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Research Paper

# Assessment of iron and calcium supplements compliance among pregnant women attending antenatal care unit of Al-Sabah Banat primary health care unit in Ismailia, Egypt

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## ABSTRACT

Compliance of pregnant women with iron and calcium supplements is very important as it had a large effect on the mothers and their fetuses. There are causes of noncompliance such as forgetfulness and side effects. This study aimed to asses' compliance of pregnant women to calcium (Ca) and iron (Fe) supplements during pregnancy to decrease health problems resulting from deficiency of these minerals for mothers and fetuses. This is a cross sectional study which asses the compliance and factors of non-compliance with Ca and Fe supplements among a convenient sample of pregnant women attending Al-Sabah Banat primary health care unit. One hundred subjects were interviewed by using self-administered questionnaire including data about socio-demographic characteristics, compliance (knowledge attitude practice) and factors of non-compliance including adverse effects. The mean age of the participants was 27.25 ± 5.491 years. In the sample population, 83% of the women lived in rural areas. The highest percentage was technical graduate (34%) while the lowest percentage was primary graduate (9%). Most of the samples were housewife's (80%), 95% of the sample knew about Fe supplements while 83% were compliant with it. The most present factor of non-compliance was constipation (35%) and the headache was the lowest present factor, only 3%. We found that 90% knew about Ca supplements. Most of the samples were compliant with Ca (82%). The most present factor was constipation (53.1%), while urticaria, flatulence and non-availability of Ca were the lowest present factors, only (6.1%). We found that 55% of population takes Ca and Fe according to the schedule. Non-compliance with Ca and Fe supplements during pregnancy is high. The most present factor for non-compliance with Ca was constipation, while urticaria, flatulence and non-availability of Ca were the lowest present factors. The most present factor for non-compliance with Fe was constipation and the headache was the lowest present factor.

**Key Words:** Calcium, compliance, iron, pregnancy, factors for noncompliance.

**Abbreviation: RDA**: Recommended Dietary Allowance, **Ca**: Calcium, **Fe**: Iron, **RR:** Relative Risk, **CI:** Confidence Interval.

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## INTRODUCTION

Every year more than 20 million infants are born with low birth weight worldwide. About 3.6 million infants die during the neonatal period. Two thirds of these deaths occur in southern Asia and sub-Saharan Africa. More

than one third of child deaths are thought to be attributed to maternal and child under nutrition (Kawai et al., 2011)
Deficiencies in micronutrients such as folate, iron and zinc and vitamins A, B6, B12, C, E and riboflavin are highly prevalent and may occur concurrently among pregnant women (Zerfu and Ayele, 2013).
During pregnancy, women need more iron to support the increased maternal red blood cell mass. This supplies the growing fetus and placenta, and supports normal brain development in the fetus. In the third trimester of pregnancy, the fetus builds iron stores for the first six months of life. Hemoglobin mass changes very little during the first trimester of pregnancy. However, it expands greatly during the second and third trimesters. This means, as pregnancy progresses, women need more iron. The Recommended Dietary Allowance (RDA) for iron during pregnancy is 27mg per day. This is the average amount of iron most healthy pregnant women need each day to meet their iron needs. The RDA is set at a level that lets women begin storing iron early in their pregnancy. That way, they build up the iron they'll need to take them through their third trimester (Hercberg, 2009).
Inadequate dietary Ca intakes during pregnancy and lactation may affect pregnancy outcome, locational performance, and child growth. There is little evidence, however, of specific clinical problems associated with low dietary Ca intakes, and few studies have investigated the influence of maternal calcium intakes on breast-milk calcium secretion or infant bone growth (Prentice, 1994).
Adaptation to low intakes and adjustments to increased requirements may take place by changes in Ca absorption and excretion. Mobilization of Ca from maternal bone could support fetal growth and breast-milk production if Ca intakes were insufficient. Changes in maternal bone mineral content and in Ca absorption, excretion, and metabolism have been observed, but it is not known to what extent these changes are normal physiological modifications or is a response to insufficient dietary Ca supply. The consequences of these changes for maternal health in the short or long term are not known. The evidence that bone changes accompanying pregnancy and lactation may increase the risk of osteoporosis is inconclusive. The incidence of hypertensive disorders in pregnancy may be reduced by high doses of Ca salts but whether this effect could be achieved by increasing dietary intakes needs investigation (Prentice, 1994).
Hofmeyr et al. (2007) in a systematic review of twelve studies (included 15,528 women) all of good quality, cleared that most women had low dietary calcium. High blood pressure was reduced with calcium supplementation rather than placebo (11 trials, 14,946 women: relative risk [RR] random effects model 0.70; 95% CI 0.57-0.86), as was pre-eclampsia (12 trials, 15,206 women: RR 0.48; 95% CI 0.33-0.69). The effect was greatest for women at high risk (five trials, 587 women: RR 0.22; 95% CI 0.12-0.42) and for those with low baseline calcium intake (seven trials, 10,154 women: RR 0.36; 95% CI 0.18-0.70). There was heterogeneity, with less effect in the larger trials. The composite outcome maternal death or serious morbidity was reduced (four trials, 9,732 women: RR 0.80; 95% CI 0.65-0.97). The syndrome of haemolysis, elevated liver enzymes and low platelets was increased (two trials, 12,901 women: RR 2.67; 95% CI 1.05-6.82). There was no overall effect on the risk of preterm birth or stillbirth or death before discharge from hospital.
From all of the above it's clear that both iron and calcium are essential during pregnancy period for the health of mother and fetus. So, this study aimed to find out the compliance and determinants of compliance to iron and calcium supplementation among pregnant females attending Al-Sabah Banat primary health care unit in Ismailia, Egypt.

## METHODOLOGY

### Study Design

A cross sectional study was carried out to assess iron and calcium supplements compliance of pregnant women attending antenatal care unit of Al-Sabah Banat primary health care unit.

### Study setting

The study was conducted in antenatal care unit of Al-Sabah Banat primary health care unit in Ismailia, Egypt. The unit was chosen by convenient technique.

### Study Subjects

Pregnant women attending antenatal care unit of Al-Sabah Banat primary health care unit in Ismailia.

### Inclusion criteria

Pregnant women attending the chosen antenatal care unit and accepted to participated in this study.

### Exclusion criteria

No exclusion criteria.

### Sample Size and Sampling Technique

Our cross sectional study was conducted on one hundred pregnant women at attending antenatal care of Al-Sabah Banat primary health care unit in Ismailia. They were enrolled in the study through a convenient sample.

**Table 1.** Age characteristics of the studied sample.

| | Range | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| **Age (year)** | 17-38 | 17 | 38 | 27.25 | 5.491 |

**Table 2.** Frequency distribution of residence of the sample.

| Address | Number | Percent |
|---|---|---|
| Rural | 83 | 83 |
| Urban | 17 | 17 |
| Total | 100 | 100 |

**Table 3.** Frequency distribution of educational level of the sample.

| Educational level | Frequency | Percent |
|---|---|---|
| Illiterate | 14 | 14 |
| Primary | 9 | 9 |
| Preparatory | 16 | 16 |
| Secondary | 15 | 15 |
| Technical | 34 | 34 |
| University | 12 | 12 |
| Total | 100 | 100 |

**Table 4.** Frequency distribution of knowledge of study subjects about iron.

| Knowledge about iron | Frequency | Percent |
|---|---|---|
| Females knowing about iron supplements | 95 | 95 |
| Females knowing about iron importance | 95 | 95 |
| Females ready to attend a seminar about iron | 76 | 76 |
| Females ready to take iron despite side effects | 72 | 72 |

Each participant could choose more than one answer.

**Table 5**. Frequency distribution of compliance of study population with iron.

| Compliance with iron | Frequency | Percent |
|---|---|---|
| Never | 17 | 17 |
| Partially | 29 | 29 |
| Strictly | 54 | 54 |
| Total | 100 | 100 |

### Statistical Analysis

The data were collected, filtered, coded and entered into the computer on an excel sheet. The SPSS program (version 16) was used for data analysis. Data are presented in the form of tables.

## RESULTS

### Socio-demographic characteristics of study sample.

Table 1 shows the demographic of the study sample. The total number of sample was 100.Table 2 showed that (83%) of the sample live in rural areas, while (17%) live in urban areas. It can be noticed, from table (3), that the highest percentage of the study group is technical graduate (34%) and preparatory graduate (16%), while the lowest percentage was primary graduate (9%).

### Compliance of study sample with iron

On asking study subjects about iron, table 4 showed that (95%) know about iron supplements and its importance, while (76%) ready to attend a seminar about iron and (72%) were ready to take iron supplements despite its side effect. Table 5 showed that most of the samples were strictly compliant with iron (54%), while (29%) were partially compliant, and (17%) were never compliant. Table 6 showed that the most present factor was

**Table 6.** Frequency distribution of common factors of never or partially compliant of the study subjects with iron.

| Factors | Frequency | Percent |
|---|---|---|
| High cost | 6 | 13.04 |
| Non availability | 5 | 10.87 |
| constipation | 35 | 76.1 |
| diarrhea | 5 | 10.87 |
| Nausea | 10 | 10 |
| vomiting | 12 | 12 |
| Heartburn | 6 | 13.04 |
| Stomach pain | 8 | 8 |
| Headache | 3 | 9.5 |
| Unusual taste in mouth | 6 | 13.04 |
| Forget | 5 | 10.87 |
| Ignorance | 9 | 9 |
| First visit | 11 | 11 |

Each participant could choose more than one answer.

**Table 7.** Frequency distribution of assessment of knowledge of study subjects about calcium.

| Knowledge about calcium | Frequency | Percent |
|---|---|---|
| Females knowing about calcium supplements | 90 | 90 |
| Females knowing about calcium importance | 89 | 89 |
| Females ready to attend a seminar about calcium | 66 | 66 |
| Females ready to take calcium despite side effects | 58 | 58 |

Each participant could choose more than one answer.

constipation (76.1%) and the headache was the lowest present factor, only (9.5%).

### Compliance of study sample with calcium

On asking study subjects about calcium, table 7 showed that (90%) know about calcium supplements and (89%) know about its importance, while (66%) ready to attend a seminar about calcium and (58%) were ready to take calcium supplements despite its side effects. Table 8 showed that most of the samples were strictly compliant with calcium (51%), while (31%) were partially compliant, and (18%) were never compliant. Table 9 showed that the most present factor was constipation (53.1%), while urticarial, flatulence and non-availability of calcium were the lowest present factors, only (6.1%).

### Attitude of strictly compliant study subjects with iron and calcium

Table 10 showed that (55%) of population take calcium and/or iron according to the schedule, (12%) took them together, and (78%) took them on full stomach. Table 11 shows the maximum number of hours between taking iron and calcium was 12, while there were some women taking iron and calcium together. The mean time was 4.10 ± 3.280 hour (Range: 0-12 hour). Table 12 showed that most of study subjects (91%) do not know about elements interfering with calcium and iron absorption

## DISCUSSION

Regarding Fe, this study showed that the knowledge of Fe supplementation was 95% and that was different to some extent from a study which has been conducted in Enugu, southeastern Nigeria and has revealed that the knowledge of Fe supplementation was only 76.3% and this difference may be due to verity in educational level in the two samples (Ugwu et al., 2014).

According to a study that was carried out in the Lady Goschen Hospital and Kasturba Medical College Hospital Attavar in Mangalore, 73.2% of the study population were aware about the importance of Iron-Folic Acid (IFA) tablets. This variation in results may be due to difference in surrounding environment and education of two populations (Mithra et al, 2014).

The major barrier in this study was constipation (76.1%) as a side effect, non-affordability (13.04%) and forgetfulness (10.87%) and this disagree with the results of a study that was conducted in Enugu, southeastern Nigeria in which the major barriers to compliance to Fe supplementation include gastrointestinal side effects of Fe supplements (41.7%), non-affordability of Fe supplements (28.3%), and forgetfulness (15.0%) among

**Table 8**. Frequency distribution of compliance of study population with calcium.

| Compliance with calcium | Frequency | Percent |
|---|---|---|
| Never | 18 | 18 |
| Partially | 31 | 31 |
| Strictly | 51 | 51 |
| Total | 100 | 100 |

**Table 9.** Frequency distribution of common factors of never or partially compliant of the study subjects with calcium.

| Factors | Frequency | Percent |
|---|---|---|
| High cost | 5 | 10.2 |
| Non availability | 3 | 6.1 |
| Constipation | 26 | 53.1 |
| Diarrhea | 8 | 8 |
| Nausea | 11 | 11 |
| Flatulence | 3 | 6.1 |
| Abdominal pain | 8 | 8 |
| Dyspepsia | 6 | 6 |
| Rash | 5 | 10.2 |
| Urticaria | 3 | 6.1 |
| Forget | 7 | 7 |
| Ignorance | 6 | 6 |
| First visit | 5 | 10.2 |

Each participant could choose more than one answer.

**Table 10.** Frequency distribution of attitude of study subjects with calcium and iron.

| Attitude with iron and calcium | Frequency | Percent |
|---|---|---|
| Females compliant with schedule | **55** | **55** |
| Females taking calcium and iron together | **12** | **12** |
| Females taking calcium and iron on full stomach | **78** | **78** |

Each participant could choose more than one answer.

**Table 11.** Intervals characteristics between taking iron and calcium by the studied subjects.

| Interval | Range | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Number of hours | 0-12 | 0 | 12 | 4.10 | 3.280 |

the antenatal mothers (Ugwu et al., 2014). The lower percentage of non-affordability of Fe supplements in this study is as a result of the primary health care (PHC) unit making Fe supplements available for free.

The present study revealed that the compliance rate for iron was 54% while the compliance rate of Fe supplementation by pregnant mothers in a study that was conducted in Enugu was 65.9% (Ugwu et al., 2014). This variation in percentage may be due to the difference in thoughts about importance of Fe In this study the compliance rate for iron was 54%, while the overall compliance towards IFA tablets among the subjects is 64.7%. In the study that was carried out in Lady Goschen Hospital and Kasturba Medical College Hospital Attavar in Mangalore. This variation may refer to difference in sample size and living conditions in both studies (Mithra et al., 2014).

Regarding Ca, the compliance rate was 51% while in a study that was carried at in two hospitals in the Greater São Paulo region, Brazil, out of 250 pregnant women interviewed, 10.40% had received a prescription for Ca supplementation and compliance rate was 80.76% of them. This difference may be due to difference in educational level and environmental conditions (Silva et al., 2010).

In this study the compliance was 54% while in a study that was conducted in multicenter serves populations with Ca consumption of 600mg per day located in

**Table 12**. assessment of population knowledge about elements interfering with calcium and iron absorption.

| knowledge about elements interfering with calcium andiron absorption | Frequency | percent |
|---|---|---|
| know about elements interfere with calcium and iron absorption | 9 | 9 |
| know about elements interfere with calcium and iron absorption | 91 | 91 |

Rosario, Argentina; Assiut, Egypt; Nagpur and Vellore, India; Lima, Peru; East London and Johannesburg, South Africa (both considered as 1 study site for co-ordination purposes) and Ho Chi Minh City, Viet Nam, compliance was 85%. The difference is due to variation in sample size as their sample size was 8,325 chosen by a random sample method (Villar et al., 2006).

## Conclusion

Almost all pregnant women attending Al-Sabah Banat primary health care unit are aware that Ca and Fe supplementation is important during their pregnancy; however they have defects in their compliance with these supplementations.

Almost half of the samples were strictly compliant with Ca (51%) and Fe (54%). Most of the other half was partially complaint due to factors as constipation, vomiting, diarrhea, heart burn and stomach pain.

Almost half of pregnant women took Ca and Fe according to the schedule, and low percentage of them took Ca and Fe together without an interval and most of them took supplementation on full stomach.

Most women in the sample did not know about elements interfering with Ca and Fe absorption.

## RECOMMENDATIONS

i.)The awareness and compliance of pregnant females toward iron and calcium supplements should be improved.

ii.) Health educational sessions should be introduced to the pregnant women about the importance of vitamin and mineral supplementations especially iron and calcium and rural areas should be given more attention.

iii.) Programs regarding nutritional health education can give excellent results if included on TV programs so as to reach and provide house wives with the proper and correct information.

iv.) During antenatal visits, the significance of calcium and iron supplementation should be repeatedly explained and enforced.

v.) More studies should be done to confirm the findings of the present study, which will help to expand the population knowledge base.

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