Adherence to Iron, Folic Acid and Calcium Supplement and Factors Affecting it among the Antenatal Care Attending Women in a Tertiary Care Hospital: A Cross Sectional Study

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ABSTRACT

Background

Pregnancy or gestation is the time during which a single or more children grows and develops inside a woman. Antenatal care improves the pregnancy outcomes under which a group of medication i.e. iron, folic acid and calcium are supplemented. Despite the effectiveness of such supplements, poor clinical outcomes are often encountered because of poor-adherence to the regimen.

Objective

To determine the adherence pattern and factors affecting adherence in antenatal care patients under iron, folic acid, and calcium therapy.

Method

A cross-sectional study was conducted in Dhulikhel Hospital, Kathmandu University Hospital. Pregnant women attending antenatal care under iron, folic acid, and calcium therapy fulfilling the inclusion criteria were enrolled in this study. After obtaining the informed consent from the patients, structured questionnaire was used to interview the patients. Statistical analysis was performed by using SPSS 23.0. P-value < 0.05 was considered as statistically significant.

Result

Among 191 patients enrolled in this study majority (39.3%) of them belonged to age group 26-30 years. More than half (61.3%) of the patients were illiterate. Of the total 191, 64.40% were non-adherent to the medication. Forgetfulness was the main reason for missing the dose in majority (52.06%) of the non-adherent subjects while adverse effects (55.40%) was the most prominent cause for discontinuing the medication among non-adherent participants. Significant association was found between patients' adherence and busy work schedule, visiting doctor for follow up.

Conclusion

More than half of the patients had not adhered to the medication under antenatal care. Forgetfulness was the most common factor for missing the dose in non-adherent patients. Illiteracy was associated with poor adherence. Patient-provider relationship, Socio-economic factors were determined as major barrier to medication adherence.

KEY WORDS

Adherence, Antenatal care, Calcium, Dhulikhel hospital, Folic acid, Iron

INTRODUCTION

Neonatal period is the most vulnerable period in a child.[1] Every year number of children are born with low birth weight all around the world.[2] Most of them die and the related cause is considered as maternal and child under nutrition.[2] Micronutrient deficiencies are usually common during pregnancy in developing countries like Nepal.[3,4] The lack of their supplement results in a large number of pregnant women prevalent with anemia and other clinical manifestations.[4]

During pregnancy, more iron, folic acid and other micro-nutrients such as calcium and multivitamins are required to uphold the increased red blood cell (RBC) mass and the proper growth and development of the fetus.[2] The progression of pregnancy causes a high need for these nutrients.[5] Thus, World health Organization (WHO) recommends supplementation of iron and other micronutrients.[2]

A key determinant to success of micronutrient supplementation especially is how well the participants adhere to these treatment supplement regimen.[6,7] To date, data on adherence pattern and factors associated with adherence to iron, folic acid and calcium supplements has not been documented in Nepal. Therefore, our study attempted to address the medication adherence pattern and factors associated with it among pregnant women attending antenatal care under iron, folic acid and calcium supplementation.

METHODS

A cross-sectional study was conducted in the Dhulikhel Hospital, Kathmandu university Hospital after an ethical approval from Institutional Review Committee, Kathmandu University School of Medical Sciences (IRC-KUSMS). This study was carried out among one hundred and ninetyone pregnant women. Pregnant women under medication (IFA and calcium) for about at least a month or more attending antenatal care unit in Department of obstetrics and gynecology, Dhulikhel Hospital who agreed to participate in the study by giving a written consent to the study were included in this study. Pregnant women who had discontinued medication at some point of time but have restarted the medication were also enrolled. The enrolled pregnant women were then interviewed using semi-structured questionnaire.

Questionnaire related to patients' socio-demographics, patients' medication history were recorded. Adherence was measured using structured questionnaire which included question related to missing dose, discontinuation of dose, with its duration and various reasons. For determining various affecting factors to adherence pattern, questions based on patients' factor, socio-economic factor, health system related factor, treatment-related factor and condition related factor were asked to participating patients. Adherence was recorded in such a way that patients missing more than 2 doses were considered as non-adherent and patients missing less than 2 doses or not missing single dose were referred as adherent. Similarly, patients who missed medication dose for more than 7 days were considered as the discontinuing patients.

Collected data was entered and analyzed in Statistical Package for Social Sciences (SPSS) software version 21.0. The quantitative data was expressed in percentages and mean ± standard deviation (SD) and presented with the help of relevant tables, charts, and bargraphs. The qualitative data was analyzed using Pearson's Chi-square test. The p value < 0.05 was considered to be statistically significant.

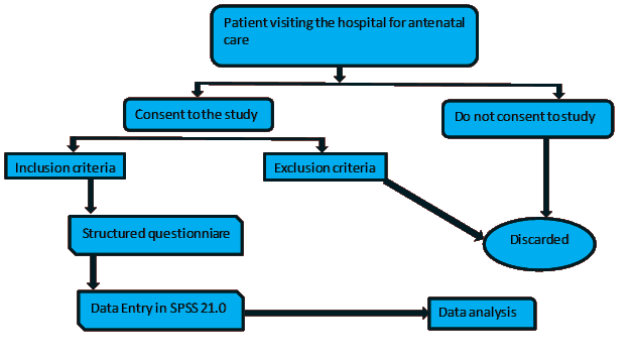

Figure 1. Flow chart showing working procedure of the study.

RESULTS

A total of 191 pregnant women participated in this study. The mean (± SD) age was 25.98 years (± 4.4) and the majority of the patients (143, 74.9%) were between 20-30 years of age. Among them, 117, 61.3% were illiterate and remaining 74, 38.7% were literate. Similarly, 105, 55.0% were at their 3rd trimester, 75, 39.3% at their 2nd trimester, 11, 5.8% at their 1st trimester of pregnancy.

In our study, 143, 74.9% of pregnant women were under folic acid, iron and calcium supplements; 28, 14.7% were taking iron and calcium only, 12, 6.3 % were consuming iron and their folic acid dosage was completed; 7, 3.7% of them were taking folic acid only and 1 (0.5%) was prescribed with iron only. Majority of the participants (48, 25.2%) were under medications for more than 8 months. The details of use of medications are shown in Table 1.

As shown in figure 2, majority of the patients (123, 64.4%) were non adherent to medication while 68 (35.6%) of them were adherent to medication. Among non-adherent participants, 63, 52.1% of the patients had missed the dose due to forgetfulness. Out of 191 participants, 18, 9.4% had discontinued the medication of which 10 (55.6%) discontinued the medication due to adverse effects of medicines. Half the number of enrolled patients (9, 50.0%) who discontinued the medications did so for 1-10 days. (Table 2). The most common adverse effects reported was gastrointestinal distress (58, 63.72%). (fig. 3)

Table 1. Details of medications used among 191 participants

Variables	No. of Patients (%)
Medication	
Iron+Folic acid+Calcium	143(74.9)
Iron+Calcium	28(14.6)
Iron+Folic acid	12(6.3)
Folic acid	7(3.7)
Iron	1(0.5)
Duration of medication	
1-2 months	39(20.4)
2-4 months	67(35.1)
4-6 months	21(10.9)
6-8 months	16(8.4)
8-10 months	48(25.2)

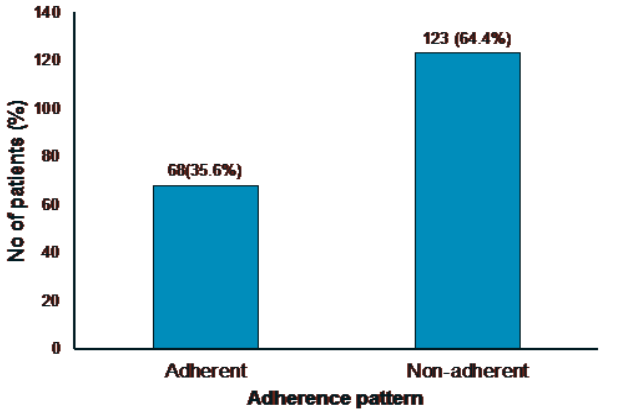

Figure 2. Bar-diagram showing adherence pattern among 191 participants

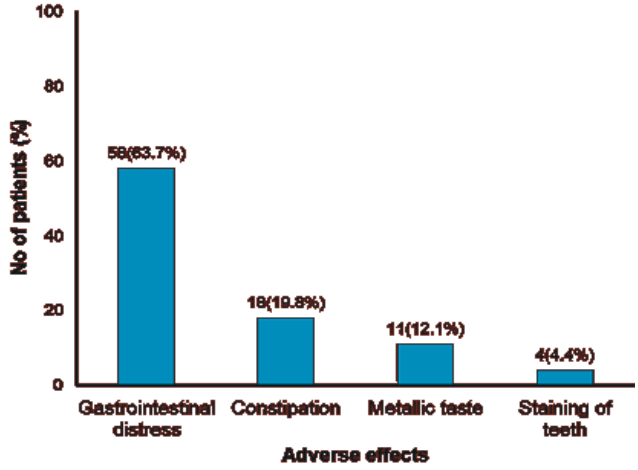

Figure 3. Bar-diagram showing adverse effects among 91 participants

Further, our study revealed significant associations of patients' adherence with their busy work schedule and their regular visit to doctor for follow up. However, significant association was not found between adherence and patients' age, literacy, knowledge about medications, medicine affordability and accessibility, special attention from doctor, adverse effects, duration of medications and concomitant drugs (Table 3).

Table 2. Adherence pattern among 191 patients

Characteristics	No. of Patients (%)
Patient who had missed the dose (n=121)	
Missing frequency	
Sometimes	117(96.6)
Often	4(3.4)
Reason behind missing the dose (n=121)	
Forgetfulness	63(52.1)
Carelessness	29(24.0)
During travelling	6(4.9)
Adverse effects	18(14.9)
Others*	5(4.1)
Patients who had discontinued the medication (n=18)	
Reasons for discontinuation	
Adverse effects	10(55.6)
Mis-guiduance from relatives	2(11.0)
Duration of treatment	1(5.5)
Carelessness	1(5.5)
Others**	4(22.4)
Duration of discontinuation	
1-10 days	9(50.0)
11-20 days	3(16.7)
21-30 days	2(11.1)
31-40 days	4(22.2)

*Medicine out of stock and/or patients inable to reach hospital in time
**Distant pharmacy, medicine out of stock, feeling of uneasiness, unaware about the presciption

DISCUSSION

Non-adherence has been reported as a major problem in management of medication during pregnancy and other acute as well as chronic conditions.[8] It is essential to identify the determinants of poor adherence trailing to different outcomes during the pregnant women's medication period.[8-11]

Majority of the women in the study belonged to age group 20-30 years possibly because women from this age are more prone to child bearing. The first child of most women were reported at this age as documented in the Nepal demographic and health survey.[12] This finding is also consistent with several other studies conducted for the study of micronutrients supplements during pregnancy.[5,8,13,14] This study suggests that the rate of pregnancy decreases with increasing age.[3,11]

In this study, more than half of the participants were non-adherent to the iron, folic acid and calcium supplementation. Similar result was obtained in a study where only 40.9% of the participants taking iron-folic acid supplement were adherent to the medication.[4] In contrast to the finding of this study, other studies, reported more than 60% of the participants to be adherent to

Table 3. Demographic and other characteristics of 191 patients with regards to adherence

Characteristics	No. of patients (%)	Adherent[α] (n=58) N (%)	Non-adherent[β] (n=55) N (%)	p-value
Age (Years)				
<20	27(14.1)	8(29.6)	19(70.4)	0.775
20-25	65(34.0)	27(41.5)	38(58.5)	
26-30	75(39.3)	25(33.3)	50(66.7)	
31-35	20(10.5)	7(35.0)	13(65.0)	
36-40	4(2.1)	1(25.0)	3(75.0)	
Literacy				
Literate	74(38.7)	23(31.1)	51(68.9)	0.299
Illiterate	117(61.3)	45(38.5)	72(61.5)	
Knowledge about the medication				
Yes	145(75.9)	52(35.9)	93(64.1)	0.894
No	46(24.1)	16(34.8)	30(65.2)	
Medication affordability				
Yes	191(100.0)	68(35.6)	123(64.4)	
No	0 (0.0)	0(0)	0(0)	
Medication accessibility				
Yes	190(99.5)	68(35.8)	122(64.2)	0.229
No	1(0.5)	0(0)	1(100)	
Busy work schedule				
Yes	67(35.1)	10(14.9)	57(85.1)	0.000012
No	124(64.9)	58(46.8)	66(53.2)	
Regular visit to doctor for follow-up				
Yes	189(98.9)	66(34.9)	123(65.1)	0.041
No	2(1.1)	2(100)	0(0)	
Special attention from doctor				
Yes	185(96.9)	64(3.6)	121(65.4)	0.185
No	6(3.1)	4(66.7)	2(33.3)	
Adverse Effects				
Yes	91(47.6)	31(34.07)	60(65.93)	0.672
No	100(52.4)	37(37.0)	63(63.0)	
Duration of medication				
1-2 months	39(20.4)	13(33.3)	26(66.7)	
2-4 months	67(35.1)	25(37.3)	42(62.7)	
4-6 months	21(11.0)	20(95.2)	1(4.8)	0.367
6-8 months	16(8.4)	9(56.3)	7(43.7)	
8-10 months	48(25.1)	1(2.1)	47(97.9)	
Concomitant drugs use				
<3	173(90.6)	62(35.8)	111(64.2)	0.227
≥3	18(9.4)	6(33.3)	12(66.7)	

[α]Patients who had never missed or discontinued the medication
[β]Patients who had missed or discontinued the medication

the prenatal medication.[5] The most common cause for missing the dose and discontinuation of medications were forgetfulness and adverse effects respectively. This finding is consistent with the findings of previous studies which have shown forgetfulness, feeling of hassled about sticking to the medication and adverse effects of the respective has shown that with increasing age, non-adherence to medication also increase.[14] However, previous study has shown contradicting results that by the age of 60 years, most of the patients achieved adherence levels of 80% in various chronic diseases like hypertension, type 2 diabetes, hypercholesterolemia, osteoporosis, seizure disorders and hypothyroidism.[20]

Various studies done to access the medication adherence has emphasized illiteracy as the major barrier to medication adherence.[21-24] The lack of health literacy among the patients might have to made it difficult understand basic health information and services needed to make appropriate health decisions as reported by previous studies.[19,25] However, similar proportion of both literate and illiterate participants were non-adherent to medication in our study. Majority of the patients in our study has claimed to have knowledge about medication. Despite that, higher proportion of them were non-adherent to medications. On other hand, among the patients who did not have knowledge about medications, majority of them were non-adherent to medications. The possible explanation for this might be that even if the participants were aware about medications, they might have become careless regarding their priority. This finding is in agreement with the previous study in which educational booklets didn't seem to have effect in the improvement of the adherence in a general practice setting.[26] However, another study has reported that knowledge of health and medication is positively associated with medication adherence.[27]

Furthermore, the present study showed no statistically significant association between medication affordability, accessibility and adherence to medication. However, most of the non-adherent participants claimed to have easy access to the medicine. The possible explanation for this might be that other reasons such as their busy schedules might have a greater role in non-adherence even though the medicine was readily accessible. According to previous studies, medication cost and missed medicine due to cost were highlighted as the important predictors of non-adherence.[22,28]

Previous study has suggested that busy schedules might hinder medication taking behavior.[29] In parallel to the study, this study showed that significant number of non-adherent patients reported busy work schedule as a confounding factor in medication adherence as majority of patients were involved in household activities followed by teaching. The evidence in support to this finding was reported in previous studies which also reported busy schedule as a barrier to medication adherence.[9,10] Patients with busy working schedule are likely to miss appointment to clinical schedules such that their prescriptions refills is also missed.[30,31]

Number of visits to doctor is directly proportional to adherence rate.[32] The motivation and attitude of the physician is of utmost importance to encourage patients to

adhere to treatment and attain successful results because patients may lack the skills or knowledge necessary to complete the medication regimen.[28,33-36] However, more than half of the participants in this study who reported regular visits to doctors were non adherent. It might be because of the possibility that non-adherence can stem from many sources including a desire not to be different from peers, a belief of personal invulnerability, or a rebellion against authority figures who are seen as being over controlling as suggested by Kandukuri et al.[34,37] Also, more than half of the participants who claimed no special attention from doctors were non-adherent to the medication in this study. This finding is consistent with the previous study which has shown that patient's involvement in regular and sound interaction with health care professional is major factor for improving the adherence pattern.[38]

Adverse effect was the most common reason for discontinuation of the medication in our study. Several studies have shown adverse effects as the hindrance factor affecting medication in different illness like hypercholesterolemia, COPD, Diabetes, HIV, Diabetes and Asthma.[14,15,18,19,33,39,40,41] Gastro-intestinal distress have occurred with iron and folic acid supplements and constipation was major adverse effects reported with calcium supplements.[42-44] Other adverse effects of this medication included metallic taste, staining of teeth and constipation Meanwhile during normal physiological changes in pregnancy, heartburn occurs in 80% of the women and there is reduced frequency of defecation.[2,43,45]

Majority of the participants have discontinued the medicines within the first 3-6 month of medication. At early stages patients might discontinue due to lack of proper awareness about the condition and also carelessness. This result is consistent with many other studies conducted among diabetic and schizophrenic patients as medication was discontinued at an early stage.[15,46] Medication adherence dramatically decreases after first six months of therapy.[47] Most non-adherent participants in the study were under their antenatal care for 8 months. In concurrence to this finding, other studies have also stated that having longer duration of medication was associated with lower adherence.[48,49] Non-adherence might be due to patients feeling hassled to stick to the medication for longer duration as suggested by Juch et al.[16] The non-adherence rate was high among participants under 2-4 months of medication. Similar to this finding, other study has also reported that short term medication withdrawal was high in number in compared to long term medication as a result of symptomatic relief, feeling of well-being and carelessness.[50]

Furthermore, it has been suggested that the therapies comprising two or more medication per day add burden to the patients leading to poor adherence.[19,33] The same is true in conditions such as HIV, diabetes mellitus and hypertension where large number of pills is to be taken daily creating a potential confusion and omissions of the dose leading to non-adherence.[33] These findings are in parallel to the finding of this study, where non-adherence rate is highest among the participants under 3 and more than 3 different medications which they were taking concomitantly. Despite being simple therapy (iron, folic acid, and calcium), increased pill burden, different timing of each medication, prescription of each medication and confusion among the drugs impede medication adherence during pregnancy.[16,51,52] The finding is supported by several other studies which have shown complexity in medication regimen is responsible for non-adherence to medication.[53,54]

This study shares few limitations. First, this study lacks the "gold standard" method of measuring adherence. The open-ended questionnaire used in our study might be another limiting factor in the interpretation of the study though it is highly unlikely. Second, recall bias of the patients regarding medication taking behavior, presence of comorbid conditions might have had an impact in the overall outcomes of the study. Third, potential false claims by the patients though rarely expected might have in one way or the other affected result of our study. Despite these limitations, it is believed that our study has provided an insight to address the factors that have led to suboptimal adherence to medication. Moreover, our findings might contribute in achieving higher adherence to medication by directing efforts to attenuating the factors leading to poor adherence. Nevertheless, this study may have not enrolled entire population. Therefore our study reinforces the need of for further studies.

CONCLUSION

Non-adherence to medication is one of the major barriers to achieve successful treatment outcomes as the patients do not get maximum benefit of medical treatment. Our study intended to determine the adherence pattern among antenatal care receiving women under iron, folic acid, and calcium supplements and identify the determinants of poor adherence. The study revealed that a majority of patients were not adherent to the medication and most common reasons were forgetfulness and adverse effects. Statistically, there was a significant association between adherence and patients' busy work schedule and visiting doctor for follow up.

This study is the first of its kind in Nepal and has a contributing role in creating scenario of adherence pattern and factors responsible for non-adherence. Non-adherence to medication during pregnancy might lead to poor pregnancy outcomes like low birth weight, anemia, preterm delivery, neural tube defects and poor bone development and lactation. Thus, required and committed initiatives have to be emphasized in order to overcome the barriers to medication adherence. This would help in the

management of most prevalent poor pregnancy outcomes of the world.

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