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Levels of Itns Use among the Jiggery and Tea Workers in the Prevention of Malaria in South Mugirango Sub -Count, Kisi, Kenya.

Masta Ondara Omwono[1], Justus Osano Osero[2], Alloys Sigar Stevn Orago[3], Taratisio Ndwiga[4], Rose Nyanchama Orure[5].

1. Department Of Public Health, Moi University, P.O.BOX 3900-30100 , Eldoret, Kenya.
2. Department Of Community Health, Kenyatta University, P.O.BOX 43844, Nairobi, Kenya.
3. Department Of Pathology, School Of Medicine, Kenyatta University, P.O. BOX 43844, Nairobi, Kenya.
4. Department Of Environmental Health, Moi University P.O. BOX 3900-30100, Eldoret, Kenya.
5. Department Of Health Services, Jomo Kenyatta University, P.O. Box 63000, Nairobi,Kenya.
Corresponding Author: Masta Ondara Omwono

Abstract:
Background; *More than half of respondents understudy aged between18-49 years are at risk of contracting malaria infection due improper use of ITNs at various levels in South Mugirango Sub County, Kisii , Kenya. This is due to the house structures in which the Jaggery and tea workers were living in. Published data on ITNs use among the Jaggery and tea workers at various levels in South Mugirango Sub County Kisii Kenya are limited. The purpose of this study is to establish the levels of ITNs use among the Jaggery and tea workers.* ***Methods;*** *A descriptive cross sectional study was used, where South Mugirango was purposively selected. The study systematically and randomly selected and interviewed 209 Jaggery and tea workers on ITNs use. Qualitative methods were used to investigate their levels of ITNs use.Data was collected by use of Structured Questionnaire, Focused Group Discussion and Key Informant Interviews to obtain views.* ***Results;*** *A total of 209 Jaggery and tea workers were selected and interviewed; 116 (56%) males and 93 (44%) females, about 37.80% were found living in semi-permanent structures, where by over 100% of non users were male aged between 18-28 years and single with no formal education. Also 64.7% by occupation were tea workers and among the non users of ITNs were found using them as tea carrying baskets to the tea buying centers. On house structures 94.1% of non users lived in grass thatched with 70.6% found living in one roomed house and this led to low use of ITNs and this was attributed to their level of income. There was a positive relationship between gender and education on ITNs use (P<0.001,) respectively. There was also significant relationship between cost, accessibility and house structure and ITNs use (P<0.0010) while age and marital status were not statistically significant.* ***Conclusion and recommendations;*** *the study concludes that various levels of house structures determines use of ITNs among the Jaggery and tea workers. Therefore the study recommends; (a) Policy review on housing so that the government can give subsidies to low income earners to improve their living conditions. (b) Intensive health awareness training to improve ITNs use at various levels with emphasis on proper use.*

Keywords: Insecticide Treated Nets, Infection, Malaria, Risk, House Structure, Cost

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I. Introduction

Most government of the world have advocated the use of ITNs at various levels especially in high endemic areas as the most important strategy in combating malaria infection whereby more than half of the population are at risk. High incidence and prevalence among the travelers and immigrants with low immunity have been recorded especially in Middle East, Asia and Latin America [1]. More than half of the world population was exposed to malaria with 240 million cases being confirmed with malaria infection [2].

Due to the repeated exposure, Sub-Sahara Africa is the worst hit with malaria infection. The mean protective efficacy by ITNs against malaria is approximately 50% in highly endemic areas of Africa .Overall, mortality have reduced by 63% in communities using impregnated nets [3]. Effective reduction and overall transmission of malaria morbidity and mortality in high endemic areas have been achieved through the intervention and proper use of ITNs at various levels. [4]. Insecticide treated nets have been advocated for as the most preventive tools against malaria infection especially in sub-Saharan Africa [5].

In Kenya malaria accounts for 30 percent of all outpatient cases with negative effects on other sectors of the national economy [6] One in every 20 deaths from malaria worldwide occurred in Kenya resulting into over 300,000 deaths in the year 2012 alone [7]. Therefore, the extent to which nets are owned leaves us with a lot of question whether nets are put to proper use at various levels.

Most of the people seeking outpatient services in Kisii Sub- Counties and County Referral Hospital suffer from malaria related infection [11]. Therefore most health facilities within the County continue to be recording high percentage of malaria cases. Thus there is concern as to whether free mosquito nets provided by the Ministry of Health [12] are put to proper use in areas with high incidences and prevalence in South Mugirango Sub- County, Kisii, Kenya.

Therefore this study seek to bridge this literature gap and provide information to spearhead the levels of ITNs use among the Jaggery and tea workers in the prevention of malaria in South Mugirango Kisii County, Kenya. Levels of ITNs use in the prevention of malaria will influence interventions aimed at decreasing morbidity and mortality among the Jaggery and tea workers. This study is use useful and will help policy makers and program planners to mobilize the appropriate needed resources to reduce malaria related morbidity and mortality to improve health.

II. Setting and Target Population

This was a community based cross sectional descriptive study. The quantitative and qualitative data was collected. The study area was in South Mugirango sub county Kisii, Kenya which yearly experiences high prevalence of highland malaria. The study population included both male and female Jaggery and tea workers aged 18-49 years at risk of contracting malaria infection.

The sample size was determined based on the prevalence of malaria which was 14.5% confirmed cases. The participants were systematically sampled from the list of KTDA and sugarcane out-grower workers. Desired sample size of 209 Jaggery and tea workers was obtained using predetermined interval. The selected subjects were interviewed on the use of ITNs in the prevention of malaria.

The inclusion criteria was those both male and female working in the sugarcane farms and tea estates for the last six months aged 18-49 years. The study excluded those who were mentally handicapped and not capable of verbally communicating and below 18 years of age. Quantitative data was collected through interviewer administered structured questions. Qualitative data was obtained from interview schedule and Focused Group Discussion and Key Informant. The questionnaire sought information on socio- demographic, perception and beliefs regarding ITNs use in the prevention of malaria.

Data collected was cleaned, coded and analyzed using SPSS version20 with 95%CI and statistical significance set at $p<0.05$.Chi –Squire was used to establish relationship on ITNs use. Ethical considerations was sought from Kenyatta University Ethical Review Committee and permit issued by (NACOSTI)-National Commission for Science, Technology and Innovation. Informed consent was also sought from the study participants and high level of confidentiality maintained during the period with guaranteed autonomy. The respondents were allowed to withdraw at their own will if wished to do so.

III. Results

3.1 Demographic and socio-economic characteristics of the Jaggery and tea workers

This study interviewed a total of 209 Jaggery and tea workers on levels of ITNs use in the prevention of malaria in South Mugirango Sub-County, Kisii county, Kenya and their data was the analyzed as shown in (*Table1*) below which details the demographics of the study population.

3.1.1 Gender of the Jaggery and tea workers

From *(Table1)* it was found out that there were more males 116 (56%) than females workers 93 (44%) in both the Jaggery and tea industry.

3.1.2 Age of the Jaggery and tea workers

The mean age of the respondents was 34 years with (SD) 6.2years and their range was 31years. Most of the Jaggery and tea workers *(Table 1)* were between the ages 29-39 years at 85 (41%) while those aged between 18-28 years were 69 (33%) with only 55 (26%) aged between 40-49 years.

3.1.3Marital status of the Jaggery and tea workers

On marital status *(Table 1)* it was found out that only 95(45%) were married with 42 (20%) being single while 29 (14%) were divorced with 23 (11%) being widowed and the rest 11(5%) having no response with a few 9 (4%) living together without any kind of formal arrangement.

3.1.4 Level of education of the Jaggery and tea workers

From their level of education *(Table 1)* the study revealed that about 88(42%) had secondary education with 62(30%) having attained college education while 29 (14%) had primary education with 16(7%) having vocational while 14(7%) had no formal education at all. This means that those without education were found to be the lowest users of ITNs.

3.1.5 Occupation of the Jaggery and tea workers

This study furthermore revealed that there were more tea workers 116 (56%) than the Jaggery workers 87 (42%) as it can be seen in *(Table 1)* below of demographic and socio-economic characteristics.

About 74 of 116 (18%)of the tea workers were found using the ITNs in carrying tea to the tea buying centers and the reasons was said that nets and netting material were portable and easy to carry compared with the baskets.

It was also found out that 42 (20%) of the Jaggery workers cited the reasons for non-use of ITNs as that they worked at night and used the ITNs in making Jaggery shades with the remains from sugarcane to protect them from adverse conditions like rain and hot sunshine during working hours.

Table 1 *Characteristics of the Jaggery and tea workers*

Variables	Frequency N	Percent
Gender		
Male	116	56
Female	93	44
Age		
18-28 years	69	33
29-39 years	85	41
40-49years	55	26
Marital status		
Single	42	20
Married	95	45
Widowed	23	11
Divorced	29	14
Living together	9	4
No response	11	5
Education level		
No Formal education	14	7
Primary	29	14
Secondary	88	42
College	62	30
Vocational training	16	7
Occupation		
Jaggery worker	87	42
Tea worker	116	56
Others	6	2

3.1.6 Level of Income per Household

Almost all the households accessed some income as it can be seen in (Figure1) below. Household income was found to be contributing factor to ITNs use among the Jaggery and tea workers. About 12.4% earned less than Kshs2500 while 13.4%earnedKshs2600-5100. Only 30.6% of the household earned between Kshs5200-7700,(62)29.7%earned Kshs7800-10300, 19(9%) earned Kshs10400-12900, with 10(4.9%)earned more than Kshs13000.

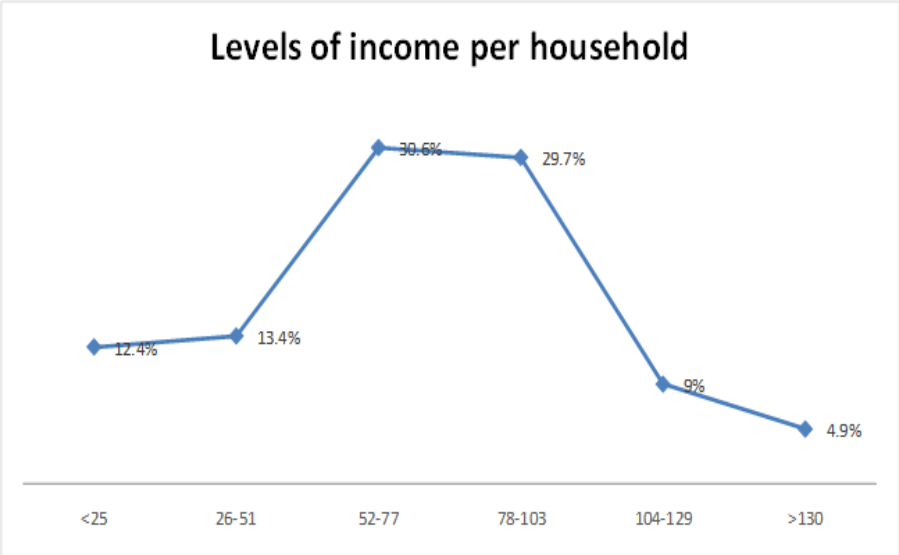

Figure 1: *House hold income level of the Jaggery and tea workers*

The average income per household was found to be Kshs77 ± 26.50. From FGDs it was revealed that workers in the Jaggery and tea industry earned very little to sustain them and have an extra to purchase ITNs at the expense of basic needs.

3.2.1 Levels of ITNs use among the Jaggery and tea workers

This study measured the level s of ITNs use by the type of house in which the Jaggery and tea workers lived as it can be seen in *(Table 2)* below.

Table 2 *Type of house, number of people sleeping in the house*

Type of house	Frequency	Percentage
Grass thatched	24	11.48
Mud	59	28.23
Semi-permanent	79	37.80
Permanent	47	22.49
Total	209	100.00

The above *(Table2)* show the type of house structure where the Jaggery and tea workers lived. The different kinds of household structures, number of rooms and number of people sleeping there may favor or deter the use of mosquito nets at various levels. Respondents were asked about the kind of household structure they stay in to establish on how these structures affected ITNs use. The majority 79 (37.80%) were living in semi-permanent houses and these were attributed from their level of income.

3.2.2 Number of rooms for the Jaggery and tea workers.

Level of ITNs use was also measured by the number of rooms they had to establish any sleeping arrangement made by Jaggery and tea workers.

Table 3 *Number of rooms and people sleeping in the house*

Number of rooms	Frequency	Percentage
One	43	20.57
Two	70	33.49
Three	47	22.49
Four	29	13.88
>Four	20	9.57
Total	209	100

It was noted in this study from (Table 3) above that 33.49% had two rooms with also 22.49% having three while 20.57%had one and 13.88% had four with 9.57% having more than four rooms. Therefore, it was revealed from this study that more of the Jaggery and tea workers lived in two rooms and these were attributed to their low level of income.

3.2.3 How often the Jaggery and tea workers slept under net

The respondents were asked on how often they slept under net to establish their consistency on the net use. Those who never and sometimes slept under the ITNs were due to fear of suffocation, irritation and dreams. About 61.8% of them reported having contracted malaria infection and frequently visited hospital for malaria treatment.

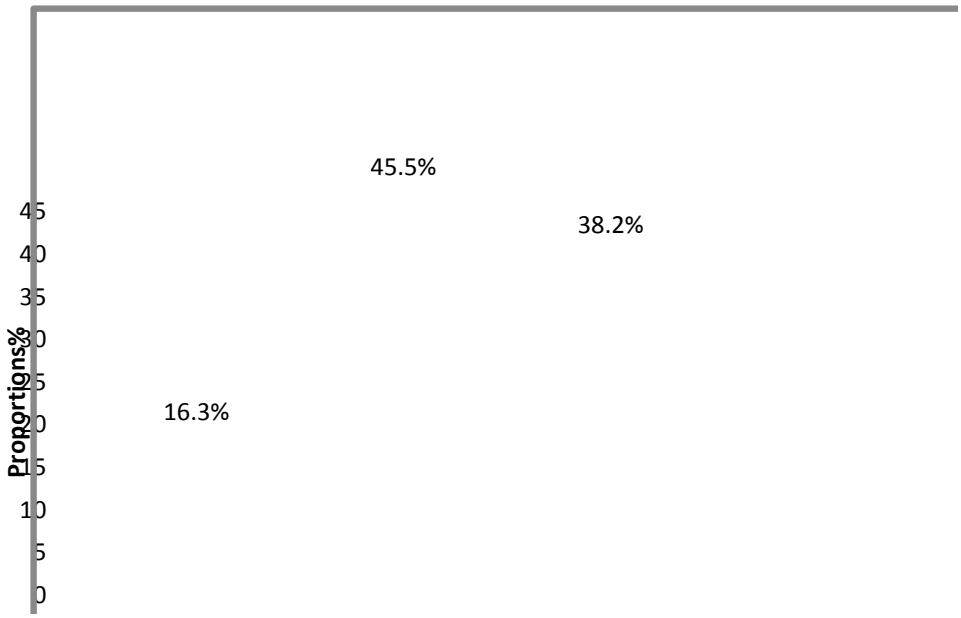

Figure: 2 *How often the Jaggery and tea workers slept under net*

The above *(Figure 2*) shows how often the respondents slept under ITN with 95(45.5%) said that they sometimes slept under the ITNs while79 (38.2%) said always with only (16.3%) said that they never used it. Among the (38.2%) who always slept under net did not report more hospital visitation for malaria treatment compared with (45.5%) and 34 (16.3%) who sometimes and never used net respectively. It was revealed that some of those who never slept under an ITN were found not having any kind of net in their household.

3.3.0 Factors that influenced use of ITNs at various levels

From this study it was revealed that various factors influenced the use of ITNs at various levels. These included; demographic and socio-economic factors and weather conditions

3.3.1 Demographic factors and ITNs use

Table 4 *Demographic factors and ITNs use*

Variables	ITN Use		$\times^{2Test}$ P-Value
	Yes n(%)	No n(%)	
Gender			<0.001
Male	99(51.6%)	17(100%)	
Female	93(48.4%)	0(0.0%)	
Age			0.131
18-28	52(27.1%)	17(100%)	
29-39	85(44.3%)	0(0.0%)	
40-49	55(28.6%)	0(0.0%)	
Marital status			0.362
Single	25(13%)	17(100%)	
Married	95(49.5%)	0(0.0%)	
Widowed	23(12.0%)	0(0.0%)	
Divorced	29(15.9%)	0(0.0%)	
Living together	9(4.7%)	0(0.0%)	
No response	11(5.7%)	0(0.0%)	
Education			
No Formal education	0(0.0%)	14(82.4%)	<0.001
Primary	26(13.5%)	3(17.6%)	

Secondary	88(45.5%)	0(0.0%)	
College	62(32.3%)	0(0.0%)	
Vocational training	16(8.3%)	0(0.0%)	
Occupation			0.003
Jagger worker	87(45.3%)	0(0.0%)	
Tea worker	105(54.7%)	11(64.7%)	
Others	0(0.0%)	6(35.3%)	

From the above *(Table 4)* 99(51.6%) of gender were male while 93 (48.4%) were female. Therefore, gender was found to play a great role and was statistically significant P< 0.001 among the ITNs users. Among the non- users of ITNs 17(100%) were also found to be males and were not having any in their households.

3.3.2 Economic factors versus ITNs use at various levels.

Table: 5 *Economic factors versus ITN use at various levels*

Variables	ITN Use		$\times^{2Test}$ P-Value
	Yes n(%)	No n(%)	
Cost			0.010
Cost high	144(75.0%)	17(100.0%)	
Cost low	48(25.0%)	0(0.0%)	
Accessibility			<0.001
Yes	192(100%)	0(0.0%)	
No	0(0.0%)	17(100%)	
House structure			<0.001
Grass thatched	8(4.2%)	16(94.1%)	
Mud	58(30.2%)	1(5.90%)	
Semi-permanent	79(41.1%)	0(0.0%)	
Permanent	47(24.5%)	0(0.0%)	
Number of rooms			0.521
One	31(16.1%)	12(70.6%)	
Two	64(34.9%)	4(23.5%)	
Three	45(23.4%)	1(5.9%)	
Four	29(15.1%)	0(0.0%)	
More than four	20(10.4%)	0(0.0%)	

This study indicated that there are other factors within the household that could influence or deter the use of ITNs and these included: cost, accessibility, house structure and the number of rooms. Therefore this study found out that enabling factors within the community such economic empowerment; access and availability determined ITNs use at the households levels. Similarly for ITNs to be effectively utilized within the household level, they must be readily affordable, accessible and available within the house structures.

3.3.3Weather conditions versus ITNs use at various levels

Table 6 *Weather conditions versus ITN use*

Variables	ITN Use		P-Value
	Yes n (%)	No n (%)	
Weather conditions			0.001
Yes(Cold)	173(90.1%)	2(11.8%)	
No (Hot)	19(9.9%)	15(88.2%)	

From the study it was found that also weather conditions were statistically significant with P<0.001 and ITNs use at household levels. It was also found that the 88.2% of non -users of ITNs cited weather condition as the reasons for not using at various levels of house structures and the respondents indicated that they caused suffocation, irritation and dreams. Among the users 19 (9.9%) who were found not using said that they do so when mosquitoes are plentiful but keep them away when there are no mosquitoes during the dry seasons.

3.4.0 Where the visitors slept

The visitors in most households altered the sleeping arrangements. The household owners preferred their visitors to sleep at various levels of their houses i.e servant quarters, visitor's room and sitting room as these places did not have any special arrangement for ITNs use.

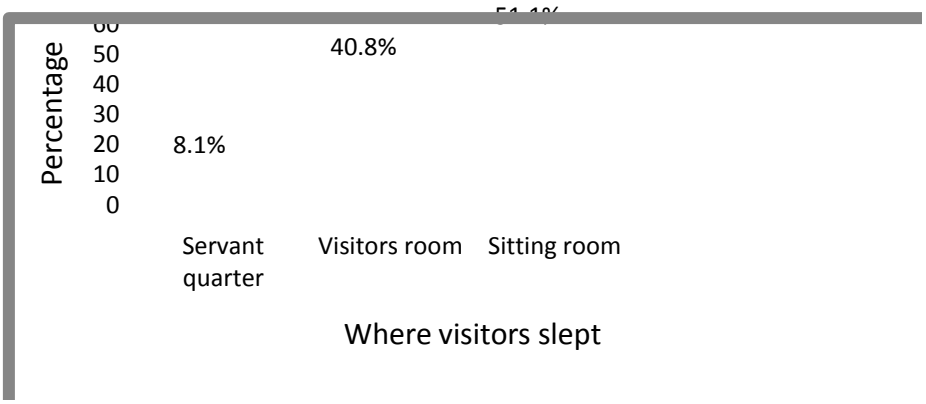

***Figure**: 4 where the visitors slept*

On where the visitors slept *(Figure 4)* above, the majority 107(51.1%) slept in the sitting room while 83(40.8%) and 17(8.1%) slept in visitors and servant quarters respectively. On those who slept in the sitting room (51.1%)there were no arrangement to use ITNs compared with (40.8 %) and(8.1%)in the visitors and servant quarters respectively were more likely to get an ITN net for use as such could be the arrangements in those rooms.

IV. Discussions

A total of 209 Jaggery and tea workers consented to be interviewed and were included in data analysis as it can be seen in *(Table1)* which details the socio-demographic of the study population. The mean age of the respondents was 34 years with (SD) = 6.2 years and ranged between18 and 49 years. Most of the workers 116 (56%) were males with 93 (44%) percent being females. It was revealed from this study that various levels determined the use of ITNs among the Jaggery and tea workers in south Mugirango Sub-County,Kisii Kenya. This factors includes; type of the house, house structure, number of occupants and number of rooms at various levels such as grass thatched, mud house, semi-permanent and permanent house.

From demographic and socio-economic characteristics the study revealed a low use of ITNs at various levels among the Jaggery and tea workers in the prevention of malaria. About 54.06% of the Jaggery and tea workers were living in both one and two rooms and this was attributed to their low level of income as can be seen in *(Table3)* above.

Gender was found to play a great role and was statistically significant with the (P< 0.001) among the ITNs users at various levels .Among the non- users of ITNs at various levels, 17 (100%) were also found to be male and were not having any in their households. Only age and marital status were found not to be statistically significant in this study. On marital status 95 (49.5%) who were married and were found to be among the users of ITNs while 17 (100%) of the singles were found to be non -users of ITNs in this study. On economic factors, this study concurred with a study done by Somi. MF 2007 *et al,* (2007) on social economic burdens who found out that there are other variables within household that could influence or deter the use of ITNs and these included: type of house, house structure and the number of rooms. Furthermore, for the ITNs to effectively used at various levels they must be readily affordable, accessible and available. This study was in contrast with Andersen et al 1968 behavioral model on the use of health services by families who found that levels of income is an attributing factor at various levels of use. This study concurred with one done by Alaii *et al,* (2003) who also found that low level of income among the users affected use of the ITNs at various levels in western Kenya. House structure was found to be statistically significant with ITNs use with (P<0.001) as 79 (41.1%) lived in semi- permanent structures. Although the awareness level has improved over time, studies by Osero *et al,* (2005) and Adeneye *et al.* (2007) have shown that a lot of factor militates against actual ownership and correct use of ITNs at various. Study on knowledge by Baume C, *et al,* (2007) indicated that ignorance on use of ITNs contributed to low use at various levels among the Jaggery and tea workers.

5.2 Conclusion

This study therefore, concludes that various levels of ITNs use are influenced by; type of house, house structure and number of rooms and number of people living there. The (88.2%) of non- users of ITNs is high number that is likely to contract malaria infection. About 94.1% of non- users were found living in the grass thatched house and this was attributed to their low level of income hence leading to low use of ITNs among the Jaggery and tea workers.

5.3 Recommendations

- The study recommends that there is need to investigate the factors that militate within various levels that led low use of ITNs in the different socioeconomic status.
- The county government should involve the low earners in income generating activities as this will empower Jaggery and tea workers to earn a living to improve their living conditions.

5.4 Recommendation For Further study

A study on the assessment of various levels should be designed to have a wider coverage in different socio-economic status to enhance Country wide representation.

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