

Factors Related to Sexual Satisfaction in Women with Gestational Diabetes in the Third Trimester

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Abstract

Background: Sexual satisfaction is important for maintaining pregnant women's self-esteem and interpersonal relationships, and serves as a major indicator of health. Affecting a woman's sexual issues will indirectly affect her quality of life. The present study aimed to examine the factors related to sexual satisfaction in women with gestational diabetes in the third trimester.

Method: This cross-sectional descriptive-analytic study was conducted in 2019 on 120 women with gestational diabetes visiting the clinics affiliated with Mazandaran University of Medical Sciences. Multistage random cluster sampling was performed, and the sample was selected in a non-probability and convenience manner. The data collection instruments included a demographic and midwifery-related information questionnaire, Hudson's Index of Sexual Satisfaction, the Female Sexual Function Index, ENRICH Marital Satisfaction Scale (short version), the Female Sexual Distress Scale, The World Health Organization Quality of Life questionnaire, the Parental Distress Questionnaire, and the Depression, Anxiety, and Stress Scale. Data were analyzed in SPSS 23 by using descriptive statistics, chi-squared test, t-test, ANOVA, Pearson's correlation coefficient, Kruskal-Wallis test, Mann-Whitney U test, and Spearman correlation coefficient.

Results: Results showed that about 50% of women with gestational diabetes had low and moderate sexual satisfaction. In women with gestational diabetes, sexual satisfaction was positively correlated with sexual function ($\beta = 0.215$, $p = 0.02$) and marital satisfaction ($\beta = 0.298$, $p = 0.003$), and negatively correlated with depression ($\beta = -0.269$, $p = 0.05$). **Conclusion:** Half of the women with gestational diabetes had low and moderate sexual satisfaction. Marital satisfaction, sexual function, and depression significantly predicted sexual satisfaction in women with gestational diabetes. Examination of sexual function, marital satisfaction, and depression must be part of the routine evaluation for women with gestational diabetes. To increase the sexual satisfaction of these women, it is essential to offer interventions for reducing depression and improving sexual function, marital satisfaction and, thus, their quality of life. **Keywords:** Sexual satisfaction, gestational diabetes, pregnancy

Background

Pregnancy is accompanied by changes in sexual function, and when accompanied by specific disorders, such as gestational diabetes, it may lead to an increase in sexual complaints (1). Gestational diabetes, defined as glucose intolerance during pregnancy (2), is an increasing health problem around the world and among the most prevalent complications of pregnancy. The prevalence of gestational diabetes has been estimated at 4.9% in Iran (3).

Diabetes leads to several well-known medical, psychological, and sexual disorders (4) that may affect the patients' quality of life (5, 6). Numerous treatments for diabetes, including insulin injection and dietary restrictions (7) cause problems in the daily life of patients, and reduce their quality of life (8, 9). During pregnancy, the woman and her spouse are concerned about the complications of pregnancy (10), and

these concerns may lead to emotional changes in couples (11). For most women, sexual activity is a positive and joyous process. Since sexual matters are complex, any life experience or disease may affect one's sexual desire, function, and satisfaction (12).

Sexual function and the resulting satisfaction are among the most important aspects of women's life (13). In fact, the couple's sexual satisfaction, and their marital satisfaction during pregnancy, is a major topic of public health (14). Sexual and marital satisfaction is a state in which the couple feel happy and satisfied with each other in most cases, which is the result of mutual love, care, acceptance, and understanding of each other, and satisfaction of needs, including the sexual need (15).

During pregnancy, women undergo many unwanted changes, which alter their physical and psychological needs (12). Pregnancy affects sexual desire, function, and satisfaction (16). Sexual problems are prevalent, even during pregnancy, especially in the third trimester, when 70% of women may run the risk of sexual dysfunction (17). In the third trimester, factors such as a change in one's mental image of her body, reduced attraction for her spouse, fear of injury to the fetus, and fear of preterm labor may lead to abstinence from sexual activity and a feeling of sin about sexual relations during pregnancy; these factors negatively affect one's sexual response and, eventually, the couple's sexual relations and sexual dissatisfaction, which eventually disrupts the family's mental health (18).

Physical, emotional, and economic stressors resulting from pregnancy may negatively impact the sense of emotional and sexual intimacy. During pregnancy, sexual satisfaction may remain unchanged, increase, or decrease. Any of these changes may lead to long-term negative effects on sexual relations and mental health (12).

Sexual satisfaction is important for maintaining pregnant women's self-esteem and interpersonal relationships, and serves as a major indicator of health. Affecting a woman's sexual issues will indirectly affect her quality of life (19). Still, limited studies have focused on the sexual satisfaction of women with gestational diabetes, necessitating the performance of more studies. Results of such a study will introduce factors related to sexual satisfaction of women with gestational diabetes and lead to the discovery of new strategies for elimination or reduction of these factors, thus playing a major role in improving the quality of life of women with gestational diabetes during pregnancy. Thus, the present study aimed to examine factors related to sexual satisfaction in women with gestational diabetes visiting the clinics of obstetrics/gynecology affiliated with Mazandaran University of Medical Sciences.

Method

This descriptive-analytical study was conducted in 2019 on women with gestational diabetes for whom diabetes was diagnosed based on gestational diabetes screening in week 24–28 of pregnancy by the two-hour oral glucose tolerance test (OGTT), which involved taking 75 g of glucose (20), in the past month. These women, who visited the clinics affiliated with Mazandaran University of Medical Sciences, lived with their husbands; were literate; sexual activity during pregnancy was not prohibited for them (due to spotting, risk of miscarriage, etc.); their husbands did not have erectile dysfunction or premature

ejaculation (as declared by the wife); the couple did not have a mental or physical disease, and were not addicted to narcotics or stimulants. The exclusion criteria were unwillingness to participate and withdrawal from completing the questionnaire.

In this study, multistage sampling was performed. First, random cluster sampling was performed; every city in Mazandaran Province was viewed as a cluster, and in addition to the center of the province, three other cities were randomly selected with a probability proportionate to their population. In the first stage, four cities were regarded as the selected clusters. Then, quota sampling was performed; the sample size was distributed among these four cities proportionate to the statistics on the prevalence of gestational diabetes in the selected cities. To reach the determined sample size in each city, some healthcare centers were randomly selected. Then, in the selected centers, a sample of women with gestational diabetes was selected by using non-probability and convenience sampling.

$$n \geq \frac{(z_{\alpha/2} + z_{\beta})^2 \sigma^2 (1 + 1/k)}{\epsilon^2}$$

Sample size was calculated to be 120 based on formula $\alpha = 0.05$, $1 - \beta = 0.80$, $K = 1$, and effect size (θ) = 0.4.

Eligible women with gestational diabetes who were willing to participate completed the informed consent form, and then completed the questionnaires in a self-report manner.

Data collection instruments: The data collection instrument included eight questionnaires: a demographic and midwifery-related information questionnaire, Hudson's Index of Sexual Satisfaction, the Female Sexual Function Index, ENRICH Marital Satisfaction Scale (short version), the Female Sexual Distress Scale, The World Health Organization Quality of Life questionnaire, the Pregnancy-Related Anxiety Scale, and the Depression, Anxiety, and Stress Scale.

The demographic and midwifery information questionnaire: This was an instrument with seven questions, examining the couples' age, level of education, length of marriage, number of pregnancies, and gestational age.

Hudson's Index of Sexual Satisfaction: This questionnaire included 25 questions scored on a five-point Likert scale. In questions 1, 2, 3, 10, 12, 13, 16, 17, 19, 21, 22, and 23, "none of the time" receives the score of 1, and "all of the time" receives the score of 5, while the rest of the questions are reverse-scored. The minimum score is 25, and the maximum score is 125. Scores 25–50 indicate lack of sexual satisfaction, 51–75 low sexual satisfaction, 71–100 moderate sexual satisfaction, and 101–125 high sexual satisfaction (21). In Iran, Bahrami et al. (2016) reported the Cronbach's alpha of 0.80 for positive questions, and 0.77 for negative questions. The intracluster correlation coefficient was 0.80. The construct validity of the questionnaire was examined by exploratory factor analysis, and showed three factors (sexual attitude, quality of sexual life, and sexual adjustment) with an eigenvalue > 1. In total, the three extracted factors explained 42.73% of the total variance of the variables of this instrument (22).

The Female Sexual Function Index: This index contains 19 questions and assesses sexual function in three dimensions of sexual desire (items 1–2), sexual arousal (items 3–6), lubrication (items 7–10), orgasm (items 11–13), satisfaction (items 14–16), and pain (items 17–19). Each item is scored from 0 (no sexual activity in the past 4 weeks) to 5 (a better function). The total score in each dimension is multiplied by a specified coefficient (desire: 0.6, arousal and lubrication: 0.3, orgasm, satisfaction, and pain: 0.4), and the total score is calculated by summing these scores. The minimum and maximum total score is 2 and 26, respectively (23). Scores higher than the cut-off score (total score: 28, desire: 3.3, arousal: 3.4, lubrication: 3.4, orgasm: 3.4, satisfaction: 3.8, and pain: 3.8) indicate optimal sexual function. The Persian version of this instrument has a high reliability and construct validity, and the Cronbach's alpha for each dimension and the entire instrument is 0.7 or above (24).

The ENRICH Marital Satisfaction Scale (short form): This questionnaire was used to assess marital satisfaction (25). The short form of this questionnaire has 10 questions, scored on a 5-point Likert scale, from "strongly agree" (5) to "strongly disagree" (1). Items 1, 3, 5, 8, and 9 should be reverse-scored. Higher scores show higher satisfaction with marital life (26). The Persian version of this questionnaire has optimal reliability and validity, with a Cronbach's alpha of 0.74 (27).

The Female Sexual Distress Scale: This 13-item scale was used for evaluation of female sexual distress. The scores on a five-point Likert scale vary from 0 to 4 (never: 0, always: 4). The total score is the sum of the scores of 13 statements, and varies from 0 to 52, with higher scores indicating higher sexual distress (28). The internal consistency of this scale (Cronbach's alpha) falls in the 0.86–0.93 range. Moreover, its diagnostic validity is optimal by differentiating normal women from women with sexual dysfunction, and its divergent validity with the Female Sexual Function Index has been reported to be optimal (29).

The World Health Organization Quality of Life Questionnaire (WHOQOL- BREF) This questionnaire has 26 items, and the first two items are separately analyzed. The first item examines one's perception of the general quality of life, and the second item evaluates one's perception of total health. The items are scored on a Likert scale (1–5), and items 3, 4, and 26 are reverse-scored. The domains include physical health, psychological health, social relationships, and the environment. The score of each domain varied from 4 to 20, with 4 showing the poorest and 20 showing the best status of quality of life in that domain (30). The psychometric properties of this questionnaire have been examined in several studies. The Cronbach's alpha for all the dimensions, except for social relationships, was > 0.70 and acceptable (31).

The Parental Distress Questionnaire This questionnaire has 12 statements scored on a five-point Likert scale (never = 0, and always = 4). Total scores vary from 0 to 48, and higher scores show higher worries during pregnancy (32). Based on several studies, this short and useful questionnaire enjoys the necessary psychometric properties. In the Persian version, the test-retest reliability of the entire questionnaire was 0.74 and its Cronbach's alpha was 0.78. Moreover, its criterion validity has been confirmed upon simultaneous administration and assessment of the correlation between its score with those of the Cambridge Worry Scale (0.75) and the State-TraitAnxiety Inventory (0.53) (33).

The Depression Anxiety Stress Scales (DASS): This 42-item questionnaire has been developed to assess depression, anxiety, and stress. Its short form has 21 items, with 7 items assessing depression, 7 assessing anxiety, and 7 stress. The items are scored on a four-point Likert scale from 0 to 3. The items for each topic are: Stress: Items 16-14-12-11-8-6-1, depression: Items 21-17-16-13-10-5-3, anxiety: Items 20-19-15-9-7-4-2. The scores fall from 0 to 21 for each domain (34). The factor structure of the short form of the questionnaire (DASS21) has been examined and confirmed (35). The internal consistency of the Persian version of the instrument was examined by calculating Cronbach's alpha, and the following results were obtained: Depression scale 0.77, stress scale 0.78, and anxiety scale 0.79. The validity of the instrument was investigated by exploratory factor analysis, its criterion validity was evaluated by simultaneous administration and calculating the correlation between its scores with those of Beck's Depression Inventory (0.70), Zung Self-Rating Anxiety Scale (0.67), and Perceived Stress Inventory (0.49) (36).

The scores of all the above-mentioned questionnaires were calculated using the following formula, and reported: $(\text{Score} - \text{Minimum}) / (\text{Maximum} - \text{Minimum}) \times 100$.

Statistical analysis: SPSS 23 (Version 23, IBM Corporation, Armonk, NY) was used to analyze the data. To check the normality of data distribution, Kolmogorov-Smirnov test was run. To describe quantitative variables, mean (SD), and to describe qualitative variables, number (percentage) were used. Moreover, to examine factors related to sexual satisfaction, the multivariate linear regression was used. P-value < 0.05 was set as the significance level.

Ethical considerations: This study was approved in the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.PHARMACY.REC.1397.263). Written informed consent was obtained from all the participants.

Results

In this study, 120 women with gestational diabetes, with the mean age of 31.21 ± 0.52 years, and gestational age of 34.24 ± 0.2 weeks participated. The demographic and midwifery information of the participants is given in Table 1.

Table 1

Frequency, percentage, mean, and SD of demographic and midwifery information of women with gestational diabetes visiting the clinics of Mazandaran University of Medical sciences (2019) (n = 120)

Variable		Number (Percentage)
Mother's education level	<High school diploma	31 (25.8)
	High-school diploma	46 (38.3)
	University degree	43 (35.8)
Mother's occupation	Homemaker	104 (86.7)
	Employed	16 (13.3)
Husband's education level	<High school diploma	35 (29.2)
	High-school diploma	46 (38.3)
	University degree	39 (32.5)
Husband's occupation	Employed	78 (65)
	Self-employed	42 (35)
History of miscarriage	Yes	68 (56.7)
	No	52 (43.3)
History of gestational diabetes	Yes	37 (30.8)
	No	83 (69.2)
Variable		Mean \pm SD
Age (years)		31.21 \pm 0.52
Length of marriage (years)		9.02 \pm 0.49
Number of pregnancies		2.31 \pm 0.1
Gestational age (week)		34.24 \pm 0.2

Mean and SD of Hudson's Index of Sexual Satisfaction score was 72.64 ± 0.74 . About 50% of the women with gestational diabetes had low and moderate sexual satisfaction. The frequency distribution of the level of sexual satisfaction is given in Table 2.

Table 2
 Frequency distribution of the level of sexual satisfaction
 in women with gestational diabetes (n = 120)

Sexual satisfaction	Number (Percentage)
Lack of sexual satisfaction	0
Low sexual satisfaction	1 (0.85)
Moderate sexual satisfaction	58 (48.4)
High sexual satisfaction	61 (50.85)
Total	120 (100)

The percentage of score was 55.6 ± 0.84 for the World Health Organization quality of life, 38.75 ± 1.74 for parental distress, 69.24 ± 1.1 for sexual function, 23.42 ± 1.1 for depression, anxiety, and stress, 72.77 ± 1.23 for marital satisfaction, and 74.81 ± 0.9 for sexual distress. Mean and SD of these variables and their dimensions are given in Table 3.

Table 3

The Mean and SD of the scores of Hudson's Index of Sexual Satisfaction, the Female Sexual Function Index, ENRICH Marital Satisfaction Scale (short version), the Female Sexual Distress Scale, The World Health Organization Quality of Life questionnaire, the Parental Distress Questionnaire, and the Depression, Anxiety, and Stress Scale in women with gestational diabetes (n = 120)

Scale (score range)	Domains (score range)	Raw score	Score 0-100
The World Health Organization Quality of Life Questionnaire (WHOQOL- BREF) (26–130)	Physical health (7–35)	19.65 ± 0.32	45.18 ± 1.15
	Psychological health (6–30)	20.81 ± 0.27	61.7 ± 1.13
	Social relationships (3–15)	10.88 ± 0.19	65.63 ± 1.58
	Environmental health (8–40)	26.95 ± 0.41	59.22 ± 1.29
	Quality of life and health (2–10)	7.08 ± 0.1	55.54 ± 0.9
	Total score	85.37 ± 1	55.6 ± 0.84
The Parental Distress Questionnaire (12–60)	Concerns regarding labor and the infant (5–25)	10.19 ± 0.44	61.15 ± 1.27
	Concerns regarding weight and body image (3–15)	4.8 ± 0.27	40.07 ± 2.26
	Concerns regarding emotion and relations (4–20)	3.61 ± 0.29	22.5 ± 1.8
	Total score	18.6 ± 0.84	38.75 ± 1.74
Sexual function (2–36)	Desire (1.2-6)	4.14 ± 0.06	61.33 ± 1.06
	Arousal (0–6)	3.76 ± 0.09	54.17 ± 1.2
	Lubrication (0–6)	4.44 ± 0.12	73.87 ± 1.62
	Orgasm (0–6)	3.45 ± 0.09	57.43 ± 1.21
	Satisfaction (0–6)	4.93 ± 0.08	81.5 ± 1.17

Scale (score range)	Domains (score range)	Raw score	Score 0-100
	Pain (0–6)	4.72 ± 0.1	80.13 ± 1.85
	Total score	25.54 ± 0.37	69.24 ± 1.1
Depression, anxiety, and stress (0–63)	Depression (0–21)	3.51 ± 0.26	16.71 ± 1.23
	Anxiety (0–21)	3.36 ± 0.31	16.07 ± 1.46
	Stress (0–21)	7.87 ± 0.2	37.46 ± 0.96
	Total score	14.3 ± 0.58	23.42 ± 1.1
Hudson’s Index of Sexual Satisfaction (25–125)		99.81 ± 0.9	72.64 ± 0.74
Marital satisfaction (10–50)		39.11 ± 0.49	72.77 ± 1.23
Sexual distress (0–52)		3.23 ± 0.49	74.81 ± 0.9

Multivariate linear regression was used to examine the factors related to sexual satisfaction in women with gestational diabetes. Independent variables in the model were: anxiety, stress, depression, marital satisfaction, sexual distress, concerns about labor, delivery, and the health of the infant, concerns regarding weight and body image, concerns regarding emotion and relations, sexual function, physical health, psychological health, social relationships, environmental health, general health, and quality of life (Table 4).

Results of linear regression showed that, in women with gestational diabetes, sexual satisfaction has a significantly positive correlation with marital satisfaction ($p = 0.003$) and sexual function ($p = 0.02$), but a significantly negative correlation with depression ($p = 0.05$). The $R^2 = 0.301$, i.e., 30.1% of the variance in sexual satisfaction is predicted by the level of marital satisfaction, sexual function, and depression. For each unit of increase in marital satisfaction, sexual satisfaction is increased 0.298 units. For each unit of increase in sexual function, sexual satisfaction is increased 0.215 units. Also, for each unit of increase in depression, sexual satisfaction is decreased 0.269 units.

Table 4

Results of multivariate linear regression for predicting factors affecting the sexual satisfaction of women with gestational diabetes (n = 120)

Variable	SE	Beta	P-value	Confidence interval
Marital satisfaction	0.177	0.298	0.003	0.192, 0.895
Sexual distress	0.18	-0.045	0.646	-0.441, 0.274
Depression	0.473	-0.269	0.05	-1.877, 0.000
anxiety	0.369	0.22	0.083	-0.085, 1.377
Stress	0.556	0.113	0.367	-0.598, 1.606
Concerns regarding labor and delivery	0.23	-0.002	0.984	-0.461, 0.451
Concerns regarding weight and body image	0.362	0.109	0.319	-0.355, 1.079
Concerns regarding emotion and relations	0.37	-0.009	0.937	-0.763, 0.704
Physical health	0.282	0.007	0.944	-0.539, 0.578
Psychological health	0.391	0.029	0.805	-0.679, 0.872
Social relationships	0.55	0.229	0.051	-0.003, 2.177
Environmental health	0.275	-0.082	0.52	-0.724, 0.369
General health	0.95	-0.003	0.981	-1.907, 1.861
Sexual function	0.221	0.215	0.02	0.084, 0.961

Discussion

The present study was the first study to examine the factors related to sexual satisfaction in women with gestational diabetes in the third trimester.

Based on the findings, about 50% of the women with gestational diabetes had low and moderate sexual satisfaction. Jamali et al. (2018) reported that about 56% of women in the reproductive age have low and moderate sexual satisfaction (37). The level of disorder in sexual satisfaction during pregnancy is 48% (38). Memarian et al. (2015) reported that 50% of women in the third trimester have low and moderate sexual satisfaction (16). Evidently, about half of the women, whether pregnant or not, have low and moderate sexual satisfaction, and this demonstrates the importance of this study.

In the present study, the score of sexual satisfaction had a significantly positive correlation with the score of sexual function in women with gestational diabetes. Research shows that a significant positive correlation exists between sexual function and sexual satisfaction in women. Inadequate attention to sexual problems can lead to sexual dissatisfaction, and may even affect marital and family relationships

over time (39). Sexual relations change during pregnancy due to physical and psychological changes. In fact, during pregnancy, changes occur in sexual behaviors, such as sexual desire, frequency of intercourse, and sexual feelings and satisfaction. A pregnant women needs more emotional support. Inadequate knowledge and negative attitude from the husband can cause certain problems; upon a reduction in sexual relations, the emotional relationships and love from the husband are also reduced, and thus women become more prone to anxiety and lack of self-confidence. In line with a disruption in sexual relations during pregnancy, physical and psychological issues are also affected (40). Diagnosis of gestational diabetes and the recommended treatment reduce sexual function during pregnancy; a change in sexual function may be the result of multiple psychological factors which, accompanied by care and counseling for diabetes, may affect the emotional intimacy of couples and their sexual life (41).

In the present study, the score of sexual satisfaction had a significantly negative correlation with the score of depression in women with gestational diabetes. Findings reveal that gestational diabetes is accompanied by psychological problems such as depression, anxiety, and stress during pregnancy (41). Moreover, depression is the most important predicting factor of sexual satisfaction and sexual desire (42).

In the present study, the score of sexual satisfaction had a significantly positive correlation with the score of marital satisfaction in women with gestational diabetes. Previous studies report a direct correlation between sexual satisfaction and marital satisfaction, with a higher sexual satisfaction accompanied by a higher marital satisfaction (43). In fact, sexual satisfaction is strongly related to marital satisfaction (40). Relationship satisfaction is the main predictor of sexual satisfaction in pregnant women in the third trimester. Sexual satisfaction has a moderate positive correlation with other dimensions of relationship, such as intimacy, commitment, and marital satisfaction (44). There is a significant negative correlation between sexual satisfaction and problems in marital problems; that is, those with a lower sexual satisfaction suffer from more marital problems (45). Satisfaction with sexual relations is a major factor contributing to marital satisfaction, and affects the health and quality of life of the couples. In fact, a mutual relationship exists between sexual satisfaction and marital satisfaction (43).

Diagnosis of gestational diabetes considerably modifies daily lifestyle, and these modifications potentially affect sexual function (41). Inadequate attention to sexual problems can lead to sexual dissatisfaction, and may affect marital and family relationships over time (43).

Based on the cultural context of Iran, a sense of shame and embarrassment in women and refraining from talking about sexual issues were the limitations of this study; by having the questionnaires completed in a self-report manner, and ensuring the participants of the confidentiality of their data, attempts were made to ameliorate this limitation.

Conclusion

Half of the women with gestational diabetes had low and moderate sexual satisfaction. Marital satisfaction, sexual function, and depression significantly predicted sexual satisfaction in women with

gestational diabetes. Examination of sexual function, marital satisfaction, and depression must be part of the routine evaluation for women with gestational diabetes. To increase the sexual satisfaction of these women, it is essential to offer interventions for reducing depression and improving sexual function, marital satisfaction and, thus, their quality of life.

Declarations

Competing interests

The authors declare that they have no competing interests.

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Availability of data and materials

All raw data will not be shared to the public, because it contains participants' personal details, sensitive health information and pregnancy status which are kept confidential. All release to the public repositories will need to be requested through responsible author.

Ethics approval and consent to participate

The participants gave written informed consent for the data collection, and This study was based on a project approved by Shahid Beheshti University of Medical Sciences (ethics code: IR.SBMU.PHARMACY.REC.1397.263).

Authors' contributions

OZ initiated the study and developed the study protocol. MS and GO reviewed the protocol and provided clinical oversight throughout the project. HAM performed the statistical analysis. MS was involved in data analysis review and revision of the drafts. OZ prepared the first draft, incorporated revisions, and prepared the final draft. All of the authors reviewed drafts and approved the manuscript.

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