

## Correlation Between Less Fetal Movement and Cardiotocography Findings

<sup>1</sup>Dr Sharmin Afroz, Consultant, Department of Obstetrics & Gynaecology, Labaid specialized hospital, Dhaka, Bangladesh.

<sup>2</sup>Dr. Sumyia Akhter, Consultant, Department of Obstetrics & Gynaecology, Obstetrics & Gynaecology Society of Bangladesh Maternity Hospital (OGSB & IRCH- Institute of reproductive and child health), Dhaka, Bangladesh.

<sup>3</sup>Dr Amena Begum, Registrar, Department of Obstetrics & Gynaecology, Army Medical College, Cumilla, Bangladesh.

<sup>4</sup>Dr Asma Begum, Medical officer; Out Patient Department, Mymensingh Medical College, Mymensingh, Bangladesh.

**Corresponding Author:** Dr Sharmin Afroz, Consultant, Department of Obstetrics & Gynaecology, Labaid specialized hospital, Dhaka, Bangladesh.

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### ABSTRACT

**Background:** Maternal assessment of fetal movements is the oldest and most commonly used form of evaluation of fetal well-being. A reduction in fetal movement may be subjective, but it may be a sign of impending or existing pathology. So, all the subjects with less fetal movement should be evaluated with Cardiotocography (CTG). CTG provides direct information of fetal condition in contrast to other technique. Acceleration of fetal heart rate is due to intact responsive CNS mechanism. The loss of fetal heart rate variability or decelerations reflect depression of this CNS mechanism. **Objectives:** Correlation between less fetal movement with CTG findings in order to compare the advantage of CTG over maternal perception of fetal movement. **Methods:** Fifty women having singleton pregnancy of gestational age  $\geq 34$  weeks with complaints of less fetal movement and intact membrane with no labour pain were taken into the study and finally CTG was done. Subjects were grouped on the basis of CTG findings. Group I: Subjects with normal CTG findings Group II: Subjects with abnormal CTG findings (suspicious CTG Findings included). Statistical analyses of the results were obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-22), were required. **Results:** The mean age was  $27.7 \pm 4.7$  years and maximum number was found in the age group of 25-29 years. The mean ( $\pm$ SD) gestational age was  $35.6 \pm 1.2$  weeks with ranged from 34 to 40 weeks- Lower abdominal pain, frequency and burning sensation during micturition, loose motion were common presenting complaints in this study group. Less fetal movement was more common in primigravida. Maximum patients of this study who complained less fetal movements were obese. Out of fifty patients of this study abnormal CTG was found in 14 patients (28.0%) and normal CTG was found in 36 (72.0%) patients. **Conclusion:** Less fetal movement does not always represent reactive CTG; it may be also due to maternal false perception. Evaluation of patient with CTG helps the clinician not only to take decision for elective delivery and future planning of neonatal resuscitation but also reduce unnecessary surgical intervention. **Keywords:** Fetal Movement, Cardiotocography, Neonatal resuscitation.

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### I. INTRODUCTION

Monitoring of fetal wellbeing by observing fetal movement in their 2nd half of pregnancy has been recommended over the past three decades. A reduction of fetal movements causes concern and anxiety and is a common indication for the assessment of fetal wellbeing. [1] Maternal assessment of fetal movements is the oldest and most commonly used form of evaluation of fetal well-being. A healthy fetus should have minimum 10 movements in 12 hours period. Awareness of and counting the frequency of fetal movements is an inexpensive and simple task. [2] Fetal movements serve as an indirect measure of central nervous system integrity and function. Regular fetal movements are regarded as an expression of fetal well-being. The fetus responds to chronic hypoxia by conserving energy and subsequent reduction in fetal movements as an adaptive mechanism to reduce oxygen consumption. [1]

All pregnant women should be counselled to assess or to be alert for fetal movements in late pregnancy. Various techniques of keeping a fetal movement record have been described, which include- 'Count to 10' method, twelve hours record and post meals count. [3] Counting of fetal movements for 30-60 minutes after meal has been popular because of the belief that fetal movement increases post prandially. [4] The basis of all techniques is to

ensure awareness of continued fetal activity except for short periods of rest, usually during the fetal nonrapid eye movement (NREM) or quiet sleep phase, which usually lasts about 20-40 minutes. [4]

It has been proposed that maternal perception of reduced fetal movements may be indicative of placental insufficiency. There are many pathological causes of reduced fetal movements including acute and chronic fetal hypoxia and fetal anomaly, especially those involving neurological and musculoskeletal systems. [2] A mother's accuracy in counting FM can vary and depends on various factors such as maternal weight and behavioral patterns, placental localization, volume of amniotic fluid, heavy maternal exercise, alcohol intake and administration of drugs like narcotics and beta-methasone. [1] It is recognized that intrauterine fetal death may be preceded by cessation of fetal movements for at least 1 day. [2]

Non-Stress Test (NST) has achieved general acceptance throughout the world as a screening test for fetal surveillance. It is the graphic presentation of the fetal heart activity and the uterine contraction to detect the fetal hypoxia. [5] A reactive or normal NST is characterized by two or more Fetal Heart Rate (FHR) accelerations of at least 15 beats per minute (bpm) and lasting at least 15 seconds from baseline to baseline within a 20 minutes period with or without association with fetal movements as perceived by the woman. A non-reactive NST is characterized by lack of accelerations for a period of 40 minutes. [6] Accelerations seen on the CTG suggest good cardiovascular reserve. [7]

A study over a 9-year period, on 2,601 women had antenatal cardiotocography (CTG) performed after reporting diminished fetal movements and abnormal CTG tracings were in 1390 women. [8]

In summary, maternal assessment of fetal movement may be a valuable way to detect fetal compromise. There is an interval between the onset of placental insufficiency and fetal demise when fetus has reduced movements. NST (CTG) as a routine assessment, is an effort to identify the fetus that may be at risk of poor pregnancy outcome. [2] The perception of fetal movement by individual mothers and differences in the activities of individual fetuses are probably the major component of variation in the fetal movements. [1] With the above-mentioned scenario, this study is an attempt to correlate less fetal movement with CTG findings in order to compare the advantage of CTG over maternal perception of fetal movement.

## II. METHODOLOGY

This is a cross-sectional analytical study. This study was carried out on 50 patients in the department of obstetrics and Gynaecology, DMCH and BSMMU, Bangladesh. The duration of the period from January 2010 to June 2010. After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. The choice of treatment was made by the patient after a full discussion with the multidisciplinary team consisting of Transfusionists. The data for this study about had been accumulated from patients' medical information. Statistical evaluation of the results used to be got via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

## III. RESULTS

**Table-I: Age distribution of the study patients (n=50)**

Age in years	n	%
<b>20 – 24</b>	15	30.0
<b>25 – 29</b>	17	34.0
<b>30 – 34</b>	13	26.0
<b>35 - 38</b>	5	10.0
<b>Mean ± SD</b>	27.7 ± 4.7	
<b>Range</b>	(20 – 38)	

A total of 50 pregnant women were included in the study. Maximum number was found in the age group of 25-29 years and the mean (±SD) age was 27.7±4.7 with ranged from 20 to 38 years.

**Table II: Gestational age distribution**

Gestational age (weeks)	n	%
<b>34-37</b>	43	86.0
<b>38-40</b>	07	14.0
<b>Mean±SD</b>	35.6±1.2	
<b>Range</b>	(34-40)	

The gestational age ranged from 34 to 40 weeks and maximum number of subjects were found in the gestational age group of 34-37 weeks with mean ( $\pm$ SD) gestational age was 35.6 $\pm$ 1.2 weeks.

**Table-III: Presenting complaints of the study patients (n=50)**

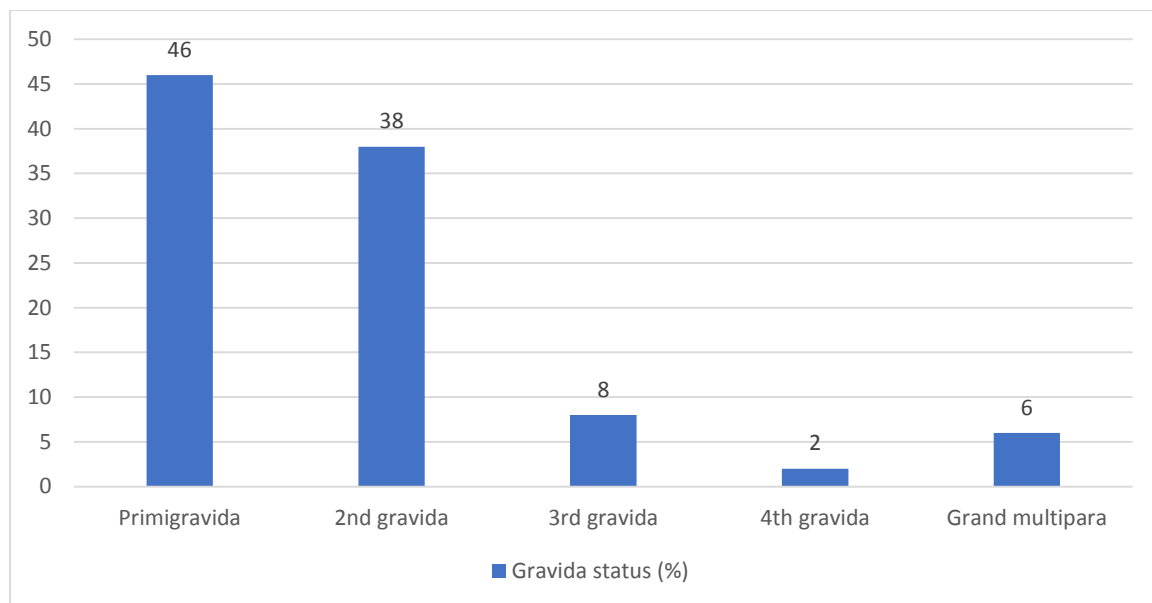
Presenting complaints	N	%
Less fetal movement alone	20	40.0
Less fetal movement with additional complaints	30	60.0

A total of 50 pregnant women were induced in the study. Maximum numbers of the subjects were found who were presenting with less fetal movement with additional complains.

**Table-IV: Presenting additional complaints patients (n=30)**

Complaints	n	%
Lower abdominal pain	10	20.0
Frequency and burning sensation during micturition	8	16.0
Loose motion	5	10.0
History of fall	3	6.0
History of Constipation	2	4.0
History of previous C/S	2	4.0

The above table IV shows the additional complaints of the patients. The frequency of lower abdominal pain, frequency and burning sensation during micturition and loose motion were more common presenting complaints of the study subjects.



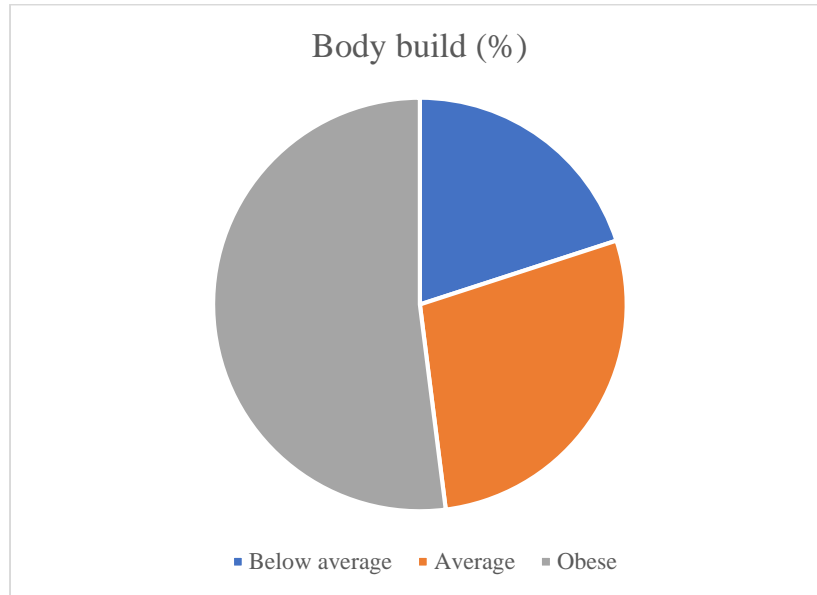
**Figure I: Distribution of the study subjects according to gravida status (n=50)**

Regarding the gravida it was observed that primi gravida and 2nd gravida were predominant in this study. Grand multipara (Para 4/more) was found 3 (6.0%) of the study patients.

**Table V: Antenatal checkup of the study patients (n=50)**

Antenatal checkup	n	%
Taken	22	44.0
Not taken	28	56.0

Regarding the antenatal checkup, it was observed that 22 (44.0%) received antenatal check-up and 28 (56.0%) did not receive any antenatal check-up.



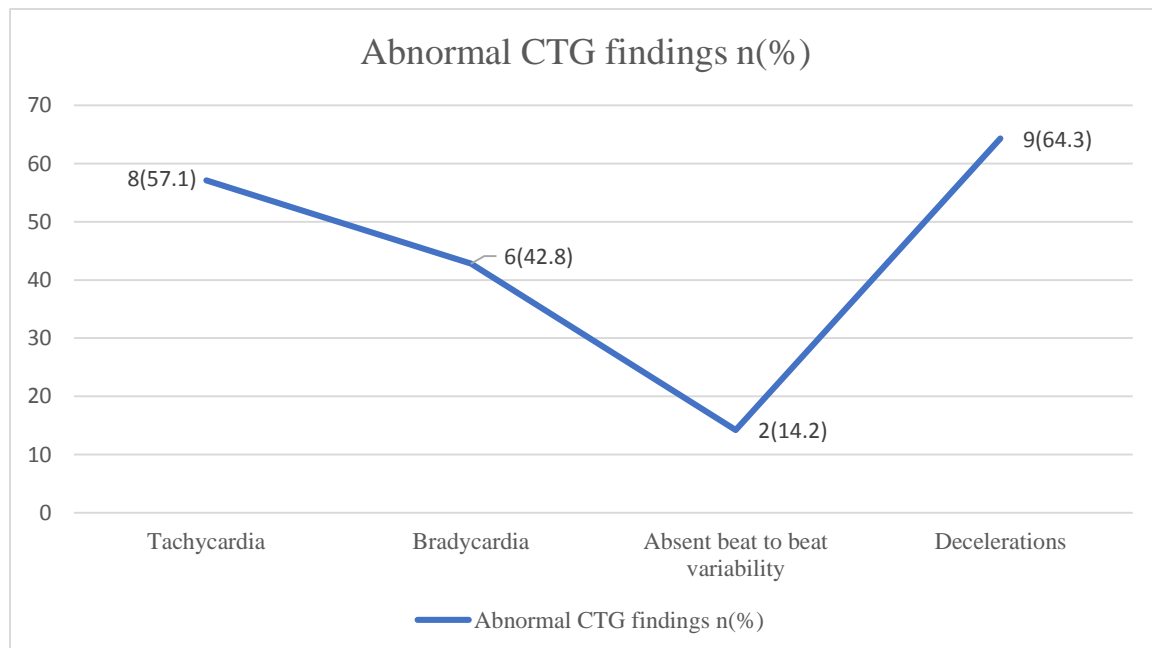
**Figure II: Body build Distribution of the study patients (n=50)**

Regarding the body build it was observed that majority of the patients of this study were obese.

**Table VI: CTG findings of the study patients (n=50)**

Group	n	%
Normal CTG	36	72.0
Abnormal CTG	14	28.0

A total of 50 patients were induced in this study, out of which normal CTG was found in 36 (72.0%) patients and abnormal CTG was found in 14 (28.0%) patients.



**Figure III: Frequency of major abnormality in CTG of the study patient (n=14)**

The above table shows the frequency of major abnormality in CTG and found that deceleration and tachycardia were more common abnormalities. Some abnormal tracings had more than one abnormality.

#### **IV. DISCUSSION**

A perception of reduced fetal movements is a common complaint by pregnant women. As a part of routine antenatal care, pregnant women have been advised to note fetal movements in the 3rd trimester for many years. A reduction in fetal movement may be physiological, such as during the later half of pregnancy or during fetal sleep states, but it may be a sign of impending or existing pathology. It was first recommended in 1973 as a nonspecific early warning sign of fetal distress [9] and since then, reduced fetal movements have been linked to both intrauterine and postpartum pathology [10, 11]. It may also result from maternal subjective difficulty in appreciating fetal activity. It is known that up to 87.0% of fetal movements are accurately perceived simultaneously by the mother when recorded using an external electromagnetic device [9] and those major body movements are more easily detected by their mothers [12]. It is quite important to note that in a small percentage woman, a pathological cause may be found. Therefore, CTG evaluation is recommended in all cases.

This cross-sectional study was carried out with an aim to evacuate the patients presenting with less fetal movement by CTG as well as to compare the advantage of CTG over maternal perception of fetal movement. Fifty women having singleton pregnancy of gestational age  $\geq 34$  weeks with complaints of less fetal movement and intact membrane with no labour pain were interviewed and finally CTG was done. Subjects were grouped on the basis of CTG findings. Group I: Subject with normal CTG Group II: Subject with abnormal CTG (Suspicious CTG included). The present study findings have been discussed and compared with previously published relevant studies.

Saastad et. have shown in their series that more than one third (34.4%) patients belonged to age 30 to 34 years age group, which is higher than the current study [13]. The mean age was  $27.7 \pm 4.7$  years (range being 20-38 years) in this study. Sinha et have shown in their series, the mean age of the patients was 28 years which is more or less similar to the present study. In this study, it was observed that the mean ( $\pm$ SD) of gestational age was  $35.6 \pm 1.2$  weeks (range being 34-40 weeks) and maximum number was found in the gestational age group of 34 to 37 weeks. Sinha et al. [1] observed 34 to 37 weeks of gestation, which is consistent with the current study. Heazell et al, [2] observed almost similar findings in their study, which is comparable with the present study. Clinical presentation of severe fetomaternal haemorrhage is commonly that of decreased fetal movements [14]. Women who present solely with this symptom in the third trimester, without any other risk factor, do not appear to constitute a high-risk group; their pregnancy outcome is similar and probably better than that of the general populations [14]. There is at present no general agreement as to what constitutes decreased fetal movements. A mother's accuracy in counting fetal movements can vary and depends on various factors such as maternal weight and behavioral patterns, placental localization, Volume of amniotic fluid and fetal malformations [15, 16]. Fetal movement monitoring is of limited value for predicting acute fetal distress during placental abruption or in cases of acute cord complications, as the insult to fetus occurs earlier.

In this study, it was observed that number of patients presenting with less fetal movement alone was 20 (40.0%), whereas the number was maximum, 30 (60.0%) when less fetal movement associated with other complaints. The presenting common complaints of the present study patients were found lower abdominal pain, frequency and burning sensation during micturition, loose motion and history of fever. O' Sullivan et observed almost similar findings in their study [17]. Tveit et al observed decreased fetal movement was 51.0% in primigravida, which is comparable with the current study [18]. Similarly, Saastad et al. have observed identical findings of their study [13]. In this study 46.0% was primigravida and grand multipara was 6.0%. It was also observed that 22 (44.0%) patients had received antenatal checkup.

#### **Limitation of the study**

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

#### **V. CONCLUSION**

Maternal assessment of fetal movement is the oldest and most commonly used form of evaluation of fetal well-being. A reduction in fetal movement may be subjective, but it may be a sign of impending or existing pathology. Evaluation of patient with CTG helps the clinician not only to take decision for elective delivery and future planning of neonatal resuscitation but also to reduce unnecessary surgical intervention.

#### **VI. RECOMMENDATION**

As the present study included a small sample size, it may not reflect the real picture. A further randomized study with larger sample size may confirm the results of the present study and will be more informative.

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The wide range of disciplines involved in correlation between less fetal movement and cardiotocography findings research means that editors need much assistance from referees in the evaluation of papers submitted for publication. I would also like to be grateful to my colleagues and family who supported me and offered deep insight into the study.

### DECLARATION

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**Conflict of interest:** None declared.

**Ethical approval:** The study was approved by the ethical committee of Dhaka Medical College Hospital, Dhaka.

### REFERENCE

- [1]. Sinha D, Sharma A, Nallaswamy V, Jayagopal N, Bhatti N. Obstetric outcome in women complaining of reduced fetal movements. *Journal of Obstetrics and Gynaecology*. 2007 Jan 1;27(1):41-3.
- [2]. Heazell AE, Sumathi GM, Bhatti NR. What investigation is appropriate following maternal perception of reduced fetal movements? *Journal of obstetrics and gynaecology*. 2005 Jan 1;25(7):648-50.
- [3]. Christensen FC, Rayburn WF. Fetal movement counts. *Obstetrics and gynecology clinics of North America*. 1999 Dec 1;26(4):607-21.
- [4]. Khurana A. Ultrasound in obstetric practice. *Ian Donald's Practical Obstetrics Problems*, 9/e. 2020 May 1:61.
- [5]. Parer JT, King T. Fetal heart rate monitoring: is it salvageable? *American journal of obstetrics and gynecology*. 2000 Apr 1;182(4):982-7.
- [6]. Arias F, Bhide AG, Arulkumaran S, Damania K, Daftary SN, editors. *Practical Guide to High-Risk Pregnancy and Delivery-E-Book: A South Asian Perspective*. Elsevier health sciences; 2008 Jul 15.
- [7]. Manning FA. Fetal biophysical profile: a critical appraisal. *Clinical obstetrics and gynecology*. 2002 Dec 1;45(4):975-85.
- [8]. Chew FT, Beischer NA. Antepartum cardiotocographic surveillance of patients with diminished fetal movements. *Australian and New Zealand journal of obstetrics and gynaecology*. 1992 May;32(2):107-13.
- [9]. Sadovsky E, Yaffe H. Daily fetal movement recording and fetal prognosis. *Obstetrics & Gynecology*. 1973 Jun 1;41(6):845-50.
- [10]. Kosasa TS, Ebesugawa I, Nakayama RT, Hale RW. Massive fetomaternal hemorrhage preceded by decreased fetal movement and a nonreactive fetal heart rate pattern. *Obstetrics & Gynecology*. 1993 Oct 1;82(4):711-4.
- [11]. K. James, Florence M. Telfer, Nicola A. Keating, ME Blair, MA Wilcox, Claire Chilvers D. Reduced fetal movements and maternal medication-new pregnancy risk factors for neurodevelopmental disability in childhood. *Journal of Obstetrics and Gynaecology*. 2000 Jan 1;20(3):226-34.
- [12]. Gettinger A, Roberts AB, Campbell S. Comparison between subjective and ultrasound assessments of fetal movement. *Br Med J*. 1978 Jul 8;2(6130):88-90.
- [13]. Saastad E, Tveit JV, Flenady V, Stray-Pedersen B, Fretts RC, Børdahl PE, Frøen JF. Implementation of uniform information on fetal movement in a Norwegian population reduced delayed reporting of decreased fetal movement and stillbirths in primiparous women—a clinical quality improvement. *BMC research notes*. 2010 Dec;3(1):1-1.
- [14]. Wilcock FM, Kadir RA. Fetomaternal haemorrhage—a cause for unexplained neonatal death, presenting with reduced fetal movements and non-reactive fetal heart trace. *Journal of Obstetrics and Gynaecology*. 2004 Jun 1;24(4):456-7.
- [15]. Neldam S. Fetal movements. A comparison between maternal assessment and registration by means of dynamic ultrasound. *Danish Medical Bulletin*. 1982 May 1;29(4):197-9.
- [16]. Roberts AB, Little D, Cooper D, Campbell S. Normal patterns of fetal activity in the third trimester. *BJOG: An International Journal of Obstetrics & Gynaecology*. 1979 Jan;86(1):4-9.
- [17]. O'sullivan O, Stephen G, Martindale E, Heazell AE. Predicting poor perinatal outcome in women who present with decreased fetal movements. *Journal of Obstetrics and Gynaecology*. 2009 Jan 1;29(8):705-10.
- [18]. Holm Tveit JV, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy. *Acta obstetrica et gynecologica Scandinavica*. 2009 Dec 1;88(12):1345-51.