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OUTCOME OF TRAINING ON YELLOW FEVER SURVEILLANCE IN A SOUTH-WESTERN STATE, NIGERIA: IMPLICATIONS FOR IMPROVED FIELD IMPLEMENTATION

***AA Fatiregun, **AO Sangowawa, ***OA Abubakar**
*Department of *Epidemiology, Medical Statistics and Environmental Health, College of Medicine, University of Ibadan, ** Institute of Child Health, Faculty of Clinical Sciences, College of Medicine, University College Hospital, Ibadan, ***Disease Surveillance and Notification Unit, Ministry of Health, Osogbo.*

ABSTRACT
Background: Nigeria is in the process of strengthening yellow fever case-based surveillance with the collection of serum samples among suspected case patients.

Objective: A training conducted for surveillance officers in the local government areas (LGAs) of Osun State on yellow fever case-based surveillance was assessed to determine its immediate impact on the knowledge of participants.

Methods: The training focused mainly on how to detect and report a suspected case of yellow fever to the national authorities and the reference laboratory. Training materials included the World Health Organization district guidelines for yellow fever surveillance. A pre and post test was used to evaluate the immediate impact of the training on knowledge among participants.

Results: A total of 31 officers participated. The mean scores for pre and post tests were 7.1 (SD 3.6) and 20.7 (SD 3.4) out of a total of 30 points respectively. More than 80% of participants rated the training as excellent in overall organization.

Conclusion: All participants indicated that they were very confident to fully implement yellow fever surveillance in their LGAs.

Key Words: Assessment, Training, Yellow fever, Surveillance, Disease Surveillance and Notification Officers (DSNOs) *(Accepted 9 March 2010)*

INTRODUCTION
Yellow fever, which has caused several epidemics for centuries, continues to cause severe morbidity and mortality in Africa and South American regions despite the availability of an effective vaccine for more than 70 years[1]. The viral hemorrhagic disease is transmitted by infected mosquitoes[2]. *Aedes aegypti* is the vector in the urban human to human cycle of transmission and various A*edes* species are intermediaries in the jungle monkey to monkey cycle, with inadvertent human insertion into that cycle. The World Health Organization (WHO) estimates that the disease causes 200,000 cases and up to 30,000 deaths each year in Africa alone. Most of these cases and deaths occur in 12 countries including Nigeria[1]. However, the surveillance for the disease is weak in the country with many suspected cases not reported and when reported they are not investigated because of lack of laboratory facility for confirmation.

Yellow fever case-based surveillance is an important strategy in the control of the disease. It helps to identify high risk areas for preventive mass immunization campaign and to promptly detect outbreaks for emergency immunization response[3]. The impact of the yellow fever routine immunization given to children at 9 month of age could also be assessed with a sensitive surveillance system, hence the need to strengthen the surveillance capacity for the disease. Although the disease is one of the priority diseases in the Integrated Disease Surveillance and Response (IDSR) in the country, aggregated data rather than case based surveillance data type is currently being implemented. In light of these, the country is in the process of strengthening yellow fever case based surveillance with serum sample collected among suspected case patients.

In Nigeria, the surveillance for priority diseases in the IDSR has been largely dependent on the resources provided for measles and AFP surveillance. The implementation of the yellow fever surveillance in the country will also depend largely on these existing resources; hence the need to train the personnel involved. Thus, in order to make the DSNOs familiar with yellow fever surveillance requirements,

Correspondence: Dr A A Fatiregun
Email:akinfati@yahoo.com

trainings were conducted for them at the state level in all the 36 states of the federation and the Federal Capital Territory. The similarities between yellow fever and measles case based surveillance were emphasized in this training. The training enabled participants to understand and appreciate the surveillance process, indicators and data management issues as well as the role of various levels in the surveillance system.

The performance of the AFP surveillance as well as the role played by DSNOs in the system has been previously described [4, 5]. Also, the assessment of a training aimed at strengthening the AFP surveillance among DSNOs has been reported[4]. The current training in Osun State, one of the states of the federation was assessed in order to determine its immediate impact on improving the knowledge of yellow fever case based surveillance among participants and its potential for an improved field implementation in the state.

METHODS

Osun State is located in the south-western part of Nigeria. It covers an area of approximately 14,875 square kilometers, lies between longitude 04 00E and latitude 05 558", and is bounded by Ogun, Kwara, Oyo and Ondo States in the South, North, West and East respectively. The State is made up of thirty LGAs and the Ife East Area Council. Osogbo, the state capital, is very rich in arts and crafts. It is about six hours drive from Abuja, the federal capital and 232 kilometers from Lagos, Nigeria's most prominent port city and commercial/industrial nerve-centre. Ibadan, the most populous city in West Africa is about 88 kilometers from Osogbo[6].

The 2-day training took place in Osogbo, at the conference room of the State Ministry of Health. Training took place between 9:00am to 5.00pm on the 2nd and 3rd of December, 2008. Participants came from the 30 LGAs and the area office. Materials for the training which were supplied from the WHO country office (WCO) including the WHO district guidelines for yellow fever surveillance[3] were adapted for use. These were made available for participants and also delivered by electronic projection during training sessions. Training contents were focused on how to detect and report a suspected case of yellow fever to the national authorities and the reference laboratory as contained in the surveillance guidelines. Also, details on investigation of suspected cases, collection and transport of laboratory specimens for diagnostic testing and how to respond to a confirmed outbreak were provided to participants. The modes of delivery of training include lectures, which were essentially participatory, demonstrations and case studies. Exercise/role play provided an opportunity for sharing experience among participants. Resource persons included; the State DSNO, the State Avian Influenza (AI) Desk Officer, the State Monitoring and Evaluation Officer, the State Guinea Worm Eradication Officer and the WHO consultants in the state. Pre- and post-tests were conducted using questions developed for the purpose. The two day training was also rated by the participants using an evaluation form that had been previously tested[4].

The descriptive analysis of the participants' performance at pre and post test was carried out using mean and standard deviation. The maximum score for a participant in each test was 30. Statistical significance of the paired differences in the pre and post tests were assessed using the paired t-test. Multivariate linear regression analysis was used to assess the influence of social and demographic variables on the post test scores. The level of significance for all statistical tests were taken at alpha = 0.05. The rating of training by participants was summarized using proportion.

RESULTS

A total of 31 DSNOs participated; this included 11 (35%) males and 20 (65%) females (figure 1). The mean age of participants was 38.2 (SD± 3.3) years with a range from 27 to 43 years. Nearly all 29 (94%) were married. About a third (65%) had higher National Diploma (HND) and other higher degrees. The median number of years in service was 15 years with a range from 8 to 19 years. More than half (52%) have worked as DSNO for 10 years and above. Majority (68%) have not attended any relevant training in the last 12 months of the training. The mean pre test score was 7.0 (SD3.7). This increased to 16.6 (SD3.4) at post test (figure 2). The mean paired differences in score between post and pretest of 13.6 (SD 3.9) was statistically significant p=0.000. Multiple linear regression analysis showed that having spent more years as DSNO (p=0.04) and being a female (p=0.05) are predictors of high post test score (table 1). Table 2 showed the ratings of the training by participants. Training evaluation forms were retrieved from 25 (81%) of the participants. Participants rated the training as excellent in relevance of topics (96%), reference materials (88%) and usefulness of exercise (84%). The overall organization was rated as excellent by all the participants (100%), while 88% rated clarity of presentation and depth of discussion as being excellent. All the participants who rated the training (100%) indicated that they were very confident to commence implementation of yellow fever case based surveillance in their LGAs.

Table 1: **Multiple Linear Regression Model with Post Test Score as Dependent Variable.**

Independent Variable	β-coefficient	T	p-value
Sex (Male=1, Female=2)	3.288	2.039	0.05
Number of years as DSNO	0.525	2.24-	0.04
Degree (1=HND and higher, 2 = all other lower degrees)	-0.330	0.188	0.85
Constant	10.379	2.442	0.02

F=4.823; p=0.010; R^2=40.8%; adjusted R^2=32.8%

Table 2: **Participants Rating of Training.**

Rating of training	Poor n (%)	Very good n (%)	Excellent n (%)
Overall organization of sessions n = 25 (%)	0	0 (0)	31 (100)
Relevance of topics n = 25 (%)	0	1 (4)	24 (96)
Clarity of presentations n = 25 (%)	0	3(12)	22 (88)
Usefulness of case studies n = 25 (%)	0	4 (16)	21 (84)
Usefulness of reference materials n = 25 (%)	0	3 (12)	22 (88)
Depth of discussion n = 25 (%)	0	4 (12)	22 (88)

Figure 1: **Distribution of Participants by Sex.**

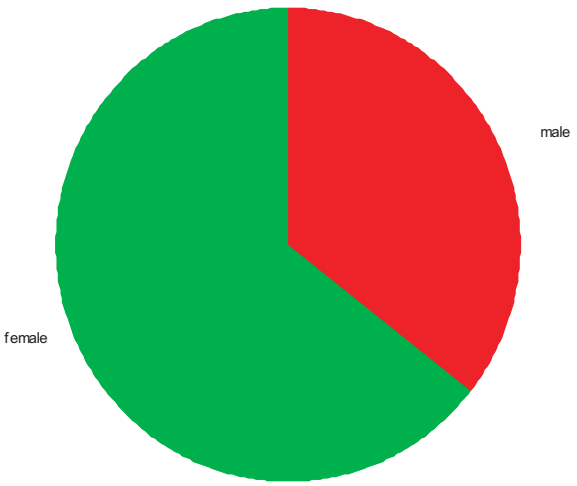
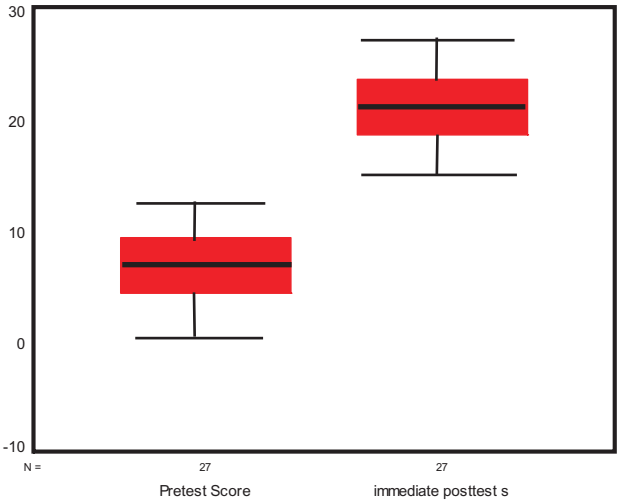


Figure 2: **Box Plot Showing the Summary of the Pretest and Post Test Scores.**



DISCUSSION

Result showed that there were some impact of the training on the score between the pre and post-tests; however, the overall improvement in surveillance performance and implementation of the yellow fever case based surveillance from January 2009 will confirm if there is correlation between the knowledge and the practice of DSNOs in surveillance activities. Also the fact that participants are experienced and have been involved in surveillance activities for an average of 14 years are strengths to implementation of the yellow fever surveillance in the state. The mean score at pre test was very low, indicating that participants are not conversant with yellow fever surveillance requirements. This suggests that trainings focused on each of the priority diseases in the IDSR will be needed to keep the DSNOs abreast of knowledge of disease surveillance.

The number of years as DSNO and sex were predictors of high score at pre-test. Participants with more number of years as DSNO got high scores in post test compared to those with few numbers of years. This is not surprising because the surveillance requirements for yellow fever is very similar to other diseases with case based surveillance especially measles. This finding therefore suggests that caution should be exercised in changing DSNOs from their posts by LGA authorities as it has the potential of affecting surveillance performance negatively. Females significantly had higher mean score at posttest compared to males in this assessment. Previous report among the same group did not show any significant difference in post test score[4]. Surveillance activities have been equally well performed by DSNOs of either sex. However, in certain part of the country, females are recommended as either immunization officers or vaccinators due to socio cultural consideration[7].

CONCLUSION

In conclusion, the participants rated the training as excellent overall. This is comparable to the rating by participants of similar training conducted in 2006 [4]. The main strengths in this training included the availability of training materials, from WCO, and also the fact that there was enough time to plan. The training was relevant at the time it was conducted and the conduct was successful. Evidence from the pre and post test scores showed that it impacted knowledge on participants who are DSNOs from the LGAs in the State. This has a potential of improving field implementation of the yellow fever case based surveillance in the state. However correlation between knowledge and practice will be determined based on subsequent surveillance performance.

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