

**ASSESSMENT OF EPIDEMIOLOGICAL MENINGITIS SURVEILLANCE SYSTEM IN  
KHARTOUM LOCALITY, 2015****Kamal Elbssir (PhD)<sup>1\*</sup>, Tarig babiker (M.sc)<sup>2</sup>, Ahmed Abu-Rayyan<sup>3</sup> and Hamid Nourain<sup>4</sup>**<sup>1</sup>Faculty of Public Health and Health informatics, Hail University, Saudi Arabia.<sup>2</sup>Federal Ministry of Health, Epidemiology Administration, Khartoum, Sudan.<sup>3</sup>Faculty of Public Health and Health Informatics, University of Hail.<sup>4</sup>Faculty of Public Health and Health Informatics, University of Hail.**\*Corresponding Author: Dr. Kamal Elbssir (PhD)**

Faculty of Public Health and Health informatics, Hail University, Saudi Arabia.

Article Received on 20/09/2016

Article Revised on 11/10/2016

Article Accepted on 01/11/2017

**ABSTRACT**

This was a descriptive cross-sectional sentinel sites based study Khartoum locality 2015. Sample was total coverage included all of medical directors and statisticians. The study aimed to assess the quality of meningitis surveillance infrastructure (Human resource, Surveillance Documentation reporting System and feedback, supervision, communication), Surveillance System, and to identify the weakness of meningitis surveillance at sentinel sites. Information was collected by using questionnaire and check list to satisfy the objectives of the study. The study showed that the type of Sentinel Sites (7.1%) was governmental hospital, (14.3%) were private hospital, (60.7%) were governmental health center and (17.9%) were NGOs health center, The study revealed that (60.7%) of respondents had previously worked in Sentinel sites while (39.3%) had not, The study showed that (25.0%) of respondents had received training on the meningitis surveillance while (75.0%) had not. The study recommended that Training of surveillance officers at all sentinel sites in locality, Improvement of cadre skills (computer, English) and supervision and development of supervision check-list for each level, Improving lab capacity and supplies and equipped for CSM case confirmation, Planning and implementing supportive supervisory visits, reinforcing feedback regarding corrective actions and establishing feedback channels between levels and Reactivation of a network of well-trained rapid response teams at locality level with reviewing meningitis epidemic preparedness and rapid response guidelines and provision of supplies for epidemic preparedness at localities level.

**INTRODUCTION**

Meningitis is a significant cause of morbidity and mortality and remains a common disease worldwide. According to "WHO" the estimated number of cases of epidemic meningitis for the last 10 years was 700,000 (WHO, n.d.). Children and young adults are most affected, and in an epidemic as many as 1 person in 100 may become ill. When an epidemic occurs, in some areas the attack rate can exceed 2,000 cases per 100,000 people (2%). The CFR is approximately 10% during an outbreak (with appropriate case management). The disease is considered as a major public health challenge in Africa's "meningitis belt" that found in sub-Saharan Africa, stretching from the Red Sea in the east to the Atlantic Ocean in the west, covering parts of Sudan, Chad, Niger, the Central African Republic, Nigeria, Cameroon, Benin, Burkina Faso, Guinea and Mali. Meningitis belt epidemics typically occur in a cyclical manner every 8 to 12 years. The onset is generally in the middle of the dry season (December to February). Outbreaks usually end spontaneously after 3 to 5 months, at the beginning of the rainy season (May-June). During

the period between epidemics, up to 50% of population can be healthy carriers and sometimes can reach up to 60% – 80 % without the appearance of single case of meningitis.

A combination of conditions and risk factors are necessary for an epidemic to occur, however the exact factors are still yet not completely understood and no one factor is sufficient to explain why an epidemic is occurring or where one is likely to occur next at the regional level. The risk factors could be related to the immunological susceptibility of the population (herd immunity), type of strain transmission, special climatic conditions such as (dry season, dust storm), low socio-economic status, poverty and crowded living conditions or poor ventilation in addition to other factors related to education and awareness of the disease. Acute respiratory tract infections and nasal mucosa cracking found that may also contribute to the development of disease. This variation in the risk factors could be the cause in changing and waving of the epidemic outbreaks from very severe to mild season during the years. Early

detection of meningitis outbreaks and prompt laboratory confirmation of circulating pathogens depend on effective implementation of surveillance activities at all levels. Epidemic meningitis surveillance is not a linear activity. The level of preparedness and the public health measures for epidemic meningitis control varies throughout the year and should be intensified as the epidemic season approaches. During the epidemic season different procedures need to be established for districts that have crossed the alert and epidemic thresholds and those that have not.

These procedures also vary depending on hyper endemic countries (within the meningitis belt) and non-endemic countries (outside the meningitis belt).

This study designed to assess current situation of quality epidemiological meningitis surveillance as a part of the national surveillance system.

## METHODS AND MATERIALS

### Study Design

This was descriptive cross-sectional study.

### Study Area

Khartoum locality lies between longitudes 37-520 and along latitude 1900. It has a total area of nineteen thousand square kilometers. It is bordered from the North by the Blue Nile in which lies Tuti Island. To the South it borders Jabel Awleya Locality and from the East and North East the Blue Nile. To the West it is bordered by the White Nile. It is connected with Bahri and Omdurman Localities through 8 bridges. It is considered one of the largest Localities at the national level due to the following reasons: It is the political capital of the country and the home of the federal government headquarters.

Health services delivered in Khartoum locality throw (220) health facilities, (185) PHC centers classified into Governmental (73) and NGOs (112) health centers strata.<sup>[28]</sup> out of total is sentinel sites.

### Study population

- **Study population** Focal person of CSM surveillance system (medical director, statistician) in sentinels' site (56 person).

### Sample size

Total coverage of all medical directors and statisticians (56).

### Data collection technique

Interview with CSM focal persons.

### Data collection tools

The data was collected using the following tools:

- Questionnaire
- Check list

### Data analysis and presentation

Data was analyzed data by using SPSS software, and then presented as table and charts.

### Ethical consideration

- Permission and clearance obtained from epidemiological department in SMOH and Khartoum locality
- Consent had been obtained from medical directors' and statisticians those accepted to participate in the study.

## RESULT AND DISCUSSION

This is a cross sectional sentinel sites based study conducted at Khartoum State localities in 2014 to study the quality of meningitis epidemiological surveillance. The data was collected by structured questionnaire based on 28 sentinel sites as primary data, observational check list and available relevant records as secondary data extraction.

The study showed the training of CSM surveillance system staff, was (14.3%) Specialist of medical director and (85.7%) Medical Officer.(14.3%) of respondents were had Bachelor in Statistics, (3.6%) were Diploma in Statistic, (60.7%) were secondary school while (21.4%) were other. this percentage effect of quality surveillance system meningitis, report and planning (Figure - 19:(Statisticians).

This finding was in agreement with study done in Khartoum locality were the surveillance system facing shortages of staff at lower levels where the staff conduct surveillance activities next to other preventive medicine activities. High work overload at those levels affects the quality of the CDSS activities. It has been pointed out that participants in the surveillance system should be properly trained for their surveillance tasks; through both initial and ongoing in-service training.<sup>[7]</sup> The study showed the availability of surveillance manuals was (53.6%) compared with CSM case based surveillance guidelines was (17.9%) only – because the CSM case based surveillance guidelines were distributed only during the CSM season( Figure 32 Statisticians) The study found that about (32.1%) of studied sentinel sites had computers (Figure -37 check least). (14.3) can be obtained for internet services and (32.1%) had telephones services for communication of reports.

The majority of sentinel sites under the study (67.9%) had been supervised throughout 2014 (Figure 16Medical Directors), in general, supervision helps to strengthen the capacity of system staff and ensures that the right skills are used appropriately, the necessary logistics are in place, and that planned activities are implemented according to schedule.<sup>[10]</sup> More than half of sentinel sites under the study (67.9%) had not received their feedback from the higher levels authorities (state – locality)( Figure 33 statistician). Feedback can provided by the different levels of

surveillance system to evaluate the quality of reporting provided, along with the implementation of follow-up actions<sup>[10]</sup> 34 (89.3%) of the reports had sent on time, compared with average (10.7%) late.(Figure 29 statistician). This finding is in agreement with previous study in Khartoum state CDSS where they found the timeliness of the system was a further problem and this was likely to be due to the primitive non-electronic method of reporting. The impact of electronic reporting on system timeliness has been documented in Sweden and Hawaii. (15 Glenn D. Israel) Nearly all data (78%) was complete (Figure 8-28) and this differ from the results found in a similar study which found that completeness of data from CDSS in Khartoum is a real problem, as there was no method for continuous checking the completeness of the data received from the health facilities. Furthermore, the data from both private and military sectors, where a large portion of population is treated, were not included in CDSS data and neither were data from 2 large teaching hospitals in the locality. Incompleteness of CDSS in Khartoum decreases the value of the system and gives misleading estimations of the magnitude of then communicable diseases burden. The situation of Khartoum CDSS data incompleteness is similar to other states in Sudan, the situation with the measles control in the Unites States of America in 2004, that of Legionnaires diseases in France in 2003 and tuberculosis control in Netherlands, to name just a few examples.(15 Glenn D. Israel) The CSM showed lowest average Percentage of specify and highly sensitivity and this is agreed with the study showed the Sensitivity is an important parameter measuring the quality of the CDSS system as it determines the true fraction of cases that are notified to CDSS. Unfortunately, Khartoum state has no other parallel system for communicable diseases data and even the laboratory data documentation is considered to be a very poor system for information on communicable disease cases, as mentioned by a surveillance officer from the central level: Our laboratory data documentation of communicable diseases is very poor and no other system collects similar communicable diseases data so we do not know if the cases we have are all what we must have or not. Unfortunately in Khartoum locality, there was no other system in place to be able to assess the sensitivity and specificity of the CDSS in Khartoum. However, since the system does not cover all health facilities, it can be assumed that it is neither sensitive nor specific. The situation is the same in all other Sudanese states as well but highly sensitive systems are achievable, as in Sweden.(15 Glenn D. Israel)35

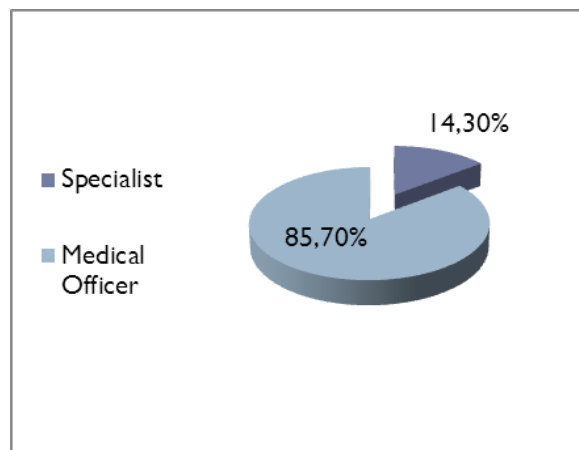


Figure No (1): shows the qualification of respondents - at Khartoum locality- 2015

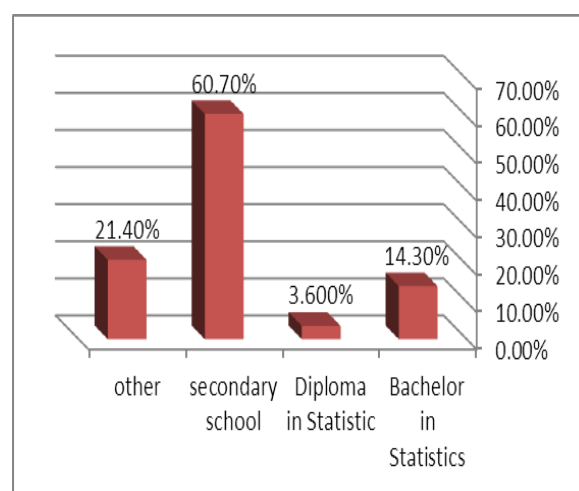


Figure (2): shows the qualification of respondents (Statisticians) at Khartoum locality- 2015

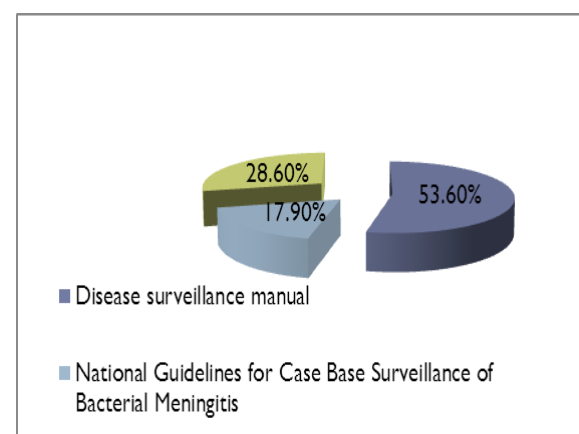


Figure No (3): shows type of guideline used in Sentinel Site respondents (Statisticians) at Khartoum locality- 2015

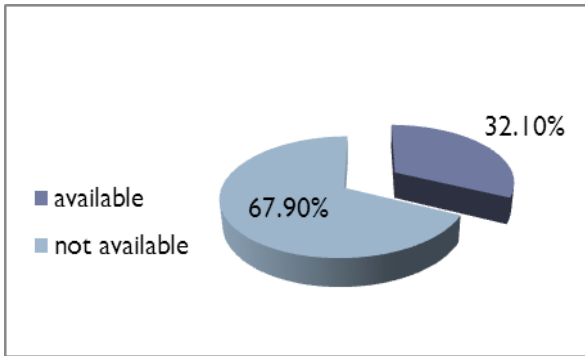


Figure (4): shows the availability of computer at the sentinel sites at Khartoum locality- 2015

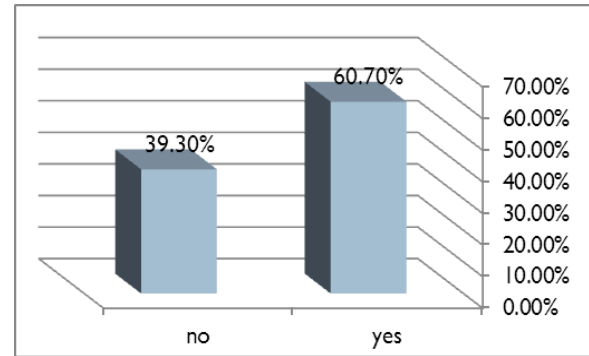


Figure (8): shows the previous working in Sentinel sites of respondents at Khartoum locality- 2015.

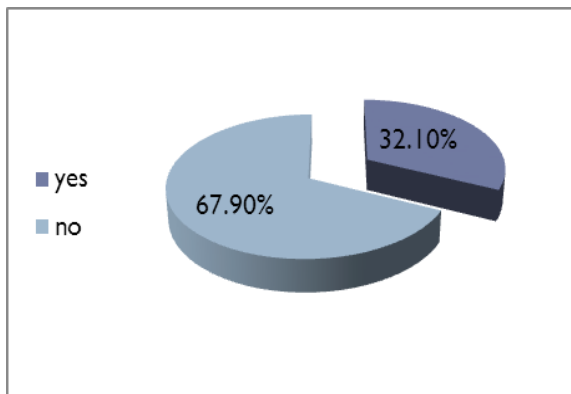


Figure (5): shows the presence of weekly feedback at Khartoum locality- 2015

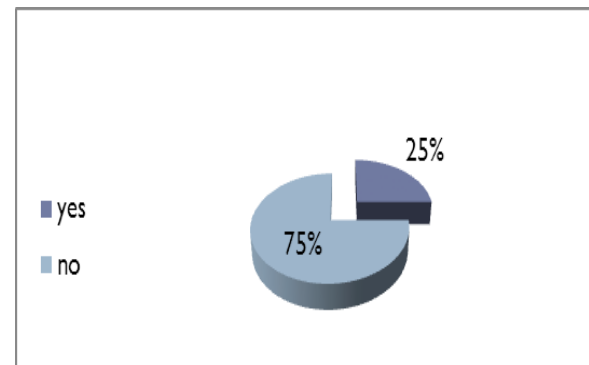


Figure (9): shows the received training on the meningitis surveillance of respondents at Khartoum locality- 2015.

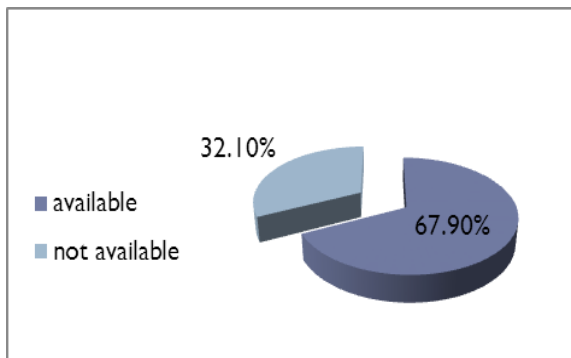


Figure (6): shows the availability of Communication Service (phone) at the sentinel sites at Khartoum locality- 2015.

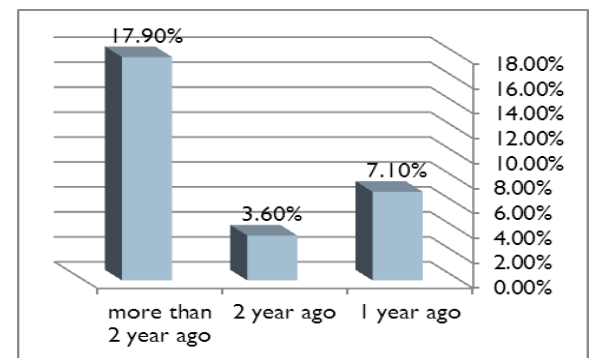


Figure (10): shows the last training received of respondents at Khartoum locality- 2015.

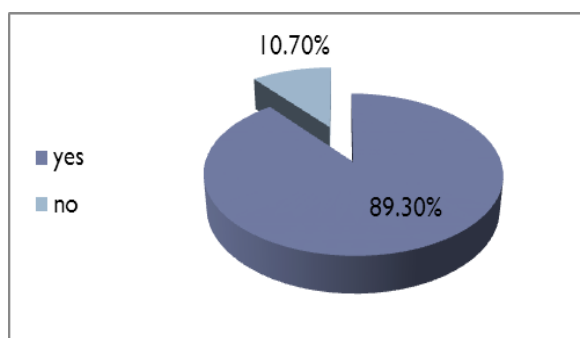


Figure (7): shows whether the report is sent to locality by respondents (Statisticians) at Khartoum locality- 2015.

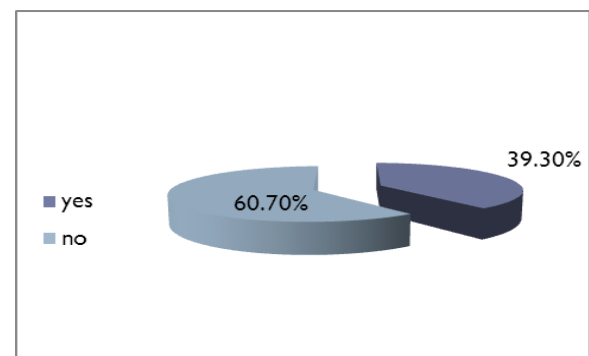


Figure (11): shows the answers of respondents regarding the existent of standard operating procedures (sops) for meningitis surveillance systems at Khartoum locality- 2015.

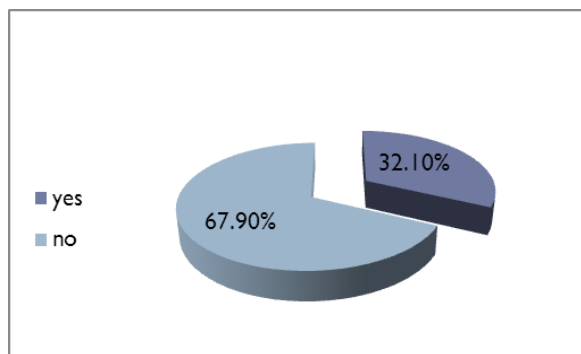


Figure (12): shows the received training on meningitis surveillance by respondents at Khartoum locality-2015.

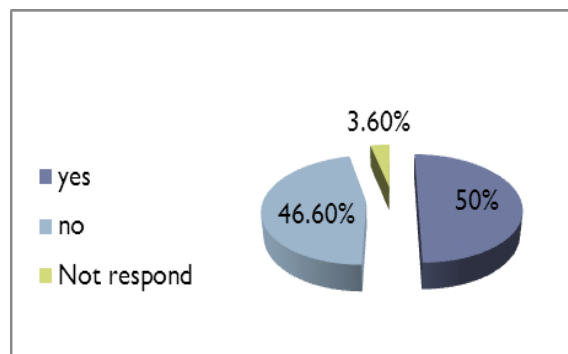


Figure (16): shows the Presence of information about population by respondents at Khartoum locality-2015.

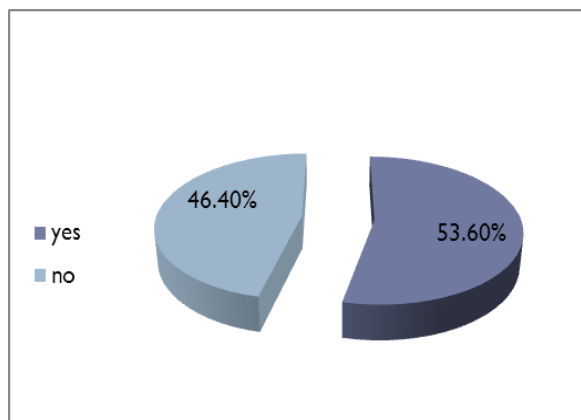


Figure (13): shows the existent of action plan in sentinel by the respondents at Khartoum locality-2015.

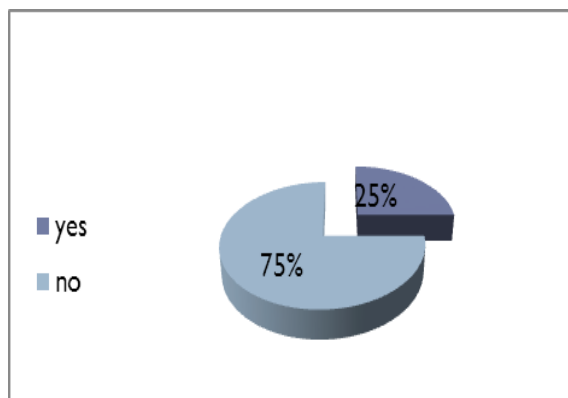


Figure (17): shows the Presence of information about climate, temperature, humidity and rainfall by respondents at Khartoum locality- 2015.

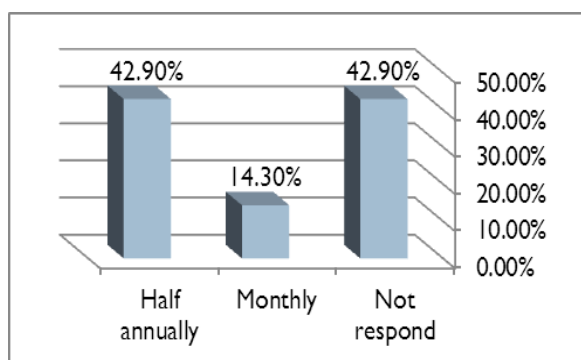


Figure (14): shows the interval to prepare action plans by the respondents at Khartoum locality- 2015.

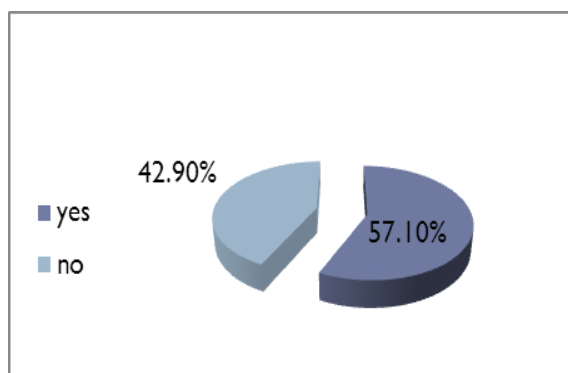


Figure (18): shows the Presence of information about education at Khartoum locality- 2015.

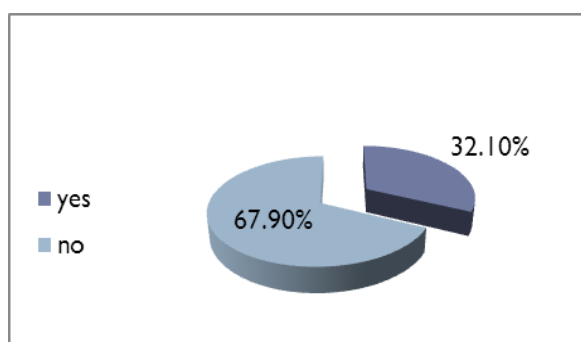


Figure (15): shows the Performance of planned activities of respondents at Khartoum locality- 2015.

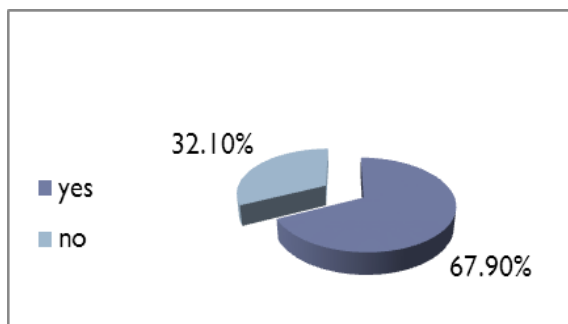


Figure (19): shows the Presence of information about numbers of IDPs and refugees in state and there places at Khartoum locality- 2015.

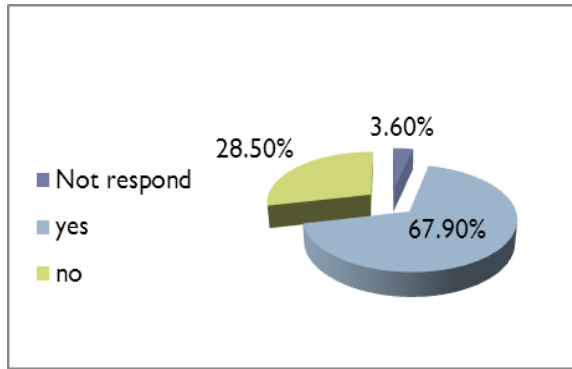


Figure (20): shows the Presence of supervision visit from locality and SMOH by the respondent at Khartoum locality- 2015.

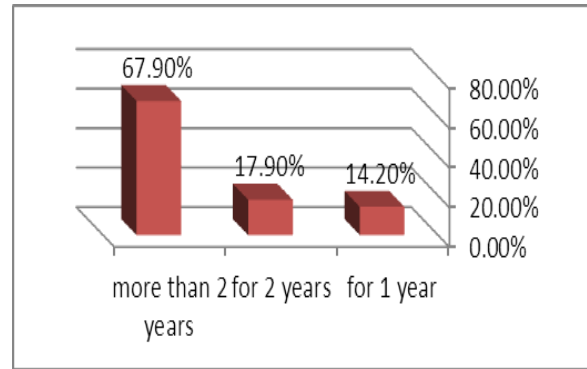


Figure (24): shows the working period of respondents (Statisticians) at Khartoum locality- 2015.

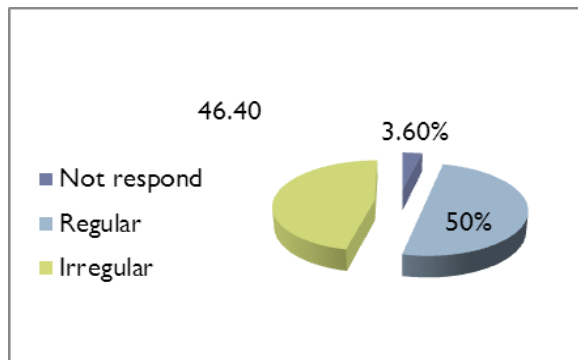


Figure (21): shows the Pattern of supervision visit from locality and SMOH- by the respondent at Khartoum locality- 2015.

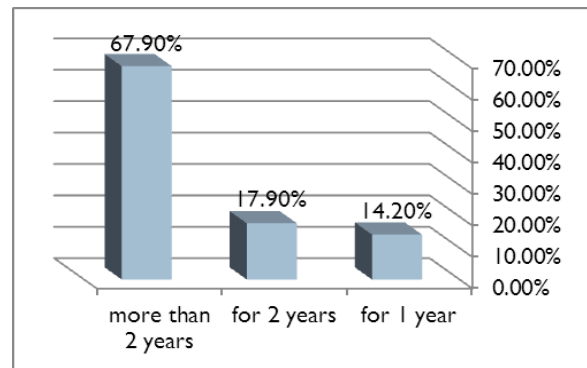


Figure (25): shows the previous working in Sentinel sites of respondents (Statisticians at Khartoum locality- 2015.

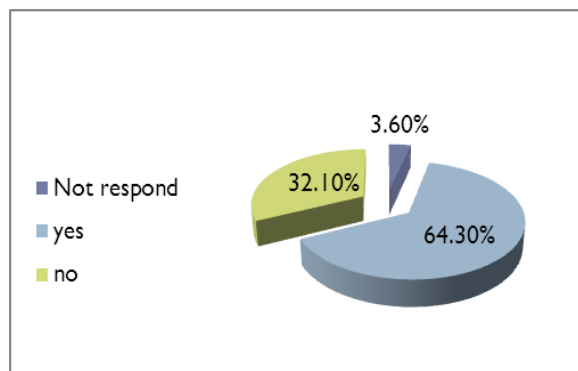


Figure (22): shows whether the supervision solves problems according to respondent's opinions at Khartoum locality- 2015.

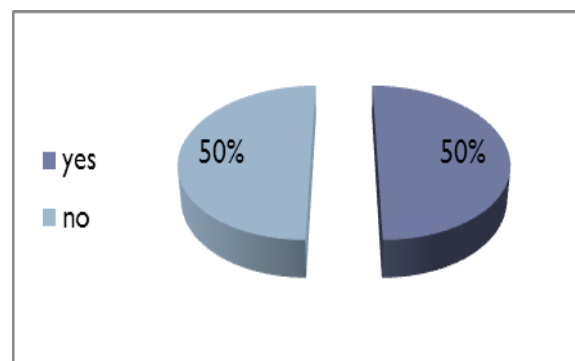


Figure (26): shows the received training on the meningitis surveillance of Statisticians at Khartoum locality- 2015.

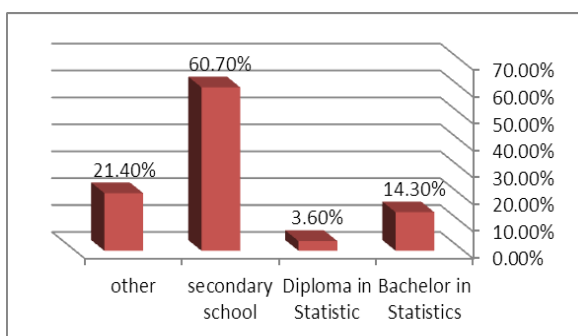


Figure (23): shows the qualification of respondents (Statisticians) at Khartoum locality- 2015.

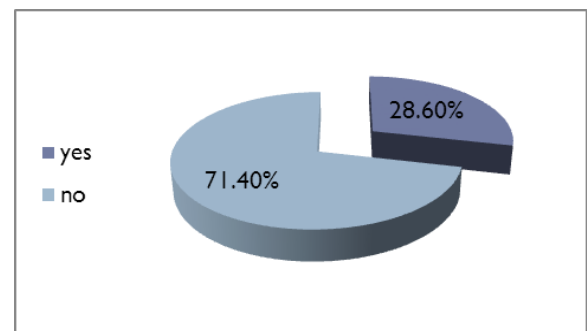
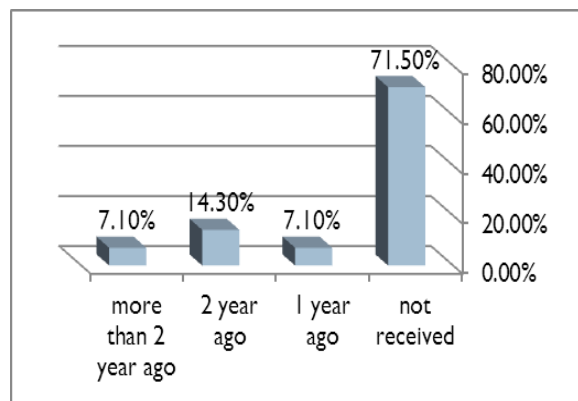


Figure (27): shows the last training received of respondents (Statisticians) at Khartoum locality- 2015.



**Figure (28):** shows the presence of registration books for respondents (Statisticians) at Khartoum locality-2015.

### Recommendations

#### The FMOH should strengthen surveillance systems by

1. Training of surveillance officers at all sentinel sites in localities level on(CSM surveillance, outbreak investigation and response, Surveillance guidelines, SOPs of meningitis surveillance system, standard case definitions of meningitis disease, reporting forms utilization and data management.

2. Improvement of cadre skills (computer, English) and supervision and development of supervision check-list for each level.

3. Improving lab capacity and supplies and equipped for CSM case confirmation.

4. Planning and implementing supportive supervisory visits, reinforcing feedback regarding corrective actions and establishing feedback channels between levels.

5. Reactivation of a network of well-trained rapid response teams at locality level with reviewing meningitis epidemic preparedness and rapid response guidelines and provision of supplies for epidemic preparedness at localities level.

#### At Sentinel Sites level

1. Sensitize clinicians at hospitals on meningitis disease surveillance with emphasis on CSM case detection and reporting on priority diseases.

2. Raise cadre awareness regarding meningitis disease, reporting, and notification and action threshold to prevent discrepancies in CSM cases reported.

3. Improving methods of data analysis in order to use electronics instead of manual methods.

4. Provision of require support from higher levels for performance reviews, training, and the provision of resources for meningitis surveillance.

5. Conduct further researches to strengthen the quality meningitis surveillance system.

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