

# Health-related quality of life in pregnancy and postpartum among women with assisted conception in Canada

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**Objective:** To study the effects of mode of conception (spontaneous vs. assisted) on health-related quality of life (HRQoL) throughout pregnancy and in the postpartum period.

**Design:** Secondary analysis of data from the All Our Babies cohort.

**Setting:** Not applicable.

**Patient(s):** A total of 243 women with assisted conception and 3,309 women with spontaneous conception.

**Intervention(s):** Short Form 12 (SF-12) health survey administered by means of questionnaires at <25 weeks, 34–36 weeks of gestation, and 4 months postpartum.

**Main Outcome Measure(s):** Changes in the SF-12 Physical (PCS) and Mental (MCS) Component Summary scores from pregnancy to postpartum.

**Result(s):** The PCS scores were lower during pregnancy and at <25 weeks and 34–36 weeks of gestation among women with assisted conception, but were equivalent to those of women with spontaneous conception by 4 months postpartum. The MCS scores were higher at <25 weeks among women with assisted conception, but by 34–36 weeks of gestation and at 4 months postpartum they were similar regardless of the method of conception. Analysis of covariance showed no significant differences for the changes in PCS and MCS scores from pregnancy to postpartum between assisted and spontaneous conception groups, after adjusting for covariates.

**Conclusion(s):** Women with assisted conception may report lower physical and better mental health during pregnancy than women with spontaneous conception. At 4 months postpartum, there were no differences in self-reported HRQoL between modes of conception. Women with assisted conception may benefit from support and reassurance that perception of suboptimal health may improve over pregnancy and into the postpartum period. (Fertil Steril® 2015;104:188–95. ©2015 by American Society for Reproductive Medicine.)

**Key Words:** Assisted conception, SF-12, physical health, mental health, quality of life

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The prevalence of infertility is estimated to be 9%–15% of the childbearing population and is on the rise (1–3). Assisted conception is increasingly more common among individuals who experience infertility

problems and desire to achieve pregnancy (4–6). The experience of infertility and its treatments have been associated with physical and psychosocial health problems with additional social, emotional, and in

some cases financial burdens (7). Depression, anxiety, and other psychologic disorders are highly prevalent and frequently reported in women who seek fertility treatment, as either a cause or a consequence of infertility (8–10). Infertile women have a subjective perception of decreased quality of life and of a greater impact on their health-related quality of life (HRQoL) (11).

After achieving conception, women who used fertility treatments may be more concerned for the health

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of their pregnancy, because assisted conception has been linked to greater incidence of pregnancy and birth complications (12–14) and adverse perinatal outcomes (15–17). These women show higher pregnancy-related distress and emotional disturbances, especially depressive and anxiety symptoms, compared with women who conceive spontaneously (18, 19). Moreover, women who undergo assisted conception may have difficulties transitioning to the postnatal period, mostly owing to high levels of anxiety and depression and to parenting and relationship difficulties (20, 21). Taken together, experience of infertility and assisted conception, subsequent pregnancy, and transition to parenting appear to greatly affect health and several areas of life, possibly impairing quality of life in these women. However, not all studies support these views, rendering the information concerning the impact of infertility and associated treatments on the quality of life inconclusive (22–24). For example, in a study by Raguz et al., the proportion of women who experienced elevated symptoms of depression, anxiety, or perceived stress was similar at 4 months postpartum, regardless of mode of conception, assisted or spontaneous (25). A systematic review evaluating the risk of postpartum depression associated with assisted conception found no or negligible risk for these women (26). In addition, there is little evidence regarding the long-term impact of assisted reproduction on the quality of life measures among women along the continuum of pregnancy and postpartum. Only a few studies have measured the quality of life of women who conceived by means of assisted conception during the prenatal and/or postnatal period (27) or longitudinally assessed self-reported HRQoL in pregnancy and after childbirth. With increases in the number of pregnancies that result from assisted conception, there is a need to understand the impact of fertility treatments on women's health and well-being. The present study evaluated the changes in perceived HRQoL throughout pregnancy and at 4 months postpartum in women who underwent fertility treatments to conceive compared with women who conceived spontaneously.

## METHODS

### Participants and Data Source

Participants from this study were drawn from the All Our Babies (AOB) study, a prospective community-based pregnancy cohort designed to examine the use of prenatal and postpartum services, and mental and physical health in pregnancy and the postpartum period. Detailed information on cohort and recruitment are provided elsewhere (28, 29). In brief, women were recruited from May 2008 to December 2010 in Calgary, Alberta, from primary health care offices, community posters, postcards, and word of mouth, and through a city-wide single provider of public health laboratory services (Calgary Laboratory Services). Women were eligible to participate if they could complete a questionnaire in English, were at least 18 years old and less than 25 weeks pregnant at the time of recruitment, and accessed prenatal care in community clinics in Calgary. Three separate questionnaires were sent to participants during the perinatal

period. Specific information on sociodemographic characteristics, lifestyle, reproductive and general health, health care utilization, and experiences with pregnancy were obtained from self-administered questionnaires at two time points during pregnancy: at <25 weeks and at 34–36 weeks of gestation. A third questionnaire administered at 4 months postpartum collected information on women's experiences with pregnancy, delivery, postpartum period, and health care utilization. Questions evaluating HRQoL in the form of the Short Form 12 Health Survey (SF-12) were included in all three questionnaires.

From the total of 3,388 participants in the AOB study, 3,355 women answered the question “When you became pregnant, were you trying to get pregnant?” from the first questionnaire and were included in this study. From these, 243 women used medical interventions to conceive, either invasive or noninvasive (assisted conception group, AC). Medical interventions included the use of fertility-enhancing drugs (Clomid, Gonal-F, etc.), artificial insemination, and assisted reproductive technologies (ART; including in vitro fertilization [IVF], intracytoplasmic sperm injection [ICSI], fresh and donor embryo transfer, etc.). The comparison group included all women who conceived spontaneously (spontaneous conception group, SC).

### Measures

The SF-12 was used to measure HRQoL in this study (30). This survey examines the impact of health conditions beyond symptomatology, morbidity, and mortality (30). SF-12, an abridged version of the Short Form 36 Health Survey (SF-36), is a well validated, reliable (31–33), and widely used instrument for capturing general health and outcomes information, shown to be sensitive to change in health status in diverse populations (34) and various medical conditions and treatments (30, 35–38), including pregnancy and prenatal period (27, 39, 40).

The SF-12 measured physical and mental health and well-being, based on participant responses to 12 questions divided into eight dimensions (subscales): physical and social functioning, role limitations due to physical and emotional health, bodily pain, general health perceptions, vitality, and mental health. The SF-12 scores for these items can vary from 0 to 100, with higher scores indicating better health. The interpretation of SF-12 was based on norm-based scores, with a mean of 50 and a standard deviation of 10. Summary scores for physical and mental health status were derived from the SF-12 scales and referred to as the Physical Component Summary (PCS) and the Mental Component Summary (MCS), respectively (35, 41). The scale and summary scores were calculated as previously described, following recommendations from the survey's developers (30, 37, 42).

### Analysis

Clinical and demographic variables were presented using descriptive statistics, including proportions, means, and standard deviations. Comparisons of the SF-12 domains, the PCS and MCS scores, and sociodemographic and obstetrical

characteristics between women who conceived through assisted conception and women who conceived spontaneously were carried out with the use of Student *t* test, analysis of variance, and chi-square tests at the three evaluations points (<25 weeks of gestation, 34–36 weeks of gestation, and 4 months postpartum) as appropriate.

The main outcomes were changes in SF-12 PCS and MCS scores from pregnancy to postpartum in women with assisted and spontaneous conception. In the initial analyses, to assess the trend of changes in the PCS and MCS scores from pregnancy to the postpartum period, the means scores of PCS and MCS were compared between the groups at <25 weeks gestation and 4 months postpartum and the results were plotted in corresponding graphs (Supplemental Fig. 1; available online at [www.fertstert.org](http://www.fertstert.org)). Plotting the individual PCS and MCS scores in graphs identified a regression to the mean effect in both instances (43–45). To adjust for each subject's follow-up scores according to their baseline PCS and MCS scores, analysis of covariance (ANCOVA) was used to evaluate the change in SF-12 summary scores ( $\Delta$ PCS and  $\Delta$ MCS) from baseline to 4 months postpartum. Potential confounders, including maternal age, gravidity, prepregnancy body mass index (BMI; which significantly distinguished the groups at bivariate level), and baseline PCS and MCS scores, were controlled for in the analysis. The baseline PCS and MCS scores were included as covariates in ANCOVA to reduce the error variance and eliminate the systematic bias (46).

### Ethics Statement

Ethical approval for this study was obtained from the Conjoint Health Research Ethics Board of the University of Calgary (Ethics ID 20821). Informed consent was obtained from each of the study participants at time of recruitment, and they were provided copies for their records.

### RESULTS

From the 3,355 women in the study, 243 (7.2%) conceived after fertility treatments (AC), and 3,112 conceived spontaneously (SC). Among women who used medical treatments to conceive, 76 (31.3%) used exclusively fertility-enhancing drugs (ovulation induction), 39 (16.0%) used artificial insemination, and 30 (12.3%) used artificial reproductive technologies (IVF/ICSI). The remainder of this group ( $n = 98$ ; 40.4%) used combinations of methods.

Women from the two groups differed in several demographic characteristics, which are summarized in Table 1. Women with assisted conception were older (32.5% vs. 18.6% were older than 35 years;  $P < .001$ ), heavier (42.8% vs. 33.4% were overweight or obese;  $P = .003$ ) and had a household income  $> \$60,000$  (87.7% vs. 81.2%;  $P = .014$ ) than women who conceived naturally. Obstetrical characteristics were also different between the two groups. Significantly more women from the AC group were primigravida ( $P = .016$ ). Women in the AC group were more likely to be primiparous compared with the SC group (63% vs. 52%). Thirty-five participants had twin pregnancies (1.2%): 15 in the AC group (6.7%) and 20 in the SC group (0.7%). AC women were also more

likely to deliver preterm ( $P < .001$ ) and by cesarean section (either planned or emergency;  $P < .001$ ) than SC women.

Women's scores on SF-12 domains subscales at <25 weeks and 34–36 weeks of gestation and at 4 months postpartum are presented in Table 2. Of note, all scores across all time points were within 1 standard deviation (10 points) of the normative mean of 50. However, at <25 weeks of gestation, AC women reported an overall better mental health (higher MCS scores;  $P < .05$ ), but poorer physical health (lower PCS scores;  $P = .031$ ) than SC women. In the single-item sub-analyses, these differences were statistically significant for physical functioning, role limitation physical, and bodily pain. That is, women who conceived by means of AC had lower scores in physical functioning ( $P \leq .001$ ) and physical performance of daily tasks ( $P \leq .001$ ) than women who conceived naturally. However, women who conceived spontaneously reported significantly more pain interfering with work than women who conceived by AC ( $P = .006$ ).

Comparing the summary scores at 34–36 weeks of gestation, a significant difference persisted only for overall physical health (PCS scores) between the two groups ( $P < .05$ ), with AC women reporting more limitation in their daily tasks because of their physical health ( $P \leq .001$ ) than SC women. At 4 months postpartum, there was no difference in overall perceived mental and physical health or in any of the eight subscale domains between the two groups of women.

When we compared the changes in the perceived physical and mental health between pregnancy (<25 weeks) and postpartum within each study group, the analysis showed an increase in the PCS but not in the MCS scores in both groups (Table 2). The increase in the PCS scores with pregnancy and delivery experiences was significantly higher in the AC group than in the SC group ( $P = .001$ ). Although both groups displayed improvements in physical and social functioning and role physical subscales between pregnancy and postpartum, the AC group showed significantly more improvement in all three subscales than the SC group (Table 2).

The slope of changes in the self-reported mental and physical health between pregnancy and postpartum by group is illustrated in Supplemental Figure 1. Although the changes in mean MCS scores in AC group between the 2nd trimester of gestation and postpartum paralleled the changes observed in the SC group (Supplemental Fig. 1A), the increase in the mean PCS scores in AC women was more prominent, though within a couple of points. As illustrated in Supplemental Figure 1B, there was only a slight difference in norm-based PCS scores of the two groups at 4 months postpartum.

When ANCOVA was performed to evaluate the effects of mode of conception on changes in perceived HRQoL, no significant effects were found regarding the changes of PCS and MCS scores from pregnancy to postpartum ( $\Delta$ PCS:  $F(1,283) = 0.237$ ;  $P = .626$ ;  $\Delta$ MCS:  $F(1,283) = 1.858$ ;  $P = .173$ ) after adjusting for the covariates (Table 3).

### DISCUSSION

This study assessed the changes in HRQoL throughout the prenatal and postpartum period among women with assisted conception compared with women with spontaneous

TABLE 1

## Sociodemographic and obstetrical characteristics of study participants.

Population characteristics	SC group (n = 3,112)	AC group (n = 243)	P value
Demographics			
Maternal age			< .001
<35 y	2,474 (81.4)	160 (67.5)	
≥35 y	564 (18.6)	77 (32.5)	
Total household income (before taxes)			.014
<\$60,000	566 (18.8)	29 (12.3)	
≥\$60,000	2,443 (81.2)	206 (87.7)	
Education			.525
Some or graduated high school	779 (25.1)	66 (26.9)	
Graduated post-secondary	2,324 (74.9)	179 (73.1)	
Ethnicity			.293
White/Caucasian	2,443 (78.8)	186 (75.9)	
Other	658 (21.2)	59 (24.1)	
Time in Canada			.388
Born in Canada or lived in Canada ≥5 y	2,785 (90.1)	224 (91.8)	
Lived in Canada <5 y	306 (9.9)	20 (8.2)	
Prepregnancy body mass index (BMI)			.003
Underweight (BMI <18.50 kg/m <sup>2</sup> )	139 (4.6)	10 (4.1)	
Normal weight (BMI 18.50–24.99 kg/m <sup>2</sup> )	1,884 (62.0)	129 (53.1)	
Overweight (BMI 25.0–29.99 kg/m <sup>2</sup> )	670 (22.1)	58 (23.9)	
Obese (BMI ≥30.00 kg/m <sup>2</sup> )	344 (11.3)	46 (18.9)	
Obstetrics			
Gravidity			.016
Primigravida	1,086 (35.1)	102 (42.9)	
Multigravida	2,006 (64.9)	136 (57.1)	
Parity			< .001
Primiparous (no previous births)	1,607 (52.1)	152 (62.6)	
Multiparous (≥1 previous birth)	1,480 (47.9)	91 (37.4)	
Gestational age at delivery			< .001
Preterm (<34 wk gestation)	33 (1.2)	10 (4.5)	
Late preterm (34–36 wk gestation)	167 (6.0)	20 (9.0)	
Term (≥37 wk gestation)	2,584 (92.8)	191 (86.4)	
Mode of delivery			< .001
Vaginal delivery	2,133 (76.1)	144 (64.0)	
Emergency cesarean section	399 (14.2)	49 (21.8)	
Planned cesarean section	270 (9.6)	32 (14.2)	

Note: Numbers for each characteristic may not add up to the total number (n = 3,309) owing to missing data. Data are presented as n (%), percentages calculated per column for each variable. AC group = women who conceived with assisted reproductive technology; SC group = women who conceived spontaneously.

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conception. With the use of longitudinal population-based self-rated data on general health status and specific functional measures of perceived physical and mental health, we found that the perceived HRQoL in women with either assisted or spontaneous conception improves over time from pregnancy to the postpartum period. Although women with assisted conception report statistically lower physical and better mental health in the 2nd trimester than women with spontaneous conception, at 4 months postpartum there were no differences in HRQoL in women with assisted conception and women with spontaneous conception. Indeed, the mean scores in HRQoL within the AC group tended to vary less than 0.5 SD, and consequently the clinical implications suggest that women undergoing fertility treatment can be reassured that their HRQoL through pregnancy and postpartum is not materially different from other women. Furthermore, although HRQoL scores among women with AC may be slightly different compared with women with SC during pregnancy, any differences are resolved in both physical and social functioning by 4 months postpartum.

Several lines of evidence commonly report that pregnant and postpartum women have lower quality of life regarding mental health, social functioning, role-emotional, and emotional behavior (11, 27, 47, 48). In contrast, we found higher MCS scores in women with assisted conception than in women with spontaneous conception only at <25 weeks of gestation, a difference that was diminished as pregnancy progressed. It can be speculated that better mental health in the second trimester in women with assisted conception may reflect either the persistence of a well-being state induced by the news of being pregnant and/or satisfaction with pregnancy progression. Our observations are in agreement with recent reports by Ahmadi et al. (48), who compared the SF-36 scores between women with assisted and natural conceptions before and after childbirth and found that women who underwent ART showed greater improvements in general and mental health than women who conceived spontaneously (48). In a systematic review, Hammarberg et al. concluded that women who conceive with the use of ART have consistently lower rates of mental disorders than women who conceive

**TABLE 2**

**SF-12 scores among women with assisted (AC) and spontaneous (SC) conception at < 25 weeks and 34–36 weeks of gestation and at 4 months postpartum.**

SF-12 domain	< 25 wk gestation		34–36 wk gestation		4 mo postpartum		Mean change <sup>a</sup>	
	SC	AC	SC	AC	SC	AC	SC	AC
General health	52.29 (8.96)	52.49 (8.43)	53.12 (8.85)	53.51 (9.17)	52.12 (9.23)	52.61 (8.57)	-0.411 (9.32)	0.11 (8.51)
Physical functioning	51.43 (8.07)	49.22 (9.02) <sup>b</sup>	44.79 (10.07)	42.79 (10.28)	55.09 (5.22)	54.79 (5.37)	3.47 (8.25)	5.47 (8.98) <sup>b</sup>
Role limitations—physical	48.01 (8.44)	45.84 (8.73) <sup>b</sup>	44.56 (8.92)	42.43 (9.44) <sup>b</sup>	53.70 (6.60)	53.70 (5.65)	5.53 (9.36)	7.91 (8.89) <sup>b</sup>
Role limitations—emotional	51.61 (7.67)	51.57 (7.65)	51.96 (7.54)	51.65 (7.65)	52.10 (7.52)	52.77 (6.76)	0.21 (8.28)	1.10 (7.73)
Bodily pain	52.28 (8.01)	50.80 (9.61) <sup>c</sup>	48.11 (9.27)	47.64 (10.15)	54.25 (7.22)	53.29 (8.12)	1.78 (9.33)	2.37 (10.51)
Mental health	52.51 (7.58)	53.18 (7.35)	52.93 (7.21)	53.56 (7.47)	52.94 (7.63)	53.86 (6.78)	0.19 (7.95)	0.44 (7.98)
Vitality	46.95 (8.64)	47.25 (8.89)	48.03 (8.56)	48.17 (9.26)	51.38 (8.33)	51.65 (8.85)	4.40 (9.53)	4.45 (9.91)
Social functioning	50.80 (7.93)	50.11 (8.70)	50.72 (8.06)	49.93 (9.32)	52.99 (7.10)	53.58 (6.08)	2.03 (8.74)	3.33 (8.80) <sup>c</sup>
Physical Component Summary (PCS)	50.31 (7.28)	48.09 (7.87) <sup>b</sup>	44.73 (8.93)	43.31 (9.60) <sup>c</sup>	54.38 (6.06)	53.79 (5.42)	3.92 (7.66)	5.62 (7.58) <sup>b</sup>
Mental Component Summary (MCS)	51.08 (7.64)	52.18 (7.43) <sup>c</sup>	54.21 (7.25)	54.85 (7.25)	51.47 (7.99)	52.46 (7.26)	0.19 (8.11)	0.16 (8.21)

Note: SF-12 subscales norm-based scores, based on a mean of 50 and a standard deviation of 10. Data are presented as mean (SD). Sample size was n = 3, 112 for the SC group and n = 243 for the AC group.

<sup>a</sup> Mean (SD) change in SF-12 domains and physical and mental component scores calculated from the average of changes in the health subscales in each study participant between <25 weeks of gestation and 4 months postpartum. Positive values indicate improvements, and negative values indicate deterioration.

<sup>b</sup> P < .001.

<sup>c</sup> P < .05; AC group compared with SC group.

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spontaneously (7, 12, 49), contradicting the findings from Moninx et al. (50), who found persistent lower mental health in women carrying high-risk pregnancies from gestation to postpartum. However, the MCS scores reported here in both groups of women were similar to the scores reported in a recent Australian cohort, in which more than one-half of the women described feeling mostly calm and relaxed (39), regardless of the mode of conception. Our results add evidence that although variations in HRQoL scores may be evident during pregnancy, these differences are likely not clinically relevant and seem to disappear by 4 months postpartum.

In agreement with other studies, our findings outline some differences in perceived physical health in women with assisted conception compared with women with spontaneous conception, who scored lower in at least three domains of the physical domain subscale. Possibly, the diagnosis of infertility followed by the burden of investigations and fertility treatments, most of which are invasive, negatively affects physical health and related quality of life during the gestational period in women with assisted conception (40, 48). However, both groups of women showed improved physical health postpartum compared with during pregnancy. In another Canadian cohort, da Costa et al. reported that pregnant women in their 3rd trimester had lower physical health scores compared with age-appropriate Canadian norms, showing worse functioning in five of the eight domains of SF-36 (51). Our results are consistent with those findings and with those from an older study (1999) by Otchet et al. in the United States (52), which compared perception of physical health in pregnancy and puerperium with community norms. These findings may suggest that the increased demands of the ongoing gestation in itself, regardless of method of conception, including increased physiologic changes, more visible body transformations, and the imminence of delivery, impose physical demands that reduce overall functioning, affecting predominantly the physical dimensions of HRQoL late in gestation. Most interestingly, childbirth and transition to motherhood were associated in our study with increase in scores in the physical but not in the mental domains for both women with assisted conception and women with spontaneous conception, which attenuated the observed differences in self-rated quality of life between the two groups. The cause of such changes is unclear; however, we may speculate that improvement in physical health may be related to removal of the physical and physiologic strain of pregnancy. Our results are in agreement with the data from an Australian cohort of 473 women, in which Emmanuel et al. found higher scores for physical health, physical and social functioning, bodily pain, vitality, and role emotional at 6 and 12 weeks postpartum compared with Australian population norms (27).

The increased functional demands of pregnancy in women with fertility treatments may reflect advanced maternal age at conception and/or increased prepregnancy BMI in this group (53, 54). Studies suggest that both maternal age and BMI are associated with increased risk of pregnancy complications and obstetrical interventions at birth, including cesarean deliveries and labor inductions, which may additionally affect physical health

TABLE 3

**Analysis of covariance results for the changes in PCS and MCS scores from pregnancy (< 25 weeks of gestation) to 4 months postpartum according to mode of conception.**

Source	SS	MS	F	P value
Changes in PCS scores				
Group, AC vs. SC	7.267	7.267	0.237	.626
Covariates				
Maternal age	105.355	105.355	3.437	.064
Gravidity	17.378	17.378	0.567	.452
Prepregnancy BMI	1,403.617	701.808	22.896	< .001
Prenatal PCS score	78,054.868	78,054.868	2,546.466	< .001
Changes in MCS scores				
Group, AC vs. SC	93.508	93.508	1.858	.173
Covariates				
Maternal age	16.217	16.217	0.322	.570
Gravidity	224.169	224.169	4.455	.035
Prepregnancy BMI	46.718	23.359	0.464	.629
Prenatal MCS score	41,676.843	41,676.843	828.229	< .001

Note: Covariates: maternal age (<35 y, ≥35 y); gravidity (primigravida, multigravida); prepregnancy BMI (underweight, normal weight, overweight/obese). MS = mean square; SS = sum of squares; other abbreviations as in Tables 1 and 2.

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(12, 13). Furthermore, complications of pregnancy, such as gestational diabetes, placenta previa, or hypertensive disorders have been shown to occur more frequently after fertility treatments and may contribute to lower physical and mental health scores in these women (55, 56). However, our analyses revealed that although the percentage of women >35 years old was higher in the AC group, maternal age was not a significant covariate for the perceived changes in physical and mental health. These findings are in agreement with the conclusions from a recent Australian cohort, Parental Age and Transition to Parenthood Australia, showing that neither maternal age nor the mode of conception were associated significantly with the MCS scores (39).

### Study Strengths and Limitations

This study followed the pregnancy-related changes in several dimensions of HRQoL throughout gestation and in early postpartum, which corresponds to major physiologic adaptations and adjustments to pregnancy and motherhood. To our knowledge, few other studies have reported on the continuum of changes in perceived health from pregnancy to the postpartum period (27, 48). Recruitment of a large sample and prospective collection of a wide array of sociodemographic information represents another considerable strength of our study. As far as we are aware, this is the first study to include a longitudinal investigation of the perceived physical and mental health of women who successfully underwent fertility treatment from 2nd trimester of pregnancy to the 3rd trimester and to 4 months postpartum. In addition, this study used validated tools to evaluate the subjective perception of HRQoL in subjects who conceived with the use of ART compared with subjects who conceived naturally.

This study also has several limitations. Firstly, the data are self-reported and were not confirmed from medical records. We did not assess the relationship between multi-

fetal gestations and perceived health and health-related functioning. It is possible that pregnancy with twins may have yielded higher changes in health status from pregnancy to postpartum, but the small number of multifetal pregnancies and the distribution between groups suggests that our results are likely robust. In addition, we did not evaluate HRQoL before conception and did not control for psychiatric symptoms that could have been present during pregnancy and/or postpartum. Subclinical symptomatology of depression is associated with reduced quality of life and could have played a role in the observed differences between women with assisted conception and women with spontaneous conception (11). Moreover, although SF-12 is designed to evaluate HRQoL and health outcomes in various populations, it is a very general instrument and could not measure quality of life concerns specific to reproductive issues.

Furthermore, we were unable to determine the duration of infertility or if the pregnancy was a result of one or multiple treatments of infertility. The AC group included only women successful in obtaining a pregnancy, regardless of the length and method of ART or the number of failed attempts. It is possible that previous fertilization attempts could have affected mental health scores, vitality, and psychology of these women and may be reflective of poorer physical health observed at the first time point of assessment. In a study by Ragni et al. of 1,000 infertile Italian women, duration of infertility and previous failed IVF attempts significantly influenced HRQoL (22). We also acknowledge that the majority of our sample was represented by socioeconomically advantaged women, and therefore the findings may not reflect the situation of women with low income.

### CONCLUSION

This study suggests that there are no significant differences in perceived physical and mental health between women

conceiving with the use of fertility treatments and women conceiving spontaneously at 4 months postpartum, despite some differences at the beginning of pregnancy. Although women who successfully complete infertility treatment might have a temporary decrease in perceived physical well-being and a slight elevation in perceived mental well-being compared with women who conceive spontaneously, pregnancy and early motherhood experience appears to attenuate any adverse effects of subfertility and fertility treatments on self-reported HRQoL. This study provides new evidence of the physical and mental effects of assisted conception, contributing to better understanding of HRQoL issues of these women as they go from pregnancy to postpartum, and providing reassurance that the postpartum HRQoL does not differ based on mode of conception.

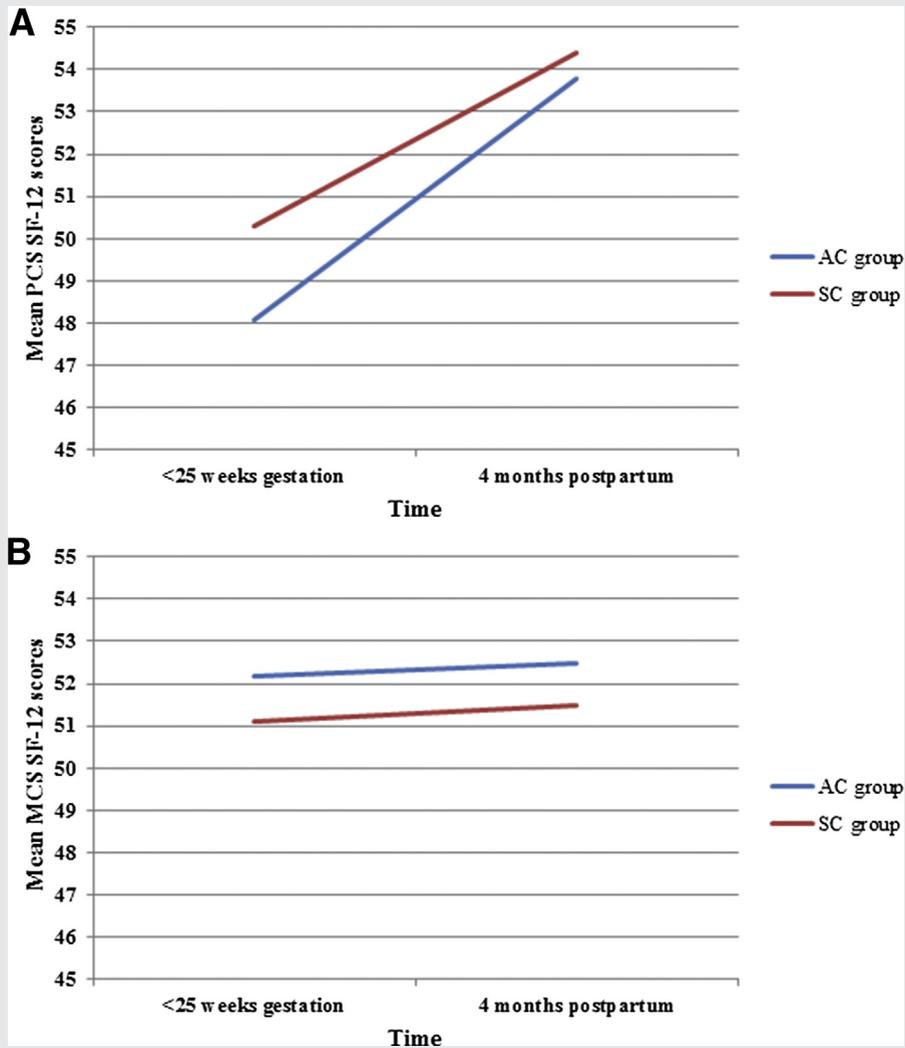
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**SUPPLEMENTAL FIGURE 1**



Changes in SF-12 (A) physical component (PCS) and (B) mental component (MCS) norm-based scores from pregnancy (at <25 weeks of gestation) to 4 months postpartum in women with assisted (AC group) and spontaneous (SC group) conception.

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