



Life Style of Binjhal Tribe Residing in a Malaria Endemic Village in Odisha, India: A Mixed Method Study

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Abstract: In Odisha, India, eight districts categorized as KBK (Kalahandi-Balangir-Koraput) have been categorized as highly malaria endemic region in the state. In spite of various time bound intervention strategies implemented by government to control malaria, villagers are suffering from the disease years together. The daily activities of people were studied in a malaria endemic tribal dominated village of Balangir district under KBK district. Data collected through mixed methods qualitative research techniques and quantitative questionnaire. In the village information on people's daily activities, their sleeping habits, knowledge on the cause, transmission and survival strategies were collected. The findings revealed that though disease was familiar among people as *Palli Jwaroo* but its treatment practices passes through steps which were found greatly influenced by decisions of the elder members of the family. Factors associated with Socio-cultural activities especially keeping country fowl inside sleeping room, sleeping places, use of herbal medicines were found influential factors.

Keywords: Malaria (*Palli Jwaroo* Key Informants (KIs). Focus Group Discussions (FGDs). Kalahandi-Balangir-Koraput (KBK).). Traditional Healer (*Baidya*, Country Fowl.

Received : 23 March 2021

Revised : 30 March 2021

Accepted : 12 April 2021

Published : 2 September 2021

TO CITE THIS ARTICLE:

Panda, M., Satapathy, K.C., & Mahapatra, A. 2021. Life Style of Binjhal Tribe Residing in a Malaria Endemic Village in Odisha, India a Mixed Method Study, *Skylines of Anthropology*, 1: 1, pp. 22-35

Introduction

Among vector borne diseases, Malaria causes more morbidity and mortality as it is transmitted through bites of female anopheles mosquito between dusk and

dawn. Malaria existing as a major public health problem of human being since time immemorial in different places namely high altitude to sea level areas because of its transmission dynamics differs from place to place. It has been reported that South Africa and South East Asian countries are mostly affected due to malaria as compared to other parts of the World. It was estimated that a total of 1.4 billions of people are at risk of malaria and out of this 1.2 billion people reside in malaria endemic countries of Africa and South-East Asian Countries. Around 65 % of total malaria cases of South-East Asian countries are from India (Hussain *et al.*, 2013). The World Malaria Report-2017, reveals that there are fourteen countries of Sub Saharan Africa and India carried about 80% of Global Malaria burden (WHO, 2017). India alone contributes 4% of total malaria cases, 6% of *pf* cases and 6% of *pv* cases and 6% of deaths .The State of Odisha in India, located on the east coast of India constitute 4% of total population of India, contributes about 44 % of *Plasmodium falciparum* (*pf*) and *Plasmodium vivax* (*pv*) category of malaria cases, out of which 49 % malaria cases are found *pf* category with 25.5% of total malaria deaths (Kumar *et al.*, 2007). In the year 2011, it has been reported that Odisha contributed 24.4% of the total malaria cases, 40 % of *Plasmodium falciparum* infections and 17.3 % of malaria deaths of the country in the year 2009. Tribal settlements are the most malaria endemic areas in the state of Odisha and are also economically underdeveloped, having difficult terrain, poor communication facilities and inadequate health infrastructure (Das *et al.*, 2011). Despite a good distribution of health facilities, family members are depending on self-treatment, private clinics, quacks and private medicine shops because of their easy and familial accessible in the locality and because of the this, young children suffered towards Malaria complicacy (Panda *et al.*, 2018). The control strategy will be fruitful and it can achieve the goal when people understand the problem of disease spread and its management and can realize the seriousness of the disease, along with the Health workers (Panda *et al.*, 2020). Malaria burden and transmission also vary from region to region in Odisha. It has been reported that the tribal dominated districts of Odisha namely- Koraput, Rayagada, Nowrangpur, Malkangiri Balangir, Sonapur, Kalahandi and Nuapada named as undivided KBK districts have shown high malaria prevalence followed by northern and western districts. In contrast, 8 coastal districts showed very low incidence of malaria over the years except few pockets in these districts. Malaria incidence is thus multifarious in KBK regions because of its vast territory of forest with only 27% of state population and 50% tribal population, contributed 70% of total malaria positive cases and 64% of total malarial deaths case of Odisha up

to 2018 (Pradhan and Meherda,2019). Hence, the present study was conducted to know the factors influential for survival of people living in Malaria endemic village in terms of their prevention and cure strategies being adopted by them for cure of malaria. This study was concentrated to highlight the indigenous methods of prevention and cure practices adopted by the people before, during and after the appearance of feverish symptoms of disease malaria popularly known by Tribe Binjhal people as “*Palli Jworaoo*”. The study was done with objectives to understand the cause, transmission and control practices of people in a malaria endemic tribal village in KBK districts of Odisha.

Methods

Study Setting and Population

The study was conducted in the village Chabripalli in Khaparakhhol Block in the district of Balangir under KBK district of Odisha lies between latitude 20° 52'41" North and Longitude 82° 56' 41" East having the unique features of varying topography such as; hills and rolling uplands covered with forests (Gandhamardan mountain part of Eastern Ghats), watercourses and plain agricultural land; as there was highest incidence of malaria cases under KBK district can be a better representative village for the whole KBK due to its backwardness and highest incidence of malaria cases with four reported deaths cases in the year 1998, 1999,2000, 2001 respectively; and more than 90 % fever cases in the village were reported due to *Plasmodium. falciparum* (*pf*) category in the year 2016 to 2018 without any death case because of Government intervention; which can represent better for the KBK district for its backwardness as well as uniqueness of the tribe namely “Binjhal tribe”.

Survey Methods

For the whole village study, two fold research techniques were used for collection of empirical data. In first phase, a field survey was undertaken by employing anthropological research methods with the following steps namely, identification of community gate keepers according to their role and responsibility in the village. Community Gate Keepers (GKs) were identified purposively from among villagers having their social responsibility in the village and their broader understanding on causes, transmission, prevention and control aspect of malaria. Information like daily habits, economic condition, exposure towards outside people, knowledge on Government sponsored schemes and treatment process were also collected from them. The

selection of Gate Keeper (GK)/ Key Informants (KIs) for in-depth interview and participants for Focus Group Discussions (FGDs) were done purposively. The GKs/KIs in the present study included Village Jati Panchayat head/, traditional healers (*Baidya*) / Private Practitioner (*Kabiraj*), local leaders (Panchayati Raj Institution (PRI) members)/ medical officers, female health workers, Anganwadi Worker (AWW), Auxiliary Nurse Mid-wives (ANM), Accredited Social Health Activists (ASHA) working in the village. The FGDs with a group of 7 to 8 villagers included adult men, adult women (including Pregnant and Lactating women) and health service providers available in the village. FGDs were organized at house of Village Head (Gatekeeper), at village common places such as village middle point, school campus as per availability of space in the village. A total number of five GKs/KI interviews and fourteen FGDs were undertaken in the present study for collection of qualitative primary data. A total 6 leading questions were asked to each KIs and during FGDs in order to have a broader understanding of villagers understanding and perception on causes, transmission, prevention and control aspect of disease malaria:

1. Is the disease malaria known to villagers and they are aware of it?
2. Do the people in the village have any idea about the Causes, Transmission and Control
3. Practices of malaria?
4. Do the villagers start the Malaria treatment immediately after occurrence of disease?
5. Do the people have any financial hardships causes delay in treatment?
6. How people do manage the Economic issues at the timing of disease burden?
7. What are the different methods adopted by people for malaria prevention practices?

Due to the remoteness of the village, the voluntarily expression of the members of the FGDs and KIs were recorded manually. On the basis of above findings a Structured Questionnaire was developed and door to door survey of all 167 Households' Heads/Members as per availability were conducted for collection of data from people in the village.

Ethical Considerations

The community members in the study village were informed well in advance about the study and the aim of the research work before visiting the study

area before seven days. The key informants such as local PRI (*Panchayatiraj* Member (*Sarpanch/Ward Member/Samiti Member*)) as well as Village head, health workers and school teacher were contacted individually. For the Focus Group Discussion, the men and women of the village were interacted separately after obtaining due consent along with permission from family heads. Further, individual members of different age-groups were duly informed and explained about the study and oral consents were taken before collection of data.

Results

Qualitative Research Findings

The disease Malaria was familiar among people as “*Pali Jwaroo* (intermittent fever) having the symptoms of high temperature, fever, severe convulsion and periodic shivering along with body ache. The findings revealed that symptoms and causes of *Palli Jwaroo* (malaria) not only caused by mosquito bite but also by other agents like flies, forest water and forest fruits. During interviews with the KIs and discussion in the FGDs it was perceived that the villagers have their own concept to distinguish Malaria (*Palli Jwaroo*) from other fever type illness. Analyzing the details of the Key Informant Interviews, it was observed that, though majority of people in the village were aware about Malaria (*Palli Jwaroo*) but still a sizeable portion of the population need to be aware about the causes, transmission, prevention and control of malaria; as they have different perceptions on the disease Malaria. The villagers still have possessed confusion and altogether wrong knowledge about occurrence of malaria namely by bathing/drinking of forest stream water. Further, it was also expressed that exposure to too much to outside village areas in bare body, over work/fatigue and sleeping outside house are also attributed towards the causes Malaria (*Palli Jwaroo*). Observations of KIs information on the issues like causes, transmission, prevention and control of malaria in the study area are mentioned as follows:-

Perception of People about Causes of Disease Malaria

Key informants during discussion informed “Now a days, people specially the women believe that malaria is a dangerous disease but sizable portion still believe that malaria is not caused only by mosquito bite but for other reasons. Regular opening of Anganwadi Centre and periodical joint visit of Anganwadi Worker and ANM to door to door of each household has created awareness among people but still it is in dormant stage. The KIs during discussion informed that if there is delay in treatment, it will affect

brain (*Munnd*) which may cause death of the patient or patient may suffer from lunatic condition". It has also been observed that due to ignorance and economic hardship, the people who are working in jungle area for plucking *kendu leaf* or collecting fire-wood or similar activities in jungle area hardly takes care of their health. It has also been suggested for prompt action on treatment of disease; further, it has been expressed that exposure to outside village areas in bare body and over work/fatigue and sleeping outside house are the causes of malaria"

Treatment Pattern and Practices on Malaria

The participants in FGDs opined that the medicines available for malaria treatment such as Chloquine (White Tablets) and Quinine (Small Brown Tablets) were supplied by the Anganwadi worker/ ASHA Worker/ ANM worker to get cured from the malaria (*Palli Jwaroo*) in the ANM/AWW Centres. This facility was not available previously and people were to travel a long distance to get medicines for treatment; by sacrificing a part of the daily earning. Because of above the types of difficulties, people preferred to seek treatment from the Traditional healer (Local Herbal Men called *Baidya*) first who is a respected person of our village provides us herbal medicines not for immediate cure but also for future prevention of the disease. Participants also informed about the mobile private practioner locally familiarly known as *Village Kabiraj* also available while visiting this area. In the village, the Traditional Healer (*Baidya*) allows the sick person to consume one locally made herbal mix paste made from medicinal plant leave including Gangaseuli (*Nyctanthes arbor-tristis* i.e., Night-flowering Jasmine) to the patient for immediate cure and future prevention from disease.

Prevention Practices on Malaria

On the aspect of Malaria prevention practices, it was mentioned by GKs and highlighted by KIs that in their village, Women and young children prefer to sleep inside their house where country fowls were kept. It was told that due to presence of country fowls inside sleeping room, the flies, mosquitoes or other small insects do not enter into their sleeping room. The practices of rearing of country fowls are being done by people years long not only for the fulfillment of cultural practices (used eggs and live bird in different rituals) but also for the economic sustenance of the family.

On the issues of the use of mosquito net, KIs opined that people are unable to use mosquito net because of unavailability of adequate number of nets to

all adult family members. It has also been explained that who are going to the forest area for collection of firewood and forest produce includes collection of leaf, fruits, plums, sleeping or staying more time inside forest area or taking bath or drinking forest rivulets water were considered as major cause of occurrence of disease Malaria in the area.

B. Quantitative Research Findings

In the study village Chabripalli a total 167 respondents representing all families residing in the village has been taken for quantitative research. The respondents in the age-group ranging from 18 years above up-to above 60 years were interviewed. The study respondents consisting of 75 (44.9%) Binjhal tribal men 58 (34.7%), Binjhal tribal women, 17 (10.17%), other caste women and 17 (10.17%) other caste men of different age groups. The respondents were categorized into different age-category namely Young-Age (18 to 40 years), Matured Middle-Age (41yrs to 60yrs) and Old -Age (61 years and above) category residing in the study village Chabripalli. The total distribution of tribal and non-tribal people in the study area is at Table-1 and Table-2:

Table 1: Total number of respondents in the study village. (N =167)

Binjhal Tribe =133 Nos (79.6%)		Other Caste=34 Nos (20.4%)	
Women	Men	Women	Men
58 (34.7%)	75(44.9%)	17(10.17%)	17(10.17%)

Table 2: Category of Study Population

Age Group			Binjhal Tribe and Others		Total
			Tribe Binjhal	Others	
Women	Age Group	Young (18 years to 40years)	28(16.76%)	9(5.39%)	37(22.15%)
		Middle Age (41yrs to 60yrs)	17(10.17%)	4(2.40%)	21(12.57%)
		Matured (Above 61yrs)	13(7.78%)	4(2.40%)	17(10.18%)
	Total	58	17	75	
Men	Age Group	Young (18 years to 40years)	42(25.15%)	7(4.19%)	49(29.34%)
		Middle Age (41yrs to 60yrs)	30(17.96%)	8(4.79%)	38(22.75%)
		Matured (Above 61yrs)	3(1.79%)	2(1.20%)	5(2.99%)
	Total	75	17	92	
Education			Binjhal Tribe and Others		Total
			Tribe Binjhal	Others	

Women	Education	Illiterate	32(42.7%)	7(9.3%)	39(52.0%)
		Literate up to Primary schooling	16(21.3%)	5(6.7%)	21(28.0%)
		Literate above Primary School	10(13.3%)	5(6.7%)	15(20.0%)
	Total	58	17	75	
Men	Education	Illiterate	23(25.0%)	12(13.0%)	35(38.0%)
		Literate up to Primary schooling	28(30.4%)	4(4.3%)	32(34.8%)
		Literate above Primary School	24(26.1%)	1(1.1%)	25(27.2%)
	Total	75	17	92	

Identification of Different Problematic Disease by People in the Study Village

Malaria is familiar as 'Palli Jwaroo', among the people in the study area. The local people used Malaria illness as "Palli Jwaroo" in the study village as described by villagers in the Village Chabripalli (Buromal). From the study it was found that the Binjhal tribal women are more concerned about disease Malaria than the tribal male in the village. The results of the finding show that 64 % of Binjhal tribal women termed 'Palli Jwaroo' as a frequently occurring problematic disease in the area in comparison with the 53% non-tribal women. The male Binjhal tribe people, on the other hand, are considering "Palli Jwaroo" as a disease (39 %) and took it casual and informed the same even at the time of discussion. Among the non-tribal men 65 % ranked Malaria as the frequently occurring disease in the Village. Other diseases like Tuberculosis (TB), Diarrhea /Dysentery, skin also prevail in the village as informed by the villagers. The details of the same are recorded in Table 3.

Table 3: Identification of different problematic diseases in the village

Gender Group	Type of disease people know in the village	N (=133) N (=34)	
		Binjhal Tribe	Others
Women	Malaria ('Palli Jwaroo')	63.8%	52.9%
	TB	12.1%	23.5%
	Diarrhea/Dysentery	5.2%	0
	Skin diseases	10.3%	23.5%
	Any Other	8.6%	0

Gender Group	Type of disease people know in the village	N (=133) N (=34)	
		Binjhal Tribe	Others
Men	Malaria('Palli Jwaroo')	38.7%	64.7%
	TB	18.7%	11.8%
	Diarrhea/Dysentery	20.0%	17.6%
	Skin diseases	12.0%	0.0%
	Anyother	10.7%	5.9%

Disease Malaria and its Perception by People in the Study Area

In order to analyze the malaria disease perception of people as per their demographic characteristics namely Age (category namely Young population (18 years to 40 years), Middle aged population (41 years to 60 years) and Old aged population (Above 61 years)), type of Community living in the village (Scheduled Tribe-Binjhal and Others) and their Education level (Illiterate, Literate up-to Primary schooling and Literate above Primary Schooling).The details are mentioned in Table-4.

Table 4: Disease malaria and its perception by people in the study area

Malaria disease perception as per demographic characteristics of people in the study area		Malaria can kill a person	Not a dangerous disease	Total
Young=(18 years to 40years)	Observed	56	12	68
	Expected	54.4	13.6	68.0
	%	82.4%	17.6%	100.0%
Middle Age (41yrs-60yrs)	Observed	38	11	49
	Expected	39.2	9.8	49.0
	%	77.6%	22.4%	100.0%
Older (Above 61yrs)	Observed	14	4	18
	Expected	14.4	3.6	18.0
	%	77.8%	22.2%	100.0%
Chi Square(χ^2) Test Result		$(\chi^2) = (DF-2, N=135^*), 0.475; P=0.78(P>.05)$		
Malaria Knowledge by community members in the study village				
ST- Binjhal	Observed	84	22	106
	Expected	84.8	21.2	106.0
	%	79.2%	20.8%	100.0%
Others	Observed	24	5	29
	Expected	23.2	5.8	29.0
	%	82.8%	17.2%	100.0%

Chi Square Test Result	$(\chi^2) = (DF-1, N=135^*), 0.176; P=0.67 (P>.05)$			
Malaria Knowledge of people as per their education				
Illiterate	Observed	45	16	61
	Expected	48.8	12.2	61.0
	%	73.8%	26.2%	100.0%
Literate up-to Primary schooling	Observed	29	4	33
	Expected	26.4	6.6	33.0
	%	87.9%	12.1%	100.0%
Literate above Primary Schooling	Observed	34	7	41
	Expected	32.8	8.2	41.0
	%	82.9%	17.1%	100.0%
Chi Square Test Result	$(\chi^2)_{0.05} = (DF-2, N=135^*); 2.979 P=0.22(P>.05)$			

*= 32 non-response cases.

In the findings it was shown that there was no significant difference in different age group population about Malaria as a killer disease perception ($P=0.78$). Further there was no statistically significant association found on the matter of perception of Tribal-Binjhal people and other community members living in the study area about their perception of disease Malaria as a killer disease ($P=0.67$).

The level of education and perception of the people as disease malaria a killer disease in the study area it was also not noticed that there was no significant difference ($P=0.22$) in disease perception among youth population (18 to 40 years age), middle aged population (41 to 60 years age) and old aged population (above 61 years age) in the study area. From this analysis it may be perceived that the community members as a whole are playing a very important role in transmission, treatment and prevention knowledge irrespective of their age and education level.

Discussion

The health seeking behavior of the tribe Binjhals in the study area as observed could be the results of their strong cultural belief as more respondents attributed bite of flies of small size responsible for Malaria (*Palli Jwaroo*). Perceptions of Binjhal tribe on usefulness of mosquito nets alone with a belief that it does not help much in controlling the incidence of *Palli Jwaroo* as they believe mosquitoes alone are not responsible for occurrence of this disease but there

are other factors namely drinking of stream water are also responsible. This type of perception of people may be attributed towards their irregular use of the mosquito net and adoption of other methods including consumption of herbal juice from local traditional healer (*Baidya*). As an immediate measure for prevention of disease the traditional healer provides local herbal mixture made from different medicinal plant leave namely Gangaseuli (*Nyctanthes arbor-tristis* i.e., Night-flowering Jasmine) (10gm) +Zinger (5gm)+black pepper (1.0gm)+ +Water (100ml)+ Honey (10gm) and equivalent amount of country liquor (*Mahuli*) to people and the patient for prevention and immediate cure and prevention." This medication has become very easily available and accessible to villagers.

Habits of villagers do have their perception that keeping country fowls inside their living room reduces the occurrence of *Palli jwaroo*. This was further observed from the observations of the respondents that sleeping inside the house where country fowls are kept; reduces the occurrence of malaria. This perception on other prevention methods of malaria in the village as found in the present study may not be in the line of observations of other studies. Hence besides people's habit of keeping country fowl inside their living room, need-based adequate supply of bed-net to each households, focusing awareness campaign by involving Women Self Help Group (SHGs) with clear message in local language/local dialect on regular use of bed-nets by all family members should be done as one of the personal protection measures to prevent mosquito bite and prevention of malaria. The local knowledge of people and the biomedical knowledge if synchronized properly could lead to adoption of appropriate health practices. In a study by Vijayakumar, et al. (2009) in a tribal belt of Odisha, the author highlighted that tribal people have their own way of treatment of disease and it embedded mostly with their socio-cultural and belief systems (Vijayakumar *et al.*, 2009). In this connection the participatory role as played by the traditional healer in treating malaria was highlighted by them in their study. So involving traditional healer in promoting different preventive measures namely use of bed-net, use of mosquito repellent and herbal medication practices for malaria prevention and control measures in endemic areas may be considered as very useful strategies. Comoro et al. (2003) in a Tanzanian village highlighted that villagers did not consider malaria as a serious health problem besides sufferings, unless they incurred huge expenses towards treatment (Comoro *et al.*, 2003). The observations of their study indicated that majority of the people are well aware about the fact that mosquito net prevents mosquito bite but few believe that it will prevent

malaria. In the present study, participant reported the culturally appropriate and environmental hygiene namely keeping country fowl inside their sleeping room to prevent croon sound and night bite of mosquitoes since long. Hence, though the cause of malaria among the respondents in the study area was not only due to mosquito bite but also for other reasons as believed by people.

Health intervention strategies including easily available services at village level influenced the people towards its use and less towards its non-use and accordingly the purpose of establishment of particular health service facilities in the area determined (Sabin et al., 2010). Similarly, in the present study, wearing full body covered clothes, sleeping inside room by women and children are perceived as safe though inside their sleeping room they are keeping country fowl not because of scarcity of space but it was a habit of people and their perception that croons of flies/mosquitoes are not noticed inside sleeping room! This type of observation shows how people perceived prevention of disease. A study by Njama et al.(2003) in Kampala city in Nigeria, Africa showed that 90% of care giver in the study area knew that mosquito causes malaria but they also indicated that drinking of un-boiled water and respiratory illness are also the reason of the cause of Malaria (Kassam *et al.*, 2015).

Since people in the study village are in the habit of keeping country fowl inside their living room and believe that fowls are not allowing mosquito to bite them inside living room at night, so use of mosquito net inside living room was not popular among people. Further people are not in favor of use of any insecticide spray inside living room or use of insecticide treated bed-net as supplied by the Government. So, use of insecticide treated bed-nets in the study village was found not popular among people (Panda *et al.*, 2019)

Conclusion

The observations of the present study revealed that the sleeping habits of people and practices prescribed by elders in the village emerged as an important preventive measure of malaria. The practice of sleeping inside room and allowing Fowls to stay inside their living room without any complain of hygienic aspect in the study area plays significant role of Fowls as a Mosquito repellent inside living room. This was because of zoophilic nature of mosquitoes. As per villagers' opinion, those who are sleeping outside are more prone to malaria fever than those who are sleeping inside living room. By seeing age old practice of people, one can conclude that malaria preventive measures are being adopted by people years together might have prevented them from sufferings of malaria. Further the role of Traditional Healers in treatment decision was found crucial as elder

members of family have always preferred to recommend advice from Healers at beginning. The roles of Traditional Healers are crucial in remote villages for their easy access and cheap treatment of malaria. Further, they are respected by villagers and they play a very important role in the socio-cultural belief of people. Further, the community may be sensitized regarding availability of malaria diagnosis and treatment facility services with the ASHA, Anganwadi Worker in village level. Similarly, the village level health worker should ensure availability of diagnostics kits and medicines at their disposal each moment so that the community members do not lose their faith on them. These important practices may be disseminated as a knowledge bank for repelling the malaria vector in an epidemiological prospective to protect public health, explore a range of habitual behavior and perceptions of people that would form a sound healthy environment for malaria disease prevention and control strategies.

Recommendations

Malaria is considered as a poor man's disease and no vaccine for prevention except available of effective medicines for cure only after detection of disease through biological test is available. The health care practices of people in terms of their daily habits as well as use of traditional knowledge for treatment of malaria is no doubt an effective tool which not only bring success in Malaria prevention but also effective in successful curb of disease in remote areas.

Limitation

This study was undertaken in a tribal dominated village in Balangir in KBK district of Odisha keeping in view of malaria cases, deaths, backwardness, varying topography and other unique socio-cultural practices of people, it cannot be a final representative of all the areas having high dominance of tribal population, higher education level, daily hygiene and unique socio-cultural behavior and practices of other tribes.

Conflict of Interest Statement

We declare that we have no conflict of interest.

Authors' Contributions

Epidemiology Division, ICMR (RMRC), Bhubaneswar, Odisha was designed the study. The first author was conducted data gathering work and all authors cross verified, analyzed and interpreted data and results. All authors have contributed in drafting and writing the manuscript.

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