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Understanding the sufficiency of community based nutritional interventions: a social determinants perspective

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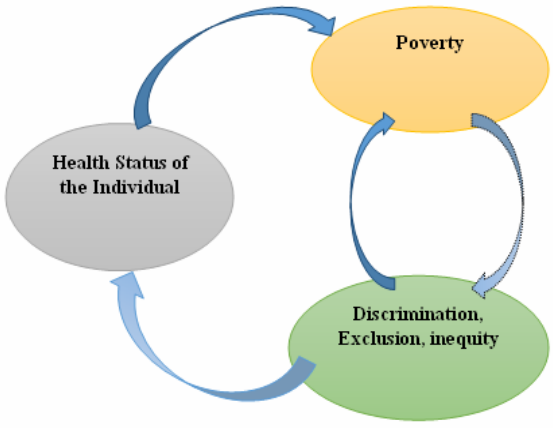
Abstract: *Back ground:* The relationship between socio-economic determinants and health is well known, and it is well established particularly with respect to malnutrition. Importantly, the health of those who are at the lowest strata such as those belonging to deprived social classes and women is worst hit. Considering that women face health inequities the most, the government of India launched "Rajiv Gandhi scheme for empowerment of adolescent girls" also called as "Sabala Yojana". *Objectives:* The current study attempted to understand the interplay of the socio-economic determinants, in a national programme context and explain how they influence the utilization of benefits of Sabala Yojana by adolescent girls. *Methodology:* The study utilized a Quantitative led qualitative mixed-methods approach. Structured questionnaire was used for quantitative data collection whereas In-depth Interview guides were used for qualitative data collection. Descriptive and Inferential statistics were used for quantitative data analysis, thematic analysis was adopted for qualitative data analysis. *Results: Quantitative Results***:** Mean BMI = 16.29 (N= 219), SD = ± 2.79. Regression Analysis BMI and Caste of Individual: Constant (b_0)= 14.496, (t)= 78. 270, $p \leq 0.01$ (r^2 = 0.580) .for OC, OBC and Other caste groups (b)= 4.275, (t) 17.299, $p \leq 0.01$; BMI and Income: Constant (b_0)=10.162, (t) = 22.493, $p \leq 0.01$ (r^2 = 0.53). for income (b)= 0.01, (t) = 15.55, $p \leq 0.01$. *Qualitative Results***:** Regularity of supplies, overburdening because of multiple programmes, poverty, lack of proper storage facilities, quality of the nutritional supplements, Utilization of Supplements for Household needs and Iniquitous utilization of supplies at household level were the emergent qualitative themes. *Conclusion:* The results of the study show that though the nutrition supplementation programmes provide considerable inputs, the efficient utilization of benefits is influenced by several social determinants, which if unchecked makes the success of the programme non-achievable.

Keywords: Malnutrition, Health Services, Hunger, Poverty, Body Mass Index.

Introduction

Poverty, discrimination and malnutrition are among the prominent challenges hindering the development of the community, and are among the most important challenges faced by several low and middle income countries including India. Most importantly, they are the predominant determinants of the health status of the individuals and their predisposition to illness and disease [1-4]. The relationship between poverty, discrimination and ill health is well understood and were even emphasized upon as the most important aspects to tackle health inequities as informed by WHO's commission on social determinants of health [4]. The interplay of socio-economic determinants such as poverty and inequity in influencing each other and impacting health could be visualized from figure 1, and is even stressed upon from time to time in the literature [5-7].

Figure-1: Figure depicting the inter-relationship between the Poverty, Discrimination and Health.



Malnutrition is one of the most important health issues in the developing world predominantly in the countries like India.

Malnutrition, primarily under-nutrition has its roots into systematized inequity, continuous economic deprivation and persistent hunger, which are often addressed by improper or inadequate pacifiers. With over 21% of its population living in poverty, India stands at 55th position in the global hunger index [8]. According to the third round of National Family Health Survey around 40% of the country's children were under weight and over 50% of the women in the reproductive age were anemic [8]. Additional to the under-nutrition among children and women, under nutrition among adolescents is an another pre-existing problem with serious consequences in later stages of life [1].

Considering the consistent existence of such serious level of under-nutrition, several programmes were initiated by the Government of India, among which Sabala Yojana launched in the year 2011 was one of the prominent one's [9-10]. Sabala yojana which was also called as "Rajiv Gandhi Scheme for Empowerment of Adolescent girls" has its primary objective to enhance the nutritional status of the adolescent girls and to empower them. The programme was running since then under the ministry of women and child welfare via anganwadi centers of integrated child development scheme (ICDS).

Under the nutrition component of the programme the adolescent girls are provided monthly supplies of additional supplementary nutrition and iron and folic acid (IFA) supplementation to prevent under nutrition and anemia among them. However what are the operational challenges at the ground level? How the socio-economic determinants of poverty and discrimination effect the implementation of such programmes is little understood. Using Body Mass Index (BMI) as one the prime out-come indicators, and employing the quantitative led qualitative mixed methods design, this current research paper attempted to address this gap and inform how the socio-economic determinants influence the functioning of the programmes at the ground level.

Objectives:

1. To understand how social determinants influence the implementation of nutritional programmes at ground level.
2. To explain the interplay of socio-economic factors in utilization of nutritional programme benefits by beneficiaries.

Material and Methods

Study design: Considering the objectives of the study it could be said that the study attempted to explain the phenomenon, not just explore it or describe it in terms of mere numbers. Thus, the researcher intended to mix the advantages of both the descriptive quantitative design and exploratory qualitative design with an assumption that both the means would collaborate each other. Thus it can be said that the study was a Mixed-methods study. Within the mixed methods design, considering the feasibility of the study, the researcher adopted a quantitative led qualitative mixed-methods design which facilitated data collection, analysis and triangulation.

Sampling Criteria: Inclusion and Exclusion criteria were developed to ensure the compatibility of the sampled participants for the study.

Inclusion criteria:

- Adolescent girls in the age 13-17 years, who were permanent residents of the sampled blocks and are enlisted at anganwadi centers were included in the study.
- Anganwadi workers (AWW) with self-reported knowledge of functioning of Sabala programme under her judistriction, and who have been working as AWW since at least three years.

Exclusion criteria:

- Participants whose contact address was not obtained at anganwadi center and those who were not present at the time of data collection were excluded
- Participants who doesn't comply with provision of informed consent were excluded from the study.
- Anganwadi workers who report lack of knowledge about the functioning of sabala programmes were excluded.

Sampling: The sampling for the study was done in two parts, the quantitative part and the qualitative part.

Part 1: Sampling for Quantitative part. The sampling method opted for the quantitative part was multistage simple random sampling. The districts where the sabala yojana was being implemented constituted the initial sampling frame form which two districts were randomly sampled. From the two districts the semi-urban blocks are enlisted from which 10 blocks are selected randomly. The list of anganwadi centers in the blocks make up the third sampling frame and 2 anganwadi centers were randomly selected from each block. From the anganwadi centers again the list of adolescent girls under their judistriction is collected from which 11 adolescent girls were randomly sampled under each anganwadi center. A total of 220 adolescent girls were included in the sample of the study. However, one was excluded because of missing variables making the sample to 219 individuals.

Part 2: Sampling for the Qualitative part. Guided by the sampling from Part 1, from the anganwadi centers, 8 anganwadi workers and 8 adolescent girls were selected by the means of purposive sampling, for the qualitative part of the study.

Data Collection tools: The data was collected by two means, survey and qualitative in-depth interviews. Structured questionnaire was designed to conduct quantitative survey whereas in-depth interview guides were designed to conduct qualitative interviews. The tools were validated in a pilot study before employing them in the main study.

Data Collection: Given that the data collection primarily involves collection of data from Adolescent girls, the aid of female data collectors who were Masters Students was taken. The data collectors were trained and data collection process was supervised by the researcher to prevent any errors. The qualitative interviews were conducted by the researcher himself.

Ethical Consideration: The data collection process of the study was initiated with a prior approval of Ethics committee of University of Hyderabad. All the participants were informed about the study both verbally in the language they understood (English or Vernacular language as per the participant's convenience) and by the means of participant information sheet which was provided to them. The participants were explained in-detail about the benefits and risks associated with the study, after which the written consent was obtained. Written consent was obtained both for the quantitative data collection and qualitative data collection. Additionally, measures were taken to ensure confidentiality and anonymity. The data security was ensured by storing the data in the password protected computer.

Data analysis: The quantitative data was analyzed by using International Business Machine's (IBM's) Statistical package for Social Sciences (SPSS) version 21, using descriptive statistics and linear regression models. The qualitative data was analyzed by using thematic analysis method as advocated by Braun and Clarke (2006) [11]. The coding of qualitative data was facilitated by using Atlas ti version 7.57. The quantitative data is triangulated with qualitative data to get the clear picture of the phenomenon under study.

Results

The sample comprises of 219 participants of which around 43.8% (96) belonged to SC or ST social group where as 56.2% (123) belonged to OC, OBC or other Social groups. Around 68.5% (150) were aware about the programme and said that it was functional, on contrary 31.5% (69) were unaware about the programme.

However, considering the utilization of the programme facilities 75.8 (166) informed that they were actually utilizing the nutritional facilities provided by the programme, and the rest 24.2% (53) informed that they are not utilizing the nutritional facilities provided. Considering the economic status of the families, around 5.5% (12) informed their family income to be ranging between 1000-3000 rupees per month, 15.1% (33) reported family income to be between 3001- 5000 rupees per month, 34.7% (76) reported family income between 5001- 7500 rupees and 44.7% (98) reported family income more than 7500 rupees per month. The mean BMI stands at 16.89, with standard deviation of 2.79.

Table-1: Table showing the interaction between Caste of the Individual and Awareness about the Programme and Utilization of Programme benefits

Caste of the Individual	Awareness about the Programme			Utilization of Programme Benefits		
	Aware	Not Aware	Total	Utilizing	Not Utilizing	Total
SC or ST	77	19	96	83	13	96
OC, OBC and Others	73	50	123	83	40	123
Total	150	69	219	166	53	219

Table-2: Table showing the interaction between the variables Awareness about the Programme and Utilization of Programme benefits

Awareness about the Programme	Utilization of the Programme benefits		
	Utilizing	Not Utilizing	Total
Aware	122	28	150
Not Aware	44	25	69
Total	166	53	219

Looking in to how variables interact with each other, Table 1 shows interaction between caste of the individual and awareness about the programme, and how caste of the individual is interacting with programme utilization. It visualizes that around 80% of the adolescents who were from SC/ST background were aware about the programme, where as 59.3% of the adolescents from other social groups such as OC, OBC and others were aware about the programme. Similarly, it can be deduced that over 86% of adolescents belonging to SC or ST caste were utilizing the programme benefits, whereas around 67% of those belonging to OC, OBC and Other Caste groups were utilizing the programme benefits. Looking at the interaction of variables awareness of the programme and utilization of programme benefits as reflected by table 2, over 81% of those who are aware of the programme were utilizing the programme benefits where as 63.7% of those who were not specifically aware of the programme reported utilizing programme benefits.

Considering the interaction between income levels and utilization of programme benefits from table 3, over 91% of those whose income is between 1000-3000 rupees were utilizing the programme benefits. Whereas it is 60%, 84% and 72% for 3001-5000, 5001-7500 and 7501 and higher income levels respectively.

Table-3: Table showing the Interaction between the income level and the utilization of the programme benefits

Family income Level of the Adolescent	Utilization of Programme benefits		
	Utilizing	Not Utilizing	Total
1000-3000	11	1	12
3001-5000	20	13	33
5001-7500	64	12	76
7501 and above	71	27	98
Total	166	53	219

Regression analysis: the regression analysis was done to understand the influence of Caste and Income on the BMI of the adolescent which is an indicator of nutritional status of the individual. Caste of the individual is able to predict the change in Body Mass Index significantly. Constant (b_0)= 14.496, (t)= 78. 270, $p \leq 0.01$ ($r^2 = 0.580$) .for OC, OBC and Other caste groups (b)= 4.275, (t) 17.299, $p \leq 0.01$.

Family Income of the individual significantly predicted the change in BMI of the adolescent. Constant (b_0)=10.162, (t) = 22.493, $p \leq 0.01$ ($r^2 = 0.53$). for income (b)= 0.01, (t) = 15.55, $p \leq 0.01$. Utilization of programme benefits also significantly predicted the change in Individuals BMI. Constant (b_0)= 16.006, (t) = 89.34, $p \leq 0.01$ ($r^2 = 0.320$). For those who are not utilizing the programme benefits b= 3.681, (t) = 10.110, $p \leq 0.01$.

Results of Qualitative Part of the Study: The qualitative interviews are analyzed using the thematic analysis approach as advocated by Braun and Clarke (2006). The results are arranged in the following themes.

Interviews of AWWs: Anganwadi workers explained how various aspects influence the functioning of the programme.

Regularity of the supplies: Anganwadi workers informed that the regularity of the supplies is the most important problems what they face for implementing the program. "They will send eggs, they will send rice and dal, but they don't send it properly. They will send it this month and next month they may not send it, again they will send it in the following month"(AWW 01).

Owing to the regularity of the supplies the implementation the programme is also seriously affected reflecting on irregular provision of the nutrition supplements to beneficiaries. "They don't give the things on time. For example we get supplies this month on 10th and next month we will get them sometimes on 2nd and sometimes on 17th we don't know when they will come, so the beneficiaries will not be present at their homes when these supplies come. So they will receive them late" (AWW 04).

Moreover, it was even opinioned by the AWWs that, the irregularity of the supplies also influences the quality of the supplies. "We don't get the supplies on time, when you get them late it is usual that the supplies start getting spoiled, and in the end we get the supplies which are spoiled which we give to the adolescents" (AWW 07).

Additionally, it was also seen that social contexts and discrimination at the level of local governance could also influence the regularity of supplies. "Our center is in SC colony, there is an another center for the OC colony also, but they are much better. They don't have many problems as we face, if they don't get supplies the surpanch who is from their caste will call and make it sure that the supplies are provided….. Even they have new building and even toilets are constructed for their center and our center they don't even care about it"(AWW08).

Burdening influencing the programme functioning: It was understood that there are considerable number of nutritional interventions taking place via Anganwadi centers which might influence programme functioning. "There are lot of programmes happening, there are programmes for children, there are programmes for pregnant and lactating mothers, there are programmes for adolescent girls", it becomes difficult to maintain these many programmes" (AWW 02).

Additionally, it was even opinioned by the AWWs that the overlapping of the programs cause an additional burden influencing the overall efficiency of the programme. "You don't get proper supplies for mothers, but there are supplies which are to be given to adolescents, but the meals for mothers also cannot be ignored right so I need to see that the supplies from the stock given for adolescents is used for mothers because it is important"(AWW06).

Lack of proper storage facilities: Lack of proper storage facilities is an important concern when talking about the nutritional supplementation programmes, crunching their implementation. "We get eggs, and normally they come to us late, how many weeks does eggs remain normal without getting damaged? It would be good if they provide fridge kind of thing to store such perishable goods"(AWW 02).

Poverty at the level of beneficiaries: Additional to the above mentioned aspects the AWWs even opinioned that the poverty at the level of beneficiaries is found to hinder the efficiency of the programme. "Because of poverty what happens is that even though we provide them these supplies they don't use it for themselves so it will not help them" (AWW 06).

Interviews of Beneficiaries:

Quality of Supplies: From the perspective of the beneficiaries, i.e., the adolescent girls who are utilizing the programme, the quality of supplies is found out to be one of the most important problems faced which might influence the overall utilization of programme. "The supplies what we get are not very good, there are insects in the rice and dal, and at least 4-5 eggs in the 14 eggs they give are spoiled" (BEN 03). "Lot of times we get the supplies which are not good, half of the things what they give are spoiled" (BEN 07).

With ill quality supplies the utilization of the programme benefits is also hindered, as lot of the beneficiaries are even reluctant to access the facilities owing to the poor quality. “I used to take the supplies previously, but they don’t give good stock always one day there were lot of insects in the rice, from then on I stopped taking the supplies (BEN 08).

Regularity of Supplies: The regularity of Supplies was understood to be one of the important problems faced by the beneficiaries. “We don’t get the supplies every month, some months they will give it to us, some months they wont give, and some times they will give the supplies of two months at once, there is no regularity, we don’t know when we will get, and we wont” (BEN 03). Additional to the irregularity of supplies, it was also understood that their exist favouritism which could be seen in the backdrop of irregular supply. Moreover, it could be seen that this kind of favoritism is existent mostly when the supplies are poor. “They will give supplies regularly to those who are their relatives or those who are of their caste, but when we go, they will tell that the stocks are over so we will get them only next month” (BEN 05).

Utilization of Supplies for House hold needs: the supplies which were provided to the adolescent girls were not used by the girls as expected. They were used by all the other members of the family even. “I and my sister go the center and bring the supplies what they have given and we give them to our mother, we used them in our house for 10 days like that” (BEN 03).

Moreover, this was justified by the beneficiaries considering their economic status and as quoted by them, poverty could be considered as one of the major reasons for such utilization. “Our parents don’t earn very much, we are poor so whatever they give us will be of some help to us. That is the reason I take them even though they don’t give good quality food to us” (BEN 07).

Inequities in utilization of benefits at home: It was even informed that there are inequities in the utilization of benefits even at household level. “I take what is given to me and give it at my home and we all will share it. If I am given 12 eggs I will eat around 4-5 eggs in them, and rice, dal, oil, we cook it and eat together” (BEN 04).

Additionally, incidents of gender based discrimination at the household level impacting the adequate utilization of nutritional supplements was informed by one of the respondents. “My mother says that my father goes for work daily and he works hard so males should eat more eggs and more food, she says that women since they are at home most of the times they don’t need much energy, so it is ok even if we eat less” (BEN 08).

Discussion

The WHO’s commission on social determinants of health argue that, the health status of the individual is dependent on several social, economic and political factors which frame his/her social environment in which the individual lives [4]. The iniquitous distribution of the resources (both at individual level and community level), result in persistent inequities. The similar is the true even for the health resources, where the persistent inequity has resulted in poor health situation among those who are deprived and marginalized.

Females are considered to be the gender which is marginalized since centuries, in the patriarchal societies around the world. Most importantly when we look in to the marginalization with respect to social groups, the females from the marginalized social strata are the ones who seem to face a double burden of marginalization. Studies even reflect on persistent gender inequity as a reason for higher prevalence of anemia and malnutrition among women [12-13] which could further impact her health status, overall influencing the important health impact indicators such as maternal mortality rate. Considering this the government of India, initiated several national level programmes under the ministry of women and child welfare, under which the sabala yojana is a prominent one primarily dealing with adolescent girls.

The nutritional status of the adolescent girls was measured by calculating their body mass index (BMI). Though there are other means to measure nutritional status, the BMI was chosen as it has reflected proficient results

else where[1, 14], and as it was one of the most simplest and efficient means to measure nutritional status. It was observed that the mean BMI was standing at 16.89 with a standard deviation of 2.8. Though the mean BMI reflect under nutrition with respect to the prominent WHOs idea of BMI less than 18 being as under nutrition [14], the standard deviation of 2.8 provides the relaxation for at least 50% of the sample in this regard. However, this could further be understood when BMI is in turn understood along with the other variables of income, caste and utilization of programme benefits.

Table 1,2 and 3 reflect on the utilization of the progaramme with respect to the caste, income status, and the awareness of the individuals. Overall, it was understood that a significant proportion of the individuals (atleast 65%) were utilizing the programme and accessing nutritional supplementation services. However, are these aspects being translated in to better nutritional status is the issue of concern.

The regression analysis gives a better explanation. Concerning the economic status, the regression analysis clearly reflects on the impact of the family income on the BMI of the individual, in the minute possible detail. It was observed that with every one rupee increase in the family income, the BMI of the individual rose by 0.01. Though, the value looks minute, considering the difference of income in thousands, the increase in BMI would be much greater and significant.

A much wider understanding could be obtained from the qualitative data reflecting on the perspectives of various stakeholders quoting poverty as one of the major reasons for poor translation of benefits. From the above mentioned perspectives, and as supported by table 3, the beneficiaries are primarily from the lower economic backgrounds, and for them though the nutrition supplements given under the programme are just for the girls, they are used for the whole family indeed. This reflects the situation how poverty might influence the utilization of services.

Additionally, looking from a gender perspective and the power relationships and dynamics within the family, it was observed that owing to their lesser position within the family the adolescent girls did not have the adequate amount of nutritious diet, as entitled by the programme. Overall, it reflects how poverty and gender discrimination go hand in hand. It reiterates the statement made by the commission on social determinants of health that, the factors causing inequities has a cumulative effect in influencing health inequities across the population [4]. The similar results were reflected upon by the other studies, which emphasized upon the social determinants influencing the nutritional status of the individuals [15-17].

An additional aspect to be considered is the social status of the individual. The social status of the individual is considered to be one of the most important social determinants effecting one's health and wellbeing. The importance of social status in influencing the health of the individual was recognized right from the time of Edwin Chadwick when he reported on the health status of laboring class in England in 1840's [18]. These inequities in health status because of iniquitous social status was stressed upon even by WHOs commission on social determinants of health [4]. Moreover, it was even identified that the iniquitous social status has considerable influence on increasing the risk of individuals to non-communicable diseases [2].

From table 1, it can be seen that there is a higher proportion of utilization of the services provided under sabalayojanaamong the lower socio-economic groups. However, the regression analysis says a different thing. The BMI at constant i.e., for SC and ST caste groups was standing around 14.50 units. However, for the caste groups of OC, BC and other castes BMI increases by 4.27 units, making the BMI for OC, BC and other caste groups to be standing at 18.77, which is in range with the normal level of BMI [3].

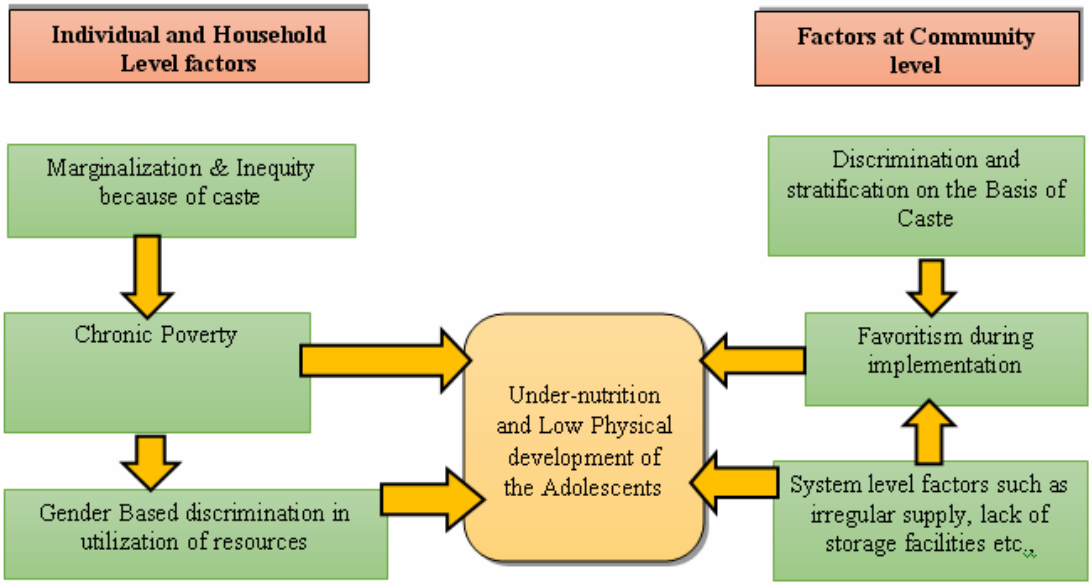
This higher utilization of services but lower levels of BMI in the individuals belonging to lower social backgrounds reflects a paradoxical situation. This could further be understood from the qualitative component of the data. Looking at it, it can be said that though the individuals belonging to lower

social groups were utilizing the services, the important aspects which influence the efficiency of these services such as regularity of the supplies, quality of the supplies and the sufficiency of the supplies were influenced by "local power dynamics, favoritism and caste based inequity" at the community level. Such an influence of social background based inequity on access to services was even reported in other programmes as well [19-20].

Additionally, the contribution of factors of poverty and gender discrimination at the household level, bringing down the benefits for the adolescent girls is informed form the qualitative results in the study.

Overall, it could be said that both poverty and inequity are acting as a prime barriers for effective functioning of sabala yojana. It could be said that though Sabala Yojana has been running, the impact it could create in the lives of adolescent girls is being compromised by these factors. How these social determinants impact the nutritional level of the adolescents is summarized in the framework given in the figure-2.

Figure-2: Framework showing the interplay of poverty and discrimination resulting in under nutrition



Strengths of the Study: The study's primary strength is it being a mixed method's study. The mixed methods design not just helped to quantify the nutrition levels among the adolescent girls, but also explain the fluctuations in their nutritional levels with respect to various socio-economic determinants. By constructing a frame work (figure-2) the study identifies the importance of the local power dynamics in influencing the implementation of community based programmes, such as that of Sabala programme.

Weakness of the Study: The study's inclusion criteria primarily includes those adolescent girls who were enlisted at the anganwadi centers, missing out those who were not enlisted. Majority of the questions were self-reported, thus certain errors are inadvertent. The lesser sample size of the qualitative (8 beneficiaries, and 8 AWWs) part is another weakness, however the inclusion criteria ensures cultural competency of the participants which aids to overcome this.

Future directions of the study: Though several community based nutritional interventions are designed, mostly their success or failure is attributed using quantitative measurements but the qualitative aspects underlying them are less recognized, the study reasserts the need for such studies for better understanding of these domains.

Conclusion

With a mixed methods design this study reflects on how social determinants impact the implementation of nutritional programme at the ground level; it also explains how the individual socio-economic factors and their interplay impact the efficient utilization of nutritional interventions by the beneficiaries, thereby hindering attainment of the overall objectives of programme.

Overall, it can said that what so ever programme might be, the success of the programme to the grater extant is largely dependent on how efficient it is in tackling ground level disparities. Unless and until the socio-economic disparities of poverty, inequity and discrimination are addressed on a war foot, all the additional programmes act as pacifiers are not sufficient or sustainable options.

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