

A STUDY OF THE NUTRITIONAL STATUS OF CHILDREN  
AND HEALTH SEEKING BEHAVIOUR IN AREAS WITH  
HIGH RATES OF MIGRATION



Dissertation submitted in partial fulfilment of the requirement of The  
Tamil Nadu Dr M.G.R. Medical University, Chennai, for the M.D.  
Community Medicine Examination to be held in May 2020.

Registration Number 201725053

## DECLARATION

I hereby declare that this dissertation titled ‘A study of the nutritional status of children and health seeking behaviour in areas with high rates of migration .’ is my original work done under the guidance and supervision of Dr. Kuryan George, Professor, Department of Community Health, Christian Medical College, Vellore. This dissertation is submitted in partial fulfilment of the rules and regulations for the degree of MD in Community Medicine examination of the Tamil Nadu Dr. M.G.R Medical University, Chennai to be held in May 2020.

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## **CERTIFICATE**

This is to certify that the dissertation titled ‘A study of the nutritional status of children and health seeking behaviour in areas with high rates of migration’. is a bonafide original work done by Dr. Harsh during his academic term April 2017 to March 2020, at the Christian Medical College, Vellore as per Community Medicine examination of the Tamil Nadu Dr. M.G.R Medical University, Chennai to be held in May 2020. This work carried out under my guidance in the department has been done by the candidate himself and is genuine.

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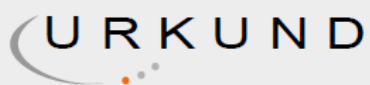
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## ABBREVIATIONS

ANC	Antenatal  Care
ASHA	Accredited Social Health Activist
MUAC	Mid Upper Arm Circumference
NFHS	National Family Health Survey
NSS	National Sample Survey
PHC	Primary Health Centre
SD	Standard Deviation
UN	United Nations
UNDA	United Nations Development Agency
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization



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## 1. INTRODUCTION AND JUSTIFICATION

Malnutrition has plagued low and middle-income countries for decades. The prevalence of malnutrition continues to be high despite the knowledge of various inputs required to tackle it. In India, the prevalence of wasting was 21% and stunting 38% (1) in 2015. One in five children under the age of five suffers from wasting and more than one in three children are stunted. There is large degree of variance between states and between groups.

Marginalized groups like the tribal population are much more likely to be affected. (2)

Migration or the movement of people for the purpose of resettlement or work is increasing globally. There is a slow but steady movement of people to certain regions. This can be attributed to an uneven distribution of resources and facilities across the globe.. Although it is more noticeable at a global level, there is a considerable amount of migration within countries. In India, about 30% of the population are internal migrants(3) – residing in a place away from their birth. Most of this migration is towards cities primarily because there is a higher chance of finding jobs in cities and improved access to healthcare. Many migrants are forced to live in deplorable conditions, primarily because of the quantum of migration and subsequent strain on the resources needed for the support of the migrants.They are also more likely to take up tougher and more dangerous job.(4) primarily because of the economic deprivation.

The added barriers in a new place including language, culture, xenophobia and lack of social support groups increase the vulnerability of the migrant population. This can affect the health status as well as the health seeking behaviour of migrant populations all over the world. (5) This then further contributes to worse health outcomes and has an effect on the economic status.

The children of migrant labourers are one of the most vulnerable groups among migrants. Having moved with their families, they exist in a space without all the measures for a healthful childhood. Very often, they do not have access to schooling and *anganwadi* centres, (6) consequently being unable to avail of facilities like mid-day meal and health checkups including growth monitoring.

This puts them at a disadvantage compared to the permanent residents. Many studies have been done on the health status of migrant labourers and their children. A study in Rajasthan found the prevalence of malnutrition migrants was 58% and that of a non-migrant population to be 39 %. (7) . Another group that is particularly vulnerable are pregnant women. With the requirement of hard labour along with poor living conditions, routine antenatal care is neglected. In Punjab a study among women found only 10.5% had the recommended number of antenatal check-ups. (8)

All the studies done till now have concentrated on migrants who have permanently settled in their place of migration. The health status and health seeking behaviour of seasonal or temporary migrants has not been adequately studied. As a population that spends a few months a year in their place of migration and partly in their native areas, they pose a unique problem of being at a risk of being excluded from the health systems in both places. Being just seasonal workers, they are also at a risk of having housing and sanitation facilities that are just temporary and probably worse off.

This study aims to fill in the gaps in the knowledge regarding the health status and health seeking behaviour of seasonal migrants

## **2. REVIEW OF LITERATURE**

### **2.1 MIGRATION**

Migration can be defined as the form of mobility in which people change their residential location across defined administrative boundaries for a variety of reasons, which may be involuntary or voluntary, or a mixture of both.(1) The UN Migration Agency (IOM) defines a migrant as any person who is moving or has moved across an international border or within a State away from his/her habitual place of residence, regardless of the person's legal status; whether the movement is voluntary or involuntary; what the causes for the movement are; or what the length of the stay is. (2).

Migration can be further classified based on the temporal pattern of migration or the location of migration. Temporally, it can either be permanent – involving a permanent resettling for reasons like marriage, work or studies, or seasonal. Seasonal migration is usually for work related activities and involves shifting of residence for a period each year, depending on the availability of work. Rural and urban migration are defined by the place the person is moving to.

### **2.1.1 GLOBAL SCENARIO**

As of 2017, there were a total of 258 million migrants globally. This number rose from 244 million in 2015. A large majority of the migrants [150.3 million] were labour migrants. 68.5 million were displaced due to conflict and natural disasters and 4.8 million were student migrants.(3) . The United Nations Development agency also studied patterns in international migration over the years, and found that apart from migrants coming to North America, all other continents predominantly had migrants originating from the same continent. (3) Male migrants formed 51.2 percent of the total migrant population though there was a significant variation between regions. Male migrants formed a much larger part in Asia due to migration to Western Asian and Gulf countries. In all other regions, women formed a slightly higher percentage.

The mean age of migrants increased from 38 years in 2000 to 39.2 years in 2017. 74 percent of the total migrant population was between the ages of 20 and 64 indicating a migration of working age populations. (3)

Global migration has significantly increased over the past few decades and has far-reaching consequences demographically, socio-economically and culturally. Though there are local factors and feelings against large scale international migration in many countries across the globe, the official view of the United Nations as well as civil society groups across the globe is positive. (4)

The 2030 Agenda for Sustainable Development recognizes for the first time the contribution of migration to sustainable development. 11 out of the 17 Sustainable Development Goals (SDGs) contain targets and indicators that are relevant to migration or mobility.

War and conflict mainly in West Asia and Africa apart from growing inequality and economic factors have been responsible for the increase in the number of migrants, mainly to higher income countries outside the region. Given the current geopolitical situations prevailing in these regions and in regions like South and Central America, the rate is expected to increase over the next few decades.

Internal migration within countries is also set to increase in the coming decades. Rapid urbanization has been observed in the past few decades. (5) By 2030 about 61% of the global population is expected to reside in urban areas. This increase in urban population size must come from the rural areas of each because of a significant level of internal migration. Low- and middle-income countries are set to witness the highest levels of these migration patterns. This is evidenced by the emergence and growth of megacities [containing more than 10 million population] in Asia and Africa. As of 2015 there were 26 megacities in the world, with 22 in Low- and middle-income countries and 18 in the continent of Asia alone. (5) This number has increased from just 2 cities in 1960 and 17 in 1999.



### 2.1.2 INDIAN SCENARIO

Data for internal migration in India comes from two sources – the decennial census conducted by the government and the NSS data. The census takes anyone enumerated differently from their place of birth as a migrant. Both describe a permanent resident as somebody residing in their current place for at least a period of six months. Anybody else is classified as a migrant.

According to the census data from 2001, 307 million have been reported as migrants. A large majority of them [84.2%] are migrants in the same state of origin. If inter-district migration is considered, the number is much lower as intra district migration forms about 74% of the total migrant population. (6). Inter-state migrants form about 14% of the total migrants and the remaining immigrants from other countries.

Given the difference in economic growth rates in the country between certain regions, a net migration internally is expected and focused on faster growing areas. The primary cause of migration in the female population is resettlement after marriage and [64.9%]. For the male population, labour and seeking new work opportunities [37.6%] are the predominant causes for migration. (6)

Though the urbanisation rates in India have been consistently increasing over the past few decades, 53% of the total migration in the country is from one rural area to another. The migration of women forms a very large part of this shift, especially in intra state migration.

The movement from urban to rural areas was 6% and the remaining was movement from rural to urban areas.

There is clear pattern of migration patterns when it comes to states with Maharashtra and Delhi having the highest net influx of migrants at 2.3 million and 1.7 million respectively. These numbers are high due to an increase in the rural to urban migration in search of labour and job opportunities in cities like Mumbai and Delhi. Uttar Pradesh and Bihar had the highest number of migrants leaving the state, more so from rural areas.

33.1% of the males and 36.8% of the females who migrate for labour are part of the informal sector with no guaranteed and regular income. (1) Due to the nature of their work and non-formal housing, the number of those migrating for labour would tend to be underestimated

### 2.1.3 SEASONAL MIGRATION

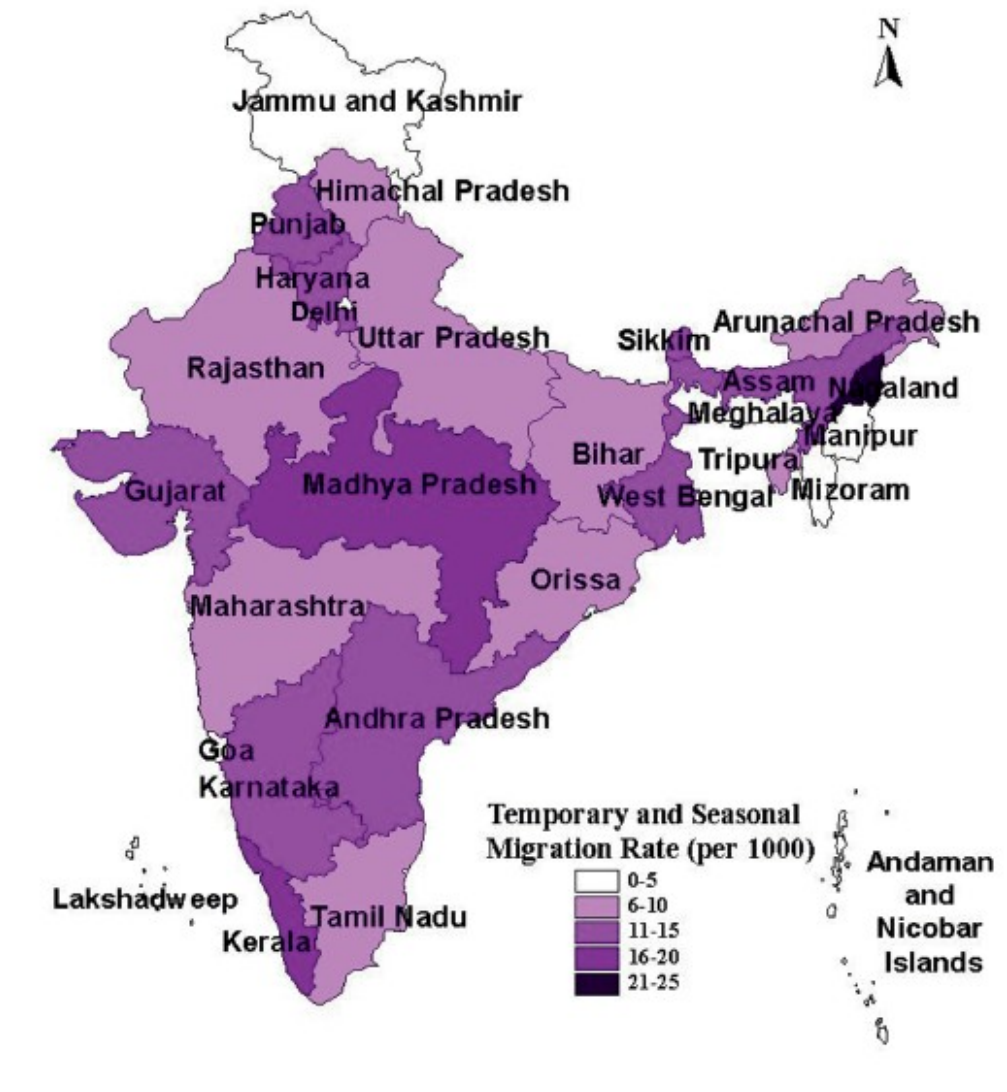
Seasonal migration is short- term migration, usually for a few months every year and predominantly for labour. Reports from the past few decades have shown that a large percentage of seasonal migrants come from a predominantly deprived sections of society, mainly Scheduled caste and Scheduled tribe populations. (1) The relative increase in these sections of society stems from an already low socio-economic background leading to an increased need for higher paying gainful employment. All studies done on this show that most of this category has people aged between 15 and 45 indicating the movement of the population in the working age group.

**Table 2.1.1 Seasonal migration rates by caste and place according to NSS 2000**

Caste	Rural	Urban	Total
Scheduled tribes	34.7	10.3	31.9
Scheduled castes	18.2	10.2	16.7
Other backward classes	13.9	14.8	14.1
Others	13.3	9.9	12.0
Total	16.8	11.5	15.4

There is also a clear pattern in the statewise spread of seasonal migration as shown in the map below. (7)

**Figure 2.1.2 Seasonal migrant rate [per 1000 population] according to NSS 2000**



The seasonal migration rates are higher in males [15 per 1000] as compared to females [9 per 1000] at a national level. There is a difference at a state level for this too as states like Uttar Pradesh, Bihar and West Bengal have a much higher number of male migrants while states like Tamil Nadu and Karnataka as a more equal level. This is a clear implication of the respective pattern of migration. In states like Tamil Nadu, seasonal migration happens with the entire family as a unit seeking work in a different place. In states in the Northern and Central parts of India the job seekers and labour force is more from the male population.

There is also a clear association between the economic status and seasonal patterns.

Seasonal migrants tend to be from a lower economic background and hence are more likely to migrate in search of work. Using Monthly per-capita expenditure quintiles as an indicator of economic status, the data for migration from NSS shows the following:

**Table 2.1.2 Seasonal migration rates by monthly per-capita expenditure quintiles according to NSS 2000.**

MPCE quintiles	Rural	Urban	Total
Lowest	24.9	9.6	23.0
Lower	16.6	9.9	16.0
Medium	16.7	12.5	13.1
Higher	13.6	11.4	13.1
Highest	13.9	13.2	13.4
Total	16.8	11.5	15.4

This shows a clear decrease in the migration rate as the economic status of population increases. There is also more of a difference in the rural and urban rates for lower economic status. The difference diminishes in the higher economic groups.

## **2.1.4 MIGRATION PATTERN IN JAWADHI HILLS**

### **2.1.4.1 DESCRIPTION OF THE POPULATION**

The Malayali or ‘hill people’ tribe are the largest tribal group in Tamil Nadu forming about 47.6% of the total tribal population in the state (2001 census). The tribal people of Tamil Nadu are spread across the various ranges of the Eastern ghats in Northern Tamil Nadu, namely Jawadhi, Kalvarayan, Shevaroy, Kolli, Sitheri and Yelagiri hills. Having settled in these hill ranges sometime in the mid-18<sup>th</sup> century, they are predominantly animistic in belief and localised to the hill ranges. Subsistence farming is the main source of livelihood. The Malayalis have the highest percentage of cultivators among all the tribes in Tamil Nadu, 98.3% of the entire tribe is rural in residence (2011 census). The literacy rate is 37.4%, much lower compared to the state average of 73.5% and even the state tribal average of 41.5%.<sup>(9)</sup> Immigration for education and employment is a relatively new phenomenon – more over the last two decades.

## 2.2 MALNUTRITION

Malnutrition refers to either a level of under-nutrition or over -nutrition as compared to the global standards .(11) During this study, only under-nutrition is looked at as malnutrition.

Different countries have attempted to define malnutrition and optimal growth for children using local data. WHO along with other International Agencies had embarked on many attempts to define a global standard from the early 1990s. (12) This culminated with the WHO Multi Centre Growth Reference Study conducted between 1997 and 2003. In this attempt to create global standards, a total of 8440 children across six countries namely India, Brazil, Oman, Norway, Ghana and the United States of America were enrolled in the study . The children were selected from strata of the population where low socio-economic status and mobility would not impede the normal growth of the child. Subsequent to this effort , most studies now refer to the WHO Growth Standards of 2006.

, A growth curve indicating the median weight for the ages of 6 to 59 months was created by using data from all the countries combined. There was also a stratification of the growth for each standard deviation above and below the median. Two separate growth curves were created for boys and girls. (13) Separate charts were made for weight for age, length for age, weight for length, head circumference and mid upper arm circumference.



Figure 2.2.1 Weight/Length for boys from 0 to 5 years

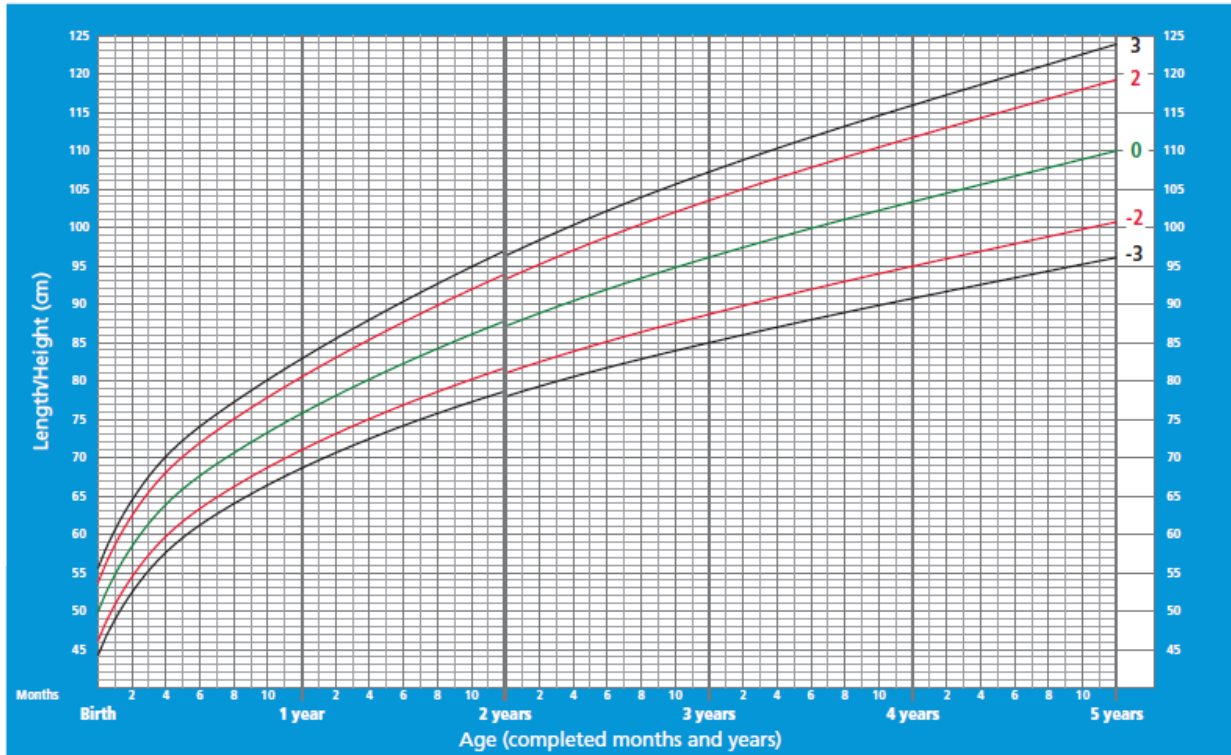
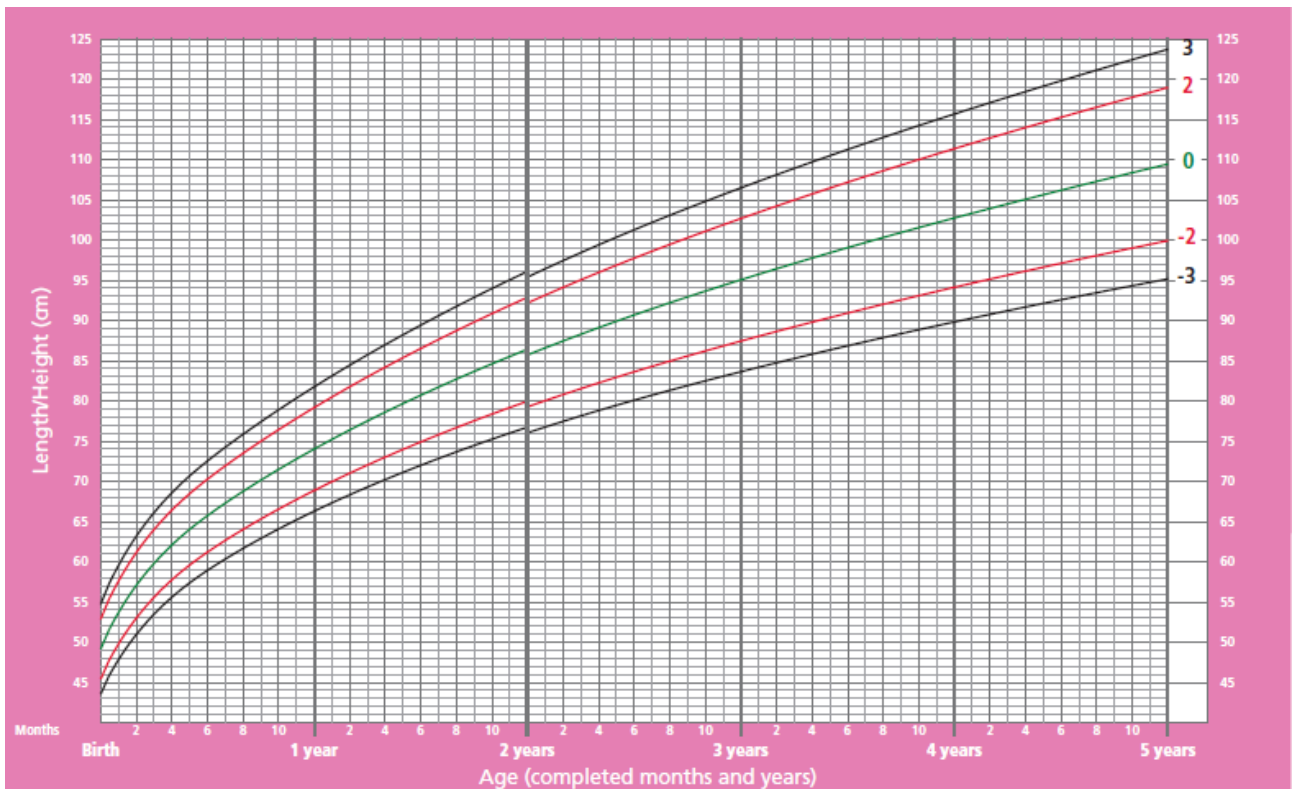


Figure 2.2.1 Weight/Length for girls from 0 to 5 years



The above figures are from the International growth standards for weight/length. There are similar tables for all the other anthropometric measurements. The central green line indicates the median. The red lines above and below indicate a change of one standard deviation from the median and black lines denote a difference of two standard deviations.

### **2.2.1 CLASSIFICATION**

Malnutrition can be classified further in three broad categories (14)

1. Under-nutrition: this includes stunting [ low length for age], wasting [low height for length] and underweight [weight for age]
2. Micronutrient related malnutrition: deficiency or excess of any micronutrient
3. Overweight and obesity

The three of the categories are commonly considered when looking at under-nutrition: (15)

1. Low weight for height: This is known as wasting. It indicates acute malnutrition primarily due to an acute deficiency of calories and protein either due to natural disasters or acute disease.. The overall prevalence of wasting is below 5% in most countries, though India is an exception with a slightly larger rate. A rate of above 15% indicates a critical level of malnutrition in the area. This usually peaks in the second year of life.

2. Low height for age: Below 2 years, the recumbent length of the child is used as a measure of stature. The standing height is used after 24 months. Stunting is the term used to denote this type of malnutrition. Stunting is an indicator of chronic malnutrition. In younger ages , upto 2 years it is indicative of an ongoing process of malnutrition while at later ages it can indicate a past history of malnutrition. A progressive decrease in the stunting rate shows an overall improvement in the nutritional status of a population..
  
3. Low weight for age : This is a reflection of the body mass to the current age of the child. Since it is influenced by both the weight and height, the interpretation is harder. For example, a child who is shorter may have a weight that is ideal for the height. Due to this conundrum, weight for height is a more accurate measure for wasting. The global distribution varies to the same extent as length for age. A decrease can also indicate an acute process like an infection. In some cases though, it is still indicative of a long term malnutrition. Due to the complex nature of its interpretation, it is seldom used in actual comparisons of large populations.

WHO bases the classification of severity based on the number of standard deviations from the mean for a particular age or the Z-score.

**Figure 2.2.3 Classification of malnutrition**

Cut off values	Terms of status
<b>Weight for Age Z-Score</b>	
< -3.00 WAZ	Severe underweight
-3.00 to -2.01 WAZ	Moderate underweight
-2.00 to 1.01 WAZ	Mild underweight
± 1.00 WAZ	Normal
<b>Height for Age Z-Score</b>	
< -3.00 HAZ	Severe stunting
-3.00 to -2.01 HAZ	Moderate stunting
-2.00 to 1.01 HAZ	Mild stunting
<b>Weight for height Z-Score</b>	
± 1.00 HAZ	Normal
< -3.00 WHZ	Severe wasting
-3.00 to -2.01 WHZ	Moderate wasting
-2.00 to 1.01 WHZ	Mild wasting
± 1.00 WHZ	Normal
+2.01 to +3.00 WHZ	Over-weight
≥3.00 WHZ	Obesity

*Source: Reference WHO child growth standards, 2006.*

A compound classification known as Waterlow's classification has been derived putting both the stunting and the wasting together. Here the two axes represent stunting and wasting and the population is classified as only stunted, only wasted, both stunted and wasted and finally neither stunted nor wasted

**Figure 2.2.4 Waterlow's classification (16)**

**Waterlow's classification**

H/A \ W/H	> m - 2 SD	< m - 2 SD
> m - 2 SD	Normal	Wasted
< m - 2 SD	Stunted	Wasted and stunted

m=mean, SD=standard deviation

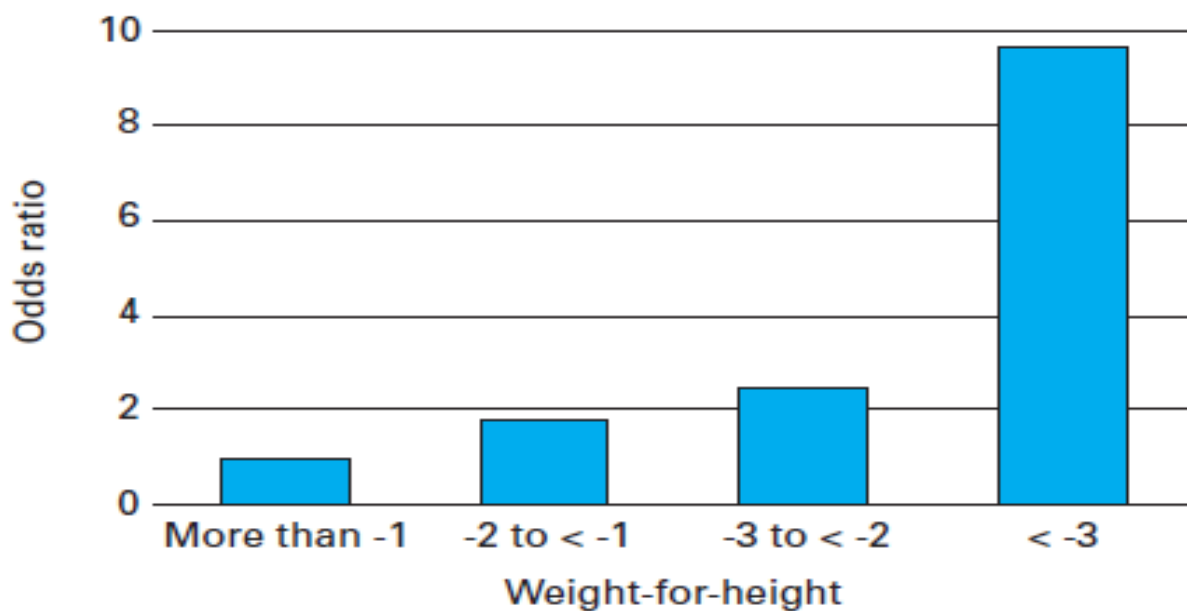
The classification of malnutrition and the grade of the same is important as the various side effects and the dangers of malnutrition vary with the respective levels. Mortality rates are significantly higher below -3 SD. Both WHO and UNICEF have characterised a Z score below below -3 as severe malnutrition. This is compounded by the clinical presence of any oedema.

### 2.2.2 EFFECTS OF MALNUTRITION

Malnutrition is not only a health issue but has socio-economic and cultural dimensions also. It is important to understand the aetiology of the malnutrition to enable analysis of the effects of both acute and chronic malnutrition in a child,. The causes of under-nutrition in a population include underlying poverty, repeated attacks of acute diseases like diarrhoea and chronic deficiency in both protein and energy levels in the diet. (17)

The effects of malnutrition are multiple and is a major determinant of childhood mortality. Though deaths due to malnutrition alone are few, the underlying weakness in the child's physiological make up as a result of malnutrition can increase mortality. 45% of the childhood deaths have been attributed to underlying malnutrition. (15) Severe acute malnutrition has been found to greatly increase the rate of death due to any other illness compared to a healthy population.(18)

**Figure 2.2.5 Odds ratio for mortality by weight for height**

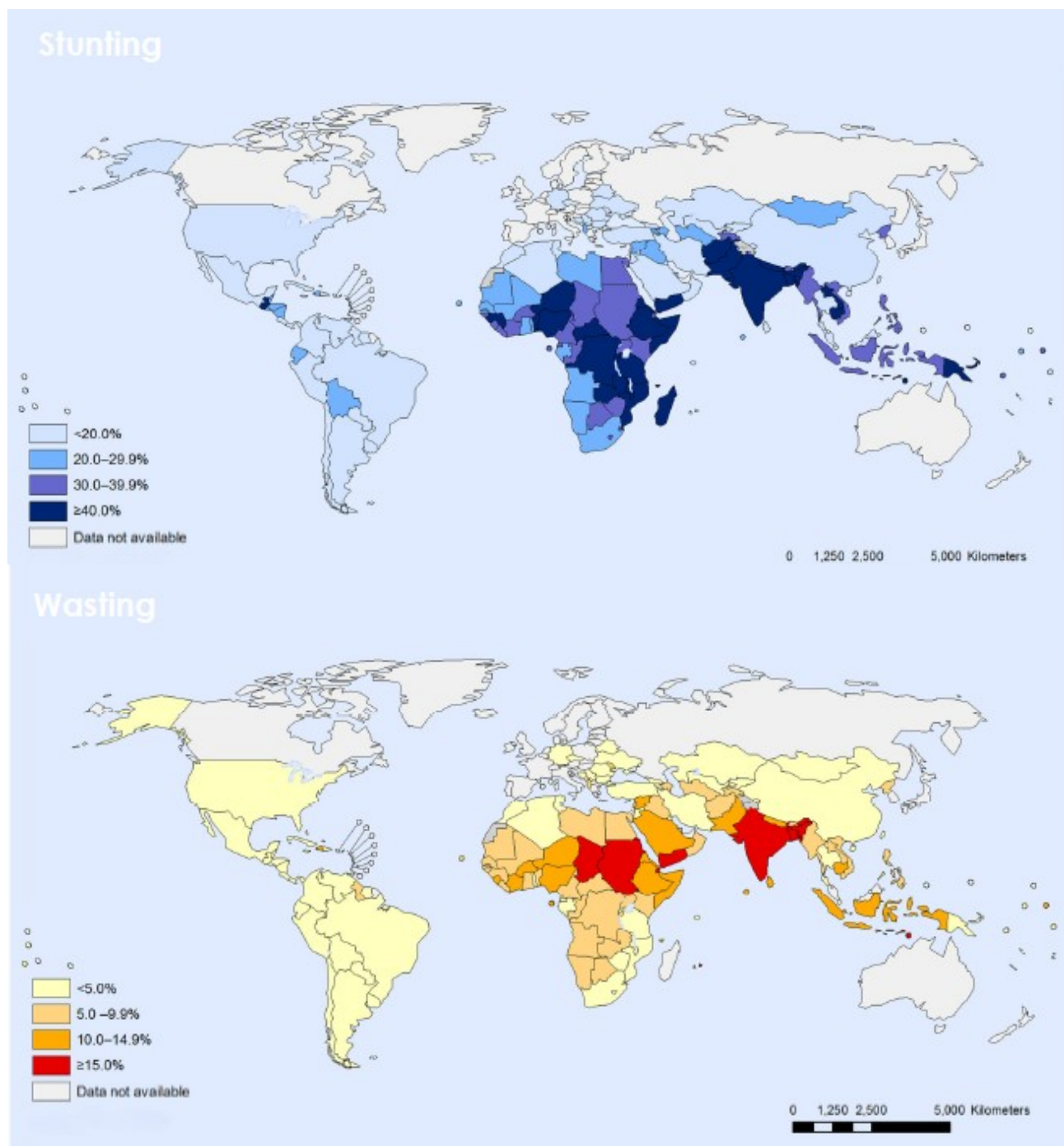


The consequences of malnutrition are by no means restricted to the mortality and biological outcomes. Chronic malnutrition influences the overall mental development of the child and the current physical condition. Children who are poorer end up being malnourished. A malnourished child is more likely to get sick and increase the health care expenditure for the family. An episode of disease contributes to a higher chance of being continually malnourished after that. This then puts the family into a vicious cycle of poverty and disease. Translating this to adulthood, there is a chance for decreased productivity and hence a furthering of the vicious cycle.(19)

### 2.2.3 BURDEN OF MALNUTRITION

Child malnutrition is a global problem, affecting low- and middle-income countries much more than high income countries. (18) Though there has been a considerable amount of reduction in the number of malnourished children since the 1990s, the burden is still considerably high and clustered. WHO estimates that of 2011 there are 165 million stunted children worldwide, with a rate of about 26 %. The percent of underweight children is about 16%.

**Figure 2.2.7 Global prevalence of stunting and wasting (18)**

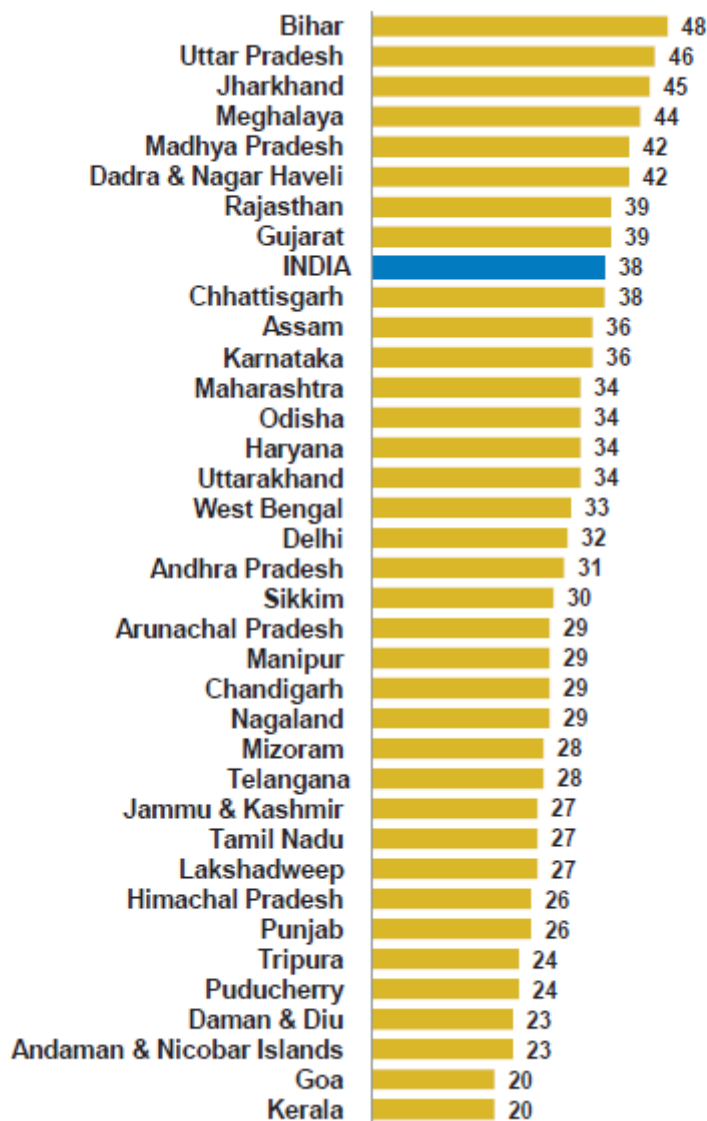




From both the maps there is clearly an uneven distribution, with Sub-Saharan Africa and South Asia having a much high prevalence as compared to the rest of the world.

According to NFHS 4, the overall prevalence of stunting among under five children in India was 38% and wasting was 21%. Though there has been a decrease from the previous survey, the number remains high. There is a large discrepancy in the geographical spread of malnutrition with differences between states being very high.

**Figure 2.2.8 Statewise percentage of stunting (21)**



In Tamil Nadu, the overall prevalence of stunting was found to be 27% and overall wasting to be 20%. (22) In Tiruvannamalai district, stunting was found to be 24.5% and wasting 34.6% . (23)

Tribal populations in India have a much higher level of malnutrition compared to the rest of the population. The expert committee on Tribal health found that the prevalence of underweight children was 42 %. (24) The report also concluded that due to geographical nature of these populations, there was very little data to get a clearer picture.

The Tamil Nadu state planning commission report of 2017 found that 41.69% of the under five children in Jawadhi hills were malnourished. Studies done previously in Jawadhi hills found the prevalence of wasting to be 10.4% and that of stunting to be 55.4% . (25)

Overall , the prevalence is much higher in Jawadhi hills as compared to the district, state and national levels, though slightly less than the rates for national tribal populations.

## 2.3 HEALTH SEEKING BEHAVIOUR

Health seeking behaviour is a term used to explain the pattern of health care utilization among any population group and the sequence of remedial actions that individuals take in order to rectify perceived ill health. (26) It is essentially the total health care utilization by the population. The nature of health seeking behaviour is not homogenous and is affected by a large number of factors. (1)

A number of models have been used to characterize and understand health seeking behaviour. These are : (2)

1. Health information acquisition model - this model assumes the steps of health information seeking to be in six steps - Stimulus ,information goal setting ,cost - benefit analysis of search ,search behavior , information evaluation and , decision point on adequacy of information . This is a descriptive model and does not consider personal factors for the influence of health seeking.
2. Johnson's comprehensive model – this model lists four main factors governing the behaviour - Demographic factors, , direct experiences of people, ,salience and beliefs of people. The strength of the model lies in its inclusion of beliefs and accounting for personal experience of the patients
3. Millers monitoring and blunting model – this model gives a larger degree of importance to personal factors in the model of health seeking. It assumes that those

with a higher degree of information seeking will take more active steps in the health seeking as opposed to those who don't

4. Longo's expanded model – this is by far the most comprehensive model thus far. Here the effects of personal and contextual factors on the information seeking behaviour of patients are investigated. Personal factors include demographic and socio-economic factors, health history, genetics, anxiety, culture, language, attitudes, behaviours, current health status, cognitive abilities and interpersonal communication motives. Contextual factors include health situation, healthcare structure, delivery of healthcare, information environment, information seeking for self, family members or friend at risk or with current medical problems, interpersonal social supports and networks.
5. Health belief model – this takes into account two main factors – the belief about the disease condition and its consequences as well as the belief in the curative effect of the treatment. It has been applied in many low income countries. (3)

On the basis of the various models proposed, an understanding of the local factors is necessary to explain the health seeking behaviour in any area. On the whole international and national health programs assume that just the provision of knowledge about a disease condition and the health is enough to influence positive health seeking behaviour (1) Evidence from descriptive studies around the world has shown that in the absence of other interventions, just provision of knowledge is not always enough to cause a change.

Some of the other factors proposed are : (3) (2) (4) (5)

1. Access to health care – availability and geographical location
2. Quality of health care provided
3. Local customs and beliefs regarding healthcare
4. Relevance of health care to local needs
5. Economic status
6. Social capital
7. Demographics
8. Women's rights and customs locally
9. Community / caste makeup of the society
10. Stigma related to diseases

The overall trend towards a positive health seeking behaviour comes from a conglomeration of all the various factors. Considering the sheer number of factors that influence this, the is expected to be a great degree of variance between populations. In a heterogeneous society, there is also an expected variance between population subgroups. In a population like the Jawadhi hills where the population is homogenous with regard to social status and community, this differences within the community is expected to be less.

For this study two aspects of health seeking are specially considered – antenatal care and morbidity in under five children.

Antenatal care is an opportunity to promote a positive pregnancy experience and improved maternal and child survival. Apart from the added effects of maternal protection, ANC has been shown to impact the growth and overall make up of child health. (6) (7) Public health platforms across the world have been advocating for a comprehensive and targeted system for providing care. In India systems have evolved over the years to help with this but have a varied acceptance in different parts of the country. (8)

WHO recommends the following for a safe and ideal pregnancy with a minimal perinatal mortality : (27)

1. Minimum of eight antenatal visits [ 4 earlier]
2. Daily intake of oral Iron and Calcium supplements
3. Tetanus toxoid vaccinations
4. One ultrasound before 24 weeks
5. Counselling by healthcare professional

Globally only 62% of the women have had access to this level of care. (9)

Both UNICEF and WHO recommend that all deliveries be institutional to minimize neonatal mortality. (28) National level data shows that 99% of all deliveries in Tamil Nadu are institutional. (29) The national recommendations for India also advocate a minimum of four visits to a health care centre and institutional delivery.

According to NFHS 4, Tiruvannamalai district had 83.4 % of women having atleast 4

antenatal check-ups though only 33.4% had eight. The percentage of institutional deliveries were 95.5% (23)

The most notable factor that has helped in the increased utilization of antenatal care has been the advent of conditional cash transfer programs. In Tamil Nadu the program was named the Dr. Muthulakshmi Reddy scheme and nationally the Janani Suraksha Yojna was introduced. A study done in Madhya Pradesh found an increase of 42.6% in institutional deliveries after the introduction of the scheme. (10) In Uttar Pradesh a study found antenatal registrations increased from 61.79 to 96.34% deliveries at the Government Health Facility increased from 25.20 to 53.25% and postnatal check-ups increased from 45.93 to 69.51%.

## **2.4 EFFECT OF MIGRATION ON NUTRITIONAL STATUS AND HEALTH SEEKING BEHAVIOUR**

Apart from having a large socio-economic impact on life, migration has a large effect on the health and health seeking behaviour of migrants. (30) A large part of the impact on health come from the loss of identity or exclusion from the public infrastructure in the place of migration. A large number of migrants are from the informal sector of employment and hence fall outside the scope of labour laws, labour unions and consequently health services. (31). The risk is even greater, primarily because many migrant labourers end up taking higher risk jobs, and being housed in places that do not have the recommended sanitation levels. Migrant labourers face a double risk when it comes to health. Due to the factors that require migration, they are more likely to require a good contact with the health system, but due to their status as migrants, are far more likely to be excluded from them. (31)

For many seasonal migrants, the added effects of poor sanitation, lack of clean drinking water, poor housing, exposure to environmental factors and over-crowding play a large role in the health effects. There are a variety of reasons that make both the access to health and quality of health worse than a resident population. Some of these include language barriers, poorer economic status, feeling of alienation in place of migration and local prejudices against migrants. (31)(32) These factors are not mutually exclusive but act synergistically to make the situation even worse than normal. It can be worse in seasonal migrants as the place of migration may vary each time and hence the access point for health changes. For



pregnant women and children, who are more vulnerable and need a higher degree of medical care even normally, the effects can be devastating. (33) There are certain theories however, that a better access to healthcare in the place of migration may be a factor for the migration itself. (34) (35) A bulk of the evidence found on this though, point in the other direction, with migrants having a much less access to health, with women and child health being much more at a risk.

A study done in rural Rajasthan comparing the nutritional status of migrants along with non-migrants found a much higher prevalence of malnutrition among migrants. The prevalence of stunting was found to be 53% among migrants and 39% among non-migrants while wasting was 33% and 15 % respectively. This study also found a significant reduction in consumption of healthy food by the mother and the child. Apart from the nutritional status, the access to schemes like the *anganwadi* was absent in the migrant population. (36)

The study concluded that a compound pathway consisting of lower access to health, absence of caregivers when the parents are at work and lower access to other security measures and infrastructure like *anganwadi* are a primary cause the poor outcomes

A study done in urban India found the health care utilization to be lower among migrant labourers, and migrants being associated with lower levels of education and income. (37)

This influenced the antenatal care received and the overall health seeking behaviour.

A study done among migrant construction workers in Punjab found that the migrants had a much lower education than the state average. Only 10.5% of the migrants had at least three antenatal check-ups as compared to the state average of 70%. Only 9.7% received Iron and Calcium supplements as compared to 24 % and only 15% of the migrants had institutional deliveries as compared to the state average of 48.4%.(38)

### **3. OBJECTIVES**

1. To determine the nutritional status of children between 6 and 59 months of age in panchayaths with a high rate of migration in Jawadhi hills.
2. To study the health seeking behaviour about maternal and child health in the population.
3. To study the effects of migration on nutritional status and health seeking behaviour.
4. To compare the health seeking behaviour of migrant labourers in Jawadhi hills and at the place of migration.

## **4. METHODOLOGY**

### **4.1 STUDY SETTING**

The study was carried out in two *panchayaths* [Nammiyampattu and Kovilur] of the Jawadhi hills revenue division of Tiruvannamalai district in Tamil Nadu. Jawadhi hills is a hill range belonging to the Eastern ghats and lying in both Tiruvannamalai and Vellore districts. The average elevation is between 2400 and 2500 feet and mostly covered by reserve forests. (8). The total population of Jawadhi hills according to the 2011 census was 50,688 with 83.5% belonging to the Malayali tribal community. The population is spread over 11 *panchayaths* and 229 villages.

### **4.2 PERIOD OF RECRUITMENT**

The study was conducted between January 2019 and June 2019, a period when seasonal migrants from Jawadhi hills return to their home villages.

### **4.3 STUDY DESIGN**

A community based cross sectional study was used

### **4.4 INCLUSION CRITERIA**

Children aged 6 to 59 months belonging to the tribal community were recruited for the study. The questionnaire was administered to the mothers of the children selected.

#### **4.5 EXCLUSION CRITERIA**

Single parent and no parent households were excluded.

#### **4.6 SAMPLE SIZE CALCULATION**

From the NFHS 4 the prevalence of underweight children in Tamil Nadu was 35.5%. The precision of the study was fixed at 20 % of the prevalence and a non-response rate of 20% was expected

Using the standard formula :

$$N = \frac{4pq}{d^2}$$

Sample size = 187

Adding 20 % non-response, final sample size = 225

#### 4.7 SELECTION OF STUDY SUBJECTS

A two staged sampling technique was used.

The two *panchayaths* in Jawadhi hills with the on the highest rates of migration from the hills were selected . Thirty villages were selected by simple random sampling from the two *panchayaths* Eight children were chosen from every village.

After reaching the geographical centre of each village , a random number ranging from 11 and 59 was generated. The first digit indicated the direction [1- North, 2- South, 3-East, 4- West and 5- field huts. The second digit indicated the number of the house in the chosen direction. Every successive house after that was visited and households with children fulfilling the inclusion criteria were identified. The process was continued in successive houses until 8 children were identified in the cluster. If a particular direction did not yield eight children a second random number was chosen and a new direction identified.. The process was continued till a total of eight children were chosen from the village. If there were more than one child in the house satisfying the criteria, the oldest child was chosen.

## 4.8 STUDY TOOLS

An interviewer administered, semi structured ,questionnaire was the primary tool for the study. The details collected were:

1. Socio-demographic variables :

- i. Age of child in months
- ii. Age of parents in years
- iii. Migration status – defined as whether the child migrated along with the parents for work anytime in the past one year for work to another district or state.
- iv. Primary caregiver of the child
- v. Type of family – nuclear, joint or extended
- vi. Type of house – thatched, tiled/concrete or mixed
- vii. Ownership of house – owned or rented
- viii. Usage of toilet – if present or absent
- ix. Mean monthly income of father and mother
- x. Employment status of mother and father – whether currently employed or not
- xi. Occupational status of mother and father – if labour, agriculture or others

xii. Education of mother and father – recorded as number of years of education

xiii. Distance from hospital

## 2. Antenatal care

- i. Number of antenatal visits for the pregnancy of the child in question – if above or below 5
- ii. Tetanus toxoid administered for pregnancy – if given or not
- iii. Iron and Calcium supplements during pregnancy – if given or not
- iv. Place of antenatal care – government, private or both
- v. Place of delivery – if home , government or private
- vi. Birth weight of child

## 3. Health seeking behaviour

- i. Vaccination status for all vaccines applicable to that age as per the Tamil Nadu government protocol
- ii. Any instance of fever, cough, diarrhoea or injuries in the past six months
- iii. Hospital visit for any condition – present or absent
- iv. Usage of traditional medicine, home remedies for the condition
- v. Hospital admissions in the past six months – present or absent
- vi. Chronic conditions – present or not



#### 4. Details of migration

- i. Place of last migration
- ii. Number of months of stay in place of migration
- iii. Parental work in place of occupation
- iv. Residence in place of migration
- v. Usage of toilet in place of migration

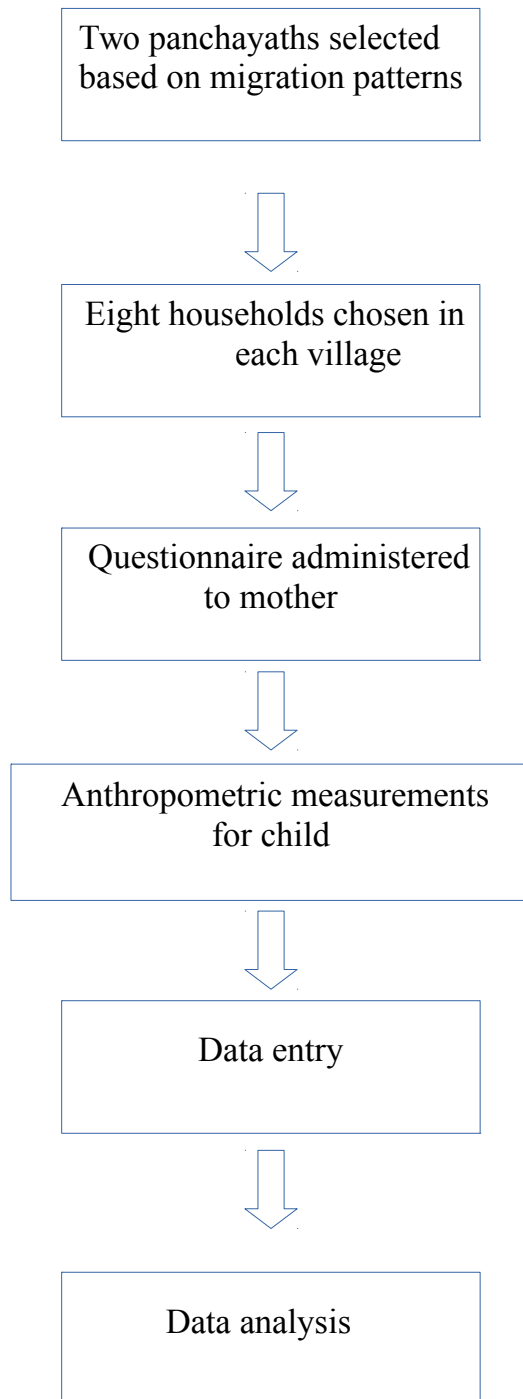
The questions pertaining to antenatal care and health seeking were repeated for all the migrants to get the details at the place of migration.

For nutritional anthropometry the following measurements were taken:

1. Height using stadiometer
2. Weight using an electronic weighing scale
3. Mid upper arm circumference using inch tape

The anthropometric measurements were converted to Z scores using the WHO anthro tool version 3.2.2. Data entry was done using EpiData version 3.1. Data analysis was done using IBM SPSS version 23.

#### 4.9 DIAGRAMMATIC ALGORITHM OF STUDY



## **4.10 STATISTICAL ANALYSIS**

### **4.10.1 UNIVARIATE ANALYSIS**

Univariate analysis was done using measures of central tendency and dispersion for continuous variables and proportions for categorical variables. Z scores obtained from the nutritional anthropometry were converted to the grade of malnutrition using the standard WHO definitions.

### **4.10.2 BIVARIATE ANALYSIS**

Bivariate analysis was done using Chi-square test. Association between socio-demographic variables including migration status and presence of moderate to severe stunting and wasting were ascertained. A comparison between the socio-demographic characteristics of migrants and non-migrants were also checked. Health seeking behaviour among migrants in Jawadhi hills was compared, to the behaviour at their their place of migration.

### **4.10.3 MULTIVARIATE ANALYSIS**

Binary logistic regression was done to assess the independent association between socio-demographic variables including migration status and stunting and wasting. All confounders were included in the model.

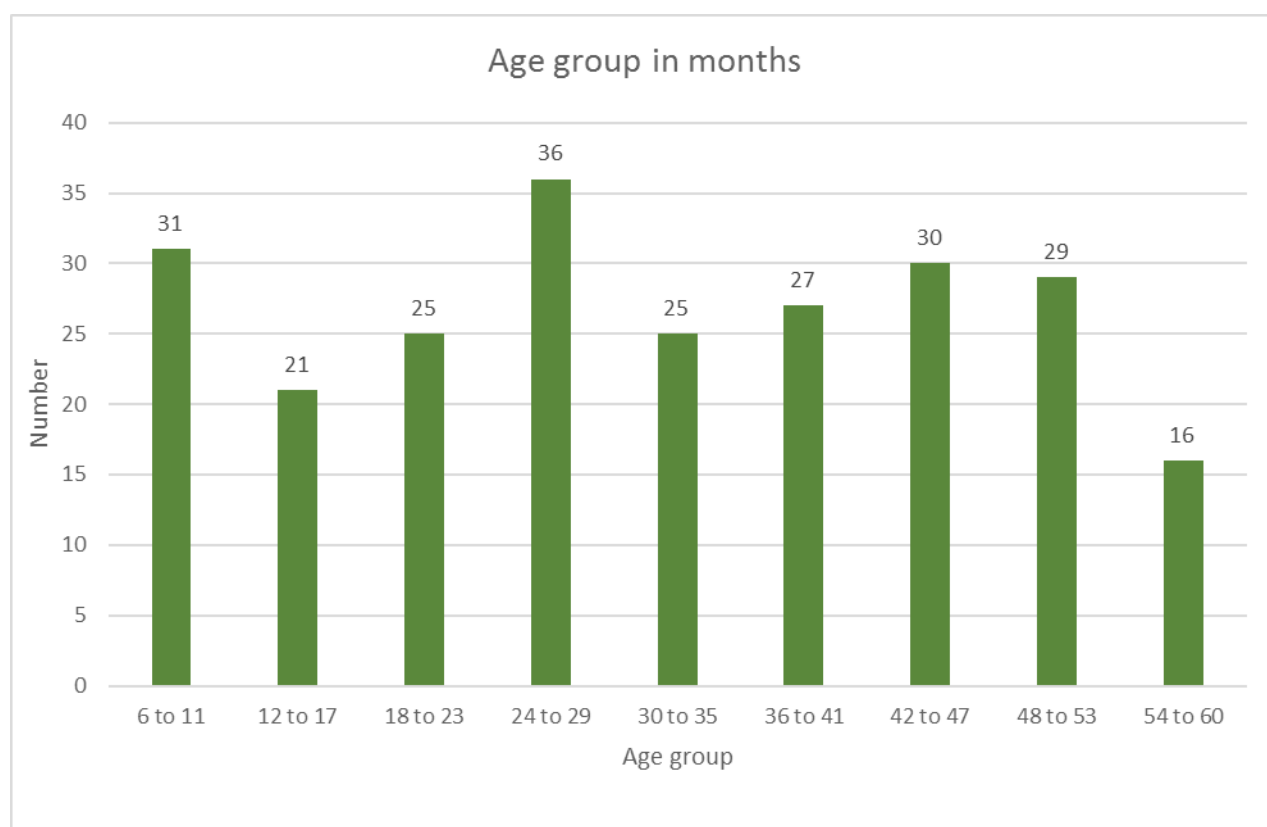
## 5. RESULTS

### 5.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY

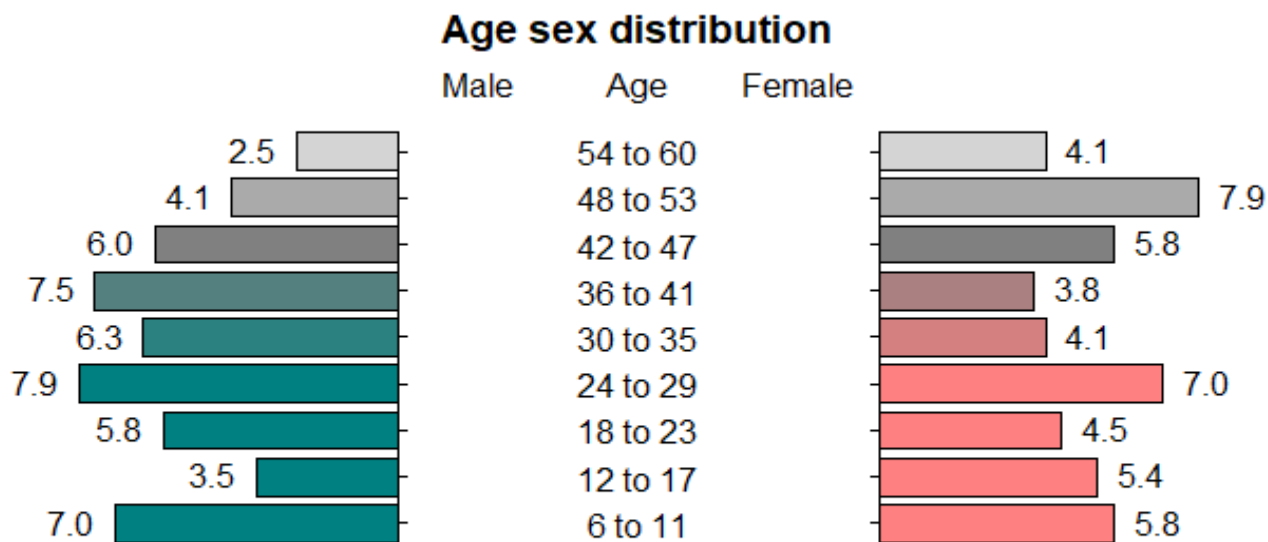
#### POPULATION

A total of 240 children were surveyed. Of these, 104 migrated with their parents for work in the last one year. The remaining 136 were entirely in Jawadhi hills during the previous year. About 49 % of the population was female and the rest male. The mean age was 31.3 months with a standard deviation of 14.8 months. The minimum age was 6 months and the maximum age of 58 months.

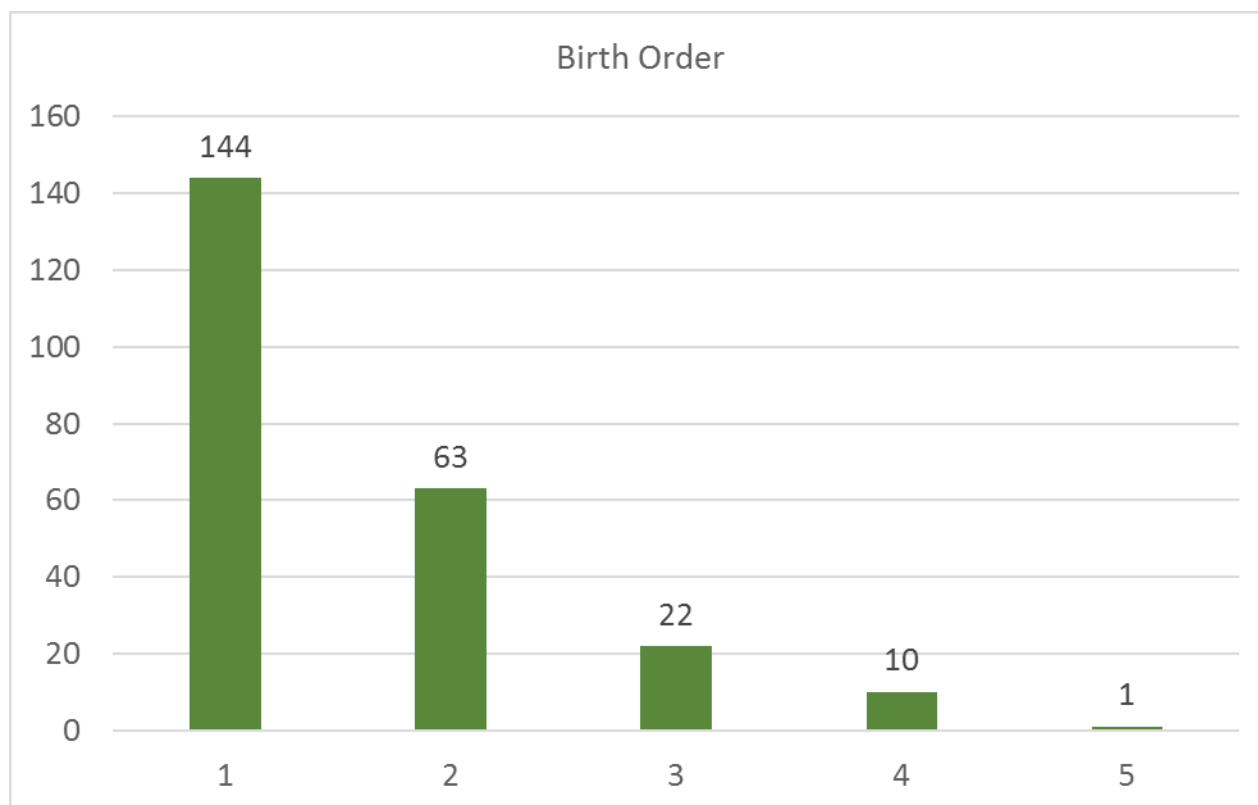
**Figure 5.1.1 Age distribution of study population**



**Figure 5.1.2 Age sex distribution**

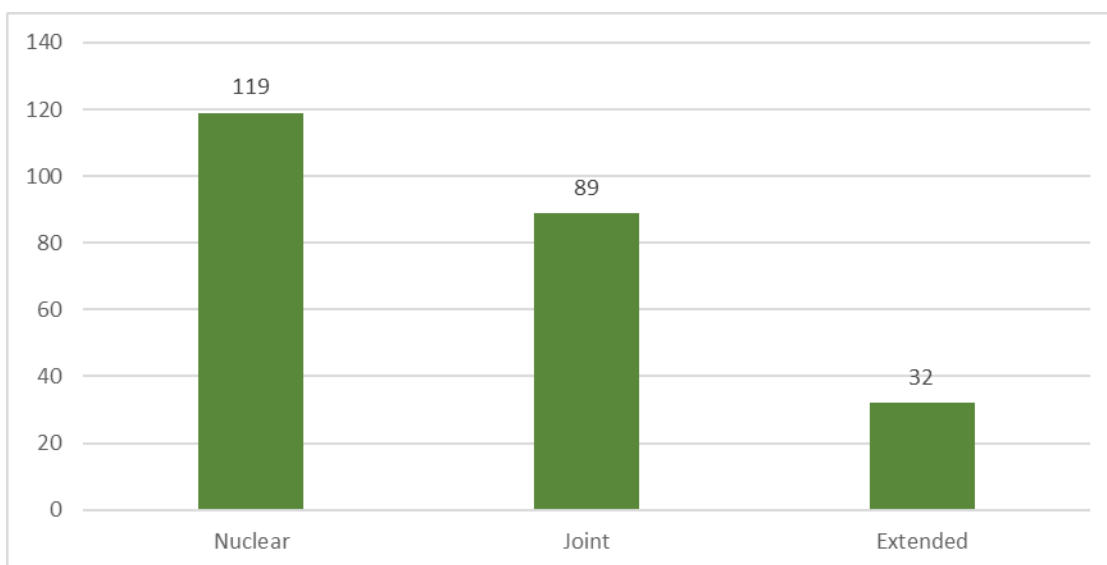


**Figure 5.1.3 Birth order of the child**



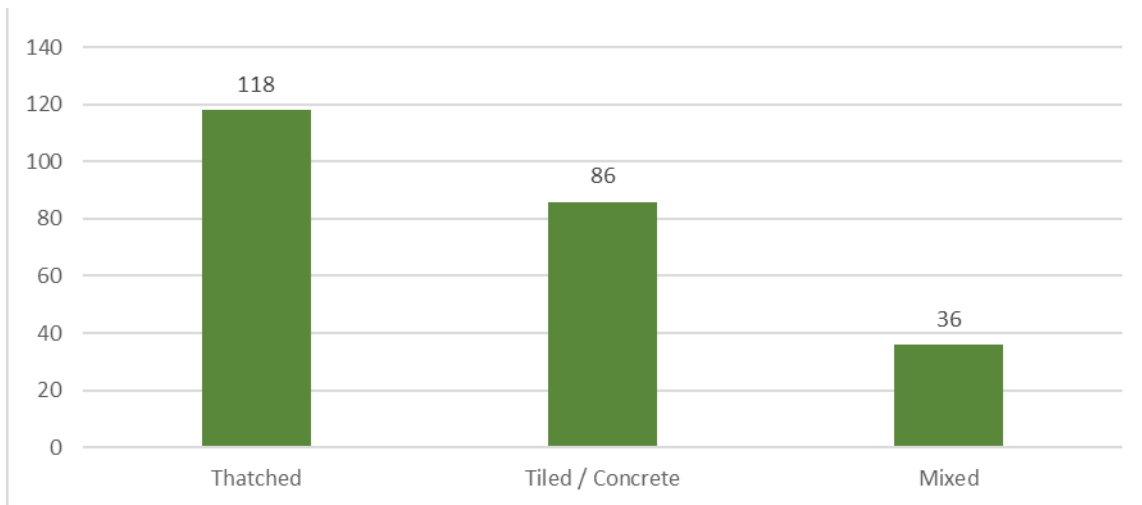
Most of the children [60%] were the first child of the parents. The mother of the child was primary caregiver for 95.4% of the children. The grandmother was the primary caregiver for the remaining children. 42.5% of the mothers and 82.5% of the fathers were currently gainfully employed. This considered the employment status at the time of the survey irrespective of their migration status and work through the rest of the year

**Figure 5.1.4 Type of family**



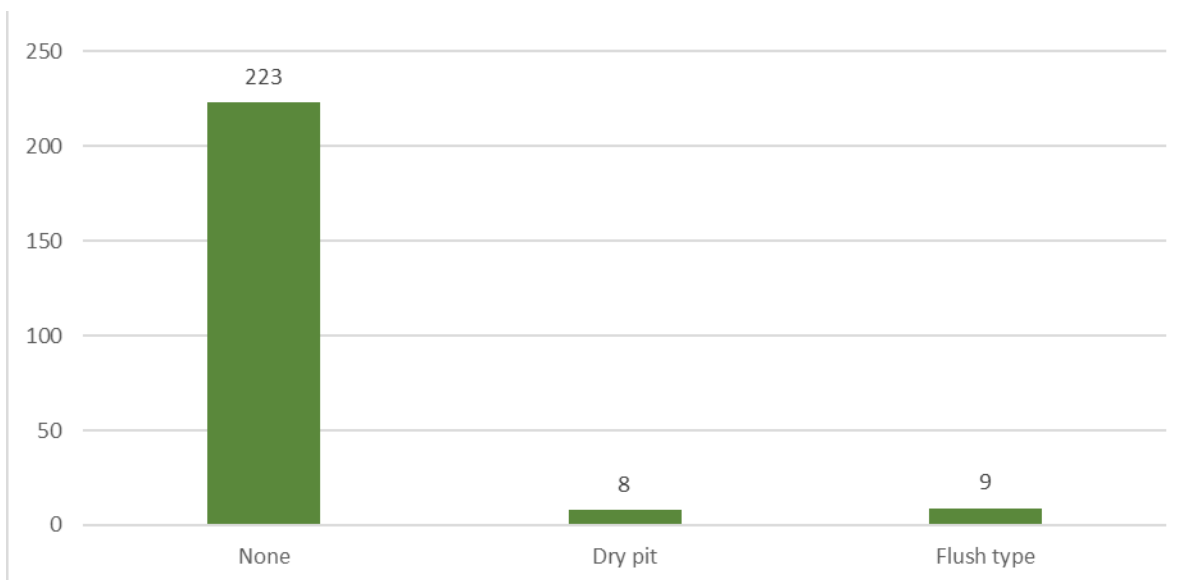
Approximately half the families were nuclear families

**Figure 5.1.5 Type of house**



About half the population stayed in thatched houses. 95.4% of the houses were self-owned and the remaining were rented.

**Figure 5.1.6 Access to toilet**



Most (92.9%) study subjects did not have access to any toilet facilities.

## 5.2 ANTENATAL CARE IN JAWADHI HILLS

The mean maternal age was 25.4 years with a standard deviation of 4.4 years. The minimum age was 16 and maximum 39.

**Table 5.2.1 Number of antenatal visits during the reference pregnancy**

	<b>Number</b>	<b>Percentage</b>
<b>More than 5</b>	144	60.0
<b>Less than 5</b>	92	38.3
<b>None</b>	4	1.7

**Table 5.2.2 Place of antenatal check-up**

	<b>Number</b>	<b>Percentage</b>
<b>Government only</b>	196	81.6
<b>Private only</b>	4	1.7
<b>Both government and private</b>	42	17.5

Both the chosen *panchayaths* had PHCs and they were the place of primary antenatal care in most people. 94.2 % of the mothers had tetanus immunization during pregnancy and 92.9 % had access to Iron and Calcium supplements

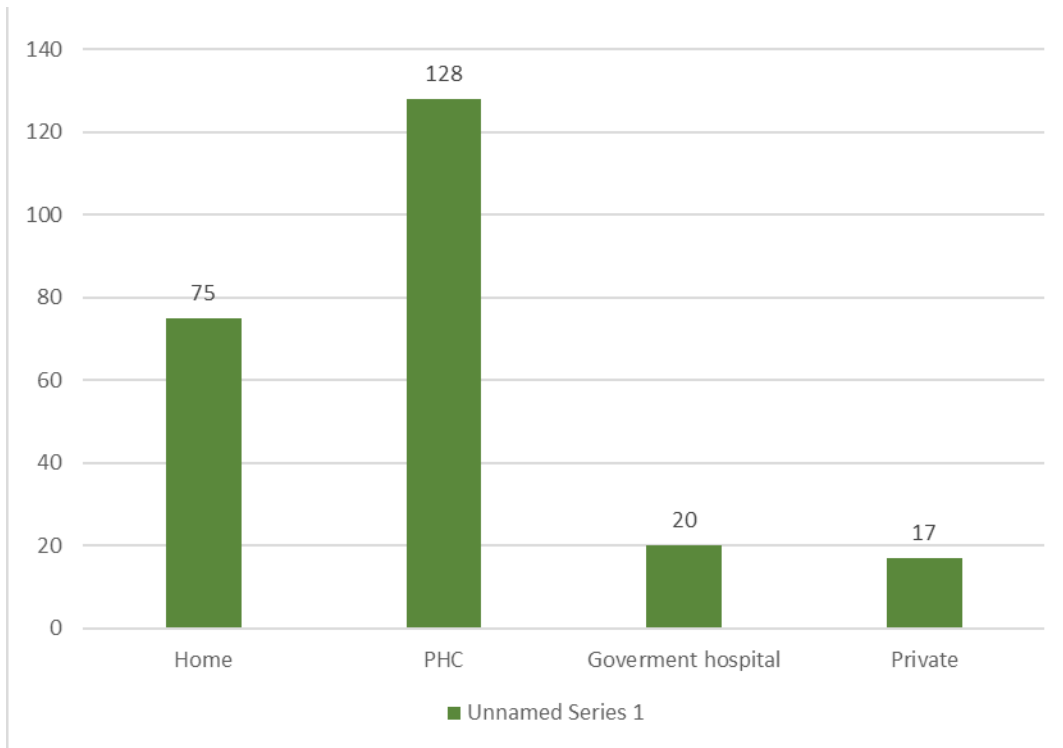
**Table 5.2.5. In Jawadhi for the entire period of pregnancy**

	<b>Number</b>	<b>Percentage</b>
<b>Yes</b>	148	61.7
<b>No</b>	92	38.3

Of the 114 mothers who had migrated this year, 22 were in Jawadhi hills for the entire pregnancy.



**Figure 5.2.1 Place of delivery**



The percentage of institutional deliveries was 69.7%.

### 5.3 MIGRATION

The *panchayaths* were chosen as they were known earlier as those in Jawadhi hills with the highest rates of migration.

**Table 5.3.1 Number of migrants**

	<b>Number</b>	<b>Percentage</b>
<b>Children</b>	104	43.0
<b>Mothers</b>	114	47.5
<b>Fathers</b>	125	52.1

There were 10 children who stayed back in Jawadhi hills but mother and father migrated for work. A further 11 children had their mother resident with them in Jawadhi hills but father migrated for work. The children whose parents had migrated but who themselves did not, were counted as non-migrant for the analysis.

**Table 5.3.2 Place of migration**

	<b>Female</b>		<b>Male</b>	
	Number	Percentage	Number	Percentage
<b>Kerala</b>	31	27.1	31	24.6
<b>Karnataka</b>	83	72.9	92	73.0
<b>Andhra Pradesh</b>	0	0	2	2.4

Most of the migration was to Karnataka, more to the coastal districts and Kodagu. The primary job was spice and coffee harvesting as well as a small amount of manual labour.

**Table 5.3.3 Place of residence of child during migration**

	<b>Number</b>	<b>Percentage</b>
<b>House</b>	19	18.3
<b>Shed</b>	77	74.0
<b>Tent</b>	8	7.7

Many of the migrants were housed in temporary sheds in the place of migration. All the migrants going to that estate for migration would be in the same shed. A few had separate houses to stay in during the same period.

**Table 5.3.4 Availability of toilet in place of migration**

	<b>Number</b>	<b>Percentage</b>
<b>None</b>	95	91.3
<b>Dry pit</b>	2	1.9
<b>Flush type</b>	7	6.7

The access to toilet was more in the place of migration than Jawadhi hills, though by a very small percentage.

**Table 5.3.5 Number of months of the pregnancy in migration**

	<b>Number</b>	<b>Percentage</b>
<b>4</b>	78	84.8
<b>6</b>	14	15.2

**Table 5.3.6 Number of antenatal visits during the period of migration**

	<b>Number</b>	<b>Percentage</b>
<b>Nil</b>	78	84.8
<b>Less than 5</b>	14	15.2
<b>More than 5</b>	0	0

A large majority of the women did not have any antenatal check-ups in their place of migration. Those who had any check-ups, were all among those who migrated to Kerala 68.5% felt there was a place for emergency care available.

Various socio-demographic factors were compared between migrants and non-migrants to see any statistically significant differences between the two groups.

**Table 5.3.7 Comparison between migrants and non-migrants**

<b>Factor</b>		<b>Migrant</b>	<b>Non-Migrant</b>	<b>P-value</b>	<b>OR</b>
<b>Gender</b>	Female	45 [43.2]	72 [52.9]	0.137	0.678
	Male	59 [56.8]	64 [47.1]		[0.406-1.133]
<b>Mother employed</b>	Yes	71 [68.2]	31 [22.7]	0.000	<b>7.287</b>
	No	33 [31.8]	105 [77.3]		[4.099-12.955]
<b>Father employed</b>	Yes	99 [95.2]	99 [72.7]	0.000	<b>7.400</b>
	No	5 [4.8]	37 [27.3]		[2.793-19.610]
<b>Family type</b>	Nuclear	53 [50.9]	66 [48.5]	0.709	1.102
	Non-nuclear	51 [49.1]	70 [51.5]		[0.661-1.837]
<b>House type</b>	Thatched	58 [55.7]	60 [44.1]	0.074	1.597
	Others	46 [44.3]	76 [55.9]		[0.955-2.671]
<b>House ownership</b>	Own	99 [95.2]	130 [95.5]	0.884	0.914
	Rented	5 [4.8]	6 [4.5]		[0.271-3.081]
<b>Access to toilet</b>	Absent	98 [94.2]	125 [91.9]	0.488	1.437
	Present	6 [5.8]	11 [8.1]		[0.514-4.023]
<b>Mothers ANC visits</b>	Less than 5	64 [61.5]	32 [22.7]	0.000	<b>5.200</b>
	More than 5	40 [38.5]	104 [77.3]		[2.972-9.099]
<b>Place of delivery</b>	Home	33 [31.7]	42 [30.8]	0.888	1.040
	Institution	71 [68.3]	94 [69.2]		[0.600-1.804]

There was a statistically significant association between the employment status of the mother, employment status of the father, number of ANC visits by the mother and the migration status of the child. Migrant children were 7.28 times more likely to have their mother currently employed and 7.4 times more likely to have their father currently employed. This employment status is at Jawadhi hills not during the time of migration. Mothers of migrant children were 5.2 times more likely to have had less than five antenatal visits in total. There was no association found between any of the other factors and migration. There was also no statistically significant difference between the birth weights of the children in both groups and the mean family incomes of both groups.

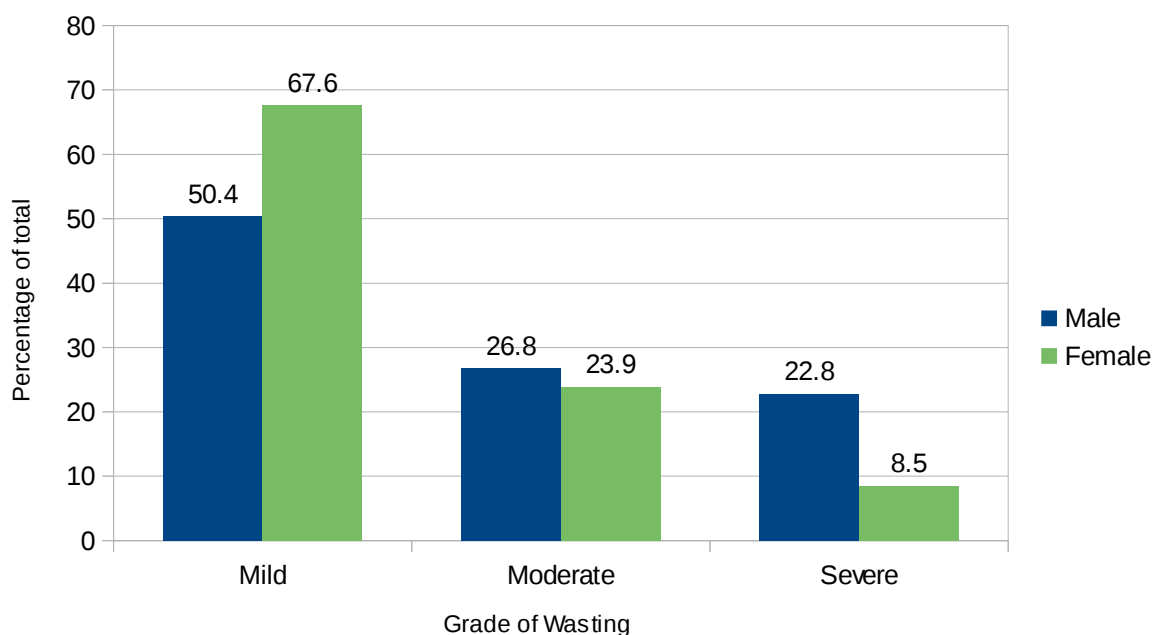
## 5.4 NUTRITIONAL STATUS

The weight, height and mid upper arm circumference was converted into a z-score and calculated. The definitions of mild, moderate and severe wasting was taken from WHO guidelines.

**Table 5.4.1 Wasting and gender**

	Female		Male	
	Number	Percent	Number	Percent
<b>Mild wasting</b>	79	67.6	62	50.4
<b>Moderate wasting</b>	28	23.9	33	26.8
<b>Severe wasting</b>	10	8.5	28	22.8

**Figure 5.4.1 Wasting and gender**

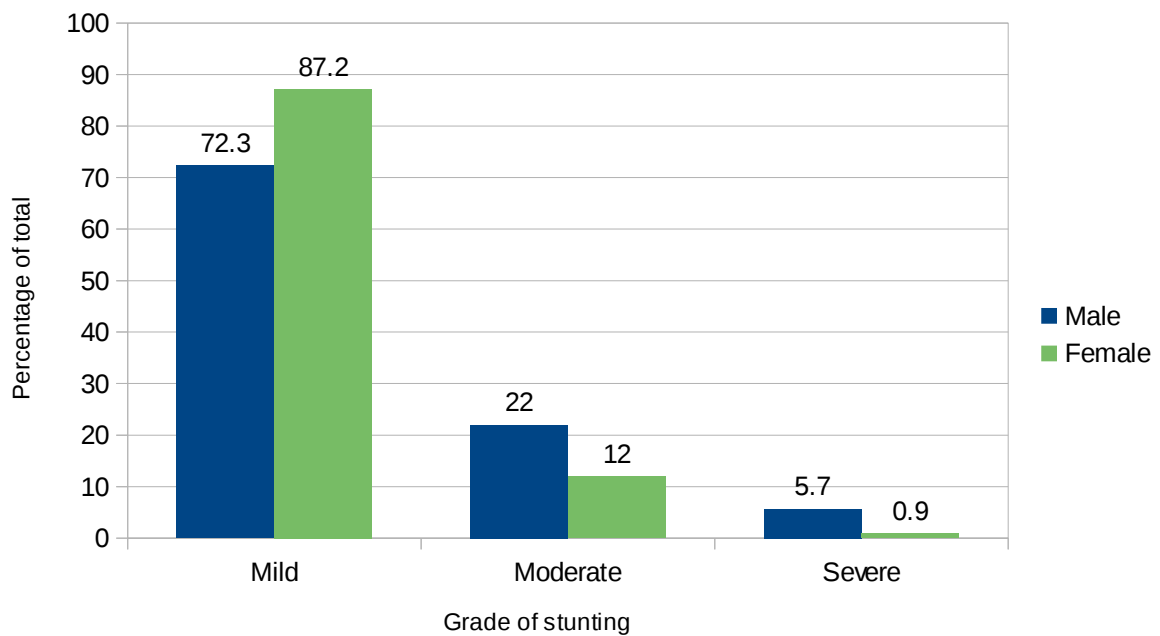


Severe wasting was more prevalent among males and mild wasting among females. The prevalence of moderate wasting was comparable among both genders.

**Table 5.4.2 Stunting and gender**

	Female		Male	
	Number	Percent	Number	Percent
<b>Mild stunting</b>	102	87.2	89	72.3
<b>Moderate stunting</b>	14	12.0	27	22.0
<b>Severe stunting</b>	1	0.9	7	5.7

**Figure 5.4.2 Stunting and gender**



Both moderate and severe stunting was more prevalent among males.



**Table 5.4.3 MUAC and gender**

	Female		Male	
	Number	Percent	Number	Percent
<b>Mild wasting</b>	74	63.2	73	47.2
<b>Moderate wasting</b>	43	36.8	65	52.8
<b>Severe wasting</b>	0	0	0	0

Malnutrition as defined by MUAC was comparable among both genders.

Waterlows classification of malnutrition was then done to compare between genders.

**Table 5.4.4 and Table 5.4.5 Waterlows classification****Males**

	Normal	Wasted
<b>Normal</b>	36 [29.2%]	53 [43.0%]
<b>Stunted</b>	26 [21.1%]	8 [6.5%]

**Females**

	Normal	Wasted
<b>Normal</b>	64 [54.8%]	38 [32.4%]
<b>Stunted</b>	15 [12.8%]	0

There were no children who were both stunted and wasted among the females. The prevalence of neither stunted or wasted children was 54.8% among the females and only 29.2% among the males. Moderate and severe wasting and stunting were combined for the purpose of bi-variate analysis. Chi square test was done with socio-demographic factors and migration status as possible risk factors.

**Table 5.4.6 Factors associated with wasting**

<b>Factor</b>		<b>Wasted</b>	<b>Not wasted</b>	<b>p-value</b>	<b>OR</b>	<b>Adjusted OR</b>
<b>Migration status</b>	Migrant	41 [39.4]	63 [60.6]	0.615	0.875	1.136
	Non-migrant	58 [42.6]	78 [57.4]		[0.52-1.47]	[0.63-2.03]
<b>Gender</b>	Male	61 [49.6]	62 [50.4]	0.007	<b>2.044</b>	<b>2.207</b>
	Female	38 [32.5]	79 [67.5]		[1.21-3.57]	[1.28-3.84]
<b>Family type</b>	Nuclear	49 [41.2]	70 [58.8]	0.982	0.994	1.063
	Non-nuclear	50 [41.3]	71 [58.7]		[0.59-1.66]	[0.62-1.81]
<b>House type</b>	Thatched	44 [37.3]	74 [62.7]	0.220	0.724	1.448
	Others	55 [45.1]	67 [54.9]		[0.43-1.21]	[0.84-2.48]
<b>Access to toilet</b>	Absent	94 [42.2]	129 [57.8]	0.304	1.749	0.570
	Present	5 [29.4]	12 [70.6]		[0.59-5.13]	[0.18-1.72]
<b>ANC visits</b>	Less than 5	37 [38.5]	59 [61.5]	0.486	0.829	1.196
	More than 5	62 [43.1]	82 [56.9]		[0.49-1.4]	[0.66-2.15]
<b>Place of delivery</b>	Home	34 [45.3]	41 [54.7]	0.386	1.276	0.732
	Institution	65 [39.4]	100 [60.6]		[0.73-2.21]	[0.41-1.30]
<b>Income</b>	High	47 [40.9]	68 [59.1]	0.909	0.970	0.903
	Low	52 [41.6]	73 [58.4]		[0.58-1.62]	[0.52-1.54]

Income was dichotomized at the median total income as high and low. There was a statistically significant association between gender and wasting. Males were 2.044 times more likely to be wasted as compared to females. There were no other significant associations found between any of the socio-demographic variables and wasting. There was also no association found between migration and wasting. All the variables were included in a binary logistic regression model to adjust for possible confounders. Here too, there was an association between gender and wasting with boys being 2.207 more likely to have moderate to severe wasting. The same was repeated with moderate and severe stunting.

**Table 5.4.7 Factors associated with stunting**

<b>Factor</b>		<b>Stunted</b>	<b>Not Stunted</b>	<b>p-value</b>	<b>OR</b>	<b>Adjusted OR</b>
<b>Migration status</b>	Migrant	28 [26.9]	76 [73.1]	0.029	<b>2.018</b> [1.06-3.81]	<b>2.217</b> [1.02-4.38]
	Non-migrant	21 [15.4]	115 [84.6]			
<b>Gender</b>	Male	34 [27.6]	89 [72.4]	0.004	<b>2.597</b> [1.3-5.26]	<b>2.457</b> [1.23-5.00]
	Female	15 [12.8]	102 [87.2]			
<b>Family type</b>	Nuclear	23 [19.3]	96 [80.7]	0.678	0.875 [0.46-1.64]	1.170 [0.60-2.25]
	Non-nuclear	26 [21.5]	95 [78.5]			
<b>House type</b>	Thatched	29 [24.6]	89 [75.4]	0.116	1.662 [0.87-3.14]	0.708 [0.36-1.38]
	Others	20 [16.4]	102 [83.6]			
<b>Access to toilet</b>	Absent	46 [20.6]	177 [79.4]	0.769	1.213 [0.33-4.39]	1.011 [0.26-3.85]
	Present	3 [17.6]	14 [82.4]			
<b>ANC visits</b>	Less than 5	20 [20.8]	76 [79.2]	0.896	1.044 [0.55-1.97]	1.306 [0.62-2.71]
	More than 5	29 [20.1]	115 [79.9]			
<b>Place of delivery</b>	Home	16 [21.3]	59 [78.7]	0.812	1.085 [0.55-2.12]	0.896 [0.43-1.83]
	Institution	33 [20.0]	132 [80.0]			
<b>Income</b>	High	21 [16.8]	104 [83.2]	0.147	0.627 [0.33-1.18]	1.647 [0.84-3.20]
	Low	28 [24.3]	87 [75.7]			

There was an association between migration status and stunting as well as gender and stunting. Migrant children were 2.018 times more likely to be stunted and boys were 2.597 more likely to be stunted. A binary logistic model also gave the same results with migrants 2.217 more likely to be stunted and boys 2.45 more likely to be stunted. There were no significant associations for any factors with MUAC for age. There was a statistically significant association with weight for age and gender, with males 3.0 times more likely to have a weight for age Z score less than -2.0

## 5.5 CHILDHOOD MORBIDITY AND HEALTH SEEKING BEHAVIOUR

Any one incident of four common childhood incidences was taken as a positive history for that disease. The morbidity profiles of all the children in Jawadhi hills in the last six months in Jawadhi hills was elicited as well as the morbidity profile for migrant children in their place of migration.

Comparisons were made between various socio-demographic factors including migration and positive health seeking behaviour in Jawadhi hills. The health seeking behaviour of migrants was compared between Jawadhi hills and the place of migration.

**Table 5.5.1 Morbidity profile in Jawadhi**

	Number	Percentage
Fever	43	17.9
Cough	30	12.5
Diarrhoea	47	19.6
Injury	9	3.8

6.7% of the children were taken to hospital on an outpatient basis. None were admitted for any treatment.

**Table 5.5.2 Morbidity profile in place of migration**

	Number	Percentage
Fever	10	9.6
Cough	6	5.8
Diarrhoea	19	18.3
Injury	4	3.8

3.2% of the children were taken to a hospital for their illness. None were hospitalised.

**Table 5.5.3 Hospital visits for illness**

<b>Factor</b>		<b>Visited hospital</b>	<b>No hospital visit</b>	<b>p-value</b>	<b>OR</b>
<b>Migration status</b>	Migrant	9 [18.8]	39 [81.3]	0.321	1.714
	Non-migrant	7 [11.9]	52 [88.1]		[0.587-5.00]
<b>Gender</b>	Female	11 [18.6]	48 [81.4]	0.235	1.971
	Male	5 [10.4]	43 [89.6]		[0.634-6.128]
<b>Family type</b>	Nuclear	8 [15.1]	45 [84.9]	0.968	1.022
	Non-nuclear	8 [14.8]	46 [85.2]		[0.353-2.958]
<b>House type</b>	Thatched	7 [12.5]	49 [87.5]	0.456	0.667
	Others	9 [17.6]	42 [82.4]		[0.229-1.944]
<b>ANC visits</b>	Less than 5	6 [13.0]	40 [87.0]	0.630	0.765
	More than 5	10 [16.4]	51 [83.6]		[0.256-2.283]
<b>Place of delivery</b>	Near	7 [18.9]	30 [81.1]	0.403	1.582
	Far	9 [12.9]	61 [87.1]		[0.537-4.651]
<b>Income</b>	High	11[20.4]	43 [79.6]	0.113	2.457
	Low	5 [9.4]	48 [90.6]		[0.789-7.633]

There was no association between any socio-demographic factors including migration and positive health seeking behaviour while in Jawadhi hills.

**Table 5.5.4 Comparison of health seeking between Jawadhi and place of migration**

	<b>Visited hospital</b>	<b>No hospital visit</b>	<b>p-value</b>	<b>OR</b>
<b>In Jawadhi</b>	2 [4.1]	46 [95.9]	0.325	0.405
<b>In Migration</b>	3 [9.6]	28 [90.4]		[0.06-2.58]

There was no difference in health seeking behaviour for childhood illnesses between Jawadhi hills and the place of migration.



## 6. DISCUSSION

There has been a steady rise in the rate of migration, both globally and locally. (11) (12) (13) (14). Given the current economic state in the world, and more so in India, the rate is expected to increase in the coming decades. With the various factors that lead to migration still not being addressed, without a careful; plan and implementation, the results could be disastrous for the population .

This study looked at the prevalence of malnutrition among children aged between 6 and 59 months. It also looked at health seeking behaviour with respect to antenatal care and childhood morbidity. Using the migration status as sub-group, a comparison between the nutritional status and health seeking behaviour was done. Thirty villages were selected from two *panchayaths* in Jawadhi hills known to have a high rate of migration. Eight children in the chosen age group were selected in each village.

Analysis of the age and sex distribution of the study population showed that roughly half - [49%] of the population was female. There was an almost uniform spread of all the age groups considered, even after separating gender. Sixty percent of the children were the first child of their parents and the number of people with higher birth orders progressively decreased with an increase in the number. It has to be noted however though, that there is still a few children with birth orders of four and five.

Even after seven decades after independence, the facilities for sanitation remain extremely poor in Jawadhi hills. With a growing focus on making India open defecation free, many initiatives have come nationally, leading to multiple government reports stating that the country is officially open defecation free. This was announced by the Primeminister on October 2<sup>nd</sup> 2019. Our study found that over 92% of the children studied were still practising open defecation. In many of the cases, there were both complete and incomplete toilets in their homes or near it. Even with the infrastructure in place, there is still a lack of motivation from the side of the community for the usage of toilets. Just building infrastructure only solves part of the problem and does not address all the issues. Given the multiple implications from such a high prevalence of unsanitary practices, a structural rethinking of the approach should be done.

In terms of housing, about half the families lived in thatched huts. The other half had both self-built and government assisted concrete or tiled housing. Half the families also lived as nuclear families. The other half was divided between joint and extended. This is an important point to note as in most other rural areas, extended families and joint families are more common.

The study showed a very high prevalence of seasonal migration. 43% of the children in the study had migrated along with their parents in the past one year. 47% of the women and 52% of the men had also migrated. In a sense half the population in the working age group had to leave their place of residence to find work for a part of the year. The latest NSS gives the rate in rural tribal population as 34%, making these two panchayaths in Jawadhi hills have a much higher percentage.

Usually majority of the migration happens to the state of Kerala and a smaller number to Karnataka. This year however, after the Kerala floods, there was a decrease in the job opportunities there and most of the people went to Karnataka. The patten of migration is very localised, in the sense that people from the same village migrate to the same place for work, usually arranged by a local contractor in the village. This helps because even at the point of migration there still exists a social support system. Sharing of duties such as cooking and taking care of children also exists in this pattern. The doctrine of safety in number applies to this pattern. What was surprising however was that most people could not name the exact place they were migrating to. The only knowledge present was the state which they had migrated to and occasionally the railway station they alighted in. This was applicable to both men and women. This makes the population which migrates much more vulnerable in general and at the mercy of the local contractor and the estate manager at the place of migration. This can be seen in the fact that over 40% of the women didn't know any place for emergency health care in case they needed to go. The implications are discussed more about health seeking behaviour.

Living conditions at the place of migration were considerably worse off as compared to Jawadhi hills. 74% of the children who migrated stayed in temporary sheds erected for the period of migration. Only 18% stayed in a permanent house. The median number of people staying at the same place was 10 in the place of migration and only 4 in Jawadhi.

Surprisingly, the percentage of people with access to toilet is marginally higher in the place of migration. The access to clean water was the same in both places.

The results for antenatal care paint a very different picture than what present data shows.

While the NFHS 4 had shown that 83% of the women in Tiruvannamalai district had more than four antenatal check-ups, our study found that only 60% had more than four. More importantly, only 15% of the women who migrated had any antenatal check-up in the place of migration. Considering that the women spend between 4 and 6 months at the place of migration, this number is alarmingly high. There is also a difference in the place of migration as nobody who migrated to Karnataka had any antenatal check-ups. Tetanus immunization coverage was 94%, which though is a high number should ideally be 100%.

Several possible factors can be attributed to the reduced number of check-ups. Though both the panchayaths taken for the study have PHCs within the panchayath, , a number of villages remain inaccessible by road given the rough nature of the. Some villages have only dirt tracks making walking the most practical form of travel. For those who are daily wage labourers ,the loss of pay for even a day can have a profound economic impact making the a trip to the PHC even once a month hard.

At the place of migration a number of other factors add up to the economics. Difference in language and local biases account for the absence. The fact that most migrants don't know exactly where they are and the location of a local health centre makes it even harder. Given the structured nature of antenatal care with everyone attached to a local PHC and supposed to have regular care from there, there is an alienation from the system leading to loss of access to the care.

The decrease in the access to antenatal care also translates to a decrease in the. The study population had only institutional delivery rate of 68.7%. Tamil Nadu has an institutional delivery rate of 99%, Historically, institutional deliveries in the region have always been uncommon partly due to geographical barriers and the presence of traditionally trained persons in the village capable of conducting deliveries. Though the number has increased considerably after the advent of the Muthulakshmi Reddy scheme , which gives a cash benefit for antenatal care and hospital births, there is much more scope for an improvement in this aspect. None of the study subjects had delivered in the place of migration. The continued presence of a high rate of home deliveries is bound to influence the overall health situation in Jawadhi hills.

Two indicators were used for the analysis of malnutrition,. The weight for height and height for age were considered. The overall prevalence of wasting [moderate and severe] was found to be 41.25%. This level was higher than the NFHS 4 result of 36.5%. Other studies done in Jawadhi have found the rates to be lower. The number is comparable to that of the expert committee on tribal health [42%] and Tamil state planning commission report [41.7%].

Boys were 2.044 [95% CI 1.21-3.57] more likely to be wasted as compared to girls. There was no association with migration status and wasting. There is no evidence of an increased risk acute malnutrition in migrants.

The overall prevalence of stunting was found to be 20.4%. This level was considerably lower than the NFHS 4 prevalence of 27% in Tiruvannamalai district. The number is also much lower than other studies done in Jawadhi hills which found a prevalence rate of 55.4% for stunting. There was a statistically significant association found between gender and stunting as well as migration status and stunting. Migrant children were 2.018 [1.06-3.81] times more likely to be stunted and boys were 2.597 [ 1.3-5.36] more likely to be stunted. Multiple studies have found that it is the economically poorer groups of population which tend to migrate. (15) Given the fact that the families of migrant workers were probably poorer to start off with causing them to migrate, the chronic malnutrition can be explained. Although there wasn't a statistically significant difference in the family income between migrants and non-migrants in the study population, it is safe to assume that the migrants were probably poorer a few years earlier. This is compounded by the fact that parents of

migrant children also tend to have a higher percentage of employment when back in the hills after migration. If the need for a job can be seen as an indicator for the economic status, the migrant group is poorer. The fact that there is no association with wasting and thereby acute malnutrition and migration status shows that the economic benefits of migration have had a part to play in the situation currently.

Seen from this perspective, it can be argued that migrating for labour may be protective for the development of acute malnutrition. Migration ensured enough economic relief to avoid a condition of acute malnutrition. This argument however only looks at malnutrition as an effect of a lower economic status and does not consider other factors. The worse living conditions in the place of migration and the time away from programs like the *anganwadi* system in the place of migration may have a negative impact on the nutritional status.

The association between gender and malnutrition found here in this study is slightly harder to understand. Normal global patterns, especially in low- and middle-income countries have a higher rate of malnutrition among female children. (16) (17) (18) Many reasons are attributed to this but the underlying factor is discrimination against female children by virtue of their gender. In many South Asian societies there is a gender preference for male children due to the cultural norms of inheritance and care for the elderly. Taking the fact that the parents would prefer a male child instead of a female child, the overall care for the child decreases for females. This is manifested in a lower school enrolment rate for girls, worse health seeking behaviour and finally into a poorer nutritional status.

Given all these, it is intuitive to think that a population in a tribal area will have a higher rate of malnutrition for girls, considering the population overall is of a lower economic status. The findings of the study on the other hand, show that male children have a statistically significant higher rate of both stunting and wasting. A possible explanation for this is that the discriminatory practices found in many other parts of the country are absent in Jawadhi hills. Prior work experience by the institution in Jawadhi hills has indicated that, though there is a preference for a male child at birth, after that there isn't much discrimination practised in the community. If both genders now will receive the same amount of care and nutrition, female children are constitutionally more likely to thrive under the same conditions. A lack of gender-specific discrimination could explain why for the given set of environmental conditions, female children will seem better off as far as nutritional status is considered. This explanation could ideally be tested by looking at other outcomes such as school enrolment and employment opportunities. The difference is thus explained by biological factors given that the environment and social factors are assumed to be equal in both the genders.

On analysing the health seeking behaviour a few interesting patterns were found. Health seeking behaviour for childhood morbidity was taken as the instance of visit to a hospital for any of the common childhood illnesses asked for in the questionnaire. If a child had a condition in the past six months and was taken to any healthcare centre for the same, it was taken as a positive health seeking behaviour. Children who had fallen ill and not taken to the hospital was assumed to be having a negative health seeking behaviour.



There was no association between positive health seeking behaviour and socio-demographic variables including migration. Visits to any health care setup occurred only in 6.7% of the instances of illness.

On comparing the health seeking behaviour between Jawadhi hills and the place of migration, there was no significant difference. There was a difference in the occurrence of any of the illness, where there were more reported instances at home as compared to the place of migration but the difference was not statistically significant..

Health seeking behaviour of a population is a result of many factors like economic status, cultural values, access to health care and knowledge about the disease condition. When in Jawadhi hills the only factor that would differ from the migrants and others would be knowledge gained from migration and observing health seeking patterns outside Jawadhi hills. There was no statistically significant difference in the income and distance from hospital and we can assume that the cultural factors regarding the disease will be same in both the groups. Given the fact that there no difference between both the groups, we can conclude that observation of health seeking behaviour in places outside Jawadhi did not translate into a difference in the actual practice of health seeking. In the place of migration the only different factor would be the access to health care and the local factors like acceptance in the place and discrimination. None of these were significant enough to bring about a change in the health seeking behaviour.

These observations lead us to conclude that addressing the root cause of migration may help solve the problems that arise from it such as poor antenatal care. A higher degree of chronic malnutrition among migrant children may indicate that it may be the poorer who tend to migrate. If the economic factors that lead people to migrate away in the first place could be alleviated by any mechanism, the need for migration would not arise.

The poorer quality and availability of healthcare, especially with regard to antenatal care in the place of migration, indicate the need for a more comprehensive health delivery system for migrants at their place of migration. The rate of migration is only set to increase in the years to come. Not addressing this will further alienate a migrant population which is more vulnerable to start with. While structural mechanisms need to be brought in to address this issue, there also needs to be change at a humanitarian level with acceptance of a migrant population. Lastly, there needs to be a conscious effort to bring this populations from the informal sectors into the formal and recognized labour force. Only then can there be a larger, more comprehensive change in the nature of work and the living conditions of those migrating for for manual work .

## 7. CONCLUSION

1. The prevalence of wasting among children aged 6 to 59 months was found to be 41.2% and that of stunting to be 20.4%.%
2. Unsanitary practices like open defecation are very prevalent [92.9%].
3. Male gender was a risk factor for wasting with an adjusted odds ratio of 2.207 [1.28-3.84].
4. The male gender was also a risk factor for stunting with an adjusted odds ratio of 2.457 [1.83-5.0].
5. Children migrating with their parents also had a 2.217 times chance of having stunting.
6. Migrant mothers were 5.2 times more likely to have had less than 5 antenatal check-ups
7. There was no association between migration status and health seeking behaviour for childhood illnesses

## 8. RECOMMENDATIONS

Based on the results of found by the study and the inferences madewe would like to recommend that:

1. The root cause of migration is socio-economic, with the poorer sections of society tending to migrate more. With all the problems attributed to migration, a comprehensive system including higher work opportunities at the place of residence is needed to check the problem.
2. The prevalence of malnutrition is still extremely high even after multiple years trying to address the problem. A more streamlined approach that is able to cater to a larger section of the population is required. Along with this, adequate support, both monetary and human resources should be put into existing programs. A complete and through audit of programs like the *anganwadi* system and mid-day meal scheme is the need of the hour. If there are shortcomings and gaps in providing the necessary facilities, they need to be addressed. Systems to identify children who are at risk of malnutrition, and who show early signs of malnutrition should be put in place. Adding to this, targeted treatment of the cases found with nutritional supplementation and parental counselling is needed. This can be aligned with existing infrastructure

like the PDS system and man power like ASHA workers. This is also directly related to the first point about income generation and improvement of economic standards.

3. There is an urgent need to bring the migrant population into the social security mechanisms implemented by the state. Most migrants who go to other states, especially seasonal migrants exist outside the social security mechanisms. Being outside the system results in the loss of things like antenatal care and childhood immunization. With no proper follow up between various centres of health, the migrant population gets lost. With the overall stress nationally on adequate and proper antenatal care, extra steps need to be taken to ensure this group is included. Steps like having separate clinics for migrants labourers in states with high migration could be attempted.
  
4. Being a part of the informal sector, most migrant labourers don't get covered by any labour laws. This is reflected by the fact that living conditions are much worse than those at home. The nature of labour is also much harder in nature. A more regulated informal sector, which has to comply to all the labour laws is needed. Employers of migrant labourers should be mandated to ensure that every employee has access to healthcare, that every pregnant woman has access to proper care and that living conditions should meet a certain standard

## **9. LIMITATIONS**

1. The sample collection could not be done exactly as planned due to the geography of the villages. With only a few number of villages having a clear quadridirectional orientation, there was some amount of change in direction, making the sampling not completely ideal.
2. Recall bias for morbidity in the past six months could have affected the results regarding health seeking.

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## 11.0 APPENDIX

### APPENDIX 11.1 IRB CLEARANCE FORMS



**OFFICE OF RESEARCH  
INSTITUTIONAL REVIEW BOARD (IRB)  
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA**

---

**Dr. B.J. Prashantham, M.A., M.A., Dr. MIs (Clinical)**  
Director, Christian Counseling Center,  
Chairperson, Ethics Committee.

**Dr. Anna Benjamin Pullmoed, M.B.B.S., MD, Ph.D.,**  
Chairperson, Research Committee & Principal

**Dr. Biju George, M.B.B.S., MD, DM,**  
Deputy Chairperson,  
Secretary, Ethics Committee, IRB  
Additional Vice-Principal (Research)

March 27, 2019

Dr. Harsh,  
PG Registrar,  
Department of Community Health,  
Christian Medical College,

**Sub: Fluid Research Grant: New Proposal:**  
A cross sectional study of the nutritional status of children and health seeking behaviour in areas with high rates of migration in Jawadhi hills.  
Dr. Harsh, PG Registrar, Community Health, Dr. Kuryan George, Dr. Anuradha Rose, community Health.

Ref: IRB Min. No. 1169 [OBSERVE] dated 03.12.2018


Dear Dr. Harsh


I enclose the following documents:-

I. Institutional Review Board approval Agreement

Could you please sign the agreement and send it to Dr. Biju George, Addl. Vice Principal (Research), so that the grant money can be released.

With best wishes,



  
Dr. Biju George  
Secretary (Ethics Committee)  
Institutional Review Board

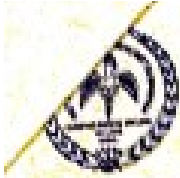
**Dr. BIJU GEORGE**  
M.B.B.S., MD, DM.  
SECRETARY (ETHICS COMMITTEE)  
Institutional Review Board,  
Christian Medical College, Vellore - 632 002.

Cc: Dr. Kuryan George, Community Health, CMC, Vellore

1 of 5

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Ethics Committee Blue, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002  
Tel: 0416 - 2284294, 2284202 Fax: 0416 - 2262788, 2284481 E-mail: research@cmcvellore.ac.in



**OFFICE OF RESEARCH  
INSTITUTIONAL REVIEW BOARD (IRB)  
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA**

**Dr. B.J. Prashanthan, MA, M.A., Dr. Min (Chief)**  
Director, Christian Counseling Center,  
Chairperson, Ethics Committee.

**Dr. Anna Benjamin Pullmond, M.D.B.S., MD, Ph.D.,**  
Chairperson, Research Committee & Principal

**Dr. Biju George, M.D.B.S., MD, DM,**  
Deputy Chairperson,  
Secretary, Ethics Committee, IRB  
Additional Vice-Principal (Research)

March 27, 2019

Dr. Harsh,  
PG Registrar,  
Department of Community Health,  
Christian Medical College,

**Sub: Fluid Research Grant: New Proposal:**

A cross sectional study of the nutritional status of children and health seeking behaviour in areas with high rates of migration in Jawadhi hills,  
Dr. Harsh, PG Registrar, Community Health, Dr. Kuryan George, Dr. Amradha Rose, community Health.

Ref: IRB Min. No. 11691 IRB/SPR/VP/REG/ETH/13/12/2018

Dear Dr. Harsh,

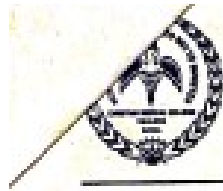
The Institutional Review Board (Blue, Research and Ethics Committee) of the Christian Medical College, Vellore, reviewed and discussed your project titled "A cross sectional study of the nutritional status of children and health seeking behaviour in areas with high rates of migration in Jawadhi hills" on December 03<sup>rd</sup> 2018.

The Committee reviewed the following documents:

1. IRB application form
2. Consent Form and Information sheet (English, Tamil)
3. Questionnaire
4. Cvs of Drs. Harsh and Kuryan George
5. No. of documents 1- 4.

The following Institutional Review Board (Blue, Research & Ethics Committee) members were present at the meeting held on December 03<sup>rd</sup> 2018 in the New IRB Room, Bagayam, Christian Medical College, Vellore 632 004.

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**OFFICE OF RESEARCH  
INSTITUTIONAL REVIEW BOARD (IRB)  
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA**

**Dr. B.J. Prashantham, M.A., M.A., Dr. Min (Clinical)**  
Director, Christian Counseling Center,  
Chairperson, Ethics Committee.

**Dr. Anna Benjamin Pallmod, M.B.B.S., MD, Ph.D.,**  
Chairperson, Research Committee & Principal

**Dr. Biju George, M.B.B.S., MD, DM,**  
Deputy Chairperson,  
Secretary, Ethics Committee, IRB  
Additional Vice-Principal (Research)

Name	Qualification	Designation	Affiliation
Dr. Biju George	MBBS, MD, DM	Professor, Haematology, Research), Additional Vice Principal , Deputy Chairperson (Research Committee), Member Secretary (Ethics Committee), IRB, CMC, Vellore	Internal, Clinician
Dr. B. J. Prashantham	MA(Counseling Psychology), MA(Theology), Dr. Min (Clinical Counseling)	Chairperson, Ethics Committee, IRB, Director, Christian Counseling Centre, Vellore	External, Social Scientist
Mr. C. Sampath	B.Sc.BL	Advocate, Vellore	External, Legal Expert
Dr. Ratna Prabha	MBBS, MD (Pharma)	Associate Professor, Clinical Pharmacology, CMC, Vellore	Internal, Pharmacologist
Mr. Samuel Abraham	M.A., PGDBA, PGDPM, M. Phil, BL	Sr. Legal Officer, CMC, Vellore	Internal, Legal Expert
Dr. John Jude Prakash	MBBS, MD	Professor, Clinical Virology, CMC, Vellore	Internal, Clinician
Dr. Rekha Pai	BSc, MSc, PhD	Associate Professor, Pathology, CMC, Vellore	Internal, Basic Medical Scientist
Mrs. Sophia V	M.Sc Nursing	Addl Deputy Dean CMC, Vellore	Internal, Nurse
Dr. Ekta Rai	MBBS, MD MRCA	Professor, Department of Anaesthesia, CMC, Vellore	Internal, Clinician
Rev. Joseph Devaraj	BSc, BD	Chaplaincy Department, CMC, Vellore	Internal, Social Scientist
Dr. Inian Samarasam	MS, FRCS, FRACS	Professor, Surgery, CMC, Vellore	Internal, Clinician
Dr. Jayaprakash Mulyil	BSc, MBBS, MD, MPH, Dr PH (Epid), DMHC	Retired Professor, CMC, Vellore	External, Scientist & Epidemiologist

IRB Min. No. 11691 [OBSERVE] dated 03.12.2018

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**OFFICE OF RESEARCH  
INSTITUTIONAL REVIEW BOARD (IRB)  
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA**

**Dr. B.J. Prashanthan, M.A., M.A., Dc.Ms (Clinical)**  
Director, Christian Counseling Center,  
Chairperson, Ethics Committee.

**Dr. Anna Benjamin Pullmoed, M.B.B.S., MD., Ph.D.,**  
Chairperson, Research Committee & Principal

**Dr. Biju George, M.B.B.S., MD., DM.,**  
Deputy Chairperson,  
Secretary, Ethics Committee, IRB  
Additional Vice-Principal (Research)

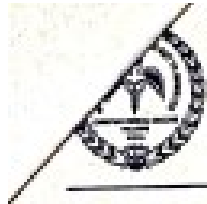
Mrs. Nirmala Margaret	MSc Nursing	Addl. Deputy Nursing Superintendent, College of Nursing, CMC, Vellore	Internal, Nurse
Dr. Asha Solomon	MSc Nursing	Associate Professor, Medical Surgical Nursing, CMC, Vellore	Internal, Nurse
Dr. Sarithanam Sridhar	MBBS, DCH, DNB	Professor, Neonatology, CMC, Vellore	Internal, Clinician
Dr. Ajith Sivadasan	MD, DM	Professor, Neurological Sciences, CMC, Vellore	Internal, Clinician
Mrs. Sheela Durai	MSc Nursing	Professor, Medical Surgical Nursing, CMC, Vellore	Internal, Nurse
Dr. Winsely Rose	MBBS, MD (Paed)	Professor, Paediatrics, CMC, Vellore	Internal, Clinician
MBBS, MD (Paed)	MBBS, MD (Paed)	MBBS, MD (Paed)	MBBS, MD (Paed)
Dr. Shyam Kumar NK	MBBS, DMRD, DNB, FRCR/FRANZCR	Professor, Radiology, CMC, Vellore	Internal, Clinician
Dr. Vivek Mathew	MD (Gen. Med) DM (Neuro) Dip. NB (Neuro)	Professor, Neurology, CMC, Vellore	Internal, Clinician
Ms. Grace Rebekah	M.Sc. (Biostatistics)	Lecturer, Biostatistics, CMC, Vellore	Internal, Statistician
Dr. Barney Isaac	MBBS, DNB (Respiratory Diseases)	Associate Professor, Pulmonary Medicine, CMC, Vellore	Internal, Clinician

We approve the project to be conducted as presented.

Kindly provide the total number of patients enrolled in your study and the total number of Withdrawals for the study entitled: "A cross sectional study of the nutritional status of children and health seeking behaviour in areas with high rates of migration in Jawadhi hills" On a monthly basis. Please send copies of this to the Research Office ([research@cmcvellore.ac.in](mailto:research@cmcvellore.ac.in)).

IRB Min. No. 11691 [OBSERVE] dated 03.12.2018

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**OFFICE OF RESEARCH  
INSTITUTIONAL REVIEW BOARD (IRB)  
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA**

**Dr. B.J. Prashantham, M.A., M.A., Dr. MIA (Clinical)**  
Director, Christian Counseling Center,  
Chairperson, Ethics Committee.

**Dr. Anna Benjamin Pullmoed, M.B.B.S., MD, Ph.D.**  
Chairperson, Research Committee & Principal

**Dr. Biju George, M.B.B.S., MD, DM,**  
Deputy Chairperson,  
Secretary, Ethics Committee, IRB  
Additional Vice-Principal (Research)

Fluid Grant Allocation:

A sum of 27,900/- INR (Rupees Twenty Seven Thousand Nine Hundred Only) will be granted for 12 Months.

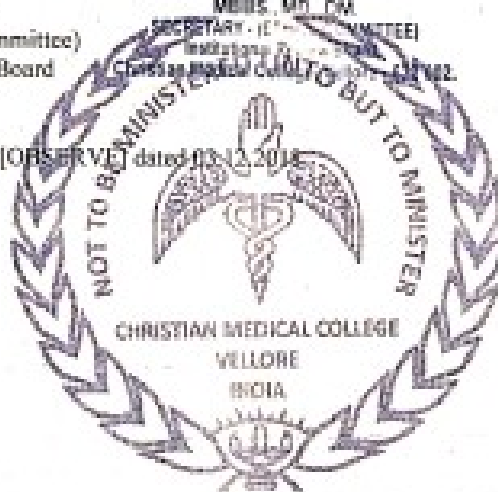
Yours sincerely,

**Dr. Biju George**  
Secretary (Ethics Committee)  
Institutional Review Board

**Dr. BIJU GEORGE**  
M.B.B.S., MD, DM  
SECRETARY - (ETHICS COMMITTEE)  
Institutional Review Board  
Christian Medical College, Vellore, India - 632 002

IRB Min. No. 11691 (OBSERVE) dated 08/12/2018

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## APPENDIX 11.2 DATA COLLECTION PROFORMA

### COMPARISON OF NUTRITIONAL STATUS OF CHILDREN OF MIGRANT WORKERS IN JAWADHI HILLS

#### I. STUDY DETAILS

- a. ID Number  CHILD b. Migrant  Non-migrant
- c. Nammiyampur  Kovilur  d. Village :
- e. Date of study

#### II. SOCIODEMOGRAPHIC DETAILS

1. Name :
2. Gender  [1 = male, 2 = female]
3. Age [in completed months]  4. Date of birth
- [For the next questions, 1 = mother, 2 = father, 3 = grandmother, 4 = grandfather, 5 = others]
5. Name of informant :
6. Relationship to child
7. Head of household  8. Primary care giver of child

	Mother	Father
Age	9.1	9.2
Migrated for work in the past two years [1-Yes 2-No]	10.1	10.2
Currently employed [1-Yes 2-No]	11.1	11.2
Occupation	12.1	12.2
Monthly Income	13.1	13.2
Years of formal education	14.1	14.2

15. Mothers age at marriage :
16. Mothers Obstetric score: G P L A D SB
17. Type of Family :  [1=Nuclear, 2=Joint, 3=Extended]

#### III. ENVIRONMENT

18. Type of house  [1=Katcha , 2=Pucca, 3=Mixed, 4=Mansion]
19. Ownership of house  [ 1= Own, 2=Rented, 3=Government built, 4=other]

20. Number of people staying in the house
21. Type of toilet used  [1=None, 2=Dry pit, 3=Flush type, 4=Communal, 5=Others]
22. Source of drinking water  [ 1=Piped to home, 2=Open well, 3=Closed well, 4=Government supply, 5=Tankers, 6= River/Pond/Stream/Reservoir]
23. Distance from source of drinking water [in meters]
24. Are there pets or farm animals staying inside the house  [1=Yes 2=No]

#### IV. BIRTH DETAILS AND HEALTH SEEKING DURING PREGNANCY

25. Mothers antenatal check up  [1=More than 5 check ups, 2= Less than 5,3=None]
26. Place of Mothers Antenatal checkup  1. PHC 2. Private 3. Home visit 4. NA [Multiple possible]
27. Did the mother get immunized for the pregnancy
28. Was the mother given Iron and Calcium tablets during pregnancy
29. Was the mother in Jawadhi hills during the WHOLE term of pregnancy
30. Place of delivery  [1=Home, 2=PHC,3=GH,4=Private,5=Others] Others \_\_\_\_\_
31. Birth Weight \_\_\_\_\_

#### V. IMMUIZATION DETAILS [ to check in immunization card/verbally]

- |           |           |                 |
|-----------|-----------|-----------------|
| 32. BCG   | 33. OPV 0 | 34. Hepatitis B |
| 35. DPT 1 | 36. DPT 2 | 37. DPT 3       |
| 38. MR 1  | 39. MR 2  | 40. DPT Booster |

[For all the above 1=Yes,2=No,3=Don't Know,4=NA]

#### VI. HEALTH SEEKING BEHAVIOUR FOR PAEDIATRIC SUBJECTS

41. Distance to the nearest hospital [in km] \_\_\_\_\_
42. Has your child fallen ill with the following complaints in the past six months :
- Fever
  - Cough
  - Diarrhoea
  - Injury
43. Did you take the child to a hospital for any of the complaints
44. Did you take the child to a faith healer/local medicine for the complaints



45. Did you use any home remedy for the complaints
46. Was your child admitted in hospital in the past one year
47. Is your child suffering from any chronic disease

**VII. ANTROPOMETRY**

48. Height [in centimeters]
- a. First reading \_\_\_\_\_
- b. Second reading \_\_\_\_\_
- c. Average \_\_\_\_\_
49. Weight [in kilograms]
- a. First reading \_\_\_\_\_
- b. Second reading \_\_\_\_\_
- c. Average \_\_\_\_\_
50. Mid Upper Arm Circumference [in centimeters] \_\_\_\_\_

**VIII. MIGRATION DETAILS [if answers to 10.1 or 10.2 is yes]**

	Mother	Father
Years of migrations	51.1	51.2
Place of latest migration	52.1	52.2
Job in migrant place	53.1	53.2

54. Place of residence in area of migration :
55. Number of people staying in the house
56. Type of toilet used  [1=None, 2=Dry pit, 3=Flush type, 4=Communal, 5=Others]
57. Source of drinking water  [ 1=Piped to home, 2=Open well, 3=Closed well, 4=Government supply, 5=Tankers, 6= River/Pond/Stream/Reservoir]
58. Distance from source of drinking water [in meters]
59. Number of continuous months in place of migrations :
60. Source of food :

**IX. HEALTH SEEKING BEHAVIOUR FOR ANTENATALS IN PLACE OF MIGRATION [ if answer to 29 is No]**

61. How many months of the pregnancy was the mother in place of migration :
62. Mothers antenatal check up  [1=More than 5 check ups, 2= Less than 5, 3=None]
63. Place of Mothers Antenatal checkup  1. PHC 2. Private 3. Home visit 4. NA [Multiple possible]
64. Was a place for emergency care present:

**X.HEALTH SEEKING BEHAVIOUR FOR PAEDIATRIC SUBJECTS IN PLACE OF MIGRATION[if answer to 2 is migrant]**

65. Distance to the nearest hospital [in km] \_\_\_\_\_

66. Has your child fallen ill with the following complaints in the last period of migration :

- a. Fever
- b. Cough
- c. Diarrhoea
- d. Injury

67. Did you take the child to a hospital for any of the complaints

68. Did you take the child to a faith healer/local medicine for the complaints

69. Did you use any home remedy for the complaints

70. Was your child admitted in hospital in the last period of migration

## APPENDIX 11.3 CONSENT FORM – ENGLISH

### Informed consent form

**Study Title:** A cross sectional study of the nutritional status of children and health seeking behaviour in areas with high rates of migration in Jawadhi hills.

**Study Number:** \_\_\_\_\_

**Subject's Initials:** \_\_\_\_\_ **Subject's Name:** \_\_\_\_\_

**Date of Birth / Age:** \_\_\_\_\_

(Subject)

- (i) I confirm that I have read and understood the information sheet dated \_\_\_\_\_ for the above study and have had the opportunity to ask questions. [ ]
- (ii) I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. [ ]
- (iii) I understand that *the Sponsor of the clinical trial, others working on the Sponsor's behalf (delete as appropriate)*, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the trial. I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published. [ ]
- (iv) I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s). [ ]
- (v) I agree to take part in the above study. [ ]

Signature (or Thumb impression) of the Subject/Legally Acceptable

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Signatory's Name: \_\_\_\_\_ Signature:

Or

Representative: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Signatory's Name: \_\_\_\_\_

Signature of the Investigator: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Study Investigator's Name: \_\_\_\_\_

Signature or thumb impression of the Witness: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Name & Address of the Witness: \_\_\_\_\_

## APPENDIX 11.4 CONSENT FORM – TAMIZH

### தகவல் தெரிவிக்கப்பட்ட ஒப்புதல் படிவம்

ஆய்வின் தலைப்பு: ஜவ்வாது மலை வாழ் குழந்தைகளின் ஊட்டச்சத்தான உணவின் நிலை மற்றும் ஆரோக்கியம் நிலை குறித்தான விகிதங்கள் குறித்த ஆய்வு

ஆய்வின் எண்: \_\_\_\_\_  
பங்குபெறுபவரின் கையெழுத்து \_\_\_\_\_  
பங்குபெறுபவரின் பெயர் \_\_\_\_\_  
பிறந்த தேதி: \_\_\_\_\_

(தெரிவிக்கப்பட்டு செய்தி)

1. இந்த ஆய்வை குறித்த தேதியிட்ட \_\_\_\_\_ தகவலை வாசித்து புரிந்துக் கொண்டேன் மற்றும் கேள்விகள் கேட்கவும் சந்தர்ப்பம் அளிக்கப்பட்டது [ ]
2. இதில் பங்கேற்பது என் சொந்த விருப்பம். இதிலிருந்து எந்த நேரத்திலும் விலகலாம் எனவும் எப்போழுது வேண்டுமானாலும் எந்த காரணமும் இல்லாமல் விலகிக் கொள்ளலாம் எனவும் அதனால் மருத்துவக் கண்காணிப்பில் எந்த மாற்றமும் இருக்காது எனவும் அறிகிறேன். [ ]
3. இந்த ஆய்விலிருந்து விலகிக் கொண்டாலும் இந்த ஆய்விற்கோ அல்லது வருங்காலத்தில் இந்த ஆய்வு தொடர்புடைய ஆய்விற்கு என்னிடமிருந்து பெறப்பட்ட தகவல்களை என்னுடைய அனுமதியில்லாமல் இந்த ஆய்வாளர்களோ அல்லது நிர்வாக நெறிமறை குழு பயன்படுத்திக் கொள்ளலாம் என்பதை புரிந்துக் கொண்டேன். எனினும், என்னுடைய தகவலை வெளியிடும் போது என்னுடைய அடையாளம் மூன்றாம் நபருக்கோ அல்லது பத்திரிகையின் வெளியிடும் போதோ தெரியாது என்பதை புரிந்துக் கொண்டேன் [ ]
4. இந்த ஆராய்ச்சியின் பயன்பாட்டிற்காக பெறப்பட்ட தகவலை அய்விற்காக உபயோகப்படுத்த நான் எவ்விதத்திலும் தடை செய்யமாட்டேன் என்று ஒத்துக் கொள்கிறேன் [ ]
5. இந்த ஆய்வில் என் பிள்ளைகள் பங்குகொள்ள ஒத்தக் கொள்ளுகிறேன் [ ]

பங்கு பெறுபவரின் கையெழுத்தம் (அல்லது) கைரேகை:

தேதி: \_\_\_/\_\_\_/\_\_\_

கையெப்பம் பெறுபவரின் பெயர்

கையெப்பம் (அல்லது) கைரேகை:

தேதி:

அல்லது

கையெப்பம் (அல்லது) கைரேகை:

தேதி:

கையெப்பம் இடுபவரின் பெயர்:

ஆய்வாளரின் பெயர் / கையெழுத்து:

தேதி

சாட்சியாளரின் கையெழுத்து / கைரேகை:

தேதி:

பெயர் மற்றும் சாட்சியாளரின் முகவரி:

## APPENDIX 11.5 INFORMATION SHEET – ENGLISH

### Patient information sheet

A cross sectional study of the nutritional status of children and health seeking behaviour in areas with high rates of migration in Jawadhi hills.

I am Harsh, a post graduate student working in in CHAD department, Christian Medical College, Vellore.

You are being requested to take part in the study to determine the level of nutrition and health seeking behaviour of children in Jawadhi hills.

The contents of information sheet are to make you aware of the various aspect of the study such as its background, aim, and what it involves. Please read this form carefully and feel free to ask any questions you may have before taking part in the study.

**WHAT WE WILL ASK YOU:**–I will be asking you details about your place of residence, work, antenatal care and delivery details of the child. I will also be asking about the immunization and health of the child. I will be measuring your child's height, weight and arm circumference.

**BENIFITS:** The data collected will be beneficial in determining the levels of malnutrition and health seeking in the community. I will also be looking at what effect migration from the hills has on the health of the mother and child. The knowledge gained will help us frame better programs for the care of children from the area.

**RISKS UPON ENROLLEMENT INTO STUDY:** There are no added risk on participating in the study as it is only as observational study. You however will obtain no benefits, monetary or otherwise from participating the study.

**CONFIDENTIAITY:** All the required information will be kept confidential and will be strictly used only for research purposes.

The records of the study will be kept private. In any sort of report we make public. We will not include any information that will make it possible to identify you

Taking part in the study is voluntary and your decision to not take part in the study will not affect your current or future treatment in RUHSA or CMCH.

**CAN I WITHDRAW THE STUDY?**

If you decide to withdraw from the study, you are free to withdraw at anytime.

If the study shows significant findings you will be notified in a timely manner,

If u have any queries :

Harsh

Post-graduate Registrar

CMCH, CHAD

Phone NO: 735886913



## APPENDIX 11.6 INFORMATION SHEET – TAMIZH

### பங்கு பெறுபவரின் தகவல் படிவம்

ஐவ்வாது மலை வாழ் குழந்தைகளின் ஊட்டசத்தான உணவு நிலை மற்றும் ஆரோக்கிய விகிதங்கள் நிலை குறித்தான ஆய்வு

என் பெயர் ஹர்ஷ், பட்ட மேற் படிப்பு மாணவர் மற்றும் வேலூரில் உள்ள கிறிஸ்துவ மருத்துவ கல்லூரி - சாட் மருத்துவமனையில் பணியாற்றி வருகிறேன்.

ஐவ்வாது மலையில் உள்ள குழந்தைகளில் ஊட்டசத்தான உணவு மற்றும் ஆரோக்கிய விகிதங்கள் குறித்தான ஆய்வில் பங்கு கொள்ள தங்களை அழைக்கிறேன்.

இந்த தகவல் படிவம் மூலம் இந்த ஆய்வின் பின்னணி, நோக்கம் மற்றும் எப்படி ஈடுபடுகிறது போன்ற பல்வேறு தகவல்களை உள்ளடங்கியது. இந்த ஆய்வில் பங்கு பெறுவதற்கு முன்பு இந்த தகவல் படிவத்தை கவனமாக வாசித்தோ / வாசித்து காண்பிக்கப்பட்டு மற்றும் கேள்விகள் / சந்தேகங்கள் இருக்குமாயின் கேட்டு தெரிந்துக் கொள்ளலாம்.

நாங்கள் உங்களிடம் கேட்கப்படுவது என்னவெனில்: உங்களின் இருப்பிடம், வேலை, பேறுகாலத்துக்கு முற்பட்ட செய்தி மற்றும் பிள்ளைப்பேறு விவரம் போன்ற தகவல்களை கேட்டு அறிந்துக் கொள்ளப்படும். தடுப்பு ஊசி மற்றும் குழந்தையின் ஆரோக்கியம் பற்றிய கேள்விகளும் கேட்கப்படும். அதோடு கூட குழந்தையின் எடை, உயரம் மற்றும் கையின் சுற்றளவு அளந்து கொள்ளப்படும்.

**பயன்கள்:** சமூகத்தில் ஆரோக்கியம் மற்றும் உணவில் ஊட்டச்சத்து குறைபாட்டின் அளவை கண்டறிவதற்கு ஆதார கூறுகளாக சேகரிக்கப்படுகிறது. முலையில் வாழும் தாய் மற்றும் குழந்தையின் ஆரோக்கியம் பற்றி அறிந்துக் கொள்ளுதல் ஆகும். இதன் மூலம் பெறப்படும் தகவல்களை கொண்டு அப்பகுதியில் வாழும் குழந்தையின் நலனில் மேலும் அக்கறை காட்ட உதவிச் செய்யும்.

இந்த ஆய்வில் பங்கு பெறுவதில் வரும் பாதகமான விளைவுகள்: இந்த ஆய்வில் எதிர்பார்க்கப்பட்ட ஆபத்தோ அல்லது பாதகமான விளைவுகளோ இல்லை. இந்த ஆய்வில் பங்கு பெறுவதினால் எந்த வித பயனோ, பொருள்

மற்றும் பண உதவியோ அல்லது வேறு எந்தவிதமான உதவியோ பெற இயலாது.

ரகசியம்: பெறப்படும் அனைத்து தகவல்கள் ரகசியமாக பாதுகாக்கப்படும் மற்றும் ஆய்விற்காக மட்டுமே பயன்படுத்தப்படும்.

பெறப்படும் தகவல்கள் அந்தரங்கமாக வைக்கப்படும். ஆய்விற்கான பத்திரிக்கையில் இந்த ஆய்வில் மூலம் வரும் விளைவுகளை வெளியிடப்படும். இந்த வெளியீட்டில் தங்களுடைய தனிப்பட்ட தகவல்கள் வெளியிடப்பட மாட்டாது மற்றும் ஆய்வு கட்டுரை மாத்திரமே வெளியிடப்படும்.

இந்த ஆய்வில் பங்கு பெறுவது தங்களுடைய விருப்பமே மற்றும் விலகிக் கொண்டாலும் தாங்கள் சி.எம்.சி அல்லது ருசாவில் பெற்று வரும் சிகிச்சை எந்த விதத்திலும் பாதிக்காது.

இந்த ஆய்விலிருந்து நான் விலகிக் கொள்ளலாமா?:

இந்த ஆய்விலிருந்து எப்போழுது வேண்டுமானாலும் எந்த நேரத்திலும் விலகிக் கொள்ளலாம்.

இந்த ஆய்வில் தங்களிடம் சரியான சமயத்தில் குறிப்பிட்ட கண்டபிடிப்புகள் கண்டுபிடிக்கப்படுமாயின் மற்றும் கேள்விகள் / சந்தேகங்கள் இருக்குமாயின் :

தொடர்புக்கு:

ஹார்ஷ்

மேற்படிப்பு பதிவாளர்

சி.எம்.சி, சாட்

தொலைப்பேசி: 735886913

