# Elucidate functional role of green tea and bitter cocoa when nutritional intervention on the pregnant and fetal movement

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**Abstract** :Because data of many researches inconclusive and sometimes conflicting which pouch author in this work to shed light on functional role's of green tea and bitter cocoa when nutritional intervention on the pregnant and fetal movement . Fifty four outpatient normal pregnant women volunteers, Age (year) was (30.5 ± 3.95) Mini, (27) Maxi, (39). BMI was (25.28±3.44) Mini, (19.10) & Maxi, (35.42). The following laboratory studies and tests were performed. Anthropometric measurements, Age (year) Weight (kg) Height (cm) BMI, Numbers of pregnancy as questioner for all cohorts. Months of pregnancy by Sonar before and after nutrition intervention , Ultrasound for Mother pulse (beat/minute/blood pressure, mm Hg, Fetus Systolic, Diastolic pulse (beat/minute/blood pressure, mm Hg and Fetus movements (within 25/35 minutes). Hemoglobin (g/dl), ABO blood group, Rh type, was carried on. Result investigated that Green tea, lower maternal (Mother) pulse (beat/minute/blood pressure, mm Hg, Fetus Systolic, Diastolic pulse (beat/minute/blood pressure, mm Hg and Fetus movements (within 25/35 minutes) values ,while Bitter cocoa rise maternal (Mother) pulse (beat/minute/blood pressure, mm Hg, Fetus Systolic, Diastolic pulse (beat/minute/blood pressure, mm Hg & fetus movements -within 25/35- minutes) values when compared with baseline (before ) nutrition intervention.

**Key words:** bitter cacao, green tea, food intervention, pulse, diastolic pressure, fetal pressure, fetal movement.

## 1. Introduction

Although evidence from epidemiological and clinical intervention studies regarding the potential beneficial health effects of green tea polyphenols (GTP) (Sarma et al., 2008) is inconclusive and sometimes conflicting, green tea extracts (GTE) have had increasing use as ingredients of dietary supplements, beverages, and (functional) foods, which may lead to a higher consumption of GTP by the general populace. Concern has been raised as to the safety of the intake of high doses of GTP and led to the recent publication of a systematic review of the safety of GTE by the US Pharmacopeia (Bruno, 2008). Bitter cocoa in epidemiological studies, regular dietary intake of plant-derived foods and beverages was found to be associated with a reduced risk of coronary heart disease (CHD) (Hertog et al., 1995) and (Keli et al., 1996) and to be inversely associated with the risk of cardiovascular disease in general. Hertog et al., (1993) and Joshipura et al., (2001) Both Green tea and bitter cocoa contain Phytochemical ,but in this research conducting elucidate functional role of green tea and bitter cocoa when nutritional intervention on the pregnant and fetal movement only.

## 2. Material and Methods

### 2.1. Subject

Fifty four outpatient normal pregnant women volunteers, Age (year) was (30.5 ± 3.95) Mini, (27) Maxi, (39). BMI was (25.28±3.44) Mini, (19.10) & Maxi, (35.42).

### 2.3. Methods

The following laboratory studies and tests were performed.

2.3.1. Anthropometric measurements, Age (year) Weight (kg) Height (cm) BMI according (Adams et al., 2005).

2.3.2. Numbers of pregnancy carry on as questioner for all cohorts.

2.3.3 Months of pregnancy by Sonar before and after nutrition intervention an ultrasound scan was carry on according to (Lee and Park 2014).

2.3.4. Hemoglobin (g/dl) assay according (Chang et al., 2003).

2.3.4. ABO blood group assay according (Hiroki et al., 2015).

2.3.5. Rh type according to (Panel et al., 2018)

2.3.6. Mother pulse (beat/minute/blood pressure, mm Hg according to (Lee and Park 2014).

2.3.7. Fetus Systolic, Diastolic pulse (beat/minute/blood pressure, mm Hg according to (Lee and Park 2014).

2.3.8. Fetus movements (movements within 25/35 minutes) according to Kuwata et al., (2008) and (Lee and Park 2014).

2.3.2.1. Model and Sonar logistic

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### 2.2. Design Experience

2.2.1. Green tea.

All study cohorts' at second and third gestational age consumed 5gm green tea drenched in 100cm³ hot water then It was drunk at room temperature before 30 minute from test done.

2.2.2. Bitter cocoa.

All study cohorts' at second and third gestational age consumed 5gm bitter cocoa drenched in 100cm$^3$ hot water then It was drunk at room temperature before 30 minute from test done.

2.2.3. Time period. Three day was the portioned time period between both, green tea and bitter cocoa consumption test.

## 3.Results and discussion

**Table (1): Characteristics for cohort study.**

| Category | Mean ± SD | Minimum | Maximum |
|---|---|---|---|
| Age(year) | 30.5 ± 3.95 | 27 | 39 |
| Weight(kg) | 79.75 ± 8.69 | 45 | 84 |
| Height(cm) | 163.50 ± 6.65 | 150 | 177 |
| BMI | 25.28±3.44 | 19.10 | 35.42 |
| Number of pregnancy | 2 ± 1.03 | 1 | 5 |
| Months of pregnancy | 7 ± 1.36 | 6 | 9 |
| Hemoglobin(g/dl) | 10±1.06 | 9 | 14 |
| ABO blood group | (A) group ± 0.79 | (O) group 1 frequency (AB) group 7frequency | (A) group 38 frequency (B) group 9frequency |
| Rh type | Positive ± 0.29 | Negative group 5 frequency | Positive group 49 frequency |

Data illustrated in table (1): characteristic for cohort study. Clearing, Age (year) for pregnant women over 35 years old, have issues and concerns to which healthcare providers must pay attention when in professional contact with these women. In order to meet the needs of older pregnant women, healthcare providers themselves, need more information concerning the experiences of older women during pregnancy, in order to increase their understanding and knowledge of age-related pregnancy risks. Healthcare providers should remember that pregnancy can evoke a broad range of feelings in women of advanced maternal age, which can vary from happiness to anxiety, agree with (Lampinen et al., 2009).

Weight (kg), the key message is that women of normal weight should avoid gaining weight between pregnancies. In addition, overweight and obese women (body mass index ≥30) are likely to benefit from weight loss before becoming pregnant. However, while the authors have argued convincingly for a causal relation between maternal weight gain and adverse pregnancy outcomes, the advice given must be balanced to avoid weight swings in the opposite direction. The association between low body mass index and subfertility is well known. Much less publicized is the association between low body mass index or substantial weight loss and pregnancy related complications, such as preterm birth and low infant birth weight. A second cohort study evaluated the impact of changing maternal nutritional status on the risk of prematurity, and specifically whether increasing or decreasing body mass index altered this risk (Merlino et al., 2006).

Overall, women whose body mass index fell by five or more units between pregnancies had a higher risk of preterm birth than women whose weight remained

stable or who gained weight. The increased risk was particularly pronounced for women who had already experienced a preterm birth (80% v 28%). should ensure that women of low body mass index attain a healthy weight before conception to reduce the risk of preterm birth and low infant birth weight. We should also counsel women with a history of previous preterm birth to maintain an associated with preterm birth, low body mass index is one of the few modifiable risk factors, Healthy weight to prevent recurrence. In the context of the neonatal morbidity and mortality .Height (cm), Several studies observed very high rates of LBW(low birth weight) babies among mothers with height less than140cm (Gopalan ,1992 & Deshmukh et al., 1998).

Another study reported 216g-birth weight variation between short (<143 cm) and tall (>162cm) mothers (Pachauri et al., 1971)) and (Bhatia et al., 1985) noticed birth weight increased as maternal height increased. Moreover, WHO collaborative study of maternal anthropometry and pregnancy outcome recommends the use of maternal height and weight for screening in its service application (W. H .O.1995). BMI, Women with an above-normal Body Mass Index had a higher incidence of pre-eclampsia, induction of labor, caesarean section, pre-term labor, and macrosomia than women with a normal body mass index normal (Yazdani et al.,2012).

Number and Months of pregnancy, it was lead to many hazard complicated for mother and fetes including complicated in hypertension ,leg vein ,pulmonary vein according (Sawin and Morgan ,1996) . Hemoglobin (g/dl), during pregnancy, anemia increased more than fourfold from the first to third trimester (Chang et al., 2003). It is a well established fact that there is a physiological drop in hemoglobin (Hb) in the mid trimester (Kalaivani, 2009) Maternal Hemoglobin Levels during PregnancyThis physiological drop is attributed to increase of plasma volume and hence (Moghaddam and Barjasteh, 2015) decrease of blood viscosity (Carlin and Alfirevic, 2008) lead to better circulation in placenta (Tan and Tan, 2013). ABO blood group, red blood cells, ABO blood group antigens (namely, A, B, AB and O) are highly expressed by a large number of human cells and tissues including epithelia, platelets, vascular endothelia and neurons(Storry and Olsson ,2009, & Liumbruno and Franchini,2013).

For this reason, a number of investigators have addressed whether this biological characteristic of the ABO system has clinical significance beyond that in transfusion and transplantation medicine. In fact, there is now a large body of evidence supporting the notion that ABO antigens are actively involved in the pathogenesis of various systemic diseases, including neoplastic, infectious, neurological and cardiovascular disorders (Franchini and Mannucci ,2014& Dentali, et al., 2014).

While the non-O blood type-related increased circulating levels of von Willebrand factor (VWF), factor VIII (FVIII), cholesterol and several inflammatory cytokines (e.g., tumor necrosis factor-alpha, soluble intercellular adhesion molecule 1, E-select in, P-select in and interleukin-6) have been suggested as the most likely mechanisms for explaining the association between ABO blood group and arterial or venous thrombosis (Jenkins and O'Donnell, 2006 & Chen et al., 2014).

Rh type, causes Rh incompatibility was difference in blood type between a pregnant woman and her baby causes Rh incompatibility. The condition occurs if a woman is Rh-negative and her baby is Rh-positive. In conditions pregnant, blood from baby can cross into mother bloodstream, especially during delivery. If her Rh-negative and baby is Rh-positive, the body will react to the baby's blood as a foreign substance. Mother body will create antibodies proteins against the baby's Rh-positive blood. These antibodies can cross the placenta and attack the baby's red blood cells. This can lead to hemolytic

anemia in the baby. Rh incompatibility usually doesn't cause problems during a first pregnancy. The baby often is born before many of the antibodies develop. However, once you've formed Rh antibodies, they remain in mother body. Thus, the condition is more likely to cause problems in second or later pregnancies (if the baby is Rh-positive).With each pregnancy, her body continues to make Rh antibodies. As a result, each Rh-positive baby you conceive becomes more at risk for serious problems, such as severe hemolytic anemia (NHLBI, 2014).

**Table (2): A comparison mother pulse (beat/minute/blood pressure, mm Hg), after / before intervention green tea and bitter cocoa.**

| Category | Mean ± SD | Minimum | Maximum |
|---|---|---|---|
| Maternal (Mother) pulse before (beat/minute/blood pressure, mm Hg ) | 76± 2.89 | 64 | 78 |
| intervention green tea | | | |
| Maternal (Mother) pulse after (beat/minute/blood pressure, mm Hg ) | 70.5 ± 3.19 | 59 | 73 |
| intervention bitter cocoa | | | |
| Maternal (Mother) r pulse after (beat/minute/blood pressure, mm Hg ) | 83±2.79 | 71 | 85 |

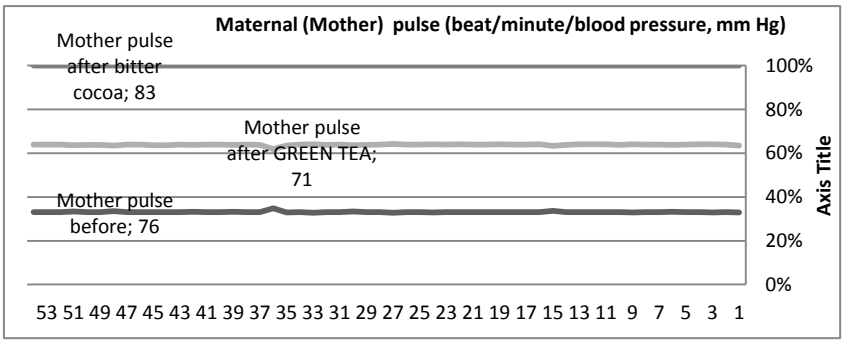


**Figure (1)**

A comparison mother pulse (beat/minute/blood pressure, mm Hg), after / before intervention green tea and bitter cocoa investigated in table (2), figure (1). (Jan al., 2009) reported that green tea consumption reduced blood pressure, value to 1- 3 mm Hg. (Geethavan et al.,2017) explained that Under resting conditions caffeine has been shown to cause increase in blood pressure and systemic vascular resistance(Janson and daniels et al.,1998). Azra et al., (2001) have shown that caffeine can change stiffness of blood vessels may be independent of blood pressure changes. They here also shown that arterial stiffness increases with caffeine and pressor effect of caffeine is predominantly on the vessel resistance rather than an increase in the cardiac output. They also claim that the increase in the sympathetic nervous system activity, serum adrenaline and rennin has been linked; the acute pressor effect is also seen in adrenelectamised patients. Caffeine with its multiple effects is (1) an adenosine receptor blocker. (2) Increasing levels of angiotensin II (3) increasing the levels of catecholamine's. an increase in the values of heart rate and blood pressure were noticed with the intake of caffeine when compared

to placebo. It has been explained due to the above said multiple effects of caffeine. Caffeine with its multiple effects is (1) an adenosine receptor blocker. (2) Increasing levels of angiotensin II (3) increasing the levels of catecholamine's. In the present study, an increase in the values of heart rate and blood pressure were noticed with the intake of caffeine when compared to placebo. It has been explained due to the above said multiple effects of caffeine (Janson et al., 1998). (Ana et al., 2015) reported that bitter cocoa containing caffeine 3.4%.

**Table (3): A comparison fetus pulse (beat/minute/blood pressure, mm Hg), after / before intervention green tea and bitter cocoa.**

| Category | Mean ± SD | Minimum | Maximum |
|---|---|---|---|
| Fetus Systolic pulse before (beat/minute/blood pressure, mm Hg ) | 118±1.33 | 112 | 121 |
| Fetus Diastolic pulse before (beat/minute/blood pressure, mm Hg ) | 69±1.59 | 65 | 71 |
| intervention green tea | | | |
| Fetus Systolic pulse before (beat/minute/blood pressure, mm Hg | 113± 1.54 | 107 | 116 |
| Fetus Diastolic pulse before (beat/minute/blood pressure, mm Hg ) | 68±2.89 | 64 | 70 |
| intervention bitter cocoa | | | |
| Fetus Systolic pulse before (beat/minute/blood pressure, mm Hg | 131±2.44 | 125 | 134 |
| Fetus Diastolic pulse before (beat/minute/blood pressure, mm Hg ) | 71±1.80 | 67 | 73 |

Data tabulated in Table (3) clear that A comparison fetus pulse (beat/minute/blood pressure, mm Hg), after / before intervention green tea and bitter cocoa. Information on gestational hypertensive complications was obtained from medical records. Data about women who were suspected of having hypertensive complications during pregnancy on the basis of these records were cross-checked with the original hospital charts (Coolman et al., 2010). The women with no previous history of hypertension who had a systolic blood pressure of 140 mm Hg or higher and/or a diastolic blood pressure of 90 mm Hg or higher were considered to have gestational hypertension. These criteria plus the presence of proteinuria (defined as 2 or more dipstick readings of 2 or greater, 1 catheter sample reading of 1 or greater, or a 24–hour urine collection containing at least 300 mg of protein) were used to identify women with preeclampsia (Brown et al., 2001). A normal fetal heart rate (FHR) usually ranges from 120 to 160 beats per minute (bpm) in the *in utero* period. It is measurable sonographically from around 6 weeks and the normal range varies during gestation, increasing to around 170 bpm at 10 weeks and decreasing from then to around 130 bpm at term.

Although the myocardium begins to contract rhythmically by 3 weeks after conception (from spontaneously depolarizing myocardial pacemaker cells in the embryonic heart) it is first visible on sonography around 6 weeks of gestation. The FHR is then usually around 100 to 120 beats per minute (bpm).FHR then increases progressively over the subsequent 2-3 weeks becoming (Gupta and Angtuaco 2007):~110 bpm (mean) by 5-6 weeks~170 bpm by 9-10 weeks This is followed by a decrease in FHR becoming on average:~150 bpm by 14 weeks~140 bpm by 20 weeks~130 bpm by term Although in the healthy fetus the heart rate is usually regular, a beat-to-beat variation of approximately 5 to 15 beats per minute can be allowed. Related pathologyA slow fetal heart rate is termed a fetal radycardia and is usually defined as ( Merz and Bahlmann, 2005).FHR <100 bpm before 6.3 weeks gestation, or FHR <120 bpm between 6.3 and 7.0 weeks (et al.,1988& Bickhaus et al.,2013) . intervention green tea Fetus Systolic pulse before (beat/minute/blood pressure, mm Hg) and Fetus Diastolic pulse before (beat/minute/blood pressure, mm Hg) lead to lowering rate while, intervention bitter cocoa lead to raise rate Fetus Systolic pulse before (beat/minute/blood pressure, mm Hg) and Fetus Diastolic pulse before (beat/minute/blood pressure, mm Hg) value in table (3) agree with (Rachel et al., 2011).

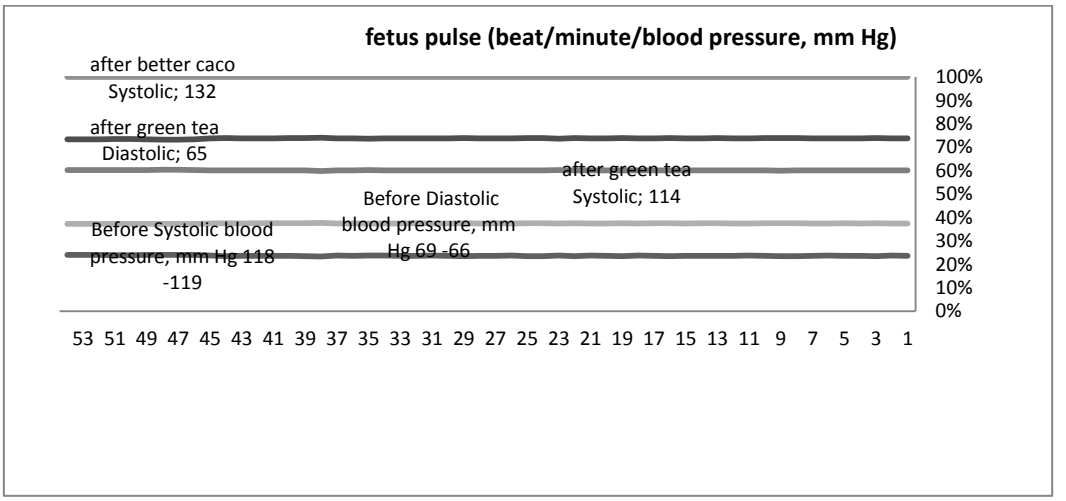


**Figure (2)**

**Table (4 ): A comparison fetus movements before (movements within 25/35 minutes) after / before intervention green tea and bitter cocoa.**

| Category | Mean ± SD | Minimum | Maximum |
|---|---|---|---|
| Fetus movements before (movements within 25/35 minutes) | 10 ± 1.44 | 10 | 14 |
| intervention green tea | | | |
| Fetus movements after | 6±1.33 | 6 | 10 |
| intervention bitter cocoa | | | |
| Fetus movements after | 16±1.22 | 16 | 20 |

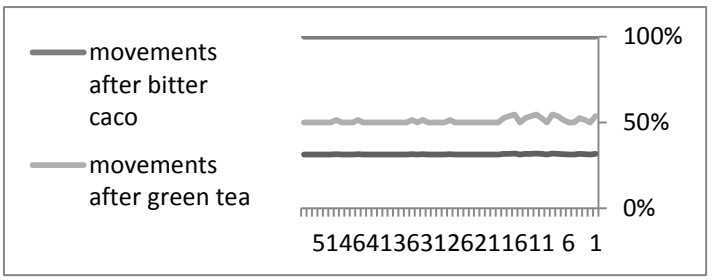


**Figure (3)**

Many studies found the mean time to perceive ten movements to be shorter than the average of 20 minutes reported in earlier studies (Valentin et al., 1984, Moore & Piacquadio 1989 and Smith et al., 1992). Our results are closer to the median of 10–14 minutes reported in a recent study, where mothers were also instructed to count at a time of the day when they knew that the baby was usually active. Kuwata et al., (2008).More importantly, we found FM to remain constant throughout gestation in normal pregnancies when measured during active periods (Figure 3). The <2 minutes increase in mean counting time was statistically significant at the population level, although it is likely of limited clinical usefulness within the concept of the 'count-to-ten' method for the individual woman. Previous studies have reported divergent results: (i) FMs decrease significantly from 32 weeks of gestation towards delivery; Ehrstrom , (1979), Kuwata et al., (2008)and 13 Pearson and Weaver (1976) (ii) FMs decrease, but not predictably, in each woman; Leader et al., (1981) or (iii) FMs remain constant. Birger et al., (1980), Pearson and Weaver (1976) and Rayburn and McKean (1980) the most credible explanation for these divergences lies in the counting method. A distinctive feature with the refined 'count-to-ten' protocol is the proper recognition that periods of fetal quiescence vary during the day, (Ehrstrom, 1984) during the third trimester. Ten et al., (2002) Therefore, both intraday and gestational age variability are duly accounted for.

## Conclusion

Green tea, lower maternal (Mother) pulse (beat/minute/blood pressure, mm Hg, Fetus Systolic, Diastolic pulse (beat/minute/blood pressure, mm Hg and Fetus movements (within 25/35 minutes) values ,while Bitter cocoa rise Mother pulse (beat/minute/blood pressure, mm Hg, Fetus Systolic, Diastolic pulse (beat/minute/blood pressure, mm Hg &fetus movements -within 25/35- minutes) values when compared with baseline (before) nutrition intervention.

## Acknowledgement

Great thanks for doctor Fekryelhossany consulter genecology and Ex-director hospital ELmoallmen Ministry of Health Shebin Elkom Menofia .governorate. Egypt. For his cooperative and cases diagnosis.

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# توضيح الدور الوظيفي للشاي الأخضر والكاكاو المر عند التدخل الغذائي على الحامل والحركة الجنينية.

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**الملخص** : لأن بيانات العديد من الأبحاث غير حاسمة وأحيانا متضاربة وهو ما دفع مؤلف هذا العمل لإلقاء الضوء على الدور الوظيفي للشاي الأخضر والكاكاو المر عند التدخل الغذائي على الحامل والحركة الجنينية.أربعة وخمسين من الحوامل المتطوعات من العيادات الخارجية ، العمر (السنة) كان (30.5 ± 3.95) الحد الادنى ، (27)الحد الاقصى، (39). كان مؤشر كتلة الجسم (25.28 ± 3.44) الحد الادنى (19.10) و الحد الاقصى (35.42).تم إجراء الدراسات والاختبارات المخبرية التالية. القياسات الأنثروبومترية ، العمر (سنة) الوزن (كجم) الطول (سم) BMI ، عدد مرات الحمل تم استبيانه بسؤال الام. أشهر الحمل قدرت من قبل الموجات فوق السمعية قبل وبعد التدخل الغذائي ، نبض الأم (نبض / دقيقة / ضغط الدم ، مم زئبق ، ضغط الدم الانقباضي ، نبض القلب الانبساطي (نبض / دقيقة / ضغط الدم ، مم زئبق وحركات الجنين (في غضون 35/25 دقيقة ) قدر ايضا بالموجات فوق السمعية.تم تقدير الهيموجلوبين (g / dl) ، مجموعة دم ABO ، نوع Rh. اوضحت النتائج أن الشاي الأخضر ، ادى لإنخفاض قيم نبض الأم والجنين (نبض / دقيقة / ضغط الدم ، مم زئبق ، ضغط الدم الانقباضي ، نبض الانبساطي (ضربات / دقيقة / ضغط الدم ، ملم زئبق) وحركات الجنين (في غضون 35/25 دقيقة) ،بينما ادى الكاكاو المر الى ارتفاع قيم نبض الأم والجنين (نبض / دقيقة / ضغط الدم ، مم زئبق ، ضغط الدم الانقباضي ، نبض الانبساطي (ضربات / دقيقة / ضغط الدم ، ملم زئبق) وحركات الجنين (في غضون 35/25 دقيقة) ،القيم عند مقارنتها مع خط الأساس (قبل) تدخل التغذية

**كلمات البحث:** الكاكاو المر،الشاى الأخضر، التدخل الغذائى،نبض ،ضغط انبساطى ،ضغط انقباضى،حركة الجنين