



EFFICACY OF HERBAL FORMULATIONS TO TREAT IRON DEFICIENCY ANAEMIA IN TRIBAL WOMAN OF REPRODUCTIVE AGE AT KOLLAM, KERALA

Dr. Unnymaya M R

Research Associate, International Centre for Technological Innovations (ICTI)

ABSTRACT

Anemia is a serious public health issue. It is highly prevalent in the marginalized population in India. In Kerala tribal woman in reproductive age have insufficient dietary intake of iron and in accessibility of the supplements provided through the primary health settings. This study aims to evaluate the incidence of Anemia in tribal woman of reproductive age (15-49) in Achankovil tribal hamlet at Kollam and testing the efficacy of herbal formulation to treat anemia in mass population. Sample size of the study was 170. Data collection was through a cross sectional epidemiological survey with a partially structured questionnaire. The Hb level was tested in the subjects after getting consent with a HemoCue 201+ device. Among 170 subjects 96 (56.47%) were identified as anaemic (Hb <12mg/dl). This included 28 pregnant women and 36 lactating mothers. Then Herbal formulation to correct digestion, improve absorption of iron and enhancing bio availability iron administered for a fixed time period. The recheck of Hb levels in study population revealed significant improvement in Hb levels and quality of life.

KEY WORDS- *Anaemia, tribal woman, Reproductive age group, herbal formulations, Embilica officinilais, Vitis vinifera, Kerala.*

INTRODUCTION

Anaemia “is a condition in which there is a low level of haemoglobin in blood either because of diminished red blood cells and/or increase blood loss. Iron is thought to be essential for normal human physiology. It’s required for a variety of proteins and enzymes that keep living human cells healthy. Iron is also a necessary component of proteins involved in haemoglobin’s oxygen transport in red blood cells. While iron is a plentiful mineral, it has low bioavailability, and dietary deficiency is among the most popular poor nutrition globally, with serious health consequences. Iron deficiency anaemia can strike at any age, but it is more common in pregnant women and children .The total body iron content of the average adult male (70 kg) is approximately 4 g, which remains relatively constant during adult life. Iron homeostasis is based on the close connection between intestinal iron absorption and total body iron requirements since there are no significant physiologic mechanisms to control iron loss. Anemia is generally caused by loss of blood because of parasites especially hookworms, excessive menstrual losses, chronic diseases such as ulcers or tuberculosis,

deficiency of iron in the diet, inadequate iron absorption from the gut. Anaemia in pregnancy can cause serious health issues to the baby including low birth weight, preterm birth, stunted growth and other developmental delays in child. Nutritional anaemia is highly prevalent in lactating mothers. It would be more prevalent in mothers with insufficient supply of vitamins in pregnancy and maternal iron depletion and blood loss during child birth. This can result in insufficient supply of breast milk to the newborn child. Postpartum anaemia can cause reduced cognitive abilities, emotional instability and post partum depression.

Anemia is one of the major health problems in Kerala population. Many researchers have emphasized on prevalence of anemia among the Indian population. This study has focused to address the incidence and prevalence of anemia among the tribal population in Achankovil (Kollam district). According to Park et al, reproductive age groups are considered to be at high risk of anemia due to their increasing demand. An estimated amount of 1.9 billion people of 27% of the world's population reported anemia (Kassebaum 2016). India continues to be one of the countries with very



high incidence and prevalence of the same. National Family Health Survey (NFHS-3) reveals the prevalence of any anemia to be 55.3% of the total population. According to the 2011 census of India the scheduled tribal population of Kerala is 4,84,839 (1.5% of the total population) and 0.4% of this residing at Kollam district. Poor eating habits and low income plays a major role in the development of iron deficiency anemia, which is an important determinant of poor health status. Anemia among tribal women and children were in the range of 78.3% to 96.5% (Purushothama et al.2017). One of the recent initiatives implemented in Kerala government was supplementing weekly iron and folic acid tablets at primary level of education. From the perceptiveness of public health the prevalence of anemia in marginalized communities and identification of its risk factors is essential for preventive interventions. There are studies on anemia in pregnant and adolescent girls in urban and rural areas, but community based study in tribal population are rare. Hence this study conducted with the objective to identify the prevalence, risk factors of anemia and the effect of diet modifications, cost effective medicines to improve health. For this, "Malapandaram" tribal community in Achankovil of southern Kerala is selected. Achankovil belongs to Aryankavu Panchayath is a continually developing Panchayat and has specific targets for sustainable development goals related to health. It is important to know the exact prevalence and determinants of anemia in the Panchayat level to further plan targeted interventions. The aim of the study is to estimate the prevalence of anemia among tribal women of Reproductive age at Achankovil Tribal Hamlet (aged 15-49 years) and interventions to improve health outcomes.

LITERATURE REVIEW

WHO has classified IDA amongst the top ten selected health risks. Iron deficiency anemia is associated with increased incidence of preterm labor and low birth weight babies and adverse obstetric outcomes like cardiac failure, puerperal sepsis, and decreased lactation due to inability to cope with the stress of child birth.

WHO has recommended iron and folic acid supplementation as standard treatment for IDA in pregnancy. But it has several side effects, like heart burn, nausea, upper gastric discomfort, constipation and diarrhea. Some studies have shown to generate free radicals, which cause damage to the intestine. But, Indian gooseberry has the ability to increase iron absorption and decreases the side effects (Barba c., 2011)

Raisins, like most fruits, possess a combination of an appealing, sweet taste and nutritional value. Raisins provide essential nutrients, soluble and insoluble fiber, and health protective bioactive components, or photochemical. Raisins are high in potassium and low in sodium. Compared to other fruits, they are high in magnesium and iron (Nora M., 2018).

There is a significant correlation between attitude against the knowledge of anemia, self awareness, and seriousness of anaemia. Self awareness can result in preparation of iron rich foods, inclusion of iron in diets and health seeking behavior. This can improve the Hb levels in communities (Shipa jose et al. 2016)

SUBJECTS AND METHODS

The study was a community-based epidemiological survey conducted at Achankovil of Kollam district, Kerala, India. Among the identified scheduled tribes, house to house visits were performed to ensure active participation of the specific subjects. The study period was from August 2021 to October 2021. A total of 170 women in the age range of 14-59 years, with no underlying systemic diseases were included in the study. Informed consent was obtained from the participants and confidentiality of the information was assured.

The primary data collection tool was a questionnaire type which includes the eating habits, menstrual pattern and flow rate, marital and reproductive status and systemic health. Questionnaire also included general symptoms of anemia (Tiredness, headaches, dizziness, shortness of breath). As Malayalam is the local language in Kerala, data was collected in Malayalam and later converted to English. Subjects Hemoglobin level checked using HemoCue 201+ hemoglobin photometer, Angelholm, Sweden. The HemoCue system consists of a portable photometer and a one-step blood collection device (microcuvette) that is covered with dry hemoglobin conversion reagents. The system does not use wet reagents and it allows for measuring hemoglobin levels within a minute. HemoCue system is accepted as a standard method for hemoglobin measurement by the International Committee for Standardization in Hematology. Sari et al. recommends the HemoCue method to be used for surveys which are conducted in relatively remote areas.

Anaemia was defined and classified according to WHO criteria, for a non-pregnant adult female normal haemoglobin (Hb) is ≥ 12 gm/dl, mild anaemia is Hb 10-11.9 gm/dl, moderate anemia is Hb 7-9.9 gm/dl and severe anaemia is Hb < 7 gm/dl.



Woman with low Hb level (7-10gm/dl) and with symptoms of anemia are considered for further study of Herbal medicine intervention. First seven days herbal powder with *Zingiber officinalis*, *Tachyspermum roxburghianum*, *Tachyspermum ammi*, *Terminalia chebula* and *Rocksalt* (Ayurvedic Formulation to improve digestion and absorption) administered with lukewarm water before food once in a day. Following

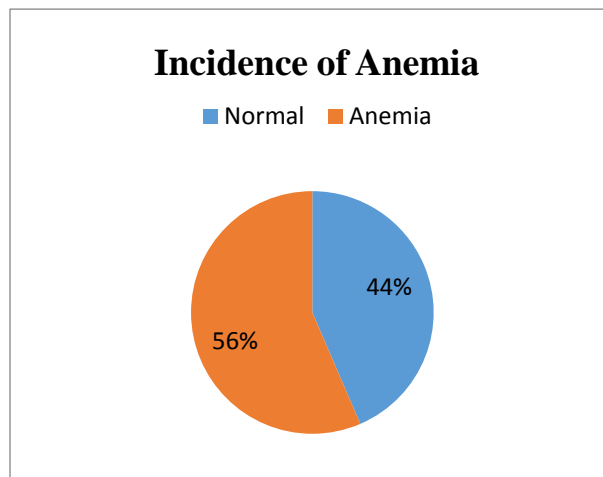
which patients were advised to follow wholesome diet and drinking water boiled with *Embilica officinalis* (Indian Gooseberry) and *Vitis vinifera*(Grapevine).Which was advised for a duration of 4 weeks. After that the Hb level of these patients were reassessed with HemoCue 201+ and difference in value noted.

RESULTS AND ANALYSIS

TABLE 1: Socio-demographic profile of the study population

Variables	N	%
Age group		
15-19	64	37.64
20-29	50	29.41
30-39	23	13.52
40-49	33	19.41
Education		
No School	20	11.76
Attended primary school	139	81.76
Above primary school	11	6.47
Household income		
Less than 5000	109	64.11
5000 and above	61	35.88
Marital status		
Never married	55	32.35
Married	113	66.47
Others	2	1.17

GRAPH 1





Prevalence of anemia is more in tribal woman of reproductive age. Among the 170 woman tested for Hb level, 96 (56.47%) showed low value of < 12gm/dl. Among these subjects 15(8.8 %) were severely anemic (Hb<7), 30(17.6%) moderately anemic and 38 (22.35%) were mildly anemic. The demographic details mentioned in Table 1. All woman participated in the study followed mixed diet pattern. In woman those who are severely anemic, noted with heavy menstrual bleeding and poor dietary intake of iron. Among the 96 identified anemic subjects were reported mixed symptoms of anemia. Poor appetite and shortness of breath with increased palpitation and tiredness were reported by 80 % of the subject.

Among the anemic subjects 26 were pregnant woman and 38 were lactating mothers. The mean age of mothers at their first birth was 19.9 years. A majority of mothers 38(50.8%) gave their second birth after 2 or more years. 80 % woman never had iron and folic acid in pregnancy. 20 mothers reported with low birth weight and 8 had stunted growth in child. All of the participants said that they neither had reason to suspect worm infestations, nor did they have any history of malaria in last 3 months.

After administration of herbal formulation with *Embilica officinalis* and *Vitis vinifera* in 96 subjects performed. In which 80 subjects improved their Hb Value significantly. Among the 15 severely anaemic subjects average Hb level after intervention was average 10 mg/dl. Mild and moderately anaemic subjects showed an average range of 12-13 mg/dl after the treatment period. 85 (88.64%) subjects had cured with the all the symptoms of anaemia.

Herbal formulation which improves digestion and absorption administered for 7 days to all the identified anaemic subjects. Herbal combination is specifically designed to remove the toxins from digestive system and stabilises the normal digestion. This intern improved absorption from the gut. Then intake of water boiled with Indian gooseberry and grape wine showed significant increase in the Hb level after 4 weeks. Also the subjects had mitigated the symptoms of anaemia.

Aqueous extracts of *Embilica officinalis* fruit administration significantly increases red blood cell, hemoglobin concentration. It is considered one of the richest sources of vitamin C (ascorbic acid). Presence of low molecular weight hydrolysable tannins prevents the oxidization of ascorbic acid even in dried fruit. Non-haem iron predominates in all diets. About 90% - 95% of total daily iron intake derived from non-haem iron. The majority of dietary non-haem iron remains in Fe³⁺ form, which must be reduced to Fe²⁺ form for its

absorption. Vitamin C present in *Embilica officinalis* causes this reduction and increases iron absorption. Combination of this with FeSO₄ can enhance iron absorption 3 fold over the control iron preparation of FeSO₄ alone. (Venkatasubramnayan P et al. 2014).

CONCLUSION

This study confirms that anaemia is highly prevalent among woman of reproductive age. According to WHO, if there is 40 % of anaemia prevalence in a population considered to be severely anaemic population. This study identified that the incidence of anaemia among tribal woman of reproductive age (study population) is 56.47%. This is higher than the WHO criteria for highly anaemic population. Therefore by placing the tribal population of Kollam is within the category of anaemic population.

It can be seen that among the identified 56.47 % of subjects, 27% is pregnant woman and 39.58% is lactating mothers. This situation demands serious concerns. Early intervention in pregnancy is needed for improving the quality of life of woman and child.

After the administration of herbal drug combinations including *Embilica officinalis* and *Vitis vinifera*, 88.64 % improved the Hb level as well as majority of severely anemic subjects comes to mild anaemic Hb level. Iron and folic acid supplementation is advised for woman in pregnancy and lactation as well as adolescent girls. But it has several side effects, like heart burn, nausea, upper gastric discomfort, constipation and diarrhea. Some studies have shown to generate free radicals, which cause damage to the intestine. Therefore it is high time to demand for herbal formulations to effectively manage iron deficiency in populations. As herbal formulation can correct the cause of disease from the root cause without side effects it is highly recommendable.

RECOMMENDATIONS

- Use of herbs to treat body is a time honoured approach to strengthening of health system delivery.
- Herbal formulations are without side effects unlike the supplements used for treating deficiency. Hence it is highly advisable to administer herbal remedies under the supervision of a registered medical practitioner.
- Population based interventions with herbal medicines to treat nutritional deficiencies is an effective public health approach.



- Efficacy proven simple herbal medicines as food or drinking water can be cost effective method to mass intervention.
 - Along with Iron supplements for pregnant woman and anaemic woman in reproductive age drinking water boiled with *Embilica officinalis* and *Vitis vinifera* can be given.
 - *Embilica officinalis* is readily available in most of the tribal hamlets as forest area is their main habitat. Most of tribal hamlets are hilly areas and is also suitable for growing grape wines. So this can be considered as a cost effective method to address anaemia of tribal woman.
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