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A Hang-Up and Behaviour Change Communication Campaign to Improve Bed Net Use: a Pilot Study from the Locality of Baré - Bakem in Cameroon

Campagne de communication pour l'accrochage et le changement de comportement visant à améliorer l'utilisation des moustiquaires : étude pilote réalisée à Baré - Bakem (Cameroun)

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ABSTRACT

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Background. In February 2019, the third mass distribution campaign of long-lasting insecticide-treated nets (LLINs) was launched in Cameroon and is very likely to take the country to a near universal coverage. However, this malaria control effort would become useless if these nets are not hung and used by their owners. We aim to report how a door-to-door hang-up and behaviour change communication (BCC) campaign could improve bed net use in a rural population of Baré in Cameroon. **Methods.** We conducted a four-day campaign comprised of a door-to-door hang up of unhung LLINs and a BCC on bed net use in April 2017 in the Peace Corps Volunteer Community of Baré. Sleeping under a bed net the previous night was used as the indicator for bed net use. A two-sample proportional test was used to determine the difference in bed net hang-up and use before and after the campaign. **Results.** A total of 6879 persons from 1414 households in all the 13 neighbourhoods and villages were reached by 26 volunteers. The number of LLINs still remaining one year after the distribution of 4255 LLINs was 2959 (70%) of which 1032 (35%) were still unhung. During the campaign, a total of 435 additional LLINs were hung up at a cost estimated at less than US\$1 per LLIN. The overall bed net hang-up rate rose from 65% (95% CI: 57% - 74%) before the campaign to 80% (95% CI: 71% - 89%) after the campaign ($p = 0.02$). Bed net use increased from 75% (95% CI: 65% - 86%) before the campaign to 92% (95% CI: 86% - 99%) after the campaign ($p = 0.009$). **Conclusion.** This small-scale dual intervention of LLIN hang up and BCC could be a useful tool to improve bed net use by scaling up bed net hang up. We recommend a more robust methodology applied on a larger population size to determine the effectiveness of this campaign.

RÉSUMÉ

Introduction. En février 2019, la troisième campagne de distribution de masse de Moustiquaires Imprégnées d'insecticide à Longue Durée d'Action (MILDA) a été lancée au Cameroun et devrait très probablement amener le pays à une couverture quasi universelle. Cependant, cet effort de lutte contre le paludisme deviendrait inutile si ces moustiquaires n'étaient pas installées et utilisées par leurs propriétaires. Notre objectif est de montrer comment une campagne de communication porte-à-porte et de changement de comportement (CCC) pourrait améliorer l'utilisation de la moustiquaire de lit dans une population rurale de Baré au Cameroun. **Matériels et méthodes.** Nous avons mené une campagne de quatre jours comprenant une pendaison de porte-à-porte pour des MILDA non accrochées et une CCC sur l'utilisation de la moustiquaire en avril 2017 dans la communauté des volontaires du Corps de la paix de Baré. Dormir sous une moustiquaire la nuit précédente a été utilisé comme indicateur de son utilisation. Un test proportionnel à deux échantillons a été utilisé pour déterminer la différence entre l'accrochage et l'utilisation de la moustiquaire avant et après la campagne. **Résultats.** Un total de 6879 personnes de 1414 ménages dans les 13 quartiers et villages ont été rejointes par 26 volontaires. Le nombre de MILDA restant encore un an après la distribution de 4255 MILDA était de 2959 (70%), dont 1032 (35%) n'étaient pas encore suspendues. Au cours de la campagne, 435 MILDA supplémentaires ont été suspendues à un coût estimé à moins de 1 USD par MILDA. Le taux global d'accrochage aux moustiquaires de lit est passé de 65% (IC 95%: 57% à 74%) avant la campagne à 80% (IC 95%: 71% à 89%) après la campagne ($p = 0,02$). L'utilisation des moustiquaires de lit a augmenté de 75% (IC 95%: 65% à 86%) avant la campagne à 92% (IC 95%: 86% à 99%) après la campagne ($p = 0,009$). **Conclusion.** Cette double intervention à petite échelle consistant à suspendre les MILDA et CCC pourrait être un outil utile pour améliorer l'utilisation de la moustiquaire en intensifiant l'accrochage. Nous recommandons une méthodologie plus rigoureuse, appliquée à une population plus importante afin de déterminer l'efficacité de cette campagne.

INTRODUCTION

Malaria is a life-threatening parasitic disease that remains a major public health problem in Cameroon where the entire population of more than 23 million inhabitants is at risk, with 71% living in high transmission areas[1]. In 2016, approximately 1.7 million malaria cases and 2637 deaths from malaria were recorded in health facilities in Cameroon. In children under five years of age, malaria was responsible for 41% of all case morbidity, 55% of hospital admissions and 69.7% of all malaria-attributed deaths in 2015. In pregnant women, malaria-related deaths were estimated at 0.17% [2]. The government of Cameroon and its health partners have adopted and implemented several intervention policies and strategies during the last two decades thanks to increasing funding from the Global Fund: free intermittent preventive treatment in pregnancy (IPTp) since 2004; scaling up the use of rapid diagnostic tests (RDT) in 2012, free treatment of uncomplicated malaria since 2011 and severe malaria since 2014 for the under-5s; reduction in the cost of artemisinin-based combination therapy (ACT) in health facilities to less than a dollar; community-based treatment of simple malaria and behaviour change communication for malaria prevention and seeking early treatment; chemoprophylaxis for seasonal malaria among children under five years of age living in the North and Far North Regions in 2016; indoor residual spraying since 2007; and more crucially the nationwide free distribution of over 8 million and 12 million long-lasting insecticide treated nets (LLINs) in 2011 and between 2015 and 2016 respectively to all age groups[1, 3-5]. As a result of these measures, malaria-related morbidity has reduced from 40.6% in 2008 to 23.6% in 2016 while malaria mortality has reduced from 17.6% in 2000 to 12.4% in 2016[2, 5, 6]. Though remarkable progress has been made so far, the country is still facing significant challenges to attain the objective of reducing the burden of malaria by 75% compared to the year 2000, as outlined in its 2014 – 2018 National Strategic Plan in the spirit of the Abuja Declaration and the then Millennium Development Goals[2].

Insecticide treated nets (ITNs) are the mainstay of malaria prevention efforts, particularly in sub-Saharan Africa where the use of ITNs has increased substantially over the last decade. However, major coverage gaps remain: in 2015, an estimated 47% of the population at risk of malaria did not sleep under a treated net[7]. Following the distribution of over 20 million LLINs, with over 14 million more LLINs expected to be distributed Cameroon is near universal distribution and ownership but the key challenge is to ensure that these nets are used effectively and consistently[8-11]. A national survey to evaluate bed net use in 2013 following the 2011 distribution of LLINs showed that bed net use was as low as 42.6%, with rural and poorest households being the hardest hit[12]. Eliminating malaria thus sounds unrealistic unless tools to bolster bed net use in Cameroon are developed and implemented.

Recognising the specific need to close the gap between LLIN ownership and use and to ultimately hasten progress

in reducing the burden of malaria, Peace Corps through its ‘Stomping Out Malaria in Africa Initiative’ is supporting communities in Cameroon to effectively fight malaria since 2011. The initiative is based on strategic partnerships, targeted mobilisation of resources, intelligent use of information technology and radically efficient use of seed funding. Here, we report a pilot study during which a combination of a post-campaign door-to-door hang-up of bed nets, and behaviour-change communication (BCC) interventions have been used by a Peace Corps volunteer community of Bare-Bakem to increase LLINs use. We hoped that by expanding these interventions in similar settings and beyond could significantly improve bed net use in the country.

METHODS

Intervention site and priority setting

The intervention was carried out in the rural town of Baré, the headquarters of Baré -Bakem municipality with a population of about 20000 inhabitants occupying a surface area of about 200km². Bare is situated at approximately 10 km from Nkongsamba (the divisional capital) and 120 km from the coastal city of Douala (the regional capital). It has about 13 neighbourhoods and villages namely *Bareko, Ebouth, Axe-Lourde, A, A bis, B, B bis, C, D, E, E bis, F and F bis*. The locality’s low elevation and its equatorial warm and wet climate are conducive for the multiplication of mosquitoes and eventually malaria endemicity. The town is host to a Peace Corps Volunteer (PCV) for the period between 2016 and 2018 with the mission to support efforts to fight infant and maternal mortality, malnutrition, malaria and HIV/AIDS. On average, across all health facilities in Baré, malaria makes up approximately 40% of all sicknesses reported in 2016. Cases of malaria can even represent up to 80% of all sicknesses during the wet season. A Community Needs Assessment (CNA) carried out in December 2016 and January 2017 prior to the intervention indicated that malaria was the number one health priority for the community. Of the 250 people that were interviewed, 84% claimed that malaria was Baré’s most important health problem. Despite the recognition that malaria is the community’s top health priority – only 34% of participants could correctly explain the mode of transmission of malaria. Without mentioning mosquitoes, many participants said malaria was caused by drinking dirty water, or by living in a dirty household. Malaria has a particularly devastating effect on children under the age of five, who make up 30% of all malaria cases in Baré. In addition, over 50% of consultations for children under five years old are confirmed cases of malaria. This is why a focus on malaria prevention and education is so critical in Baré. The bed net distribution campaign in 2015 successfully handed out 4255 bed nets to a recorded population of 7675 people according to the campaign data obtained from the health facility registers. Bed net ownership had attained and gone beyond the 1 LLIN for 2 persons ratio of 0.5. The government’s coverage goal of 1 bed net for every 2 people was achieved as confirmed by the CNA, where it was found that an average household had 6 people, and each household had an average of 3 bed nets. However, during distributions there was no hang up

phase and hardly any time for effective communication on behaviour change. Participants reported to have hung about 72% of their bed nets and 75% reported to have slept under a bed net the previous night, just below the 80. Some reasons for not using bed nets included the perception that bed nets are too hot to sleep under, bed nets are suffocating, eye irritating action of the insecticide, lack of knowledge or materials to hang up, the misconception that mosquitoes are absent in certain neighbourhoods, or that bed nets do not work. At the end of the CNA, it was clear that the bed net coverage had successfully reached the target of 1 net for every 2 people. We then needed to build upon this success and address the high morbidity levels from malaria by focusing on comprehensive malaria education and correct bed net utilisation. The hang up and BCC project was then conceived, developed and planned to be conducted between March and April 2017 corresponding to the onset of the rainy season, the period of intense malaria transmission.

The Hang-Up and Behaviour Change Communication Project

The project was divided into two main activities, a Bed Net Hang-Up Campaign and a BCC Malaria Mural. Both activities were trying to encourage bed net use by addressing the existing obstacles to correct utilisation. Permission to carry out the project was obtained from local administrative and health authorities and from Peace Corps Cameroon that equally approved the protocol. The project was funded by Peace Corps to the tune of about 500 US Dollars.

The Hang-Up Campaign had as objectives to assess current bed net ownership and utilisation levels, to help families correctly install their unhung bed nets; and to disseminate information around malaria transmission, prevention, and importance of seeking early treatment. Practically, it involved: social mobilisation, training of community volunteers and nets hang up phases. Social mobilisation using several communication channels were used: letters to traditional chiefs, daily radio announcements, visits and talks with local associations, a featured radio show, church announcements during services, and town criers. Key messages delivered focused on persuading community members to cooperate with CHW and allow them to access homes, educating them on symptoms of malaria and urging them to seek early treatment, on preventive measures essentially by sleeping under a bed net every night. CHW also had the chance to demonstrate how to install bed nets and how they can treat uncomplicated malaria at home using the 'test and treat' malaria kits made available by the government.

The training that lasted a whole day took place on the 19th April 2017 saw the participation of thirty volunteers including four supervisors and 26 volunteers (two from each of the 13 neighbourhoods and villages) to hang up bed nets. They were briefed on basic knowledge on malaria; goals and objectives of the campaign; campaign procedures; tips on effective inter-personal communication; community volunteerism; monitoring and supervision including problem resolution tips; and

demonstrations on data collection tools and on various bed net installation techniques using locally adapted tools.

The hang up campaign proper kicked off on 20th April 2017 and lasted four days. Each of the 13 teams of two members each received a bag stuffed with string, nails, data collection tools, malaria information memory aids, and chalk to mark each home to help supervisors keep track. From door-to-door, they inspected LLINs available in homes, hung-up the unattached ones, provided information relating to the fight against malaria; collected data relating to household demographics, LLINs available, LLIN already attached by household members, LLINs hung-up by CHW, and the number of fever events (as proxy for malaria episodes) in the last three months prior to the campaign. The supervisors were tracking the teams to ensure quality, correct errors and resolve issues relating to refusal among others. The data collected was then entered electronically into a Microsoft Excel® spreadsheet for analysis.

The BCC Malaria Mural was painted with a key message urging everyone to sleep under a LLIN every night and that '*malaria fever is hotter than a bed net*' (Figure 1).



Figure 1. The behaviour change communication malaria mural

A post-campaign survey identical to the CNA based on interviewing a sample of community members was carried out one month later to assess bed net usage based on the proportion sleeping under a LLIN the previous night.

Data analysis

Data analyses were performed using Stata version 14.2 (StataCorp. LP, College Station, United States of America) and Microsoft Excel 2016 (Microsoft Corporation, Redmond, USA). The data set was checked for logical inconsistencies, invalid codes, omissions and improbable data. Summary statistics were presented as proportions for categorical variables, as means and standard deviations for normally distributed continuous variables. The difference in the proportion of bed net use before and after the interventions was compared using the two-sample test of proportions. Unpaired t-test analyses were used to examine the difference in means before and after the campaign. A p-value below 0.05 was considered significant.

RESULTS

At the end of the four-day door-to-door campaign, 6879 persons from 1414 households in all the 13 communities were reached. The number of LLINs still remaining one

year after the distribution of 4255 LLINs was 2959 (70%) of which 1032 (35%) were yet to be hung (Table 1).

Table 1. Daily household census and bed net hang-up coverage

Date	Number of households visited	Number of persons living in the households	Number of LLINs owned by the households	Number of LLINs already hung up	Number of unhung LLINs	Number of additional LLINs hung up by CHW
20-Apr-17	289	1397	591	394	197	100
21-Apr-17	395	1891	827	529	298	136
22-Apr-17	423	2164	944	605	339	108
23-Apr-17	307	1427	597	399	198	91
Total	1414	6879	2959	1927	1032	435

The bed net to population ratio ranged from 0.36 to 0.51 with a mean of 0.43 ± 0.04 while the average number of LLINs per household was 2.09 ± 0.34 . Of these remaining nets, 1927 (65%) had already been installed

by their owners themselves, with hang up rates varying from 50% at the *Axe-lourde* neighbourhood to 93% at the *A bis* neighbourhood (Table 2).

Table 2. Household census, LLIN ownership before and after the interventions

Villages and neighbourhoods	Number of households visited	Number of persons living in the households	Number of LLINs owned by the households	Bed net ownership to population ratio	Proportion of all LLINs hung up before the campaign	Proportion of all LLINs hung up during the campaign	Proportion of all LLINs hung up after the campaign
A	169	820	380	0.46	0.49	0.10	0.59
A bis	111	510	215	0.42	0.93	0.07	0.99
Axe lourde	70	384	153	0.40	0.50	0.03	0.54
B	192	874	373	0.43	0.56	0.21	0.77
B bis	61	344	123	0.36	0.54	0.05	0.59
C	76	380	138	0.36	0.71	0.27	0.98
D	102	411	180	0.44	0.62	0.12	0.74
E	75	465	231	0.50	0.62	0.20	0.82
E bis	109	452	229	0.51	0.65	0.12	0.77
F	140	614	282	0.46	0.80	0.20	1.00
F bis	92	468	192	0.41	0.51	0.36	0.88
Bareko	116	686	272	0.40	0.76	0.09	0.86
Ebouth	101	471	191	0.41	0.83	0.05	0.88
Total	1414	6879	2959	0.43	0.65	0.15	0.80

Of the 65 persons interviewed at random during the CNA, 49 (75%) self-reported to have slept under a bed net the previous night. A total of 1489 febrile episodes were reported during the last three months prior to the campaign suggesting a malaria morbidity of approximately 22% between January 2017 and March 2017.

During the campaign, a total of 435 additional LLINs were installed by the volunteers thus raising the overall bed net hang-up rate from 65% (95% CI: 57% - 74%) to 80% (95% CI: 71% - 89%), with wide variations from one community to another (Figure 2).

The proportion of LLINs hung up attributable to the campaign was thus 15% (95% CI: 2% - 26%), $p = 0.02$ (Figure 3).

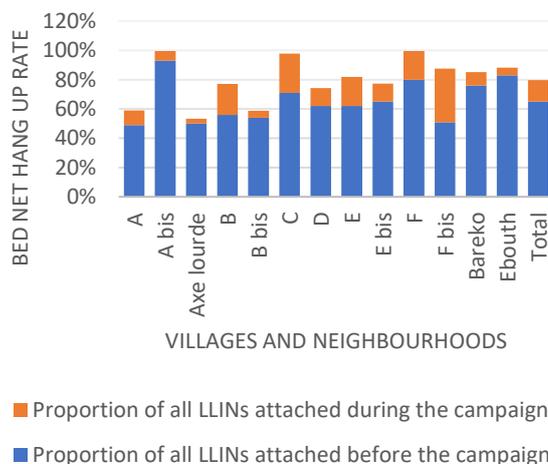


Figure 2: Bed net hang up rates before and after the campaign From a different sample of 65 persons interviewed a month after the campaign, 60 claimed to have slept under a bed net the previous night thus increasing bed net use

from 75% (95%CI: 65% - 86%) to 92% (95%CI: 86% - 99%). The improvement in bed net use attributable to both the hang up campaign and the behaviour change communication interventions was thus 17% (95%CI: 5% - 29%), $p = 0.009$ (Figure 3).

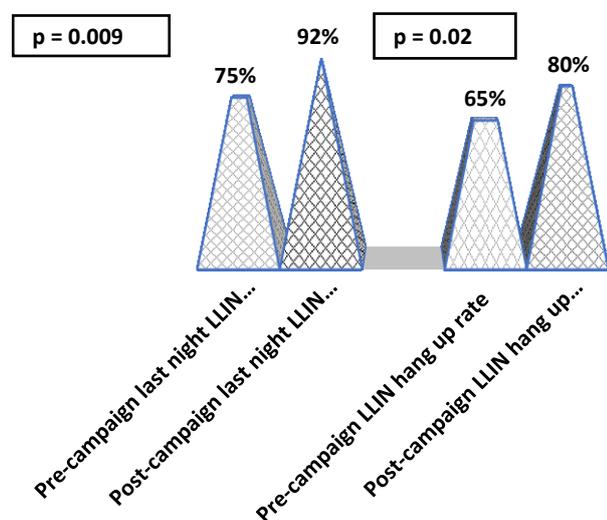


Figure 3. Bed net hang up and utilisation rates before and after the campaign

DISCUSSION

This pilot study has indicated that, a small-scale hang-up and behaviour change campaign might have improved bed net hang up by 15% and bed net use by 17% in the short term at a low cost using community volunteers.

Though gaps still exist within the country, the government of Cameroon has successfully made universal access to bed nets in the country through two free mass distribution campaigns of LLINs within the last five years. Yet, bed net use is still far from reaching a satisfactory and protective threshold necessary to significantly control malaria transmission. Hanging-up a bed net over a sleeping space is the strongest factor associated with bed net use and substantial efforts should be made to improve hang up rates [13]. Both mass distribution campaigns implemented in Cameroon had never been associated with any hang up intervention except for public demonstrations and mass communication messages. Similarly, most studies in Cameroon had focused on assessing bed net use and their determinants with just a few like The Knock Out Malaria mass media campaign had assessed the impact of an intervention to improve bed net use [8-11, 14, 15]. This study suggests that it is feasible to carry out a supplemental but cost-effective intervention to improve bed net use on a small scale in a poor and rural community. Rural and the poorest communities had been the worst affected by low bed net use [12]. Similar hang up campaigns have been successfully conducted by Peace Corps Volunteers in similar settings in Cameroon. The country can build on the successes of these small interventions as a pilot study for a subsequent implementation of a large scale LLIN hang up campaign to help improve bed net use. This will incur additional costs obviously but integration of a bed net distribution

with a hang up campaign would reduce such costs. The next bed net distribution campaign is unlikely to take place in the near future but opportunities to integrate bed net hang up are available such as the multiple door-to-door vaccination campaigns and the community-based ivermectin distribution against onchocerciasis that are implemented regularly in Cameroon. Countries using an integrated approach like Sierra Leone and Senegal have substantially and rapidly improved bed net possession and use [16-19].

Overall, this campaign had significantly improved bed net hang up over sleeping spaces in Baré but gaps still persist within and between the various communities as evidenced by the wide confidence interval around the effect estimate. The improvement was as low as 3% in the *Axe-Lourde* neighbourhood but was up to 36% in the *F bis* neighbourhood that had a similar hang up rate before the campaign. On average, each volunteer hung up approximately 17 LLINs but visited up to 54 households reaching 265 persons with BCC messages. The degree of improvement depended on the strengths of and challenges faced by the field team in their respective communities. The 13 field teams had a broad spectrum of differences between and within the teams in their age and gender composition; levels of education and training; degree of personal or group commitment; timing and duration of household visits; field or logistic challenges inherent to housing types, size of the community, availability of household members, number of unhung bed nets, satisfaction/dissatisfaction related to their current bed net coverage following the mass LLIN distribution, community perception and attitudes towards bed nets and issues related to protection of personal or home privacy, and the amount of support from their supervisors. The success of this campaign was rooted in the teams' long-term experiences and commitments to serve their communities as volunteers on a wide range of community development projects. The project managers also opted to work as volunteers in order to further reduce cost and to build a team with the spirit of equity, necessary for frank collaboration and effective team work. Eventually, each LLIN was hung up at a cost less than a dollar. The major challenges were related to the above mentioned structural and functional characteristics of households and communities as well as the short duration of the campaign and the caprices of bad weather conditions.

The increase in bed net use can objectively be linked above all to the proportionate increase in the bed net hang up rate observed because a net that is hung over a sleeping space is more likely and ready to be used by the owner for protection against mosquito bites than an unhung net that is liable for misuse. Hanging up a bed net determines its utility for malaria protection. We also believe that the BCC intervention also had an added value to the existing mass media campaigns because it targeted the major obstacle to bed net use as raised by the communities themselves. Its door-to-door and interactive nature further gave household members the opportunity to raise specific issues regarding bed nets. These issues were addressed with a more humane touch by the field teams and their supervisors or where necessary by the local health

authority who was actively involved at all stages of the project. However, the before and after intervention survey to determine last night bed use is merely subjective and was conducted on a limited number of respondents. Yet, the results obtained are plausible and coherent with those obtained by a cluster randomised control trial conducted in Togo in 2012[20]; and with a survey in Zambia in 2008 which suggested that campaigns and messages that persuade recipients to hang up their ITNs would contribute towards closing the gap between ownership and use[13]. There are also concerns that these results obtained in the short run may not be sustainable. To ensure sustainability:

- LLINs are required to be re-treated with insecticide after three years or be replaced altogether if physically damaged in order to improve ownership that has reduced to 70% one year after distribution, with less than a net for 2 persons (bed net to population ratio of 0.43 below the 0.5 target achieved during the distribution);
- More home visits are required to hang up the remaining unhung nets and because the effect on behaviour of a one-off visit will likely wane with time;
- The distribution should take into account not only household size (1 net for 2 people) but the number of sleeping spaces to ensure equity and not just equality. We have observed that large households with few sleeping spaces had many unused nets while small households with more sleeping spaces had insufficient bed net coverage.

The study did suffer from significant limitations: the sample size and approach used to assess bed net use was not adequate and thus we could not demonstrate with a high degree of confidence that bed net use did actually increase. While the bed net hang-up campaign did reach all households, exposure to the BCC mural was not exhaustive and was not independently measured.

CONCLUSION

Thanks to the door-to-door hang up and BCC interventions, the proportion of bed net hung over sleeping spaces has increased in the locality of Bare and might have indirectly improved bed net use necessary for malaria control. However, these interventions may require periodic and sustainable implementation to achieve a long-term impact. We recommend a more robust methodology and the expansion of this campaign to a larger population to demonstrate effectiveness in improving bed net use.

What is already known on this topic

- Insecticide treated nets (ITNs) are the mainstay of malaria prevention efforts, particularly in sub-Saharan Africa
- Bed net ownership has increased substantially over the last decade in Cameroon through free distribution campaigns but
- There is gap between bed net ownership and use in Cameroon.

What this study adds

- A hang up campaign is feasible and can increase bed net coverage over sleeping spaces.

- Bed net use can be improved indirectly after improving bed net hang up rates.

DECLARATIONS

Ethics approval and consent to participate

The campaign was approved by Peace Corps Cameroon and local administrative and health authorities. Verbal consent was obtained from household members after making public announcements and providing an information leaflets to explain the objectives of the campaign. No individual person's data was collected.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Conception and design: TDW, CEB, PN, SN

Data collection, analysis and interpretation: TDW, CEB

Drafting the manuscript: CEB

All authors read and approved the final manuscript

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REFERENCES

1. **Cameroon Malaria Profile in 2015** [http://www.who.int/malaria/publications/country-profiles/profile_cmr_en.pdf?ua=1]
2. UNICEF: **En finir avec le paludisme pour de bon** *Nous sommes une génération qui peut éliminer le paludisme*. Yaounde: United Nations Children Fund; 2017.
3. MINSANTE: **Note d'Information 2eme Campagne Nationale de Distribution Gratuite de 12 350 000 de MILDA**. Yaounde: Ministère de la Sante Publique du Cameroun; 2016.
4. MINSANTE: **Note d'Information sur la Campagne de Masse et de Distribution Gratuite de 2 310 829 MILDA dans la Region du Centre**. Yaounde: Ministère de la Sante Publique du Cameroun; 2016.
5. MINSANTE: **La cérémonie officielle de commémoration de la 10ème Journée Mondiale de lutte contre le paludisme**. pp. 2. Yaounde: Ministère de la Sante Publique du Cameroun; 2017:2.
6. WHO: **Country Brief Malaria In Cameroon**. Geneva2013.
7. WHO: **World Malaria Day 2017: Malaria Prevention Works, Lets Close the Gap**. pp. 28. Geneva2017:28.
8. Ntonifor NH, Veyufambom S: **Assessing the effective use of mosquito nets in the prevention of malaria in some parts of Mezam division, Northwest Region Cameroon**. *Malar J* 2016, **15**:390.

9. Apinjoh TO, Anchang-Kimbi JK, Mugri RN, Tangoh DA, Nyingchu RV, Chi HF, Tata RB, Njumkeng C, Njua-Yafi C, Achidi EA: **The effect of Insecticide Treated Nets (ITNs) on Plasmodium falciparum infection in rural and semi-urban communities in the south west region of Cameroon.** *PLoS One* 2015, **10**:e0116300.
10. Fokam EB, Dzi KT, Ngimuh L, Enyong P: **The Effect of Long Lasting Insecticide Bed Net Use on Malaria Prevalence in the Tombel Health District, South West Region-Cameroon.** *Malar Res Treat* 2016, **2016**:3216017.
11. Tchinda VH, Socpa A, Keundo AA, Zeukeng F, Seumen CT, Leke RG, Moyou RS: **Factors associated to bed net use in Cameroon: a retrospective study in Mfou health district in the Centre Region.** *Pan Afr Med J* 2012, **12**:112.
12. InstitutNationaldeStatistiques: **Enquete Post Campagne sur l'Utilisation des Moustiquaires Impregnees d'Insecticide a Longue Duree d'Action.** Yaounde2013.
13. Macintyre K, Littrell M, Keating J, Hamainza B, Miller J, Eisele TP: **Determinants of hanging and use of ITNs in the context of near universal coverage in Zambia.** *Health Policy Plan* 2012, **27**:316-325.
14. Bowen HL: **Impact of a mass media campaign on bed net use in Cameroon.** *Malar J* 2013, **12**:36.
15. Kimbi HK, Nkesa SB, Ndamukong-Nyanga JL, Sumbele IU, Atashili J, Atanga MB: **Socio-demographic factors influencing the ownership and utilization of insecticide-treated bed nets among malaria vulnerable groups in the Buea Health District, Cameroon.** *BMC Res Notes* 2014, **7**:624.
16. Adam Bennett , Samuel Juana Smith, Sahr Yambasu, Amara Jambai, Wondimagegnehu Alemu, Augustin Kabano, Eisele TP: **Household Possession and Use of Insecticide-Treated Mosquito Nets in Sierra Leone 6 Months after a National Mass-Distribution Campaign.** *PLoS ONE* 2012, **7**:e37927.
17. Thwing JI, Perry RT, Townes DA, Diouf MB, Ndiaye S, Thior M: **Success of Senegal's first nationwide distribution of long-lasting insecticide-treated nets to children under five - contribution toward universal coverage.** *Malar J* 2011, **10**:86.
18. Grabowsky M, Farrell N, Hawley W, Chimumbwa J, Hoyer S, Wolkon A, Selanikio J: **Integrating insecticide-treated bednets into a measles vaccination campaign achieves high, rapid and equitable coverage with direct and voucher-based methods.** *Trop Med Int Health* 2005, **10**:1151-1160.
19. Grabowsky M, Nobiya T, Selanikio J: **Sustained high coverage of insecticide-treated bednets through combined Catch-up and Keep-up strategies.** *Trop Med Int Health* 2007, **12**:815-822.
20. Desrochers RE, Siekmans K, Berti PR, Bramhill K, Buchan SA, Battah GK, Gbetoglo D, Vignikin K, Sabino A: **Effectiveness of post-campaign, door-to-door, hang-up, and communication interventions to increase long-lasting, insecticidal bed net utilization in Togo (2011-2012): a cluster randomized, control trial.** *Malar J* 2014, **13**:260.