Research Paper | Medical Science

Effectiveness of Nutritional Intervention for Anaemia on Maternal and Fetal Outcomes Among Antenatal Women in Selected Villages in Trichy District, Tamil Nadu State, SouthIndia.

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ABSTRACT The aim of the study was to determine the effectiveness of nutritional intervention for anaemia on maternal and fetal outcomes among antenatal women in selected villages in Trichy district. A quasi experimental, non- equivalent posttest only control group design was used.150 antenatal women were selected by purposive sampling technique. The instruments used for the study consisted of background variables, maternal and fetal outcome instrument and structured interview schedule. Descriptive and inferential statistics were used. There was a highly significant difference in the mean difference scores of maternal Hb and mean scores of knowledge on IDA among antenatal women between control and experimental group. 8% increase in low birth weight in the control group. The nutrition intervention given along with nutritional health education among antenatal women is an effective method in improving maternal Hb and knowledge of the antenatal women on IDA.

KEYWORDS : Nutritional Intervention, Anaemia, Maternal and Fetal Outcomes, Antenatal Women.

Introduction:

Nutrition is a fundamental pillar of human life. During pregnancy, mother's diet is more important. A woman's normal requirement increases during pregnancy to meet the needs of the growing fetus. An inadequate diet during pregnancy affects the health of the mother and baby and develops nutritional deficiency diseases like anaemia.

Anaemia is the most widespread and often neglected disorder complicating pregnancy. Mary Ann Anderson of USAID stated that "Anaemia contributes a brake on human development. The country tops in the prevalence of anaemia with its incidence high in all groups of the population. Approximately one –third of the global populations are anaemic. The prevalence may be as high as 56 or 61% in developing countries (Daftary et al, 2005)

Need for the Study:

Anaemia during pregnancy is a major public health problem, especially in developing countries. In India, 13 million pregnant women are suffering from anaemia. Low dietary iron intake and poor dietary iron absorption from food items are the major factors causing iron deficiency (Dunn, 2011). It is estimated that about half of the global maternal deaths due to anaemia occur in South Asian countries (Kaur,2014).Many reports state that anaemia has a major consequences on human health as well as social and economic development. Anaemia is the world's second leading cause of disability (Guidelines for Control of Iron Deficiency Anaemia,2013).

Ali et al, (2011) report that the greater the severity of the anaemia during pregnancy, the greater the risk of preeclampsia, preterm delivery, LBW and stillbirth. The study recommended that the preventive measures should be undertaken to decrease the prevalence of anaemia in pregnancy.The prevention and reduction of maternal and fetal complications is vital for ensuring maternal and fetal, infant health through maternal nutrition (WHO,1999). Nutritional intervention strategies are preventive, cost-effective, and sustainable. Keeping in mind the above facts and in the light of scarcity of nutritional intervention studies done in this area, the researcher has undertaken this study.

Objectives:

1. To determine the effectiveness of nutritional intervention for anaemia on maternal outcomes among antenatal women.

2. To determine the effectiveness of nutritional intervention for anaemia on fetal outcomes.

3. To find out the relationship among maternal and fetal outcomes of the antenatal women in the experimental and control group.

4. To find out the association between maternal outcomes and background variables of the antenatal women.

5. To find out the association between fetal outcomes and background variables of the antenatal women.

Hypotheses:

H1.There will be a significant difference in primary maternal outcomes between the antenatal women who receive nutritional intervention and those who do not.

H2.There will be a significant difference in primary fetal outcome between the antenatal women who receive nutritional intervention and those who do not.

Materials and Methods:

An evaluative approach with quasi experimental, non- equivalent posttest only control group design was used. Conceptual framework of this current study was based on the General System Theory by Ludwig von Bertanlanfy's (1968).

Setting of the Study:

The study was conducted in the villages under two Primary Health Centres namely Vaiyampatti and Chettiyappatti Primary Health Centres.

Population:

The target population of the study was the antenatal women residing in the villages under the two government primary health centres

Sample and Sample Size:

The antenatal women who fulfilled inclusion criteria were recruited as sample. The sample size consisted of 150 antenatal women with Hb level 7-10.9gm/dl, 75 in the experimental group and 75 in the control group.

Sampling Technique:

The convenient sampling technique was used to select the two PHCs and for allotting PHC for experimental and control group and also for selecting villages for both the groups under two PHCs. The study samples from the villages of the experimental and control group were selected using purposive sampling technique.

Inclusion Criteria:

Antenatal women who were:

- Having haemoglobin 7 – 10.9gm /dl during 16 to 20 weeks of gestation.
- Residing in the selected villages under two selected primary health centres.
- Willing to have child birth in any part of Trichy District.
- Willing to participate in the study.
- Able to speak and understand Tamil language.

Exclusive criteria

Antenatal women with

- Complications like pregnancy induced hypertension, hydramnios, multiple pregnancy, psychiatric problems and gestational diabetes.
- Previous history of habitual abortion and undergoing infertility treatment.

Tools and Technique:

The instruments used for the study consisted of background variables, maternal and fetal outcome instrument and structured interview schedule. The data were collected from the records of the antenatal women in the PHCs and by interview technique with antenatal women.

Section I: Background variables of antenatal women such as age, age at marriage, educational status, religion, occupation of the antenatal women, monthly family income, type of family, gravida, number of antenatal visits, birth spacing, type of diet, method of excreta disposal, history of pica, number of IFA tablet consumed, use of cheppals and deworming during pregnancy.

Section II: Maternal and Fetal outcomes related instrument was used to record the primary and secondary maternal and fetal outcomes except knowledge. Primary maternal outcomes: Haemoglobin of the antenatal women and their knowledge on iron deficiency anaemia. Hb was estimated by Sahli's method.

Secondary maternal outcomes: Weight of antenatal women, APH, primary PPH, and preterm labour. Actual measurement of Hb and maternal weight was taken and their mean values were calculated. For other maternal outcomes, like APH, stillbirth, premature labour, the investigator made an assessment to find out the presence or absence. A score of '1' was given for presence of each outcome and zero for its absence. Frequency was calculated for the distribution of antenatal women according to different levels of Hb.

Section III: Structured interview schedule was used to assess the knowledge regarding prevention and management of iron deficiency anaemia. Structured interview schedule contained 25 multiple choice questions with 4 options. The areas of IDA and the numbers of items in each area were as follows: Definition of Iron deficiency anemia (1,),Prevalence(1), iron and functions of iron (2),Causes (1), signs and symptoms (1), Complication to mother and fetus (2), Prevention and management of iron deficiency anemia(17).The total possible score for the multiple choice questionnaire on the knowledge - 25.1 mark for the right answer, and 0 – mark for wrong answer. The total score of each subject was calculated, converted into percentage and interpreted as follows: Adequate knowledge –75-100 %, Moderately Adequate knowledge –50-74.99 %, and inadequate knowledge - < 50 %.

Validity and reliability of the tools were established. The reliability of structured interview schedule, weighing scale and haemoglobinometer was established by test and retest method and the coefficient of correlation (r) value for both was 0.94 and for structured interview schedule was 0.97.

Ethical clearance was obtained from Institutional Ethical Committee of K.A.P Viswanatham government medical college, Trichy. The written informed consent was obtained from all the study subjects. The pilot study was conducted with ten antenatal women in each group.

Data Collection Procedure:

The formal permission was obtained from the Director of Public Health and Preventive Medicine, Chennai and the deputy director of Health Services and Family Welfare, Trichy. The study was conducted in four phases: 1.Selection of the study samples, 2. Nutritional health education was conducted in groups (4-8) to antenatal women on the 1st day of the 21st week of gestation in the experimental group at Chettiyapatti PHC and the houses of antenatal women according to their convenience. Nutritional health education was conducted using lecture cum discussion and each session lasted for about 45 minutes to one hour. 3. After nutritional health education, Nutritional intervention (Amaranth leaves + Guava) for anaemia was administered for 12 weeks between 21 to 32 weeks of gestation. 4. Posttest was done on maternal and fetal outcome from 28th week of gestation onwards.

Data Analysis:

After data collection, the data were organized, tabulated, summarized and analyzed using descriptive and inferential statistics (Chisquare, independent t-test, paired t- test, and Pearson correlation, multiple regression analysis, and ANOVA) were used.

Results:

Table -1: Comparison of Mean scores of Posttest Maternal Haemoglobin Between Control and Experimental Group (N=150)

Variable	Control Group (n=75)		Experimental group (n=75)		Mean Difference	Independent 't' test
	M	SD	M	SD		
Haemoglobin	9.32	0.70	10.01	0.67	0.69	6.2***

***p<.001

Table 1 shows that, there was a highly significant difference in the mean scores of maternal haemoglobin on posttest between control and experimental group.
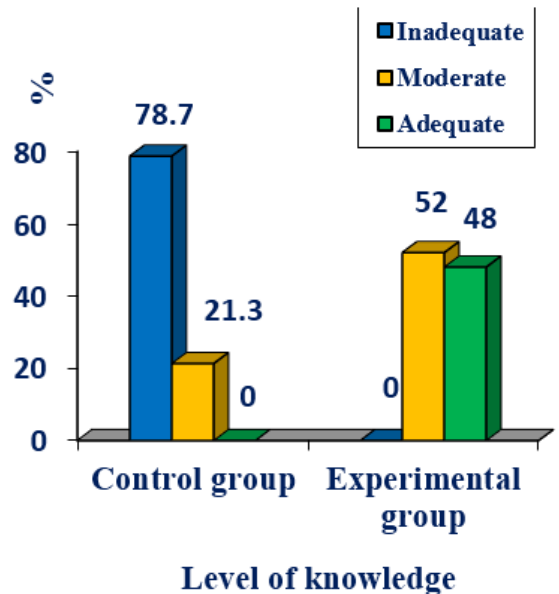

Figure 1 shows the Level of Knowledge on IDA among Antenatal Women in the Control and Experimental Group on Posttest (N=150).

Table 2 Comparison of Posttest Knowledge Score on IDA between Control and Experimental Group (N=150)

Variable	Control Group (n=75)		Experimental group (n=75)		Mean Difference	Independent 't'test
	M	SD	M	SD		

| Knowl-edge | 11.29 | 2.6 | 19.45 | 2.04 | 8.16 | 20.94*** |

***p<.001

The above table 2 depicts that there was a highly significant difference (p< .001 ; Mean difference = 8.16) in the posttest mean scores of knowledge on IDA among antenatal women.

Table 3: Comparisons of Birth Weight between Control and Experimental Group Antenatal Women (N=150)

Variable	Control Group (n=75)		Experimental group (n=75)		Mean Difference	Independent 't'test
	M	SD	M	SD		
Birth weight	2.8	0.36	2.85	0.34	0.59	0.318 (0.75#)

The table 3 reveals that there was no significant difference in birth weight means between control and experimental group.

Discussion:
The first objective of the study was to determine the effectiveness of nutritional intervention for anaemia on maternal outcomes among antenatal women. The corresponding hypothesis was: There will be a significant difference in primary maternal outcomes between the antenatal women who receive nutritional intervention and those who do not. This hypothesis was supported by the study findings, there by the hypothesis was accepted.

The study found that there was a highly significant difference (p<0.001) in primary outcomes (maternal Hb and knowledge on IDA) between control and experimental group. It shows that Consumption of amaranth leaves and guava weekly thrice for 12 weeks significantly improved the Hb of the antenatal women. A study by Rao et al,(2013) showed that consumption of green leafy vegetables more than twice weekly for 1 year of intervention, mean Hb increased from 10.94 ± 1.22 to 11.59 ± 1.11g/dl.

In relation to second primary maternal outcomes, knowledge on IDA. Nutritional health education was effective in increasing the level of knowledge on IDA. These findings are consistent with a study done by Sarin et al,(2008) & Abd El Sayed et al, (2012)who found that the planned health education programme was effective in enhancing knowledge of antenatal mothers regarding prevention and management of anaemia during pregnancy.

The effect of nutritional intervention was insignificant on secondary maternal outcomes, maternal weight and premature labour. The other secondary maternal outcomes, the incidence of APH, primary PPH were absent in both groups.

The second objective of the study was to determine the effectiveness of nutritional Intervention for anaemia on fetal outcome. The corresponding hypothesis was: There will be a significant difference in primary fetal outcome between the antenatal women who receive nutritional intervention and those who do not. The study findings revealed that there was no significant difference in birth weight of the newborns between the control and experimental group.This hypothesis was not supported by the study findings, thereby the hypothesis was not accepted

Nutritional intervention was not effective in improving primary fetal outcome (Birth weight).There was no significant difference in birth weight of the newborns between the control and experimental group. 20% and 12 % of the newborns in the control and experimental group had birth weight < 2500gms which is 8% increase in low birth weight in the control group and was found statistically insignificant.

Regarding secondary fetal outcomes, 4% and 2.77% of the antenatal women in the control and experimental group had premature newborns. The other secondary fetal outcomes, still birth and perinatal mortality were absent in both groups. All of the newborns had good APGAR score. A study by Rohilla et al, (2010) reported that out of 96 pregnant women, 5.12% of all deliveries were pre-term and the other maternal and perinatal outcome were good.

The third objective of the study was to find out the relationship among maternal and fetal outcomes of the antenatal women in the experimental and control group. Significant positive correlations were found in the experimental group between: haemoglobin and maternal weight; haemoglobin and knowledge on IDA; maternal weight and knowledge. In the control group, significant positive correlations were found between: haemoglobin and maternal weight; haemoglobin and birth weight; maternal weight and birth weight. Varma et al, (2008) revealed that birth weight of an infant was found to be positively correlated with weight gain and Hb level of mother during pregnancy.

The fourth objective of the study was to find out the association between maternal outcomes and background variables of the antenatal women. The association was done for three maternal outcomes, maternal Hb, maternal weight, knowledge on IDA and premature labour. The association was not done for the other maternal outcomes with background variables because of their NIL incidences.

In the experimental group, there was a significant association between: maternal weight and type of family; premature labour/prematurity and total family income; knowledge on IDA and religion; gravida, birth spacing and birth weight. In the control group, maternal weight was significantly associated with the use of cheppals; maternal Hb with number of IFA tablets consumed.

Conclusion:
The nutrition intervention (Amaranth leaves and guava) given along with nutritional health education among antenatal women is an effective method in improving maternal Hb and knowledge of the antenatal women on IDA. The modified nutritional intervention recipe with large sample size may be needed to find out the effect on the birth weight of the newborns, secondary maternal and fetal outcomes.

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