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A public–private partnership to reduce tuberculosis burden in Akwa Ibom State, Nigeria

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ABSTRACT

Background: Tuberculosis (TB) infection and spread are preventable, and TB disease is curable depending on individual and community knowledge of causes of the disease, mode of prevention and cure. An earlier educational intervention carried out in Akwa Ibom State (AKS) of Nigeria in 2006 created awareness of the disease and improved utilization of orthodox medical facilities of residents in 34 communities who had symptoms of TB.

Objective: The overall aim of this program is to reduce the burden of TB disease in 18 communities of AKS through educational intervention, TB case detection and integration into the State National Tuberculosis and Leprosy Control Programme (NTBLCP), as well as build laboratory capacity to improve TB case detection and control.

Methods: Prior to the educational intervention in each community, standard pretested questionnaires were administered to residents to test their knowledge, attitudes and practices concerning TB. Information about causes, symptoms and prevention of TB was disseminated in community town halls, churches, markets and schools. Individuals who were coughing for three weeks or more were investigated for TB following clinical examination by a physician. Three sputum samples (spot-morning-spot) were obtained from each individual and examined microscopically for the presence of acid-fast bacilli (AFB) using the Ziehl–Neelson staining technique. Those with positive AFB results were integrated into the existing NTBLCP treatment facilities for immediate commencement of Directly-Observed Therapy Short Course (DOTS). Treatment outcome was monitored by retesting patients' sputum after two, five and seven months. Two new laboratories were facilitated while existing laboratory capacity was built by providing higher resolution microscopes, power generating plants, refrigerators, locally-fabricated incinerators and furnishing of staff offices.

The program was facilitated by a public–private partnership. Effective Health Care Alliance Research Programme (EHCARP-Nigeria), in collaboration with Nigeria National Petroleum Cooperation and Mobil Producing Nigeria Unlimited (NNPC/MPN) Joint Venture,

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utilized health personnel from the Akwa Ibom State NTBLCP who conducted laboratory testing and supervised the treatment.

Results: The 916 responses to the questionnaires showed that 65.3% (549/841) correctly identified that TB is airborne, and 86% (749/871) were aware that TB could be cured by anti-TB medication. Responses to care-seeking attitudes were provided by 123 respondents. Of this number, fear of stigmatization was the reason for 31% (38) seeking care in unorthodox facilities, while 43.1% (53) did not believe that orthodox medicine could cure their symptoms.

Of the 374 detected cases, 9 did not commence treatment. Hence, 365 were placed on DOTS; 36 defaulted, while 11 either died or failed to convert after the seventh month. At the end of month 8, cure was achieved for 87.1% (318).

Conclusion: Although the previous intervention may have contributed to the good knowledge about TB and care-seeking attitudes displayed by respondents in the communities, sustaining active case finding through public–private partnership can go a long way to reduce TB burden, especially in rural communities where healthcare systems are generally weak or inadequate. Adequate funding of TB control activities is critical in eliminating TB as a public health problem, and the private sector participation such as this is a welcome development.

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Introduction

Tuberculosis (TB) is still a public health challenge in Nigeria which ranks 11th among the TB High Burden Countries (HBCs) [1]. A recent report from the national TB prevalence survey in Nigeria has provided a robust direct measurement of TB disease burden in the country for the first time. Amongst all national TB prevalence surveys since 2001, Nigeria has the highest prevalence to annual case notification ratio, at approximately 5 to 1 [1]. The report also revealed that 75% of untreated TB cases reside in rural areas with poor access to health facilities. In Nigeria, like most other countries endemic for TB, case finding for TB is passive (healthcare program waits for patients to come to the facility to seek help for their TB-related symptoms). While this may be ideal, not every person with infectious TB goes to the health facility. Consequently, these individuals continue to spread the disease to other people around them, further increasing the TB burden. In contrast, active case finding means going to places where there might be people with undiagnosed TB. The goal is to find, diagnose and treat TB sooner in almost all the people with the disease. Early detection of the disease is essential to further improve health outcomes for people with TB, and to reduce TB transmission more effectively. The current strategies recommended by the World Health Organization (WHO) Stop TB Partnership include the intensification of active case finding, as well as the engagement of all relevant healthcare providers in TB care and control through Public–Private mix (PPM). PPM encompasses diverse collaborative strategies among the public sector, such as the National Tuberculosis and Leprosy Control Programme (NTBLCP), and the private sector [2]. In recognition of this enormous public health challenge, and with the perspective of TB eradication in the country, a public–private partnership collaborated to reduce the TB burden in Akwa Ibom State (AKS) of Nigeria.

The TB program in AKS was first introduced in 2006, with a focus on creating awareness about the disease and educating the communities on appropriate care-seeking attitudes. The program outcome showed considerable improvement in both TB service utilization as well as case detection [3]. The objective of the phase II program hereby described was to reduce the TB burden in AKS through education, detection of TB cases and strengthening of laboratory capacity. This paper discusses the outcome of the second phase of the program, including knowledge, attitudes and practices affecting treatment-seeking behavior.

Methods

The phase II TB reduction program in AKS lasted 12 months and had the following components: training for program facilitators; consultation with community leaders; mobilization of community residents; administration of standardized, pre-tested questionnaires to test knowledge, attitudes and practices (KAP); and educational intervention through talks, focus group discussions (FGDs) and distribution of TB fact sheets. These were followed by detection of TB cases, integration into the existing DOTS program and laboratory capacity building. A total of 42 field (research and community) assistants and other relevant health workers (TB supervisors and Laboratory technicians) were trained at a workshop. The training module focused on the causes, transmission and symptoms of TB. Also incorporated into the training were HIV/TB co-infection and stigmatization, as they affect TB control. TB fact sheets from the Centers for Disease Control and Prevention (CDC) were modified to include specific messages as required by the NTBLCP. Trainers were drawn from the AKS NTBLCP led by the State TB coordinator. The program was carried out in 18 communities in the 6 selected local government areas (LGAs) of Uyo, Oron, IkotEkpene, OrukAnam,

Eket and Ibeno (the selection of communities was based on the recommendation of the State TB coordinator). Permission to carry out the work was obtained from the AKS Ministry of Health, in collaboration with the State National TB Control Programme. Prior to sample collection, participants were explained about the procedures and their consent was obtained with an option of declining.

The entire program lasted one year and was phased as shown in the Gantt chart (Appendix A). Educational intervention and sampling of individuals whose cough had lasted 3 weeks or more was carried out for 9 weeks. TB cases were detected by receiving 3 sputum samples (spot – morning – spot) from each individual with chronic cough. The sputum samples were examined by smear microscopy for the presence of AFB (acid-fast bacilli). Individuals confirmed to have AFB in their sputum were integrated into the existing DOTS (8 months' treatment regimen) facility nearest to their location of residence. Patients' sputa were retested for the presence of AFB after months 2, 5, and 7 to ascertain the effectiveness of the treatment. A clinician examined individuals who had a cough lasting 3 weeks or more but whose sputa were negative for AFB. Based on the physician's clinical judgment and patient history, some were treated with appropriate antibiotics, while a few of the others were integrated into the State DOTS program. Laboratory capacity was enhanced by providing higher resolution microscopes, power-generating plants, refrigerators, locally-fabricated incinerators and furnishing of staff offices. Nigeria National Petroleum Corporation (NNPC)/Mobil Producing Nigeria (MPN) Joint Venture sponsored the project through a non-governmental University-based organization–EHCARP (Effective Health Care Alliance Research Programme).

Results

Program outcome

At the end of the program, an estimated total of 9251 people were reached in the 18 communities (Table 1). A total of 374 TB cases were detected (140 cases detected during the intensive phase of the campaign and 234 cases referred by field assistants). Of the 374 patients, 9 did not commence treatment; hence, 365 (97.6%) were placed on DOTS. Of the 365 patients placed on DOTS, 318 (87.1%) were successfully cured of the disease. Thirty-six (10%) patients defaulted (stopped their treatment prematurely), while 11 (3.01%) had variable outcomes, including death or non-conversion at month 7 (Fig. 1).

Knowledge, attitudes and practices affecting care-seeking

Demographic data

The educational intervention preceded the active case detection exercise in the targeted communities. Nine hundred and sixteen (916) respondents filled the questionnaires. Some questionnaires had to be discarded for inappropriate responses. None of the participants responded to all the questions. Of the 896 respondents who indicated their gender, 474 were females (52.9%) and 422 were males (47.1%). Over 95% of the respondents were Christians (897/904). The age of respondents ranged from 10 to over 70 years and is distributed as shown in Table 1, with the majority (45.9%) of respondents in the category of 10–19 years (405/882). Equally, the majority of respondents were single 562/864 (65%), followed by those married 224/864 (25.9%) (Table 2).

The participants in this study cut across a wide range of occupations, including students 445/790 (56.3%), traders 162/790 (20.5%) and others including fishermen, artisans, small-scale businessmen or unemployed (23.2%). The educational attainment of the participants showed that 62.9% (563/895) of respondents had completed a secondary education, while only 7.5% (67/895) had no formal education.

Knowledge about TB

As many as 98.2% (703/716) of the respondents knew the traditional name for TB in their community. The knowledge of respondents on causes, transmission, cure and prevention of TB is summarized in Table 3.

Knowledge of the causes and ways of contracting TB. Various responses about the cause of TB were given by the respondents. The majority of respondents (540/834 = 64.7%) correctly identified bacteria as the cause of TB. However, other identified causes of TB included fungi in 4.8% (40/98), and spiritual attacks or witchcraft in 7% (58/98) of the respondents. On how TB is transmitted, 65% (549/841) of the respondents correctly indicated that inhalation of germs in the air was the route of transmission. Other responses are as shown in Table 3.

Knowledge about treatment. Knowledge about the treatment of TB was high with 86% (749/871) of the respondents stating that it could be treated and cured with orthodox medications. Other ways of curing TB as indicated by the respondents are shown in Table 3.

Table 1 – Number of people reached and TB patients registered in the 6 local government areas (LGAs).

LGAs	No. (%) of people reached	No. (%) of TB patients registered
Uyo	2607 (28.2)	14 (3.7)
Oron	871 (9.4)	30 (8.0)
IkotEkpene	798 (8.6)	109 (29.1)
OrukAnam	2486 (26.9)	204 (54.5)
Eket	1634 (17.7)	09 (2.4)
Ibeno	855 (9.2)	08 (2.1)
Total	9251	374

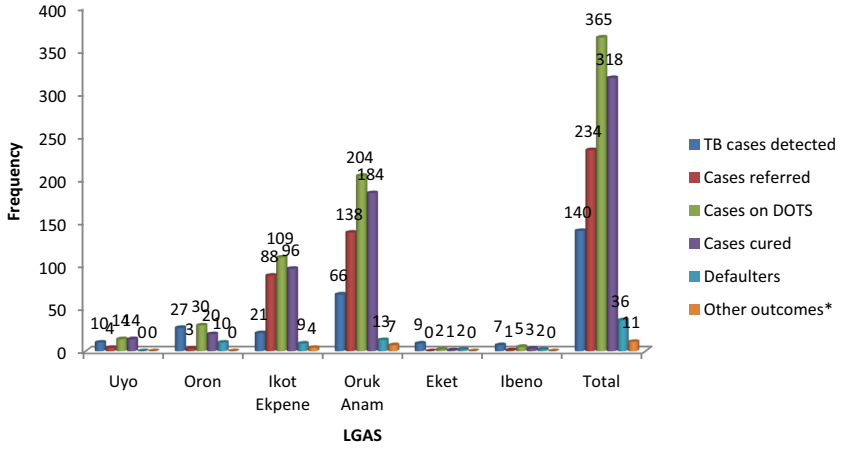

Fig. 1 – TB cases detected and cured. * Died or not cured.

Table 2 – Demographic characteristics of respondents.

Demographic characteristics	No. (%)
Gender	
Female	474 (52.9)
Male	422 (47.1)
Total	896
Age category	
10–19	405 (45.9)
20–29	186 (21.1)
30–39	140 (15.9)
40–49	90 (10.2)
50–59	39 (4.4)
60–69	16 (1.8)
70 & above	6 (0.7)
Total	882
Marital status	
Married	224 (25.9)
Single	562 (65)
Separated	26 (3.0)
Divorced	11 (1.3)
Widowed	41 (4.7)
Total	864
Occupation	
Student	445 (56.3)
Trader	162 (20.5)
Fishermen	22 (2.8)
Public servant	46 (5.8)
Unskilled labor	47 (5.9)
Skilled labor	40 (5.1)
Clergy	1 (0.1)
Unemployed	27 (3.4)
Total	790

Knowledge about prevention. Forty-four percent (323/737) of the respondents were of the opinion that seeking care for prolonged coughing in orthodox healthcare facilities was a way of preventing TB, while another 41.5% (306/737) of the respondents thought TB could be prevented by reducing contact with infected persons. Another 9.8% (72/737) of the respondents did not know how TB could be prevented, and 4.9% (36/737) reported that TB could not be prevented (Table 3).

Knowledge about TB symptoms. The respondents' knowledge of the symptoms of TB are shown in Fig. 2. The most

Table 3 – Knowledge of causes, transmission, cure and prevention of TB of the respondents.

Respondents' knowledge	*n* (%)
Causes	
Bacteria	540 (64.7)
Virus	118 (14.1)
Fungi	40 (4.8)
Spiritual attacks/witchcraft	58 (7)
Don't know	68 (8.2)
Total	834 (100)
Ways of contracting tuberculosis	
Bad food	54 (6.4)
Bad water	78 (9.3)
Curse	8 (1)
Don't know	103 (12.2)
Inhalation of germs	549 (65.3)
Touching a person with TB	26 (3.1)
Witchcraft	19 (2.3)
Others	4 (0.5)
Total	841 (100)
Cure for tuberculosis	
Native charms/sacrifice	19 (2.2)
Native herbs	20 (2.3)
Proper treatment with drugs	749 (86)
Cannot be cured	22 (2.5)
Don't know	61 (7)
Total	871 (100)
Prevention means	
Seeking care for prolonged cough	323 (43.8)
Reduce contact with patients	306 (41.5)
Did not know how to be prevented	72 (9.8)
Cannot be prevented	36 (4.9)
Total	737 (100)

common response was a lean appearance and coughing as reported by 92.5% (443/479) of the respondents. Forty of the 126 respondents (31.7%) thought there was no way of knowing if someone was infected with TB.

Attitudes and beliefs about TB

The majority of the respondents, 76% (655/862), did not agree that TB was a curse from the 'gods,' as was indicated by 8% of the respondents. However, as many as 16% (134/862) reported they did not know if TB was a curse from the 'gods'. In response to the question of their belief about TB resulting from witchcraft, 65% (570/861) of the respondents disagreed, while 34% (291/861) of the respondents either agreed or claimed ignorance. Fifty-five percent (459/841) of the responses favored TB patients and their families being accorded equal rights with others in the community, although only 37% (321/857) of the respondents believed it was okay to marry from a family where someone had TB.

Table 4 – Reasons for seeking alternative care for symptoms related to tuberculosis.

Reasons	*n* (%)
Stigmatization	38 (31)
Not treatable in hospital	53 (43.1)
Peer influence	11 (9)
Religion	21 (17.1)
Total	123

Care-seeking attitudes

About 60% (452/760) of the respondents reported they had never had any symptoms of TB. The care-seeking attitudes of the 308/760 (40.5%) respondents who admitted having some of the symptoms associated with TB varied as shown in Fig. 3. Most respondents in this category (257/308; 83.4%) sought care at the hospitals and health centers.

Amongst those who did not seek care from hospitals/health centers, the major reasons for seeking care in alternative places included fear of stigmatization (31%; 38/123) and lack of knowledge that the symptoms were treatable in the hospital (43.1%; 53/123). The other reasons given were peer influence (9%; 11/123) and religion (17.1%; 21/123) (Table 4). A total of 302 (46%) of the 658 respondents were aware of where to receive free drugs and up to 91% of the respondents (540/594) stated they would be willing to go to these free TB treatment centers if the need arose to do so.

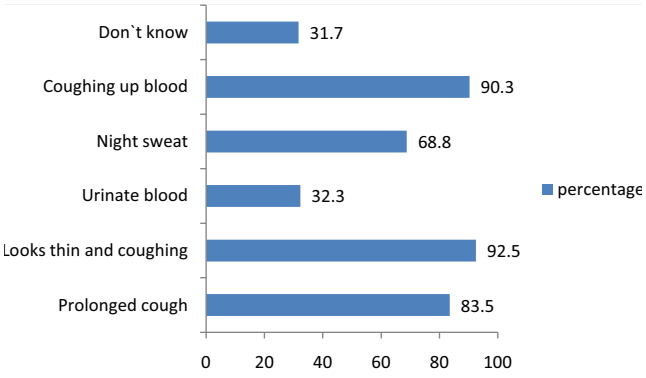

Fig. 2 – Respondents' knowledge of the symptoms of tuberculosis.

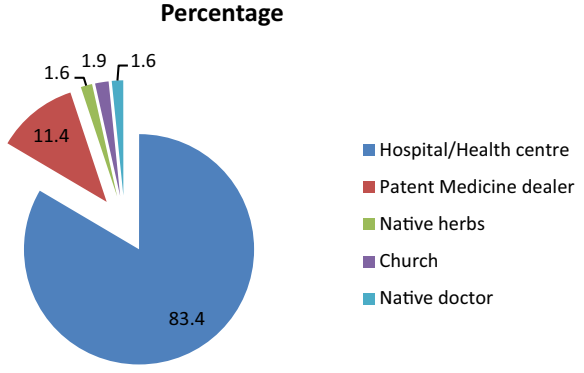

Fig. 3 – Preferred place of treatment for tuberculosis-like symptoms.

Discussion

By detecting and treating TB in patients earlier than would occur otherwise, Active and Enhanced Case Finding (ACF and ECF) can reduce the number of subsequent TB infections and prevent secondary cases, and it has been shown that focusing on cough as a determining symptom was sufficient [4]. In India, following an ACF intervention, a 6.7% symptomatic case was detected. This study recorded 4.04% of symptomatic case detection, which is slightly lower than the Indian study which covered out-patients population at health centers [5]. PPM could help increase case detection (between 10% and 60%), improve treatment outcomes (over 85%), reach the poor and save costs [2]. In Chiapas, Mexico, three strategies of ACF were compared: surveying for chronic coughers in a regional hospital, 7 primary care centers and 32 communities. High rates were obtained with each method, although case detection was highest in the hospital [6].

In this study, three of the areas, namely, Oron, Ikot Ekpene and particularly Oruk Anam, were "virgin" areas where no previous intervention took place before this study. A wider reach was also attained, notably due to the commitment of the TB supervisors in those areas. It has been shown that providing basic information about the earliest symptoms of TB and the procedures for diagnosis can increase diagnostic coverage, and thus reduce infection risk and help control programs to achieve high cure rates [7].

The program identified the need for laboratories for TB detection in two LGAs with no testing facilities. Donation of microscopes, refrigerators, incinerators, generators and other furniture to Eket and Ibeno to improve access of community members to TB testing facilities would consequently improve TB case detection. The other 4 LGAs that had laboratories alongside the two newly established ones were provided with 2.9 kva power-generating plants to improve their services. Some of the fundamental elements required to successfully reduce TB burden are efficient health care services that will enable early diagnosis and adherence to treatment [7]. Moreover, strengthening health care services would promote a higher level of health consciousness in the society, which would ultimately lead to an increased number of symptomatic patients visiting health facilities. Passive case finding (PCF) could be successful if augmented with diagnostic services and improved training of healthcare personnel [4].

In some areas, the TB treatment centers were located several kilometers from the rural communities where many patients were identified. This was particularly true of Ikot Ibritam and Ikot Esenam in Oruk-Anam LGA located at a far distance from the DOTS center at Ikot Okoro hospital; hence, the need to establish a DOTS center at Ikot Esenam. A study in Kenya has shown that the proportion of suspects detected at four district hospitals decreased with increasing distance from hospital; however, the proportion of bacteriologically-positive cases increased with increasing distance from the hospital [8]. This finding suggested that patients living far from the hospital were less likely to present until their symptoms had progressed significantly. Patients living far from the hospital were more likely to attend peripheral health units where diagnostic resources were limited [8,9]. This is in concordance with our finding at Oruk-Anam LGA, especially at Ikot Esenam, where there was no facility for TB diagnosis. The program, therefore, in collaboration with the State NTBLCP established a DOTS treatment center in the locality, thereby improving care-seeking attitudes and treatment outcomes of TB patients in the area. In addition, the burden of transportation costs to access medical care was significantly lessened. Collaborations between public and private providers of healthcare hold considerable potential to improve TB control [10]. Under PPM, the private sector provides either early and complete referral, or early and accurate diagnosis, for TB symptomatic patients [11].

Conclusion

Active case finding has been shown to supplement DOTS by yielding additional smear-positive TB cases, leading to early diagnosis and thus shortening the duration of infectiousness [12]. This approach has been proved useful in increasing case detection in both clinical and community settings, especially where HIV prevalence is high [13–16]. The program target of finding at least 300 TB cases set by the public–private partnership was achieved despite several challenges. On the whole, the ability of the program to detect and treat more than 300 cases is a major boost to case detection in AKS. Since each undetected case has the potential of infecting 10–12 susceptible individuals annually, the exercise has saved between 3000 and 3600 susceptible individuals from being infected. It is hoped that the efforts made by this program would be sustained.

Conflict of interest

None to declare.

Authors' contributions

A.E.A conceived and planned the study, coordinated the fieldwork, drafted and corrected the final manuscript. B.T.P carried out the fieldwork, collected data, drafted and edited the final manuscript. E.I. carried out the campaign and collected data, E.E. analysed the data, V.O. participated in the study design and campaign, P.N.A. drafted the questionnaire, edited the facts sheets, and analysed data. All authors read and approved the final draft.

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Appendix A. GANNT chart showing program of activities.

Activities/Weeks		Printing and purchasing of materials, relevant contact with government officials	Community consultation/ Workshop	Fieldwork and localities	Laboratory testing and release/dissemination of results	Registration and integration of positive cases into DOTS	Follow – up lab investigation (2^{nd}, 5^{th} and 7^{th} months)	Monitoring and collation of data	Final collation and report writing
Jan 2010									
Feb	1								
	2			Uyo (8-9) Oron (10-11)					
	3			Uyo (15-16) Oron (17-18)					
	4			Uyo (22-23) Oron (24-25)					
Mar	1			Eket (1-2) Ibeno (3-4)					
	2			Eket (8-9) Ibeno (10-11)					
	3			Eket (15-16) Ibeno (17-18)					
	4			IK (22-23) Orukanam (24-25) IK (29-30)					
Apr	1			Oruknam (31-1)					
	2			IK (5-6) Oruknam (7-8)					
	3								
	4								
May									
Jun - Oct									
Nov – Jan 2011									

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