

Residual Malaria Among Migrant Workers in Myanmar: Why Still Persistent and How to Eliminate?

Myat Htut Nyunt (✉ drmhnyunt@gmail.com)

Department of Medical Research <https://orcid.org/0000-0002-2026-8026>

Khin Myo Aye

Department of Medical Research

Shine Thura Naing

Department of Medical Research

Aye Su Mon

Department of Medical Research

Mi Mi Htwe

Department of Medical Research

Su Mon Win

Department of Medical Research

Wai Myat Thwe

Department of Medical Research

Aung Thi

National Malaria Control Program

Myat Phone Kyaw

Department of Medical Research

Research

Keywords: Residual malaria, pretested questionnaires, pre) elimination areas and identification of factors

Posted Date: November 4th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-100620/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

Residual malaria may be an important source for re-emerging of the malaria infection in the (pre)elimination era. Assessment of the residual-malaria in endemic areas as well as in (pre) elimination areas and identification of factors for residual malaria is needed to explore to support the evidence-based decision to the stakeholders and policymakers.

Methods

This study was conducted to explore the factors influencing the residual malaria infection among migrant workers in Myanmar by mixed-model method in two sentinel sites (one from pre-elimination areas and one from still endemic areas).

Results

A total of 102 migrant workers (65 in Bamauk and 37 in Shwegyin) were included in this study for quantitative assessment by using pretested questionnaires in household visits. Only 57.9% of the migrant in Shwegyin and 68.3% in Bmanuk were using the Long-lasting Insecticidal treated bed nets (LLINs) regularly although utilization of any bed net is high (91.0% in Shwegyin vs 79.9% in Bamauk). The mean of the number of the LLINs in their family was 2.89 (95%CI: 2.67-3.11) in Shwegyin and 1.64 (95%CI:1.48-1.81) in Bamauk. Unfortunately, their knowledge of the prevention of malaria was still low. Qualitative findings revealed that some of them reported no health information for malaria prevention was received in the last two years.

Conclusion

Strategy for distribution of LLINs for mobile/migrant populations should be reviewed and an appropriate action plan should be formulated. Health promotion activities for behavior change communication for malaria should be emphasized in the migrant population. Unlike the residence, an appropriate action plan should be considered for migrant groups, as some of the migrant groups are unable to be easily accessible by local health authorities nor village volunteers.

Background

Myanmar is now moving forward to malaria elimination by 2030 as the trend of malaria has been decreasing dramatically within the last decades. Within 2005-2015, malaria incidence in Myanmar was decreased by 81%, malaria mortality by 94%, and in-patient admission rate by 87%[1, 2]. However, 291 out of 330 townships were classified as malaria-endemic and 43.9 million peoples were living in these endemic areas causing 110,146 clinical cases and 21 deaths in 2016[1].

As the prevalence of malaria was observed, malaria elimination was initiated in Greater Mekong Sub-regions countries[3]. In Myanmar, a national strategic plan for intensifying malaria control and accelerating progress towards malaria elimination 2016-2020 is formulated and 5 Regions/States have been selected for the elimination of malaria since 2016 and another 5 Regions/States by 2019 will be followed by prevention of reintroduction of malaria in eliminated areas[1, 4].

However, residual malaria as well as an outbreak of the vivax infection in southern Myanmar was recently reported in 2018. This residual malaria may be an important source for re-emerging of the malaria infection in the pre-elimination era and there were many factors contributing to the cause of the residual malaria [1, 5, 6] (Figure 1). Assessment of this residual malaria in endemic areas as well as in (pre) elimination areas and identification on factors leading to residual malaria is needed to explore to support the evidence-based decision to the stakeholders and policymakers[7].

Methods

In this study, a cross-sectional descriptive study with analytical components using quantitative and qualitative approaches was used to explore the factors influencing residual malaria among migrant workers in Myanmar.

Data collection

In this study, two townships were selected to study. Shwegyin, Bago Region was previously malaria-endemic areas in the last decade but very few local cases were reported after 2017 leading to malaria elimination. Bamauk Township, Sagaing Region was one of the malaria high burden areas in Myanmar and as of 2018, it was included as one township of ten highest malaria morbidity townships in Myanmar. Although the reported malaria cases were different in these two townships, many migrant workers were working in both areas especially in gold-mines. Because of the nature of work, they were living in the deep forest and hard-to-reach areas, sometimes underground mines leading to an increased chance to expose malaria and inaccessibility to routine health care.

The quantitative data was collected during the household visit by using pretested semi-structured questionnaires to explore the situation, prevention, and control of malaria among the migrants. In each study site, three Focus group discussions (FGD) and five key informal interviews (KII) on local health authorities, community leaders, and migrant workers were conducted.

All of the quantitative data will be entered by using the SPSS software package. The analysis will be carried out using 95% CI, $p < 0.05$ will be accepted as significant. Qualitative data will be transcribed and analyzed across themes and sub-themes for triangulation with quantitative data.

Ethical consideration

All respondents were clearly informed on the nature and purpose of the study, private questions, and benefits to be deprived, the right to refuse to participate, or to withdrawal from the study, and confidential

handling of the data. Participation in this project was entirely voluntary. The interview was done in a comfortable place or respondent's home. Informed consent was taken from all participants. This project was obtained ethical clearance from the ethics review committee of the Department of Medical Research and register at Myanmar Health Research Registry with identifier PLRID-00107_V4.

Results

A total of 102 household visits were conducted in this study in which composed of 65 migrant families in Bamauk and 37 in Shwegyin. Most of them were working age group and male predominant (Table 1). Very few migrants were living with family while most were living with other migrants together at the temporary camp. More than one-third of the migrants in Bamauk, malaria controlled areas, and nearly one-fifth of the migrants in Shwegyin, malaria (pre)elimination areas, had a known history of malaria within five years. More than half of them agreed they have a risk of malaria (Table 1).

Among the health facilities, the most popular included drug sellers, quacks, rural health centers, and private clinic while malaria volunteers were not mentioned although nearly all nearby villages have the volunteer for diagnosis and treatment of malaria (Table 2). Although almost all families had the bed net, less than one-third in Bamauk and about 40 percent in Shwegyin used it regularly. Interestingly, most of them were unable to mention the benefits on the use of LLINs (Figure 2). The reasons for not utilization of the bed net included too hot inside the net, dislike to use, and nature of the work. More than one-third of the families complained that their nets had holes or damage. Only half of them used the bed net last night before the household survey (Table 2). Moreover, more than 30 percent in Bamauk and 15 percent in Shwegyin lacked knowledge on the benefit of the LLINs (Figure 2). Only 57.9% of the migrant in Shwegyin and 68.3% in Bmanuk were using the Long-lasting Insecticidal treated bed nets (LLINs) regularly although utilization of any bed net is high (91.0% in Shwegyin vs 79.9% in Bamauk). More than 80% (85.4% in Bamauk and 88.9% in Shwegyin) said that they did not receive any health education session or activity for the prevention of malaria within the last two years.

During household visits, misuse of the distributed LLINs was assessed. The use of the LLINs for animal farms, plant covers, and fence of the housing were noted in 4 households in Bamauk and 5 households in Shwegyin (Figure 3).

Qualitative findings

One of the migrant workers in gold-mine said

"We know that malaria is caused by the bite of mosquitoes and it can be prevented by insecticidal bed net. But I got this message while I was staying in my native town, not here. In this migrant site, no health care person comes and gives information about malaria"

At the same time, one man (38 yr old) said that

"In my previous place, there are many posters and bill-board on the side of the road. Here, there is no bill-board nor poster. It would be better to have a similar board near-by gold mine or our place so that we can know the information"

One of the local health staff pointed out that

"There is no specific budget allocation for behavior change communication (BCC) in this area. We have a very old vinyl poster presented at the front of the hospital. We need specific support for information, education, and communication (IEC) materials to improve the BCC of the migrants"

One migrant woman complied on the distribution and ownership of the LLINs as follows,

"We got no insecticide-treated net from local health centers here, but we have the bed nets that were carried from our previous place"

Local community leader explained the challenges of the health-related activities in their places as

"Migrants peoples are moving one place to another place without prior notice. Moreover, some are working 48 hours continuously in the underground mine, followed by 48 hours rest. So, it is difficult to meet and give proper health education"

Moreover, one worker said that

"We have received the nets, but we don't know what is it exactly. So, we used it at night, and become a red rash appeared on face and hand. We were afraid to use the net. Then, we do not use until now"

Discussion

Unlike the residence, the migrant/mobile population cannot be expected to stay in one specific area for a long-period especially for gold-mines workers who are ready to move to more convenient places and lived in the temporary camp. Because of the nature of the work and working conditions, the migrants were unable to use the bed net during the sleeping time[8]. Furthermore, their working sites were usually in the hard-to-reach areas where routine health care facilities were not easily accessible. Therefore, migrant workers were at high risk for malaria in the endemic areas[9]. Residual malaria among migrant workers may lead to sporadic cases as well as the outbreak in controlled or (pre)eliminated setting.

In this study, the two study sites, malaria controlled areas (Bamauk) and pre-elimination areas (Shwegyin) were included to explore the prevention of the disease residual malaria among migrant workers. Currently, no local cases were reported in Shwegyin, known history of malaria within the last five years was common among migrant workers while malaria-controlled areas, Bamauk showed a high percentage of the known history of malaria within five years[1]. However, the migrants in both sites had limited knowledge of the prevention of malaria. Although most of them had at least a bed net, they did not use regularly for many reasons in which included the nature of the working sites. Moreover, many

complained that they did not receive the distributed LLINs as well as health promotion activities. However, migrant and mobile populations were difficult on to focus to provide LLINs and health literacy. Moreover, some misuses of the distributed LLINs were noted and it were similar to the previous finding[10-12]. It may reflect their attitude and practice on the prevention of malaria by using LLINs.

Provision of LLINs and preventative measures for malaria in migrants is important as residual malaria may pose with them and amplify to the community, that may challenge the elimination target[13, 14]. Moreover, drug resistance in the clinical malaria cases among migrant workers alerts disease control and elimination in the region[15]. Unlike the residence, the migrants prone to get malaria in hard-to-reach areas where no routine health care facilities were unable to reach. Lacks adequate knowledge on the prevention of malaria including the benefits of using LLINs lead to the improper use of the bed net and unawareness of prevention of the malaria. Therefore, a specific strategy should be formulated to eliminate malaria among migrant populations.

Recommendation for policy implications

1. Strengthening surveillance and monitoring of malaria among the migrant workers should be encouraged.
2. Strategy for distribution of LLINs for mobile/migrant population should be reviewed and an appropriate action plan should be formulated.
3. Health promotion activities for behavior change communication for malaria should be emphasized in the migrant population.
4. IEC materials including vinyl sheets, posters, pamphlets should be distributed in migrant sites.
5. Appropriate action plan should be considered for migrant groups as some migrant groups are unable to be easily accessible the health care by local health authorities nor village volunteers.

Conclusions

Malaria infection among the migrant/mobile population is a hidden threat to achieving the elimination target by 2030. A specific strategy focusing on prevention and control of malaria in the migrant population should be emphasized.

Abbreviations

BCC: Behaviour change communication

CI: Confidence interval

FGD: Focus group discussion

IEC: Information, education and communication

LLINs: Long lasting insecticidal nets

Declarations

Authors' contributions

MHN, KMA, AT and MPK conceived and designed the study; MHN, KMA, AT, STN, ASM, MMH, SMW and WMT collected the data and data management; MHN, MPK and KMA analyzed the data and wrote the manuscript. All authors read and approved the final manuscript.

Acknowledgements

The authors would like to express their gratitude towards authorities from Department of Medical Research and Department of Public Health for allowing us to conduct this study. The authors also like to thanks participants in this study.

Competing interests

The authors declare that they have no competing interests.

Funding

This study was supported by the IROR Grant scheme of the Ministry of Health and Sports, Myanmar 2018-2019.

Author information

Affiliations

Department of Medical Research, Yangon, Republic of the Union of Myanmar

Myat Htut Nyunt, Khin Myo Aye, Shine Thura Naing, Aye Su Mon, Mi Mi Htwe, Su Mon Win, Wai Myat Thwe

National Malaria Control Program, Department of Public Health, Ministry of Health and Sports, Republic of the Union of Myanmar

Aung Thi

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

References

1. VBDC M: VBDC Report 2018. Nay Pyi Taw, Ministry of Health: Vector Borne Disease Control Program; 2019.
2. Mu TT, Sein AA, Kyi TT, Min M, Aung NM, Anstey NM, Kyaw MP, Soe C, Kyi MM, Hanson J: Malaria incidence in Myanmar 2005–2014: steady but fragile progress towards elimination. *Malar J.* 2016, 15:503.
3. WHO. Strategy for malaria elimination in the greater Mekong subregion (2015–2030). World Health Organization Regional Office for the Western Pacific; 2015.
4. National Malaria Control Programme: National Plan for Malaria Elimination in Myanmar 2016-2030. Nay-Pyi-Taw: Department of Public Health; 2017.
5. World Health Organization: World Malaria Report 2019. Geneva, Switzerland.
6. Killeen GF: Characterizing, controlling and eliminating residual malaria transmission. *Malar J.* 2014, 13:330.
7. Global Malaria Programme: Control of residual malaria parasite transmission_Guidance note – September 2014. 2014.
8. Nyunt MH, Aye KM, Kyaw MP, Kyaw TT, Hlaing T, Oo K: Challenges in universal coverage and utilization of insecticide-treated bed nets in migrant plantation workers in Myanmar. *Malar J.* 2014, 13.
9. Wai KT, Kyaw MP, Oo T, Zaw PT, Nyunt MH, Thida M, Kyaw TT: Spatial distribution, work patterns, and perception towards malaria interventions among temporary mobile/migrant workers in artemisinin resistance containment zone. *BMC Public Health*, 2014, 463.
10. Aung T, Wei C, McFarland W, Aung YK, Khin HS: Ownership and Use of Insecticide-Treated Nets among People Living in Malaria Endemic Areas of Eastern Myanmar. *PLoS One* 2016, 11:e0162292.
11. Nyunt MH, Aye KM, Kyaw MP, Kyaw TT, Hlaing T, Oo K, Zaw NN, Aye TT, San NA: Challenges in universal coverage and utilization of insecticide-treated bed nets in migrant plantation workers in Myanmar. *Malar J.* 2014, 211.
12. Nyunt MH, Aye KM, Kyaw MP, Wai KT, Oo T, Than A, Oo HW, Phway HP, Han SS, Htun T, San KK: Evaluation of the behaviour change communication and community mobilization activities in Myanmar artemisinin resistance containment zones. *Malar J* 2015, 14.
13. Soe HZ, Thi A, Aye NN: Socioeconomic and behavioural determinants of malaria among the migrants in gold mining, rubber and oil palm plantation areas in Myanmar. *Infect Dis Poverty* 2017, 6:142.
14. Lengeler C: Insecticide-treated bed nets and curtains for preventing malaria. *Cochrane Database Syst Rev* 2004, 2.
15. Nyunt MH, Wang B, Aye KM, Aye KH, Han J-H, Lee S-K: Molecular surveillance of artemisinin resistance *falciparum* malaria among migrant goldmine workers in Myanmar. *Malar J* 2017, 16.

Tables

Table 1. Demographic characteristics of the study population

Characters	Bamauk n=65 (%)	Shwegyin n=37 (%)	Total n=102 (%)
Age mean (SD)	34 (12.4)	38 (10.6)	36 (11.5)
Female Sex (%)	15 (23.1)	10 (27.0)	25 (24.5)
Family member Medium (95%CI)	1.5 (0.9-6.3)	1.3 (0.8-7.1)	1.4 (0.9-6.8)
Known history of malaria within 5 year	23 (35.4)	6 (16.2)	29 (28.4)
Perceived risk of malaria	35 (53.8)	25 (67.6)	70 (68.6)

Table 2. Behavior related to the prevention of malaria among the two migrant population

Category	Description	Bamauk n=65 (%)	Shwegyin n=37 (%)
First choice of health facilities for their family	Township Hospital	1 (1.5)	1 (2.7)
	RHC	19 (29.2)	3 (8.1)
	Private clinic	5 (7.7)	15 (40.5)
	Village Health Workers	2 (3.1)	3 (8.1)
	Drug seller	20 (30.8)	10 (27.0)
	Quacks	18 (27.7)	5 (13.5)
Prevented measures from mosquitoes bite	Utilization of LLIN	27 (41.5)	28 (75.7)
	Utilization of non-treated net	25 (38.5)	18 (48.6)
	Mosquitoes coil	20 (30.8)	11 (29.7)
	Spray	1 (1.5)	1 (2.7)
	Cream/lotion	1 (1.5)	0
Ownership of the bed net	No. of bed nets in family, mean (95% CI)	1.07 (0.96-1.17)	1.33 (1.17-1.49)
	No. of LLIN in family, mean (95% CI)	1.64 (1.48-1.81)	2.89 (2.67-3.11)
Utilization of bed net	Regular	22 (33.8)	15 (40.5)
	Irregular	17 (26.2)	11 (29.7)
	Never use	11 (16.9)	5 (13.5)
Reasons for not using the net	Don't like	18 (27.7)	12 (32.4)
	Too hot inside	15 (23.1)	11 (29.7)
	Because of the nature of work	10 (15.4)	5 (13.5)
	Presence of holes/damage of the currently using net	25 (38.5)	17 (45.9)
	Presence of extra-/unused bed net	5 (7.7)	7 (10.8)
Utilization of the bed net last night	Yes	35 (53.8)	19 (51.4)
	No	30(46.2)	18 (48.6)

Figures

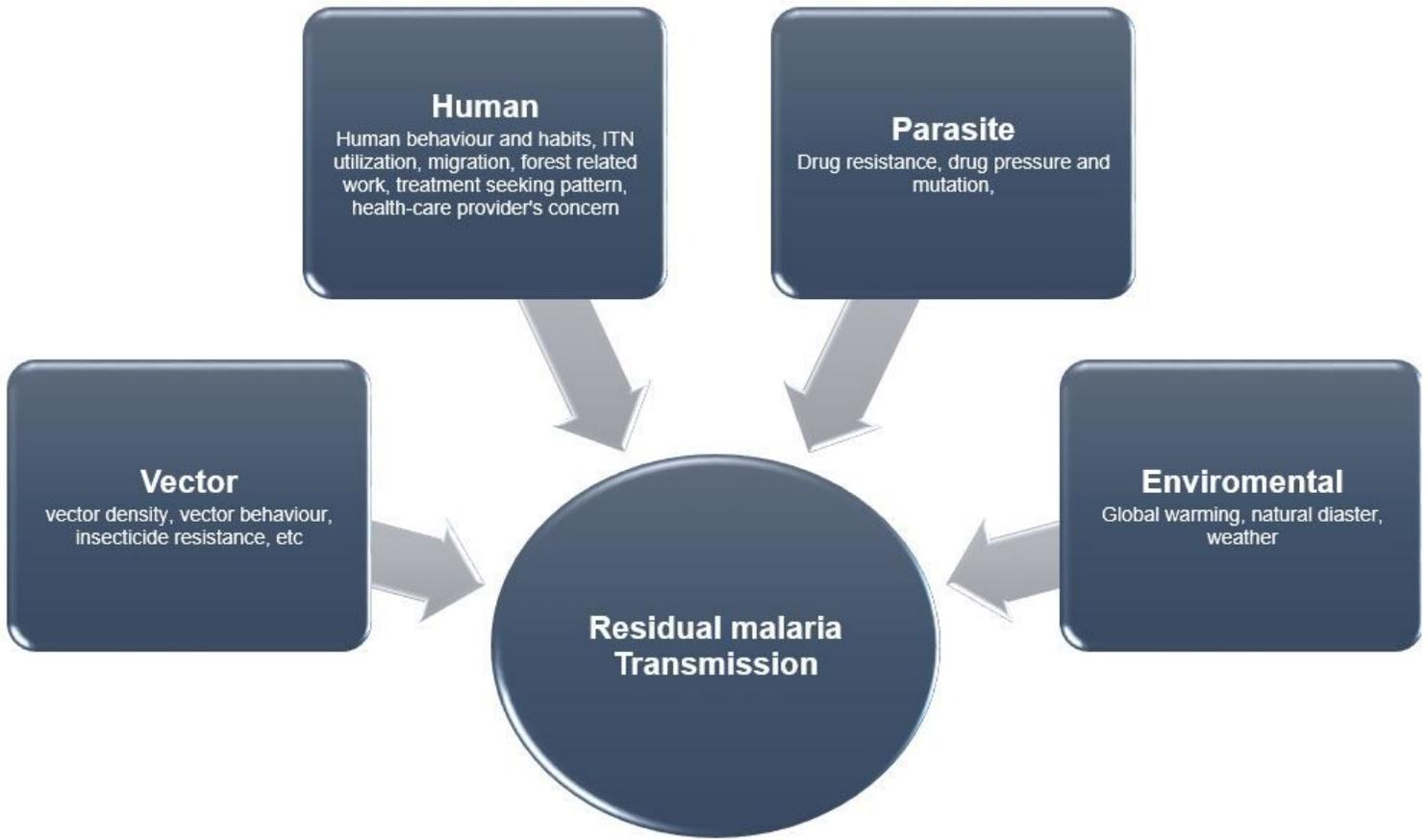


Figure 1

Conceptual framework of the study

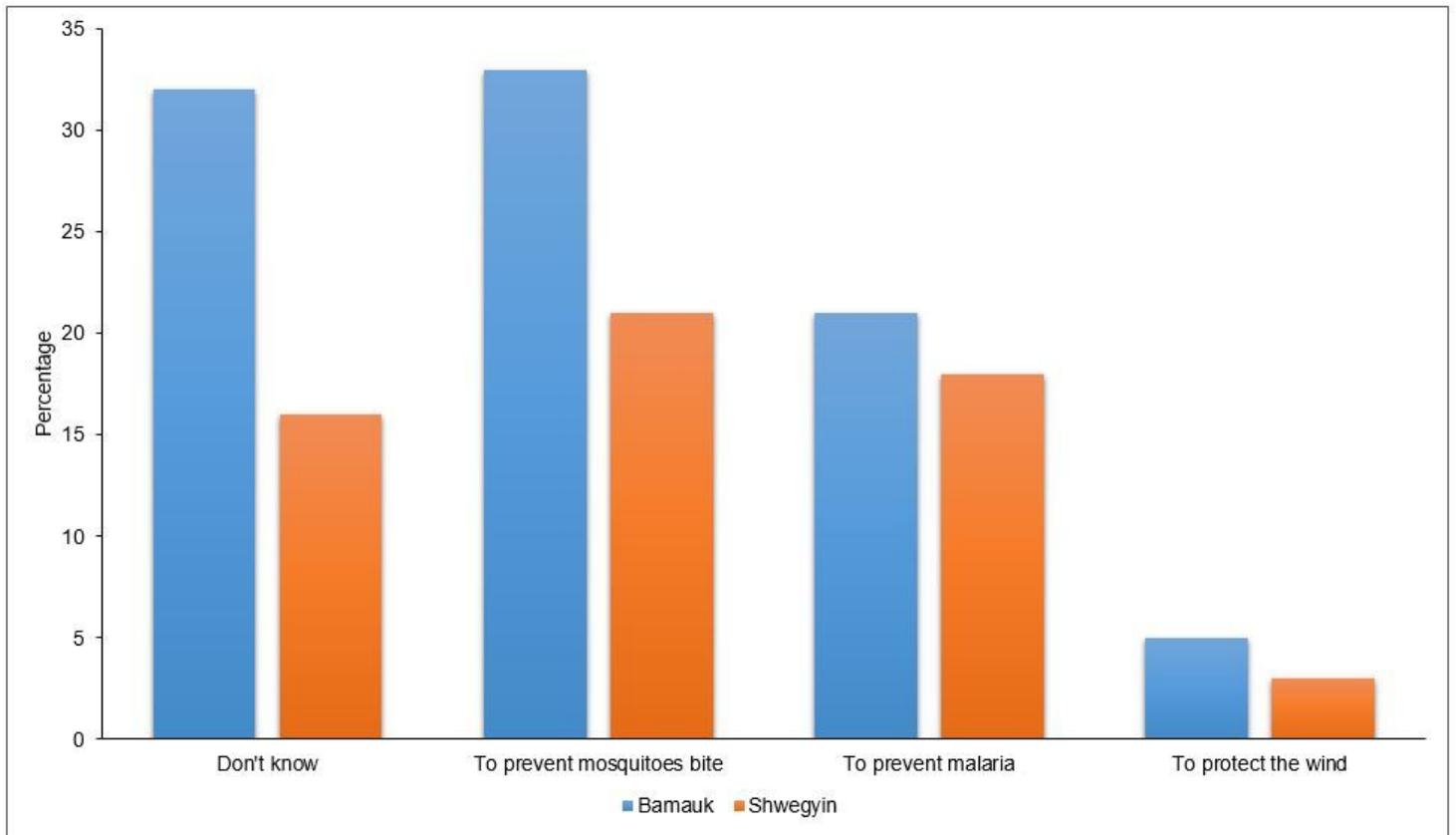


Figure 2

Knowledge on the benefits on use of LLINs among the migrant populations in two study sites



Figure 3

Misuses of the LLINs. (a) LLINs was installed under the housing for animals (b and c) LLINs were used for plant covering (d) fence of the housing covered by LLINs