

**Original article:**

## **Factors associated with refusal of Indoor Residual Spraying in a high endemic district of Assam**

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**Abstract:**

**Background:** Indoor Residual Spraying is an effective malaria control intervention. However, high refusal rates have been reported in many studies from different parts of the country. The objective of the study was to study the various factors associated with refusal of Indoor Residual Spraying (IRS) in the malaria endemic district of Assam.

**Materials and Methods:** This is a community based cross-sectional study carried out in the district of Karbi Anglong. A multistage sampling technique was applied to achieve a sample size of 320 households for the study. A predesigned, pretested interview schedule was used while interviewing the households and information on last spraying status was enquired.

**Results:** Out of the 320 households interviewed, spraying was done in 153(47.81%), in 124(38.75%) households spraying was refused and in 43(13.43%) households spraying was not done due to reasons other than refusal. The most common reason for refusal was lack of advanced spray information (85.48%), followed by bad smell (51.62%) and damage to silkworm (49.19%), damage to food grains (38.70%), discomfort (36.29%), damage to walls (25.80%) and presence of small children in the house (10.48%). Statistically significant association (p-value <0.05) was observed between silkworm rearing and refusal of DDT spraying. **Conclusion:** The study shows that there is lack of community preparation for indoor residual spraying activities. Hence effort must be made to motivate the community by the frontline workers before spraying.

**Key words:** Indoor Residual Spray, malaria, refusal rate.

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**Introduction:**

Indoor Residual Spray (IRS) for control of malaria is at present carried out in high risk areas ( $API \geq 2$ ) and is also the main method for control of epidemics. DDT is the insecticide of choice for IRS. However, in areas where the vector has shown resistance to DDT, the alternatives are malathion and synthetic pyrethroids. The objective of IRS as in the Strategic Action Plan is to at least cover 80% of the household in targeted high risk areas<sup>(1)</sup>. The Hinman Committee in 1960 evaluated the status of NMEP in India and reported that the spraying operations did not achieve the desired precision<sup>(2)</sup>. Various studies from time to time have reported high refusal rates even though DDT spraying is an

effective method in malaria control<sup>(3),(4),(5)</sup>.

Therefore, this study was carried out to study the various factors associated with refusal of Indoor Residual Spraying in the malaria endemic district.

**Materials and methods:**

The study carried out in the district of Karbi Anglong, a hill district of Assam which is highly endemic for malaria. It is the largest district in Assam and majority of the population are tribal. Resistance to chloroquine in India was first reported from the district<sup>(6)</sup>.

It is a community based cross-sectional study carried out from January to July 2015. DDT spraying coverage in the last round was found to be 52%. Considering 52% as prevalence and 11% of

the prevalence as relative error, with 95% confidence interval, a sample size of 305 was obtained on applying the formula,  $n = 4pq/L^2$ , which was rounded off to 320. A multistage sampling technique was done for selecting the households. The district of Karbi Anglong has eight (8) Block PHCs, out of which two blocks (2) were selected by simple random sampling. The list of high risk sub-centres (API>2) in these two blocks has been considered in the sampling frame. From each block, four (4) such subcentres were selected. Again from each subcentre, two (2) villages were selected by simple random sampling giving a total of 16 villages. From each village, twenty (20) households were selected. The first household was selected randomly and after that systematic random sampling was applied. Thus a total of 320 household were included in the study. Households that were found to be locked were visited twice and if on the second visit households were found to be locked then the adjacent house was taken. The head of the household or any adult responsible member was interviewed. Respondents residing for the last one year in the study area were included in the study. A predesigned, pretested interview schedule was used while interviewing the households and information regarding the spraying status of the last round was considered.

For determining the socio-economic status Revised Modified B.G.Prasad Scale 2014 was used. Classification of different types of houses by Pareek and Trivedi was considered for the study. Approval from the institutional ethics committee was obtained. The findings of the study were tabulated and presented as percentages. Chi-square test was applied while analysing qualitative variables.

**Results:**

Overall spraying was done in less than 50% of the households. In the remaining households it was either refused (38.75%) or not done (13.43%). In the households where spraying could not be done, locked houses due to lack of advanced spraying information was found to be the cause [Table 1].

Table 2 reveals different reasons cited for refusal of DDT spraying. Lack of advance spray information was reported by majority (85.48%) of the households. Significant number of households refused spraying due to bad smell (51.62%) and damage to silkworm (49.19%).

Table 3 shows DDT spraying status with certain variables. No significant association of spraying status with socio-economic status and type of house was observed. However significant association was observed between silkworm rearing and spraying status.

**Table 1: Distribution of respondents according to the DDT spraying status in the last one year**

Spraying Status	No. of respondents (%)
Spraying done	153 (47.81%)
Spraying not done	43 (13.43 %)
Spraying refused	124 (38.75%)

**Table 2: Distribution of respondents according to the reasons for refusal of DDT spraying.**

*Reasons for refusal	Number (%)
Bad smell	64 (51.62)
Damage to the walls	32 (25.80)
Damage to food grains	48 (38.70)
Small children in the house	13 (10.48)
Damage to silkworm	61 (49.19)
Discomfort	45 (36.29)
Not getting advanced information	106 (85.48)

Total (n=124)

\*multiple response

**Table 3: Relationship between different variables and spraying status:**

Variables	Spraying status		X <sup>2</sup>	p-value
	Spraying done (%)	Spraying refused (%)		
Socio-economic status			1.323	>0.05
Upper class	1 (50)	1 (50)		
Upper middle class	18 (60)	12 (40)		
Middle class	46 (55.42)	37 (44.58)		
Lower middle class	58 (57.42)	43 (42.58)		
Lower class	30 (49.18)	31 (50.82)		
Type of house			5.863	>0.05
Kutchha	43 (49.42)	44 (50.58)		
Pucca	25 (73.52)	9 (26.48)		
Semi-kutchha	55 (53.92)	47 (46.08)		
Semi-pucca	30 (55.55)	24 (44.45)		
Silkworm rearing practice			105.67	<0.05
No	122 (85.31)	21 (14.69)		
Yes	31 (23.13)	103 (76.87)		

**Discussion:**

According to Government of India guidelines, spraying coverage in high risk areas should be more than 80%<sup>(1)</sup>. However, the preset study clearly reflects deficiencies in the implementation of the programme activities which was evident from low spraying coverage. In a good number of households spraying was not done (13.43%) due to locked

houses and almost 85% of those who refused spraying revealed lack of spray information This could be addressed through advanced spray information to the community through the frontline workers. According to the programme guideline advanced spray information must be given to the community fifteen days before spraying which was found to be lacking in such a high risk area.

In the study, refusal to DDT spraying was found to be 38.75%. Similar observations were reported by Rajagopalan and Das (1990), in their study in tribal areas of Orissa<sup>(3)</sup> and by Prasad H in 2007 in his study in Assam<sup>(4)</sup>. However, in a study conducted in Gurgaon, Haryana refusal rate was not more than 10%.<sup>(7)</sup> and in a study conducted in Gujarat, the refusal rate was reported to be 21.9%<sup>(8)</sup>. This high rate of refusal could be due to lack of motivation of the community regarding DDT. Majority of the respondents refused spraying due to lack of advanced spraying information. This finding is found to be significant in context to policy guidelines which urges advanced spraying information within 15 days. This reflects lack of commitment of the frontline workers towards programme activities. Bad smell as a reason for refusal was cited by many authors which was in conformity with the present study. An important finding that was observed while interviewing the households was instead of spraying their houses, they ask for the DDT powder and use it with mud to mop their walls and floors.

The above study shows acceptance for spraying was more in the households without silkworm rearing practice (85.31%) than refusal (14.69%). A significant association was found between silkworm rearing practice and spraying acceptance. ( $\chi^2 = 105.67$ , p value < 0.05). Similar findings were reported by the In-depth Evaluation Committee (1985)<sup>(9)</sup>. Dutta and co-workers (1994) in their study in Boko PHC, Assam, also observed that many of tribal population did not allow spraying of DDT as they practiced rearing of silkworm in their houses<sup>(10)</sup>. More comprehensive information is required to have an in-depth idea. Lack of qualitative methods in the study is one important limiting factor.

**Conclusion:**

Lack of advanced spray information was the most common reason for refusal of DDT spraying. This simple information could help immensely in improving the malaria situation in the district. Motivation of the community by the frontline workers should also be strengthened with enhanced supervision. Effort should be made at all levels for adequate community preparation before spraying.

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