



# Fetal Movement Measurement and Technology: Maternal Compliance

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Received: 1 October 2021  
Accepted: 25 November 2021  
Published online: 23 February 2022

**Keywords:** fetal movement count, Cardiff count to ten chart, DFMC chart

Fetal movement counts have long been employed as a measure of fetal well-being, but they have been displaced as the major metric due to advances in technology. Fetal movement refers to the movement caused by the fetus's own muscle activity. The motor activity begins in the late embryonic stage and changes during the development of nature. The Cardiff count to ten chart is a method of assessing health in the womb, in which pregnant women record the movement of the fetus in its normal activities. The daily fetal movement count (DFMC) chart is a cheap, simple, and non-invasive tool. DFMC needs pregnant women to start counting fetal movements at a selected time every day, count ten fetal movements, and record the elapsed time from the first fetal movement to the tenth fetal movement. A quantitative research approach was conducted at the urban PHC, Nerkundram using a Post-test only design with the comparison group among 40 samples were selected by non-probability convenient sampling technique. 20 samples for Cardiff count to ten chart and 20 samples for DFMC chart. A self-assessment of fetal wellbeing by using Cardiff count to ten chart and DFMC chart. Among the 40 antenatal mothers, 9(45%) had non-compliance, and 11(55%) had compliance towards DFMC chart and In Cardiff count to ten chart non-compliance is 6(30%), and compliance is 14(70%). Assessment methods such as maternal involvement, clinician involvement, technology-assisted, and automated technology helps for better maternal compliance.

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## Introduction

Pregnancy occurs when sperm cells leave the ovary during ovulation and fertilize the egg. The fertilized egg then enters the uterus, where it is implanted. Successful implantation can lead to pregnancy [1]. Fetal movement refers to the movement caused by the fetus's own muscle activity. The motor activity begins in the late embryonic stage and changes during the development of nature. Once the muscles are innervated by the nerves, they begin to move [2]. Fetal movement has long been used as an indicator of fetal well-being [3]. Assessment of fetal movement is an accepted method of identifying adverse pregnancy outcomes, including intrauterine growth restriction and placental insufficiency [4]. Counting the movements of the fetus by the mother is one method of assessing the wellbeing of the fetus, and this unstructured screening helps the mother to be sure of the health of the fetus [5]. The Cardiff count to ten charts is a method of assessing health in the

womb, in which pregnant women record the movement of the fetus in its normal activities. At least ten movements must be performed within 12 hours; if less than ten movements are felt, additional medical examinations are required [6].

The daily fetal movement count (DFMC) chart is a cheap, simple, and non-invasive tool. It is a clinically effective tool for determining the health of the fetus after 20 years. DFMC requires pregnant women to start counting fetal movements at a selected time every day, count ten fetal movements, and record the elapsed time from the first fetal movement to the tenth fetal movement[7]. With the advent of ultrasound technology and blood test screening, fetal movement is no longer the primary clinical test of fetal well-being. However, for practical and safety reasons, these technologies cannot be used continuously [8], so assessment of fetal movement continues to play an important role.

Four main categories of fetal movement measurement were identified for the taxonomy. Categories were based on the primary requirement needed for movement assessment to be possible. The taxonomy categories are: maternal involvement; clinician involvement; technology-assisted; and automated technology. The

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immediate report, including less than ten movements within 12 hours; no sense of movement for eight hours; changes to the fetus's usual movement pattern; or sudden increase in fetal movement and then complete cessation of movement [7].

The most common method of fetal movement assessment is maternal observation [9]. There are two main categories of this method, informed and uninformed maternal awareness. Some health care professionals inform women of the importance of fetal movements and encourage them to report any change, including change in pattern or reduction in fetal movement strength [10]. Maternal observation can help prevent stillbirth. In contrast if uninformed, women may not be aware of what is abnormal or the importance of seeking appropriate clinical help if changes in fetal movements are observed [11]. A brief historical and technological overview and the expected measurements of each assessment method are described.

## Materials and Methods

After obtaining ethical clearance from the institutional ethical committee of saveetha Institute of medical and technical science and a formal permission letter, a quantitative research approach was conducted at the urban primary health center (Nerkundram) using a Post-test only design with the comparison group. A Non-probability convenient sampling technique was used to select 40 samples, 20 samples for Cardiff count to ten chart and 20 samples for DFMC chart. The purpose of this study was to compare the maternal compliance of Cardiff count to ten chart and DFMC chart among antenatal mothers. The data collection period was carried out with prior permission obtained ethical approval (SIMATS) from the agency. Determine the purpose of the sample survey and obtain written informed consent for the sample. A self-assessment of fetal wellbeing by using Cardiff count to ten chart and DFMC chart. Use descriptive and inferential statistics to analyze the data. The characteristics of the sample are described by frequency and percentage. Chi-square test is used to an association of maternal compliance towards Cardiff count to ten Chart with their selected demographic variables among antenatal mothers

## Results and Discussion

### Section A: Demographic characteristics

Among 40 antenatal mothers, 8 (40%) of women age ranged from 20 to 25 years, and 12(60%) were in 26 to 30 years in the DFMC chart. In Cardiff count to ten chart 14(70%) in 20 to 25years and 6(30%) in 26 to 30years. In educational status, 7(35%) were graduates in DFMC Chart, but in Cardiff count, to ten chart 7(35%) were studied in high school. About occupation 17(85%) of mothers were housewives in DFMC chart, and 19(95%) were housewives in Cardiff count to ten chart. In DFMC chart, 11 (55%) of mothers got 5000- 10,000 income and In Cardiff count to ten chart, 11 (55%) of mothers got 5,000- 10,000 income. According to the listing of religious preferences, 16(80%) were Hindus in the DFMC chart, and in Cardiff count to ten chart 18(90%) of mothers are Hindu. In the DFMC chart, among the twenty antenatal mothers, 7(35%) of mothers working less than 10 hours, 11(55%) working between 10-20 hours, 2(10%) were in 20-40 hours. But in Cardiff count to ten Chart, 9(45%) were in less than 10 hours, 10(50%) were working in between 10-20 hours, and 1(5%) were working between 20-40 hours, 16(80%) of mothers were primigravida mothers Cardiff count to ten chart, and in DFMC chart 13(65%) of mothers were primigravida mother, In both DFMC chart and Cardiff count to ten chart 9(45%) of mothers were multigravida mother. 1(5%) of mothers having an abortion in DFMC chart and 4(20%) 34 of mothers in Cardiff count to ten chart. About

gestational age, 13(65%) of mothers were in <36 weeks in DFMC chart, in the same manner, 14(70%) belongs to <36 weeks in Cardiff count to ten chart. Among 20 antenatal mothers, 18(90%) were normal, and 2(10%) mothers are high-risk women in the DFMC chart. But in Cardiff count to ten chart 19(95%) and in high risk it is decreased to 1(5%) Majority 17(85%) of mothers was not taught to monitor the fetal movements in DFMC chart. In Cardiff count to ten chart, 16(80%) were not taught the fetal movements. Likewise, 1(5%) and 2(10%) of mothers have the knowledge about the fetal movement in both DFMC chart and Cardiff count to ten chart. 19(95%) and 18(90%) of mothers in the DFMC chart and Cardiff count to ten chart were not having previous knowledge about fetal movements.

These findings were supported by Maj K Sindhu, et al. (2007) had conducted a study on A prospective study was carried out on over 500 booked cases after introducing the daily fetal movements count (DFMC) Chart in the ninth month of pregnancy. Prior ultrasound was done in all cases. DFMC Chart was used to record the number of fetal movements perceived by patients for one hour after food (breakfast, lunch, dinner). The fetal movements were considered satisfactory if the count was three or more on each occasion. During the study period, no fetus was lost after the introduction of the DFMC Chart in the 250 cases and they were delivered in the hospital with nil perinatal mortality. This was compared with 250 booked cases that were not given DFMC Chart but had a normal ultrasound done after completion of 8 months of pregnancy and followed up. Five intrauterine deaths occurred in the ninth month in the control group (2% perinatal mortality). In the DFMC Chart group, 15 patients were admitted with decreased fetal movements. Out of this, 12 were discharged after monitoring for three days, and 3 cases were delivered [12].

### Section B: Frequency and percentage distribution of level of maternal compliance towards Cardiff Count to Ten Chart and DFMC chart among antenatal mothers

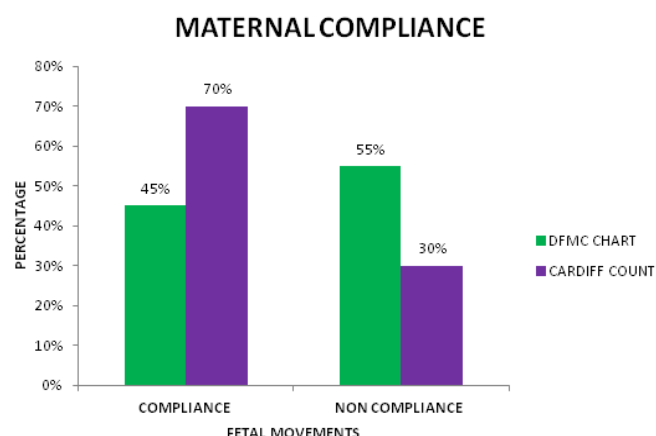
Among the 40 antenatal mothers, 9(45%) had non-compliance, and 11(55%) had compliance towards DFMC chart and In Cardiff count to ten chart non-compliance is 6(30%) and compliance is 14(70%).

The present study findings were supported by Saasatard E, Et Al., (2012) had conducted a study on A multicenter controlled trial on 1,013 women with a singleton pregnancy were randomly assigned either to perform daily fetal movement counting from pregnancy week 28 or to follow standard Norwegian antenatal care where fetal movement counting is not encouraged. The primary outcome was a maternal concern, measured by the Cambridge Worry Scale. The result shows that women who performed fetal movement counting in the third trimester reported less concern than those in the control group. The frequency of maternal reports of concern about the decreased fetal activity was similar between the groups. Most women considered the use of a counting chart to be positive [13].

### Section C: Comparison of maternal compliance towards Cardiff Count to Ten Chart and DFMC Chart among antenatal mothers

Maternal compliance among antenatal mothers towards Cardiff count to ten chart mean is 20.3 and SD of 1.34. But in DFMC chart 106.4 of mean and 42.18 of SD. Since there is a significant

Difference between Cardiff Count to ten chart and DFMC chart. Maternal compliance is more towards the Cardiff count to ten chart. So the hypothesis is accepted.



**Figure 1: Maternal compliance between Cardiff count and DFMC chart**

The present study findings were supported by James F. Pearson, et al. (1995) had conducted a study on The clinical value of the daily fetal movement count (DFMC) as a test of antepartum fetal wellbeing was assessed. The lowest 2-5% of 1654 DFMCs recorded by 61 women who subsequently delivered healthy infants fell below ten movements per 12 hours. This level was taken as the lower limit of normal for clinical purposes. A normal DFMC in a population at risk was associated with a satisfactory fetal outcome. A low DFMC was associated with a high incidence of fetal asphyxia, and when fetal death occurred, fetal movements rapidly diminished and stopped 12 to 48 hours before death. The DFMC is a generally applicable method of monitoring fetal welfare during pregnancy which provides an inexpensive adjunct or even an alternative to the more expensive placental function tests in current use [14].

#### **Section D: Association between the selected demographic variables and maternal compliance to Cardiff count to ten chart and DFMC chart among antenatal mothers**

There is no association between age (0.831), educational status (0.677), income (0.510), religion (0.621), gestational age (0.642), pregnancy category (0.501), methods to monitor the fetal movements (0.807), previous knowledge about fetal movement counting (0.515) in Cardiff count to ten chart and there is no association between the age (0.142), educational status (0.623), income (0.098), religion (0.340), pregnancy category (0.882), methods to monitor the fetal movements (0.089) and previous knowledge about fetal movement monitoring (0.353) in DFMC chart.

The present study findings were supported by Ashna Jose, (2016) had conducted a comparative study on the effectiveness of the DFMC chart versus Cardiff count ten chart in relation to maternal compliance and mother's perception on self-assessment of fetal wellbeing. The research design adopted for this study was a post-test-only design with the comparison group. Non-probability convenient sampling techniques were used. The study was conducted in PSG Hospitals, Coimbatore. Desired samples of 40 were selected. DFMC chart was given to one group. The mother was used to record the number of fetal movements in the chart one hour after food in the morning, afternoon, and evening. Cardiff count ten chart was given to another group to assess the fetal movements for 12 hours in a day, from 9 am to 9 pm. During their next visit, the perception was assessed. This study concluded by two main protocols are used to assess the fetal wellbeing are Cardiff count ten chart and DFMC chart.

DFMC chart for the self-assessment of fetal wellbeing by antenatal mother in relation to maternal compliance [15]. The past researchers have shown that maternal monitoring of fetal movements can lead to a lower incidence of stillbirth. Within prenatal diagnostics, ultrasound is commonly used for fetal morphology, analysis of amniotic fluid volume, biometric analysis, and further investigation of potential developmental issues [4]. Evaluation of these factors is most commonly performed between 18 and 22 weeks of gestation as there is a higher chance of detecting major congenital anomalies, though dating the pregnancy is more accurate if done earlier [16].

### **Conclusion**

This study investigated the study to compare the maternal compliance of Cardiff count to ten chart and DFMC chart among antenatal mothers in the urban primary health center, Nerkundram. The findings of the present study revealed that to compare the maternal compliance of Cardiff count to ten chart and DFMC chart, there is a significant difference between Cardiff Count to ten chart and DFMC chart. Maternal compliance is more towards the Cardiff count to ten chart. The comparison of maternal compliance of Cardiff count to ten chart and DFMC chart shows that none of the demographic variables had shown statistically significant association in Cardiff count to ten chart and DFMC chart. The primary requirement for these methods is the use of technological aid with interpretation by a trained health professional to assess fetal movement.

### **Acknowledgment**

We could like to extend our gratitude to the authorities of Saveetha College of Nursing and Saveetha Medical College and Hospital and Urban primary health center in Nerkundram for this study.

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