

Path to poor gut health of malnourished tribal children between 7 months and 5 years in Nomadic tribes of Sikar District of Rajasthan: A mixed-method research

By

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Abstract

In this mixed method study, we described the multi factors to maintain child health among malnourished children living in the nomadic tribe of Sikar, Rajasthan. Nomadic tribes form 15% of the Indian population. Unlike SCs and STs, nomadic tribes are not part of the Indian census. We determined how WASH practices and mothers' knowledge attitude practices are related to child health. We collected data from 11 mothers of 0-5-year-old children living in the Basti. Structured questionnaires and in-depth interviews were conducted to obtain information on sociodemographic profiles, WASH practices, and information on child health. Our finding suggests that empowering mothers with knowledge related to WASH practices, government health schemes, and government policies is needed to maintain the health status of their children. In addition, the finding suggests that examining comprehensive nutrition and other health practices is critical in maintaining the child's optimum health, particularly in vulnerable populations such as nomadic tribe settings. There are very few studies on the nomadic tribes of India, and they are untouched by researchers. This study will bring facts for consideration for better health of their children. Among nomadic tribes, there is double burden of undernutrition and poor sanitation facility. Therefore, a diverse set of intervention may be required to improve knowledge of mother which will facilitate good health of their child.

Keywords: Nomadic Tribes, Banjara

Introduction

In developing countries, malnutrition status in children under five years of age remains alarming. The UNICEF/WHO/WB Joint Child Malnutrition estimates (JME) group data for 2021 reports that globally in 2017, 149.2 and 45.9 million children were wasted and stunted, respectively. Africans and Asians are most affected by undernutrition; the prevalence of those under five years of age stunting is 39 % & 55 percent, respectively [1].

Urban expansion is occurring rapidly in India. In contrast, approximately 35.2% of the Indian urban population lives in slums [2], 8.6 percent in tribes of India [3], and about 80 percent of the malnourished tribal children live in just eight states of India: Karnataka, Rajasthan, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Chhattisgarh & Odisha [4].

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A number of factors contribute to malnutrition. Children's malnutrition is influenced by a variety of demographic, environmental, economic, social, as well as cultural factors. The indirect cause of malnutrition is poverty, food insecurity, poor hygiene, illness, and illiteracy [5]. Poverty with associated food insecurity is a significant risk factor for malnutrition. However, the condition's etiology is far more complex than a simple lack of food. The United States Department of Agriculture (USDA) categorized food insecurity into two [6].

- Low food security: Food insecurity without hunger might manifest as a diet that is of lower quality, variety, or appeal. There is also minimal to no evidence of decreased food intake.
- Low food security: Hunger and food insecurity are similar to several symptoms of disturbed eating habits and decreased food intake.

The nutritional state of the youngsters is significantly correlated with poor hygiene practises. Yet, inadequate infrastructure, the low socioeconomic condition of many households, [7] and the mother's or caregiver's reading level all have an impact on the child's nutritional health[8]. However, the primary cause of malnutrition is the inadequate quantity and quality of food. But persistent food insecurity, poor Water Sanitation, and Hygiene (WASH) practice can lead to prolonged malnutrition, are part of vicious recurrent infections, and lead to diarrhea, and poor gut health. Thus, malnutrition in children, particularly in low-income countries, is largely caused by poor gut health [9].

Impaired immunity compounded by poor gut health leads to diarrhea and malnutrition through impaired nutrition absorption and depletion associated with each episode of diarrhea [10]. This condition can lead to stunting and wasting among children.

A mixed-method study was conducted to understand the gaps and barriers to gut health and mothers' knowledge about food and WASH practices. The study aimed to determine the factors affecting nutrition among under-five children living in Banjara, Loharu, and the Sikar District of the Rajasthan community. We also explored the factors associated with poor gut health.

Methods

Study Design

It was an exploratory mixed-method study of child nutrition, eating patterns, WASH practices, mobile phone usage, and other government facilities in a convenience sample of mothers of 6-months to five-year-old children living in Kacchi Basti and belonging to the nomadic tribe of Sikar District of Rajasthan, India. Participation was voluntary.

Study Setting

Rajasthan is a state in northern India. It is also the largest state in terms of size and population in the country. Ajmer State, Hadoti, Dhundhar, Gorwar, Shekhawati, Mewar, Marwar, Vagad, & Mewar are the nine subregions of Rajasthan. The study area, i.e., Sikar district, comes under the Shekhawati region of Rajasthan. The study was done in the Kacchi Basti, which had three tribes Loharu, Banjara, and Sapera community. They are also known as the nomadic tribes of Rajasthan. This Kacchi Basti has one government Rashan Shop/ Public Distribution System (PDS), One government school, One government hospital, and an Anganwadi center within 3 kilometers of its vicinity.

Study Population:

A total of 11 mothers were interviewed who had a child under five years. The study was conducted between 11 October to 18 October 2021. The questionnaire was administered to collect quantitative data, and then qualitative data from the mother was collected. The data was acquired exclusively by qualified data collectors.

Inclusion criteria:

- a) Ready to give consent
- b) Mother with children aged six months to five years
- c) Living in the Basti for at least five years
- d) Having identity proof

The exclusion criteria comprised of the following:

- a) Presence of any mental or physical challenges in children/mother

The study received ethical approval from the UREC (University Research Ethics Committee) of DIT University, Dehradun, Uttarakhand, India (DITU/UREC/2021/07/6).

Quantitative methods:

Personal interviews were conducted with 11 mothers of children living in Basti and belonging to nomadic tribes (Banjara and Loharu). The participants' audio was recorded on an audio recorder for the qualitative data collection of the same participant.

The completed data collection of a mother lasted 45-90 minutes, was audio-recorded, and transcribed from Hindi to English. The principal themes, subthemes, as well as illustrative quotations were determined.

The data gathering devices were created in English before being translated into Hindi, the local language. The trained researcher provided moms with an oral explanation of the study protocol in their native language (Hindi) and got their signed consent. Included in the data gathering were the following:

- Sociodemographic Profile: Baseline data was gathered on mother and child socio-demographics such as the mother's age, education, child's age, family, household income, household employment status, education level, and ethnicity.
- Water and Sanitation Hygiene Practice (WASH): Practices on handwashing and sanitary habits were gathered [11].
- Food Insecurity: Food Insecurity Experience Scale Survey Module (FIES) collected data on food insecurity. The scale was developed by the Food and Agriculture Organization (FAO). This scale is an experience-based measure and has been validated for cross-cultural use to assess pointers of food security. It consists of eight short questions with dichotomous (yes/no) responses. The scale also seeks data on degrees of food security in the pre-post covid-19 [12].
- Knowledge Attitude Practices: This information pertains to the participants' WASH knowledge, food pattern knowledge, and attitudes and practises regarding preventative measures to minimise gut health problems. The information collected would aid in the development of tailored public health messages to address KAP linked to the gut health of children [13].
- Mobile phone usage: Questions related to mobile phone type and phone usage were asked to know the familiarity with technology.

Qualitative Data Analysis:

The entire session was transcribed verbatim from audiotapes by the researcher. Transcripts were proofread and translated into English. First, the list of themes and subthemes was identified. Once hooks and sub-themes were agreed on, all authors read and coded the transcripts.

Table 1: *Identified themes and subthemes describing factors influencing child health*

Theme, subtheme	Description
Theme 1	Perception and practice for child illness and diarrhea
• Subtheme A	Poor understanding of diarrhea
• Subtheme B	Poor illness handling
• Subtheme C	Knowledge about vaccine

Results

Study population characteristics:

Most mothers were in the age group of 23-26 years of age (63%, n=7). The mean age was 27.63 ± 4.07 , with no primary education (63%, n=7), unemployed (82%, n=9), no formal education of spouse (54%, n=6), and all the spouses were craftsmen (making sand idols). The average age of children was 27 months (SD 15), ranging from 6 months to 5 years old. The majority of the children (91%, n=10) were not taking breastfeeding. Although 82% of mothers were on special diets due to the lactation period. 91% of families (n=10) were eligible to be part of TPDS (Targeted Public Distribution System). Still, only 54% of families (n=6) were enrolled in this system, and out of that, only 50 percent of families availed services of TPDS. Whereas all participants' households have Rashan shops within one kilometer, they can approach them by walk. (Table 1)

Water, Sanitation, and Hygiene (WASH) practices:

Most of the households (63%, n=7) have drinking water facilities. However, the pipeline in their dwelling (Picture A) and the primary water source can be reached within 500 meters by 73% (n=8) of the participants; hence they do not need to stand in queue for more than 30 minutes to avail water. Data also depicts that none of the households processes their water before drinking and 73% (n=8) of them store the water in an open container. Also, 82% (n=9) of households reported that they need only 10-15 liters of water a day for household chores, and 46% (n=5) of the household pay less than 250 rupees per month for drinking water. The observational data reveal that the majority of the participants (63%, n=7) have yards in their houses for hand washing, and 54% (n=6) of participants' households have water presence near that area, but 46% (n=5) of the household don't have soap/ detergent near to water. It is also observed that all the households have open pit toilet facilities (Picture B), but 73% drain feces in open drains. When it comes to the children, most of the children (91%, n=10) don't take a bath daily. However, mother washes them after defecation, but 91% don't wash their hands after washing them. All the mother washes their hand before feeding but doesn't wash their nipple before and after feeding. It is also observed that none of the mothers washes their hands before eating food. No child wears washed clothes daily, and 46% of mothers wash household clothes every fortnight. 73% of mothers wash their hands in a bowl of water without soap, and 82% of households have shared sanitation facilities.

Qualitative analysis:

Perception and practice for child illness and diarrhea (Table 3)

Understanding of diarrhea:

The word diarrhea was relatively unfamiliar to the mothers. They considered diarrhea as roughly loose motion only; hence, 37% (n=4) of mothers think that their child is passing watery stools more than two times a day considered as diarrhea, and 18% (n=2) mothers did not even understand the term "Diarrhea." Most mothers (54%, n=6) thought teething was the leading cause of diarrhea. They believe it is a common issue with the child and not that serious. Only one other out of 11 considered diarrhea as a fatal condition. 46% of mothers considered irritability and weakness as a consequence of diarrhea and fever as a sign of dehydration.

Poor illness handling:

Regarding treatment modality for the diarrhea condition, it is always self-administered by 82% (n=9) mothers, and 54% (n=6) mothers administer ORS immediately after diagnosis. However, 26% (n=3) mothers reported that no sense and faint sign is a danger sign and that to be taken to the doctor for further treatment; hence only 37% (n=4) mothers only go to the doctor if such a condition happens. 54% (n=6) of mothers don't manage their child's disease because such issues are handled by their spouse only.

Knowledge about vaccines:

The researcher verified the child's immunization card to collect information on immunization. If the mother could not provide that, she was asked if she was aware of such vaccination. Family perception about vaccines identified as a problem; a mother stated: "my relatives and in-laws say we did not take any vaccine, and still, we are in good health; loose motion is a common issue in child, so you don't need to worry about it." One mother has a dependency on her spouse for child-related decisions. 46% of mothers (n=5) don't know about the rotavirus vaccine.

Diet during diarrhea:

All mothers considered homemade food the only option in diarrhea conditions and administered ORS fluid along with it. Only 46% (n=5) of mothers considered other medicine to treat diarrhea. It is also observed that they don't feel safe drinking water as a primary treatment and don't process water before drinking. All mothers use animal-sourced milk to feed their children, but only 46% (n=5) of mothers give cereal, pulses, fruit, and vegetables. In addition, 46% (n=5) of mothers offered only 250 ml of fluid daily. No mother has ever taken advice from a nutritionist to treat such a condition.

Episodes of diarrhea:

82% of mothers reported that children have episodes of diarrhea every month and 18% of mothers reported weekly diarrhea issues after recovery from the previous episode. The usual stool color of the child is yellow (54%, n=6), Green (37%, n=4), bright yellow (9%, n=1), and the usual type of stools is solid (54%, n=6)

Technology Assessment of mothers:

All participants have basic mobile phones and can pick up the call. However, 18% of participants can type messages, and only 27% can make calls.

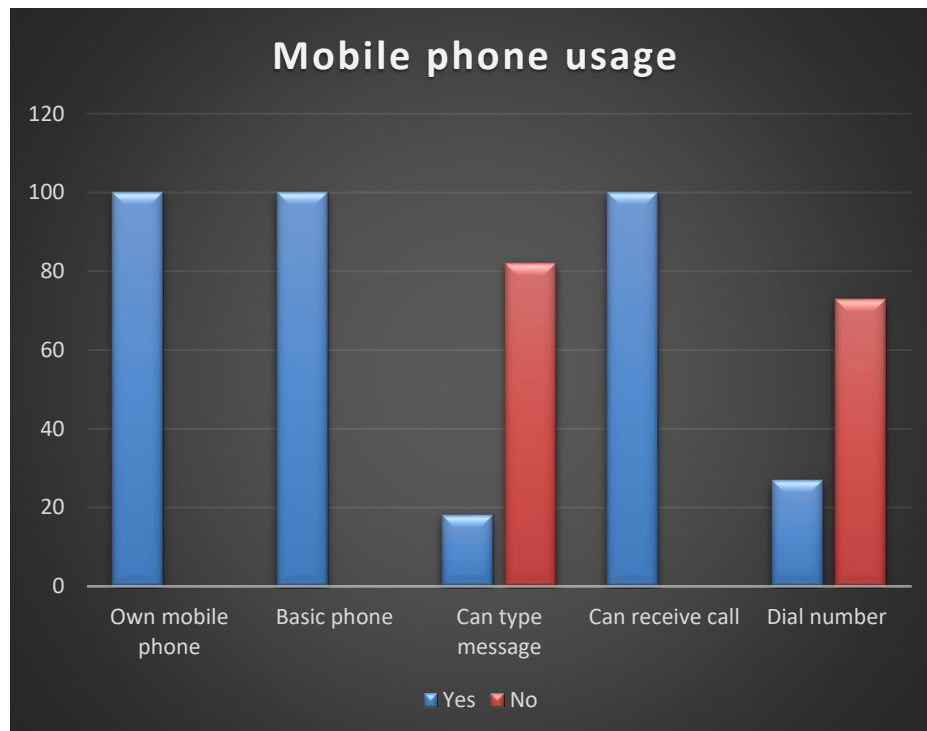


Figure 1: *Mobile phone usage*

Discussion

In this mixed method study, we examined mothers' sociodemographic factors, knowledge, attitude, and practice (KAP) related to WASH, child gut health, awareness about government schemes and programs, and the diet of mothers and children. The vaccination of children was also studied since child immunization is crucial for protective response development. There is an urgent need to strengthen the knowledge awareness program to empower the community to take care of WASH practices, the Public Distribution System (PDS), the Aanganwadi Center, and other healthcare services for children and families. This can be done through educating women's organisations at the Basti level, as they can act as a platform for behaviour modification and counselling with a focus on WASH education, PDS, & vaccine education to lower the risk of diarrhoea and poor gut health in children. The PDS/Rashan shop and AWC within the 2km of the Basti were our primary exposure of interest. Even after that, participants could not avail themselves of the services because they didn't have proper documentation to fulfill the eligibility criteria by the government. Therefore, a robust implementation with knowledge dissemination is needed to enroll the Basti household.

Our study highlights a need for government policy awareness about health services, especially for mothers. The study also shows that better coordination between multiple-level stakeholders is needed to improve the outreach of child health services. Empowering mother is crucial so that they can identify child health needs and can address them on time to minimize adverse health conditions. This study suggests that policymakers should consider effective awareness programs in implementing government health policy among Basti women. The study also proposes a baby WASH program as an additional pivotal component of a child health program targeting mothers to enhance knowledge about WASH practices to overcome gut health issues. A holistic approach is needed to maintain child gut health, like mother education programs, government policy awareness, awareness about the benefits of AWC/PDS, and WASH-related intervention.

Acknowledgment:

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Funding:

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Conflict of interest:

None declared

Ethical approval:

The study was approved by the Institutional Ethics Committee

Table 2: Study population characteristics.

Variable	N (%)
Mother's age (in years)	Mean 27.63 SD 4.07
Age of child (in months)	Mean 27.18 SD 15
Gender of child	
Male	6 (54)
Female	5 (46)
Mother education	7 (63)
No formal education or below ISCED	4 (37)
Primary education	
Education of spouse	6 (54)
No formal education or below ISCED	4 (37)
Primary education	1 (9)
Lower secondary education	
Occupation of mother	9 (82)
Unemployed	2 (18)
Fulfilling domestic tasks	
Occupation of father	11 (100)
Craftsmen	
Ethnicity	7 (63)
Banjara	4 (37)
Loharu	
Child diet pattern	10 (91)
Normal condition	1 (9)
On breastfeed	
Mother diet pattern	2 (18)
Normal condition	9 (82)
Lactating (only for women with small children)	
Family comes under TPDS	10 (91)
Yes	1 (9)
No	
Enrolled in TPDS	6 (54)
Yes	5 (46)
No	
Card	3 (27)
Antyodaya Anna Yojna	3 (27)
Bhamashah Card	5 (46)
Not enrolled	

Avail Service	3 (27)
Yes	3 (27)
No	5 (46)
Not Applicable	
Household access to TPDS	11 (100)
Yes	0
No	
Distance to Rashan Shop	11 (100)
Within 1 km	
How do they commute to Rashan Shop	11 (100)
Walk	

Table 2: Water, Sanitation, and Hygiene (WASH) practices

Variable	N (%)
The MAIN source of drinking water	7 (63)
PIPED INTO DWELLING	1 (9)
PIPED TO YARD / PLOT	1 (9)
PIPED TO NEIGHBOUR	2 (18)
PUBLIC TAP / STANDPIPE	
The trekking distance to the current primary water source	8 (73)
Less than 500m (Less than 15 minutes)	3 (27)
more than 500m to less than 2km (15 min to 1 hour)	
Queue for water	8 (73)
Less than 30 minutes	3 (27)
30-60 minutes	0 (0)
More than 1 hour	
Process before drinking water	11 (100)
No	
Storage of drinking water	8 (73)
Open container	3 (27)
Close container	
Use of water in a day	9 (82)
10-15 LTR	2 (18)
MORE THAN 15 LTR	
Pay for water	5 (46)
Yes	3 (27)
No	2 (18)
Sometime	
If yes, INR expenditure on water per month	11 (100)
250 Rupees	

Observational data

Variable	N (%)
Washing of hands	
In dwelling	4 (37)
In yard	7 (63)
Presence of water at the place for handwashing	
Yes	6 (54)
No	5 (46)
Soap or detergent or ash/mud/sand present at the place for handwashing	
Yes	6 (54)
No	5 (46)
Kind of toilet facility	11 (100)
Pour flush	
Kind of toilet facility	3 (27)
Flush to don't know where	8 (73)
Flush to open the drain	
Type of latrine	11 (100)
Open pit	

Practice

Variable	N (%)
Bathing children daily	
Yes	1 (9)
No	10 (91)
Washing child after defecation	11 (100)
Yes	0
No	
Washing your hand after defecation	
Yes	5 (46)
No	6 (54)
Washing child's hands after defecation	
Yes	1 (9)
No	10 (91)
Washing hands before feeding	
Yes	0 (0)
No	11 (100)
Washing nipples (if applicable) before feeding	
Yes	0 (0)
No	11 (100)
Washing hands before preparing food	
Yes	0 (0)
No	11 (100)
Washing hands before eating	
Yes	0 (0)
No	11 (100)
Washing hands after touching/ cleaning animals	
Yes	10 (91)
No	1 (9)

Do you daily wear washed clothes	0 (0)
Yes	11 (100)
No	
Frequency of washing clothes	5 (46)
Fortnight	1 (9)
Twice a week	5 (46)
Weekly	
Ways of washing hands	
Washes hands in a bowl of water (sharing with other people with soap)	2 (18)
Washes hands in a bowl of water (sharing with other people without soap)	1 (9)
Washes hands in a bowl of water (sharing with other people without soap)	8 (73)
Access to and type of sanitation facilities	2 (18)
Open defecation	9 (82)
Shared sanitation facility	

Table 3: *Qualitative data analysis: Mother knowledge and perception of child health*

Variable	N (%)
What is diarrhea	4 (37)
Frequency of stools more than two times	1 (8)
Stomach ache	4 (37)
Vomit and stool pass more than five times	2 (18)
Don't know	
Causes of diarrhea	6 (54)
Teething	1 (9)
Too much milk	4 (37)
Don't Know	
Consequences of diarrhea	5 (46)
Irritability	5 (46)
Weakness	1 (8)
Death	
Signs of dehydration	5 (46)
Lazy and fever	1 (8)
No sense, I feel like dead	4 (38)
Irritated child	1 (8)
Don't know	
Treatment modalities	9 (82)
Self-Administered	2 (18)
Nothing	6 (54)
ORS	5 (46)
Yes	2 (18)
No	1 (9)
Danger signs	5 (46)
Fever	3 (27)
Laziness	2 (18)
No sense and faint child	3 (27)
Watery stools more than 3 times	4 (37)
When to seek medical advice	2 (18)

After 3 days of watery stools	5 (46)
After 7 days of watery stools	6 (54)
If child faints	5 (46)
On day one	6 (54)
Preventive measures	
Don't know	
Yes, I know about it	
Rotavirus vaccination	
Don't know	
Yes, I know about it	
Diarrhea is a severe health problem	
Yes	7 (63)
No	4 (37)
Management measures, if required	
Health Care Professional	6 (54)
Nothing	5 (46)
Fluids and feeds during diarrheal illness (yes)	
Homemade fluids	11 (100)
ORS	11 (100)
No oral fluids	5 (46)
Medications	5 (46)
Bottle feeds	5 (46)
Preventive measures (not taken by)	
Safe drinking water	11 (100)
Hygienic practices	11 (100)
Vaccination	11 (100)
Why is there no rotavirus vaccination	
Don't know about it	6 (46)
Not applicable (as they have not registered in any scheme)	5 (54)
Supporter in taking care of the child	
Yes	4 (37)
No	7 (63)
Type of food used for making top feed (Given by)	
Animal sourced milk	11 (100)
Pulses	3 (27)
Animal food	3 (27)
Egg	3 (27)
Green leafy vegetables	3 (27)
Fruits and vegetables	3 (27)
Fluid offered in a day	
250 ml	6 (46)
500 ml	5 (54)
Nutrition counseling provided	
Yes	0 (0)
No	11 (100)
Episodes of diarrhea	
Weekly	2 (18)
Monthly	9 (82)
Color of stools (usual)	
Bright Yellow	1 (9)
	6 (54)

Yellow	4 (37)
Green	
Type of stools (usual)	4 (37)
Curdled	1 (9)
Semi Solid	6 (54)
Solid	

Picture A: *Pipeline in their dwelling*



Picture B: *Pit latrine in the Basti*



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