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Research Article

QUALITATIVE ASSESSMENT REGARDING MALARIA KNOWLEDGE, ATTITUDE AND RISKS AMONG MIGRANT CONSTRUCTION WORKERS AT CONSTRUCTION AREAS AND MIGRATORY SETTLEMENTS IN UDUPI TALUK, KARNATAKA, INDIA

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ABSTRACT
Malaria is a major public health problem in Karnatka, which is mainly man-made malaria or malaria among the construction workers and one of the main factors which contributes significantly to the overall malaria burden in South-East Asia. The National Vector Borne Disease Control Program of India reported 1.6 million cases and 1100 malaria deaths in 2009. Qualitative assessment conducted among the construction workers in their migratory settlements as well as in their work site, thus on exploring the construction workers awareness and knowledge level regarding malaria transmission, prevention and control intervention can be planned in acceptable manner. We conducted 23 in-depth interviews among the migratory construction workers including both men and women at different construction sites in Manipal, Udupi district. Most of the workers were migrated from different states of India maximum from West Bengal, Bihar, Jharkhand, and north Karnataka, thus language during interview session was not barrier. On analysing the qualitative data of 23 interviews to draw result, we found that most of the workers have heard of malaria but they did not respond adequately in terms of transmission and mode of infection. However they did know that malaria and mosquito are related. Persons who had previously had malaria demonstrated better knowledge and awareness. Few workers also mentioned that Malaria is sexually transmitted disease. Most of the workers have bed nets but they don't use it because of several reasons. Health education and innovative approach while framing the policies are recommended.

Key Words: *Malaria, Migrant Construction Workers, Migratory Settlements*

INTRODUCTION
Malaria is a major public health problem in India and one which contributes significantly to the overall malaria burden in South-East Asia. The National Vector Borne Disease Control Program of India reported 1.6 million cases and 1100 malaria deaths in 2009. Some experts argue that this is a serious underestimation and that the actual number of malaria cases per year is likely between 9 and 50 times greater, with an approximate 13-fold underestimation of malaria-related mortality. The difficulty in making these estimations is further exacerbated by (i) highly variable malaria eco-epidemiological profiles, (ii) the transmission and overlap of multiple Plasmodium species and Anopheles vectors, (iii) increasing anti-malarial drug resistance and insecticide resistance, and (iv) the impact of climate change on each of these variables. Simply stated, the burden of malaria in India is complex.
As the second most populous country in the world, with a population exceeding one billion people, India's public health system faces many challenges including implementation of surveillance programs to accurately estimate and control the national malaria burden. Historically, the highest incidence of malaria in India occurred in the 1950s, with an estimated 75 million cases and 0.8 million deaths per year (World Health Organization, Country Office for India).
The Karnataka state in India is endemic for malaria, dengue, lymphatic filariasis and Japanese encephalitis. Different districts have variable disease rates. During 2000, the state reported a total of 109 118 malaria cases, of which 28 065 were of *P. falciparum*. Of these, Bangalore district accounted for 278 cases, of which 143 were of *P. falciparum*. The annual parasite incidence (API. cases per thousand

populations during the year) was 0.14. Kolar district reported 4114 malaria cases and 1372 *P. falciparum* cases. The API was 1.48. There were 189 dengue cases reported in the Karnataka state 2000, of which 8 were from Bangalore district and 106 from Kolar district. Japanese encephalitis accounted for 125 cases in the state in 2000, of which 2 were from Bangalore district and 28 from Kolar district *(Source: State Health Department, Karnataka)*.

Malaria is not endemic in the Udupi district of the Karnataka state of India. However, in recent years some hundreds of cases of both *P. Vivax & Falciparum* are found in this state. Most of this cases came where construction workers who emigrated from endemic parts. They were infected in the North and the disease became apparent in this non endemic area. But recently some cases of malaria are found in local people, all living close to construction sites. Apparently malaria is transmitted from the pre infected workers to the local population. Research of Manipal University showed that a construction technique called 'curing' where water for twenty one days is put on concrete, provides excellent and large breeding sites for mosquitos. Together with the infected migrants this creates optimal conditions for malaria transmission (*Source: Hiridika primary health centre, Udupi Takul , Karnataka*)

It is clear both people living at and around the construction sites are at risk to get malaria. To prevent malaria becoming endemic in this district, it is important to detect and treat cases in an early stage. One of the policies now enrolled is the screening of all workers of new constructions sites with a single blood smear and the provision of free treatment (interview district malaria officer). Furthermore every case of malaria in the district is supposed to be reported; as this is mainly construction workers, all other the workers will be screened and treated too. Except from some private clinics this system works well and many cases are found and treated in recent times (*Source: Udupi district, Karnataka, Community health care centre*).

Insecticides continue to be the mainstay for the control of these infections. However, for reasons of inadequate health infrastructure, particularly in remote and inaccessible areas where most vulnerable groups live, and urban areas where access to houses is a difficult proposition due to security, it is essential that communities themselves undertake interventions against vector mosquitoes. For the success of community-based programs, it is necessary to know as a first step the communities perceptions about mosquitoes and disease transmission, the breeding habits of mosquitoes and how best the communities can participate in the control efforts.

For development of a suitable health education strategy and health policies, it is necessary to understand the level of knowledge and perception of the community regarding mosquito-borne\ infectious diseases, the practices the people follow to prevent mosquito bites at home, and finally to determine the requirements of media type and specific channels for effective communication and efficient dissemination of information. Therefore the underlying study address the following question: What is the migrant population perception on malaria risk, prevention and treatment and what is the actual practise regarding these issues.

Research Articles

Kumar and Gurujai (2005) carried out a knowledge, attitude and practice (KAP) in an urban and a rural area in Karnataka state of India with the objective of determining the perceived risk by the community of mosquito-borne infectious diseases and the level of knowledge regarding mosquitoes. The study brought out that more than 90% of the people interviewed perceived mosquitoes as a problem. However, this perception was with regard to the nuisance value of mosquito bites rather than their disease-causing potential. Malaria was known as the main disease transmitted by mosquitoes. Quite a large number of people did not know where the mosquitoes bred. Those who have knowledge have mentioned drains and stagnant water as the main breeding sites. More than one third of the interviewees did not know of any preventive measures against mosquitoes at the community level. More than 75% were taking some kind of personal prophylactic measures against mosquito bites. Approaches based on social mobilization and communication aimed at bringing behaviour change in the communities is stressed.

Sabin, Rizal, Brooks, Singh & Tuchmann et al (2010) explored views toward and use of malaria prevention and treatment measures among pregnant women in Jharkhand, India. They conducted 32 in-depth interviews and six focus group discussions (total = 73 respondents) with pregnant women in urban, semi-urban, and rural locations in a region with moderate intensity malaria transmission. Most respondents ranked malaria as an important health issue affecting pregnant women, had partially correct understanding of malaria transmission and prevention, and reported using potentially effective prevention methods, usually untreated bed nets. However, most conveyed misinformation and described using unproven prevention and/or treatment methods. Many described using different ineffective traditional malaria remedies. The majority also showed willingness to try new prevention methods and take medications if doctor-prescribed. Misconceptions and use of unproven prevention and treatment methods are common among pregnant women in eastern India. Policy makers should focus on improving knowledge and availability of effective malaria control strategies in this population.

These results are not directly applicable on the target population of our study as the construction workers come from all different states and cultures around India. But is gave suggestions where to look for in developing the structure for our interviews and where to look for in the conversations. Please refer to the appendix for the overview of the topics which where chosen to be discussed in the interview.

MATERIALS AND METHODS

To answer the research questions, a qualitative, descriptive study was conducted, consisting of individual structured interviews. The research population is the population of four slums areas of construction sites in and around Manipal, Karnataka, India. The interviewed subjects consisted of people at home in the daytime, during the break time of workers or when workers were present for interview and give verbal consent to give information.. A snowball technique was used to find construction workers along with convenient sampling. Duration of study is two months from December 2012-January2013. Study population focused on migratory construction workers. The intention was to interview twenty-five people, but due to time restrictions twenty-three people were interviewed, which was found to be sufficient because saturation of information was reached. The interviews took place on the construction sites, sometimes in an office, but many times outside which resulted in less privacy and some curious listeners. The research team consisted of three people; the majority of the interviews were conducted in two languages Hindi and Bengali. The researcher spoke with the interviewee and translated the information. To ensure all the important topics were covered, a list of useful questions was used to guide the researcher, which was prepared in advance.

RESULTS

Study Population

Socio- Demographic Profile:

Most of the workers were in the age group of 20-25 years (47%). 69% of the workers were in the age group of (20-30). The range was 17 to 60 years. The majority of the workers were male (73%) and from West Bengal (39%), followed by North Karnataka (26%). 14 out of 23 workers were married (60%). Most of the workers went to school (65%). Literacy level was high (65 %).

Malaria Awareness and Behaviour

Cause of malaria and prevention

Almost all interviewees see mosquito's as cause for malaria. Some measures to protect from mosquito bites are common knowledge and mosquito nets are used less frequently. When it was reported that mosquito nets are used, it was unclear if it was to protect them from malaria or just from the unpleasant mosquito bites. The measures that are in use are bed nets, coils and keeping the environment clean. The use of bed nets was not popular because it makes the night even hotter as it constrains the airflow of the fan. This issue is related to the housing conditions. We found construction workers were living in crowded spaces (up to 18 people in a small room) the houses were mostly made of metal and some bricks, which

often become incredibly hot in the sun. Further, the use of coils was seen as a good replacement for bed nets, but rarely both were used.

Some respondents see a relationship between rain and/or dirty water and getting malaria. As preventive measure some interviewees mentioned staying inside during the rainy season. The respondents were not able to explain why the rainy season was associated with an increased risk of contracting malaria. General health promoting behaviour like eating properly and going to sleep early and waking up early were also mentioned several times in the interviews. Sometimes the perceived cause of malaria did not match with the known or used protective measures. For example, one interviewee mentioned sex and physical contact with malaria ill people was a main cause for malaria, but did not come up with any preventive measure related to this mechanism. A common idea next to mosquito's as cause for malaria is a lack of cleanness and close dumps. How this cause malaria became not clear: Is it the dirt itself, the adverse impact in person's health that makes them more at risk for any disease or that dirt is a favourable environment for mosquitos? Remarkable is that mosquito repellent was only mentioned by one person as a good protective strategy, even though mosquito repellent is widely used and recommended worldwide.

Symptoms

The most common symptoms of malaria mentioned were fever (especially during the night), shivering, and lack of appetite, body ache, headache, weakness, and vomiting. Additionally, laziness, red eyes and a positive blood test were mentioned as symptoms. People who did have had malaria themselves give a more extensive pallet of symptoms then others.

Treatment

The findings regarding to treatment where one directional: malaria is curable by medicine derived from a doctor. An interesting issue is the preference of many people to go to an expensive private clinic instead of a free governmental one. In their perception are the medicine prescribed by governmental doctors not well working where the 'private medication' works very well. If different medication is prescribed or where this idea is coming from became not clear.

Origin of knowledge

There is not one common recognized source of malaria knowledge in this population, everyone give different sources. Radio, doctor, school, Television are the formal sources on which we did not elaborate on the details of what kind of programs ed. Own experience and that of relatives are the other form of gaining knowledge.

Some findings appear strange for us. Some people had relatives with malaria but could not told us not to know anything about it. Obviously they do know a lot of things about it, at least if for instance every body with malaria dies or not. Most likely some shortcomings in the interview skills become apparent here.

Perception Regarding Work Environment

Construction site safety

The majority of respondents felt that the workplace was safe with respect to malaria when asked. However, a number of people also described the sites as "not clean", and there is "accumulation of water." Unrelated to malaria but also of general importance were workers that reported that no safety gear was provided by the contractors and there is hazardous debris that sometimes falls from the structures.

Health effects

Surprisingly, many interviewees responded that they did not know of any health effects that were the result of their work environment. Accidents were the second most common answer followed by malaria, then fever.

Malaria breeding

Most of the respondents felt that there were many mosquitoes at the construction site and that the area was conducive to breeding. It was not always clear if there was an association between mosquitoes and the accumulation of still water. Approximately a quarter of workers said no or that they did not know.

Malaria incidence

Approximately fifty percent of construction workers felt there was a high incidence of malaria among construction workers and either experienced the disease themselves or knew of a worker who had it. The remaining fifty percent was almost equally split between individuals who reported not hearing about any malaria cases or said they did not know (which we can assume is no).

Responsibility of malaria control

Most people responded that they were not sure who should be responsible for the control of malaria, which was closely followed by that it is the responsibility of the contractors. There was one location specifically which seemed to have a special relationship with the housing area security guard. For many questions that were asked, many workers said they would report to the security guard on site or it was his responsibility to help them. While conducting an interview of a worker in the doctor's office, the security guard came in and told us that a worker had a fever and was feeling ill. We then observed him go into a cupboard and pull out a box of medicines and began searching through them and asked us what he should give the worker. He informed us that when the doctor visits he observes the assessments and takes notes on what the doctor gives the workers in terms of medications for the various complaints and then tries to remember them. When the physician is not around, the security guard appears to be somewhat responsible for the workers well being.

Malaria treatment

Approximately fifty percent reported that if they felt ill or that they might have malaria they would see a doctor to get a blood test. Thirty percent did not know how they should go about seeking treatment if they felt ill followed by twenty percent who said they would go home for help. Any interesting observation was that some workers mentioned that "private clinics" were much better than government hospitals. There seemed to be a stigma attached to government hospitals and that the treatment received for malaria would be poorer than if treatment was received privately. From speaking with the primary health centres and malaria surveillance centre, it is our understanding that malaria treatment is free from the Indian government to every citizen (which includes the migrant population), and individuals would be charged about 3000 rupees for malaria treatment in the private sector.

Perception Regarding Migrant Living Conditions

Housing condition and ventilation

- Most of the workers mention they have good housing condition, as they belong to low socioeconomic condition, they provided with room in labour shed area and worker from different state are living in same room
- Strength of worker living in single room varies from 4- 15 person in singles room.
- Few workers said that rooms are small and crowded, but they have good facilities as water, electricity and fan is provided to them
- Most workers room are not ventilated, there is no window in the room and no sanitary facilities is provided
- Few workers are staying with their families, but most of them are living with people of different state

Housing conditions and mosquitos

- All the workers mentioned that there is mosquitoes in the houses
- Few women who were interviewed mentioned that mosquitoes are more in the evening and night time
- Most of the use net , some use coils , liquid refill , or scented sticks
- Few of them put fan on or light on and close the door in evening protect themselves from mosquitoes.
- Few of the said that keep house clean and put fan on as they avoid net because houses are made of tin and only few houses are made of bricks so tin houses very hot so they don't use net

Responsibility of housing conditions

- Most of the migratory workers and their family mentioned that they have good housing facilities, with water and electricity, but no sanitation facility.
- Provision to doctors visit is also provided twice in week in few of labour shed area
- Most of the worker said the that the security is responsible for the housing condition
- Few said that manager, company, site supervisor is the responsible person
- Few said that government and all people staying in the community is responsible for the housing condition
- Many of them have don't have knowledge about whom to inform about housing condition

Malaria cases among construction workers

- Most of them said use of self-protection such as use of net, visiting doctor, coils, put fan on, close the door in evening, keep home clean.
- Few said that bath daily, eating properly, sleep on time and maintain personal hygiene.
- Few reported proper medication, prevent stagnant water and use of bleaching

DISCUSSION

Limitations

- Substantial interviewer variation, risk for asking questions and interpreting responses differently
- Language barrier of local language, did not always have access to an interpreter
- Difficult to reach families, many not home during the daytime, women are often found working at the construction site carrying sand/rocks (target population problematic)
- Many workers were unable to take a break to speak with us
- The environment of the interview was distracting since there were many people around even though we did ask them to leave while we interviewed
- Learning how to interview participants in a qualitative study is a complex skill that is achieved over time, many of us were novice interviewers
- It was difficult to retrieve participants full perception and understanding of malaria as respondents unwilling to open up to interviewers (often one word answers or requiring a lot of prompting)
- There may have been hesitancy to talk or say the true feelings in case the manager or person in charge overheard (respondents do not want to risk losing their job)

Recommendations for population

- Education program to help clarify what is malaria, what are the risks, what are the ways to help prevent illness (be sure to adapt program to all levels which include those that are illiterate and those that do not speak the language)
- Educate workers and their families on how to go about getting treatment if they suspect malaria, and inform them of free treatment at the government hospitals which give the same radical treatment as private hospitals

Recommendations for further study

- Interview in the evening if trying to reach the families (many of them work)
- Have an interpreter as part of the investigation team
- Clarify target population
- A questionnaire is not necessary for the interviews but helps as a guideline
- Prior interview training skills
- It was found in the study that malaria is not a priority concern for construction workers and there are other more pressing issues, those being housing conditions, proper sanitation, and safety at the job site

- It should be investigated if there are policies in place for safety of workers (e.g. protective equipment—helmet, safety glasses, steel toe boots, ear plugs, bug repellent etc.). The work environment should not be a hazardous environment, if accidents or health issues can be avoided, they must.
- There was one housing area that was substantially worse than the others, is there a minimum standard that contractors must meet? If not, should there be?
- Migrant workers need adequate protection and are a vulnerable usually poor population that should not be taken advantage of, policies must be put in place and enforced (otherwise, there is a risk of human rights violations)
- Is there a way that migrant children can go to school?

Conclusion

A qualitative study was conducted on 23 migratory construction workers and their families. We assessed their level of knowledge about malaria and awareness regarding malaria in the construction site. In real scenario workers did not find malaria as very serious problem in the community and have very superficial knowledge about this vector borne disease. Through our study we found most of the respondents have some level of knowledge about malaria but it appears as though it is not a priority focus of this population and there are issues of higher concern. There is varied perception about malaria and its causes, spread of diseases, source of infection and how to prevent the disease through self-protection interventions. The workers who have already suffered from the disease or knew that some of their co-workers suffering from malaria, had appeared to have a higher level of knowledge than those who had no experience with the disease.

The main issues that the construction workers mentioned were accidents at the construction site resulting in injuries, and housing conditions which include lack sanitary facilities, inadequate space, and crowded spaces. Most of the workers feel that the conditions are the responsibility of the contractors closely followed by individuals that are unsure who should be held responsible. Migratory workers also face extra challenges of a language barrier which can be problematic in expressing their concerns and communication in general.

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