

# Changes in Functional Health Status During Normal Pregnancy

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**BACKGROUND.** Pregnancy is a period of physical and emotional stress that can have a significant impact on the well-being of an expectant mother. To explore the extent to which normal pregnancy affects the life of a mother, we sought to assess changes in a standard quality-of-life measure throughout normal pregnancy.

**METHODS.** We performed serial assessments of health-related functional status in a cohort of 125 healthy women who obtained care from a residency-training clinic during pregnancy. Before each antenatal visit, women completed the Medical Outcomes Study Short-Form 36 (SF-36) along with a questionnaire to assess any complications with their pregnancy. Scores for each of the SF-36 subscales were calculated and examined to determine the influence of gestational age and socioeconomic factors on quality of life during pregnancy.

**RESULTS.** Of the eight subscales of the SF-36, three of the four associated with physical health status changed significantly with gestational age. Physical functioning ( $P < .001$ ), role limitation due to physical problems ( $P < .001$ ), and pain scales ( $P < .001$ ) all decreased as pregnancy progressed. These scales showed linear decreases during the first two trimesters, with relative flattening in the third trimester. Sociodemographic factors such as employment, level of income, and presence of a spouse or support partner had only a small influence on functional status in pregnancy.

**CONCLUSIONS.** Health-related functional status during pregnancy changes only for physical measures of health. Sociodemographic factors appear to have only limited influence on health-related functional status during pregnancy.

**KEY WORDS.** Pregnancy; quality of life; stress. (*J Fam Pract* 1998; 47:209-212)

Pregnancy is a time of intense physical change, and is associated with a great deal of emotional upheaval in many women.<sup>1,2</sup> In addition to the obvious outward physical changes that accompany pregnancy, significant increases in mental health problems, including depression and psychosis, occur either during pregnancy or in the immediate postpartum period.<sup>3,4</sup> Even in normal pregnancies, women experience subtle changes that may alter their ability to carry out their usual roles and may detract from their overall quality of life.<sup>5</sup> Certain circumstances, such as excessive nausea and vomiting,<sup>6</sup> are dramatic examples of how pregnancy can have an impact on quality of life, but other less dramatic factors, such as increasing gestational age or family support, could also influence how a woman feels during her pregnancy.

The concept that health care be directed toward both increasing the health-related functional status and lifespan has been advanced by methods that can

validly measure an individual's quality of life.<sup>7,9</sup> While the goal of medical care during pregnancy remains directed at increasing the likelihood of a favorable maternal and neonatal outcome, consideration should be given to how a woman's life can be affected by factors that arise during pregnancy. An awareness of these factors and how they influence a woman's functional status may lead to the ability to provide effective interventions to protect a woman's health-related functional status when complications arise during pregnancy.

While previous studies have defined ranges for health-related functional status in other populations,<sup>8</sup> there has been little attention paid to functional status in pregnant women. This study was undertaken to assess how the quality of a woman's life changes with the normal progression of pregnancy and explore the impact of social and economic variables on health-related functional status in pregnancy.

## METHODS

### SAMPLE RECRUITMENT

All women who initiated their maternity care at the Eau Claire (Wisconsin) Family Medicine Clinic between June 1995 and May 1996 were approached and invited to participate in the study. At the first pre-

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natal visits, the nature of the study was explained to patients and their participation was solicited. From the potential sample of 188 women who initiated care at the clinic during the enrollment period, 10 were excluded because they did not speak and read English, and 12 declined to participate. Of the 166 patients initially enrolled, 41 developed complications during their pregnancy and were excluded from this analysis of normal pregnancy. The range of complications included the following: preterm labor (16), preeclampsia (4), gestational diabetes (3), recurrent urinary tract infections (3), abnormal bleeding (2), major depression (2), and other medical or obstetric complications (11).

### QUESTIONNAIRE ADMINISTRATION

Patients who participated were given an initial survey instrument that included several questions about their sociodemographic status, health and obstetric history, and feelings about the current pregnancy. At future visits, questionnaires about the progress of their pregnancy were completed. If patients indicated that their pregnancy had become complicated by any problem, they were excluded from analysis.

At the initial visit and every subsequent visit, patients completed the Medical Outcomes Study Short-Form 36 (SF-36).<sup>7,8</sup> This measure has been used extensively to evaluate health-related functional status in a variety of populations and to assess the effects of physical and psychiatric problems on that status.<sup>10,11</sup> The SF-36 allows measurement of functional status on eight subscales that reflect mental and physical components of health perceptions, role limitations due to health problems, and other characteristics of functional status. Raw score responses on the SF-36 were converted to a 100-point scale in which higher numbers reflect a higher health-related functional status.<sup>9</sup>

Socioeconomic variables assessed included age, occupation status, the presence of children in the

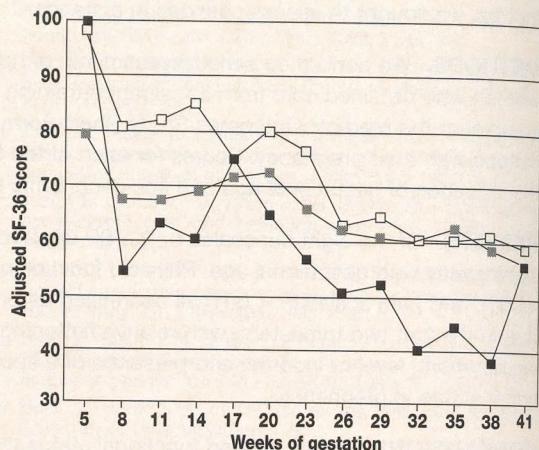
TABLE 1

#### Demographic Characteristics of the 125 Women Who Completed the Medical Outcomes Study Short-Form 36

Characteristic	n	(%)
White	125	(100)
Nulliparous	55	(36)
Starting prenatal care in 1st trimester	72	(48)
Currently married or in stable relationship	112	(80)
Employed outside home	86	(61)
Planned pregnancy	63	(46)
Annual household income per year		
< \$10,000	55	(42)
\$10,000 to \$19,999	36	(28)
\$20,000 to \$29,999	19	(15)
≥\$30,000 or more	20	(15)

FIGURE 1

Representation of the health-related functional status in the Medical Outcomes Study 36-item short-form health survey (SF-36) subscales. Physical limitations (■), functioning (□), and bodily pain (■) all showed statistically significant declines with advancing gestational age.



household, whether a significant other resided in the household, whether the pregnancy was planned, and income. Annual household income was classified into four strata of \$10,000 increments, with the highest being >\$30,000 per year.

### DATA ANALYSIS

To adjust for gestational age, data were handled in two ways. Three-week intervals starting at 4 weeks' gestation (ie, 4 to 6 weeks, 7 to 9 weeks, and so on) were defined, and responses given by women during that interval were pooled and averaged. Responses over time for each domain were then compared using analysis of variance, and the responses were averaged for all patients seen during that time.

Because each analysis of the SF-36 involves eight subscales, an alpha of .006 was chosen to define statistical significance, based on the Bonferroni adjustment for multiple comparisons.<sup>12</sup>

All responses were pooled to produce a single mean and standard deviation to compare SF-36 domains that did not vary over gestational age with nonpregnancy control groups reported in the literature. These values were then compared with reference values using Student's *t* test. For this comparison, a value of  $P < .05$  was considered statistically significant.

## RESULTS

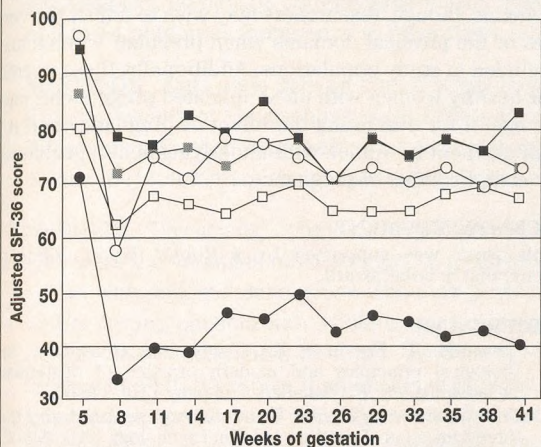
### SAMPLE CHARACTERISTICS

During the 18 months of study, 166 white women were enrolled in the study. Of these, 125 patients did not



FIGURE 2

Representation of the health-related functional status in the Medical Outcomes Study 36-item short-form health survey (SF-36) subscales that remained stable throughout pregnancy. Scales represented are: emotional role limitations (■), general health (□), mental health (■), social functioning (○), and vitality (●).



report any complications during their pregnancies and made 653 total office visits, during which time they completed an SF-36 questionnaire.

Demographic characteristics of the participating women are shown in Table 1. The average age of participants was 23.6 (standard deviation = 5.4) years. Consistent with the demographic composition of the area, all of the patients were white. The majority of the study population were in a stable relationship or married, and employed. Despite being employed, the majority of women in the sample reported a low income level during their pregnancies, with 42% earning <\$10,000 per year.

### FUNCTIONAL STATUS AND GESTATIONAL AGE

Three of the subscales on the SF-36 showed a significant relationship to gestational age ( $P < .001$ ) (Figure 1). Domains that reflect role limitation due to physical problems, physical functioning, and pain all showed significant declines as the pregnancy progressed. While physical functioning appeared to decline throughout the entire pregnancy, changes observed in the other two subscales were most dramatic during the first two trimesters, then were relatively stable in the final 13 weeks of pregnancy.

The other five subscales of the SF-36

did not change substantially with gestational age (Figure 2). Several scales showed a sharp decline in early pregnancy, but this was influenced by a small number of women who began their prenatal care before 8 weeks. The value of these subscales shows only minimal variation from the mean scores for women aged 18 to 34 years as determined by Ware and colleagues<sup>9</sup> (Table 2).

### FUNCTIONAL STATUS AND OTHER SOCIOECONOMIC VARIABLES

When we analyzed other variables on health-related functional status during pregnancy, we found little effect. After stratification by gestational age, there was no statistically significant effect on any of the functional status domains for parity, employment status, and the presence of a partner in the household. Level of income did show a relationship to two of the domains. Both general health and mental health scores were higher in more affluent patients at the beginning of pregnancy. However, the two patient populations converged as pregnancy progressed into the second trimester and remained the same for the rest of the pregnancy (Figure 3).

### DISCUSSION

Pregnancy has long been considered a time of great emotional and physical upheaval, but these data suggest that while pregnancy produces a predictable effect on physical function, it has a much more limited impact on emotional health status. Furthermore, health-related functional status in pregnancy is relatively unaffected by variations in social support, income, or employment. Whereas differences did exist either before or in early gestational ages, pregnancy appears to equalize differences rather than contribute

TABLE 2

Comparison of Average SF-36 Scores for Women with Uncomplicated Pregnancies and Healthy Women Aged 18 to 24 Years

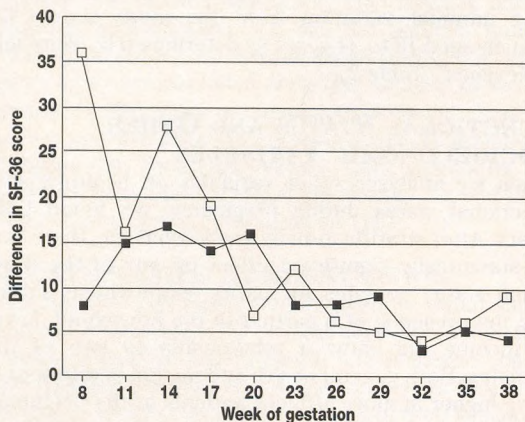
Subscale of SF-36	Pregnant Women Mean (SD) (N=125)	Healthy Nonpregnant Women Aged 18 to 24 Mean (SD)* (N=102)
General health perceptions	70 (12)	76 (19)
Mental health	77 (11)	72 (19)
Role limitation from emotions	81 (14)	79 (34)
Social functioning	75 (12)	82 (21)
Vitality	45 (15)	60 (20)

SF-36 denotes the Medical Outcomes Study Short-Form 36. Data taken from Ware JE Jr, et al.<sup>9</sup>  
\*Figures are rounded to the whole number.



FIGURE 3

Differences in the Medical Outcomes Study 36-item short-form health survey (SF-36) scores between patients at high incomes and low incomes for general health perceptions (□) and mental health (■) for differing gestational ages.



to further divergence.

Our finding that the level of income and the presence of an ongoing spousal or equivalent relationship does not have an effect on functional status in pregnant women differs from previous studies. Others have reported that these social factors have a beneficial effect on women's health in pregnancy. Gjerdingen and colleagues<sup>8</sup> reported that both emotional and material support can be linked to self-reports of improved functional status in pregnancy that persists into the postpartum period. These previous findings did not adjust for potential confounders such as medical or obstetric problems that arose during the pregnancy. Additionally, there was no adjustment for gestational age, and we found in this study that measures of physical functioning are related to gestational age. Finally, previous data relied on outcome measures that were limited in scope and not as comprehensive as the SF-36.

These conclusions must be interpreted in light of the limitations of the study. The trial was limited to white women in a single upper Midwestern practice site. The ability to generalize these results to nonwhite populations or women in other cultural settings may be limited until further evidence demonstrates the

external validity of these findings. The small sample size in this study also limits its power to detect small but potentially important differences.

The relative stability of the emotional domains of the SF-36 and the apparently predictable changes in physical functioning during pregnancy imply that the SF-36 can be a useful tool for evaluating functional status in pregnant as well as nonpregnant women. Because of the changes associated with gestational age in physical domains, though, researchers may wish to adjust the values of the physical domains when pregnant women are included in study populations. Additionally, these norms for healthy women with uncomplicated pregnancies can be useful for evaluating the effect of pregnancy and its management in women with underlying health problems or complications of pregnancy.

#### ACKNOWLEDGMENT

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