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ORIGINAL ARTICLE

"Growing Solutions: Evaluating the Impact and Viability of Poshan-Vatika in Combating Anemia among Pregnant Women and Adolescent Girls in Bhanvad Taluka, DevBhoomi Dwarka, Gujarat"

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Abstract

Introduction: Kitchen gardens, as small-scale vegetable cultivation areas within households, play a crucial role in providing a sustainable source of fresh and nutritious vegetables. This study forms a pivotal component of an innovation pilot project where kitchen garden intervention holds significant importance. The primary aim and objectives of this study revolve around assessing the effectiveness and feasibility of the kitchen garden intervention in addressing anemia among pregnant women and adolescent girls in Bhanvad Taluka of Devbhoomi Dwarka, Gujarat. By integrating the cultivation of vegetables within households, the study aims to contribute to improved nutrition and overall well-being in these specific demographic groups. **Materials and Methods:** The current study, conducted between June 2020 to March 2021, focused on Bhanvad Taluka of DevBhoomi Dwarka, Gujarat. Employing a mixed-method approach, the study targeted a sample of 60 pregnant women and 304 adolescent girls, selected through simple random sampling. Verbal informed consent was obtained from each participant to ensure ethical research practices. The evaluation team administered a semi-structured, pilot-tested questionnaire in the local language. Counsellors, including FHW/ MS/ FHS/ ASHA, actively participated in the project, contributing to the comprehensive nature of the study. **Results:** Severity of anemia got reduced due to the project interventions. Overall scenario among total beneficiaries at the end of project found that mild cases were increased and moderate cases got reduced while there no change among severe cases reported. **Conclusion:** The use of Kitchen Garden can promote awareness of the importance of a healthy diet and encourage the consumption of locally grown fruits and vegetables. However, further research is needed to evaluate the effectiveness and feasibility of Kitchen Garden as an intervention to address anemia among pregnant women and adolescent girls.

Keywords: Kitchen Garden, Anemia, Anganwadi centre, Pregnant women, Adolescent Girls, Counselors

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Graphical Abstract

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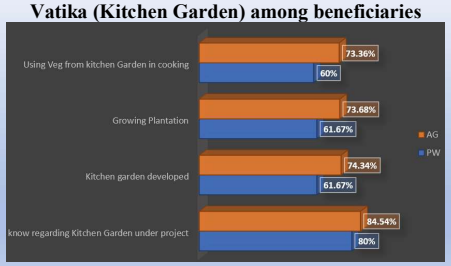
Aims & Objectives
To assess the effectiveness and feasibility of Poshan-Vatika (Kitchen Garden) intervention on anemia among pregnant women and adolescent girls in Bhanvad Taluka of Devbhoomi Dwarka, Gujarat.

Introduction
Kitchen gardens, as small-scale vegetable cultivation areas within households, play a crucial role in providing a sustainable source of fresh and nutritious vegetables. This study forms a pivotal component of an innovation pilot project where kitchen garden intervention holds significant importance. By integrating the cultivation of vegetables within households, the study aims to contribute to improved nutrition and overall well-being in these specific demographic groups.

Bar Chart showing Awareness regarding Poshan-Vatika (Kitchen Garden) among beneficiaries



Results: Severity of anemia got reduced due to the project interventions. Overall scenario among total beneficiaries at the end of project found that mild cases were increased and moderate cases got reduced while there no change among severe cases reported. **Conclusion:** The use of Kitchen Garden can promote awareness of the importance of a healthy diet and encourage the consumption of locally grown fruits and vegetables.

Material and Methods:
The current study, conducted between June 2020 to March 2021, focused on Bhanvad Taluka of DevBhoomi Dwarka, Gujarat. Employing a mixed-method approach, the study targeted a sample of 60 pregnant women and 304 adolescent girls, selected through simple random sampling. Verbal informed consent was obtained from each participant to ensure ethical research practices. Counsellors, including FHW/ MS/ FHS/ ASHA, actively participated in the project.

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Introduction

Anemia is a major public health concern in India, particularly among pregnant women and adolescent girls. According to a study conducted in the Devbhumi Dwarka district of Gujarat, the prevalence of anemia among pregnant and lactating women was found to be high [1]. Anemia during pregnancy can lead to adverse maternal and fetal outcomes, including preterm delivery, low birth weight, and maternal mortality [2] while adolescent girls are also at a higher risk of anemia due to poor dietary intake and menstrual blood loss [3]. As, iron requirement of the body increases during this period and resulting into anemia [3,4]. Poor iron content in body result into poor cognitive and motor development outcomes in children, can cause fatigue and low productivity and during pregnancy it is associated with poor birth outcomes like low birth weight, prematurity and death; in fact it can lead to maternal or perinatal mortality [5]. To address the issue of anemia among pregnant women and adolescent girls in Bhanvad Taluka of Devbhoomi Dwarka, Gujarat, a kitchen garden intervention is proposed. Kitchen gardens are small-scale vegetable gardens that can be grown in households, providing a source of fresh and nutritious vegetables. Several studies have shown that kitchen gardens can improve dietary diversity and

nutritional status. It is a cost-effective intervention to combat anemia at large scale. Poshan Vatika can play an important role in enhancing dietary diversity by providing key micronutrients through local fruits and vegetables. Poshan Vatika is a good example of convergent action on-ground. This is designed to address the issue of malnutrition through transparency, accountability, balanced diets, diet diversity and quality, greater grassroots involvement and last-mile delivery of services supported by key strategies, viz., corrective strategies to address nutrition related deficiencies, nutrition awareness strategies to develop good eating habits for sustainable health and well-being, strategies for communication and development of green eco-systems such as Poshan Vatika at or near Anganwadi Centres, wherever possible and in Government led schools and Gram Panchayat lands where benefits can easily be given to women and children [6,7]. It is to address the challenges of malnutrition in children, adolescent girls, pregnant women and lactating mothers through a strategic shift in nutrition content and delivery and by creation of a convergent eco-system to develop and promote practices that nurture health, wellness and immunity [6]. Current study is the part of the innovation pilot project in which Poshan Vatika intervention was very important component; thus, keeping this is mind the aim and objectives of this study was to assess the effectiveness and feasibility of poshan vatika intervention on anemia among pregnant women and adolescent girls in Bhanvad Taluka of Devbhoomi Dwarka, Gujarat.

Materials and Methods

The current study, conducted between June 2020 to March 2021 in Bhanvad Taluka of DevBhoomi Dwarka, Gujarat, is part of the innovation pilot Anaemia Project under ICDS. There were almost 3498 adolescent girls and 816 pregnant women registered in Bhanvad Taluka in June 2020 when baseline screening under the project was planned. Out of these, 3255 adolescent girls and 699 pregnant women were screened for anemia in June 2020. Out of these, 517 pregnant women and 3036 adolescent girls were found to be anemic, and all interventions under the project were directed to them. It was decided to take 10% of the sample of target beneficiaries under the project for evaluation, which came out to be 52 pregnant women and 303 adolescent girls in the Bhanvad Taluka. So for convenience, it was decided to include 60 pregnant women and 300 adolescent girls from various parts of Bhanvad Taluka for evaluation (Figure 1).

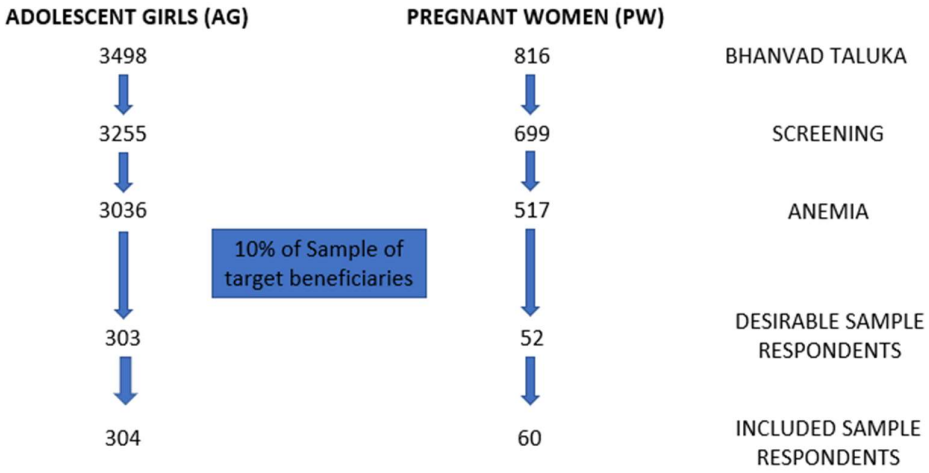

Figure 1. Sampling Frame and Sample

Utilizing a mixed-method approach, the study focused on 60 pregnant women and 304 adolescent girls, selected through simple random sampling. This initiative aimed to comprehensively address anemia and contribute valuable insights to inform future interventions and public health strategies. The inclusion criteria for the study encompassed individuals identified as anemic during baseline screening. Additionally, participants who demonstrated a willingness to provide consent were considered eligible for inclusion. This dual criterion aimed to ensure that individuals with a specific health condition, anemia, were included in the study, and that their active consent was obtained, emphasizing both health status and voluntary participation. The exclusion criteria for the study involved individuals who were not identified as anemic during baseline screening and those who did not express a willingness to provide consent. This twofold criterion was established to exclude participants who did not meet the specific health condition of anemia and those who chose not to participate voluntarily. By delineating these criteria, the study aimed to ensure a focused and willing participant pool, emphasizing the relevance of anemia status and active consent in the research. The study ensured ethical practices by obtaining Verbal Informed Consent from each participant and commenced after receiving approval from the institutional ethical committee. A semi-structured, pilot-tested questionnaire was administered in the local language by the evaluation team. Counsellors, including FHW/ MS/ FHS/ ASHA, played a pivotal role in the project. They underwent training before being instructed to provide counseling to beneficiaries at their respective premises. To monitor and assess the counseling services, the evaluation team conducted field visits, engaging with counsellors and beneficiaries, thereby ensuring the quality and effectiveness of the project activities. Nutrition awareness and affordability strategies in terms of Poshan Vatika aim to develop sustainable health and well-being through regional meal plans to bridge dietary gaps. This highlights the nutrient content of each plant and how they can help to address specific nutrition issues. Beneficiaries of the current study

were equipped with all the information needed to build their own Poshan Vatika from the shape of the garden, how to grow and harvest the plants, vegetables and fruits, to recommendations on medicinal crops.

The process of data entry was executed using MS Excel, and subsequent analysis was conducted utilizing the Statistical Package for Social Science (IBM SPSS Statistics version 26) along with MS Excel. The data was presented in terms of frequency, percentages, mean, standard deviation, and mean difference. Statistical significance in all analyses was determined by a p-value of <0.05, ensuring a rigorous approach to the interpretation of the results.

Results

In the current study, it was found that among Pregnant Women (PWs) that, both the number as well as proportion of anemia prevalence was reduced and it has been found that mild anemia (10-10.9 gm%) cases were more reduced at the end of the project. While the number and proportion of moderate anemia (7-9.9 gm%) among PWs remained almost same. While there was no case of severe anemia (<7 gm%) at the end of the project as compared to one case at the start of project among PWs. Among Adolescent Girls (AGs), it was found that there was more reduction of moderate type of anemia (8-10.9 gm%) at the end of the project while number and proportion of mild anemia (11-11.9 gm%) cases had been increased. It was also observed that one case of severe anemia (<8 gm%) was also increased at the end of the project. Above findings indicate that severity of anemia got reduced due to the project interventions. Overall scenario among total beneficiaries at the end of project found that mild cases were increased and moderate cases got reduced while there no change among severe cases reported.

The main aim of the evaluation of the innovation project was to assess the impact of various intervention done under the project on anemia status. The findings of anemia status among beneficiaries and its severity among them before and after the interventions are mentioned in Table 1. It was found that overall anemia burden among beneficiaries is reduced (9.34%). This reduction was more seen among PWs (18.33%) as compared to AGs (7.56%). We also found that as compared to base line screening findings, anemia prevalence had been decreased by 22.91%, 7.64% and 9.74% among PWs, AGs and both of them respectively at the end of the project.

It is observed that there is slight increase in the number as well as percentage of mean Hb level at the end of the project. There is slight change in mean Hb level and its variation among beneficiaries. As compared to base line mean Hb level findings, it is found that there is 4%, 6.02% and 5.64% rise in the percentage of mean Hb level respectively at the end of the project (Figure 2). Most of PWs (80%) and AGs (84.54%) know regarding kitchen Garden under the project. Out of total PWs, approx. 60% developed kitchen garden, had grown plantation and were using them. While approx. 74% AGs developed poshan vatika, had grown plantation and were using vegetables from it for cooking (Figure 3).

Out of all beneficiaries, almost 60% developed kitchen garden and had grown plantation and using them in their daily routine. Though, it was not developed in household of 39%. The major

reasons given by them for not developing kitchen garden were unawareness, no information, lack of space and eaten by cattle. No awareness and without any information and not developing kitchen garden reflecting communication gap from project level.

Out of total beneficiaries, 66% of beneficiaries are counseled regarding kitchen garden and 38.10% ofbeneficiaries are supported for development of kitchen garden in the form of mainly by giving seeds and education. As per response from counselors, most of the beneficiaries supported for kitchen garden are growing plantation and using vegetables for them (Table 2).

Table 1. Anemia burden among beneficiaries in Base line and End line screening

Anemia	**PW (n = 60)**		**AG (n = 304)**		**Total (n=364)**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Baseline	48	80.00	301	99.01	349	95.88
End Line	37	61.67	278	91.45	315	86.54
Decrease	11	18.33	23	7.56	34	9.34
% Decrease from baseline	22.91%		7.64%		9.74%	

Table 2. Findings of Poshan-Vatika by Counselor

	N=1029	**%**
No. of Beneficiaries counseled for Kitchen Garden	679	65.99
No. of Kitchen Garden developed	392	38.10
Growing Plantation	389	37.80
Using Veg in Project	387	37.61

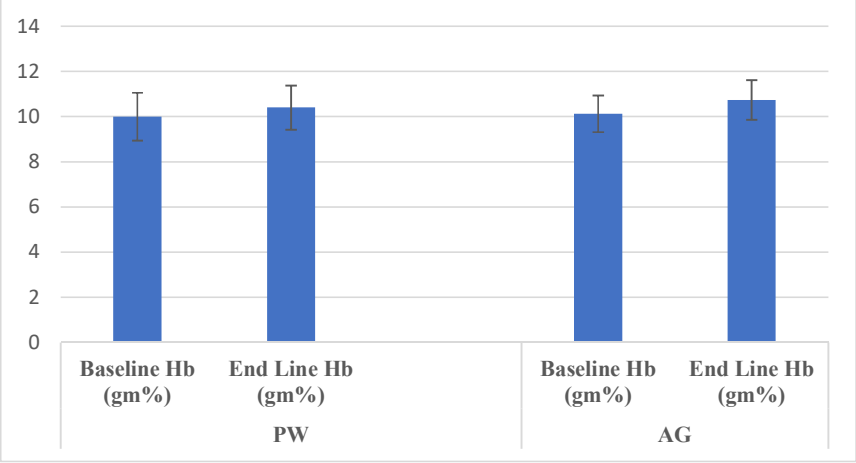

Figure 2. Mean (SD) Hb level among beneficiaries in Base line and End line screening

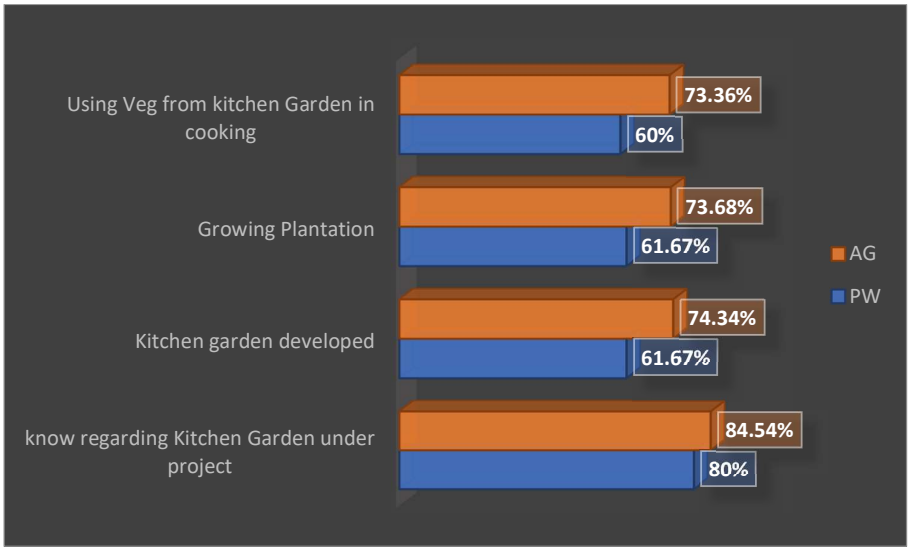

Figure 3. Awareness regarding Poshan-Vatika (Kitchen Garden) among beneficiaries

Discussion

According to the current study, there was a provision under the project for supporting and developing kitchen garden at AWCs, Beneficiaries Households, school etc. in Bhanvad Taluka. Support was given to AWCs for developing Kitchen Garden within premises of AWCs under the project like fencing, seeds, building wall, giving readymade "kyaras" etc. It was also observed that many beneficiaries have their own "Wadis" or Farms or Gardens in their own households and they are planting and growing vegetables, fruits and other items. As per interaction with them, many of them received support especially received seeds for developing kitchen garden (Poshan Vatika) under the project. As per Londhe et al. [8] primary focus of such intervention is to bridge the gap between easy affordability and scarcity. While in another study [9] kitchen garden in addition with supplementary nutrition could bridge the gap between recommended dietary allowance and the average daily intake. Other study [10,11] showed that the lack of resources being main factor to affect food and nutritional security at the remote area, resulting in micronutrient deficiency, particularly in children, pregnant and lactating women. So, Poshan Vatikas was very much essential in isolated places and villages far from main cities. As per Arimond et al. [12] dietary diversification which include home gardening was an effective strategy to improve nutrition in maternal and child under nutrition. Study done in villages of Odisha and Maharashtra [13] showed the favorable results in terms of improved diet diversity after promotion of nutrition gardens similarly study by Khan et al. [14] positive health and nutrition behavior change, improved nutrition and food preference in children improved after introduction of school garden. According to Michaux et al. [15] and Verbowski, et al. [16], all experimental households received seeds, seedlings as intervention to grow and came with conclusion that nutrition-sensitive agriculture programmes should be adopted to improve nutritional status in women and children over a period

of time. Whereas as per Peter R Berti et al. [17] agriculture interventions had mixed results in terms of improving nutritional status in participating households as there was difficulty in comparing the outcomes of interventions to distinguish between the effects of the type of intervention, having a nutrition objective and the types of capital investment, because of the fact that all of the home gardening interventions had an explicit nutrition objective as well as investing broadly in various types of capital, especially nutrition education (human capital).

Several studies have reported the effectiveness of Poshan Vatikas in improving hemoglobin levels among pregnant women and adolescent girls. A study [13] conducted in rural Maharashtra found that the use of Poshan Vatikas led to a significant increase in hemoglobin levels among pregnant women. Another study [18] conducted in a tribal area of Gujarat found that the use of Poshan Vatikas led to a significant increase in hemoglobin levels among adolescent girls.

Current study showed that majority of beneficiaries who did not grow plants in kitchen garden had lack of awareness and information regarding it while another study done at rural areas of Nanded district [19] most of the women (91.33%) were giving very less priority to household kitchen garden than their farm activities. However, 87.33% women reported the problem of unavailability of improved vegetable seeds and seedlings followed by lack of technical guidance (73.33%), improper water availability for garden (24%) and lack of family support (15.33%) were also problems faced by women while developing kitchen garden. Current study showed that approximate 80% beneficiaries were made aware through counselors regarding kitchen garden that how to grow plantation and regarding seeds and seedlings while According to Sudhakarrao [19] Around 18% women had knowledge about kitchen garden whereas, highest knowledge was observed on proper sowing time and season (50%) while as per Singh et al. [20] most of the beneficiaries did not have sufficient knowledge to grow and cultivate plants in kitchen garden while as per another study [6] development of Poshan Vatika at AWC might face challenges in the implementation, mainly related to the (a) time on the part of Anganwadi worker/helper or maintenance staff as they are already “overloaded” with other duties, (b) funding amount—Poshan Vatika will require considerable amount for procurement of seeds, cultivation/maintenance cost, fencing, etc., (c) support on the part of community or parents or volunteers, and (d) availability of space in the urban area.

Conclusion

In conclusion, the implementation of Poshan Vatikas in addressing anemia among pregnant women and adolescent girls in Bhanvad Taluka, Devbhoomi Dwarka, Gujarat, shows promise as a multifaceted intervention. These nutritional gardens not only combat anemia but also act as agents for heightened awareness regarding the importance of a healthy diet and the consumption of locally cultivated fruits and vegetables. Poshan Vatikas provide a sustainable reservoir of fresh, nutrient-rich produce, contributing to enhanced dietary diversity and improved nutritional well-being. The establishment of standardized mechanisms and pathways is crucial for comprehending how Poshan Vatikas can

positively influence community health. While existing studies indicate their efficacy in elevating hemoglobin levels, further research is imperative to evaluate the overall feasibility and effectiveness of Poshan Vatikas in addressing anemia among the target demographic. Continuous evaluation and research efforts will aid in documenting the seamless integration of these programs into Anganwadi Centers, ensuring a comprehensive understanding of their pivotal role in promoting community health and well-being.

Limitations and Recommendations

The evaluation adopted an exploratory study design for undertaking the quick assessment of the innovation pilot project. As the sample size was relatively lesser which included 14 AWC; higher sample size would increase external validity of the study. Multiple training sessions should be given to both counselors and beneficiaries as for changing behavior and life style modification needs time and motivation. Awareness regarding seeds, saplings, methods to grow and importance of Poshan Vatika should be given to the study population. Initiation and maintenance of poshan vatika was challenging as it requires considerable amount for procurement of seeds, cultivation/maintenance cost, fencing, etc. Also, support on the part of community or volunteers were needed and should be given at utmost priority. Proper space should be given at AWCs or at home of study population for growing plantation.

Conflicts of interest

The authors declares that they do not have conflict of interest.

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