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Physical activity and exercise during pregnancy in Greece: A cross-sectional study

Ermioni Tsarna, Ioanna Mavrommati, Grigorios Bogdanis, Olga Triantafillidou, George Paltoglou, Panagiotis Christopoulos

2nd Department of Obstetrics and Gynecology, Aretaieion University Hospital, Athens Medical School, Greece

Corresponding Author

Ermioni Tsarna, 2nd Department of Obstetrics and Gynecology, Aretaieion University Hospital, Athens Medical School, Greece, Tel.: +306946349866, e-mail: ermina1990@windowslive.com

Abstract

Introduction: Physical activity and exercise during pregnancy is regarded safe and beneficial in absence of pregnancy complications. The aim of this cross-sectional study is to describe physical activity of pregnant women in Greece and explore if it changes during pregnancy compared to the period before pregnancy.

Material and Methods: The study was conducted in a private maternity hospital. Women were asked to fill in an adapted questionnaire based on Pregnant Physical Activity Questionnaire; birth outcomes and anthropometric measurements of the neonate were collected by the research midwife.

Results: In our study population of 193 pregnant women, approximately half reported no or minimal physical activity during pregnancy and were less active than current guidelines' recommendations. Gynaecologist's opinion regarding exercise during pregnancy was conceived as positive only by a minority of women. Overall, women were less active during pregnancy than before, although they spent more time slowly walking for fun or exercise. Lastly, significant decrease was observed in all occupational activities involving slow or quick walking and lifting weights.

Conclusions: These results indicate that systematic counselling of pregnant women regarding physical activity and exercise during pregnancy will be needed to achieve optimal physical activity levels for the majority of women in Greece.

Key words: Physical activity, exercise, pregnancy

Introduction

Physical activity is well recognised as an important contributor to health and well-being; its beneficiary effect during pregnancy is nowadays widely accepted. Increased physical activity during pregnancy has been associated with favourable birth outcomes, namely reduced risk for preterm birth, reduced duration of labour, and less frequent delivery complications[1–3]. In addition, more physically active pregnant women

on average gain less weight during pregnancy and suffer less frequently from gestational diabetes mellitus, preeclampsia, varicose veins, and deep vein thrombosis compared to pregnant women that are less physically active[1–3]. Last but not least, physical activity has been shown to improve pregnant women's psychology, as it alleviates fatigue, stress, anxiety, and depression[1,2].

Several public health and clinical guidelines regarding physical activity and exercise during pregnancy have been published around the World. These guidelines are mostly addressed to developed countries, such as Australia, Canada, Japan, the United States, and European countries[4]. In general, most guidelines advise against vigorous exercise and/or athletic competition during pregnancy, although high-intensity physical activity before pregnancy might continue as long as the pregnant woman feels comfortable[4]. With regard to physical activity duration, two hours per week is regarded as the minimum; aerobic exercise is usually indicated, although strengthening exercises are also advised in some guidelines[4]. In case of dizziness, shortness of breath, vaginal bleeding, amniotic fluid leakage, and abdominal or back pain, exercise discontinuance is advised[4]. Despite the existence of the aforementioned guidelines, women's adherence has been shown poor and their physical activity during pregnancy is reported low across the world[5–13].

The aim of this study is to describe physical activity and exercise habits of pregnant women in Greece, to compare the aforementioned with current guidelines regarding physical activity during pregnancy, and to explore the change in their physical activity before and during pregnancy.

Material and Methods

This was a cross-sectional study conducted in a private maternity hospital located in the capital city of Greece, Athens. Pregnant women giving birth were approached to participate, with the exception of pregnant women with an elective caesarean section for any indication. Women were asked to fill in a questionnaire and provide informed consent, so that the birth outcomes and anthropometric measurements of the neonate could be collected by the research midwife. The study protocol was approved by the Research Ethics Committee of the Maternity Hospital.

The assessment of the intensity and frequency of physical activity before and during pregnancy was based on the Pregnant Physical Activity Questionnaire (PPAQ)[14]. This is a semi-quantitative questionnaire that examines the daily or weekly time spent during pregnancy for activities that involve physical activity[14]. The examined activities are grouped into occupational activities, activities related to the household, to sports or exercise, and to transportation[14]. In addition, three questions that reflect inactivity are also included in the questionnaire[14]. PPAQ was translated by two independent translators from English to Greek; all of the translated questions were identical with the exception of the two questions related to lowing lawn. These were combined into one question regarding gardening, which was deemed necessary for cultural reasons. Furthermore, two questions regarding preparing meals and light cleaning in house were merged into one for cultural reasons as well. In addition, all questions were asked both for the period during pregnancy and for the period before pregnancy, so that any change in pregnant women's physical activity due to the pregnancy could be examined. In order to ensure that the translated and adapted questionnaire remained internally consistent, Cronbach's alpha was calculated. Apart from the aforementioned, women were asked to report the number of previous pregnancies, vaginal labours, and caesarean sections, as well as their demographic and anthropometric characteristics. Birth outcomes, such as mode of birth, birth weight, and gestational age at birth, were recorded by the research midwife.

Pregnant women's baseline characteristics were described using means and standard deviation for continuous variables, and frequencies and proportions for categorical variables. In addition, the level of physical activity, sports, and exercise before and during pregnancy was described with frequencies and proportions. In order to compare physical activity before and during pregnancy, McNemar's test for paired nominal data was applied. In case that calculation of p-value for McNemar's test was not possible due to zero expected frequencies, consecutive levels were merged so that expected frequencies were positive values. Furthermore, a graphical representation was obtained for all physical activity variables with a significant difference before and during pregnancy, to estimate whether activity increased or decreased during pregnancy. Level of significance was 0.05 for all the aforementioned statistical analyses.

In a sensitivity analysis, we examined whether our results regarding changes in physical activity during pregnancy were driven by women that were advised to bed rest by their gynaecologist due to medical indications. To this end, we repeated the aforementioned analyses after excluding from our sample all women that were advised by their gynaecologist to bed rest.

All statistical analyses were performed using R statistical software (version 3.4.0; R Foundation for Statistical Computing, Vienna, Austria)[15]and the following software packages: "tableone"[16], "psych"[17], "ggplot2"[18], "Hmisc"[19], "dplyr"[20], and "reshape2"[21].

Results

Two hundred twenty four (224) women were invited to participate in this study. Of these, 193 agreed to participate and filled in the study questionnaire. Thus, study sample size is 193 women. The internal consistency of the study questionnaire was regarded satisfactory, since Cronbach's alpha was 0.77 (0.73-0.82).

In our study population, on average maternal age at labour was 31.5 years old (standard deviation (SD), 4.4), weight before pregnancy was 62.4 kg (SD, 11.4), and BMI was 22.81 (SD, 3.75), while mean maternal weight at labour was 75.8 kg (SD, 12.6) and gestational weight gain 13.5 kg (SD, 6.9). Notably, one hundred sixty eight (168, 87%) women were checking their body weight every month or more frequently during pregnancy. For the majority of our study population (124, 64.2%) this was their first pregnancy, while only 50 (25.9%) women had one or two living children and no woman had more than two living children. Only 19 (9.8%) women had a prior caesarean section, of which two gave birth vaginally. All but 9 (4.7%) women had conceived naturally, and six (3.1%) women had a multiple pregnancy. With regard to smoking, 85 (44%) were smoking before pregnancy, whereas only 23 (11.9%) continued smoking during pregnancy. Nonetheless, 88 (45.6%) women reported exposure to passive smoking at home during pregnancy. In addition, during this pregnancy 96 (49.7%) women reported vomiting episodes, while 35 (18.1%) women were advised to bedrest due to medical indications. With regard to birth outcomes, mean gestational age at birth was 38.53 (SD, 1.38) completed weeks, mean birth weight was 3075.1g (SD, 499.7), and 80 (47.6%) of the neonates were boys. The labour was induced in 117 (61.7%) women; in 6 (3.2%) women labour started with cervical mucus discharge, in 37 (19.6%) with uterine contractions, and in 29 (15.3%) with rupture of membranes. Ninety two (92, 47.9%) women gave birth vaginally, while 100 (52.1%) had a caesarean section. Descriptive statistics for our study population baseline characteristics are presented in more detail in Supplementary Table 1.

With regard to physical activity, 88 (45.6%) women reported low physical activity before pregnancy, 76 (39.4%) moderate, 26 (13.5%) vigorous, and 3 (1.6%) were professionally involved in sports. Dur-

ing pregnancy, 62 (32.1%) women conceived their gynaecologist's opinion for physical activity during pregnancy as positive or probably positive, 25 (13%) as negative or probably negative, and 106 (54.9%) as neutral. With regard to exercise during pregnancy, excluding occupational activities, the following activities were examined: slow walking, quick walking, quick walking up hills, jogging, swimming, dancing, prenatal exercise class, and other physical activities for fun or exercise (Supplementary Table 2).Overall, twenty three (11.9%) women did not exercise at all, of which only seven were advised by their gynaecologist to bed rest. Seventy two (37.3%) women had minimal physical activity during pregnancy, meaning less than 30 minutes spent per activity per week. Of these, only 14 were advised by their gynaecologist to bed rest. Thirty five (18.1%) women exercised regularly during pregnancy, meaning at least two hours spent per week in one of the aforementioned activities.

Pregnant women reported significant changes in their physical activity during pregnancy related to several activities. This was observed in all domains, including household related activities (Supplementary Table 3) and transportation related activities (Supplementary Table 4), but was more pronounced in activities for fun or exercise (Supplementary Table 2) and work related activities (Supplementary Table 5). In general, pregnant women significantly decreased their physical activity, with the only exception of slow walking for fun or exercise that was more frequent during pregnancy ($p<0.01$)(Figure 1). Namely, women spent less time in preparing meals and light cleaning($p<0.01$), heavy cleaning($p<0.01$), playing with children($p<0.01$ for playing while sitting or standing, and $p=0.01$ for playing while walking or running), quickly walking($p<0.01$ for fun or exercise, $p<0.01$to go to places), walking quickly up hills($p<0.01$), jogging($p=0.01$), swimming($p=0.04$), dancing($p<0.01$), standing or walking slowly at work($p<0.01$while carrying things, $p<0.01$ without carrying things), walking quickly at work ($p<0.01$while carrying things, $p<0.01$ without carrying things), and other physical activity for fun or exercise ($p=0.04$)(Figures 2-5). Furthermore,

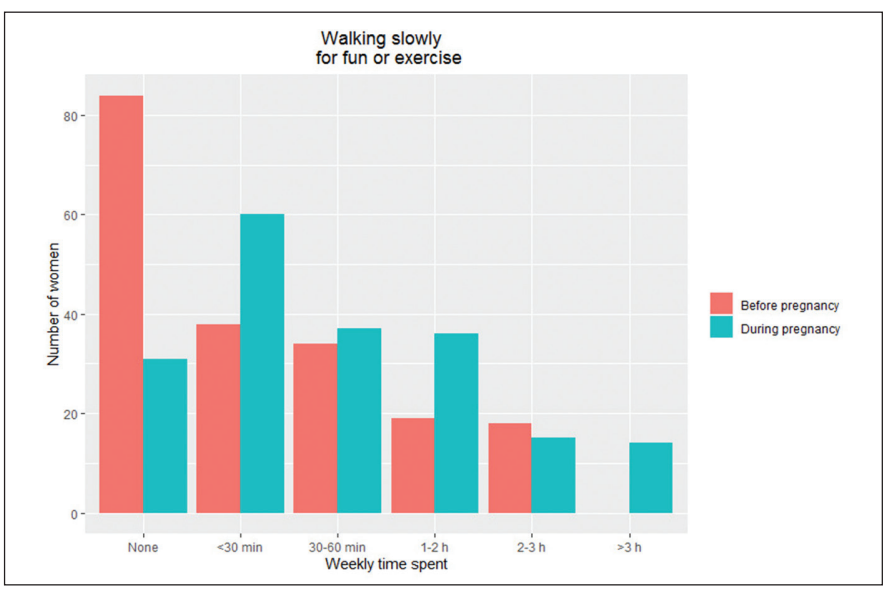

Figure 1. Weekly time spent walking slowly for fun or exercise before and during pregnancy.

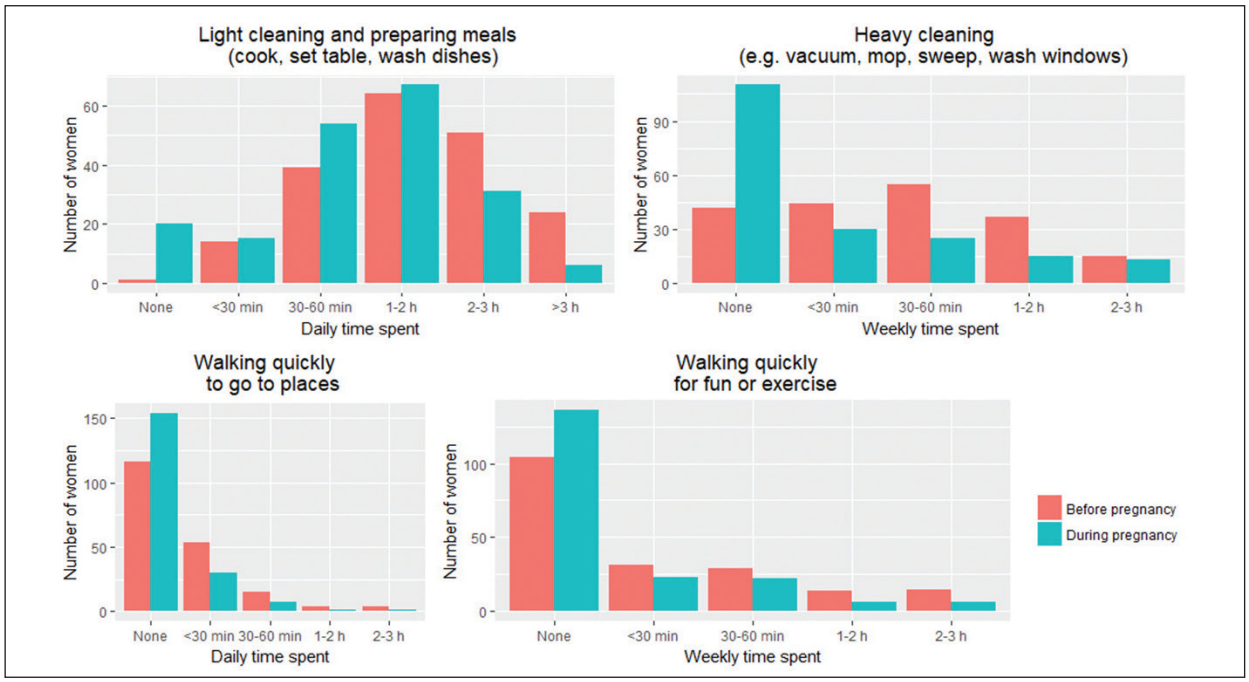

Figure 2. Daily time spent preparing meals and walking quickly to go to places, and weekly time spent in heavy cleaning and walking quickly for fun or exercise before and during pregnancy.

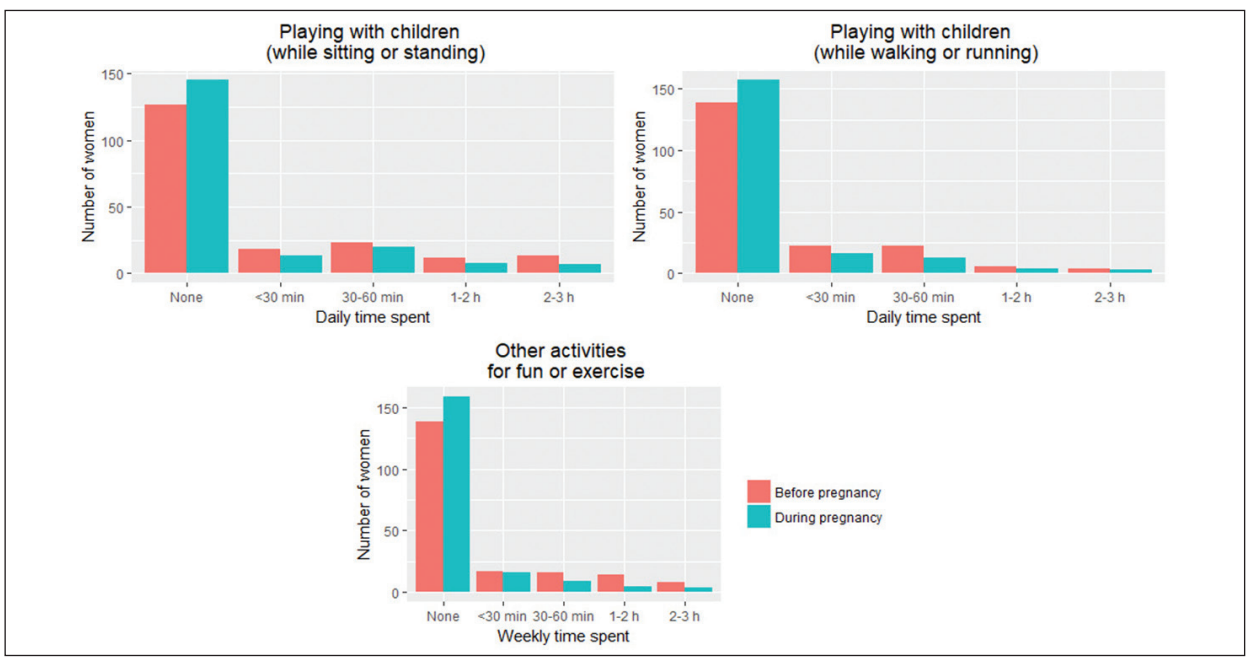

Figure 3. Daily time spent playing with children, and weekly time spent in other activities for fun or exercise before and during pregnancy.

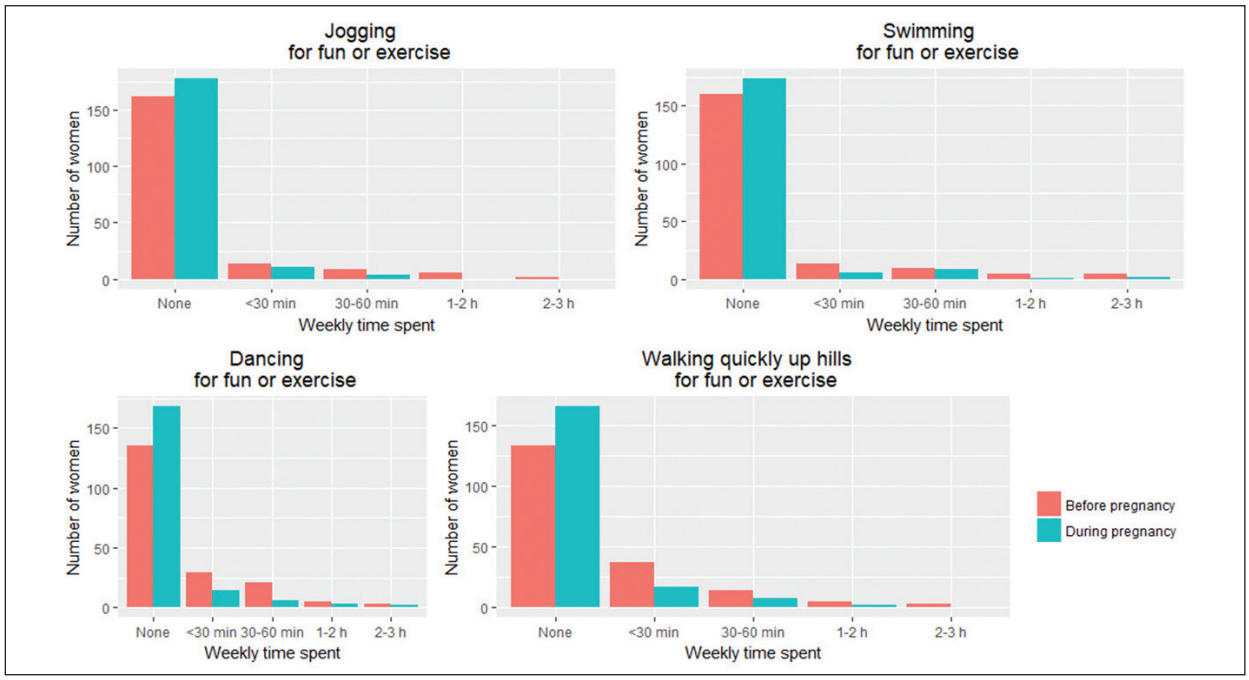

Figure 4. Weekly time spent jogging, swimming, dancing, and walking up hills for fun or exercise before and during pregnancy.

Figure 5. Daily time spent standing and walking slowly or quickly, with or without carrying things at work before and during pregnancy.

Figure 6. Daily time spent sitting at work or class, and watching television or video before and during pregnancy.

women reported less time spent sitting at work or class($p<0.01$)but more time spent watching television during pregnancy ($p<0.01$)(Figure 6). The aforementioned results were reasonably stable in a sensitivity analysis of 158 women that were never advised by their gynaecologist to bed rest due to medical indications. In particular, only the reduction of time spent in swimming and other physical activity for fun or exercise lost statistical significance. In addition, a significant reduction of time spent in dressing, bathing, and feeding children while standing was observed in this sensitivity analysis.

Discussion

In our study population of 193 pregnant women, approximately half reported no or minimal physical activity during pregnancy and, thus, were less active than current guidelines' recommendations. Notably, gynaecologist's opinion regarding exercise during pregnancy was conceived as positive only by a minority of women. Overall, women were less active during pregnancy than before, although they spent more time slowly walking for fun or exercise. Finally, significant decrease was observed in all occupational activities involving slow or quick walking and lifting weights.

To our knowledge, this is the first study to describe physical activity during pregnancy in Greece and examine the change in physical activity before and during pregnancy. We, thus, cannot compare our results with previous studies from Greece. Nonetheless, in consistence with our results, research in other developed and developing countries has shown that few women meet the current guidelines regarding physical activity during pregnancy[5–13]. In addition, previous research in developed western countries has shown that on average women reduce their physical activity during pregnancy, as was the

case in our study[22–24]. However, it is not possible to compare the degree of this reductionbetween studies, since different questionnaires were used to assess physical activity[22–24]. The underlying factors that influence the level of prenatal physical activity are less well studied. Notably, in our study gynaecologist's opinion for exercise in pregnancy was rarely conceived as positive, which might contribute to the observed low levels of physical activity. To improve how women perceive their gynaecologist's opinion for exercise in pregnancy and ultimately achieve an increase in women's physical activity, gynaecologists and midwifes in Greece need to consult pregnant women systematically, rather than on demand basis. To this end, publication of local guidelines and patients' information leaflets might, also, help.

Physical activity during pregnancy has been associated with favourable birth outcomes, less frequent pregnancy and delivery complications, and improved maternal mental health. Nonetheless, concerns have been raised regarding potential risks both in uncomplicated and complicated pregnancies. During pregnancy an increase in joint laxity is observed, which in combination with the displacement of the centre of gravity may predispose pregnant women to musculoskeletal injuries during exercise and/or falls and traumatic injuries [25]. Furthermore, exercise on the supine position may trigger hypotension due to compression of the inferior vena cava by the gravid uterus, and is not advised during pregnancy [26]. Finally, exercise's safety is debated in a wide range of medical conditions during pregnancy; such are anaemia, hypertension, preeclampsia, cervical insufficiency, vaginal bleeding, placenta previa, premature uterine contractions, and premature rupture of membranes[4]. In presence of the aforementioned medical conditions, most guidelines advise against physical activity during pregnancy [4]; in line with these guidelines, 18.1% of women participating in our study were advised to bed rest by their gynaecologist for various reasons.

In contrast to the low adherence to guidelines regarding prenatal physical activity, in our study occupational activities were to an extent modified during pregnancy in accordance with current scientific evidence. In particular, lifting weights and standing, which are regarded as potential risk factors for many pregnancy complications and adverse birth outcomes, were considerably reduced during pregnancy in our study population[3]. However, since our study was not designed to examine occupational hazards during pregnancy, we have no further data to explore if other undesirable occupational exposures, such as shift work and exposure to chemicals, were also limited during pregnancy.

Notwithstanding our findings, this study had several limitations. The sample size was relatively small and women were recruited in a single-centre. Furthermore, since the study was conducted in a private maternity hospital located in the capital city of Greece, our sample might differ from the general population in Greece with regards to socioeconomic position. Giving birth in a private facility has a cost that is not affordable by a proportion of Greek population; therefore, we expect that physical activity and exercise habits of such women may not be well described by our study results. In addition, occupational differences from the general population might also exist. Agricultural and livestock occupations are expected to be underrepresented in our sample, since such occupations are more frequent in Greek countryside rather than the capital city. Similarly, manual occupations might be underrepresented, as they are more frequent among women of lower socioeconomic position. Last but not least, to our knowledge PPAQ has never been used and validated in Greece before. In spite of our efforts to ensure the internal consistency of the translated and adapted study questionnaire, external validation was not feasible.

Conclusions

In our study, the majority of pregnant women were less physically active than advised by current guidelines and conceived their gynaecologist's opinion for physical activity in pregnancy as neutral or negative. In addition, they significantly decreased physical activity during pregnancy compared to the period before pregnancy. Nonetheless, occupational hazards related to physical activity were reduced during pregnancy. These results, collectively, indicate that systematic counselling of pregnant women regarding physical activity and exercise during pregnancy will be needed to achieve optimal physical activity levels for the majority of women in Greece.

Conflict of Interest Statement

None to declare.

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Appendix

Supplementary Table 1. Maternal and offspring characteristics in study population.

MATERNAL CHARACTERISTICS AND OFFSPRING CHARACTERISTICS		MEAN (SD) / N (%)	N (%) MISSING
Age in years, mean (sd)		31.53 (4.43)	0 (0)
Height in cm, mean (sd)		165.20 (5.35)	0 (0)
Weight before pregnancy in kg, mean (sd)		62.35 (11.38)	0 (0)
BMI before pregnancy, mean (sd)		22.81 (3.75)	0 (0)
Weight at term in kg, mean (sd)		75.81 (12.63)	0 (0)
Gestational weight gain in kg, mean (sd)		13.46 (6.94)	0 (0)
Frequency of weight checking in pregnancy, n (%)	Never	1 (0.5)	0 (0)
	Every month	97 (50.3)	
	Every week	71 (36.8)	
	Other	24 (12.4)	
Number of previous pregnancies, n (%)	0	124 (64.2)	0 (0)
	1	43 (22.3)	
	2	18 (9.3)	
	3	6 (3.1)	
	4	2 (1.0)	
Number of live children, n (%)	0	143 (74.1)	0 (0)
	1	45 (23.3)	
	2	5 (2.6)	
Number of previous vaginal labors, n (%)	0	155 (80.3)	0 (0)
	1	34 (17.6)	
	2	4 (2.1)	
Number of previous caesarian sections, n (%)	0	174 (90.2)	0 (0)
	1	19 (9.8)	
Use of IVF, n (%)	No	184 (95.3)	0 (0)
	Yes	9 (4.7)	
Multiple Pregnancies, n (%)	No	187 (96.9)	0 (0)
	Yes	6 (3.1)	
Smoking before pregnancy, n (%)	No	108 (56.0)	0 (0)
	Yes	85 (44.0)	
Duration of smoking before pregnancy in years[1], mean (sd)		4.70 (6.17)	0 (0)
Amount of smoking per day before pregnancy[2], n (%)	5 cigarettes	18 (21.4)	1 (1.2)
	10 cigarettes	34 (40.5)	
	20 cigarettes	26 (31.0)	
	30 or more cigarettes	6 (7.1)	
Self-reported physical activity before pregnancy, n (%)	Low	88 (45.6)	0 (0)
	Moderate	76 (39.4)	
	Vigorous	26 (13.5)	
	Professional	3 (1.6)	

Supplementary Table 1. Maternal and offspring characteristics in study population *(continued).*

MATERNAL CHARACTERISTICS AND OFFSPRING CHARACTERISTICS		MEAN (SD) / N (%)	N (%) MISSING
Smoking during pregnancy, n (%)	No	170 (88.1)	0 (0)
	Yes	23 (11.9)	
Amount of smoking per day during pregnancy, n (%)	None	170 (88.1)	0 (0)
	5 cigarettes	17 (8.8)	
	10 cigarettes	4 (2.1)	
	20 cigarettes	1 (0.5)	
	30 or more cigarettes	1 (0.5)	
Exposure to passive smoking at home during pregnancy, n (%)	No	105 (54.4)	0 (0)
	Yes	88 (45.6)	
Vomiting episodes during pregnancy, n (%)	No	97 (50.3)	0 (0)
	Yes	96 (49.7)	
Medically indicated bed rest during pregnancy, n (%)	No	158 (81.9)	0 (0)
	Yes	35 (18.1)	
Bed rest due to vaginal bleeding, n (%)	No	175 (90.7)	0 (0)
	Yes	18 (9.3)	
Bed rest due to placenta abruption, n (%)	No	182 (94.3)	0 (0)
	Yes	11 (5.7)	
Other reasons for bed rest, n (%)	No	181 (93.8)	0 (0)
	Yes	12 (6.2)	
Duration of bedrest, n (%)	None	156 (80.8)	0 (0)
	Few days	15 (7.8)	
	One month	10 (5.2)	
	More than one month	12 (6.2)	
Gynecologist opinion for physical activity during pregnancy, n (%)	Negative	13 (6.7)	0 (0)
	Probably negative	12 (6.2)	
	Neutral	106 (54.9)	
	Probably positive	26 (13.5)	
	Positive	36 (18.7)	
Gestational age at birth in completed weeks, mean (sd)		38.53 (1.38)	0 (0)
Onset of labor, n (%)	Cervical mucus	6 (3.2)	4 (2.1)
	Rupture of membranes	29 (15.3)	
	Labor induction	117 (61.9)	
	Uterine contractions	37 (19.6)	
Mode of birth, n (%)	Vaginal birth	92 (47.9)	1 (0.5)
	Caesarian section	100 (52.1)	
Birth weight in g, mean (sd)		3075.12 (499.66)	26 (13)
Sex, n (%)	Female	88 (52.4)	25 (13)
	Male	80 (47.6)	
Birth weight of second twin[3], mean (sd)		2192.00 (258.79)	1 (16.7)
Sex of second twin[3], n (%)	Female	5 (100.0)	1 (16.7)
	Male	0 (0.0)	
Willingness to exercise after birth, n (%)	No	104 (53.9)	0 (0)
	Yes	89 (46.1)	

Supplementary Table 1. Maternal and offspring characteristics in study population *(continued).*

MATERNAL CHARACTERISTICS AND OFFSPRING CHARACTERISTICS		MEAN (SD) / N (%)	N (%) MISSING
Willingness to exclusively breastfeed, n (%)	No	22 (11.4)	0 (0)
	Yes	171 (88.6)	
Willingness to quit smoking after birth[3], n (%)	No	8 (10.7)	10 (11.8)
	Yes	67 (89.3)	
Total sample size (n)		193	

[1]Including non-smokers, [2]only among smokers, [3]among multiple pregnancies
Abbreviations: sd standard deviation, n number of women, cm centimeters, kg kilograms, g grams

Supplementary Table 2. Time spent for fun or exercise before and during pregnancy, n(%).

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Walking slowly (per week)	None	84 (43.5)	31 (16.1)	<0.01
	< 30minutes	38 (19.7)	60 (31.1)	
	30-60 min	34 (17.6)	37 (19.2)	
	1-2 hours	19 (9.8)	36 (18.7)	
	2-3 hours	18 (9.3)	15 (7.8)	
	> 3hours	0 (0.0)	14 (7.3)	
Walking more quickly (per week)	None	104 (53.9)	136 (70.5)	<0.01
	< 30minutes	31 (16.1)	23 (11.9)	
	30-60 min	29 (15.0)	22 (11.4)	
	1-2 hours	14 (7.3)	6 (3.1)	
	2-3 hours	15 (7.8)	6 (3.1)	
Walking quickly up hills (per week)	None	134 (69.4)	166 (86.0)	<0.01
	< 30minutes	37 (19.2)	17 (8.8)	
	30-60 min	14 (7.3)	8 (4.1)	
	1-2 hours	5 (2.6)	2 (1.0)	
	2-3 hours	3 (1.6)	0 (0.0)	
Jogging (per week)	None	162 (83.9)	178 (92.2)	0.01
	< 30minutes	14 (7.3)	11 (5.7)	
	30-60 min	9 (4.7)	4 (2.1)	
	1-2 hours	6 (3.1)	0 (0.0)	
	2-3 hours	2 (1.0)	0 (0.0)	
Swimming (per week)	None	160 (82.9)	174 (90.6)	0.04
	< 30minutes	13 (6.7)	6 (3.1)	
	30-60 min	10 (5.2)	9 (4.7)	
	1-2 hours	5 (2.6)	1 (0.5)	
	2-3 hours	5 (2.6)	2 (1.0)	

Supplementary Table 2. Time spent for fun or exercise before and during pregnancy, n(%) *(continued).*

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Dancing (per week)	None	135 (69.9)	168 (87.0)	<0.01
	< 30minutes	29 (15.0)	14 (7.3)	
	30-60 min	21 (10.9)	6 (3.1)	
	1-2 hours	5 (2.6)	3 (1.6)	
	2-3 hours	3 (1.6)	2 (1.0)	
Other activities (per week)	None	138 (71.5)	159 (82.4)	0.04
	< 30minutes	17 (8.8)	16 (8.3)	
	30-60 min	16 (8.3)	9 (4.7)	
	1-2 hours	14 (7.3)	5 (2.6)	
	2-3 hours	8 (4.1)	4 (2.1)	

Supplementary Table 3. Time spent while not at work at everyday household related activities before and during pregnancy, n(%).

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Preparing meals and light cleaning (per day)	None	1 (0.5)	20 (10.4)	<0.01
	< 30minutes	14 (7.3)	15 (7.8)	
	30-60 min	39 (20.2)	54 (28.0)	
	1-2 hours	64 (33.2)	67 (34.7)	
	2-3 hours	51 (26.4)	31 (16.1)	
	> 3hours	24 (12.4)	6 (3.1)	
Dressing, bathing, feeding children, while sitting (per day)	None	140 (72.5)	140 (72.5)	0.74
	< 30minutes	19 (9.8)	15 (7.8)	
	30-60 min	18 (9.3)	20 (10.4)	
	1-2 hours	10 (5.2)	14 (7.3)	
	2-3 hours	6 (3.1)	4 (2.1)	
Dressing, bathing, feeding children, while standing (per day)	None	135 (69.9)	148 (76.7)	0.11
	< 30minutes	18 (9.3)	13 (6.7)	
	30-60 min	21 (10.9)	19 (9.8)	
	1-2 hours	17 (8.8)	8 (4.1)	
	2-3 hours	2 (1.0)	5 (2.6)	
Playing with children while sitting or standing (per day)	None	127 (65.8)	145 (75.1)	<0.01
	< 30minutes	18 (9.3)	13 (6.7)	
	30-60 min	23 (11.9)	20 (10.4)	
	1-2 hours	12 (6.2)	8 (4.1)	
	2-3 hours	13 (6.7)	7 (3.6)	

Supplementary Table 3. Time spent while not at work at everyday household related activities before and during pregnancy, n(%) *(continued).*

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Playing with children while walking or running (per day)	None	139 (72.0)	157 (81.3)	0.01
	< 30minutes	22 (11.4)	16 (8.3)	
	30-60 min	22 (11.4)	13 (6.7)	
	1-2 hours	6 (3.1)	4 (2.1)	
	2-3 hours	4 (2.1)	3 (1.6)	
Taking care of an older adult (per day)	None	180 (93.3)	178 (92.2)	0.71
	< 30minutes	6 (3.1)	7 (3.6)	
	30-60 min	4 (2.1)	4 (2.1)	
	1-2 hours	3 (1.6)	2 (1.0)	
	2-3 hours	0 (0.0)	2 (1.0)	
Sitting and using a computer or writing, while NOT at work (per day)	None	71 (36.8)	69 (35.8)	0.06
	< 30minutes	46 (23.8)	43 (22.3)	
	30-60 min	38 (19.7)	31 (16.1)	
	1-2 hours	17 (8.8)	36 (18.7)	
	2-3 hours	21 (10.9)	14 (7.3)	
Watching television or video (per day)	None	33 (17.1)	28 (14.5)	<0.01
	< 30minutes	39 (20.2)	26 (13.5)	
	30-60 min	63 (32.6)	59 (30.6)	
	1-2 hours	50 (25.9)	57 (29.5)	
	2-3 hours	7 (3.6)	17 (8.8)	
	> 3hours	1 (0.5)	6 (3.1)	
Sitting and reading, talking, or on the phone, while NOT at work (per day)	None	73 (37.8)	55 (28.5)	0.42
	< 30minutes	56 (29.0)	57 (29.5)	
	30-60 min	45 (23.3)	58 (30.1)	
	1-2 hours	12 (6.2)	20 (10.4)	
	2-3 hours	4 (2.1)	0 (0.0)	
	> 3hours	3 (1.6)	3 (1.6)	
Playing with pets (per day)	None	151 (78.2)	157 (81.3)	0.17
	< 30minutes	22 (11.4)	18 (9.3)	
	30-60 min	8 (4.1)	13 (6.7)	
	1-2 hours	7 (3.6)	4 (2.1)	
	2-3 hours	5 (2.6)	1 (0.5)	

Supplementary Table 3. Time spent while not at work at everyday household related activities before and during pregnancy, n(%) *(continued).*

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Shopping (per day)	None	80 (41.5)	97 (50.3)	
	< 30minutes	71 (36.8)	66 (34.2)	
	30-60 min	33 (17.1)	23 (11.9)	0.29
	1-2 hours	5 (2.6)	4 (2.1)	
	2-3 hours	4 (2.1)	3 (1.6)	
Heavy cleaning (per week)	None	42 (21.8)	110 (57.0)	
	< 30minutes	44 (22.8)	30 (15.5)	
	30-60 min	55 (28.5)	25 (13.0)	<0.01
	1-2 hours	37 (19.2)	15 (7.8)	
	2-3 hours	15 (7.8)	13 (6.7)	
Gardening (per week)	None	158 (81.9)	164 (85.0)	
	< 30minutes	18 (9.3)	13 (6.7)	
	30-60 min	12 (6.2)	12 (6.2)	0.82
	1-2 hours	2 (1.0)	2 (1.0)	
	2-3 hours	3 (1.6)	2 (1.0)	

Supplementary Table 4. Time spent going to places before and during pregnancy, n(%).

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Walking slowly to go to places (per day)	None	98 (50.8)	113 (58.5)	
	< 30minutes	74 (38.3)	58 (30.1)	
	30-60 min	13 (6.7)	16 (8.3)	0.16
	1-2 hours	6 (3.1)	4 (2.1)	
	2-3 hours	2 (1.0)	2 (1.0)	
Walking quickly to go to places (per day)	None	116 (60.1)	154 (79.8)	
	< 30minutes	54 (28.0)	30 (15.5)	
	30-60 min	15 (7.8)	7 (3.6)	<0.01
	1-2 hours	4 (2.1)	1 (0.5)	
	2-3 hours	4 (2.1)	1 (0.5)	
Driving or riding in a car or bus (per day)	None	86 (44.6)	104 (53.9)	
	< 30minutes	61 (31.6)	46 (23.8)	
	30-60 min	33 (17.1)	33 (17.1)	0.14
	1-2 hours	8 (4.1)	4 (2.1)	
	2-3 hours	5 (2.6)	6 (3.1)	

Supplementary Table 5. Time spent at work before and during pregnancy, n (%).

		BEFORE PREGNANCY	DURING PREGNANCY	P-VALUE
Sitting at work or class (per week)	None	49 (25.5)	106 (54.9)	<0.01
	< 30 minutes	19 (9.9)	17 (8.8)	
	1/2 - 2 hours	15 (7.8)	18 (9.3)	
	2-4 hours	35 (18.2)	23 (11.9)	
	4-6 hours	74 (38.5)	29 (15.0)	
Standing or slowly walking while carrying things (per week)	None	78 (40.4)	138 (71.5)	<0.01
	< 30 minutes	44 (22.8)	26 (13.5)	
	1/2 - 2 hours	21 (10.9)	9 (4.7)	
	2-4 hours	21 (10.9)	11 (5.7)	
	4-6 hours	29 (15.0)	9 (4.7)	
Standing or slowly walking without carrying things (per week)	None	83 (43.0)	143 (74.1)	<0.01
	< 30 minutes	29 (15.0)	21 (10.9)	
	1/2 - 2 hours	29 (15.0)	13 (6.7)	
	2-4 hours	23 (11.9)	5 (2.6)	
	4-6 hours	29 (15.0)	11 (5.7)	
Walking quickly while carrying things (per week)	None	129 (66.8)	167 (86.5)	<0.01
	< 30 minutes	24 (12.4)	12 (6.2)	
	1/2 - 2 hours	18 (9.3)	6 (3.1)	
	2-4 hours	12 (6.2)	4 (2.1)	
	4-6 hours	10 (5.2)	4 (2.1)	
Walking quickly without carrying things (per week)	None	108 (56.0)	160 (82.9)	<0.01
	< 30 minutes	40 (20.7)	20 (10.4)	
	1/2 - 2 hours	15 (7.8)	7 (3.6)	
	2-4 hours	10 (5.2)	2 (1.0)	
	4-6 hours	20 (10.4)	4 (2.1)	