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Evaluation of comparative efficacy of Dietary supplement acquired from Kitchen Garden (*Parasbag*) and *Gudharitaki Awaleha* in *Pandu Roga* (Iron Deficiency Anemia)

Research Article

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Abstract

Backround-Panduroga is a Raktapradoshaja vyadhi having pitta dominance. Due to similarity of symptoms it can be correlated with Iron deficiency Anemia. Iron deficiency anemia secondary to inadequate dietary iron intake is caused by consuming a diet low in iron-rich foods. The richest sources of minerals and vitamins are fruits and green leafy vegetables. Growing a variety of crops in the kitchen garden is one of the simplest methods to make sure that everyone has access to a balanced meal that contains enough micronutrients. Aim and objectives-The objective of this study, which is being conducted in association with Mission Samriddhi (MS), is to compare the effectiveness of dietary supplements from Kitchen Garden (Parasbag) and Gudaharitaki Awaleha. Methodology- Total 60 patients were selected and divided in two equal groups. Group A patients were treated with nutritional supplement obtained from (Parasbag) Kitchen Garden along with Gudaharitaki Awaleha whereas group B patients were treated with Gudaharitaki Awaleha for 90 days. Assessment of subjective and objective criteria was done before and after treatment. Result and Discussion- Significant improvement was observed in subjective and objective parameters in both groups. But improvement was observed in more number of patients in group A than group B. Conclusion- Nutritional supplement obtained from (Parasbag) Kitchen Garden and Gudharitaki Awaleha improve Haemoglobin percentage because organically grown vegetables and fruits are rich in nutrients which help in prevention of nutritional deficiencies.

Key Words: Fruits and vegetables, *Gudharitaki Awaleha*, Iron deficiency Anemia, Kitchen garden (KG), *Panduroga, Parasbag.*

Introduction

Pandu Roga is Tridoshaja with dominance of Pitta dosha. The symptoms are caused by a decrease in rasa and rakta, which are primarily responsible for nourishing and supporting major activities. Kapha, Vayu, Rakta, Twaka, Mamsa, and Ojas are all adversely affected by aggravated Pitta Dosha. The defining attribute of Pandu is the Twaka Vivarnya (Panduta/skin discoloration). Agnimandya (reduced appetite), Aruchi (tastelessness in food), Daurbalya (general weakness), Bhrama (elation), are other symptoms of pandu roga (1). Due to similar symptoms, it might be compared to iron deficiency anaemia. Consuming a diet deficient in iron-rich foods results in iron deficiency anaemia related to inadequate dietary iron intake. It is a condition when the body's red blood cell count is insufficient to meet physiological needs and haemoglobin concentration (Hb percent) is low (2).

Iron deficiency anaemia is a major health issue that affects people all over the world. The WHO recognized that iron insufficiency is the most common dietary deficits in the world today, particularly affects female and children population (3). Anaemia is caused by multiple factors including nutritional and non-nutritional factors. Nutritional anaemia is attributable to iron, vitamin A, folate, vitamin B_{12}, ascorbic acid and zinc deficiencies. These nutrients deficiencies may be due to inadequate dietary intake and poor bioavailability of these micronutrients. The most prevalent nutritional deficit recognized globally is iron deficiency anaemia (IDA). For adult men and post-menopausal women, the recommended dietary intake for iron is 8 mg/day, whereas for pre-menopausal women it is 18 mg/day. To address the requirement, enhanced bioavailability techniques and diet selection rich in iron are essential. One of the necessary minerals for the formation of haemoglobin is iron (4).

The rich sources of minerals and vitamins include fruits and green leafy vegetables . These crops' average productivity (48.6 q/ha) is significantly lower than the state's (52.4 q/ha) and the country's (171.1 q/ha)

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averages. Growing a variety of crops in the kitchen garden is one of the simplest methods to make sure that everyone has access to a balanced meal that contains enough micronutrients. This is crucial, especially in rural areas where purchasing power of people is minimal and markets are far away. By giving access to food that can be quickly gathered, processed, and served to family members on a daily basis or as necessary, kitchen gardening directly contributes to food and nutritional security. Additionally, these vegetables give us taste, consumer acceptability, better digestion, and an increase in hunger. According to Recommended Dietary Allowances, a person should consume 300 grams of vegetables each day, comprising root and tuber crops, leafy green vegetables and other vegetables. Generally these are short duration crops and are properly developed in kitchen gardens so that family members can consume them throughout the year from kitchen gardens (5).

A kitchen garden is a small area close to a home where various fruits and vegetables are grown as per the season. One can obtain clean, fresh, pure, organic, cost effective, and healthful fruits and vegetables from it including those that are a good source of micronutrients.

Additionally, by supplying organic manure and a kitchen waste, they are free from any chemicals and poisonsKitchen gardening gives healthy food that can be quickly accessible, processed, and served to family members on a regular basis or as necessary, directly ensuring food and nutritional security (6).

Dietary supplements obtained from (Parasbag) Kitchen Garden, which primarily comprises of fruits and vegetables. The kit of Kitchen Garden consists climbers like cucumber, pumpkin, ridge gourd, bottle gourd, bitter gourd; root and tubers include beet, carrot and radish, fruits like papaya and vegetables like drumsticks, brinjal, tomato, lady finger, Cluster beans, green chilli, Long beans/Cow-pea beans, and green leafy vegetables like spinach, fenugreek, White amaranth, Red amaranth, White Goosefoot, and Green Cori. This contributes to raising nutritional awareness and promoting the use of foods high in iron through dietary supplements sourced from kitchen gardens to prevent anaemia in rural India. In all texts of Ayurveda, haritaki is recommended for the treatment of pandu roga. In Bharat Bhaisajya Ratnavali, one of the key treatments recommended for panduroga is guda-haritaki yoga (7). The research studies available using Guda-Haritaki yoga in Panduroga showed its effectiveness in improving symptoms of Pandu whose properties are mentioned in Table no.2 .

Need of the study

According to the National Family Health Survey, anaemic status was discovered in 53.2 percent of non-pregnant and 50.4 percent of pregnant women aged 15 to 49 in 2016, but only 22.7 percent of men in this age group (8).

Most cases of anemia caused by iron deficiency are mild and do not cause complications. However, prolonged deficiency can leads to serious complications for the health, cognitive development, and productivity of adults and children globally. Iron deficiency can be treated using a variety of methods, including oral and parenteral iron formulations, blood transfusions, and dietary supplements rich in iron. But due to negative consequences, all have limitations (9). Therefore, choosing an iron-rich diet is crucial for preventing and treating iron deficiency. India is the world's second-largest country in the production of fruits and vegetables, although the population consumption is very little of them, especially in rural areas. This may be because of lack of knowledge, illiteracy, limited access to fruits and vegetables, and low household income.

One of the simplest and least expensive strategies to improve health is to increase the amount of fruits and vegetables consumption. Fruits and vegetables are abundant sources of dietary bioactive components. In Kitchen Garden, fruits and vegetables are grown organically and without the use of harmful pesticides, but there is a dearth of knowledge and expertise. Consuming traditional vegetables, both cultivated and wild, may greatly increase the supply of micronutrients and may be related to lower rates of anaemia and Mineral deficiency in populations with limited resources (10, 11). Close co - ordination and co-operation between the numerous related sectors, such as nutrition, health, water, sanitation, and hygiene, along with poverty alleviation, agriculture, industry, and education, and groups like government agencies, nongovernmental organizations (NGOs), and the private sector are required to effectively address the multifactorial causes of anaemia. For the past three years, Mission Samriddhi (MS), a social impact organization, has worked in Wardha and Yavatmal on the themes of panchayat empowerment, health, education, and livelihood. MS strives to create holistic sustainable rural development.

Mission Samriddhi (MS) has chosen Kelapur Tq. Wardha as the target village for their pilot project to make one community anemia-free. With a population of 1026, Kelapur is 30 kilometres away from Wardha on the Deoli-Pulgaon route. With the assistance of MSRLM, they have been promoting the use of kitchen gardens for the past three years. They have given out seeds and held kitchen garden training sessions in order to prevent occurrence of anaemia in the village. To maintain good health and fight nutritional deficiency diseases like Iron Deficiency Anemia, it is important to promote and raise awareness about the intake of organically cultivated fruits and vegetables. In order to compare the effectiveness of dietary supplements obtained from Kitchen Garden (Parasbag) and Gudharitaki Awaleha, this study is being conducted in association with Mission Samriddhi (MS).

Aims and objectives

Aim

Assessment of efficacy of nutritional supplement obtained from (Parasbag) Kitchen garden along with Gudharitaki Awaleha on Complete Blood Count for making village Kelapur anemia free (Iron deficiency) .

Objectives

- To assess the effectiveness of nutritional supplement obtained from (Parasbag) Kitchen garden with Gudharitaki Awaleha on subjective and objective parameters.
- To assess the effectiveness of nutritional Gudharitaki on subjective and objective parameters.
- To compare the results of both in *Pandu Roga (*Iron Deficiency Anemia).

Materials and Methods

Locus of study

The Subjects from Kelapur Village (Tal. Deoli, Arvi) were registered and investigated at MGACH and RC, Salod(H), Wardha .

Methodology

Study was started after **a**pproval of Institutional Ethics Committee Ref. No. MGACHRC/IEC/ October-2020/149. Study was started only after taking written consent from each patient. Throughout the study privacy of patients was preserved.

- **Type of Study:** Interventional
- **Study design:** Randomized open reference standard controlled clinical study.
- **Drug collection/ Authentication:** The raw material was procured from authentic shop and authenticated by experts from Dravyaguna Department.
- **Storage:** Stored in plastic containers.

Detail of Drug Preparation:

Gudharitaki containing Haritaki and Gud as shown in table 1 was prepared in the form of Awaleha in Dattatreya Rasashala of MGACH & RC, Salod (H), Wardha using standard operating process mentioned in Sharangadhara Samhita.

Seed and training for cultivation was provided by Mission Samruddhi to families and counsel them for consumption of more organically grown vegetables and fruits as a dietary supplement from Kitchen Garden.

Table 1: Ingredients of Gudharitaki Awaleha-(12)

SN	Ingredients	Botanical nomenclature	Part utilized	Quantity
i	Haritaki	*Terminalia chebula*. Retz.	Fruits	One part
ii	Gud	Jaggery	-	One part

Table 2: Properties of drug

SN	Drug	Rasa	Guna	Virya	Vipaka	Doshghnata	Rogaghnata
1	Haritaki (13)	Kashaya, Madhura, Amla, Katu, Tikta	Laghu, Ruksha	Ushna	Madhura	Tridoshaghna	*Kushtha, Krimi, Grahani, Arsha, Amlapitta, Jwar,* ***Pandu****, Kamla.*
2	Gud (14,15)	Madhura	Snigdha, laghu	Natiushna	Madhura		*Vatapittaghna, Asrukprasadana* ***Pandu****, Balya*

Toxicity study

***Haritaki (Terminalia chebula* Retz*.)* (16)**

Haritaki's acute and sub-chronic toxicity studies on animals suggested that at the dose level (5000 mg/ kg), the animals exhibited normal behavioral pattern, breathing, cardiovascular characteristics, motor functions, reflexes, and changes in their skin and fur that were consistent with normal ageing.

Sampling procedure: Computerized Randomized chart

Sample size (Including sample size calculation): 60 (30x2)

Table 3: Grouping and Posology (As per PICO model)

Group	Sample size	Intervention	Dose and Frequency	Anupana	Duration	Follow-up
A	30	Dietary supplement acquired from KG and Gudharitaki Awaleha	5gm BD	Water	90days	On day 0 and 90
B	30	Gudharitaki Awaleha	5gmBD	Water	90days	On day 0 and 90

Inclusion criteria

- Patients having age between 16 to 50 years of both the sexes.
- Patients with hemoglobin percentage between the range of 7 - 11gm/dl.
- Patients with deficiency of iron due to other causes of Anemia.
- Patients willing to give written informed consent.

Exclusion criteria

- Diagnosed patients of Sickle cell, Sideroblastic, Aplastic anemia, Thalassemia, Malignancies causing anemia and hemolytic anemia.
- Pregnancy & lactating mothers.
- Diagnosed patients of hemorrhagic diseases.
- Menstrual disorders

Withdrawal criteria

- Patients not ready to continue the treatment
- Patients suffered from any adverse effects.
- Disease progresses during treatment.

Assessment Criteria

a) Subjective Assessment

Table 4: showing gradation method of Subjective parameters

SN	Parameter	Grade 0	Grade 1	Grade 2	Grade 3
1	*Vaivarnata* of (Tvaka, Nakha, Netravartma, Jihva, Hastapadatala (Pallor)	Absent	Present in any 1-2 of these	Present in any 3-4 of these	Present in all of these
2	*Agnimandyata* (reduction of digestive fire)	No agnimandya	Delayed digestion of heavy meals	Delayed digestion of light meal	Cannot digest even light meals
3	*Daurbalya (*weakness)	Not Present	After heavy work, relieved soon and tolerate	After moderate work relieved later and tolerate	After little work relieved later but beyond tolerate
4	*Shwasa* (dyspnoea)	**No** dyspnoea	Dyspnoea on heavy work	Dyspnoea on light work	Dyspnoea on heavy work

Vaivarnata (skin pallorness*), Agnimandyata* (reduction of digestive fire), *Daurbalya (*weakness), *Shwasa*(dyspnoea) were assessed as per gradation before and after treatment as shown in Table no. 4.

b) Objective Assessment

The following assessment were done before & after the treatment

- Hb % -Percentage of Haemoglobin
- RBC - Red blood cell count
- MCV- Mean corpuscular volume
- MCH- Mean corpuscular hemoglobin
- MCHC- Mean corpuscular hemoglobin concentration

Investigations: Screening investigations (base line):

- Complete Blood Count (CBC)

Observation and results

Data was analyzed Statistically by means of descriptive and inferential statistics using chi square test, student's paired and unpaired t test and Mann Whitney U test and software used in the analysis were SPSS 27.0 version and Graph Pad Prism 7.0 version and $p<0.05$ is considered as level of significance.

Demographic Data

Distribution of patients as per age, showed that mean of age in group A was 37.63±10.31 and in group B was 34.03±9.78 with non significant p value (p=0.17) thus both groups were comparable. In this study, distribution of patients as per gender showed that maximum number of patients 50 (83.33%) were female and maximum were 53 (88.33%) married with family history was absent in 43 (71.66%). This study showed that maximum number of patients 41 (68.33%) were having no habit of alcohol, whereas habit of tobacco and tea was observed in very few number of patients. Occupation wise distribution showed that maximum patients 27 (45%) were farmers, and 20 (33.33%) were housewives. *Prakriti* wise distribution showed that 20 (33.33%) patients were having *Vatapittaja Prakriti*, 16 (16.66%) had *Kaphapittaja* and 12 (20%) had *Vatakaphaja Prakriti*. *Koshtha* wise distribution showed that *Madhyam Koshtha* was found in maximum that is 49 (81.66%) patients. *Agni* was *Manda* in 35 (58.33%) patients and dietary habit of mixed and vegetarian was observed equal that is 50% of patients.

Table 5: Effect of therapy on subjective parameters in group A

Parameter	Mean BT	Mean AT	%	SD	SE	t-value	p-value
Vaivarnya	1.3	0.3	76.92	0.47	0.09	14.74	<0.05
Agnimandya	0.8	0.13	79.16	0.81	0.15	4.82	<0.05
Daurbalya	1.86	0.3	83.92	0.57	0.10	17.02	<0.05
Shwasa	0.3	0.03	88.8	0.47	0.09	2.80	<0.05

Table 6: Effect of therapy on subjective parameters in group B

Parameter	Mean BT	Mean AT	%	SD	SE	t-value	p-value
Vaivarnya	1.46	0.36	68.18	0.57	0.10	10.42	<0.05
Agnimandya	1.03	0.33	67.74	0.83	0.15	7.16	<0.05
Daurbalya	1.76	0.73	58.49	0.61	0.11	13.67	<0.05
Shwasa	0.56	0.1	82.35	0.63	0.11	5.03	<0.05

Table 7: Comparison of Hb% in two groups before and after treatment

Hb%	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	10.66	±1.26	11.53	±1.40	8.72	0.0001,S
Group B	10.44	±1.28	10.83	±1.37	5.23	0.0001,S
p-value	0.63,p=0.52,NS		1.94,p=0.057,NS			

Table 8: Comparison of RBC million/cu.mm in two groups before and after treatment

RBC	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	4.22	±0.62	4.57	±0.47	3.52	0.001,S
Group B	4.31	±0.58	4.38	±0.56	0.66	0.51,NS
p-value	0.51,p=0.58,NS		1.40,p=0.16,NS			

Table 9: Comparison of MCV(cu micron) in two groups before and after treatment

MCV	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	83.40	±14.32	84.70	±10.59	0.75	0.45,NS
Group B	81.83	±10.07	81.96	±9.08	0.10	0.90,NS
p-value	0.49,p=0.62,NS		1.07,p=0.28,NS			

Table 10: Comparison of MCH(pico-gm) in two groups before and after treatment

MCH(pico-gm)	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	24.36	±4.88	25.23	±4.20	0.75	,p=0.45,NS
Group B	23.92	±3.72	24.06	±3.50	0.10	,p=0.90,NS
p-value	0.39,p=0.69,NS		1.17,p=0.24,NS			

Table 11: Comparison of MCHC (%) in two groups before and after treatment

MCHC	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	29.18	±1.48	29.85	±1.65	2.58	0.015,S
Group B	29.07	±1.88	29.16	±1.88	0.45	0.65,NS
p-value	0.26,p=0.79,NS		1.65,p=0.10,NS			

Table 12: Comparison of RDW (%) in two groups before and after treatment

RDW(%)	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	14.30	±1.59	15.12	±1.82	4.27	0.0001,S
Group B	14.94	±1.86	14.36	±1.73	2.39	0.023,S
p-value	1.41,p=0.16,NS		1.69,p=0.09,NS			

Table 13: Comparison of HCT(%) in two groups before and after treatment

HCT(%)	Mean BT	SD	Mean AT	SD	t value	p-value
Group A	36.73	±3.42	38.69	±3.98	4.79	0.0001,S
Group B	35.93	±3.73	36.68	±4.23	2.33	0.023,S
p-value	0.86,p=0.39,NS		1.89,p=0.06,NS			

Discussion

The comparative study was conducted to assess the efficacy of nutritional supplement obtained from (Parasbag) Kitchen Garden and Gudharitaki Awaleha in Pandu Roga (Iron Deficiency Anemia), which comprises total 60 patients. They were treated with Dietary supplement acquired from KG and Gudharitaki Awaleha in group A and only Gudharitaki Awaleha 5gm twice a day in group B for 90 days as shown in table no.3. Patients were assessed before and after treatment for subjective parameters like *Vaivarnata* (skin pallorness*), Agnimandata* (reduction of digestive fire), *Daurbalya (*weakness), *Shwasa* (dyspnoea on exersion) as per gradation as shown in table 4 and Objective parameters like hemoglobin percentage (Hb %), Red blood cell count (RBC), Mean corpuscular volume (MCV), Mean corpuscular Haemoglobin (MCH) and Mean corpuscular hemoglobin concentration (MCHC). In group A, *Vaivarnya, Agnimandya*, *Daurbalya* and *Shwasa* showed 76.92% ,79.16%, 83.92% and 88.8% improvement respectively as shown in table no.5. In group B, *Vaivarnya, Agnimandya*, *Daurbalya* and *Shwasa* showed 68.18% , 67.74 %, 58.49% and 82.35% improvement respectively as shown in table no.6. Significant improvement was observed in *Vaivarnya, Agnimandya*, *Daurbalya* and *Shwasa* in both groups. But improvement was observed in more number of patients in group A treated with nutritional supplement obtained from (Parasbag) Kitchen Garden and *Gudharitaki Awaleha*, than group B treated only with *Gudharitaki Awaleha,* Both groups showed significant improvement in Hb%, RDW, and HCT% and comparison of both groups was not significant but the improvement was more in group A than in group B as shown in table no. 7, 12 and 13. In RBC and MCHC (%) group A showed significant improvement whereas in group B it was not significant as shown in table no. 8 and 11 . In MCV and MCH both groups showed no significant improvement as shown in table no.9, 10.

Thus from above results it is evident that group A treated with nutritional supplement obtained from (Parasbag) Kitchen Garden and *Gudharitaki Awaleha* showed better improvement as compared to group B treated only with *Gudharitaki Awaleha*.

Probable mode of action of Gudharitaki Awaleha

Gudharitaki Awaleha consists *Gud* (jaggery) and *Haritaki* (*Terminalia chebula.* Retz.). The formulation described in Bharat Bhaishajya Ratnavali indicated in *Panduroga*. *Haritaki* is recommended by all Acharyas for management of *Pandu roga*. *Mandagni* is the main etiological factor for *Panduroga*. It can be corrected

with *deepana* and *pachana* properties of Haritaki. Rasa and *Rakta dhatu* are mainly vitiated in *Pandu roga* (17). *Haritaki* being *Rasayana* drug helps in normalizing vitiated *Dhatu* and promoting synthesis of good *Dhatu*. As per Modern pharmacology *Haritaki* acts as Immunomodulatory, Antioxidant, Antihelminthics and Antibacterial properties (18). Jaggery (Gud), a sugarcane product, is abundant in minerals, particularly Iron and calcium . Jaggery has an iron content of 10–13 mg per 100 g. The Recommended Dietary Allowances (RDA) for iron for men and women are 17 mg and 21 mg, respectively (19). Jaggery's effectiveness in raising Hb percent has been demonstrated in researches conducted on iron deficient anaemia. Tayade et. al. conducted clinical study in which 50 patients were incidentally selected and treated with *Haritaki Churna* with Guda (20gm) for 15 days. The hemoglobin concentration raised significantly and response of clinical features of Pandu to the drug is good. In this study *Gudaharitaki* is statistically significant (20). Shailendra Kumar et al conducted study in which 35 children were divided into 3 groups, one group patients were treated with *Gudaharitaki* 500mg/kg/day, and in other group *Punarnava mandura* was given 500 mg two times per day, prior to food and in third group both drugs in similar doses were given for 4 weeks. *Panduta* showed 58.82 percent improvement in *Gudaharitaki* group, 65% with Punarnava Mandura and 67 % when both drugs were given together. The trial drugs showed no any adverse effects. From this they concluded that *Punarnava mandura* when used with *Gudaharitaki* showed more improvement as compared to used individually in treatment of Iron Deficiency Anemia in children (21). I. Hudedmani and S. P. Mangoli conducted a research Study to assess comparative efficacy of *Haritaki Churna* versus *Amalaki Churna* in *Panduroga* (Iron Deficiency Anemia), in which they given *Haritaki Churna* 1.5g two times per day along with honey prior to food in one group and in other group *Amalaki Churna* 1.5g two times per day was given along with honey prior to food. Marked improvement was observed in both groups but *Amalaki Churna* showed slight more improvement as compared to the *Haritaki Churna* in all parameters. Improvement was observed in symptoms like pallorness, dyspnoea, exertion, anorexia, vertigo, weakness, Hairfall, Bodyache, Glossitis, and improvement in hemoglobin percent, Red cell count and serum.Ferritin levels (22). V. Mohan G and R. Shastry V. V. S., carried out single arm research trial in 30 patients in which they were treated with 12 gms *Gudharitaki* after meal with lukewarm water for 45 days. Highly significant improvement was observed in in all parameters and they concluded that, *Gudharitaki is more effective* when the associated *doshas* are mainly *Vata* and *Kapha*. They found reduction in symptoms like Dourabalyata, Aruchi, Asyavairasya, Kasa, Shwasa, Atinidrata, and Shotha with gradual increase in Hemoglobin and RBC levels with oral intake of 12 grams of Gudaharitaki within 15 days. (23).

Probable mode of action of organically grown vegetables and fruits acquired from Kitchen Garden

Nutritional deficiencies like Iron, folate, vitamin B12, and vitamin A can lead to anaemia. A kitchen garden is very useful and has many benefits. A kitchen garden guarantees a cheap, consistent, and practical source of fresh veggies, which are essential to good nutrition. The vitamins and minerals included in green vegetables help to prevent sickness. Malnutrition produces problems including anaemia and night blindness because of a lack of intake of vegetables, especially green leafy vegetables. The Kitchen Garden provides nutrient-dense fruits and vegetables that are also devoid of harmful chemicals. Saving money on the cost of buying fruits and vegetables is also one of the benefits. Fruits and vegetables harvested from Kitchen garden tastes better than purchased from market. It causes successful utilization of kitchen waste water and kitchen waste material. The effluent from the kitchen is rich in organic material and comprises starch, rice hulls, etc. Moreover, it has nutrients like nitrogen, potassium, phosphorus, and others that are good for the soil. The organic content in the kitchen wastewater helps to keep the soil moist and also gives the roots aeration. Plants can be directly watered with kitchen sink water. It is advised to avoid watering edible plants with dishwashing detergent or other harsh chemicals because they could leach into the soil and taint the fruits and vegetables (24). The study's findings demonstrated that okra may be watered with kitchen waste water without any additional treatment. Household kitchen waste water is a very good source of water for irrigating homesteads (25)..Thus it helps in recycling of waste from kitchen. The products grown in Kitchen garden are rich in nutrients especially phytochemicals, antioxidants, vitamin C, vitamin A, vitamin B and folate, without the risk of adulteration and pesticides. It helps in promotion of health. They are rich in vitamins and minerals. Vitamins mainly vitamin B and minerals like iron are very essential in synthesis of RBCs and Haemoglobin. Thus these Dietary supplement easily available from Kitchen Garden (Parasbag) showed more improvement. Meena Shelgaonkar, et.al. in order to understand the impact of an Organic Kitchen Garden for Nutrition (OKGN) to address nutritional deficiency anaemia, this correlation study was conducted by Aamhi Aamchya Aarogyasathi (AAA), implementing and knowledge partner of AFIF, with the support of The Sahayak Trust, in 2018**.** The analysis shows a noticeable increase of 1.25gm in the level of Hb after consistent consumption of organically grown vegetables from OKGNs. This is a significant improvement and it was also found that OKGNs are a far more acceptable and effective way to combat nutritional deficiency anemia than the standard administration of Fe+Folic acid tablets, which are often not consumed due to unpleasant side effects. AAA has also documented the Hb of 906 women over a period of 18 months and found an increase of 1.1 to 2 gm in Hb in 33.44% and slightly less than 1 gm Hb improvement in 39% of women growing OKGNs. Awareness on anemia and regular

consumption of vegetables was a vital starting point for this (26).

Conclusion

From this study it can be concluded that *Panduroga* can be correlated with iron deficiency anemia as it is the main cause as per modern science. In this study more occurrence of Panduroga was observed in married females in middle age group having *Mandagni*, and were farmers. This study concluded that group A treated with nutritional supplement obtained from (Parasbag) Kitchen Garden (Parasbag) and Gudharitaki Awaleha showed better improvement as compared to group B treated only with Gudharitaki Awaleha. This is because of organically grown vegetables and fruits are rich in nutrients which help in prevention of nutritional deficiencies. It helps in improving Haemoglobin percentage. This study will increase awareness among villagers regarding adequate consumption of organically grown vegetables and fruits acquired from KG. It is recommended that like Kelapur it will be implemented in other villages to make them Anemia (Iron deficiency) free.

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Conflict of Interest

No conflict of interest.

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