS:** We studied 383 women, of whom 168 (44%) had been randomized to pessary, 142 (37%) to care as usual, and 73 (19%) did not participate in the randomized part of the study. After adjusting for confounding variables, working >28 hours was associated with very preterm birth (n=33; 78%) (adjusted odds ratio, 3.0; 95% confidence interval,

1.1–8.1), and irregular working times were associated with preterm birth (n=26, 17%) (adjusted odds ratio, 2.0; 95% confidence interval, 1.0–4.1) and very preterm birth (n=10; 24%) (adjusted odds ratio, 2.7; 95% confidence interval, 1.0–7.3). Within a subgroup of 213 participants working >28 hours per week, multivariable analysis showed that irregular working times (n=16; 20%) (adjusted odds ratio, 3.5; 95% confidence interval, 1.2–10.1) and no/little freedom in performance of tasks (n=23; 28%) (adjusted odds ratio, 3.0; 95% confidence interval, 1.3–7.3) were associated with preterm birth. Irregular working times (n=9; 27%) (adjusted odds ratio, 3.4; 95% confidence interval, 1.0–11.1), requiring physical strength (n=9; 27%) (adjusted odds ratio, 5.3; 95% confidence interval, 1.6–17.8), high physical workload (n=7; 21%) (adjusted odds ratio, 3.9; 95% confidence interval, 1.1–13.9), and no/little freedom in performing tasks (n=10; 30%) (adjusted odds ratio, 3.2; 95% confidence interval, 1.1–9.6) were associated with very preterm birth. Before 20 weeks of pregnancy, 224 (58.5%) women with multiple pregnancy continued to work under circumstances that were not in accordance with the guidelines.

**CONCLUSION:** In our cohort study, nearly 60% of women with multiple pregnancy continued to work under circumstances not in accordance with the guidelines to avoid physical and job strain and long and irregular working hours. Irregular hours were associated with preterm and very preterm birth, and long hours were associated with preterm birth.

**Key words:** job strain, maternity protection legislation, occupational exposure, physical workload, shift work, working hours

## Introduction

Many women continue to work during pregnancy.<sup>1,2</sup> Working conditions can lead to adverse pregnancy outcomes,

including preterm birth (PTB).<sup>3–10</sup> Infants born preterm are at higher risk of mortality and morbidity.<sup>11,12</sup> In 2015, 12 per 1000 births worldwide were twins,<sup>13</sup> and in the Netherlands, 15 out of 1000 births in 2020 involved a multiple pregnancy.<sup>14</sup>

Women with multiple pregnancies have an increased risk for PTB; 6- to 10-fold higher than that observed in singleton gestation.<sup>15,16</sup> In the United States, 60% of women with multiple pregnancy deliver before 37 weeks' gestation.<sup>17</sup> In the Netherlands, 45% of women with a multiple pregnancy deliver between 32 and 36 weeks' gestation (PTB), and almost 10% before 32

weeks' gestation (very PTB). These rates are comparable with those of other European countries.<sup>12</sup>

In the Netherlands, occupational physicians together with midwives and obstetricians have developed an evidence-based guideline for working pregnant women: “Pregnancy, Postpartum Period and Work.”<sup>18</sup> Taking into account the increased risk for PTB, growth restriction, and preeclampsia, this guideline provides advice to women with multiple pregnancy to “Avoid physical and job strain, and long and irregular working times throughout pregnancy; from 20 to 24 weeks, limit work to four hours per day, and stop

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## AJOG at a Glance

**Why was this study conducted?**

This study aimed to evaluate if working conditions of Dutch women with multiple pregnancy have been adjusted to the guidelines and whether working conditions increase the risk of preterm birth.

**Key findings**

Working >28 hours per week was associated with very preterm birth, and irregular working times were associated with preterm and very preterm birth. In a subgroup of participants working >28 hours per week, irregular working times and limited freedom in task performance were associated with preterm and very preterm birth, and high physical workload and requiring physical strength were associated with very preterm birth. Nearly 60% of women with multiple pregnancy continued to work not in accordance with the guidelines.

**What does this add to what is known?**

Following the guidelines to avoid physical and job strain and long and irregular working times throughout pregnancy may be able to prevent (very) preterm birth.

working at 26 to 30 weeks.” The authors point out that there is hardly any research into the impact of working conditions in multiple pregnancy.

Determining whether adjustment of working conditions in multiple pregnancies reduces the risk of PTB can support preventive measures. Therefore, the first aim of this study was to evaluate if the working conditions of Dutch women with multiple pregnancies have been adjusted in accordance with the guidelines. The second aim was to identify whether certain working conditions up to 20 weeks' gestation increase the risk of PTB in multiple pregnancies.

**Materials and Methods****Study design**

We performed a cohort study alongside the ProTWIN trial,<sup>19</sup> a multicenter, open-label randomized controlled trial that assessed cervical pessaries as a preventive measure for PTB in women with a multiple pregnancy. The study protocol and trial report have been published elsewhere.<sup>19,20</sup> Women with multiple pregnancy between 12 and 20 weeks of gestation eligible for the ProTWIN trial were asked to participate in this sub-study. Regardless of whether they decided to participate in the trial, women could participate in this sub-study. All participating women provided written informed consent. In addition to

the approval of the ProTWIN trial, this additional cohort study on work-related factors in pregnancy was approved by the research ethics committee of Amsterdam University Medical Center, location AMC (MEC 09-107) and by the boards of each of the 40 participating hospitals. The trial was registered in the Dutch trial register (NTR1858).

**Guidelines**

We used the recommendations for multiple pregnancy from the Dutch guideline “Pregnancy, Postpartum Period and Work”<sup>18</sup> (Figure 1). We defined work-related risk factors as >40 hours of work per week, irregular working times,  $\geq 16$  h/wk of standing and walking, physical strain, and problems with job strain. The exact definitions of these risk factors are listed in Table 1. We constructed a composite work risk variable, with which we compared “working in accordance with guidelines” (score 0 on risk factors) with “working in the presence of  $\geq 1$  risk factors” (score 1–5).

**Data collection**

We used a validated questionnaire on psychosocial job strain and physically demanding work,<sup>8</sup> supplemented with questions on other working conditions, for example, (irregular) working times, chemical, biological, and physical

factors, work adjustments, leisure time, and household characteristics.

Data on the gestational age at delivery and other outcomes related to delivery and maternal and perinatal morbidity were retrieved from patient files by local research nurses or midwives.

**Procedure**

From May 2010 until March 2012 every woman eligible for the ProTWIN study received a questionnaire (in Dutch language) at 16, 24, and 32 weeks' gestation, handed out by the attending research nurse, midwife, or obstetrician. The first questionnaires had to be completed before 20 weeks' gestation, the second before 28 weeks, and the third at 34 weeks' gestation. Completed questionnaires were received, checked, and digitalized.

**Participants**

The study focused on women with a multiple pregnancy, at 12 to 20 weeks of gestation, eligible for the ProTWIN trial, and with paid employment or self-employed, defined as paid work for at least 8 hours per week during the woman's first trimester.

**Outcome measurements**

The main outcome of this study was gestational age at delivery. The secondary outcome was the proportion of women with multiple pregnancy who are exposed to work-related risk factors, as defined in Table 1 (participant-reported and retrieved from the questionnaires [Supplemental Table 1]), that exceed the recommendations from the guideline “Pregnancy, Postpartum Period and Work” concerning multiple pregnancy, up to 20 weeks of gestation.

**Statistical analysis**

Baseline characteristics were presented as absolute numbers with percentages for categorical variables, and means with standard deviation (SD) or median with interquartile range (IQR) for continuous variables.

The analysis of the main outcome measure, PTB, was performed using logistic regression to estimate crude (OR) and adjusted odds ratios (aOR) with

FIGURE 1

## Recommendations multiple pregnancy and work, guideline “Pregnancy, Postpartum Period and Work” NVAB

Multiple pregnancy	Recommendations
	<ul style="list-style-type: none"> <li>➢ Advice, throughout pregnancy:               <ul style="list-style-type: none"> <li>– avoid physical and job strain</li> <li>– regular working times</li> <li>– working hours:                   <ul style="list-style-type: none"> <li>○ &lt; 20 weeks: ≤ 40 hours per week</li> <li>○ 20-24 weeks: ≤ 4 per day;</li> <li>○ 26-30 weeks: stop work*</li> </ul> </li> </ul> </li> <li>➢ Consider consulting with gynaecologist</li> <li>➢ Follow-up consultation around 20 weeks to check whether the adjustments have been made and work is not a risk</li> </ul>
	<p>* for multiple pregnancies: since 1-4-2016 maternity leave from 30 weeks of pregnancy. (for single pregnancy from 34-36 weeks).</p>

From:

NVAB. Practice guideline — Pregnancy, postpartum period and work. Advice and guidance by the occupational physician. NVAB, the Netherlands Society of Occupational Medicine: recommendations multiple pregnancy and work.

NVAB, Netherlands Society of Occupational Medicine.

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TABLE 1

## Work-related factors that exceed the limit values of guidelines for multiple pregnancy (&lt;20 weeks)

1. Working times >40 h/wk
2. Irregular working times (working in the evening and/or at night)
3. Standing+walking ≥16 h/wk
4. Physical strain<sup>a</sup>
5. Problems with pressure: often/always

<sup>a</sup> Sum score from 6 questions: bending, squatting, reaching high, requiring physical strength, physically demanding, uncomfortable or strenuous postures.

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95% confidence intervals (CIs). We compared women with PTB (32–36 weeks gestation) and very PTB (<32 weeks gestation) with women who delivered at term (≥37 weeks gestation). Demographic and pregnancy characteristics and working conditions at 16 to 20 weeks' gestation were used as explanatory variables. ORs were adjusted for a set of predetermined risk factors known to be associated with risks for PTB (age, body mass index [BMI], level of education, parity) and factors with significant baseline differences between groups (parity, assisted conception, ethnicity). A subgroup analysis for the association between gestational age and working conditions in the group of participants working >28 hours per week was performed by stratification. We opted for a cutoff of >28 hours because this equals to working for more than half a week (>3.5 days per week) and can be considered as the point at which work-related factors become an important part of daily life.

A sum score of “physical workload” was calculated on the basis of 4 questions concerning physical work. Scale reliability (Cronbach) was 0.83. For analysis, these questions were dichotomized:

“never sometimes” (score 0) vs “often always” (score 1), and then the sum score was calculated. The sum score of physical workload was dichotomized into: “high” (score 3–4) vs “low-moderate” (≤2).

The analysis of the second outcome measure, a constructed composite work-related variable, was based on work-related factors, as defined in Table 1. They were measured as categorical and numeric variables, and dichotomized. Three factors were based on 1 question each: “working >40 h/wk,” “irregular working times,” and “problems with job strain often/always.” The factor “standing and walking ≥16 h/wk” was constructed from 2 questions (working h/wk, and percentage standing and walking). The factor “physical strain” was the sum score of 6 questions concerning physical work. Scale reliability (Cronbach alpha) was 0.87. These questions were dichotomized: “never sometimes” (score 0) vs “often always” (score 1), and then the sum score was calculated. A score of 1 to 6 was classified as “physical strain.”

The constructed composite work-related variable comprised 1 point for each work-related factor present (Table 1). Participants whose working

conditions complied with guideline recommendations scored 0. The composite work-related variable was dichotomized, comparing no risk factors present (score 0) with ≥1 risk factors present (score 1–5).

Missing baseline values of demographic and pregnancy characteristics (BMI, race, education, smoking, parity, previous PTB, triplets, chorionicity, cervical length, and gestational age) used in multivariable models were imputed using multiple imputation under the missing-at-random assumption. Data were missing for 18% of patients on ≥1 variables of interest. Ethnicity, BMI, and level of education were most commonly missing (11% and both 9%, respectively). Data of work-related questionnaires were less commonly missing (>91% complete). Imputation was conducted using SAS 9.4 (SAS Institute, Cary, NC) with fully conditional specification, creating 25 imputation datasets.<sup>21</sup> Both data measured directly and derived variables were included in the models. The continuous variables of BMI and gestational age were categorized and imputed using dummy variables. Additional variables (pregnancy characteristics, gestational age) were included in the model as predictors of missingness. Model convergence was evidenced by plots. Values after imputation were plausible for the variables concerned. Weighing and pooling of

results over imputation sets was done using Rubin's rules.<sup>21</sup>

Analyses were performed using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp, Armonk, NY). *P* values <.05 were considered statistically significant.

## Results

Between May 2010 and March 2012, 996 women met the cohort's inclusion criteria, of whom 813 had been recruited in the ProTWIN trial. Because questionnaires on workload were introduced later during the trial, 324 participants did not receive the questionnaires. Of the 672 women (68%) who received a questionnaire, 449 (67%) returned a completed one. Of these 449 women, 61 women (16%) did not have paid employment, and 5 women (1%) worked <8 h/wk and were excluded, whereas 383 (85%) had paid employment status and were suitable for our analysis (Figure 2). The analysis population of this study consisted of these 383 women, of whom 189 (49%) delivered at

term ( $\geq 37$  weeks' gestation), 152 (40%) delivered between 32 and 36 weeks, and 42 (11%) delivered at <32 weeks.

Baseline characteristics are outlined in Table 2, Supplementary Tables 2 and 3. Mean maternal age at inclusion was 32 (SD, 4.1) years and the mean BMI was 25 (IQR, 21.3–26.3). Most women were White ( $n=358$ ; 93%) and had completed a higher professional education or university ( $n=260$ ; 68%). Of the included women, 223 (58%) were nulliparous and 160 (42%) multiparous, of whom 9 (6%) had a history of PTB. Almost one-third of the participants (31%) worked in the healthcare sector, and 62% worked in a company with >50 employees. A total of 168 (44%) women had been randomized to pessary use and 142 (37%) to the control group, and 73 (19%) women did not participate in the randomized part of the study.

## Associations between working conditions and gestational age

Results of univariable analysis with demographic and pregnancy characteristics

are listed in Table 3. PTB occurred more frequently among participants with ethnic origin "other than Caucasian" (OR, 3.5; 95% CI, 1.1–11.4) and nulliparity (OR, 1.8; 95% CI, 1.2–2.9). Nulliparity (OR, 4.8; 95% CI, 2.0–11.2) and assisted conception (OR, 2.1; 95% CI, 1.1–4.2) were associated with very PTB.

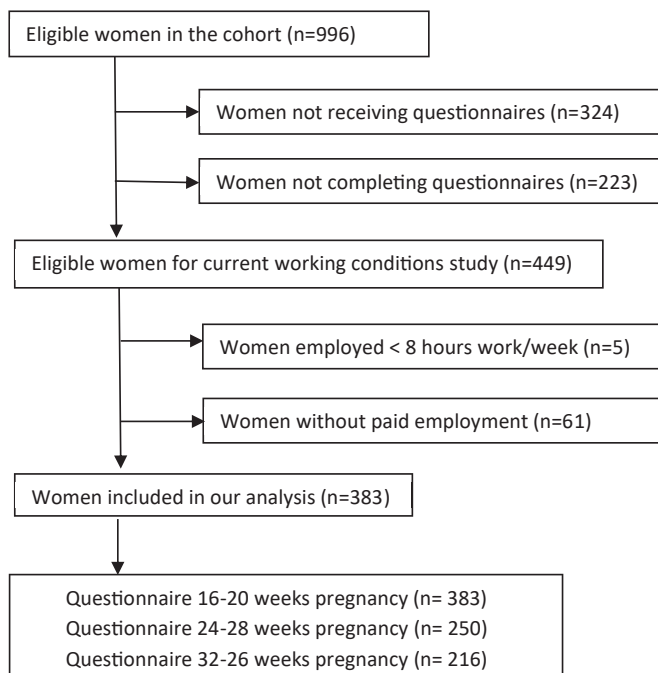
Table 4 and Supplemental Table 4 show the results of univariable analyses with working conditions and PTB within the total population. Working >28 hours at 16 to 20 weeks of gestation (OR, 3.3; 95% CI, 1.5–7.2) and performing irregular working times (OR, 2.5; 95% CI, 1.1–5.7) were associated with very PTB.

In the subgroup of participants working >28 hours per week, irregular working times (OR, 2.8; 95% CI, 1.1–6.9) and no/little freedom in performance of tasks (OR, 2.4; 95% CI, 1.1–5.1) were associated with PTB (Table 7; Supplemental Table 5). Furthermore, the following work-related factors were associated with very PTB: irregular working times (OR, 4.2; 95% CI, 1.5–12.0), requiring physical strength (OR, 4.2; 95% CI, 1.5–12.1), high physical workload (sum score of 4 questions concerning physical work) (OR, 4.0; 95% CI, 1.2–13.0), and no/little freedom in performance of tasks (OR, 2.6; 95% CI, 1.02–6.7) (Table 5; Supplemental Table 5).

Results of the multivariate analysis between working conditions and PTB are shown in Tables 6 and 7. In the analyses within the total study population, working >28 hours was associated with very PTB (aOR, 3.02; 95% CI, 1.1–8.1), and irregular working times were associated with PTB (aOR, 2.0; 95% CI, 1.01–4.1) and very PTB (aOR, 2.7; 95% CI, 1.0–7.3) (Table 6).

In the subgroup analyses with participants working >28 hours per week, irregular working times (aOR, 3.5; 95% CI, 1.2–10.1) and no/little freedom in performance of tasks (aOR, 3.0; 95% CI, 1.3–7.3) were associated with PTB (Table 7). Within this subgroup, irregular working times (aOR, 3.4; 95% CI, 1.02–11.1), requiring physical strength (aOR, 5.3; 95% CI, 1.6–17.8), high physical workload (aOR, 3.9; 95% CI,

**FIGURE 2**  
Selection of the study cohort





**TABLE 2**  
**Baseline characteristics of the study population<sup>a</sup>**

N=383	After imputation
<b>Demographics and general health</b>	
Maternal age <sup>b</sup> (y) (Mean, SD) (IQR)	32 (4.1) (30–35)
– ≤35	298 (77.8%)
– >35	83 (21.7%)
BMI (Mean, SD) (IQR)	25 (5) (21–26)
– <18.5	10 (3%)
– 18.5–25.0	247 (65%)
– >25.0–30.0	71 (18%)
– >30.0	55 (14%)
<b>Ethnic origin:</b>	
– White European	358 (93%)
– Non-White European	25 (7%)
<b>Highest educational level</b>	
– Primary or secondary school or Lower professional education	123 (32%)
– Higher professional education or University	260 (68%)
Smoking during pregnancy	21 (6%)
Physical activity (sports) during pregnancy	118 (31%)
<b>Pregnancy characteristics</b>	
Nulliparous	223 (58%)
Multiparous	160 (42%)
Multiparous, previous preterm birth	9 (6% [from 160])
Cervical length (20 wk) ≤25 mm	19 (5%)
<b>Conception<sup>c</sup></b>	
– Spontaneous conception – no (%)	231 (60%)
– Assisted conception	135 (35%)
Triplets	11 (3%)
Monochorionic	82 (21%)
Pessary <sup>d</sup>	168 (44%)
<b>Gestation (wk)</b>	
– <32	43 (11%)
– 32 to <37	152 (40%)
– ≥37	189 (49%)
<b>Work: general aspects</b>	
	n (%)
<b>Employment sector</b>	
– Health care	118 (31%)
– Financial and business services	70 (18%)
– Education, child care, and welfare	67 (17%)
– Government	46 (12%)
– Retail and hospitality industry	37 (10%)

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1.1–13.9), and no/little freedom in performing tasks (aOR, 3.2; 95% CI, 1.1–9.6) were associated with very PTB.

### Adherence to guidelines

From 16 to 20 weeks of pregnancy, 224 (58.5%) women with multiple pregnancy continued to work under circumstances that were not in accordance with the guidelines (Table 8). An overview of risk factors contributing to exceeding the limits of guidelines and legislation on work during pregnancy is shown in Table 3. Physical strain (sum score of 6 questions concerning physical work) (166; 43%) and prolonged standing and walking (119; 31%) were the risk factors most frequently exceeded before 20 weeks of pregnancy.

### Comment

#### Principal findings

In this study, we found that before 20 weeks of pregnancy, working >28 hours and irregular working times were associated with very PTB (<32 weeks of gestation), and irregular working times were associated with PTB (32–36 weeks of gestation). In the subgroup of participants working >28 hours per week, irregular working times and no/little freedom in performing tasks were associated with PTB (32–36 weeks of gestation) and very PTB. Requiring physical strength and high physical workload were associated with very PTB.

Before 20 weeks of pregnancy, nearly 60% of women with multiple pregnancy continued to work under circumstances not in accordance with the guidelines of the Netherlands Society of Occupational Medicine (NVAB).<sup>18</sup> Physical strain (43%) and prolonged standing and walking (31%) were the most frequently exceeded risk factors.

#### Results in the context of what is known

Our study found a proportion of nearly 60% of women with multiple pregnancy who continued to work under circumstances not in accordance with the guidelines, which is higher than that found in groups of women with low-risk pregnancies (40% before 20 weeks' gestation).<sup>22</sup> There are only a few

**TABLE 2**  
**Baseline characteristics of the study population<sup>a</sup>** (continued)

N=383	After imputation	
– Industry/transport	25 (6%)	
– Culture, recreation	14 (4%)	
– Other or unknown	6 (2%)	
Number of employees in the company >50	239 (62%)	
Travel distance commuting, km (mean, SD) (IQR)	33 (±37) (6–48)	
	58 (+/- 40) (0-240)	
Travel time commuting, min/h (mean, SD) (IQR)	53 (±40) (25–60)	
Household conditions		
Care for children (living at home): Yes	162 (42%)	
	1 child	2 children
● 0–4 y	143 (37%)	11 (3%)
● >5 y	50 (13%)	19 (5%)
No half-day eq. childcare (mean, SD) (min-max) (n=152)	5 (±2) (1–10)	
Housekeeping largely done by participant herself	87 (23%)	

BMI, body mass index; IQR, interquartile range; SD, standard deviation.

<sup>a</sup> All variables shown as number (percentage); <sup>b</sup> Missing: 2 (0.5%); <sup>c</sup> Missing: 17 (5%); <sup>d</sup> Not participating in randomized part of the study: 73 (19%).

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guidelines (accessible and in English) on multiple pregnancy with recommendations on working conditions, mostly limited to general advice.<sup>23–25</sup> It is unknown whether they are followed.

There are no previous studies into the impact of working conditions on PTB in multiple pregnancies because these pregnancies are usually excluded because of their high risk of PTB. Two recent meta-analyses showed that long working hours, rotating shifts, and high physical workload were associated with PTB in singleton pregnancies.<sup>6,7</sup> The difference between singleton and multiple pregnancies, which have higher risk of complications, may explain why the ORs are somewhat higher in our study.

### Strengths and limitations

In this study, we prospectively and accurately identified various work-related risk factors of women with multiple pregnancies at different periods of pregnancy.

This study examined the impact of working conditions in multiple

pregnancies and provided direct evidence for the recommendations of the NVAB guideline. These have been formulated in accordance with (weighting the strength of) scientific evidence on the increased risk of PTB, growth restriction, and pre-eclampsia in multiple pregnancies.

To prevent bias, we only included pregnant women with paid work because employment during pregnancy is associated with a reduction in the risk of PTB.<sup>26</sup> Compared with the baseline characteristics of a recent randomized controlled trial (n=13,520) in a low-risk pregnancy population in the Netherlands, BMI and age were comparable, but the highly educated, White, nulliparous, and nonsmoking women were overrepresented in our study.<sup>27</sup> The sectors in which the participants worked are a reflection of the national Dutch figures.<sup>28</sup> In our study, nulliparas were overrepresented. As in our study, they have been found to have a higher risk of PTB than multiparous women without a history of PTB.<sup>29</sup> Probably because of the

low number of multiparas with previous PTB (6%), their risk of PTB was not increased in our study. Therefore, we only adjusted for the variable of parity.

The number of participants who gave birth between 32 and 36 weeks' gestation was lower than the average in the Netherlands (40% vs 45%), whereas the number of those who gave birth before 32 weeks' gestation was slightly higher (11% vs 10%).<sup>12</sup> The rate of monochorionic pregnancies, which have a higher risk of PTB compared with dichorionic pregnancies, was comparable to the mean incidence (21% vs 20%).<sup>30</sup> To minimize the impact of demographic and pregnancy-related factors on the outcome of PTB, we adjusted for the risk factors that significantly increased the risk of PTB (parity, ethnicity, and assisted conception).

Presentation of the results took place approximately 10 years after data collection. Because medical and occupational health policies for women with multiple pregnancies have not changed during this period, we do not expect this to affect the primary and secondary outcomes of our study.

The association between the composite work-related variable (working according to guideline, as measured using various separate working conditions) and gestational age did not clearly reveal the value of independent components for this score, and therefore we chose not to present these results.

Missing values of demographic and pregnancy characteristics could have caused bias of the results, despite imputation. Data were mainly missing from women eligible for participating in the ProTWIN trial who refused randomization and did not allow their pregnancy outcomes to be recorded.

### Implications for research and practice

Adverse pregnancy outcomes, such as PTB, have an enormous impact on well-being of parents and children.<sup>12</sup> No guideline identified an effective strategy for women with multiple pregnancies to prevent PTB.<sup>31</sup> This study confirms that avoiding physical

TABLE 3

**Univariable associations with demographic and pregnancy characteristics in women with preterm birth and very preterm birth compared with women with delivery at term (total study population)**

Participants at 16–20 weeks' pregnancy Total study population	Total 383 N (%)	≥37 wk 189 (49%) %	32–36 wk 152 (40%) %	<32 wk 42 (11%) %	32–36 wk vs ≥37 wk		<32 wk vs ≥37 wk	
					OR	(95% CI)	OR	(95% CI)
Age >35 vs ≤35	83 (21.8%)	23.4	20.3	19.6	0.83	0.49–1.41	0.8	0.34–1.85
<b>BMI groups</b>								
• 18.5–25 (ref)	247 (65%)	61.4	69.8	59.5				
• BMI ≤18.5 vs 18.5–25	10 (3%)	3.1	2.6	1.4	0.72	0.14–3.63	0.00	0.0–0.0
• BMI >25–30 vs 18.5–25	71 (18%)	18.4	16.3	26.3	0.78	0.43–1.43	1.48	0.65–3.37
• BMI >30 vs 18.5–25	55 (14%)	17.2	11.1	13.5	0.57	0.28–1.15	0.81	0.28–2.31
Education, low–middle vs high	123 (32%)	30.3	35.4	27.5	1.25	0.77–2.04	0.74	0.40–1.91
Ethnic origin, other vs White European	25 (7%)	3.3	10.3	7.5	3.50 <sup>a</sup>	1.07–11.44 <sup>a</sup>	2.33	0.46–11.80
Parity, 0 vs >0 (ref)	223 (58%)	48.7	63.3	81.9	1.83 <sup>a</sup>	1.16–2.86 <sup>a</sup>	4.77 <sup>a</sup>	2.03–11.20 <sup>a</sup>
Previous PTB, yes vs no	9 (2%)	2.4	2.2	2.8	1.34	0.29–6.11	3.90	0.37–41.53
Twin monochorionic vs dichorionic	82 (21%)	17.8	26.2	24.3	1.64	0.94–2.87	1.49	0.64–3.44
Cervical length ≤25 mm vs >25 mm	19 (5%)	3.6	6.6	5.6	2.04	0.44–9.38	1.70	0.23–12.69
Smoking	21 (6%)	5.7	5.2	6.6	0.85	0.25–2.92	1.13	0.25–5.11
Assisted conception	135 (37%)	34.4	35.8	52.5	1.07	0.67–1.69	2.11 <sup>a</sup>	1.06–4.22 <sup>a</sup>

BMI, body mass index; CI, confidence interval; OR, odds ratio; PTB, preterm birth; ref, reference.

<sup>a</sup> Association is statistically significant.

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TABLE 4

**Univariable associations with working conditions in women with preterm birth and very preterm birth compared with women with delivery at term: total study population**

Participants at 16–20 weeks' pregnancy Total study population	Total 383 %	≥37 wk 189 (49%) %	32–36 wk 152 (40%) %	<32 wk 42 (11%) %	32–36 wk vs ≥37 wk		<32 wk vs ≥37 wk	
					OR	(95% CI)	OR	(95% CI)
Working >28 h/wk vs ≤28 (ref)	56	52	54	78	1.06	0.69–1.63	3.26 <sup>a</sup>	1.48–7.18 <sup>a</sup>
Irregular working times: yes vs no	15	11	17	24	1.65	0.89–3.08	2.46 <sup>a</sup>	1.06–5.72 <sup>a</sup>
Standing/walking ≥15 h/wk	31	28	35	36	1.21	0.94–1.54	1.47	0.72–2.99
High physical workload <sup>b</sup>	12	9	14	19	1.66	0.84–3.30	2.41	0.93–5.81
<b>Job strain</b>								
Problems with pressure <sup>c</sup>	13	11	13	19	1.14	0.59–2.20	1.84	0.75–4.50
Freedom in performing tasks <sup>d</sup>	29	25	34	29	1.56	0.97–2.52	1.24	0.57–2.64
Influence on pace <sup>c</sup>	47	44	50	52	1.32	0.86–2.04	1.43	0.73–2.80

CI, confidence interval; OR, odds ratio; ref, reference.

<sup>a</sup> Association is statistically significant; <sup>b</sup> Sum score of physical workload, high vs low–moderate: sum of 4 variables: lifting, physically very demanding, requiring physical strength, strenuous postures; <sup>c</sup> Often-always vs never-sometimes (ref); <sup>d</sup> Never-sometimes vs often-always (ref).

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TABLE 5

**Univariable associations with working conditions in women with preterm birth and very preterm birth compared with women with delivery at term: subgroup of participants working >28 h/wk**

Participants at 16–20 weeks' pregnancy Subgroup working >28 h/wk	Total 213 %	≥37 wk 99 (46%) %	32–36 wk 81 (38%) %	<32 wk 33 (16%) %	32–36 wk vs ≥37 wk		<32 wk vs ≥37 wk	
					OR	(95% CI)	OR	(95% CI)
Irregular working times: yes vs no	16	8	20	27	2.78 <sup>a</sup>	1.12–6.88 <sup>a</sup>	4.22 <sup>a</sup>	1.47–12.10 <sup>a</sup>
Standing/walking ≥15 h/wk	34	29	39	34	1.56	0.83–2.96	1.38	0.60–3.18
Requiring physical strength <sup>b</sup>	14	8	16	27	2.16	0.85–5.50	4.22 <sup>a</sup>	1.47–12.10 <sup>a</sup>
High physical workload <sup>c</sup>	10	6	11	21	1.87	0.64–5.49	4.02 <sup>a</sup>	1.24–13.00 <sup>a</sup>
Job strain								
Problems with pressure <sup>b</sup>	15	15	21	16	0.97	0.42–2.20	1.49	0.55–4.05
Freedom in performing tasks <sup>d</sup>	22	14	28	30	2.37 <sup>a</sup>	1.10–5.11 <sup>a</sup>	2.63 <sup>a</sup>	1.02–6.74 <sup>a</sup>
Influence on pace <sup>d</sup>	45	39	49	54	1.54	0.84–2.82	1.90	0.86–4.23

CI, confidence interval; OR, odds ratio; ref, reference.

<sup>a</sup> Association is statistically significant; <sup>b</sup> Often-always vs never-sometimes (ref); <sup>c</sup> Sum score of physical workload, high vs low–moderate: sum of 4 variables: lifting, physically very demanding, requiring physical strength, strenuous postures; <sup>d</sup> Never-sometimes vs often-always (ref).

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and job strain and long and irregular working hours throughout pregnancy may be able to prevent (very) PTB. Because there are hardly any evidence-based guidelines for working women with other medically complicated pregnancies, it is worth considering applying these recommendations to them as well.

Experiences observed during the COVID-19 pandemic seem to

support these recommendations. During periods of strict restrictive measures to prevent the transmission of SARS-CoV-2, the number of PTBs fell in several countries. In Australia, this reduction was higher in women with a previous PTB, who may have benefited from restrictive measures such as cessation of working.<sup>32</sup>

Further research is needed in working women with multiple

pregnancy and other medically complicated pregnancies, with lower educational level and ethnicity other than White. In addition to PTB, also focusing on adverse outcomes such as growth restriction and pre-eclampsia may help support the cost-effectiveness of work adjustment early in pregnancy for working pregnant women with high-risk pregnancies.

TABLE 6

**Multivariable associations with working conditions in women with preterm birth and very preterm birth compared with women with delivery at term: total study population**

Participants at 16–20 weeks' pregnancy Total study population, n=383	32–36 wk vs ≥37 wk		<32 wk vs ≥37 wk	
	aOR <sup>a</sup>	(95% CI)	aOR <sup>a</sup>	(95% CI)
Working >28 h/wk vs ≤28 (ref)	0.95	0.57–1.58	3.02 <sup>b</sup>	1.13–8.07 <sup>b</sup>
Irregular working times	2.03 <sup>b</sup>	1.01–4.07 <sup>b</sup>	2.7 <sup>b</sup>	1.00–7.28 <sup>b</sup>
Physical work				
Requiring physical strength <sup>c</sup>	1.56	0.82–3.03	2.12	0.8–5.63
High physical workload <sup>d</sup>	1.67	0.77–3.6	2.12	0.71–6.31

aOR, adjusted odds ratio; CI, confidence interval; ref, reference.

<sup>a</sup> Adjusted for parity, assisted conception, ethnicity, age, body mass index, age, education; <sup>b</sup> Association is statistically significant; <sup>c</sup> Often-always vs never-sometimes (ref); <sup>d</sup> Sum score of physical workload, high vs low-moderate: sum of 4 variables: lifting, physically very demanding, requiring physical strength, strenuous postures.

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TABLE 7

**Multivariable associations with working conditions in women with preterm birth and very preterm birth compared with women with delivery at term: subgroup of participants working >28 h/wk**

Participants at 16–20 weeks' pregnancy Subgroup working >28 h/wk n=213	32–36 wk vs ≥37 wk		<32 wk vs ≥37 wk	
	aOR <sup>a</sup>	(95% CI)	aOR <sup>b</sup>	(95% CI)
Irregular working times	3.5 <sup>c</sup>	1.23–10.05 <sup>c</sup>	3.36 <sup>c</sup>	1.02–11.06 <sup>c</sup>
Physical work				
Requiring physical strength <sup>d</sup>	1.99	0.66–6.0	5.31 <sup>c</sup>	1.59–17.78 <sup>c</sup>
High physical workload <sup>e</sup>	1.94	0.6–6.23	3.87 <sup>c</sup>	1.08–13.94 <sup>c</sup>
Job strain				
Freedom in performing tasks <sup>f</sup>	3.02 <sup>c</sup>	1.25–7.25 <sup>c</sup>	3.21 <sup>c</sup>	1.08–9.56 <sup>c</sup>

aOR, adjusted odds ratio; BMI, body mass index; CI, confidence interval; ref, reference.

<sup>a</sup> Adjusted for parity, assisted conception, ethnicity, age, BMI, age, education; <sup>b</sup> Adjusted for parity, assisted conception, age, BMI, education (ethnicity=too sparse); <sup>c</sup> Association is statistically significant; <sup>d</sup> Often-always vs never-sometimes (ref); <sup>e</sup> Sum score of physical workload, high vs low-moderate: sum of 4 variables: lifting, physically very demanding, requiring physical strength, strenuous postures; <sup>f</sup> Never-sometimes vs often-always (ref).

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**Conclusion**

In multiple pregnancies before 20 weeks' gestation, long (>28 h/wk) and irregular working hours were associated with very PTB (<32 weeks of gestation), and irregular working hours were associated with PTB (32–36 weeks of gestation). In the group of participants working >28 hours per week, irregular working hours and little or no freedom in performance of tasks were associated with PTB and very PTB, and working

with high physical strain was associated with very PTB. Before 20 weeks of gestation, nearly 60% of women with multiple pregnancy continued to work under circumstances not in accordance with the guidelines of the NVAB. Adjustment of working conditions according to the recommendations of the NVAB guideline on multiple pregnancies (to avoid physical and job strain and long and irregular working hours throughout pregnancy) may be able to prevent (very) PTB. ■

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TABLE 8

**Number and specification of work-related risk factors that exceeded the limit values of guidelines<sup>a</sup>**

Work-related risk factors that exceeded the limit values of guidelines (N=383)			
Number of risk factors	16–20 weeks' pregnancy	Specification of risk factors	16–20 weeks' pregnancy
None	159 (41.5%)	>40 h/wk	16 (4%)
≥1	224 (58.5%)	Irregular working times	57 (15%)
1	97 (25%)	≥16 h standing+walking/wk	119 (31%)
2	78 (20%)	Physical strain <sup>b</sup>	166 (43%)
3	44 (12%)	Problems with job strain often/always	48 (13%)
4	5 (1%)		

<sup>a</sup> Shown as number (percentage); <sup>b</sup> Sum score of 6 questions on: bending, squatting, reaching high, requiring physical strength, physically demanding, uncomfortable, or strenuous postures.

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Authors are willing to share data on reasonable request.

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## Appendix

## SUPPLEMENTAL TABLE 1

## Questions used for information about risk factors (Table 1)

1. How many hours per week do you currently work on average? \_\_\_\_\_ hours a week

2. Do you work in irregular shifts?

No

Yes

How many of your working hours do you on average spend on these shifts a week?

\_\_\_\_\_ % in day shifts

\_\_\_\_\_ % in evening shifts (until 23:00)

\_\_\_\_\_ % in night shifts

3. During your work, how many hours a day do you have to:

Walk? \_\_\_\_\_ %

Stand? \_\_\_\_\_ %

Sit? \_\_\_\_\_ %

For the next couple of questions, please indicate every time how often certain things occur at the moment.

You can choose between the following answers: **never, sometimes, often, always.**

	Never	Sometimes	Often	Always
4. Do you have to bend over during work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you have to squat during work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you have to reach high during work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Do you think your work is requiring physical strength?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you think your work is very physically demanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Do you work in an uncomfortable or strenuous position?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you have problems with the pressure of work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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SUPPLEMENTAL TABLE 2

Work status and working conditions by gestational time<sup>a</sup>

Work status and working conditions	16–20 weeks' pregnancy N=383	24–28 weeks' pregnancy N=333	32–36 weeks' pregnancy N=216
<b>Current work status</b>			
Usual working hours	284 (74%)	141 (42%)	32 (15%)
Less than usual because of illness	99 (26%)	109 (33%)	29 (13%)
No work because of illness	0	75 (23%)	114 (53%)
Pregnancy leave	0	8 (2%)	41 (19%)
At work	n=383 (100%)	n=250 (75%)	n=61 (28%)
<b>Working hours</b>			
H/wk <sup>b</sup>	29 (±9) (8–70)	24 (±10) (4–50)	23 (±11) (4–42)
Irregular working times (yes)	58 (15%)	11 (4%)	1 (2%)
<b>H/wk per shift</b>			
• Day shifts <sup>b</sup>	18 (±9) (0–42)	21 (±8) (6–34)	
• Evening shifts <sup>b</sup>	10 (±7) (0–30) (n=57)	5 (±2) (2–9) (n=11)	n=1, 10 h/wk
• Night shifts <sup>b</sup>	2 (±4) (0–18) (n=14)	n=1, 6 h/wk	
<b>Physical work</b>			
Work posture (hours/week)		NA <sup>c</sup>	NA <sup>c</sup>
• Walking <sup>b</sup>	7 (±6) (0–30)		
• Standing <sup>b</sup>	5 (±6) (0–40)		
• Sitting <sup>b</sup>	18 (±12) (0–70)		
<b>Physical work (often/always)</b>			
Lifting/carrying	68 (18%)	14 (6%)	1 (2%)
Bending	122 (32%)	39 (15%)	3 (5%)
Reaching high	29 (8%)	13 (5%)	2 (3%)
Repetitive motion	142 (37%)	79 (33%)	15 (25%)
Physically demanding	82 (21%)	35 (14%)	8 (14%)
Requiring physical strength	68 (18%)	20 (8%)	4 (7%)
Uncomfortable or strenuous postures	50 (13%)	20 (8%)	4 (7%)
On a strenuous machine or assembly line	3 (1%)	1 (0%)	0
<b>Job strain (often/always)</b>			
Problems with work pace	9 (2%)	12 (5%)	4 (7%)
Problems with the pressure	48 (13%)	25 (10%)	8 (13%)
Like to take things a little easier	77 (21%)	51 (22%)	10 (16%)
Freedom in performance of tasks	273 (71%)	201 (80%)	52 (86%)
Influence on the pace	202 (53%)	164 (66%)	46 (77%)
Planning own work	237 (62%)	183 (73%)	52 (86%)
Support from manager	260 (68%)	182 (73%)	46 (76%)
Support of colleagues	309 (81%)	214 (86%)	51 (44%)
Varied work	289 (75%)	192 (77%)	49 (80%)
freedom planning working times	143 (37%)	143 (57%)	43 (71%)
Physical factors (yes)		NA <sup>c</sup>	NA <sup>c</sup>

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(continued)

## SUPPLEMENTAL TABLE 2

Work status and working conditions by gestational time<sup>a</sup> (continued)

Work status and working conditions	16–20 weeks' pregnancy N=383	24–28 weeks' pregnancy N=333	32–36 weeks' pregnancy N=216
Heat	24 (6%)		
Cold	19 (5%)		
Noise	46 (13%)		
Biological agents	147 (38%)	NA <sup>c</sup>	NA <sup>c</sup>
Small and/or sick children	77 (20%)		
Sick adults	73 (19%)		
Blood or other bodily fluids	59 (15%)		
Animals, raw meat, waste (-water)	25 (8%)		
Stool	64 (17%)		
Nature (forests, gardens)	5 (1%)		
Chemical agents (yes) (more options)	78 (20%)	NA <sup>c</sup>	NA <sup>c</sup>
Cleaning supplies	49 (13%)		
Solvents (paint, lacquer, glue, detergents)	16 (4%)		
Anesthetic gases	5 (1%)		
Cancer inhibitory medication	10 (3%)		
Pesticides	3 (1%)		
Heavy metals/metallic compounds	5 (15%)		
Other "medication"	6 (2%)		
Hair dye/nail polish remover	4 (1%)		

NA, not applicable.

<sup>a</sup> All variables shown as number (percentage); <sup>b</sup> (mean, standard deviation) (min-max); <sup>c</sup> Not in questionnaire.

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**SUPPLEMENTAL TABLE 3**  
**Work advice and adjustments<sup>a</sup>**

	16–20 weeks' pregnancy n=383	24–28 weeks' pregnancy n=333	32–36 weeks' pregnancy n=216
At work	383 (100%)	250 (75%)	61 (28%)
Work adjustment because of current pregnancy	143 (37%)	169 (68%)	52 (85%)
• Less physically demanding work	55 (15%)	59 (24%)	10 (16%)
• Other working hours	41 (11%)	41 (16.5%)	13 (21%)
• Less hours a day	90 (24%)	120 (48%)	34 (56%)
• Plan work yourself	44 (12%)	57 (23%)	20 (33%)
		(0) 1	
• Other (less work, slower work pace)	83 (22%)	105 (42%)	19 (31%)
Advice to adjust work from:			
• Own initiative	43 (16%)	95 (38%)	38 (62%)
• Obstetrician	NA <sup>b</sup>	104 (42%)	24 (40%)
• Occupational physician	2 (1%)	53 (21%)	10 (16%)
• Manager	25 (9%)	45 (18%)	14 (23%)
• Other (partner, colleague, obstetrician) (=first questionnaire)	9 (2%)	23 (9%)	6 (10%)

NA, not applicable.

<sup>a</sup> All variables shown as number (percentage); <sup>b</sup> Not in questionnaire.

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## SUPPLEMENTAL TABLE 4

## Univariable associations with working conditions in women with preterm birth and very preterm birth compared with women with delivery at term (total study population)

Participants at 16–20 weeks' pregnancy Total study population	Total	≥37 wk	32–36 wk	<32 wk	32–36 wk vs ≥37 wk			<32 wk vs ≥37 wk		
	383 %	189 (49%) %	152 (40%) %	42 (11%) %	OR	(95% CI)	Pvalue	OR	(95% CI)	Pvalue
Working hours >28 h/wk vs ≤28 (ref)	56	52	54	78	1.06	0.69–1.63	.80	3.26	1.48–7.18	.003 <sup>a</sup>
Irregular working times: yes vs no	15	11	17	24	1.65	0.89–3.08	.11	2.46	1.06–5.72	.036 <sup>a</sup>
Physical work										
Standing/walking ≥15 h/wk	31	286	35	36	1.21	0.94–1.54	.15	1.47	0.72–2.99	.294
a. Lifting <sup>b</sup>	18	16	19	22	1.21	0.68–2.13	.52	1.43	0.62–3.30	.407
b. Physically very demanding <sup>b</sup>	21	20	22	26	1.15	0.68–1.95	.61	1.45	0.67–3.15	.346
c. Requiring physical strength <sup>b</sup>	18	15	21	26	1.54	0.88–2.73	.13	2.11	0.95–4.70	.067
d. Strenuous postures <sup>b</sup>	13	11	14	19	1.28	0.67–2.45	.46	1.89	0.77–4.64	.165
Sum score a–d, high vs low–moderate	12	9	14	19	1.66	0.84–3.30	.17	2.41	0.93–5.81	.061
Job strain										
Problems with pressure <sup>b</sup>	13	11	13	19	1.14	0.59–2.20	.71	1.84	0.75–4.50	.182
Freedom in performing tasks <sup>c</sup>	29	25	34	29	1.56	0.97–2.52	.07	1.24	0.57–2.64	.570
Influence on pace <sup>c</sup>	47	44	50	52	1.32	0.86–2.04	.21	1.43	0.73–2.80	.299

CI, confidence interval; OR, odds ratio; ref, reference.

<sup>s</sup>Sum score of physical workload, high vs low–moderate: sum of 4 variables: lifting, <sup>b</sup> physically very demanding, <sup>b</sup> requiring physical strength, <sup>b</sup> strenuous postures<sup>b</sup>.

<sup>a</sup> Association is statistically significant; <sup>b</sup> Often-always vs never-sometimes (ref); <sup>c</sup> Never-sometimes vs often-always (ref)

Van Beukering. Working conditions in women with multiple pregnancy, impact on preterm birth and adherence to guidelines. *Am J Obstet Gynecol* 2023.

## SUPPLEMENTAL TABLE 5

## Univariable associations with working conditions in women with preterm birth and very preterm birth compared with women with delivery at term (subgroup of participants working &gt;28 h/wk)

Participants at 16–20 weeks' pregnancy

Subgroup working >28 h/wk	Total 213 %	Pregnancy			32–36 wk vs ≥37 wk			<32 wk vs ≥37 wk		
		≥37 wk 99 (46%) %	32–36 wk 81 (38%) %	<32 wk 33 (16%) %	OR	(95% CI)	Pvalue	OR	(95% CI)	Pvalue
<b>Total</b>										
Irregular working times: yes vs no	16	8	20	27	2.78	1.12–6.88	.028 <sup>a</sup>	4.22	1.47–12.1	.007 <sup>a</sup>
<b>Physical work</b>										
Standing/walking ≥15 h/wk	34	29	39	34	1.57	0.83–2.96	.169	1.38	0.60–3.18	.455
a. Lifting <sup>b</sup>	17	15	17	21	1.11	0.49–2.53	.801	1.51	0.55–4.13	.420
b. Physically very demanding <sup>b</sup>	16	13	16	27	1.25	0.55–2.88	.596	2.45	0.94–6.43	.068
c. Requiring physical strength <sup>b</sup>	14	8	16	27	2.16	0.85–5.50	.108	4.22	1.47–12.1	.007 <sup>a</sup>
d. Strenuous postures <sup>b</sup>	12	10	11	22	1.11	0.43–2.87	.837	2.44	0.84–7.06	.101
Sum score a–d, high vs low–moderate	10	6	11	21	1.87	0.64–5.49	.254	4.02	1.24–13.0	.020 <sup>a</sup>
<b>Job strain</b>										
Problems with pressure <sup>b</sup>	15	15	21	16	0.97	0.42–2.20	.932	1.49	0.55–4.05	.434
Freedom in performing tasks <sup>c</sup>	22	14	28	30	2.37	1.10–5.11	.028 <sup>a</sup>	2.63	1.02–6.74	.045 <sup>a</sup>
Influence on pace <sup>c</sup>	45	39	49	54	1.54	0.85–2.82	.159	1.90	0.86–4.23	.114

CI, confidence interval; OR, odds ratio; ref, reference.

<sup>s</sup>Sum score of physical workload, high vs low–moderate: sum of 4 variables: lifting,<sup>b</sup> physically very demanding,<sup>b</sup> requiring physical strength,<sup>b</sup> strenuous postures<sup>b</sup>.<sup>a</sup> Association is statistically significant; <sup>b</sup> Often-always vs never-sometimes (ref); <sup>c</sup> Never-sometimes vs often-always (ref)Van Beukering. Working conditions in women with multiple pregnancy, impact on preterm birth and adherence to guidelines. *Am J Obstet Gynecol* 2023.