International Journal of Medical Science and Health Research

Vol. 5, No. 04; 2021

ISSN: 2581-3366

Evaluation of House-to House Active Tuberculosis Case Finding Contribution to TB Case Notification in 10 States in Nigeria

Ogbuji Queen Chidinma [1], Ojo Ola Matthews [1], Owoyomi Oladipo [1], Anozie Ijeoma [1], Osho Adewale John [1], Ladipo Oladapo [1], Osinowo Kehinde [1],

[1]Association for Reproductive and Family Health (ARFH) Abuja, Nigeria.

doi: 10.51505/ijmshr.2021.5403 URL: http://dx.doi.org/10.51505/ijmshr.2021.5403

Abstract

Objectives: This article examines the contribution of the house-to-house active TB case strategy to TB case notification in ten Nigerian States.

Methodology-The study involved all Local Government Areas (LGAs) in the selected ten States in Nigeria. There was desk review of laboratory and facility registers for referrals from the community house-to-house intervention. Data collection process included engagement of Community Based Organizations(CBOs) and TB workers(CTWs) in the LGAs of the ten states, mapping of slums and hotspots with high potentials for TB cases, followed by sensitization and awareness creation in communities to provide accurate information on TB. House-to–house active case search, sputum collection from presumptive TB cases was done for diagnosis and linkage of positive persons to DOTS clinics for TB treatment. Data was analyzed using descriptive and inferential statistics. The excel 2016 version was used to provide basic analysis of frequency distributions of important variables, proportions and percentages for qualitative variables and results presented in tables and graphs. Data from source documents were integrated to generate the contribution of ACF to the state TB notification.

Results: This strategy increased TB case notification by 45% in the ten states and between 52-74% in three of the ten states.

Conclusion: The house-to-house search strategy has shown to be an effective approach in finding the missing TB cases in the slum communities in Nigeria over the passive approach. Scale-up is needed to increase TB case notification in Nigeria.

Keywords: Active TB case finding, Community TB Workers, House to house.

Introduction

Tuberculosis (TB), is a leading infectious killer disease and one of the top 10 causes of death globally (ranking above HIV/AIDS) [1]. It constitutes a major public health challenge globally and remains a huge burden to public health in Nigeria. In 2019, Nigeria was ranked 6th among the eight countries that accounted for two thirds of the global total burdens of TB, TB/HIV and drug resistant TB (DR TB) and first in Africa [1] The TB incidence rate in Nigeria is 219/100,000 and the Nigeria's TB case notification in 2019 was only 120, 266 out of an

Vol. 5, No. 04; 2021

ISSN: 2581-3366

estimated 440,000 TB cases [2]. Similarly, only 11% (2,384) DR-TB cases out of an estimated 21,000 cases in 2019 were diagnosed. Childhood TB cases notification (children less than 15 years) was only 8% of all forms of notified TB cases in the country. The target of eliminating TB in Nigeria at any date will be impossible if the current poor and alarmingly low TB case notification continues. Therefore, it becomes obvious that Nigeria needs new strategic interventions that would enhance the active TB case finding in the communities. The case notification is low in all the states in the country despite huge investments by government and its international partners in diagnostic and treatment components of this disease as evident by the site expansion and training of General Health Workers for DOTS provision [2].In addition to efforts made at the national and sub-national levels to achieve the United Nations High Level Meeting targets for 2022 for case notification, innovative community-driven activities are pertinent to increase the TB case finding profile of Nigeria.

ARFH in collaboration with NTBLCP, conducted a ***KAP survey among the general population, TB patients, HIV clients and Health Workers***, the first ***TB Patient Cost Survey*** (PCS) and also participated in NTBLCP/Breakthrough Action ***human-centered design qualitative study***. From these studies we found that the public awareness of TB is relatively high at 85%, however, the knowledge of the cause of TB is low at 24% [3], stigma and denial are still rife while 71% of households experienced catastrophic costs [4]. Also, poor health seeking behavior has been identified as a barrier to accessing TB services and this is further escalated by stigma, myths, misconceptions, religious beliefs, cultural norms and poor attitude of health workers [5,6,7]. These limitations that are often found in low resource settings underscore the inadequacy of the passive TB case finding approaches to control the spread of TB especially in the densely populated and over-crowded urban slums. Besides, Urban slums are associated with poor infrastructure development and poor supply of basic amenities such as water, electricity and a high level of crime rate due to unemployment and genuine means of livelihood. These situations pre-dispose the slum dwellers to poor health and increased transmission of communicable diseases such as TB and other infections. There are ample evidences in the literature about the effectiveness of the various models of active case finding interventions both in clinical and community settings [8] and the approach has been successful in crowded urban populations in countries like Pakistan, Nepal, Kenya, South India, and Nigeria among others [9 -14].To address the challenge of low TB case notification in Nigeria, the Association for Reproductive and Family Health (ARFH) and partners employed **''House-to-house''** active TB case finding in the slums and densely populated areas from July 2019 to December 2020 in 10 States of Nigeria including the Federal Capital Territory(FCT). We present in this article, the process and outcome of this intervention.

Objective of the study

This article examines the contribution of the house-to-house active TB case strategy to TB case notification in ten Nigerian States.

Vol. 5, No. 04; 2021

ISSN: 2581-3366

Methods

Study Design**:** The study design included desk review of existing TB registers in the DOTS clinics to identify areas/community with high number of TB patients and this helped in focusing on communities with higher TB burden. Also, mapping/identification of slums and hot spots within the communities in the intervention states were carried out by the CBOs and the TBLS. The list of the identified slums and hot spots formed the location of the intervention.

Study area**:** The house–to-house active TB case search was implemented in all the Local Government Areas (LGAs}in 9 Nigerian states and the FCT. Two states (Abia and Anambra) are located in the South East region, four states (Kaduna, Kano, Katsina and Sokoto) in the North West region, Osun and Oyo in the South West region, Rivers state in the South-south region while FCT is located in the North Central region of Nigeria. The FCT has the least number of LGAs (6 Municipal areas) while Kano state has the highest number of LGAs of 44. State saturation was achieved in terms of coverage ie the intervention was implemented in all the LGAs and Municipal areas of the states. Based on the National TB statistical report, the ten states were among the priority states in Nigeria with high burden of TB and accounted for approximately 50% of the estimated missed TB cases in 2019.

The Intervention**:** The Association for Reproductive and Family Health has over the years mentored several Community Based Organizations in the implementation of cost effective and sustainable community-driven model/health interventions in Reproductive health, Maternal and Child health, Family Planning, Adolescent health and other health programs. So in order to address the challenge of low TB case notification in Nigeria, ARFH employed the **''House-to-house''** active TB case finding model in the slums and densely populated areas of Nigeria from July 2019 to December 2020 in 10 States of Nigeria namely Abia, Anambra, Oyo, Osun, Rivers, Kaduna, Kano, Katsina, Sokoto and the Federal Capital Territory (FCT). The intervention model aimed at increasing the identification of all forms of TB cases through house-to-house search, contact tracing, sputum collection and transportation; ensure that communities have accurate knowledge of TB through community level mobilization, sensitization; improved access to quality TB/HIV services as well as strengthening the mechanism for community linkages and coordination by collaborating with relevant stakeholders in the LGA and community. During the house-to-house search, innovative **Social and Behavior Change activities based on the Health Belief Model (HBM) for behavior change** was employed, educating individuals on susceptibility and severity of TB as well as the benefits of prevention and treatment, and cultivating ***self-efficacy to prevent, diagnosed and treated for TB***. This approach addressed the barriers and weakest links to TB case finding at the different communities of implementation and helped to identify presumptive TB cases and linking them to diagnostic and treatment services.

House to house TB Case Search: House to house visits were conducted by the trained CTWs to identify presumptive TB cases (those coughing for two weeks or more), collect their sputum samples and transfer to GeneXpert centres or microscopy sites for diagnosis. Those with positive test results were contacted and linked to treatment centers and the smear negative symptomatic

Vol. 5, No. 04; 2021

ISSN: 2581-3366

cases were referred to the State TB Program for further investigation. Follow up of those placed on treatment was carried out by the CTWs to ensure adherence to treatment regimen and completeness of treatment. The activities of the CTWs were monitored by the CBOs, State TB Control teams and Association for Reproductive and Family Health. The target population for intervention included slum dwellers and densely populated households, contacts of TB index cases, women, men, children and the general community members. To drive commitment, effectiveness and improved efficiency in the house–to-house intervention, a performance-based incentive funding approach was adopted to engage CBOs on a given target for presumptive and positive TB cases. The target was based on the population and burden of TB in each state. The aim of this study is to examine the contribution of the House-to –house active case strategy to TB notification in Nigeria.

Sample procedure:
A multistage sampling technique was used as follow:

Stage 1 – State selection. Ten states including the FCT were purposively selected based on the burden of TB. These states accounted for approximately 50% of the estimated missed TB cases in Nigeria in 2019. All the LGAs in the intervention states were selected.

Stage II: The intervention employed the engagement of the lead CBOs in each of the States who worked in collaboration with the Community TB Workers (CTWs) within the state to identify TB cases. Selection of the CBOs was based on certain criteria such as previous experience of community TB project implementation or other health related projects and CBOs must be located in the state of implementation. Other criteria include- CBOs must have physical address and have sufficient structure to implement the intervention i.e availability of staff to carry out activities (adequate financial management and administrative structure in place. Request for expression of interest (EOI) was advertised on ARFH website. Short-listed CBOs were interviewed and the best organization was engaged per State. An orientation workshop was conducted for the selected Community Based organizations (CBOs) and CTWs to acquaint them on basic facts about TB and other TB program related issues that would enable them deliver on the Service Delivery Areas. It also guided the CBOs on the operational issues of the intervention. This was followed by awareness creation in the intervention communities to sensitize them about TB and for acceptability of the Community TB Workers(CTWs) during the house-to-house search. The suitability of the choice of methodology was based on the naturalistic and descriptive nature of quantitative research which is helpful to provide the information that addresses the specific objectives of the study [15].

Data collection instruments:
Two templates were developed for data collection. The first template was used to extract information from the registers at the facilities of important variables. The variables include: Number of Presumptive TB cases referred by CBOs, Number of sputum sample collected from the CBO that were processed and number of positive TB cases. The second template was used to retrieve information from the engaged CBOs. The items include: Number of households visited

Vol. 5, No. 04; 2021

ISSN: 2581-3366

by CTWs in the LGA within the month, Number of persons in the Households visited within the month, Number of Presumptive TB cases identified in the households visited by CTWs in the LGA within the month, Number of sputum sample collected, Number of Sputum sample sent for Lab test, processed and received results (Actual test done), Number of positive TB cases detected in the LGA within the month, Number of TB cases diagnosed by GeneXpert, Number of TB cases diagnosed by AFB microscopy, Number of TB cases diagnosed by X-Ray, Number of TB cases placed on treatment among those referred by CTWs in the LGA within the month and Number of TB index case whose contacts were traced within the community

Data Collection Procedure: Data collection was through retrieval of data from existing source documents which include the laboratory register, presumptive TB register, the facility TB register and the Local Government Central Register for referrals from the community house-to-house intervention. This review was done in 1,221 public health facility providing TB services where the community house–to –house was implemented. No Ethical approval for the study was received as the study was part of a routine statistical data review

Data Analysis: Data was summarized using descriptive statistics, frequency distribution tables and presented in tables and charts. The excel 2016 version was used for the basic statistical analysis of frequencies, percentages for categorical data and tables.

Results/Key findings

The result showed a total of 39, 420 TB cases were diagnosed and notified from the community house to house active TB case finding representing a 52% achievement of the set target while a total presumptive TB cases of 353, 992 was identified representing 47% achievement of the set target. The strategy increased the TB case notification by about 45% in the ten states and between 52-74% in three out of the ten states. Despite the ambitious target, the result showed a ratio of 1 positive TB case in every 9 presumptive TB case identified. However, out of the 39,420 TB cases diagnosed, only 39, 081 were placed on treatment. Data was summarized using descriptive statistics, frequency distribution tables and presented in tables and charts. The excel 2016 version was used for the basic statistical analysis of frequencies, percentages for categorical data and tables.

Table 1 shows the cascade and yield of the community TB intervention in the ten states ranging from number of households visited by the CTWs, presumptive TB cases identified, positives TB cases out of the identified presumptive and the number of patients placed on treatment. The table shows that a total of five hundred and eleven thousand, one hundred and eighty-one (511,181) households were visited in the ten (10) states where house to house active TB case search was implemented. In these households visited, three hundred and sixty-three thousand, seven hundred and fifty-eight (363,758) presumptive TB cases were identified out of which three hundred and fifty-three thousand, nine hundred and ninety-two (353,992) were tested for TB. The test result showed thirty-nine thousand, four hundred and twenty (39,420) individuals tested positive for TB. Thirty-nine thousand and eighty-one (39,081) individuals out of the number tested positive to TB representing 99% were placed on treatment. About 1in 9 presumptive TB

Vol. 5, No. 04; 2021

ISSN: 2581-3366

Cases identified was positive for TB. Furthermore, in about every 2 houses visited, a presumptive TB case was found.

Table 1: Community TB ACF result cascades and yield in the ten (10) States (Q3-2019 - Q4-2020)

Indicators (Variables)	Results
Number of households visited in the community	511,181
Number of Presumptive TB cases identified	363,758
Number of Presumptive TB cases tested	353,992
Number of TB Cases Diagnosed	39,420
Number of TB Cases Placed on Treatment	39,081
Percentage (%) TB Cases Placed on Treatment	99%

Table 2 shows the quarterly results for number and percentage achievement for both presumptive TB cases identified and positives cases diagnosed viz a viz the target. It also shows the ratio of presumptive TB case to a positive TB case. There was increase in the number of both presumptive TB cases identified and positive TB cases detected from commencement of the intervention in Qrt 3, 2019 to Qrt 1, 2020. There was a rise from 31% in quarter 3, 2019 for positive TB cases detected to 54% in quarter 4, 2019 and 57% in quarter 1, 2020. Similarly, the same trend was seen for the presumptive TB cases of a rise to 47% in quarter 4, 2019 from 30% in quarter 3 2019 and 48% in quarter 1, 2020. However, a decrease was observed in Qrt 2, 2020 and then a rise in Qrts 3- 4, 2020 respectively.

Tables 2: ACF TB case detection achievement (Q3-2019 - Q4-2020) in the 10 States of implementation versus intervention target.

Indicators (Variables)	Reporting period						
	Quarter-3 2019	Quarter-4 2019	Quarter-1 2020	Quarter-2 2020	Quarter-3 2020	Quarter-4 2020	Total (N)
TB Case Target	13580	13580	12035	12035	12035	12035	75298
TB Case Achievement n (%)	4173 (31%)	7397 (54%)	6853 (57%)	5760 (48%)	6927 (58%)	8310 (69%)	39420 (52%)
Presumptive TB case achievement							
PTB Case Target	135798	135798	120347	120347	120347	120347	752982
PTB Case Achievement n (%)	40355 (30%)	63919 (47%)	58188 (48%)	48036 (40%)	61353 (51%)	82141 (68%)	353992 (47%)
Ratio of Presumptive TB Case to a TB case							
Presumptive TB	40355	63919	58188	48036	61353	82141	353992
TB Case	4173	7397	6853	5760	6927	8310	39420
Ratio of PTB/TB Case	**10**	**9**	**8**	**8**	**9**	**10**	**9**

Vol. 5, No. 04; 2021

ISSN: 2581-3366

Table 3a shows the pre-ACF intervention period for number of TB cases notified and presumptive TB cases respectively in the ten states while Table 3b and 3c show the contribution of community Active TB Case Finding(ACF) to the overall and individual State TB case notification and presumptive in the 10 states respectively. The ACF intervention increased the TB case notification by about 45% in the ten states and 52-74% in three out of the ten states. Table 3a shows the quarterly contribution in the 10 states for both presumptive and positive TB cases. The result showed a similar pattern as in table 1. There showed a rise in contribution to the total TB case notification in the states in Qrt 4, 2019 (52%) from 34% in Qrt 3, 2019 following the commencement of the community intervention. However, a drop was observed in subsequent quarters. Similarly, a rise of 14% was observed in qrt 4, 2019 from qrt 3, 2019(36% and 50% respectively) for the presumptive TB case and a drop in the subsequent quarters of the intervention. Table 3b shows contribution of ACF to individual State TB notification for both presumptive and positive cases. There was a contribution of 24-74% to the states positive TB cases across the ten (10) states and a very significant contribution of 52-74% to the overall TB cases in three (3) out of the ten (10) states.

Table3a: States TB case notification (Pre-ACF interventions) in the 10 states.

Q1 2019		**Q2 2019**	
Number of TB Case notified	**Number of Presumptive TB Case**	**Number of TB Case notified**	**Number of Presumptive TB Case**
10,178	**71,042**	**10,483**	**82,559**

Table 3b: Quarterly Percentage contribution of Community TB ACF Intervention to the 10 States TB presumptive and case notification.

Indicators (variables)	**Reporting period**						
	Quarter -3 2019	**Quarter-4 2019**	**Quarter-1 2020**	**Quarter-2 2020**	**Quarter-3 2020**	**Quarter-4 2020**	**Total (N)**
TB Case notification							
States Data	12,406	14,102	13,911	12,017	16,163	19,544	88,143
ACFTB case n (%)	4,173 (34%)	7,397 (52%)	6,853 (49%)	5,760 (48%)	6,927 (43%)	8,310 (43%)	39,420 (45%)
Presumptive TB case							
State PTB cases	113,346	128,243	136,482	115,631	188,573	281,353	963,628
ACF PTB case n (%)	40,355 (36%)	63,919 (50%)	58,188 (43%)	48,036 (42%)	61,353 (33%)	82,141 (29%)	353,992 (37%)

Vol. 5, No. 04; 2021

ISSN: 2581-3366

Table 3c: ACF Contribution to Individual State's achievements of Presumptive TB Case and TB Case (Q3 2019 – Q4 2020)

		Number of Presumptive TB Case			Number of TB Case notified		
	STATE	**State's Data**	**ACF**	**ACF % Contribution**	**State's Data**	**ACF**	**ACF % Contribution**
1	Abia	16,779	4,327	26%	2,053	700	34%
2	Anambra	43,396	11,101	26%	4,394	1,107	25%
3	FCT	13,671	3,844	28%	2,424	570	24%
4	Kaduna	99,128	26,106	26%	8,242	2,357	29%
5	Kano	305,782	90,018	29%	16,901	8,727	52%
6	Katsina	142,182	94,426	66%	14,053	10,409	74%
7	Osun	87,244	43,055	49%	8,773	4,757	54%
8	Oyo	101,811	20,010	20%	11,571	3,416	30%
9	Rivers	64,112	16,119	25%	6,631	1,688	25%
10	Sokoto	89,523	44,986	50%	13,101	5,689	43%
	Total	**963,628**	**353,992**	**37%**	**88,143**	**39,420**	**45%**

Sex disaggregation of TB cases notified from the community ACF intervention.

Table 4 shows the sex disaggregation of the TB cases from the community intervention. About two-third of the TB cases detected are female while male make up of only one-third of the detected TB cases from the community intervention.

Table 4: Sex Disaggregation of TB cases notified

	STATE	**TB Case by Sex**	
		Male	**Female**
1	Abia	455 (65%)	245 (35%)
2	Anambra	598 (54%)	509 (46%)
3	FCT	348 (61%)	222 (39%)
4	Kaduna	1461 (62%)	896 (38%)
5	Kano	5861 (67%)	2866 (33%)
6	Katsina	7112 (68%)	3297 (32%)
7	Osun	3019 (63%)	1738 (37%)
8	Oyo	2050 (60%)	1366 (40%)
9	Rivers	912 (54%)	776 (46%)
10	Sokoto	3807 (67%)	1882 (33%)
		25,623 (65%)	**13797 (35%)**
	Total	**39,420 (100%)**	

Discussion

Low TB case notification in Nigeria remains a major challenge. Hence strategies that will increase case finding and improve TB case notification and treatment are considered very important to the policy of Nigerian Government to eliminate TB by 2030. The house-to-house

Vol. 5, No. 04; 2021

ISSN: 2581-3366

active TB case finding implemented by ARFH in ten states of Nigeria including the FCT made significant contribution to overall case notification in those states. As evident on table 2: ACF TB case detection achievement (Q3-2019 - Q4-2020) in the 10 States of implementation versus intervention target**:** A rise in the number of identified presumptive TB cases and detected positive TB cases was observed in the 10 states following commencement of the house –to – house strategy in Qrt3, 2019 – Qrt 1, 2020.

This result corroborates the findings of other studies of the effectiveness of active case finding approach in increasing TB case notification. In a study conducted by Ogbudebe et al (2015) on " Active TB case finding in urban slums in Southeastern Nigeria" it revealed a high prevalence of TB in Nigeria slum population and recommended that targeted screening of out-patients, TB contacts, and HIV-infected patients should be optimized for active TB case finding in Nigeria. Also, in another study by Mastinu etal(2016) in Northern Italy, the finding showed the impact of active surveillance for efficient control of spread of TB disease. However, despite the increase observed in Qrt 3, 2019 –Qrt 1, 2020, the decrease observed in Qrt2, 2020 is not unconnected to the impact of the global Corona virus pandemic and national lockdown and restriction of movements. Hence, the community activities of outreaches, awareness creation in hot spots and in places with large gathering such as market, churches, motor parks were not conducted. House-to-house search was also reduced. However, with the ease of restrictions in Qrts 3 and 4, 2020, a sharp rise was documented.

There was an observed relationship between the number of presumptive TB cases and number of positive cases as States with higher identification of presumptive TB cases by the CTWs had higher number of positive TB cases. This is evident in Table 3b: Quarterly Percentage contribution of Community TB ACF Intervention to the 10 States TB presumptive and case notification and Table 3c: ACF Contribution to Individual State's achievements of Presumptive TB Case and TB Case Q3 2019 – Q4 2020. The low number of presumptive TB cases identified in FCT and Abia States may have also contributed to the low positive TB cases and the overall contribution to the State data. This may be due to poor performance of the engaged CTWs and/or low coverage of the LGAs in the States. Similarly, the high number of presumptive TB cases in Katsina, Kano, Osun and Sokoto States may have also contributed to overall TB positive cases notified in those states. This could be attributed to the high performance of the engaged CTWs in those states. This shows that intensive active case finding activities within the community are essential for finding the missed TB cases and increasing case notification.

A 1% pre-treatment loss to follow-up was observed during the intervention (39,081 out of 39,420 patients were placed on treatment). The reason adduced to this observation was economic reasons as patients were unable to access supported baseline investigations provided by the grant due to lack of fund to transport themselves to the facilities where such investigation could be done.

Sex disaggregation of the TB cases from the community intervention shows that a higher proportion of men (65%) was diagnosed of TB than the women (35%). This corroborates the global report that men are likely to be diagnosed with TB. WHO Global tuberculosis report 2016

Vol. 5, No. 04; 2021

ISSN: 2581-3366

indicated that men are more likely to be diagnosed with TB than women, with a male-to-female ratio of 6:1, globally [17]. Different factors have been proposed to explain this gender gap including biological differences in disease and disease presentation and different access to health care specifically in developing countries [18] [19] [20]. An analysis of Tuberculosis and gender, a study by Sukhesh Rao2009 indicated that the male to female ratio in patients of pulmonary tuberculosis was 2:1, which was also maintained when smear positive and smear negative were studied separately[24]. It could be that the health seeking behaviour of females is better than that of males. When family members are sick, female tend to take them for health services. Also, female attend antenatal clinics and immunization for their children and hence are more in contact with health services than men.

Limitations:

The study utilized review of existing source documents in the facilities hence, the variables explored for inferential statistics were facility-based. This limited the inclusion of individual level variables such as socio-demographics (marital status, educational status, occupation, place of residence, income), and laboratory findings.

Conclusion

This study showed an increase in TB case finding in the ten (10) states from commencement of the house to house active case finding intervention. An association was observed between the number of households visited and the number of presumptive and positive TB cases detected. The intervention contributed up to 45% to the overall TB case notification in the ten states and 52-74% in three out of the ten states. Out of the 39,420 TB cases diagnosed, only 39, 081 were placed on treatment. The reason adduced to the 1% pre-treatment loss to follow was due to economic reasons as patients were unable to access supported baseline investigations provided by the grant due to lack of fund to get to the facilities where such investigation could be done. The implication of the result is that sustained effort in the house–to-house strategy will result in increasing the number of TB cases detected within the communities and thereby reducing the gap in the missing cases in Nigeria. Also adequate support is needed for follow up of diagnosed TB cases to ensure all diagnosed patients are placed on treatment. House-to-house TB search is a good strategy for increasing the TB case finding in Nigeria and there is need for scale up of this intervention to other states of the country to enable Nigeria address the challenge of low TB case finding.

Acknowledgments

The Association for Reproductive and Family Health(ARFH) wish to acknowledge the financial support from the Global Fund to fight HIV/AIDS, Tuberculosis and Malaria through the National Tuberculosis, Leprosy and Buruli Ulcer Control(NTBLCP) of the Federal Ministry of Health Nigeria for the implementation of the house to house TB case finding. The immense efforts of the engaged Community Based Organizations and Community TB Workers in the house-to-house search for TB cases cannot be overemphasized. Many thanks to the AFB laboratories and GeneXpert sites and DOTS Clinic staff whose collaborative supportive contributed to the overall success of the intervention. The team spirit of the TB unit staff of ARFH in putting this

manuscript together and the constructive critiquing by Professors Elijah Bamgboye and Ademola Ajuwon of the manuscript is most appreciated.

References

1. WHO. (2020) Global Tuberculosis Report.
2. National Tuberculosis Leprosy & Buruli ulcer Control Program Annual Statistical Report, 2019
3. National Tuberculosis Leprosy & Buruli ulcer Control Program. (2017). Knowledge, Attitude and Practice Survey in Nigeria- Report
4. National Tuberculosis Federal Ministry of Health, Nigeria. (2017). Catastrophic Cost Survey Report.
5. Li, Y., Ehiri, J., Tang, S.L., Li D.K., Bian, Y.Q., Lin, H., Marshall. C., Cao, J. (2013). Factors Associated with Patient, and Diagnostic Delays in Chinese TB Patients: A Systematic Review and Meta-Analysis. BMC Medicine 11, 156. https://doi.org/10.1186/1741-7015-11-156
6. Yang, W.T., Gounder. C.R., Akande, T., De Neve, J.W., McIntire, K.N., Chandrasekhar. A., de Lima Pereira, A., Gummadi, N., Samanta, S., Gupta, A.(2014). Barriers and Delays in Tuberculosis Diagnosis and Treatment Services: Does Gender Matter? Tuberculosis Research and Treatment, Article ID: 461935. https://doi.org/10.1155/2014/461935
7. Krishnan.L., Akande, T., Shankar, A.V., McIntire, K.N., Gounder, C.R., Gupta, A., Yang, W.T. (2014). Gender-Related Barriers and Delays in Accessing Tuberculosis Diagnostic and Treatment Services: A Systematic Review of Qualitative Studies. Tuberculosis Research and Treatment, Article ID: 215059 https://doi.org/10.1155/2014/21505.
8. Golub, J.E., Mohan, C.I., Comstock, G.W., Chaisson, R.E. (2005). Active Case Finding of Tuberculosis: Historical Perspective and Future Prospects. International Journal of Tuberculosis and Lung Disease 9, 1183-1203
9. Yuen, C.M., Amanullah, F., Dharmadhikari, A., Nardell, E.A., Seddon, J.A., Vasilyeva, I. (2015). Turning off the Tap: Stopping Tuberculosis Transmission through Active Case-Finding and Prompt Effective Treatment. Lancet 386, 2334-2343. https://doi.org/10.1016/S0140-6736(15)00322-0
10. Kusimo. O., Olukolade, R., Ogbuji,Q. , Osho, J ., Onikan, A., Hassan, A., Ladipo, O., Owoyomi, O., Bakare, J., Onyemaechi, S., Lawanson, A. (2018). Implementation of the Active TB Case Finding in Nigeria; Processes, Lessons Learnt and Recommendations. *Journal of Tuberculosis Research* **6**, 10-18. doi: 10.4236/jtr.2018.61002
11. Mastinu, A., Stobbione, T., Rivetti, D., Oddone, M., Terreno, M. (2016) Impact of Active TB Case Finding in a Population Resident in an Area of Northern Italy.Chest, 150, 279A. https://doi.org/10.1016/j.chest.08.292
12. Benson, U.O, Mobegi, D., Kiptai, T., Mueni, J., Mungai, M., Ngari, F., Mwamburi, C., Samoei, Z., Kamau. C. (2016). Increasing Tuberculosis Yield from Investigation of Contacts of Smear Positive TB Cases through Engagement of Civil Society

Organizations: Active TB Case Finding in Mombasa, Kenya. International Journal of Infectious Diseases45, 293-294. https://doi.org/10.1016/j.ijid.02.647

13. Ogbudebe, C.L., Chukwu, J.N., Nwafor, C.C., Meka, A.O., Ekeke, N., Madichie, N.O. (2015). Reaching the Underserved: Active Tuberculosis Case Finding in Urban Slums in Southeastern Nigeria. International Journal of Mycobacteriology 4, 18-24. https://doi.org/10.1016/j.ijmyco.2014.12.007
14. Alemayehu, M., Gelaw, B., Abate, E., Wassie, L., Belyhun, Y., Bekele, S. (2014). Active Tuberculosis Case Finding and Detection of Drug Resistance among HIV-Infected Patients: A Cross-Sectional Study in a TB Endemic area, Gondar, Northwest Ethiopia. International Journal of Mycobacteriology 3, 132-138. https://doi.org/10.1016/j.ijmyco.2014.02.004
15. Crosby, R.A., DiClemente, R.I., Salazar, L.F. (2006). Research Methods in Health Promotion Jossey –Bass, San Francisco.
16. WHO. (2016). Global TB Report
17. Van den Hof, S., Najlis, C.A., Bloss, E., Straetemans, M.(2010). A systematic review on the role of gender in tuberculosis control. KNCV Tuberculosis Foundation https://www.kncvtbc.org/uploaded/2015/09/Role_of_Gender_in_TB_Control.pdf [accessed 09.03.18]
18. Karim, F., Ahmed, F., Begum, I., Johansson, E., Diwan, V.K. (2008). Female-male differences at various clinical steps of tuberculosis management in rural Bangladesh. Int J Tuberc Lung Dis, 12 pp. 1336-1339 Medline
19. Jiménez-Corona, M.E., García-García, L., DeRiemer, K., Ferreyra-Reyes, L., Bobadilla-del-Valle, M., Cano-Arellano, B. (2006). Gender differentials of pulmonary tuberculosis transmission and reactivation in an endemic area. Thorax, 61 pp. 348-353 http://dx.doi.org/10.1136/thx.2005.049452 | Medline
20. Lim SS, Vos. T., Flaxman, A.D., Danaei, G., Shibuya, K., Adair-Rohani, H., *et al*. (2010) A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study. Lancet 380 (2012), pp. 2224-2260 http://dx.doi.org/10.1016/S0140-6736(12)61766-8 | Medline
21. Feng, J.Y., Huang, S.F., Ting, W.Y., Chen, Y.C., Lin, Y.Y., Huang, R.M., *et al*. (2012) Gender differences in treatment outcomes of tuberculosis patients in Taiwan: a prospective observational study. Clin Microbiol Infect, 18 pp. 331-337
22. Smith, G.S., Van Den Eeden, S.K., Baxter, R., Shan, J., Van Rie, A., Herring, A.H., *et al*.(2015). Cigarette smoking and pulmonary tuberculosis in northern California. J Epidemiol Community Health, 69 pp. 568-573 http://dx.doi.org/10.1136/jech-2014-204292 | Medline
23. Sukhesh, R.(2009). Tuberculosis and patient gender: An analysis and its implications in tuberculosis control Lung India. Apr-Jun; 26(2): 46–47. doi: 10.4103/0970-2113.48897PMCID: PMC2860414, PMID: 20440394