

# Evaluation of Quality of Life in Japanese Normal Pregnant Women

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To evaluate QOL changes during pregnancy in developed country, we analyzed 159 pregnant Japanese women (67 nulliparous and 92 multiparous) who had no complications during pregnancy. Subjects were asked to complete the Medical Outcomes Study Short Form (SF-36) every 4 weeks up to 24 weeks of gestation, and every 2 weeks from 24 weeks of gestation until delivery. Subscales that reflect "Physical functioning ( $p < 0.001$ )", "Role-physical ( $p < 0.001$ )" and "Bodily pain ( $p < 0.001$ )" showed significant declines throughout the entire pregnancy. On the other hand, subscales that reflect "Vitality," "General health" and "Mental health" did not change substantially with gestational age. Furthermore, subscales that reflect "Physical functioning," "Role physical," "General health" showed no significant differences between nulliparous and multiparous women. Although subscales that reflect "Bodily pain," "Vitality," "Social functioning," "Role emotional" and "Mental health" showed significant differences between nulliparous and multiparous women, these subscales showed significant interactions. Our results suggest that pregnant women need support, regardless of the number of deliveries. Appropriate supports to pregnant women will be available to improve the birth rate in developed countries.

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**Keywords:** Fertility rate; Medical Outcomes Study Short Form (SF-36); Number of deliveries; Quality of Life (QOL)

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## Abbreviations

QOL: quality of life, SF-36: Medical Outcomes Study Short Form, BMI: body mass index

## Introduction

Declining birth rate is one of the important and common issues in developed countries. In Japan, marriage is delayed and postponed until later in life, an increasing number of women choose to remain single, and there are fewer children even among married couples. The total fertility rate decreased to 1.26 in 2005 and is one of the

lowest fertility rates in the world.<sup>1</sup> Besides the appropriate implementations of social, economical and political strategies, improvement of women's health, according to the profiles of each stage during pregnancy should be carefully taken into account, in order to recover the fertility rate in developed countries including Japan. Furthermore, evaluation of the health effects of multiple pregnancies for women is also very important, to provide support for women who wish to have multiple deliveries.

On the other hand, pregnancy causes profound physical, mental, and social changes for a woman. For example, physical problems, such as breast tenderness, nausea, general fatigue and sleepiness occur even during normal pregnancy.<sup>2,3</sup> These problems, in combination with emotional reactions to pregnancy, limit a pregnant woman's

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activities and lower quality of life (QOL). Using "Medical Outcomes Study Short Form (SF-36)," which is a standard measure of QOL for "serial assessments of health-related functional status,"<sup>4-6</sup> several studies showed declining QOL scores in the "Physical functioning" subscale during the early stages, and in the "Role-physical" and "Bodily pain" subscales during the middle and late stages of normal pregnancy, respectively.<sup>3,7</sup> In addition, physical and emotional changes during pregnancy can reportedly alter the ability to undertake the normal activities of daily life.<sup>8-11</sup> These findings suggest that, given the changes in QOL, careful support of pregnant women is essential, particularly from the family.

Furthermore, nulliparous and multiparous women experience different health problems during pregnancy. It has been reported that multiparous women, compared with nulliparous women, have more health problems, such as back pain and obesity.<sup>12-14</sup> However, the effect of the number of deliveries on women's QOL during pregnancy has received less attention.<sup>15</sup> In order to recover the fertility rate in developed countries, evaluation of QOL changes of multiparous women and nulliparous women should be considered to improve their health environment.

With these considerations, we evaluated chronological changes of QOL in normal pregnant Japanese women throughout pregnancy and the effects of the number of deliveries in this study.

## Methods

### Study Participants

Before the study, ethical approval was obtained from the special committee of Siebold University of Nagasaki (project registration #39).

The study was conducted from August 2005 to September 2006. Subjects included 190 Japanese women (in the early gestational period) who initiated maternity care at one of 4 hospitals and clinics in Nagasaki city (Japan) and who were invited to participate in the study. At initial examination, details of the study were explained to each participant. Informed consent was obtained from all participants before enrollment in the study. A total of 16 participants who

developed complications (extracorporeal fertilization, abortion, antepartum fetal death, pregnancy-induced hypertension, premature delivery, and other medical complications) and 12 participants who transferred to other hospitals and clinics or returned to their hometown for delivery were excluded from the analysis. Three participants who did not report the number of deliveries were also excluded from analysis. A total of 159 pregnant women were thus included for final analysis.

### Questionnaire Administration

Each study participant was asked to complete a self-administered questionnaire. In addition to number of deliveries, sociodemographic variables were also elicited including age, body mass index (BMI), occupational status, family composition, and whether the current pregnancy was planned.

Every 4 weeks up to 24 weeks of gestation, and then every 2 weeks from 24 weeks of gestation until delivery, study participants were asked to complete the Medical Outcomes Study Short-Form 36 (Japanese edition of SF-36) version 2 Acute (iHope International, Japan). The questionnaire consists of 36-items generating 8 dimensions of functioning: "Physical functioning" (10 items); "Role-physical" (4 items); "Bodily pain" (2 items), "General health" (5 items), "Vitality" (4 items), "Social functioning" (2 items); "Role-emotional" (3 items) and "Mental health" (5 items) (Table 1, (16)). These 8 subscales are separately scored from 0 (lowest) to 100 (highest).

### Statistical Analysis

To evaluate the difference between nulliparous and multiparous women, we used a general linear model in each subscale. Values of  $p < 0.05$  were considered statistically significant. Statistical analyses were performed using SPSS version 11.0 software (SPSS Japan, Tokyo, Japan), and GLM in the SAS system (SAS Institute Inc. Cary, USA).

**Table 1.** Dimensions in the Medical Outcomes Study Short Form 36 Questionnaire

Dimension	Item number	Definition
Physical functioning	10	Extent to which health interferes with a variety of activities in life
Role-physical	4	Problems with work or other daily activities as a result of physical health in the last week
Bodily pain	2	Extent of bodily pain in the last week
General health	5	Personal evaluation of general health
Vitality	4	Perception of degree of fatigue or energy in the last week
Social functioning	2	Extent to which health interferes with normal social activities in the last week
Role-emotional	3	Problems with work or other activities as a result of emotional problems in the last week
Mental health	5	General mood or affect, psychological well-being in the last week

## Results

### Subject attributes

Table 2 shows subject attributes. Age was ranged from 20 to 39 years old at beginning of the study, and its mean was  $29.5 \pm 4.2$ . BMI was ranged from 16.4 to 32.4 at beginning of the study, and its mean was  $20.3 \pm 2.4$ . While 67 women were nulliparous (42.1%), 92 women were multiparous (once: 69 (43.4%); twice 22 (13.8%) and three times 1 (0.6%)). In the present study, 90 women (56.6%) had planned pregnancy.

As to other attributes, 122 women (76.7%) lived in nuclear family households. In addition, 87 women (54.7%) worked while pregnant.

**Table 2.** Background of 159 pregnant women who completed the SF-36

Background		Number (%)
Age	Twenties	78 (49.1)
	Thirties	81 (50.9)
BMI (Body Mass Index) prior to pregnancy	閏18.4	26 (16.4)
	18.5-24.9	118 (74.2)
	疇25	4 (2.5)
	Not evaluated	11 (6.9)
Employed outside home	Yes	87 (54.7)
	No	72 (45.3)
Composition of family	Nuclear family	122 (76.7)
	Stepfamily	31 (19.5)
	Unknown	6 (3.8)
Number of deliveries	Nulliparous	67 (42.1)
	Multiparous (once)	69 (43.4)
	Multiparous (twice)	22 (13.8)
	Multiparous (three times)	1 (0.6)
Planning of current pregnancy	Yes	90 (56.6)
	No	69 (43.4)

### Subscales of QOL and gestational age

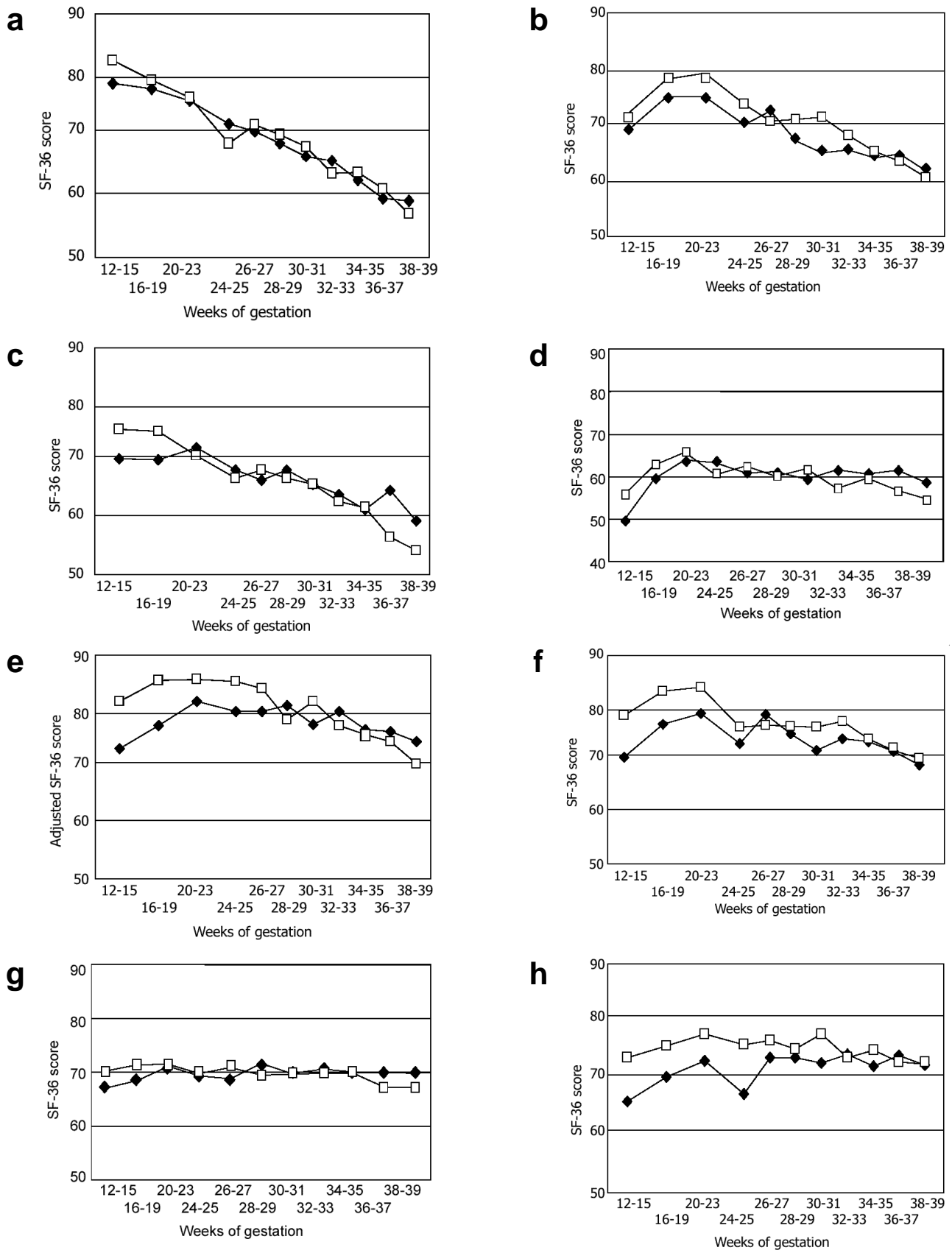
Subscales that reflect "Physical functioning ( $p < 0.001$ )," "Role-physical ( $p < 0.001$ )" and "Bodily pain ( $p < 0.001$ )" showed significant declines throughout the entire pregnancy (Figure 1a, 1b and 1c). On the other hand, subscales that reflect "Social functioning" and "Role-emotional" declined in the third trimester. Subscale that reflects "Vitality" did not change substantially with gestational age, except for 12-15 weeks. Also, subscales that reflect "General health" and "Mental health" did not change substantially with gestational age.

Figure 1a-h show the comparison of QOL scores between nulliparous and multiparous women for each subscale. Subscales that reflect "Physical functioning," "Role physical," "General health" showed no significant differences between nulliparous and multiparous women. On the other hand, subscales that reflect "Bodily pain," "Vitality," "Social functioning," "Role emotional," and "Mental health" showed significant differences between nulliparous and multiparous women ( $p = 0.006, 0.007, 0.002, 0.041$  and  $< 0.001$ , respectively). However, these subscales showed significant interactions between nulliparous and multiparous women ( $p < 0.001, 0.002, 0.006, 0.049$  and  $0.004$ , respectively). For example, in subscales that reflect "Bodily pain" and "Vitality," adjusted SF-36 scores were higher in multiparous than in nulliparous women from 12-15 weeks to 16-19 weeks, whereas those were lower in multiparous than in nulliparous women from 36-37 weeks to 38-39 weeks.

## Discussion

In the current study, we showed that subscales that reflect "Physical functioning," "Role-physical," "Bodily pain," "Social functioning" and "Role-emotional", showed significant decline throughout the entire or partial gestation, whereas subscales that reflect "Vitality," "General health" and "Mental health" did not change during the gestation. Pregnancy has been considered a time of great emotional and physical upheaval, but our current results suggest that while pregnancy produces a predictable effect on physical function, it has much limited impact on emotional health status, and that SF-36 is a useful tool especially for evaluating functional status in pregnant as well as non-pregnant women.

Furthermore, our results showed that subscales that reflect "Physical functioning," "Role physical," "General health" showed no significant differences between nulliparous and multiparous women. Although subscales that reflect "Bodily pain," "Vitality," "Social functioning," "Role emotional," and "Mental health" showed significant differences between nulliparous and multiparous women, these subscales showed significant interactions between nulliparous and multiparous women. Interestingly, in subscales that reflect "Bodily pain" and "Vitality," adjusted SF-36 scores were higher in multiparous than in nulliparous women from 12-15 weeks to 16-19 weeks, whereas those were lower in multiparous than in nulliparous women from 36-37 weeks to 38-39 weeks. Also, subscale that reflects "Social functioning" tended to be higher in multiparous than in nulliparous women from 12-15 weeks to 28-29 weeks, whereas those were lower in multiparous than in nulliparous women in 38-39 weeks. These results suggest in both multiparous and nulliparous women, changes of QOL are observed in a certain period. Although we tend to underestimate the QOL change for women who experience childbirth, our current findings showed that QOL of multiparous, as well as nulliparous women tends to decline during pregnancy. Regardless of the number of deliveries, we should effectively support pregnant women, according to changes that occur in the QOL.



**Figure 1.** Comparison of QOL scores between nulliparous ( ) and multiparous ( ) women for each subscale during pregnancy. **a.** Physical functioning, **b.** Role-physical, **c.** Bodily pain, **d.** Vitality, **e.** Social functioning, **f.** Role-emotional, **g.** General health and **h.** Mental health.

In Japan, decrease of fertility rate is an important social issue. In 2003, total fertility rate of Japan was 1.29. According to the latest demographic projection by the National Institute of Population and Social Security Research, Japan's population, currently 127 million will decline to 100 million by 2050, and will further decline to 64 million by the end of the century.<sup>17,18</sup> Also in other developed countries, a drop in the fertility level has been observed. Birth rates in EU countries have on average decreased by 0.1%, falling to the lowest level ever in some countries where rates have been high in the past.<sup>18</sup> On the other hands, a minor baby boom has shown in France, according to the report from France's National Institute of Statistics and Economic Studies. The birth rate in France has increased from 1.88 in 2000 to 1.89 in 2002. France's birth rate is now same as the rate in the Republic of Ireland, which for several years has had the highest birth rate in the European Union. The increase of birth rate in France is mainly due to the effective Governmental policies, including financial supports to families which have more than two children, improving of nursery serves and careful consideration of working system to mothers, which suggest not only the individual care for pregnant women, but also effective Governmental policy is definitely needed to improve birth rate.

In 2004, the Japanese Government outlined "Child-Care Support Plan", which presents specific measures and objectives for 2005 to 2009, with a focus on four priority issues cited in the general politics of measures for the society with fewer children. This plan has four priority issues as follows:

1. Promoting the independence of young persons and the nurturing of healthy, active children.
2. Reconciling work and family life and revising work styles.
3. Promote understanding of the values of human life and the family's care.
4. Promoting further collaboration and mutual support in childcare.

In combination of individual care to each pregnant women and implementation of above mentioned governmental policies, appropriate strategies to improve birth rate should be carefully considered in developed countries, including Japan.

Our study has several limitations. The number of participants was relatively small. Other socio-economical factors, which may affect the changes of QOL, were not considered. Further studies will be essentially needed.

In conclusion, we clarified the changes of QOL during normal pregnancy, and suggest that pregnant women need support, regardless of the number of deliveries. Appropriate supports to pregnant women will be available to improve the birth rate in developed countries.

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