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DO PREGNANT WOMEN FOLLOW EXERCISE GUIDELINES? PREVALENCE DATA AMONG 3482 WOMEN, AND PREDICTION OF LOW BACK PAIN, PELVIC GIRDLE PAIN AND DEPRESSION.

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ABSTRACT

Purpose: We describe exercise level in mid-pregnancy, associated sociodemographic variables, and investigate the association between exercise in mid-pregnancy and subsequent low back pain, pelvic girdle pain and depression at 32 weeks of pregnancy. **Material & Methods:** The study included 3482 pregnant women participating in the Akershus Birth Cohort (ABC) study (response rate 80.5%). Data were collected by questionnaire in pregnancy weeks 17-21, pregnancy week 32, and electronic birth journal. The results were analysed by logistic regression and are presented as crude (cOR) and adjusted odds ratios (aOR) with 95% confidence interval (CI). **Results:** Only 14.6% of the respondents followed the current exercise prescription for exercise during pregnancy (≥3 times a week, > 20 minutes at moderate intensity). One third of the study sample exercised less than once a week at pregnancy weeks 17-21. Women exercising either 1-2 times or ≥3 times a week at mid-pregnancy, were more often primiparous, higher-educated and had less often prepregnacy BMI > 30 kg/m^2 compared to women exercising <once a week. Women who exercised ≥3 times a week were less likely to report pelvic girdle pain (aOR: 0.76, 95%CI: 0.61-0.96), while women exercising 1-2 times a week were less likely to report low back pain (aOR: 0.80, 95%CI: 0.66-0.97) and depression (aOR: 0.66, 95%CI: 0.48-0.91). **Conclusion:** Few Norwegian women follow current exercise prescriptions for exercise in mid-pregnancy. The results may indicate an association between exercising mid-pregnancy and lower prevalence of low back pain, pelvic girdle pain and depression in late pregnancy.

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INTRODUCTION

In the absence of medical or obstetrical contraindications, pregnant women are recommended to be physically active on most, if not all days, for at least 30 minutes of moderate intensity [1,2], or exercise 3-5 times a week for at least 15 minutes at moderate intensity progressing to 30 minutes [3]. These exercise prescriptions are in line with current exercise recommendations for the general population [4]. Exercise during pregnancy has been associated with health benefits. Studies have reported reduced risk of gestational diabetes [5], preeclampsia [6], improved maternal glucose tolerance [7], increased well-being, self-esteem plus fewer depressive symptoms [8,9], shorter duration of labour and higher prevalence of vaginal delivery [10].

Pregnancy is related to significant changes in the musculoskeletal system with possible subsequent complaints. It has been claimed that virtually all women have some degree of musculoskeletal discomfort during pregnancy [11,12]. Studies have demonstrated that low back pain affects nearly 50% of all pregnant women [13] and 20-45% experience pelvic girdle pain [14,15]. Additionally, mood disturbances and depression are common in pregnant and postpartum women [16]. Bennett et al. (2004) reported a prevalence of depression of 7.4%, 12.8% and 12% in the first, second and third trimester, respectively [17]. These conditions lead to a reduction in daily activity, lower quality of life, and may lead to increased sick-leave [16,18,19].

Knowledge considering exercise level during pregnancy and sociodemographic predictors of exercise behaviour is of public health importance. Previous studies often had low response rates [20-24]. We found only two studies with response rates ≥80% [25,26]. However, the

external validity of these studies may be questioned, as both studies included women with higher educational levels compared to the general pregnant population.

Women participating in the Akershus Birth Cohort (ABC study) at Akershus University Hospital (Ahus) responded to questions regarding exercise in mid-pregnancy (pregnancy weeks 17-21) (n=3751). The response rate for the study is >80%. This provides a unique opportunity to explore exercise in pregnancy. The aims for the present study were: i) Describe exercise level mid-pregnancy; ii) Examine sociodemographic variables associated with exercise; iii) Analyse the association between exercise in mid-pregnancy and low back pain, pelvic girdle pain, and depression in pregnancy week 32, within a population-based group of pregnant Norwegian women. We hypothesized that women exercising in mid-pregnancy had less low back pain, pelvic girdle pain and depression in late pregnancy.

MATERIAL AND METHODS

The ABC study methods are detailed elsewhere [27]. Briefly, Ahus is located near Oslo, the capital of Norway, and serves a total population of 400,000 from both urban and rural surroundings. On average, 4,200 women give birth at the hospital each year. Women were recruited to the ABC study at the routine fetal ultrasound examination in pregnancy week 17, from November 2008 to April 2010. This examination is part of the public antenatal care program, offered free of charge to all pregnant women in the hospital's catchment area. All pregnant women able to complete a questionnaire in Norwegian were eligible for the ABC study. There were no other exclusion criteria. The participants received one questionnaire at four different time points; between pregnancy weeks 17-21 (Q1), at pregnancy week 32 (Q2), and 8 weeks (Q3) and 2 years (Q4) postpartum. If the questionnaires were not returned within 2 weeks, at least one reminder was sent by mail. The questionnaires are linked to electronic birth records (PARTUS) with information regarding the woman, labour and the child. The study was approved by the Regional Committee for Ethics in Medical Research in Norway, and all participants provided informed consent (S-08013a).

Information on exercise level and parity were obtained in Q1, while other sociodemographic variables were retrieved from PARTUS. Information regarding low back pain, pelvic girdle pain and depression were collected through Q2.

During the recruitment period, 4,662 out of 6,244 women (74.7%) were included into the ABC study. Reasons for not participating were language difficulties (n=1,088), midwife forgot to invite (n=342), and choose not to participate (n=152). Out of the included women, 80.4% (n=3,751) answered Q1. We excluded women with missing information regarding frequency of exercise during pregnancy (n=36), multiple pregnancies (n=49), and missing

information in PARTUS (n=187) (three women had missing information on both exercise and PARTUS). Thus, 3,482 women were included in the description of exercise levels, and the association between exercise in pregnancy weeks 17-21 and sociodemographic variables (Fig.1).

Only women who returned Q1 received Q2. Furthermore, three percent (n=131) did not receive Q2 due to different reasons, e.g., moving out of the area or perinatal death. Out of the 3,620 women who received Q2, 2,936 responded. As we excluded women with missing exercise and PARTUS information and with multiple pregnancies, a total of 2,753 women were included in the analysis of the association between exercise in pregnancy weeks 17-21 and low back pain, pelvic girdle pain, and depression in pregnancy week 32 (Fig.1).

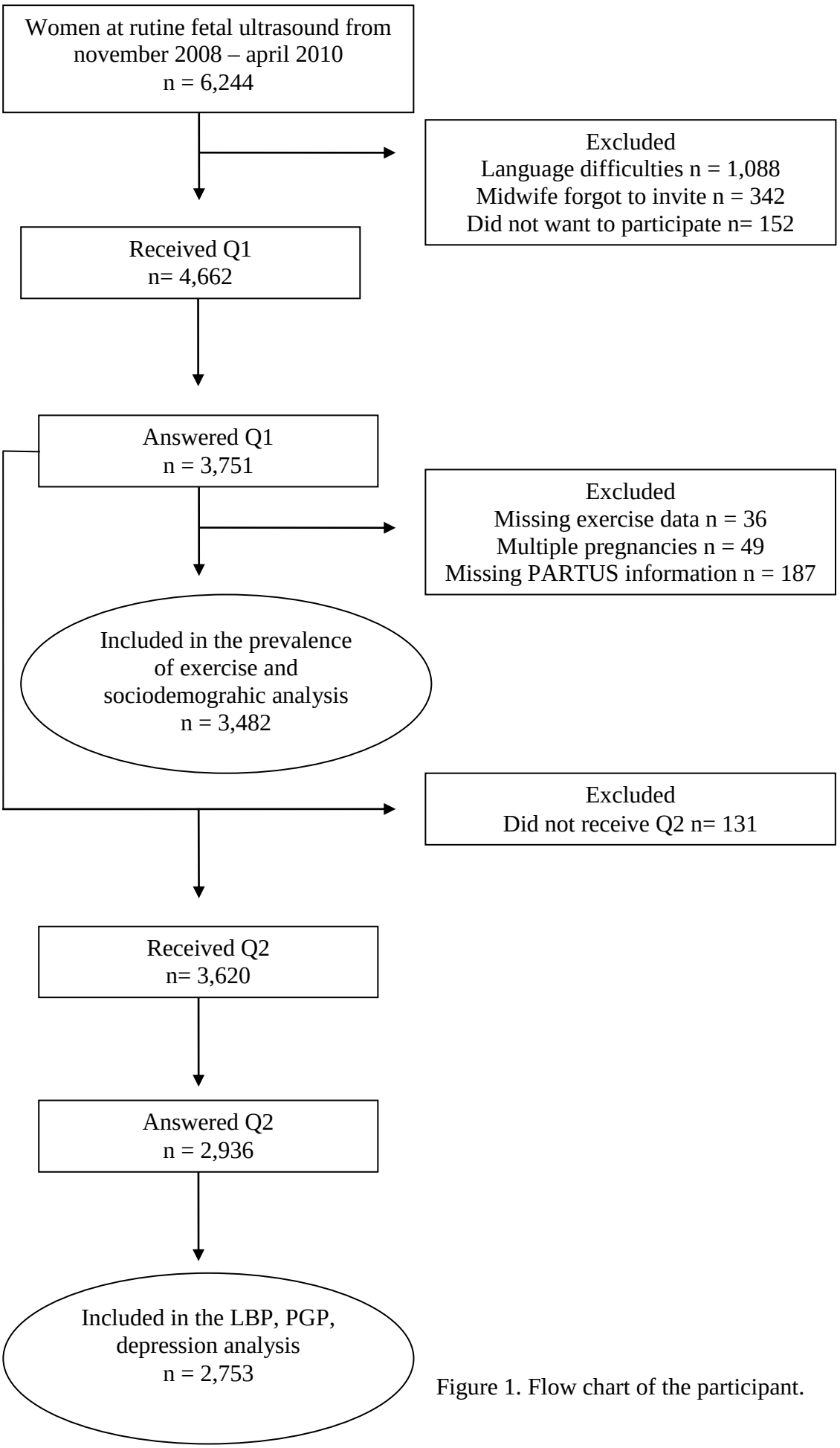

Figure 1. Flow chart of the participant.

Variable specifications

Exercise

The three questions asked concerning frequency, intensity and duration of exercise were as follows: 1) After conception, how often do you engage in exercise (e.g., brisk walking, skiing, commuting to work by bike, sports/exercise) (never, <once a week, once a week, twice a week, three times a week, ≥3 times a week); 2) If you engage in exercise, how strenuously do you exercise? (no sweating and normal breathing, modest sweating and light breathing, sweating and breathing heavily) 3) If you engage in exercise, for how long do you exercise? (10 minutes, 11-20 minutes, 21-60 minutes, >60 minutes). Additionally, we categorized exercise by frequency of exercise into three groups: <once a week (never + <once a week), 1-2 times a week, and ≥3 times a week.

Sociodemographic variables

Included sociodemographic variables that may influence exercise during pregnancy weeks 17-21 were as follows: age, parity (0, 1, ≥2), education (primary/secondary school vs college/university), marital status (single, cohabitant, unknown), smoking at the time when pregnancy started (smokers vs non-smokers) and prepregnancy body mass index (BMI) (<18.5, 18.5-24.9, 25.0-29.9, 30.0-34.9, 35+). In this study, parity was defined as number of previous births.

Low back pain, pelvic girdle pain and depression

Low back pain has been defined as pain between the 12th rib and the gluteal fold, with or without leg pain [28], and the question asked was: "At present, do you experience any low

back pain?"(yes vs no). Pelvic girdle pain has been defined as pain experienced between the posterior iliac crest and the gluteal fold, particularly in the vicinity of the sacroiliac joints. The pain may radiate in the posterior thigh and can also occur in conjunction with/or separately in the symphysis [15]. The question asked was: "At present, do you experience pelvic girdle pain (in Norwegian: "Bekkenløsning"? (yes vs no). Ability to separate low back pain and pelvic girdle pain in questionnaires has previously been found by Bø & Backe-Hansen (2007) [29].

The Edinburgh Postnatal Depression Scale (EDPS) was used to assess depression [30]. The EDPS was developed to screen for depression in the postnatal period, but the scale has also shown good psychometric properties, and good test-retest reliability (0.81) in pregnant populations [31]. It consists of a self-rating, 10-item scale, with a sum score ranging from 0-30. A cut off of ≥12 was set to define depression [30].

STATISTICAL ANALYSIS

The statistical package SPSS Statistical Software version 15.0 was used for the statistical analyses. Sociodemographic characteristics of the study sample and exercise level are presented by numbers and percentages. Univariable and multiple logistic regression analyses were used to calculate the association between exercise and sociodemographic variables and low back pain, pelvic girdle pain and depression. Women exercising <once a week (never + <once a week) was used as the reference group for the logistic regression analysis. Based on prior studies, we included known covariates in the adjusted regression analysis that may influence exercise during pregnancy and have an association to the included sociodemographic variables and low back pain, pelvic girdle pain and depression.

Sociodemographic variables with missing values were replaced by dummy variables and are included in the statistical analysis.

The results are presented as crude (cOR) and adjusted odds ratio (aOR) with 95% confidence interval (CI). P values of <0.05 were considered significant.

RESULTS

Sociodemographic characteristics of the study sample are shown in Table 1. Of the 3,482 women included in the study, mean age was 31.1 (SD=4.8) years.

Exercise level in mid-pregnancy is reported in Table 2. About one third of the study sample exercised less than once a week. Approximately 40% exercised 1-2 times a week, while 26.6% exercised ≥3 times a week. A significant proportion were not sweating or out of breath when they exercised (39.1%). Most of the exercising women reported exercise bouts of >20 minutes (71.9%) (Table 2). A total of 14.6% followed the current guidelines for exercise during pregnancy and exercised ≥3 times a week at moderate intensity, for at least 20 minutes.

Women who exercised either 1-2 times or ≥3 times a week in pregnancy week 17-21 were more likely to be primiparous and have had more education (college/university) compared to women who exercised <1 a week.

Exercising 1-2 times a week was inversely associated with prepregnancy BMI between 30-35 kg/m^2, while exercising ≥3 times a week were both inversely associated with prepregnancy BMI between 30-35 kg/m^2 and 35 kg/m^2 (Table 3).

Table 4 shows the regression analysis of the associations between exercise and low back pain, pelvic girdle pain, and depression. Of the 2,753 women included in the analysis, 51.2%, 51.7%, and 8.2 % reported low back pain, pelvic girdle pain, and depression in pregnancy week 32, respectively. Women who were exercising ≥3 times a week in pregnancy weeks 17-21 were significantly less likely to experience pelvic girdle pain in late pregnancy, and there was a trend toward a dose-response relationship comparing exercising 1-2 times a week and ≥3 times a week. A significant association between exercising 1-2 times a week and lower prevalence low back pain and symptoms of depression was also found. These associations did not reach statistical significance regarding exercising ≥3 times a week (Table 4).

Table 1. Sociodemographic characteristics of the participants (n=3,482).

Variable	N	%
Parity		
0	1700	48.8
1	1364	39.2
≥ 2	418	12.0
Education		
Primary/secondary school (≤ 12 yrs)	1236	35.5
College/university (< 12 yrs)	2108	60.5
Unknown	92	2.6
Missing	46	1.3
Marital status		
Married/cohabitant	3353	96.3
Single	105	3.0
Unknown	24	0.7
Smoking		
Non-smoker	3113	89.4
Smoker	255	7.3
Missing	114	3.3
Body Mass Index		
< 18.5	87	2.5
18.5 – 24.9	1651	47.4
25.0 – 29.9	583	16.7
30 – 34.9	259	7.4
35 +	108	3.1
Missing	794	22.8

Table 2. Frequency, intensity and duration of exercise in pregnancy week 17-21 (n=3,482).

	N	%
Exercise frequency		
Never	200	5.7
< once a week	890	25.6
Once a week	752	21.6
Twice a week	714	20.5
3 times a week	393	11.3
> 3 times a week	533	15.3
Exercise intensity*		
No sweating and normal breathing	1361	39.1
Sweating and increased breathing	1737	49.9
Sweating and breathing heavily	54	1.6
Duration of exercise*		
10 minutes	96	2.8
11-20 minutes	537	15.4
21-60 minutes	2061	59.2
> 60 minutes	441	12.7

* Percentages do not total 100, mainly due women who did not report intensity and duration of exercise because they reported 'never exercising' or exercising '< once a week'.

Table 3. Association between exercising 1-2x per week and ≥3x per week in pregnancy week 17-21 and sociodemographic variables. Exercising <once a week (never + <once a week) is used as the reference group. (n=3,482).

Variable	<1x per week n = 1090	1-2x per week n = 1466			≥3x per week n = 926		
	%	%	cOR (95 % CI)	aOR (95 % CI)*	%	cOR (95 % CI)	aOR (95 % CI)*
Age			1.02 (0.99-1.04)	1.02 (1.00-1.04)		1.00 (0.98-1.02)	1.02 (0.99-1.04)
Parity							
0	25.4	42.1	1.00	1.00	32.5	1.00	1.00
1	36.5	42.4	0.70 (0.59-0.83)	0.61 (0.51-0.74) †	21.0	0.45 (0.37-0.55)	0.41 (0.33-0.50) †
≥ 2	38.3	41.1	0.65 (0.51-0.83)	0.55 (0.42-0.72) †	20.6	0.42 (0.31-0.56)	0.39 (0.28-0.53) †
Education							
Primary/secondary school (≤12 yrs)	38.2	38.3	0.60 (0.51-0.71)	0.67 (0.56-0.80) †	23.5	0.60 (0.50-0.72)	0.63 (0.51-0.78) †
College/university (>12 yrs)	27.1	45.0	1.00	1.00	27.9	1.00	1.00
Unknown	38.0	33.7	0.53 (0.33-0.88)	0.48 (0.29-0.80) †	28.3	0.72 (0.43-1.21)	0.64 (0.37-1.10)
Missing	26.1	30.4	0.70 (0.32-1.53)	0.62 (0.28-1.40)	43.5	1.62 (0.78-3.34)	1.52 (0.71-3.24)
Marital status							
Married/cohabitant	31.3	42.4	1.00	1.00	26.4	1.00	1.00
Single	32.4	33.3	0.76 (0.47-1.23)	0.78 (0.47-1.28)	34.3	1.25 (0.78-2.02)	1.27 (0.76-2.10)
Unknown	33.3	45.8	1.02 (0.41-2.53)	1.26 (0.48-3.33)	20.8	0.74 (0.24-2.27)	0.63 (0.20-2.01)
Smoking							
Non-smoker	30.7	42.6	1.00	1.00	26.7	1.00	1.00
Smoker	38.0	35.3	0.67 (0.50-0.90)	0.79 (0.58-1.08)	26.7	0.81 (0.58-1.11)	0.87 (0.61-1.24)
Missing	32.5	44.7	1.00 (0.65-1.53)	1.05 (0.67-1.63)	22.8	0.81 (0.49-1.35)	0.85 (0.50-1.44)
Body Mass Index							
< 18.5	33.3	36.8	0.77 (0.46-1.29)	0.81 (0.48-1.37)	29.9	0.95 (0.55-1.64)	1.04 (0.59-1.84)
18.5 – 24.9	29.6	42.4	1.00	1.00	28.0	1.00	1.00
25.0 – 29.9	32.2	40.1	0.87 (0.70-1.09)	0.87 (0.69-1.10)	27.6	0.91 (0.71-1.16)	0.90 (0.70-1.17)
30 – 34.9	41.3	36.7	0.62 (0.46-0.84)	0.64 (0.47-0.87) †	22.0	0.56 (0.40-0.80)	0.61 (0.43-0.87) †
35 +	40.7	44.4	0.76 (0.50-1.17)	0.81 (0.53-1.26)	14.8	0.39 (0.21-0.69)	0.41 (0.23-0.76) †
Missing	29.3	45.0	1.07 (0.88-1.31)	1.11 (0.91-1.37)	25.7	0.93 (0.74-1.16)	0.99 (0.78-1.25)

cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval

*Adjusted for all factors listed in the table.

† Significance level p=<0.05

Table 4. Association between exercising 1-2x per week and ≥ 3x per week in pregnancy week 17-21 and LBP, PGP, and depression in pregnancy week 32. Exercising <once a week (never+<once a week) is used as the reference group. (n=2,753).

Variable	<1x per week n=835	1-2x per week n = 1178			≥3x per week n=740		
	%	%	cOR (95 % CI)	aOR (95 % CI)	%	cOR (95 % CI)	aOR (95 % CI)
*Low back pain [a]							
No	27.8	45.0	1.00	1.00	27.2	1.00	1.00
Yes	32.8	40.6	0.77 (0.64-0.91)	0.80 (0.66-0.97) †	26.6	0.83 (0.68-1.01)	0.82 (0.68-1.02)
*Pelvic girdle pain [b]							
No	26.5	43.6	1.00	1.00	29.9	1.00	1.00
Yes	33.9	42.1	0.75 (0.63-0.90)	0.88 (0.72-1.07)	24.0	0.63 (0.51-0.77)	0.76 (0.61-0.96) †
**Depression [c]							
No	29.6	43.7	1.00	1.00	26.7	1.00	1.00
Yes	38.8	33.5	0.59 (0.43-0.81)	0.66 (0.48-0.91) †	27.8	0.79 (0.56-1.11)	0.90 (0.64-1.28)

cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval

* Adjusted for maternal age, parity, education, smoking, prepregnancy body mass index, low back pain and/or pelvic girdle pain before current pregnancy

**Adjusted for maternal age, parity, education, marital status, smoking and prepregnancy body mass index

† Significance level p=<0.05

[a] Missing values on 13 women

[b] Missing values on 15 women

[c] Missing values on 5 women

DISCUSSION

In the present study, we demonstrated that only 14.6% of the respondents followed the current guidelines for exercise during pregnancy and one third exercised less than once a week. Women who exercised were more likely to be primiparous, more highly educated, and had less often prepregnacy BMI > 30 kg/m^2. A noteworthy proportion of the women reported low back pain, pelvic girdle pain and depression. We also found an association between exercising in mid-pregnancy and having less low back pain and pelvic girdle pain in late pregnancy. This may appear paradoxical for some women who might assume that exercise would predispose them to low back or pelvic girdle pain. As in other clinical settings [32] exercise was inversely associated with the rate of depression.

Prevalence of exercise behaviours

Reported exercise levels during pregnancy vary across studies, depending on the definitions used, which trimester the exercise level was measured, and the type of population studied. We found a higher prevalence of women who engaged in exercise less than once a week (31.3%) compared to Haakstad et al. (2007) (24.6%) [33]. This discrepancy may be due to differences in the populations studied, as our study had fewer participants with higher education, thereby be more representative for the overall pregnant population. On the other hand, our results concerning number of women following exercise guidelines during pregnancy correspond with those of Evenson et al. (2004) and Petersen et al. (2005), where 15.6% and 14% exercised at least 5 times a week for at least 30 minutes at moderate intensity, participated in vigorous-intensity activities 3 times a week for at least 20 minutes, or did both. However, gestational age of the participants was not reported in these studies, and the response rate reported in Evenson et al. (2004) was 49% [23,34]. On the basis of prior studies demonstrating a decrease in exercise and total amount of physical activity during pregnancy

[24,33], it is reasonable to believe that our prevalence estimates would have been even lower if we had measured level of exercise later in pregnancy. This was not possible in the present study, as questions about exercise level were posed only in Q1. Because of the very few exclusion criteria, the large study population, and a response rate above 80%, our exercise estimates likely represent pregnant Norwegian women living in the areas surrounding Akershus University Hospital and most probably pregnant Norwegian women as a whole.

We can speculate as to reasons for the low exercise level; our study provides an important rationale for investigation of this phenomenon of physical inactivity during pregnancy. We speculate that it may be due to residual dogma that exercise may lead to fetal hypoxia, fetal growth restriction and hyperthermia with potential teratogenic effects [3]. In addition, barriers toward exercise during pregnancy are pregnancy-related complaints, lack of time, too much effort to get started and childcare difficulties [20,26]. Our results extend previous studies reporting that women who exercise regularly are more likely to be primiparous, more highly educated and less likely to be overweight [20,21,23-25,34]. As exercise has health benefits for both the mother and the fetus [11], there is a clear need to communicate to women that current exercise guidelines are safe, and that women can achieve these benefits through a range of different and motivating activities.

Self-reported low back pain and pelvic girdle pain

Our findings concerning the associations between exercise and low back pain and pelvic girdle pain suggest that exercise in mid-pregnancy decreases the prevalence of such complaints in late pregnancy. In addition, we found a trend toward a dose-response relationship between exercise and pelvic girdle pain, where the odds ratio for having pelvic girdle pain became lower with exercising ≥3 times a week. Previous studies have demonstrated that women with pelvic girdle pain report higher degrees of disability compared to women with low back pain [19,35]. These and our results suggest that the disorders should be differentiated [14]. Earlier observational studies have concluded that leisure-time physical activity before pregnancy decrease the risk for developing pelvic girdle pain and/or low back pain during pregnancy [36-38]. These results may be explained by the hypothesis that pregnant women in good physical condition are more likely to handle the changes in the musculoskeletal system better (e.g, increased ligament laxity and joint impact) compared to their sedentary counterparts.

Does exercise in pregnancy prevent depression occurring?

The present results showed an association between exercising 1-2 times a week and fewer symptoms of depression. However, the results did not reach statistical significance among participants exercising ≥3 times a week. The lack of this dose-response relationship may be explained by wide confidence intervals and that only 26% undertook exercise ≥3times a week, while 42.7% exercised 1-2 times a week. A possible association between exercise and reduced depressive symptoms has previously been explained as exercise causing distraction from discomfort, pain and light depression, leading to improved self-efficacy and increased levels of endorphins, norepinephrine and serotonin [39]. We have no available data to investigate this hypothesis. In a recent RCT a supervised, 3-month aerobic exercise program

reduced depressive symptoms among pregnant women [40]. Earlier observational studies have shown conflicting results. Some studies have found an association between exercise and/or total physical activity level (occupational, recreational and transportation activities) and less depressive symptoms in pregnancy [9,41-45]. Other studies have not found such associations [8,46,47]. The lack of documented associations in these studies may be because of small sample sizes (n=≤65) [8,46], and a homogeneous study sample, considered to be more active than the general population [47]. To our knowledge, the present study is the first to show an association between exercise and depression during pregnancy among pregnant women in Western Europe, using a valid and reliable instrument to measure depression in a pregnant population.

There are some limitations to address. First, women who were not able to complete a questionnaire in Norwegian were excluded, making it impossible to generalize the results to non-Scandinavian ethnic groups. Additionally, we have no information concerning sociodemographic variables of the non-respondents. However, with a response rate at 80.5% we consider the risk for selection bias to be minimal. Second, there was no clinical assessment to diagnose low back pain, pelvic girdle pain and depression. In addition there may be other unknown and unavailable confounding variables (e.g heavy workload for lumbupelvic pain) that are not included in the statistical analysis. Another limitation is the self-reporting of exercise, which may be prone to measurement biases, as recall bias and overestimation of physical activity level [48]. There are few validated questionnaires that are designed especially to measure physical activity in a pregnant population [49,50]. However, the questions are similar to the questions used to measure frequency, duration, and intensity of exercise in the Physical Activity Pregnancy Questionnaire (PAPQ) [50]. Haakstad's et al. (2010) questionnaire was found to correctly categorize exercise levels according to the current guidelines for exercise during pregnancy.

The present study of a population-based sample of women provides novel data that exercise in pregnancy may be associated with reduced prevalence of low back pain, pelvic girdle pain and depression later in pregnancy. To further examine whether exercise has a causal relationship with such health outcomes will require RCTs.

WHAT THIS STUDY ADDS:

- Only 14.6 % of the Norwegian population sample followed current exercise guidelines for exercise in mid-pregnancy.
- The prevalence of self-reported symptoms at week 32 of pregnancy was as follows; low back pain, 52.1%, pelvic girdle pain, 51.7% and depression, 8.2%.
- Exercising 1-2 times a week mid-pregnancy was associated with lower prevalence of low back pain (aOR:0.80) and depression (aOR:0.66), while exercising ≥ 3 times a week was associated with lower prevalence of pelvic girdle pain (aOR:0.76).

HOW CLINICIANS CAN ACT ON THIS STUDY:

Acknowledging the limitations outlined, these data should add confidence to clinicians in telling patients that exercise in mid-pregnancy may reduce the possibility of low back pain, pelvic girdle pain and depression in late pregnancy.

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COMPETING INTEREST:

None

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