Community Perceptions on Different Delivery Mechanisms for Insecticide-Treated Bed Nets in Rural Burkina Faso

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Abstract: ***Background:*** This study aims to describe the community perceptions regarding an insecticide-treated bed net (ITN) programme in Burkina Faso, where communities were randomised to either ITN social marketing combined with free ITN distribution through antenatal care services (intervention A) or ITN social marketing only (intervention B).

Methods: For this descriptive qualitative study data were collected through a total of 20 focus group discussions (FGD), 10 FGD with women and men respectively. FGD were conducted in 8 purposefully selected villages of the study area and in Nouna town.

Findings: The ITN free distribution was well known to and highly appreciated in the intervention area A. Awareness of the ITN social marketing distribution was however low in both intervention areas, except in the urban part (Nouna town) of intervention area B. Women were reported to be able to purchase ITNs independent of their husbands. Poverty and frequent unavailability of ITN for purchase were the main barriers for ITN ownership. ITN information was mainly received through personal communication with health workers and through radio messages.

Conclusion: While the free ITN distribution was highly appreciated by the population, the social marketing approach alone appeared not be sufficient to reach the goal of high ITN coverage, mainly due to prevailing poverty and the insufficient availability of ITN for purchase.

INTRODUCTION

Malaria remains among the leading causes of morbidity and mortality in large areas of the world with most of the illnesses and deaths occurring among young children in sub-Saharan Africa (SSA) [1]. Malaria control is generally based on the combined application of preventive and therapeutic interventions including the use of insecticide-treated bed nets (ITN).

ITN were consistently demonstrated to be very effective in the reduction of malaria-related morbidity and mortality in SSA and are now one of the main malaria control tools recommended by the World Health Organisation (WHO) [2-3]. The progress in the roll-out of ITN programmes in SSA, however, has been and remains slow [4-6]. Therefore, research on sustainable strategies for scaling up ITN coverage in SSA has to be considered a public health priority.

In the international debate two approaches – often seen as incompatible – were competing with each other. The first group argued to consider ITN as a public good like vaccines and to consequently provide them through the public sector free of charge [7-8]. The second group argued for strengthening commercial markets but acknowledged the importance of subsidies for the groups most at risk, i.e. pregnant women and young children [9]. More recently, a broader agreement is emerging amongst the malariologists and policy makers to consider the different approaches for ITN distribution as complementary rather than opponent [10-12].

This study aims to describe community perceptions on different ITN interventions which were implemented in one province of north-western Burkina Faso.

METHODS

Study Area

The study took place in the Kossi province, which is located in northwestern Burkina Faso, approximately 300 km from the capital Ouagadougou. The Kossi province is identical to the Nouna Health District (NHD), which has a population of 312.807 living in some 300 villages and Nouna town [13]. At the time of the beginning of the study, the governmental health facilities of NHD comprised of 24 village-based health centers and one district hospital in Nouna town [6]. People living in this savannah area are from different ethnic groups, mainly working as subsistence farmers. Malaria is highly endemic, but also highly seasonal in the study area. Most malaria transmission takes place during and shortly after the rainy season which usually lasts from June until October [14].

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ITN Interventions in the Study Area

This study was embedded in a community-based cluster-randomised controlled trial (trial registration: Current Controlled Trials Ltd. ISRCTN07985309) where 24 health facilities and their catchment areas were randomised to intervention A (social marketing of ITNs to the general population plus free distribution of ITN to pregnant women attending ANC services) and intervention B (only social marketing of ITN to the general population). Village allocation to respective interventions took place by public lottery in a public meeting conducted in Nouna town before the trial, to which representatives from all communities of NHD were invited. Nouna town was however predefined to intervention B. The primary outcome of the trial is ITN coverage in households – measured through annual household surveys. For further details on this trial see Mueller et al. 2008 [15].

The social marketing intervention was implemented by Population Services International (PSI), a non-governmental organisation (NGO). PSI has run ITN social marketing campaigns in various regions of Burkina Faso since 2002, which was however based on limited distribution of subsidised ITN in the big cities and some rural districts through wholesalers. The ITN which is used by PSI in Burkina Faso has got the brand name *Serena*, and is a WHO-approved long-lasting ITN (PermaNet, Vestergaard-Frandsen, Danmark) usually sold as a white family-size rectangular net.

During the rainy season of the year 2006, PSI had identified an appropriate wholesaler in Nouna town who was supplied with 15.000 *Serena* ITNs for distribution in the NHD. In a specific promotion campaign conducted by PSI staff in August 2006, a large number of villages in NHD were visited to identify shopkeepers who were willing to participate in the ITN distribution. Shops willing to sell ITN were referred to the specific wholesaler in Nouna town to refill their stocks. To promote *Serena* among the population and to reach the goal of increasing ownership and utilisation of ITN among the population of NHD, PSI had developed and implemented specific information, education and communication (IEC) materials such as mass sensitisation, local radio spots and posters, in addition to its already existing national radio and TV messages. The subsidised prize per *Serena* ITN in NHD was 1.500 FCFA (Franc Communauté Financière d'Afrique; 1 Euro = 650 FCFA).

In the areas of intervention A, social marketing of the *Serena* ITN was accompanied by free distribution of *Serena* ITNs to pregnant women via ANC services in existing governmental health centres. The nurses of the health centres were provided with an initial stock of *Serena* ITN at the beginning of the intervention and could refill their stock regularly at the head office of the District Health Team in Nouna town.

Study Design, Objectives and Procedures

This descriptive qualitative study aimed to explore: (1) whether the population in the different study areas was aware of the social marketing campaign and the ANC intervention; (2) how these interventions were perceived by the population; and (3) whether the two interventions had played a role on knowledge and use of ITN.

Fieldwork was conducted in cooperation with the *Centre de Recherche en Santé de Nouna* (CRSN), a governmental research institute situated in Nouna town.

A total of 20 focus group discussions (FGD) were conducted over a period of seven weeks during May - July 2007. Eight study villages were purposefully selected taking into account the criteria (1) trial study group, (2) distance to Nouna town, as this could influence sales since the wholesaler was located in Nouna town and (3) presence of a village-based health centre, as this could influence access to information on ITN (Fig. **1**). In each village, two FGD were held, one with women and one with men. Pregnant women and young children are high risk groups for malaria. Men are generally regarded as the decision makers in the households. We therefore chose the inclusion criteria for participants to be having an infant or being currently pregnant (women) and having an infant or a wife which is currently pregnant (men). Furthermore, four FGD were conducted in Nouna town, two with women and two with men.

The first author drafted the interview guide and discussed it with the second and third author at various stages of its development. Four interviewers with previous experience in qualitative data collection were selected from the CRSN staff. As the rural population in Burkina Faso rarely speaks French, the interviewers facilitated the FGD in Dioula, the local lingua franca. A two day workshop was conducted to train the interviewers on the specificities of the study. During this workshop, the interview guide was intensively discussed among all members and translated into Dioula. The communities were informed prior to the scheduled date of the FGD and the village head was then in charge of finding 8 to 12 people fitting the selection criteria and willing to take part in the study.

Each FGD was held by two interviewers, one moderator and one note taker, in the presence of the principal investigator (CB). The FGD were tape recorded with permission of the participants and later verbatim transcribed and translated into French by the interviewers. The following topics were discussed: 1) knowledge of bed nets and ITN; 2) their mechanism/mode of action; 3) details of the social marketing campaign; and 4) details of the free distribution of ITN through ANC services.

DATA ANALYSIS

Data were analysed by the first author through content analysis using software AtlasTi 5.2 [16]. The data material was coded using an initial set of codes developed on the basis of the interview guide and complemented while progressing through the material with additional codes as information emerged from the data.

ETHICAL ASPECTS

Approval for the ITN trial in which this study was embedded was obtained by the Ethics Committee of the Heidelberg University Medical School and the local Ethics Committee in Burkina Faso (i.e. the institutional review board of the CRSN).

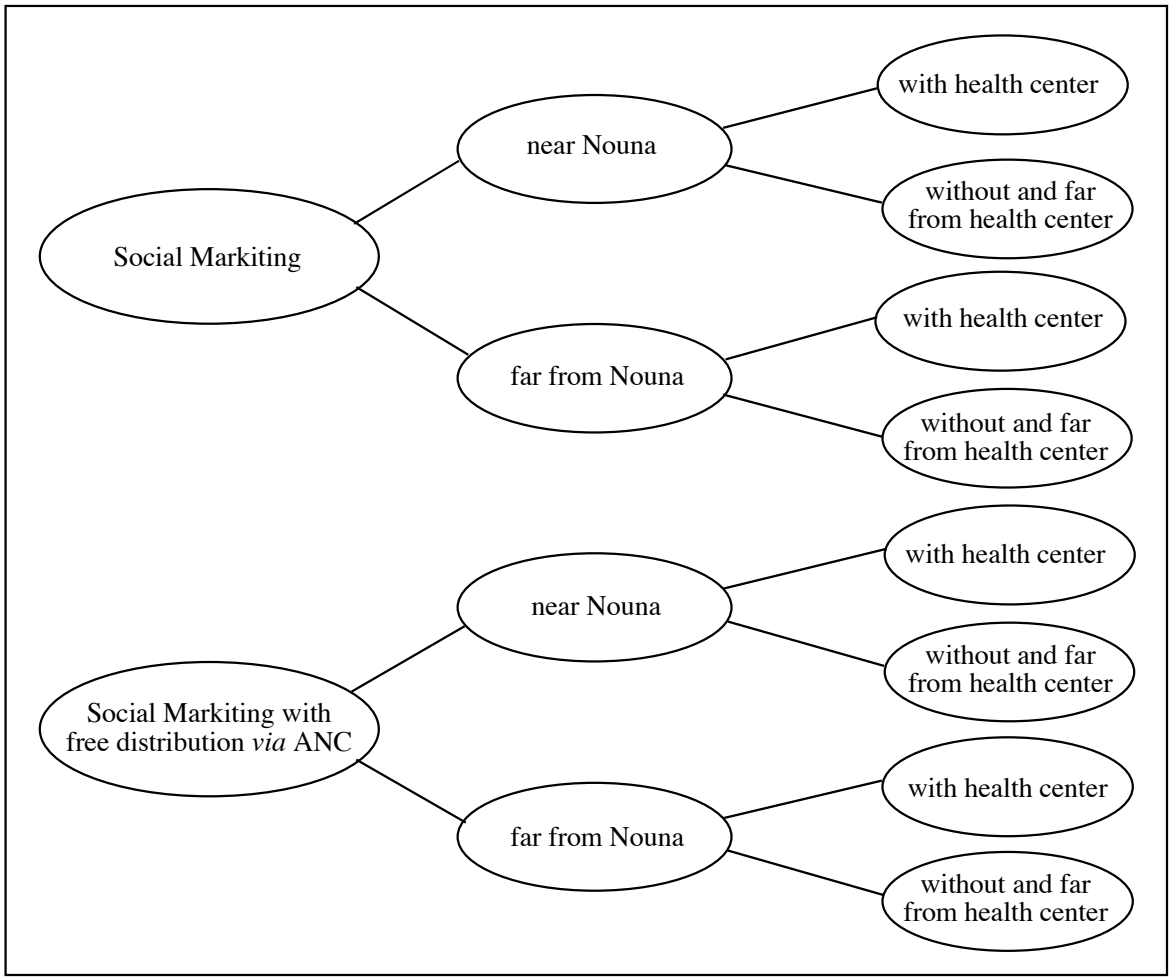

Fig. (1). Village sampling procedure.

Before each FGD, oral informed consent was sought from the participants. Study objectives were explained, the voluntary nature of participation was stressed, and confidentiality was assured. Permission was asked for tape-recording. The participants were informed that they could withdraw from the FGD at any time and without any negative effects.

RESULTS

The following section is divided into three parts: communities' knowledge on mosquito nets and ITN, knowledge and attitudes towards the social marketing campaign and knowledge and attitudes towards the ANC free distribution campaign. As the results on these topics did not differ remarkably among the two different intervention areas, the intervention groups are not presented separately. Where differences were found it is explicitly stated in the text.

KNOWLEDGE ON BED NETS AND ITN

Mosquito nets are well known to the study population. Respondents stated that they got to know the nets from their parents and grandparents when growing up as these were used in their households. However, these statements refer to the – as the people called them – 'simple' nets (= non-ITN) which were usually described as available on the market, tailored out of any cloth, and available in different colours. They are usually heavy and the air can not penetrate the material, therefore it gets hot when lying under the net. But the people are also well aware of ITN and the fact that they are different from the 'simple' nets. They describe them as treated with a chemical ('*product*' or '*medicament*') that repels and kills mosquitoes and other insects and animals, such as flies, cockroaches, scorpions, salamanders or spiders. The light, white ITN have small holes through which the wind can pass, therefore it doesn't get hot when one is lying under it.

When talking of ITN, respondents immediately associated them with health workers and health services in contrast to the non-ITN which were associated with the market. When asked about the source of their knowledge on ITN, respondents automatically referred to the health workers. This was the case regardless whether respondents lived in villages of intervention area A or B. However, during the FGD it became obvious that also PSI staff and CRSN field researchers were perceived as health workers.

The main purpose of a mosquito net was protection against mosquito nuisance, but it is also considered useful for protection against disease. Disease is not always specified but malaria ('*sumaya*') is frequently mentioned.

However, respondents did not regularly draw a link between mosquitoes and malaria. Less frequently mentioned was the protection against other insects and animals such as scorpions, spiders, salamanders, cockroaches or simple flies. Nets are also seen as useful to facilitate sleep, to avoid skin irritations due to the mosquito bites, to protect against cold, dirt and wind, as well as to provide privacy. In one FGD protection from HIV/AIDS was mentioned – mosquitoes were here seen as the transmitters of HIV.

"There are two types of mosquito nets. There is one, which is sold at the market, the other one is with the health workers, …, which is very powerful, ..., because when you hang the net the mosquito can not bite. The other one, the one from the market, is heavy, but the one from the health workers, …, is airy, the wind passes through and the mosquito can not bite you. It protects you against a lot of things, there are these two types of mosquito nets, the one from the health workers is the one that is more powerful." (FGD_B_fN_wofHC_women).

Overall, the respondents' opinion on ITN was positive. Respondents defined ITN as a '*good thing*', meaning useful, beneficiary, and necessary. Respondents stressed that they would always prefer an ITN to a non-ITN. To explain their preference, they argued that ITN are more powerful, as the mosquitoes/insects are repelled and killed immediately so that nothing can approach and bite.

According to the respondents, both husband and wife are able to decide to buy a net. Depending on who has the money, this person can go and buy a net. Not having enough money due to poverty was mentioned as the main reason for not buying an ITN.

… in case you do not have mosquito nets, it is the head of the family who should buy it, but in case you yourself have the money available, you can buy it, it is mutual help." (FGD_B_fN_wofHC_women)

"Often, when the husband does not have the money, if the wife has the money, you can help each other." (FGD_A_nN_wHC_women)

It was mentioned that mosquito nets are usually available for purchase in the rainy season because this is when there are most mosquitoes and this is when the nets will be bought, so the shopkeepers fill their stock for the rainy season. Respondents, however, also stated that during the same season, fewer savings are available and it becomes more difficult to be able to afford the purchase. In contrast, the dry season, when people have money from selling their harvest, was not seen as the time to buy a net because there are no mosquitoes. Some people admitted that they put away the net during the dry season.

"…the time for the mosquitoes is the rainy season and it is also the time of our work [= farm work on the fields]. And at this moment you need your small savings for the work, for cultivating your field. Making money available at this moment to buy a mosquito net is hard for us…." (FGD_B_nN_wofHC_men).

"There are no more mosquitoes, me, I stopped [using a mosquito net], because there are no more mosquitoes. When the mosquitoes start again, I will use it again" (FGD_A_fN_wHC_women).

According to the respondents the price for a *Serena* ITN varies between 750 and 2000 FCFA. The price for non-ITN was reported to be higher, between 2500 and 6000 FCFA. The price of an ITN was judged either as fair or as too high. Respondents who judged the price to be too high, however, explained that it was not because the product was seen as not worth its price, but rather because people are too poor to afford the purchase. Respondents are aware that they get a better product (ITN) for a lower price. Wishes were made to see the price be diminished to amounts such as 1000, 750, or even 500 FCFA.

"The mosquito net which is impregnated with insecticide, the 1500 FCFA is good because there are mosquito nets that cost 3000FCFA which are not impregnated with insecticide and that is expensive." (FGD_B_nN_wofHC_women).

KNOWLEDGE AND ATTITUDES TOWARDS THE SOCIAL MARKETING CAMPAIGN

The brand name *Serena* was spontaneously mentioned in 7 out of the 20 FGD (three in Nouna town, two in intervention area B, two in intervention area A. The name was cited in six FGD with men, but only in one FGD with women, in Nouna town. The respondents in those FGD were well aware that *Serena* is an ITN. Only in one FGD there was uncertainty whether *Serena* is an ITN or not. People knowing *Serena* also knew that the price is 1500 FCFA.

In five FGD (three in Nouna town, two in intervention area B) respondents stated that ITN were available for purchase in their community. In twelve FGD participants reported that ITN were not available (six in intervention area A, six in intervention area B). However, in three of these twelve respondents mentioned them to be available in the rainy season (all in intervention area B) and in seven of these twelve respondents named other villages where ITN would be available (two in intervention area A, five in intervention area B). In two FGD participants gave contradictory statements regarding the availability of ITN in their village (one in intervention area A, one in intervention area B) and in one FGD it was stated that they had been available in the past (in intervention area A).

In only a few FGD the meeting was mentioned where the villages were randomized to either intervention A or B. This procedure was perceived as fair. Respondents here, however, also noted that the promised sales of ITNs were not happening in their villages.

"…there was a meeting they called us to. They said that they will proceed by drawing. That was in Nouna, our community leader and another person went there. They did the drawing, in case we would win, our pregnant women would have [the ITN] for free. If we would not win, they would come and sell [the ITN] to us. We were not lucky…everybody understood and was prepared for waiting. We did not get what was for free, the sales also did not arrive." (FGD_B_fN_wofHC_men).

Radio was - besides the health workers - cited by the respondents as another major source of information regarding the existence, purpose and benefits of ITN. They also received information on the price of ITNs via the radio, often specified by the respondents as 1500 FCFA, which is the official price for a Serena ITN. TV is much less

prominent than radio in NHD but the respondents told to have received information on ITN also from this channel. Only in five FGD people mentioned to have seen a poster advertising ITN, three of which were in a local health centre.

For the promotion of the *Serena* ITN, PSI had furthermore conducted six mass sensitisation campaigns, two of which took place in Nouna town. Respondents from the rural areas did not remember these events, contrary to Nouna town where it was remembered and respondents stated having received specific information on *Serena*. However, the PSI staff conducting these sensitisations was perceived as governmental health staff.

KNOWLEDGE AND ATTITUDES TOWARDS THE ANC FREE DISTRIBUTION CAMPAIGN

The population in the villages of study area A were very well informed about the ANC-based free ITN distribution. This was different in the populations living in the study area B: Although many people in Nouna town had heard about the free ITN distribution and could even name some villages where it took place, only few people in the rural areas of intervention B were aware of such a free distribution happening in other zones of NHD.

The respondents in the villages with free ITN distribution through ANC services always perceived it as a good thing. The fact that it was only pregnant women who got a free ITN, was also seen as positive rather than as unfair or discriminating. Even men saw it as an advantage.

"It is a very good initiative because it is an aide, and it is us they are giving aid. If someone gives a mosquito net to your wife, it is you, the husband, one is helping because it is a tool to prevent diseases. … So it is a good thing which they are implementing." (FGD_A_nN_wofHC_men).

"… In case a disease catches her [the pregnant wife], it is the problem of you, her husband, because it is you who should take her to the health centre and if you do not have the money? So you see, this is a problem. But in case she sleeps under it [the ITN] she is protected from diseases, so you, too, can have peace." (FGD_A_fN_wofHC_men).

Many respondents reported that the free ITN distribution had a positive effect on ANC attendance, e.g. by motivating women to visit these services already in an early stage of the pregnancy or motivating them to overcome the distance to the health facility. Respondents, however, also insisted that women already attended ANC services regularly even before the introduction of free ITN.

"… it is for a long time we do the ANC. Then this distribution came. I can say that this [distribution] has motivated some [women] but we did the ANC since long time…. That was even before the arrival of the mosquito nets." (FGD_A_fN_wofHC_women).

According to most respondents in the intervention area A, the health workers provide the community with valuable information on the existence and benefits of ITN. They could well recite the information given to them by the CSPS staff when receiving the free ITN, e.g. information regarding ITN utilisation and washing.

DISCUSSION

The ITN intervention trial was implemented under real program conditions in a typical malaria endemic area of rural Burkina Faso. While the social marketing intervention was carried out by PSI, the organisation already in charge of social marketing in the whole of Burkina Faso, the ITN free distribution intervention arm was integrated into the routine activities of the district health team of NHD.

Mosquito nets are not a new concept in the study area as it is the case in many areas of SSA [2, 17-20]. As a result, traditional (untreated) mosquito nets are usually well accepted and there is already a local market for such products. Interestingly, the difference of non-ITN and ITN was well known to the study population and the benefit of ITN over the more traditional bed nets was clearly considered. It is noteworthy, that in the study area as in many other SSA study areas alike and despite years of sensitisation campaigns, malaria prevention is not the main reason why mosquito nets are used [19-20, 21-25]. A former study in the Nouna area had shown that mosquito nets are mainly used by adults against mosquito nuisance [26]. Moreover, the low compliance with bed net protection in these populations during the dry season even in target groups well educated on the subject has again been pointed out in this study as already documented in an earlier investigation in the area [22]. However, concerning heat as a reason for not using mosquito nets, respondents remarked that when lying under a traditional bed net it usually gets very hot, but that ITN are more comfortable to this regard, an observation which supports the likely acceptance of light ITN at least during the hot times of the year. Further well designed IEC interventions are clearly needed to accompany the ongoing ITN roll-out in SSA.

It is noteworthy that the population in the whole study area strongly associated ITN and the acquisition of relevant knowledge with the health workers, rather than with the IEC activities conducted by PSI. This strong link might be due to the fact that in addition to the new free ITN distribution in half of the health centres of NHD there were a number of former malaria control interventions carried out by health workers, such as limited free distribution of ITN through a CRSN research project or governmental insecticide-impregnation services [14]. This might have led to the fact that respondents also referred to CRSN researchers as 'health workers'. Moreover, when people visit a health centre they usually get informed about ITN.

Besides the health workers, radio was a major source of information for the population regarding ITN and seems to be a trusted medium in the study area. A large proportion of the ITN information might be attributed to the PSI radio spots as no one else has passed advertisements on ITN via the radio. Furthermore respondents stated also that they received information on the price for an ITN via the radio, often specified as 1.500 FCFA, which is the official price of a Serena ITN. This supports the importance of mass media messages in the conduct of ITN social marketing campaigns [20, 27-28]. In conclusion, personal contact with the health workers and radio can be seen as the best ways to reach the communities in the Nouna study area.

Contrary to Nouna town, knowledge of the *Serena* ITN was not common in the rural NHD and the product was not readily available here. The higher level of knowledge on and the better availability of the *Serena* ITN in Nouna town might be due to the fact that this product has already been sold in town for a couple of years, although not at a subsidised prize. Moreover, the wholesaler in charge of selling this product to the villages of NHD was situated in Nouna town. In addition, the specific PSI sensitisation campaigns during the rainy season of 2006 might not have covered a large enough proportion of the rural population and those shopkeepers who were interested to buy more Serena ITN in Nouna might have found it difficult to travel long distances in the rainy season, to fill their stock. However, it might also well be, that many of the 15.000 *Serena* ITN which have been handed over to this wholesaler might have been sold to other places in Burkina Faso despite clear instructions to the opposite. Such a leakage of highly subsidised quality ITN in social marketing campaigns has also been observed in other SSA countries [23].

Poverty was stated as the main barrier to, ITN ownership in the study area. This was also reflected by the wish of respondents to diminish the price of the ITN. This finding confirms the results from many observations in SSA countries where lack of sufficient funds was a main reason for not buying ITN [20, 29-36]. This observation supports the arguments of those in favour for free ITN distribution systems in SSA [9]. However, social marketing and free distribution systems may well be complementary to each other in malaria endemic regions [10-12].

Gender issues have been mentioned to impair ITN purchase in some SSA communities [37-38]. In this regard it is promising, that being female was not seen as a barrier to ITN purchase in this rural area of West Africa. This should be considered when developing marketing campaigns. Thus, economically autonomous women could be targeted as independent customers in such programs.

The respondents have stated that their ability to pay for ITN is much lower during the rainy season, when the demand is highest, than after the harvest during the dry season, when mosquito nuisance is however rather low. This season-dependent ability of respondents to pay for ITN has been observed in other West African countries as well and has led to approaches such as pre-payment services for ITN [20, 28]. However, a success of offering such services could not be demonstrated [28].

Free distribution of ITN through ANC services was highly appreciated by the population in the NHD. In the villages of intervention A, ITN education given through the health workers when handing over the product was clearly remembered by the study participants which shows that one-to-one communication is an efficient tool to convey knowledge in such predominantly rural populations. Hearing about ITNs from health agents was also a significant predictor of ITNs use in a study in neighbouring Mali [24].

The study has some limitations. In the process of translation of the interview guide from French into Dioula and vice versa, the possibility exists that important information got lost or emphases in interviewees' responses were accidentally changed. However, we think to have sufficiently taken care of this during the training process for the interviewers. Additionally, to ensure consistency in the translation, the transcription and translation of randomly selected passages from the interviews was checked by one of the authors (JT). Finally, the analysis was triangulated at various stages by a number of investigators (MDA, MS, JT, CB) in order to avoid misunderstandings and to ensure a good coding scheme.

In conclusion, this study has shown that ITN are already well known and highly appreciated by a predominantly rural population of SSA. This has been attributed to both, an NGO-led sensitisation campaign on the subject as well as to personal information given out to the population through health workers in the study province. Free ITN distribution through ANC services to the risk groups was highly appreciated by the population. Due to the prevailing poverty and the insufficient availability of ITN for purchase in the rural villages, subsidised ITN sales in the frame of a standard social marketing approach alone is not sufficient to reach the goal of high ITN coverage.

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AUTHOR'S CONTRIBUTIONS

The study was designed by CB, MDA, AJ and OM. The field work was conducted by CB, MS and JT. Data analysis was carried out by CB with support from MDA, MS and JT. All authors contributed to the interpretation of the results and to writing the manuscript.

LEGEND FOR FOCUS GROUP DISCUSSIONS

FGD_A_fN_wofHC_men:

Focus Group Discussion_intervention area A_far from Nouna_without and far from a Health Centre_men

FGD_A_fN_wofHC_women:

Focus Group Discussion_intervention area A_far from Nouna_without and far from a Health Centre_women

FGD_A_fN_wHC_women:

Focus Group Discussion_intervention area A_far from Nouna_with a Health Centre_women

FGD_A_nN_wHC_women:

Focus Group Discussion_intervention area A_near Nouna_with a Health Centre_women

FGD_A_nN_wofHC_men:

Focus Group Discussion_intervention area A_near Nouna_without and far from a Health Centre_men

FGD_B_fN_wofHC_women:

Focus Group Discussion_intervention area B_far from Nouna_without and far from a Health Centre_women

FGD_B_fN_wofHC_men:

Focus Group Discussion_intervention area B_far from Nouna_without and far from a Health Centre_men

FGD_B_nN_wofHC_men:

Focus Group Discussion_intervention area B_near Nouna_without and far from a Health Centre_men

FGD_B_nN_wofHC_women:

Focus Group Discussion_intervention area B_near Nouna_without and far from a Health Centre_women

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