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Original Article

A frequently asked question: Is it normal not to feel my baby's movements yet?

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Abstract

Background: This study aims to investigate average gestational week in which mothers feel their baby's movements for the first time, and the maternal–fetal factors affecting this time.
Methods: A total of 423 pregnant women between 11 and 25 weeks of gestation were included in this prospective study. The patient cohort was divided into three subgroups according to the gestational week in which fetal movements were felt for the first time by the pregnant women. The women who felt the first movement before 25th percentile value constituted Group 1; between 25th and 75th percentile value constituted Group 2; and beyond 75th percentile value constituted Group 3. These three groups were then compared in terms of maternal age, parity, body mass index (BMI), tea and coffee consumption during pregnancy, smoking, educational status, accordance of mother to regular pregnancy follow-ups, placental site, and gender of the baby.
Results: These three groups were statistically and significantly different regarding the above mentioned determinants except for mothers' tea and coffee consumption, smoking, and gender of the baby ($p < 0.05$).
Conclusion: This study revealed factors that affect maternal perception of first fetal movements in both a positive and negative manner. Although it is hard to define an exact time for each individual, an approximate time according to our data can be given to a mother, which considers an affecting factor on the basis of average gestational week.

Keywords: Body mass index; Coffee consumption; Fetal behavior; Fetal movement; Maternal education; Placental location; Smoking

1. Introduction

Since early historical periods, fetal movement has been suggested as a positive evidence of a healthy pregnancy; while fetal physical inactivity has been associated with adverse conditions and fetal death.

Fetal movements are considered to start at about the 7th to 8th week of gestation.[1] But maternal perception of the first fetal movement occurs long after, which is in the broad range of the 16th to 20th gestational week. However, there are no available reports on the subject.[2] First perception of fetal movement is usually described as a gentle flutter by women, which are then replaced by prominent kicks. For normal fetal movements, neuromuscular functions must be intact. Therefore, fetal movements have been accepted as evidence for mature motor component of the central nervous system.[1,3] Fetal movements are considered to increase until 32 gestational weeks, and thereafter decrease gradually.[4] For a healthy fetus, the number of fetal movements range from 4 to 100 movements per hour. As well as the maternal perception time of the first fetal movement, however, there is not an arrangement on fetal movement count, as it may differ inter-fetal and possibly intra-fetal manner. Furthermore, it is uncertain

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whether formal fetal movement counting is beneficial for better perinatal outcomes, even in high risk pregnancies.[5,6]

Most of the obstetricians face the question; "Is it normal not to feel my baby's movements yet?," in daily practice. It becomes a challenge for the obstetrician to answer this question because, there is not enough sufficient data on this issue in the current literature. A broad range of weeks have been reported as 16th to 20th weeks in round figures. Therefore when a woman in the 21st gestational week of her pregnancy asks this question to her obstetrician, she will often follow up with another question immediately after: "What is the problem with my baby?". The obstetrician will not be able to give an assuring answer because of the lack of knowledge in the current literature.

Thus, we decided to investigate the average week in which pregnant women in a low risk population felt the baby's movements for the first time and to find out the affects of probable factors which may act on this time.

2. Methods

This prospective comparative study was conducted between June 2016 and September 2016, at Kayseri Research and Training Hospital Department of Obstetrics and Gynecology in Kayseri province of Turkey where ~8000 deliveries per year were recorded. The study protocol was approved by the institutional review board of the local ethics committee. All participants who met the eligibility criteria were informed of the procedure, and provided informed written consent for participation in the study (ClinicalTrials.gov Identifier: NCT02979834).

The study population included spontaneous, singleton pregnancies in the first and second-trimester of their pregnancy. Multiple pregnancies, evidence of fetal or maternal infection, hypertensive disorders of gestation, gestational and pregestational diabetes mellitus, maternal drug use, evidence of fetal congenital abnormalities and amniotic fluid abnormalities were considered exclusion criteria for the study group.

All of the participants were given a questionnaire at the time of a routine follow-up visit including patient's dietary habits, smoking status, obstetric and socio-demographic features. For the validity and reliability of the questionnaire form, preapplication was made. Cronbach's Alpha internal consistency coefficient was calculated for the survey, which took its final version by making the factor analysis. The KMO value, Bartlett's test, and Cronbach's alpha value of the survey were calculated as 0.61, $p < 0.0001$, and 0.98, respectively as the result of a pilot study consisting of 95 cases. In addition, fetal and placental assessment were determined via ultrasonography (Toshiba Xario, Toshiba Medical Systems Corporation, Japan) with a curvilinear, 3.5 MHz probe by a single experienced sonographer (H.A) and recorded on patient charts for each participant.

After the evaluation of previous study results, power analysis was performed. Alpha and beta errors were stated as 0.05 and 0.20, respectively. The minimum number of patients needed to obtain 80% power was calculated as 126 for each groups. PASS 11 software (NCSS, Kaysville, UT, USA) was used for performing these analyses.[15,16] Three groups were formed according to the gestational week in which fetal movements felt by mother for the first time. Participants who felt the baby's movements at or before 25th (16th week) percentile value constituted Group 1 (early perception group); participants who felt the baby's movements between 25th and 75th (17−18th week) percentile value constituted Group 2 (average perception group); and the participants who felt the baby's movements at or beyond 75th (19th week) value constituted Group 3 (late perception group). Subsequently, these three groups were compared regarding maternal age, gestational week of inclusion in the study, obstetric features, maternal body mass index (BMI) values, caffeine consumption, smoking status, maternal education status, placental localization, and fetal gender.

Statistical analyses were performed using the SPSS for Windows 21.0 (SPSS Inc. IL, USA) software package. A p-value less than 0.05 was considered statistically significant. The normality of distribution for variables was assessed using the Shapiro−Wilk test. Data were presented as means ± SD for continuous variables. Kruskal−Wallis test was used for determining the differences in variables among groups, followed by evaluation with the Mann−Whitney U test for multiple comparisons. The resulting p-values were corrected according to the Bonferroni method. The Spearman Rho correlation coefficient was used to determine the correlation between perception of the first fetal movement and clinic features of the pregnant woman.

3. Results

A total of 423 pregnant women who met the inclusion criteria were evaluated in this prospective study. Mean maternal age of the whole study population was 27.71 ± 6.1 (16−42). One hundred twenty-five of the 423 pregnant women (29.6%) women were on their first pregnancy, while 298 (70.4%) women were on their second or more pregnancy. The average gestational age of inclusion in the study was 20.83 ± 2,27 (15−24) weeks according to the last menstrual period (LMP).

Since, the first maternal perception time of fetal movements varied in a broad range, percentile values were established to better classify the study groups. The 25th, 50th, and 75th percentile values for the gestational week, in which women felt the baby's movements for the first time, was 16, 17, and 19 weeks, respectively. The early perception group consisted of 152 pregnant women who felt the baby's movements before 25th percentile value, while the average perception group and the late perception group consisted of 141 women and 130 women, respectively.

There were no statistically significant differences in the three groups regarding the gestational week in which the participants were included in the study ($p > 0.05$). The parity the late perception group was lower than the other two groups; and the difference was statistically significant ($p = 0.029$). However, there was no statistically significant difference between three groups regarding gravidae ($p > 0.05$). In regards to maternal age, there were statistically significant differences in all three groups ($p = 0.03$). When the groups were compared between

each other dually the maternal age in Group 1 was significantly older than Group 2 ($p = 0.009$). However, the maternal age in Group 1 was older than Group 3, but the difference was not statistically significant ($p > 0.017$) (Tables 1 and 2).

The mean amniotic fluid indexes (AFI) were calculated as 102.4 ± 48.1, 105.8 ± 59.1, and 102.2 ± 45.7 for Group 1, Group 2, and Group 3, respectively. No statistically significant differences were found between the groups regarding AFI.

The effects of possible confounding factors (age, parity, BMI, fetal gender, and/or AFI) on the significant differences between the groups were investigated using ANCOVA test after logarithmic transformation of nonparametric data to parametric data. None of the possible confounding factors had a significant effect on the initial statistical comparisons. The 25th, 50th, and 75th percentile values for the gestational week, in which women felt the babies' movements for the first time, were 16, 17, and 19 weeks, respectively.

In regards to placental settlement, there was a statistically significant difference between three groups ($p = 0.003$). Moreover, when compared dually, the difference between average perception group and late perception group was statistically significant ($p = 0.001$) as well as the difference between early perception and late perception groups ($p = 0.013$) (Table 3).

When the three groups were compared according to follow up status, the difference was not statistically significant ($p = 0.035$). However, when early perception and late perception group were compared between each other, the women who continued regular follow up examinations were more in early perception group ($p = 0.011$).

There was a statistically significant correlation between three groups in terms of maternal education status ($p < 0.001$). Early perception group had significantly more women with high educational status than the other two groups. Even though the difference between early and late perception groups was not significant, the difference between early perception and average perception groups was statistically significant ($p < 0.001$ and $p < 0.001$) (Fig. 1).

Table 3
Spearman Rho Correlation Between early movement perception and selected demographic information.

Variable	Early fetal	Movement perception	*p*
	n	r	
Maternal Age	423	−0.089	0.067
Parity	423	−0.116	**0.017**
Gravity	423	−0.109	**0.024**
Body Mass Index kg/m^2	423	0.146	**0.003**
Placenta Localization	423	−0.117	**0.016**
Maternal education level	423	−0.341	**0.0000**
Regularly follow-up	423	−0.123	**0.012**

p-value sig two tailed.

The height and weight measurements of the women were made at the day of inclusion in the study. There were statistically significant differences between three groups in terms of BMI ($p = 0.006$). The late perception group had significantly higher BMI values than the other groups. When compared dually, there was statistically significant differences between and late perception groups ($p = 0.003$), and average and late perception groups ($p = 0.012$). There were no statistically significant differences between groups in terms of fetal gender ($p = 0.191$) and maternal tea and coffee consumption during pregnancy ($p > 0.05$ and $p > 0.05$).

4. Discussion

The results of this study revealed that, in a low risk population, the mean time for the perception by the mother of first

Table 1
Demographic characteristics of three groups.

	Group 1 Early perception ≤25th percentile n = 152	Group 2 Average perception >25th and <75th percentile n = 141	Group 3 Late perception ≥75th percentile n = 130	*p*
Age (mean ± SD)	28.76 ± 6.31	26.78 ± 5.95	27.48 ± 6.11	**0.03**
Gravida (mean ± SD)	2.45 ± 1.2	2.4 ± 1.1	2.22 ± 1.4	>0.05
Parite (mean ± SD)	1.2 ± 1.22	1.1 ± 1.13	0.97 ± 1.37	**0.029**
Gestational age (mean ± SD)	19.8 ± 2.54	20.74 ± 1.9	22.04 ± 1.5	>0.05
Amniotic fluid index mm (AFI)	102.4 ± 48.1	105.8 ± 59.1	102.2 ± 45.7	0.81
BMIkg/m^2 (mean ± SD)	26.54 ± 4.79	26.80 ± 4.65	28.13 ± 4.67	**0.006**
Smoking	11/141	6/135	8/122	>0.05
Tea consumption	106/46	104/37	88/42	>0.05
Coffee consumption	39/113	45/96	51/79	>0.05

Table 2
Clinical features of three groups.

	Early perception Group 1 n = 152	Average perception Group 2 n = 141	Late perception Group 3 n = 130	*p*
Gender of the babies (male/female)	80/72 (%52.4/47.6)	68/73 (%48.2/51.8)	77/53 (%59.2/40.8)	0.191
Placental site (anterior/posterior)	56/96 (%36.8/63.2)	45/96 (%31.9/68.1)	67/63 (%51.5/48.5)	**0.003**
Continuous follow-up status	136/16 (%89.5/10.5)	115/26 (%81.6/18.4)	102/28 (%78.5/21.5)	**0.035**
Maternal education level low/middle/high	22/80/50	49/82/10	55/67/8	**<0.001**

Low level: primary school; middle level: secondary school education; high level: college or academic education.

fetal movements was at the 17th gestational week. However, this time was affected in a positive or negative manner, by maternal age, placental location, BMI, and maternal education status. This study updates the knowledge about maternal perception of first fetal movements and investigates the issues comprehensively for the first time.

Although fetal movements are accepted as an evidence for fetal well-being since ancient times, the first clinical study concerning fetal movements was published in 1837.[7] After this time fetal movements became a popular issue in perinatal medicine and literature. Apart from the perinatal importance, fetal movements were suggested as important milestones for maternal−fetal attachment. Thus, fetal movements became a popular issue in pediatrics and psychiatry as well.[8,9]

Most of the studies regarding fetal movements, focused on the relationship between fetal movement and perinatal outcomes. However from maternal aspect, perception of the first fetal movements seems to involve sense, more than this relationship. Almost all obstetricians have been asked the question, “Is it normal not to feel my baby's movements yet?,” and cannot give an assuring answer. There is not enough information in the current literature regarding the time of maternal perception of first fetal movements and the related factors that can change this time.

Only a few studies exist in the current literature regarding the perception of first fetal movements or “quickening” in other words. These studies were conducted between early 1960's and 80's, before the implication of ultrasonography in clinical practice. Most of these studies investigated the efficacy of quickening on predicting post-term pregnancies. Kraus et al. were the first reporting the average time of quickening in a selected population consisting of noblewomen, which revealed earlier times of quickening in multiparous women.[10] However in the current study, we were unable show any affect of parity on maternal perception of first fetal movements. Rawlings et al. reported the second study in a similar

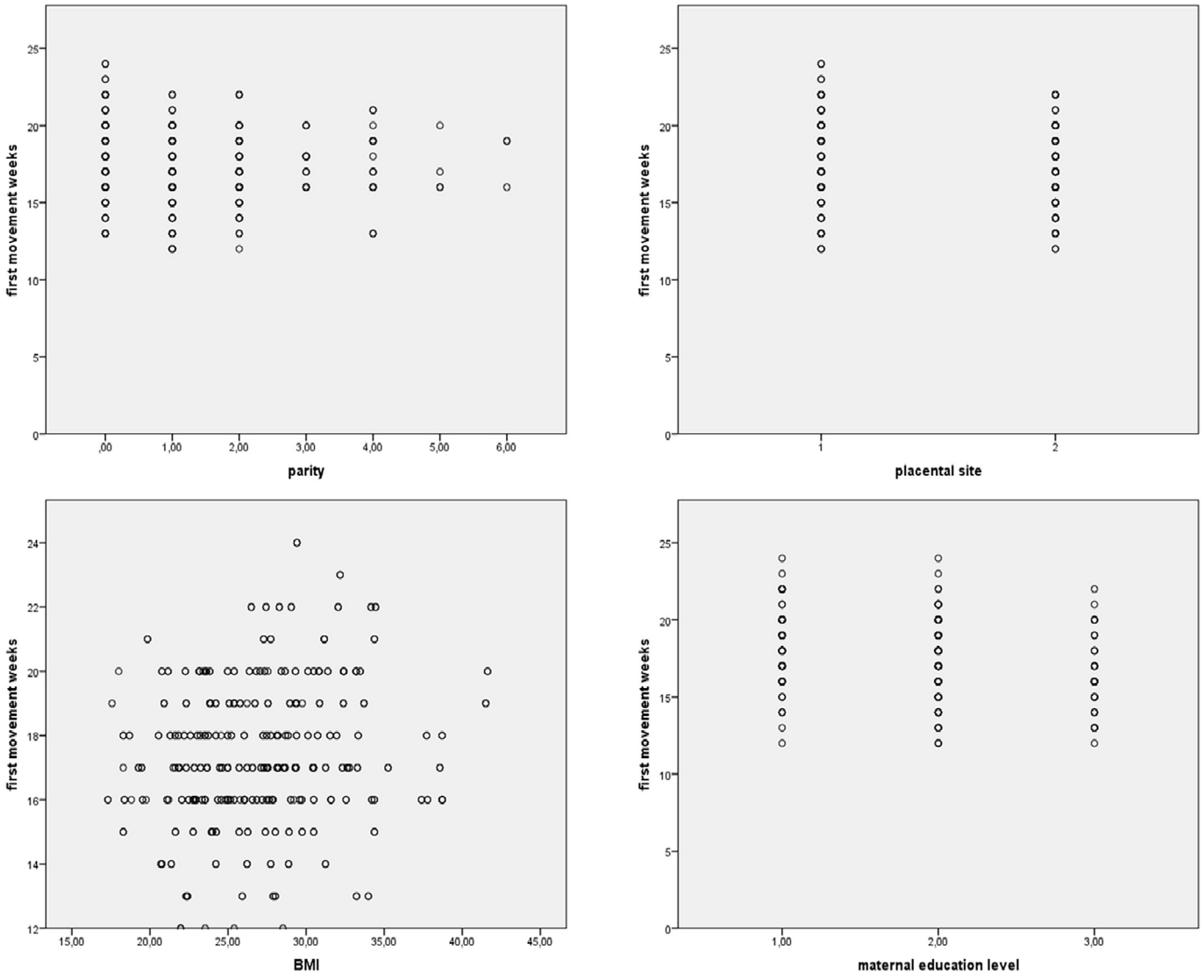

Fig. 1. Correlation between perception first fetal movement week and pregnant woman's features (parity, placental localization, body mass index, maternal education level).

methodology and aim with the first study, which included 441 pregnancies and revealed earlier times of perception with increasing number parity.[11] However, both of the studies had methodological and statistical limitations. The following study by Hertz et al., which included 690 pregnancies and based on a retrospective chart review, could not find any difference related with parity.[12]

After the clinical implementation of ultrasonography two studies were conducted. These studies took into consideration the effect of placental settlement on fetal quickening time; however, they revealed inverse results.[2,13] The results of our study revealed that anterior placental location was related with late maternal perception of first fetal movements. This finding made us think that anterior placenta may be a softening layer below maternal abdomen, on which the movements were felt. Subsequent to these studies, no other studies were implemented that focused on maternal perception of the first fetal movement, because ultrasound became the method of choice to determine the exact gestational age and fetal quickening time lost its importance in dating pregnancy.

Some other studies were also implemented investigating the possible effect of factors like BMI, maternal age, amniotic fluid volume, and fetal and maternal position. Almost all of these studies were conducted in later gestational weeks, and even for these factors the results were contradictory.[14−17] In the current study, we found that BMI and maternal age affected maternal perception of first fetal movements significantly. We considered that prior pregnancy experience sensitizes women to fetal quickening and like anterior placental location, higher BMI creates a softening layer below maternal abdomen.[18−20]

With reference to all above mentioned studies and related knowledge, obviously the data of the current literature is insufficient to suggest an approximate time for fetal quickening or maternal perception of the first fetal movements and the factors acting on this time. Interestingly, the last study that evaluated this issue was conducted 30 years ago, and revealed unreliable results due to the methodological deficiencies. With the technological evolutions involved, the women's awareness and unfortunately anxiety evolved. Therefore, the data from 30 years ago fell behind to give appropriate answers to their questions. Hence, we designated this study to determine a validate time of quickening with respect to all factors previously investigated and additional factors that could be affecting fetal quickening time.

In the last three decades social status of the women changed a lot and the percentage of working women increased. Besides big advantages, this situation created its disadvantages like stressful life. The increasing amount of stress led to higher amounts of tea and coffee consumption and higher rates of smoking women. Therefore, we decided that tea and coffee consumption during pregnancy and smoking status might be acting on quickening time. But the results of our study revealed no relationship between these factors and quickening time. We also investigated the effect of fetal gender, maternal educational status, and the accordance to regular follow-ups on quickening time. While fetal gender had no effect on the quickening time, maternal educational status differed in the three groups and the difference was statistically significant. Accordance to regular follow-ups affected the quickening time also, but only the significant difference occurred in subgroup analysis.

In conclusion, this study revealed reliable results and updated our knowledge of quickening time in respect to previously investigated and new additional factors. To summarize the results of this study, we can suggest that: “Well educated, thinner, and elderly women that took account of regular follow-ups and who had posteriorly localized placenta women will perceive the fetal movements earliest among others.”

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