

Impact Assessment and Replication Plan of the Malnutrition Treatment Center of Parivar Kalya Sansthan

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1. Introduction

This report is the culmination of two months spent at the Malnutrition Treatment Center (MTC) of Parivar Kalya Sansthan (PKS). The first part of the report documents the impact of the MTC from July 2009 till July 2012 through ten case studies. While the impact has been overwhelmingly positive, there are still needs in the community being unmet. Recommendations are suggested for improving the MTC based on interviews with staff, patients and rural health workers.

The second part of this document is an outline to replicate the MTC in a new environment. The protocol for admitting, treating and discharging patients is given as well as an organizational chart of the current staff. Also included is the relevant external stakeholders in the MTC and how they support its mission. The replication plan concludes with suggested improved features to make a replicate program more effective and successful than the current model.

2. Impact Assessment of the Malnutrition Treatment Center of Parivar Kalya Sansthan:

From July 2009 to July 2012



2.1. Introduction

The following report assesses the impact of the Malnutrition Treatment Center (MTC) of Parivar Kalya Sansthan (PKS) through case studies of past patients. Each case study focuses on one mechanism through which the MTC has impacted the patient's family or the community at large. These mechanisms include improving the health of the child directly through treatment at the MTC (Case 2), training and educating the primary caregiver on childcare and nutrition (Cases 3,4,5, and 6), and broadening the support and resources for at-risk children in rural villages (Cases 1,7,8, and 9).

The first part of the report provides background information on the MTC. The reasoning behind its establishment, the process used to treat patients and the profile of past patients are given to show the external context in which the MTC works. The next section is divided into 10 case studies each highlighting one impact of the MTC.

The case studies are based on personal interviews with the families and the staff of the MTC undertaken in July and August 2012. Patient information is accurate up to the end of July 2012.

2.2. Background

Parivar Kalya Sansthan (PKS), a corporate social responsibility organization of Tata Motors, created the Malnutrition Treatment Center (MTC) in July 2009 with an objective to decrease the malnutrition rate in identified children in East Singhbhum District. The MTC was opened in Jamshedpur, Jharkhand, within the PKS medical complex with 6 treatment beds available for children between the ages of 6 months and 5 years old who have severe acute malnutrition (SAM). The community response was immediate, with 75% average daily bed capacity in the first year.



Original, 6 bed MTC building



10 bed MTC, opened in March 2012

On 2nd March 2012, the MTC expanded by adding a brand new building with 10 beds. Mr. Ratan N. Tata, the Chairman of the Tata Group, inaugurated the opening of the new building.

Why is there a MTC?

The center was created to help alleviate the local malnutrition problem. Malnutrition is a major problem in all of India but is especially a problem in East Singhbhum District.

Malnutrition is dangerous because it has both short-term and long-term negative effects. In the short term, malnutrition causes an elevated risk of death through precipitating diseases and speeding their progression. Children with SAM face a 9 times higher mortality rate than those



Medical Complex of PKS

without malnourishment. In fact, malnutrition is identified as a contributing factor in nearly 50% of all childhood deaths, especially from major diseases. Malnutrition is a contributing factor in 57% of deaths from malaria and 61% of deaths from diarrhea.



Nurses Neelima Bhengra, Yasmin Parveen and Rina Adhikari outside the MTC

The long-term effects of malnutrition are also severe. Malnutrition can irrevocably damage the cognitive and physical development of children, which may have life long implications. Lower mental and physical development causes decreased life time earnings through a decreased capacity to learn due to limited cognitive development and less schooling. Moreover, future career productivity is lost through the physical impairments caused by childhood malnutrition. Studies estimate that India loses 2-3% of GDP

(Gross Domestic Product) due to physical productivity losses from malnutrition.

The dangers of malnutrition are faced by millions of Indians daily. According to the World Bank, the malnutrition problem for children in India is among the worst in the world. Over one third of the world's malnourished children are in India. Nearly one half (47%) of all Indian children are underweight - the second highest national percentage of all countries. The problem has also remained constant even with the recent economic growth. Estimates suggest the malnutrition rate should have fallen further in concord with the economic growth



Nurses checking in on patients, August 2012

Furthermore, India's malnutrition problem affects population groups unequally. The poor are the most affected. The percentage of malnourished children in the lowest income groups is almost 60%. Other demographic traits which suffer disproportionately from malnutrition are rural areas, girls, scheduled tribes and scheduled castes.

The distribution of malnutrition is heavily concentrated with nearly 30% of malnourished children residing in only 10% of districts (sub-state levels). On the state level, Jharkhand, where the MTC is located, has been noted as having one of the highest rates of malnutrition and childhood mortality rates in the country. The rate of SAM children in Jharkhand is nearly 12% according to UNICEF. With a large statewide malnutrition

problem and demographics suggesting higher rates in the immediate area, the MTC has a clear need to fill in the community.

What does the MTC do?

The MTC treats the most severe cases of malnutrition. According to the World Health Organization (WHO), there are 4 grades of malnutrition based on height to weight ratios



Nurse K. Laxmi measures the height of a new patient

or the mid-upper arm circumference (MUAC). Grade 4 is the most severe and Grade 1 the least.¹ Children are admitted to the center if they have measurements with the range of Grades 3 or 4, which are also known as severe acute malnutrition (SAM). Children with SAM have a 9 times higher mortality rate than non-malnourished children.

The MTC uses a treatment process recommended by the WHO. The process has three main steps: Admittance, Treatment and Follow-ups.

The Admittance Process starts when patients are identified as SAM. Children can be identified by 3 different means; rural health workers, self-referrals, and the mobile health clinics of PKS. Rural health workers see mothers and children when they come for free child immunizations to Aganbari Centers (AWC), which are local community clinics run by volunteers called sevikas or sahiyas. AWC workers refer patients to the MTC for treatment by contacting the center that a child has been identified. Often transportation is then arranged by PKS and the AWC. AWC workers refer about 75% of the patients at the MTC. The second way for referrals is patients can self-refer to the MTC if they believe their child is malnourished. Self-referrals account for about 13% of new patients. Finally, some patients are found through the mobile health clinics of PKS which set-up weekly in different villages.



Nurses Rina Adhikari and Sweeta Lal preparing food in MTC kitchen

¹ The Grades are based on the standard deviations (SD) from the standard weight to height ratio and MUAC as stated by the WHO. Children who are SAM are more than 3 SD from the standard amounts, which in a healthy population should rarely occur.



Patients in the 6-bed building, August 2012

When a child is brought to the MTC, a brief examination is done to check if the child is SAM. Two measurements are taken; the height to weight ratio and the mid-upper arm circumference. If either of these measurements is within the range of SAM as outlined by the WHO, the child is admitted with a caregiver, usually the mother. There are two reasons for admitting both child and caregiver. First, the child is often too young to be completely separated from his/her family. Second, while the primary mission of the MTC is to treat children, PKS believes it

is also important to treat caregivers by training them on proper childcare practices.

If the child is admitted, then pathology tests are taken to look for any complications, such as tuberculosis or high fever. Children with serious complications are referred to Tata Motors Hospital. PKS arranges for the transportation and stay. When the complication is resolved, the child can return to the MTC and continue his/her SAM treatment. There have been 42 referrals to the hospital and about 14% of all admitted patients have been referred.

The treatment process starts immediately upon admittance when the child is given his/her first meal of formula. The initial formula is a heavily protein-fortified milk-based formula called F-75. It is given every 2 hours for the first 2 days of stay. Afterwards, a less fortified formula called F-100 is given for the rest of the duration of the stay. All food is prepared by the MTC staff at their kitchen, located next to the center. The caregivers staying at the MTC are encouraged to participate in preparing the food. All caregivers are taught proper feeding techniques, including hygiene, types of food to give, and spacing of meals. Everyday, weight and height measurements are taken to record progress.



Patients in the 10-bed building, August 2012

Discharges are allowed if one of several criteria is met, such as consistent weight gain for more than a week, non-SAM Grade measurements, or 15% of admit weight gained. Along with any one of these criteria, the child must not have any complications and the caregiver must complete counseling with a trained professional on staff. All discharges are approved by the doctor. The usual length of stay is about 15 days. The MTC provides

the caregiver with a 100 Rupee per day to offset any wage losses her stay at the center may cause.

After discharge, three follow-ups are mandated. These occur every 15 days for the first 45 days post-treatment. Follow-ups consist of taking the height, weight and MUAC measurements of the child to ensure she/he remains within healthy (non-SAM) ranges. If SAM ranges re-occur, the family can be re-admitted to the center to begin treatment again. However, re-admittance is rare. The rate of patients being readmitted is 4%.

The treatment of the MTC has been very effective. The vast majority of patients, 93%, stay until being discharged (i.e. do not leave against medical advice). Of discharged patients, 94% improved during their stay and 80% were discharged as non-SAM. More information on the effectiveness of treatment can be found in the Appendix.

Who are the patients?

From July 2009 till July 2012, the MTC had 294 new patients. The average age of a patient is about 19 months, with the gender breakdown as 55% female and 45% male. The vast majority of patients were referred by a health worker, 86%, and only 14% were self-admittances. The ST and SC communities make up 75% of the patients with another 21% from other backward castes (OBC). Most patients reside in the Karandhi block of East Singbhum with 61% of all new patients and other blocks with significant representation are Potka (15%), Patamda (8%) and Jugsali (7%). More information regarding the patient profile can be seen in the Appendix.



Patients at the MTC, August 2012

2.3. Case Studies

The following ten case studies each highlight a different mechanism through which the MTC impacts the community.

1. Sovita, Love & Kush Gope.....*Filling a Need*
2. Bibi Dhoni & Sanoka Sardar.....*From the Brink*
3. Vimla & Ismeeta Sardar.....*Staff as Teachers*
4. Bharti & Silpa Mandel.....*Hygiene Education*
5. Kakuli & Namita Karmakar.....*The Solid Food Dilemma*
6. Laxmi & Belwati Hansda.....*Generational Learning*
7. Sangita & Karan Gope.....*New Experiences*
8. Suman & Sagar Sador*Spreading the Word*
9. Gita, Satish, Shanti & Amit Patra.....*Creating a Community*
10. Kunu & Prakash Soren.....*Not There Yet*

1.) Savita, Love & Kush Gope

Filling a Need



*Love Gope on admittance,
March 2012*

Savita Gope was struggling to feed her two twin boys, Love and Kush and her other 3 children in her tiny village of Luabasa. For help she turned to her local Aganbari Cener (AWC), where she received take home rations for her children every 2 weeks. She was lucky enough to live very close to her AWC and had lots of contact with her sevikas, Nithila Davimahato, Manju Mahto, and Tulsi Mato. When the sevikas saw her twins for immunizations, they knew both the children were malnourished. They had to explain to Savita what malnutrition was, its dangers and what treatment options were available.

The option they suggested for Savita was the MTC. Savita was hesitant to travel alone so they traveled with her to the center in March 2012 where the three were then admitted for treatment. Love and Kush gained weight while Savita learned about malnutrition and childcare. Both boys improved and were discharged as Grade 1, non-SAM, after a 19-day stay.



*Kush Gope on
admittance, March 2012*



*From left to right: Sevikas Manju Mahto and Tulsi Mahto,
Savita with her 5 children, holding Kush, Love standing in
front and Sevika Nithila Davimahato*

The MTC was the best option the sevikas had to offer Savita. The bimonthly food rations that the sevikas gave were not enough to cure the boys' malnourishment and the local hospital only admits sickly children. This situation is all too common in the local community. Children who are endangered by malnutrition had no place to go until the MTC was created. The role of the MTC is to fill this need by treating children who need professional treatment but can't go to the hospital. In this

way, the MTC has a niche in the local health system. Without the MTC, Love and Kush could still be suffering from malnutrition.

2.) Bibi Dhoni & Sanaka Sardar

“From the Brink”



*Sanaka Sardar on admittance,
February 2010*

Sanaka Sardar had a tragic early childhood. Her father died of alcoholism before Sanaka turned 2. Her mother had personal issues that led to her suicide soon after. With her parents gone, Sanaka was not receiving adequate care. In February 2010, then 14 month-old Sanaka was bedridden and did not talk or walk. Her future was in doubt. Bibi Dhoni, Sanaka's paternal grandmother, decided something had to be done. She took Sanaka to the local health center for an examination. Sanaka was identified as SAM Grade IV – the most life-threatening level.

Bibi and Sanaka were brought to the center on 24 February 2010 and stayed for a total of 43 days. Sanaka's recovery was nothing less than miraculous. During her stay she gained 2700mg, over 66% of her weight on admittance. In other words, her body grew by 2/3 during 43 days – the largest percentage weight gain ever seen at the MTC. She was discharged as non-SAM and now lives at her uncle's house with her grandmother and extended family.



*Sanaka Sardar on discharge,
April 2010*



*Bibi Dhoni and Sanaka Sardar,
August 2012*

Bibi Dhoni credits the center for saving her granddaughter's life.

The treatment from the MTC improved Sanaka's health dramatically and has allowed her to live a normal life. She is now running and playing with other children and will begin school next year. Though Sanaka still suffers from ailments due to her tragic early years, her future is more secure after her time at the MTC.

3.) Vimla & Ismeeta Sardar *Staff as Teachers*

In the Spring of 2012, Vimla Sardar's two-and-a-half-year-old daughter Ismeeta, was identified as Grade IV SAM by a local health worker. Vimla was told of the treatment program at the MTC but was hesitant to go. The center is over 10km from her small rural village, Badhasidki. Soon, though, her fears were assuaged by the staff of the MTC.



Vimla and Ismeeta, August 2012

On 14 April 2012, Vimla and Ismeeta were admitted to the center. Over the next 10 days, Ismeeta gained weight and her conditioned improved. Vimla also set about improving herself. While becoming very friendly with the staff, she learned about childcare, nutrition, and hygiene – topics she had never been taught before. The staff nurses were her teachers. She was able to see how food was properly prepared in the MTC kitchen, learned about feeding times, and nutritious food. She said she learned a lot during her time at the MTC. She was able to incorporate these lessons into her daily life and now Ismeeta is a very healthy nearly-three-year-old. Their time at the center not only improved Ismeet's health but allowed Vimla to learn better ways to take care of her.

Vimla credits the staff, especially the five trained nurses, for teaching her this life-changing information. The impact of the MTC is thus providing *both* health treatment and education. The staff of the MTC must embody two roles; that of health care provider and health care teacher. They teach the mothers better childcare practices to improve long-term care, while also treating the short-term problem of a malnourished child.



Vimla and Ismeeta Sardar with Nurse Yasmin Parveen

4.) Bharti & Shilpa Mandal *Hygiene Education*

When Bharti Mandal took her daughter Shilpa to her local AWC, she thought something was wrong with her. Shilpa had been having reoccurring digestive problems and looked sickly. Luckily, the AWC was just around the corner from their home. At the AWC, Tulsi Mahato, their Sevika, diagnosed Shilpa as Grade III SAM.



Shilpa Mandal, February 2012

Tulsi traveled with the Bharti and Shilpa to the MTC where they were admitted in February 2012. The staff noted Shilpa was malnourished and suffering from diarrhea. Shilpa was put on a special feeding plan which included antibiotics. After the 5 day antibiotic dosage, she quickly gained weight 15% of her admittance weight. In fact she was discharged as Grade I SAM, ahead of

schedule, after just 8 days. The antibiotics also cured her digestive problems. While Shilpa was improving, Bharti learned proper food preparation techniques from the nurses in the MTC kitchen. Bharti watched as the nurses prepared nutrient rich formulas for every patient, several times a day, and still kept a tidy and clean kitchen. She learned to wash your hands before preparing food and to boil drinking water.



Nurses Sweta Lal and Rina Adhikari preparing food in the MTC kitchen

learned proper hygiene techniques before. Proper hygiene is very important for treating malnutrition because the lack of it is a major cause of diarrhea and malnutrition. Bharti's new knowledge will hopefully allow her to keep Shilpa healthy and will soon be even more important as Bharti is pregnant with her third child. Hopefully, her hygiene lessons will prevent her new child from ever suffering from malnutrition.

The impact of the MTC was more than just the immediate weight gains of Shilpa. The long-lasting gain was the education of Bharti. She had never



Bharti and Shilpa Mandal with their Sevika, Tulsi Mahato, August 2012

5.) Kakeali & Namita Karmakar

The Solid Food Dilemma



*Namita Karmakar during her stay
February 2011*

Kakeali Karmakar knew something was wrong with her 9-month-old daughter Namita when she noticed abnormal weakness and weight loss. After an examination by her local sevika, Kakeali and Namita were brought to the MTC for treatment in February 2011.

Namita was admitted as Grade III SAM and was put on a feeding plan. During her 11-day stay, she gained weight and was discharged much healthier, as Grade 1. While Namita was receiving treatment, Kakeali also learned about nutrition and feeding habits. Most importantly, she learned about the appropriate types of food for infants. Before coming

to the center, she had been feeding 9-month-old Namita only breast milk. This is what she had been taught from her mother Keshari Karmakar. However, according to WHO Standards mothers should start feeding solid food to their children at 6 months old. Dr. Pranati Buse, the on-site doctor at MTC, believes the lack of solid food is one of the main causes of malnutrition of patients at the MTC. Kakeali said she never knew to feed solid food but is feeding Namita solid food since returning from the MTC.



*Kakeali, Namita and Keshari Karmakar,
August 2012*

The MTC has helped to break unhealthy childcare traditions, such as the one that was passed between Keshari and Kakeali. These harmful practices can persist unchallenged unless adequately refuted. Often it takes more than just hearing the information to convince rural mothers to change their behavior. The MTC provides an opportunity for mothers to learn and *witness* the benefits of improved nutrition and childcare. Kakeali has changed her daily habits and now can teach others in her family and community about the benefits of early introduction of solid food to infants' diets.

6.) Laxmi & Belwati Hansda *Generational Learning*

Surfa Hansda faced a troubling dilemma when she learned her daughter Belwati was malnourished: she wanted to take Belwati to the MTC for treatment but was unable to travel because she was 6 months pregnant. Instead, Surfa recruited her young niece, Laxmi, to accompany Belwati to the center.

Laxmi traveled with Belwati to the center for treatment in April 2012. Belwati rapidly improved by gaining almost 500mg during their 12 day stay. However she was not the only one to change. Laxmi, who is too young for a family of her own, learned about proper feeding habits of infants.



Belwati during her stay, April 2012

Specifically, she learned from the staff nurses the appropriate types of food to serve infants and the proper amount of time between meals. When they returned home, Laxmi told her older Aunt Surfa what she had learned. Surfa and her husband, Narayan, listened to Laxmi and now feed Belwati and their new daughter the appropriate types of food. The original cause of malnutrition in Belwati was not access to food. The family are subsistence farmers and have access to food. The problem was a lack of knowledge regarding nutrition. They did not know the proper nutritional diets for infants. Laxmi's lessons from the MTC solved this. Her knowledge of nutrition will not only help Surfa and Narayan with their two daughters but also, Laxmi knows proper nutrition when she starts a family of her own. Preventing malnutrition has spread through the Hansda family and across generations due to the MTC.



From left to right: Narayan with Belwati, Laxmi, and Surfa holding her new daughter, August 2012



Surfa, Belwati and Surfa's new daughter, August, 2012

7.) Sangita & Karan Gope *New Experiences*

When 18-year-old Sangita brought her son Karan to an AWC for her bimonthly take home rations, the sevika identified Karan as SAM. Sangita along with her husband, Dinbundo, had never heard of SAM, or even malnutrition before and did not know what to do. The sevikas told them about the MTC and made arrangements for Sangita and Karan to be taken there by the center's driver. This began a trip full of new experiences for both Karan and Sangita



Karan Gope on admittance, May 2011

Sangita and Karan stayed at the center for 9 days. Karan improved from Grade 3 SAM to Grade 1 and gained nearly 500mg of weight. Along with the improvement in Karan's health, their experience at the center provided Sangita with her first time in a car, her first time in Jamshedpur, and even her first time outside her village. She visited the area around the MTC during slow afternoons, including a nearby market and Hindu temple. She said she noticed how people in the urban area were "different" than people in her village.

Thus Sangita's and Karan's time at the MTC did not just improve Karan's health. It was also a time for Sangita to experience a new environment and see, firsthand, how people live outside of her village. These experiences are valuable in themselves as young Sangita starts her family. Sangita can make minor changes in her family and life after visiting another area and learning about different lifestyles. The indirect impact of the MTC was giving her the opportunity for these new experiences. Sangita would never have had these without the MTC.



Dinbundo, Sangita and Karan Gope, August 2012

8.) Suman & Sagar Sadar *Spreading the News*

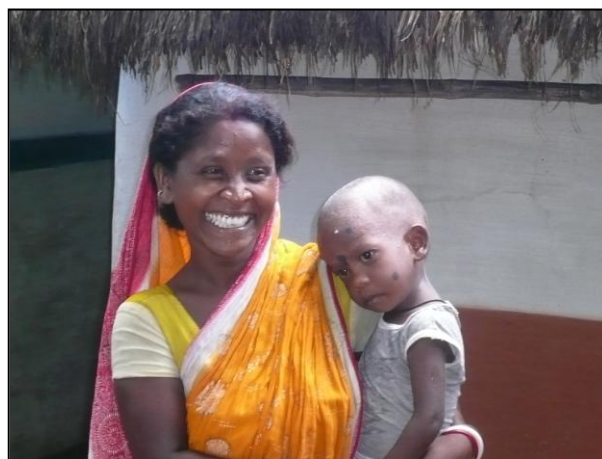


Suman Sadar, on admittance September 2011

In September 2011, Suman took her 14-month-old son Sagar to her local AWC for his immunizations. The sevika at the center did a standard malnutrition check for Sagar and identified him as Grade III SAM. What could she do? At this time, only one other person from her village had been to the MTC. There was very little knowledge of malnutrition in general and the MTC in particular in her village. Suman met with Mr. Robin Murma, a local health worker, and they discussed the options available for young Sagar. After some cajoling, Suman agreed to travel to the center with Robin.

Suman and Sagar were admitted to the MTC in September 2011 and ended up staying for 17 days. Sagar gained over 500mg of weight and was discharged as non-SAM. Suman said she had no problems at the center and Sagar has been healthy ever since.

Today, Suman speaks to mothers in her village who have children identified as SAM. She soothes apprehension about traveling to the center and motivates mothers to travel there. She has spoken to over 25 mothers, convincing them to go to the center to improve the health of their children. Mr. Murma says she is the local spokesperson for the MTC. Through past patients like Suman, the MTC is spreading the word about the malnutrition and is becoming the preferred option for families with malnourished children in the local area.



Suman and Sagar Sadar, August 2012

9.) Gita, Satish, Shanti & Amit Patra *Creating a Community*

Gita and Shanti Patro have been friends for a long time. Both are from Gobratodla, a small village about 10km from the MTC. They are also both young moms who were patients at the MTC.

In April 2012, Shanti learned her 8-month-old son Amit was malnourished from her local AWC when she took him for immunizations. Less than one month later, Gita also learned her 10-month-old son Satish was malnourished. They both took their children to the MTC to receive treatment. The boys each gained weight and both were discharged in just 9 days as Grade II (non-SAM). Moreover, Satish and Gita learned better childcare habits at the center. They learned about appropriate feeding habits, types of food and hygiene. Both said their childcare practices have changed since being at the center. They have also both told others in their community about what they learned.



*Satish Patra during his stay,
April 2012*



*From right to left: Gita and Satish, Shanti and
Amit and their friend with her son*

What this case illustrates is that the MTC is building a community of knowledgeable mothers who can work together to ameliorate the malnutrition problem at a grassroots level. Malnutrition is not just a private disorder but a problem of communities. It is caused by lack of knowledge and support to vulnerable families. Equipping friends such as Gita and Shanti with better childcare information allows them to prevent the spread of malnutrition together by creating a network of knowledgeable mothers to support families at risk of malnutrition.

10.) Kunu & Prakash Soren *Not There Yet*

In April 2012, Kunu Soren learned her 5-year-old son Prakash was malnourished from her local AWC. She took him to the MTC where he improved greatly, gaining over 1000mg and being discharged as non-SAM. While at the center, Kunu learned proper diet techniques, including types of food and timing of meals. For example, before coming to the MTC she had served Prakash only rice but learned to feed him dal (lentils), vegetables and meat. The MTC's staff equipped her with the knowledge she needed to put Prakash on a healthy diet.



Prakash on admittance, April 2012



Kunu Soren holding Prakash on the right with their neighbors

However, today Prakash remains unhealthy. During our interview, he was found alone on a bamboo cot in the sun and was noticeably thin. He is still below the WHO standards for weight and height of a 5-year-old. Kunu said she does the best she can but her living situation is very difficult. She knows she should serve nutritious foods but the family's entire diet is nearly potatoes and it is very difficult to purchase vegetables and meat. Moreover, she works as a farmer along side her husband in nearby fields. While she is farming, her parents-in-law care for Prakash and her two other children. Due

to their old age and deteriorating health, Prakash's grandparents can not provide adequate care for the children. All three appeared unhealthy during our visit.

While the center has been very successful in treating patients, sometimes the problems of the families are not fixed. Training in childcare and temporarily getting Prakash to a healthy weight were not enough for this family to become healthy. More is still needed for families similar to the Sorens to help them combat malnutrition in the local community.

2.4. Conclusion

Since opening its doors in July 2009, the MTC has had a variety of impacts in the fight against malnutrition in the local area. The most direct impact has been improving the health of its patients, which has occurred in every case study. Most notably, in Case 2, Bibi Dhoni credits the center with saving her granddaughter Sanaka's life after she was bedridden and silent at 14 months old. Also, Bharti and Shilpa's stay at the center cured Shilpa's diarrhea and saw discharged at a healthy weight.

The MTC has also impacted the community through educating the caretakers who stay at the center in proper childcare practices. Sometimes the impact of education occurs directly through teaching the caregivers as in the cases of Vimla Sardar, Bharti Mandal and Kakuli Karmakar. Vimla used the staff as teachers to learn about nutritious diets and proper childcare. Bharti learned the proper hygiene techniques to prepare food. Kakeali learned the correct foods for infants, specifically to feed infants solid food starting at 6 months.

In other cases, MTC's educational impact is indirect. The impact occurs through the attendees disseminating the proper childcare practices to family and community members. Some examples are Laxmi Hansda, Suman Sagar, and Gita and Shanti Patra. Laxmi, a young girl, learned about nutrition during her stay with her infant cousin Belwati. She then shared this information with her Aunt Surfa, Belwati's mother, which changed family habits. Suman shares her story at the MTC with other mothers of malnourished children in her village to motivate them to seek treatment at the MTC. Gita and Shanti are friends who both took their children to the MTC. They now provide support to at-risk mothers in their community through sharing information on childcare and discussing their experiences at the MTC.

Through both directly improving the health of children and educating caregivers on better childcare practices, the MTC is having a significant impact on the local community in the fight against malnutrition. But more can still be done. As seen in the final case of Kunu Soren, there are still community problems and practices that cannot be solved by the MTC.

2.5. Appendix 1: Patient Profile

GENDER and AGE

	Number of New Patients	Percent New Admit	Average Age New Admit
Female	160	54.4	18.3
Male	134	45.6	19.3
All	294	100	18.7

CASTE

	Total Number of New Patients	Percent New Admittances
General	9	2.9
OBC	64	21.2
SC	38	13.4
ST	183	62.4
Totals	294	100

SOURCE OF REFERRAL

	Total Number of New Referrals	Percent New Admittance
Sahiya	106	35.8
Savika	120	40.5
Self	40	13.5
ANM (nurse)	15	5.1
Other	8	2.7
Social Worker	7	2.4
Total	296 ²	100

LOCATIONS

Block	Number of Patients from Block	Percentage of Total New Patients
Karandhi	198	64.7
Potka	47	15.4
Patamda	25	8.2
Jugsali	21	6.9
Other	15	4.9

² 2 patients came to the MTC only for malnutrition checks and were not admitted, hence the discrepancy between this and other new patient amounts

Appendix 2: Treatment Profile

ADMITTANCES

New Admittances	294
Re-Admittances	10
OPD Check ups	2
Total Patients	306

DISCHARGES

Number of Discharged Patients	273
Number of Patients Left Against Medical Advice (LAMA)	21
Percent of Patients LAMA	7.1
Percent of Admitted Patients Discharged	92.9

EFFECTIVENESS

Percentage of Discharged Patients who Improved SAM Grade	94.1
Percentage of Discharged Patients with SAM Grade Less than 3	79.6
Percentage of Discharged Patients who gained at least 15% of weight	35.9
Average Percentage Weight Gain	13.4

HOSPITAL REFERRAL

No. of Referrals to Hospital	42
Percent of Admitted patients referred to Hospital	14.3

LENGTH OF STAY

Average Length of Stay (days)	18.8
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3. Recommendations

There are 4 recommendations for the MTC at PKS. These recommendations are thought to improve the ability and capacity of MTC to decrease the malnutrition rate in the target areas. The first is to emphasize the role of the caregiver instead of the child during the child's stay for treatment. The second and third recommendations deal with the problem of treating harder to reach patients - those who do not seek treatment at an AWC or those who cannot attend treatment at the MTC. The second recommendation is to increase self-referrals by equipping more community members with the skills to identify SAM children. The third recommendation is to extend the program to deal with the approximately half of identified SAM children who do not seek treatment at the MTC. The fourth recommendation is to commission a study to track the root causes of malnutrition in the area so that the MTC can stay on the leading edge of malnutrition treatment in India.

1.) **Recommendation:** *Emphasize role of caregivers in treatment at MTC*

Reason: *Long-term health of child rests with caregiver*

Description: The mothers, or more generally caregivers, who are staying at the MTC should be the focal point of treatment and not the malnourished child. Currently, the emphasis is placed on treating the child and curing him/her of malnutrition. While improving the child's health is a vital component of the MTC, the emphasis should be treating caregivers through training and education. Caregivers are responsible for the long-term health of the children. They must have the proper skills to care for the child so that he/she remains healthy post-treatment. Not changing the caregivers' childcare practices will likely result in the same mistakes that led to malnutrition in the first place. Moreover, the caregiver has the ability to return to her community and teach others. She can exponentially increase the impact of the MTC by disseminating the information she learned. For these two reasons, the caregiver should be the focal point of treatment at the MTC.

Program Suggestion: *Add formal training program for caregivers staying at the center*

Description: The suggestion for implementing a focus on caregivers is to have a formal training program every two weeks for the caregivers at the center. The training program would cover basic hygiene, proper diet, feeding times and infant nutrition. Staff members of PKS who have knowledge in these fields can be chosen to run a short presentation in the auditorium. An added benefit of having a group session is to teach caregivers to teach others in a group setting when she returns to her community.

Currently, there is an informal, one-on-one counseling with caregivers. However, this training can be improved by making it more formal, so caregivers understand the

importance of the training. A proper training program would also ensure all caregivers have the proper skills and knowledge to deliver adequate care to the children.

2.) Recommendation: *Increase self-referrals to the center*

Reason: *Rural health workers do not reach the whole community*

Description: There are two reasons why an effort should be made to increase self-referrals. First, there is an underserved section of the population that is not likely to see treatment - families who do not visit rural health clinics. Most of the patients who come to the MTC are referred by rural health workers. However, some people in these communities do not visit the rural health clinics. So, these people are missing the opportunity for the services of the MTC. Second, the MTC has been operating on average below bed capacity. In the first 3 years of service, the MTC has had an average daily bed capacity of 72%. In other words, with a 10 bed capacity, about 3 beds are empty each night which suggests there is room for more patients. These empty beds should be able to be filled. According to the statistics of malnutrition in Jharkhand by UNICEF, there should be an ample number of malnourished children in the area.

Program Suggestion: *Give self-diagnostic kits to past patients and Aganbari Centers*

Description: To increase the number of self-referrals, self-diagnostic kits can be given to former patients and AWC to distribute in their communities. These kits can include pictures of past patients with bipedal edema, wasting and other visible signs as well as a MUAC measurement device. A MUAC measuring device can be very simply created by cutting a regular piece of paper and adding the proper marks. Community members can then be trained to take proper measurements and identify SAM children independently of health professionals.

3.) Recommendation: *Extend program to reach SAM children not coming to MTC*

Reason: *Approximately half of identified SAM children are not treated at MTC*

Description: Every rural health worker interviewed for this report said that only approximately half of the identified SAM patients seek treatment at the center. The same was true for health workers in blocks closer to MTC (in Karandhi block) as well as those further (such as in Potka block). Reasons given for not going to the center include unwillingness of mothers to leave their families, hesitancy to travel alone, and ignorance of the benefits of the MTC. For whatever reason, only half of identified SAM children are being treated. An extended ('extended' into the villages) program is needed to attempt to reach the other half of patients whom do not come to the MTC. Without an extended program, these patients will remain untreated and face the negative consequences of dealing with SAM.

Program Suggestion: *Deliver fortified formulas to rural health clinics to dispense*

Description: Rural health clinics already deliver take home rations (THR) to community members who are pregnant or lactating. Fortified formulas, or the ingredients needed to make these formulas, should be given to rural health clinics to dispense to these same patients and more. The THR is not enough in some cases to prevent malnutrition as many patients at the MTC had been receiving THR. Strengthening the THR by adding fortified formulas similar to those served at the center would do more to treat and prevent malnutrition in the communities, relaxing the strain on the MTC of treating all patients in person. While this program suggestion is not a cure-all (it will likely be less effective than treatment at the MTC), it will help treat the SAM children who do not come to the MTC.

4.) **Recommendation:** *Conduct more research into causes of malnutrition*

Reason: *Causes of malnutrition are more diverse than income*

Description: According to the World Bank, World Health Organization, and UNICEF, there are multiple causes of malnutrition in children, most of which do not concern household income or wealth. Some of these other factors include mother's age, mother's educational level, types of diet, spacing of children and the mother's influence in household decisions. These other factors should be studied in order to understand the root causes of malnutrition in the area. When a better understanding is created, more targeted interventions can be implemented to deal with the significant factors. For example, if mother's education is recognized as a major factor, then more training and education should be given to new mothers and programs should be created to keep girls in school to prevent malnutrition.

The current formulation of the MTC treats one cause of malnutrition - insufficient income – by providing proper nutritious food. If other factors are shown to be significant, then programs can be created to change these factors as a complement to the current plan. This would also benefit PKS because finding and treating the root causes of malnutrition will allow PKS to stay a leader in the fight against malnutrition in India. The new plans for treating malnutrition will likely be more comprehensive than free food programs.

Program Suggestion: *Commission report on factors of malnutrition*

Description: A report similar to this Impact Assessment should be commissioned so that PKS can learn which factors are most significant in causing malnutrition in the area. A statistical analysis can be undertaken to calculate the probability associated with the proposed causes of malnutrition. The sample set should include mothers with AND without malnourished children who have the same socio-economic levels to control for income.

4.) Replication Plan for a Malnutrition Treatment Center (MTC) Based on the MTC at PKS

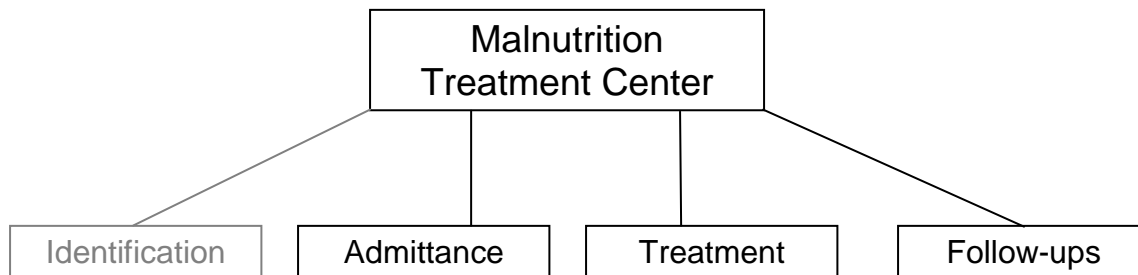
4.1. Introduction

The following report gives a replication plan for a Malnutrition Treatment Center (MTC) based on the experience of the MTC of Parivar Kalya Sansthan (PKS) in Jamshedpur, Jharkhand. The report is divided into five sections. The first section is a work breakdown structure which diagrams the process of treating patients. The second section is an organizational chart which shows the current staffing of the MTC. The third section explains the external stakeholders, namely the local health system and PKS, which give vital support to the MTC at PKS. The fourth section extrapolates the experience of the MTC at PKS to suggest opportunities for improvement of a new MTC. The final section concludes the report.

The work is based on interviews with staff, external stakeholders and patients, undertaken in July and August 2012 by the author.

4.2. Work Breakdown Structure

This section will explicate the process that the MTC uses to admit, treat and follow-up patients. Each process will be broken down to smaller components in hopes of facilitating their duplication in other situations. Most importantly, the external processes that occur to assist the MTC patient process will be mentioned. These processes call for special attention as they do not fall within the privy of the MTC yet they are vital in the work of the MTC.

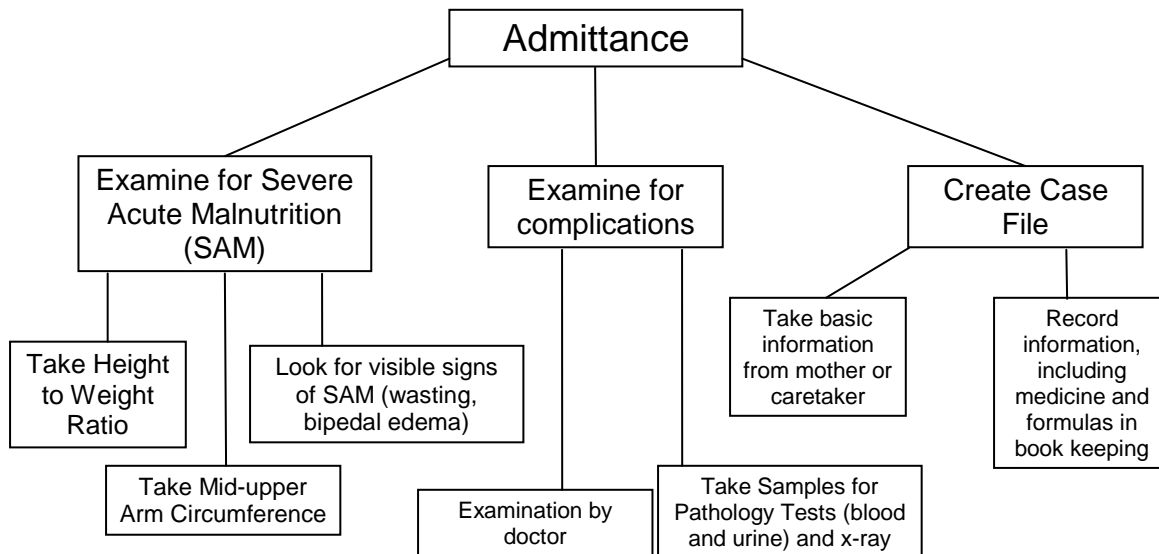


The first step in the process, as seen in diagram above is the identification of SAM patients. In the current formulation of the MTC, this process happens outside of the MTC the majority of the time (hence its grey shading). There are several reasons this does not occur within the MTC. The first reason is the location of the center. The center is located centrally within the local community and in an urban setting to facilitate transportation. However, the central, urban location also means most patients need to travel at least 10km to reach the MTC. This type of traveling is very inconvenient and expensive for those of modest means. Another reason is that many families do not know about malnutrition or the MTC. They do not seek treatment because they do not think anything is wrong with their child if he or she is only malnourished. Furthermore, they do not know the MTC exists so even if their child is sick, they do not know where to go.

These factors inhibit the patient uptake of the center. In the case of the MTC at PKS, rural health workers most notably, sevikas and sahiyas at Aganbari Centers (AWC), facilitate the admittance process. They are usually the ones to identify SAM children in their communities (86% of patients are referred by a rural health worker). They interact with the children through post-natal check-ups, dispersing take home rations (THR) and child immunizations. These times provide a great opportunity for the rural health workers to identify SAM children.

When a child is identified as SAM, things still need to be done to motivate the family to seek treatment. In many areas, past patients are used to talk and encourage families to seek treatment. These past patients will not exist in new places so gathering new patients may be more challenging.

4.2.2. Admittance

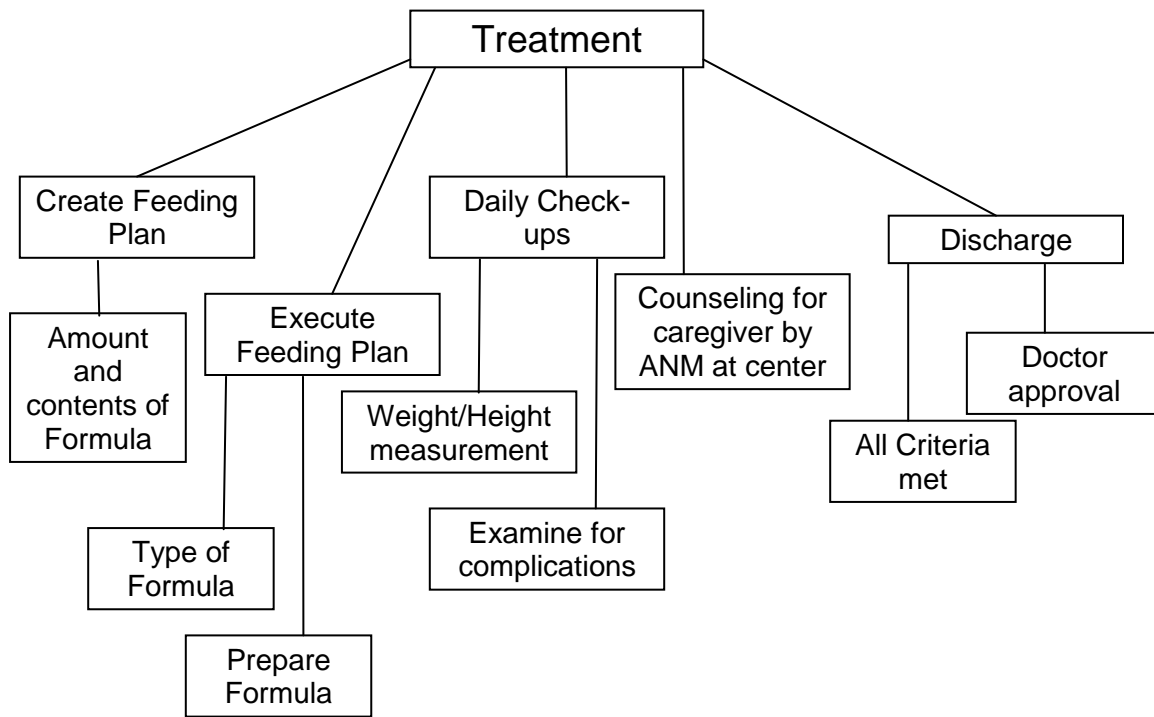


Once the family reaches the MTC, the admittance part of the process can occur. A brief examination is done to check if the child is SAM. Two measurements are taken; the height to weight ratio and the mid-upper arm circumference. These are then checked against the SAM ranges as outlined by the WHO. Also, the child is checked for any visible signs of malnutrition such as bipedal edema or wasting. If any indication of malnutrition exists, the child is admitted.

After admittance, an examination by the doctor is done to check for complications, such as tuberculosis or high fever. Also, pathology samples are taken, such as blood and urine, and examined in the in-house pathology lab. If any complication is found, the patient is referred to the local hospital. Transportation and admittance to the hospital is arranged by the MTC. When the complication is resolved, the child returns to the MTC to continue his/her SAM treatment.

The last step within the admittance process is creating a case file. All patients are recorded in a registry book. A new case file is created and graphs of the child's weight are made to track progress. These records facilitate measuring the impact and efficacy of the center.

4.2.3. Treatment

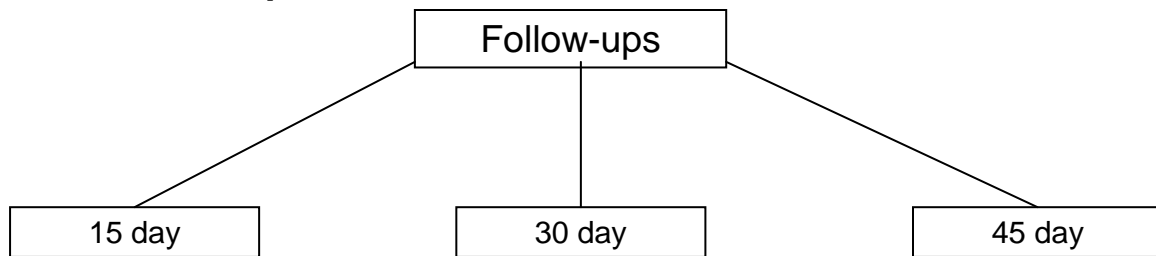


The treatment process starts immediately following admittance. Based on the child's weight, presence of complications and health, a feeding plan is created that will be used for the duration of the child's stay. For the first two days, the formula used is a protein-fortified milk-based formula called F-75. It is given every two hours. After the first two days, a less fortified formula called F-100 is given every three hours. The amount of formula given is based on the child's weight and age. Older patients also receive complementary rations of solid food. All food is prepared on site and in a clean environment. Everyday examinations are done to check the weight and height measurements and look for complications. Approximately 14% of patients have had serious complications and been referred to the hospital.

Caregivers are encouraged to participate in preparing food and maintaining the center. There is one-on-one counseling for all caregivers at the center with a trained nurse (ANM) in a variety of childcare subjects, which occurs informally during treatment.

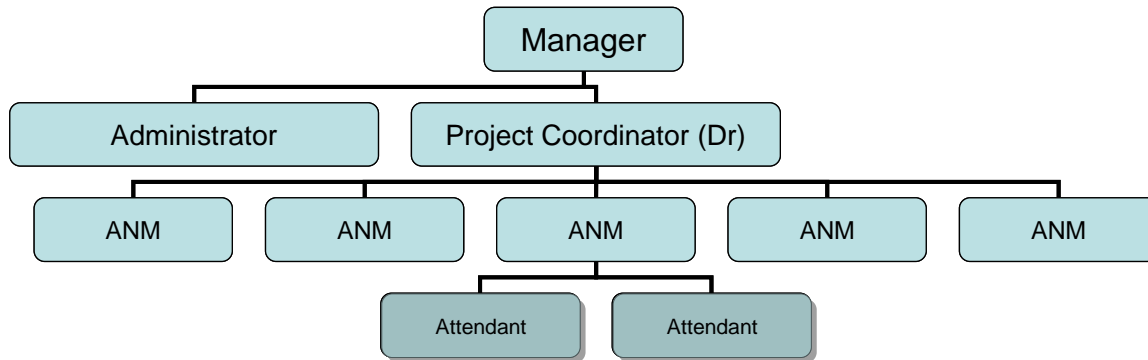
There are several criteria that must be met to allow discharge, such as consistent weight gain (more than a week), non-SAM Grade measurements, and 15% of admit weight gained. Along with any one of these criteria, the child must not have any complications and the caregiver must complete the one-on-one counseling. All discharges are also approved by the doctor. The usual length of stay is about 15 days. The MTC provides the caregiver with a 100 Rupee per day to offset any wage losses her stay at the center may cause.

4.2.4. Follow-ups



After discharge, three follow-ups are mandated. These occur every 15 days for the first 45 days post-treatment. Follow-ups consist of taking the height, weight and MUAC measurements of the baby to ensure the baby remains within healthy (non-SAM) ranges. If SAM ranges re-occur, the family can be re-admitted to the center to begin treatment again. However, re-admittance is rare. The rate of new patients being readmitted is 4%.

4.3. Organizational Structure



The organizational structure staff directly working within the MTC at PKS is seen above. The top level is a manager who oversees all program activities. Below is the administrator who deals with mainly with reports and day-to-day activities, and the program coordinator, who is a trained medical doctor. The Program Coordinator is in charge of 5 ANM, or trained nurses. Below the nurses are two nursing attendants who have similar responsibilities as the ANM but not as much training.

Nurses and attendants are the operating core of the staff and have the most interaction with patients. They work three daily eight-hour shifts in the center's treatment room everyday. Two staff must be present during daylight hours and one staffer must remain during the night. The doctor visits at least twice a day and is on call most of the time. The manager and administrator do not have medical training and work 6 days a week during normal working hours.

The current staffing requirements are for a 10-bed MTC. The PKS community is looking to increase staff as they switch to a full 16-bed capacity. Moreover, there use to be more doctors on staff. The current doctor splits her time between MTC responsibilities and work with other PKS programs. The administrator and manager also have other responsibilities with PKS. They split their day between MTC and PKS responsibilities but do some MTC work at least once a day.

Auxiliary staff within PKS that supports the MTC includes the pathology lab staff, drivers, accounts, security, and cleaning services. The MTC benefits greatly from being within the PKS medical complex. All these other supplementary services must be taken into account in forming a duplicate of the MTC. More is discussed in about the role of PKS in the following section.

4.4 Relevant External Stakeholders

The work breakdown structure and organizational chart give a good indication of the work of the MTC at PKS. However, the MTC at PKS would not function properly without the support of two groups of external stakeholders; the local health system and PKS itself. This section will describe the relationship and support given by these two external stakeholders to the MTC. Though both are technically outside the MTC at PKS, their support is vital to the proper functioning of the center.

1.) Local Health System

The local health system supports the MTC through two main ways; identifying and referring SAM children and providing medical support during treatment, namely in the cases of hospital referrals and x-rays.

As explained in the work breakdown structure, the vast majority of patients at the MTC are referred by a rural health worker. Many villagers would not know their child was SAM or that there existed a center for treatment without rural health workers. Several past patients stated they never heard of malnutrition or the MTC before being told by their local health worker. Thus, rural health workers provide vital support in generating patient turnout. Without a support from these health workers, a MTC would likely have considerable fewer patients.

Furthermore, the MTC relies on the local health system to treat children that the center does not have the resources for. The MTC was established specifically for SAM children and thus does not have the equipment to deal with serious cases. If a child develops complications, which often happens, they must be referred to a hospital.

Luckily, the MTC at PKS has a relationship with the Tata Motors Hospital nearby. Patients with complications are referred to the hospital and often immediately admitted, which increases caregivers' respect to the MTC when they see quick hospital admission. This relationship allows the MTC to focus solely on malnutrition, knowing it has quick back-up support in case anything goes seriously wrong.

The MTC also relies on the outside medical system for x-ray tests. An x-ray machine is very expensive and dangerous. Having tests done outside the center is much easier for patients and staff.

2.) PKS

The support of PKS as an independent organization on the MTC at PKS is immense. It was difficult in both the organizational chart and the work breakdown structure to differentiate between process steps or staff working with MTC or PKS. The two have much overlap in terms of staff and work.

PKS supports the MTC in a many diverse ways. The MTC relies on PKS for drivers, accounting staff, security, pathology, cleaning services, medicine storage, and senior management. Basically, every support position not covered independently in the MTC is done by PKS staff.

It is highly advised that a replicate program be supported by a similar type of organization. An independent MTC would need many more resources, employees and funding than the MTC at PKS. The added costs to PKS of housing the MTC are quite low as most of the staff working with both places was previously employed with PKS.

4.5 Opportunities for Improvement

While the MTC has been very successful in its treatment program, more can be done to create a larger and stronger impact in the fight against malnutrition in the local community. The following section lists three opportunities for improvement for a new MTC based on interviews with staff, patients and external stakeholders of the MTC at PKS.

The first opportunity for improvement is to complement facility-based patients with field-based patients through an extended program into rural villages. The second opportunity is to provide formalized training to the caregivers staying at the center for treatment. The third opportunity is to commission a report on the root causes of malnutrition in the area to temper projects to fit these specific needs.

1.) Improvement: *Complement facility-based patients with community-based patients*
Reason: *Approximately half of identified SAM children remain untreated*

Description: According to interviews with rural health workers, only about half of the identified SAM children seek treatment at the MTC at PKS. In order to reach these children who do not seek treatment, a community-based patient management system should be included to compliment the traditional facility-based patient management currently being done at the MTC at PKS. Community-based patient management would entail treating SAM children in their homes or at an easy-to-reach meeting place nearby (such as an Aganbari Center). In essence, it would mean taking the treatment to families instead of them seeking treatment at a centralized location.

A community-based patient management system would solve the problem of untreated SAM children because it addresses the problems of seeking treatment quoted by these families. The reasons for not seeking treatment are often family problems keeping caregivers at home. For example, some reasons given were another sick adult family member or no one available to watch over other children. A patient system which treats patients at home would solve these problems.

There are many possible project suggestions to implement a community-based patient system. One example of such a program is UNICEF Ethiopia which treats malnourished children in nomad populations through mobile health clinics. Trained medical staff is driven to gathering points to visit patients who would otherwise not stay in a facility. Measurements and food is given at each clinic and SAM children have improved through this work.

Another method would be to add the ingredients of the formulas used at the MTC to the take home rations already dispensed at AWC. Families receive take home rations when the mother is lactating or pregnant. However, take home rations alone may be inadequate in preventing malnutrition as many families with SAM children had been receiving them. If these rations could be fortified with the ingredients used at the MTC, such as protein

powder, puffed rice, sugar and condensed milk, this could aid families unwilling to seek facility-based treatment.

There will most likely be less control available for staff in community-based patients. Hence a minor drop in the effectiveness of treatment should be expected since the proper feeding protocol is less likely to be followed. This is one reason why community-based patient management should be used in *tandem* with facility-based management. Facility-based management would be preferred but in cases where this is not possible, community-based management could then treat the family. A community-based management, while not perfect, would be an opportunity for a MTC to increase its impact.

2.) Improvement: *Formalized training program for caregivers on childcare practices*

Reason: *Long-term health of child is responsibility of caregiver*

Description: While improving the child's health is a vital component of a MTC, equally important is treating the caregiver. Caregivers are responsible for the long-term health of the children. Any health improvements made during treatment may disappear if the caregiver does not know proper childcare techniques. They must have the proper skills to care for the child so that he/she remains healthy post-treatment. Not changing the caregivers' childcare practices will likely result in a relapse of the same mistakes that led to malnutrition in the first place.

Moreover, the caregiver has the ability to return to her community and teach others. The impact of a MTC can be vastly increased if returned caregivers share their knowledge and experience of what they learned at a MTC. Returned caregivers have the opportunity to prevent malnutrition or cure pre-existing malnutrition if they share knowledge and support other families in their community. If one past MTC patient goes home and talks with 5 friends or family, that will increase the impact of the MTC by *5 fold*. Major gains of impact through influenced families are available if past patients' share information.

One possible program suggestion to implement a formalized training program is to have training sessions in a group setting once every two weeks. The training program would cover basic hygiene, proper diet, feeding times and infant nutrition. Staff members with requisite knowledge in these fields can be chosen to run a short presentation. Having the training every two weeks will ensure most caregivers can attend, as the average stay is about 15 days. An added benefit of having a group session is to teach caregivers how to teach others in a group setting when she returns to her community.

3.) Improvement: *Commission report on causes of malnutrition*

Reason: *Causes of malnutrition are more diverse than income*

Description: According to the World Bank, World Health Organization, and UNICEF, there are multiple causes of malnutrition in children, most of which do not concern

household income or wealth. Some of these other factors include mother's age, mother's educational level, types of diet, spacing of children and the mother's influence in household decisions. These other factors should be studied in order to understand the root causes of malnutrition in whatever area the center works in. When a better understanding is created, more targeted interventions can be implemented to deal with the significant factors causing malnutrition. For example, if mother's education is recognized as a major factor, than more training and education should be given to new mothers and programs should be created to keep girls in school to prevent malnutrition.

A report should be commissioned so that the MTC can learn which factors are most significant in causing malnutrition in the area. A statistical analysis can be undertaken to calculate the probability associated with the proposed causes of malnutrition. The sample set should include mothers with AND without malnourished children who have the same socio-economic levels, to control for income.

4.6 Conclusion

It is hoped this report has given a practical replication plan of the MTC at PKS. The work breakdown structure explained the protocol of treating patients step-by-step. The organizational chart showed the staffing requirements of the MTC at PKS. The relevant external stakeholders section described the organizations and people who support the work of the MTC at PKS from outside the direct staff. These groups provide vital support to the work at the MTC. Opportunities for improvement highlighted three possible ways to improve the work of a MTC by having community-based patients, formalizing a training program for attendant caregivers, and commissioning a report on malnutrition in the desired area.

