**Effectiveness of Millet--Pulse-Groundnut based formulations in improving the growth of the**

**pre-school tribal children in Telangana State, India**

**Supplementary Files**

**Table S1. Mothers’ knowledge, acceptance and challenges during intervention**

|  |  |
| --- | --- |
| **Questions asked (selected)** | **Mother’s answer** |
| What do you know about millets? | “We know millets are healthy, but we don’t know what is in it that makes us healthy”  “It is generally given in our village to diabetes and sick people” |
| Do you eat millet at home? Or do you feed millet to the children at home? | Some mothers “Yes” (ones in two days)  Some mothers “Yes” (only during summer)  Some mothers “no” |
| If you make millet dish at home, what form you make/eat? | Mostly as porridge rarely roti (Indian flat bread) |
| Why don’t you eat millet in place of rice? | “Rice is easy to cook so we make rice everyday”  “We are used to rice”  “As we go to our farm work rice is easy to make compared to any other dish” |
| Why you consume only as porridge? | “We consume millet in the form of porridge especially in summer because it keeps our body cool as we add water or yoghurt in it”  “During summer we don’t feel like eating rice as it is not palatable, but we like to consume millet porridge which is more palatable during summer, and it keeps our body cool. Therefore, we make millet porridge and take to form and also, we consume millet porridge at home which means we consume less rice more millets in summer”  “We consume millet in the form of porridge only because it is easy to make”  “We consume millet in the form of porridge in summer because there is no farm cultivation work to be done, so we are free and could be able to prepare different meal other than rice”  “In summer we consume millet because it provides more energy and helps us to protect from sun stroke” |
| Where did you learn about millets and sorghum? Or where did you hear about millets? Or what is the source of information? | “From the anganwadi teachers”  “We studied about millets in school”  “From elders at home” (parents and grandparents) |
| What did your elders at home say about millets? | Elders at home usually say “eating millets regularly only kept us healthy and strong but the diet these days are not as healthy as what we consumed those days”  “Those days we pound our grains at home which was healthy and tasty whereas now it is milled and polished at grain mill which is not healthy and not tasty” |
| What are the constraints in consuming millet by you or feeding the millets for your children at home? | “It is not produced in our village”  “It is not available in our village”  “We need to travel to buy them from other places (at least 30 to 60 kms)”.  “It is not affordable for us compared to rice which can be purchased at 1 Rs, millets are expensive (price varies from 60-100 Rs).  “The children usually trained to eat family diet and rice is our family diet”  “Rice is easy to cook compared to millets”  “At home-cooking the similar taste is not achieved like the food provided in AWC”  “Time consuming to travel and buy, and cooking millet take lot of our time”.  “Generally rice is preferred by all family members, so we are not able to make millet at home for children as we want the family food pattern to follow for all members at family”  “We used to rice now, so we are not able to go back to millets even if it is available” |
| What are the production constraints? | “Those days we never used any chemicals in millet production process but now our land is used to lot of chemicals after started producing rice so now we are not able to produce millet without chemicals. Moreover, all the farmers produce rice so we have common arrangement to protect the crop from birds and monkeys so I can’t produce millet by myself as it can become a trap crop for birds and monkeys, and I need to do the protection process myself without support and I may not be able to control the threat properly”  “Millet production is risky for us. We won’t get better yield compared to rice and also we don’t get better price”  “Our soil is suitable for rice not for millet as it stores lot of water, millet is dryland crop” |
| Why didn’t you like multi grain savoury meal and sorghum meal? | “It was salty and spicy whereas energy bar and multigrain sweet meal were sweet in taste, so children liked them more than multigrain savoury and sorghum meal”  “Children prefer mostly sweet meal over savoury meal” |
| What changes you observed in children during nutritional intervention? | “Children were generally more active”  “Weight gained”  “Number of visits to hospital generally reduced”  “Grown tall”  “Recovered quickly from illness” |
| What changes you have seen after stopping nutritional intervention? | “Children started asking for the snacks provided in the feeding program which we couldn’t make at home” |
| Benefits of  the nutritional intervention in your opinion | “I could be able to save money on snacks which is increasing after they stopped the intervention”  “Children shown more interest to go to school regularly without making fuss”  “Some of the snacks such as groundnut cakes, we can also buy at shop but the quality is very poor and our children become sick. The food given in  nutritional intervention has good quality” |

**Table S2. Teachers’ opinion on the challenges on nutritional intervention**

|  |  |
| --- | --- |
| **Questions asked (selected)** | **Teachers answer** |
| What are the production constraints in the local area? | “As we have lot of water available so why don’t we just produce rice” that is how people think. |
| What are constraint in cooking millets at AWCs | “It is time talking process especially RTC meals served in this program”  “Along with other regular diet we had to also make these RTC products which increased the frequency in cooking thereby our workload” |
| Why didn’t you like multi grain savoury meal and sorghum meal? | “It was spicy and salty”  “Energy bytes also had salt and spice however, the salt and spice of multigrain savoury meal and sorghum meal was more than energy bytes so children could be able to eat energy bytes but no other two savoury meal” |
| What changes you observed in children during feeding program? | “Moderate Acute Malnutrition (MAM) children moved to normal”  “Attendance increased due to nutritional intervention and there was mostly 100% attendance”  “Children were actively participating in all activities”  “We observed within 3 months of feeding RTE and RTC from  nutritional intervention the MAM children became normal” |
| What changes you have seen after stopping the feeding program? | “We started seeing some MAM children now” (after stopping nutritional intervention).  “There are some children who are weak needs the intervention again” |
| Benefits of the  nutritional intervention in your opinion | “It was beneficial for the children’s general health and growth”  “Children generally listened well to the teacher and actively participated in all activities during the feeding program”  “I usually had to go and call the children to come to AWC but during the  nutritional intervention children were visiting AWC on their own without my efforts which made my work easy” |

**Table S3- Feedback form for acceptability study**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Name :** | | | **Age:** | | | | **Place:** | | |
| **S. NO** | **Questions** | **Food products** | | | | | | | |
| **Sorghum Meal** | | **Multigrain meal** | **Multigrain sweet meal** | **Nutri-cookies** | | **Energy bar** | **Energy bytes** |
| 1 | How do you rate the product (rating) |  | |  |  |  | |  |  |
| 2 | When do you like to eat this product Morning (M)/Afternoon (A)/Evening (E)/Night (N) |  | |  |  |  | |  |  |
| 3 | Do you think it is healthy? Yes (Y) / No (N) |  | |  |  |  | |  |  |
| 4 | Do you recommend this product to your children and other family members Yes (Y) / No (N) |  | |  |  |  | |  |  |
| 5 | How do you rate the product in terms of following: |  | |  |  |  | |  |  |
| 1. Saltiness |  | |  |  |  | |  |  |
| 2. Spiciness |  | |  |  |  | |  |  |
| 3. Sweetness |  | |  |  |  | |  |  |
| 6 | Do you have any other suggestions? |  | |  |  |  | |  |  |

**Rating:** 1 = dislike very much, 2 = dislike slightly, 3 = neither like nor dislike, 4 = like slightly, 5 = like very much

**Table S4**- FGD Questionnaires: S4 (A)-Mothers of the children 3-6years; S4(B)- Anganwadi Teachers;

S4(A) -Mothers of children (3-6yrs)

1. Nutritional Intervention structure

* What are the GP food products consumed for breakfast and snacks by your children as part of the GP project?
* Was it convenient to send your children to the Anganwadi center to have GP food? Y/N If N why?
* Do children eat anything additionally for breakfast at home?
* Are children hungry after coming home from Anganwadi center?
* What food (breakfast and snacks) were children consuming before the intervention?
* What food (breakfast and snacks) are children consuming now after the intervention is over?
* Were your children happy/losing interest to consume GP food?

If happy, which GP food product they liked most? If losing interest, Reason?

Have children ever mentioned about the GP food products consumed at Anganwadi? If yes, what are the products they have mentioned

Did children like the taste/flavor of the GP food products

Do you think GP food is nutritious and improves kids’ health?

* Are you willing to pay and purchase from the market, if its available?

Behavioral change

1. Keenness to eat

* How interested the children were towards eating the GP food?
* Do the children ask for GP food during Sundays or after the intervention?

1. Hygiene

* Does your child practice hand wash at home?

1. Improvement in their attention

* Have you noticed any change in Childs’ attentiveness at home?
* Were they dull before? Any change now?

Physical change

* Any visible change in height/weight of children?
* Improvement in physical activity
* Frequency of sickness? Any change after GP food
* Any change in time taken for recovery from illness?

Attendance

* Does GP food play any role in encouraging the children to attend AWC regularly?

Awareness on millets

* + Do you know millets is considered highly nutritious and good for health? Yes / No
  + What are the qualities you know about millets and millet-based products?
* Provides higher energy
* High in nutrition
* Increases appetite
* Has higher proteins
* Give more strength
* Good for weight loss
* Good for diabetics
* Good for blood pressure management
* Good for immunity
* I don't know
* Presently are you consuming any millet products in your family? Yes/ No
* What kind of millet products do you consume in your family?
* Traditional products
* Value added product like Biscuits/ Flakes/ Noodles/ Dalia/ laddu/ Pasta/ Vermicelli
* Do you think there is an increase or decrease in the consumption of traditional millet products?
* Increase (If yes please provide response to Q f)
* Decrease (If yes please provide response to Q g)
* What are the main reasons for increasing consumption of traditional millet products? Rank them (1 – most preferred to 5 – least preferred)
* Better taste
* Easy availability
* Easy to prepare
* Healthier/ nutritious food and provide more immunity than other Value-added products
* Value for money
* Community influence
* Good for children and old age people
* Increased awareness on their nutritional quality
* Recommended by doctor/ nutritionist
* Ready to cook product
* Ready to eat product
* Good packaging
* What are the main reasons for decreasing consumption of traditional millet products? Rank them (1 – most preferred to 5 – least preferred)
* Better taste
* Easy availability
* Easy to prepare
* Healthier/ nutritious food and provide more immunity than other Value-added products
* Value for money
* Community influence
* Good for children and old age people
* Increased awareness on their nutritional quality
* Recommended by doctor/ nutritionist
* Ready to cook product
* Ready to eat product
* Good packaging

Regular dietary pattern of the beneficiary

**Questionnaires:** S4(B)- **Anganwadi Teachers**

1. Nutritional Intervention structure

• Were beneficiaries satisfied with the GP food given as breakfast and snacks

• Do you think that the GP breakfast should have been given during some other time? Y/N;

if Yes, suggest timings

• Is the quantity given for breakfast and snacks, filling? Y/N; If No, suggest quantity (less/more)

• How often was the GP food distributed to the anganwadi centre?

• Was the GP food  received  on time? (Regular/Irregular)  ? If  irregular, why?

• Did beneficiaries like the taste/flavor of the food products?

• What is the meal plan that is being followed in Anganwadi centre? Details of other (Non- GP) foods?

2. Consumer preference:

• Rank the food products according to the preference (1 – most preferred to 5 – least preferred)

Sorghum meal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Multigrain meal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Multigrain sweet meal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Nutri-cookies \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Energy bar (chikki) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Energy bytes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Any other comments:

3. Behavioral change

a. Keenness to eat

• How interested the beneficiaries were towards eating the food Do the children ask for GP food after the intervention?

b. Hygiene

• Do they practice hand wash at anganwadi center?

c. Improvement in their attention

• Have you noticed any change in their attentiveness in the class/home?

• Were they dull before? Any change now?

d. Performance in school/AWC

• Are they punctual to AWC?

• Do children follow timings?

4. Physical change

• Any visible change in height and weight of children?

• Improvement in physical activity

• Frequency of sickness? Any change after GP food

• Any change in time taken for recovery from illness?

5. Attendance

* Does GP food play any role in encouraging the children/women to attend AWC regularly?
* Did all beneficiaries show willingness to consume GP food? did they consume it regularly?
* Did attendance of the beneficiaries, especially children improve during the GP project? Y/N. If Y what was the reason?
* Have all beneficiaries consumed regular AWC food (other than GP)?
* What do you think the reason for unavailability of beneficiaries during endline survey?

6. Did you face any other challenges in implementation of GP project? Please specify