MEDECINS SANS FRONTIERES
ÄRZTE OHNE GRENZEN

Rapid meningitis vaccination coverage survey

Kapoeta North and Kapoeta South counties

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Iza Ciglenečki

Background

Cases of meningitis have been reported in Kapoeta counties in January 2009. Meningitis outbreak was declared on 31/1/2009 and vaccination campaign was organized by MSF in collaboration with Ministry of health and local authorities.

Vaccination campaign targeting all population aged between 2 and 40 years was organized between 12th and 20th February, with mop-up activities ongoing until 3rd of March. These included mobile teams covering smaller villages that were missed by the original planning targeting bigger settlements, and vaccination in cattle camps (MOH teams staying overnight in the camps to be able to reach mobile population).

Despite generally good running of vaccination campaign, the coverage rates were unsatisfactory: vaccination reached 23% of target population using GOSS data, or 87% when using Carter center data from guinea worm census, inflated by 20% (because this number only includes villages including in active surveillance – most, but not all villages in 2 counties). Details of vaccination coverage are in the attachment. In addition, part of the population moves with their cattle to the cattle camps during dry season. Estimation of vaccination coverage is therefore difficult.

We felt it would be useful to estimate actual coverage and to understand reasons why people were not vaccinated if so.

Objectives

- Estimate vaccination coverage in settled villages of Kapoeta North and South counties
- Explain reasons for not being vaccinated
- Estimate proportion of population absent from the villages

Methods

A 2-stage cluster sampling survey was conducted in Kapoeta South and North counties. Clusters were chosen from the list of villages with known population numbers as used by Carter centre for the purpose of guinea worm eradication. This list is not exhaustive list of villages of the area, as it only includes villages included in active surveillance for guinea worm transmission. As guinea worm transmission is particularly common in Kapoeta, most of the villages are included, but no all, especially in Kapoeta South. Population currently in the cattle camps was not included in the survey due to difficult accessibility.

In rural areas, each village consists of several bomas or households – fenced group of houses, reaching up to 1000 members. In each cluster we identified village centre, span the pen and followed direction till the end of the village counting bomas or households. Boma/household was chosen using random number table. Inside the boma/household we again identified the centre, span the pen and followed direction till the end of the boma/household counting houses until the fence. First house was chosen using random number. Next house was identified as closest on the right.

“Household” was defined us a hut – all people sleeping under the same roof the night before. Simple questionnaire was administered to head of the family or his/her

representative about all people sleeping in the hut. 12 huts were selected in each cluster. Due to lack of time there was no attempt to return to empty houses.

Sample size was calculated assuming 80% of coverage with 7% precision and cluster effect of 2 – 30 clusters of 12 individuals.

Survey was conducted with 3 teams of one MSF interviewer and translator between 24th and 26th February 2007.

Data was entered and analysed using Stata 9.2. All indicators were calculated using proportions or means with 95% confidence intervals taking into account cluster design.

Survey was done with the approval of MOH GOSS and local authorities in Kapoeta South and Kapoeta North counties.

Results

During the survey, a total of 423 houses were visited, 96 were empty (22.7%). Information was collected about 1348 people from 327 houses.

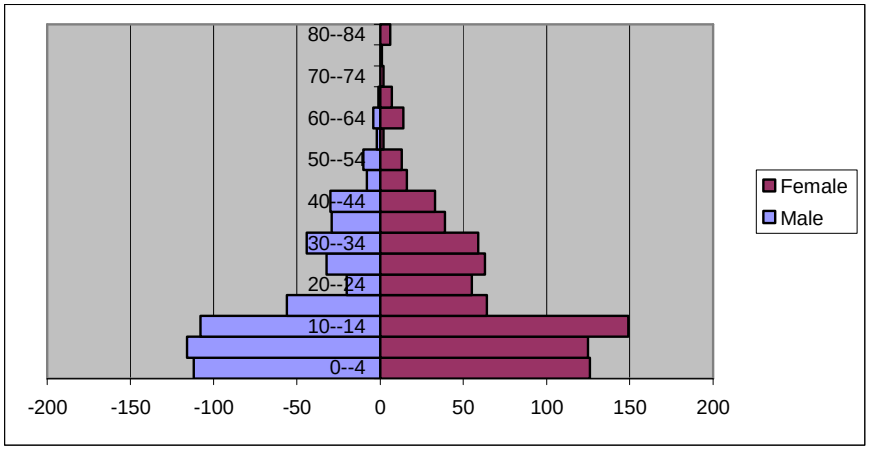
Median age in our sample was 13 years, ranging from 0 to 83. 57.4% of interviewees were female, and 42.4% were male, with male to female ratio 0.74. In the age group 15-29 years, the male female ration was 0.57.

Table 1. *Age and sex distribution among surveyed population. Kapoeta North & South counties, Eastern Equatoria state, South Sudan, February 2009.*

Age	Male	Female	Total	Proportion	M/F ratio
0--4	112	126	238	18%	0.89
5--14	224	272	498	37%	0.82
15--29	103	182	290	22%	0.57
30+	128	192	320	24%	0.67
	572	774	1346	100%	0.74

Details of age and sex distribution are shown in figure 1.

Figure 1. *Age pyramid of the surveyed population. Kapoeta North & South counties, Eastern Equatoria state, South Sudan, February 2009.*



Among the interviewees, 917 were in the target age group for the vaccination. Of those, 651 have received meningitis vaccine (71%, 95% CI 58-84%). Vaccination status was unknown for 5 people (0.5%).

Table 1. *Proportion of interviewees vaccinated. SE – standard error, CI – confidence interval. Kapoeta North & South counties, Eastern Equatoria state, South Sudan, February 2009.*

Vaccinated	Number	Proportion	SE	95% CI
Yes	651	71%	0.06	58-84%
No	261	28%	0.06	16-41%
Unknown	5	1%	0.004	0-1%

A total of 261 interviewees were not vaccinated. The most common reason was that the whole cluster – village was missed out during vaccination campaign, teams never reached the village and population was never informed about vaccination campaign in the county. 3 clusters out of 29 were completely missed. The second most common reason was being absent – most commonly in the cattle camp. Details in Table 2.

Table 2. *Reasons for not being vaccinated. Kapoeta North & South county, Eastern Equatoria state, South Sudan, February 2009.*

Reason	Number	Proportion
Absent	22	8%
In cattle camp	69	26%
No vaccination	115	44%
Refused	6	2%
Not informed	5	2%
Site overcrowded	7	3%
Collecting grass	14	5%
Others	24	9%
Total	262	100%

Discussion

Findings from the vaccination coverage survey show that over 70% of the target population residing in settled villages in Kapoeta North and South counties was reached by meningitis vaccination campaign. This proportion is slightly higher in reality, as the vaccination survey was conducted while mop-up vaccination activities were still ongoing and the results of the survey were used to improve the coverage.

Demography

Our sample shows young population, with median age of 13 years. Age pyramid shows a gap in age group 15-30 years,

We tried to assess the proportion of population being absent in cattle camps during dry season. Of the surveyed area, 22% of the huts were empty at the time of the visit. Among the surveyed population, 9.9% were absent during vaccination campaign, but have since returned. Looking at the age and sex distribution of the population present during the survey, a part of population between 15-29 years old are absent, with more male than female being absent. Rebuilding the age pyramid based on the number of children 0-14 years old present, but using standard distributions between age groups (in Sudan, 0-14 years old represent 44.4% of total population) the number of people in the sample would be 1.23-times higher than actual number (1658 vs. 1346). With 22% of huts empty, and at least 18% of population not being present, we could estimate that about 40% of population is absent during dry season.

A total of 48560 in the target age group of 2-30 years were vaccinated, 40’907 among those in settled villages. Assuming 71% vaccination coverage (95% CI 58-84%) in the settled villages, the population in the villages could be estimated at 88’638 (95% CI 74’921-108’638). Total population in the 2 counties, presuming around 40% population being absent at the cattle camps during the dry season, the population could be estimated at 147’731 (95%CI 124’869-180’844). This number is 60% bigger than the number from Carter centre, and less than half the official MOH/GOSS number.

Vaccination

Vaccination coverage in our sample was 71% (95% CI 58-84%). This is not actual vaccination coverage in the population, as part of the population was absent in the cattle camps during the campaign (and not included in the survey sample). On the other had, some villages were vaccinated after the survey based on the survey results, and additional 7653 people in target age group were vaccinated in cattle camps.

Out of 29 clusters surveyed, 3 were not vaccinated as whole, and information has never reached these villages. The 3 clusters were all in Kapoeta South County (2 Longeleya and 1 in Machi 1 payam). This is likely a result of campaign being conducted in a hurry without much knowledge of the area. MSF team was relying on local authorities for the information where to place vaccination sites. Also, for this fixed strategy, local authorities took responsibility of informing population. Although cluster surveys are not designed to identify areas of low coverage, team took opportunity of identified missed areas, and did mop-up vaccination in those and neighbouring villages that were missed out.

Next most common reason of not being vaccinated was being absent – almost 10% of the surveyed population has been absent during vaccination campaign but has since returned. This shows a high mobility of this population during dry season, with family members constantly moving between settled villages and cattle camps.

Limitations of the survey

Survey was conducted in settled villages only and is thus not representative for the all population of Kapoeta South and North Counties. It was not possible to conduct survey in the cattle camps, due to difficult access to the camps – although vaccination was conducted in some areas closer to settled villages, the far away places were impossible to reach during the campaign.

The list of villages used to define 1st stage clusters was list of Carter centre used for Guinea worm eradication. This list is not complete, and it was clearly underestimating number of people living in Kapoeta town, and it completely missed one payam (Pweta) close to Kapoeta town. As this was the only list of villages available, and as this list was independent from meningitis, it should not biased results too much. It is likely thought that coverage was underestimated due to under-representation of urban areas in the surveyed sample (coverage likely to be higher in urban area).

The confidence interval around the estimate is very wide due to unexpectedly high cluster effect (16), probably due to extreme clustering of non-vaccinated individuals (3 clusters).

Conclusion

The estimated coverage of 71% in the settled villages of Kapoeta North and South County is below the target of 80%. However this is a mobile cattle-herding population, which is difficult to reach with classical vaccination campaign strategies. The results of the survey and the intervention itself also show how difficult is to plan good intervention in the absence of reliable denominators and reliable maps of the area.

Recommendations

- Follow the surveillance data to see the impact of vaccination campaign and assess the need for further assistance in case management

- To MSF for further campaigns in similar areas:
    - Improve the geopolitical knowledge of the area before starting intervention. A compromise can be sought to reduce the political pressure (for example by starting vaccination in urban areas not needing detailed mapping)
    - If MSF takes responsibility of intervention, we have to be also involved in the planning and social mobilisation of the population
    - While it is possible to reach part of the population in the cattle camps, the strategies have to be innovative and done in close collaboration with local population.

Annex 1. Example of questionnaire, Kapoeta North and Kapoeta South County, February 2009.

Rapid vaccination coverage survey, Kapoeta North and South counties, February 2009

Date **Village** ………………………….

Cluster no………………… **Team ………………………………**

No	**Family no**	**Age** years	**Sex** M/F	**Vaccinated** 0 = no 1 = yes	**If not, why?**