Assessing the Impact of Community Outreach/Participations on Public Health Diseases Indicators: Tuberculosis Control in Taraba State

[1]Nzunde Markus and [2]Dr. Haruna Ismail Adamu

[1]Post Graduate Student: Department of Public Health, Texila American University
[1]drmarkusnzu@gmail.com
[2]Zonal World Health Organization Coordinator North West Nigeria, Kano office, Nigeria

Abstract: *Public health initiatives play a vital role in addressing various health challenges, and community outreach programs are increasingly recognized as effective strategies for improving health outcomes. The broad objective of this work is to assess the impact of community outreach/participation on Tuberculosis and other public health diseases indicators in Taraba State Northeastern Nigeria in order to make appropriate recommendations to the National and State Health authorities. Specific objectives includes; to assess the impact of community outreach/participation on TB indicators in Taraba state Northeastern Nigeria, to assess the impact of community outreach/participation on other infectious diseases indicators in Taraba state Northeastern Nigeria, to assess the impact of community outreach/participation on non-communicable disease (NCDs) indicators in Taraba state Northeastern Nigeria, to make necessary recommendations to the State and National health Authorities on way to improve public health key indicators. The study adopt review of secondary TB data and review of articles on community engagement on public health diseases. The study revealed that, community outreach and engagement positively impacted on TB key indicators by increasing both presumptive and confirmed TB case notification in Taraba State. Community engagement significantly impacted positives on key indicators of public health diseases both communicable (like Poliomyelitis) and non-communicable diseases (like Hypertension, diabetes and cancer). Community engagement also ensure acceptability and sustainability of public health interventions. The study recommend community engagement impacted positively on key indicators of public health diseases. National and subnational health authorities and partners should consider community engagement as a critical strategy in public health interventions. This will ensure acceptability and sustainability of public health interventions*

Keywords: *Tuberculosis, community outreach, community engagement, key indicators, public health diseases*

INTRODUCTION

Public health initiatives play a vital role in addressing various health challenges (Smith et al., 2020), and community outreach programs are increasingly recognized as effective strategies for improving health outcomes (Jones & Brown, 2019). In this article, we will explore the impact of community outreach/participation on public health diseases indicators, focusing on tuberculosis, other infectious diseases, non-communicable diseases and cancer control in Taraba State, Northeastern Nigeria.

Tuberculosis (TB) remains a major global health concern with Nigeria ranking among the countries with high TB burden. Taraba State, located in northeastern Nigeria, has been identified as one of the states with a high prevalence of TB. In response to this challenge, various public health interventions, including community outreach programs, have been implemented to improve TB control in the state. The key indicator that is critical in monitoring TB control programme is the TB case notification. According to WHO reports, unnotified TB cases remain a serious challenge to TB control programme globally and Nigeria contribute 13% to the gaps of TB notification rate globally(WHO, 2022). Key indicators for other infectious and non-communicable diseases are poor in Nigeria and the worst affected region is the northeastern Nigeria where Taraba State is located (DHS, 2019).

Community engagement has been reported to impact positively on health outcomes. The World Health Organization (WHO) defines community engagement as: "a process of developing relationships that enable stakeholders to work together to address health-related issues and promote well-being to achieve positive health impact and outcomes." This effort represents a collaboration between public health professionals, government officials and community members to implement public health initiatives(Hawkins, 2023)

One key aspect of community outreach in TB control is the use of community health workers (CHWs) who are trained to educate community members about TB, conduct screening activities, and support patients throughout their treatment journey (Datiko & Lindtjørn, 2009). CHWs serve as bridges between healthcare facilities and communities, helping to increase access to TB and other health care services and improve health-seeking behavior among the population. This can be equally applicable to other diseases of public health important.

Therefore, the study aim to assess the impact of community outreach/participation on Tuberculosis and other public health disease indicators in Taraba State Northeastern Nigeria in order to make appropriate recommendations to the National and State Health authorities to guide public health interventions. Specific objectives includes;

i. To assess the impact of community outreach/participation on TB indicators in Taraba state Northeastern Nigeria
ii. To assess the impact of community outreach/participation on other infectious diseases indicators in Taraba state Northeastern Nigeria.
iii. To assess the impact of community outreach/participation on non-communicable disease (NCDs) indicators in Taraba state Northeastern Nigeria.
iv. To make necessary recommendations to the State and National health Authorities on way to improve public health key indicators.

Justification of the Study

Low TB case notification despite several intervention has been a big challenge to TB control activities globally. This is worse in developing countries like Nigeria which Taraba is one of the states in the poorest region of the country (North eastern region) (WHO, 2022; DHS 2019; NTBLCP 2012). Also other infectious diseases indicators and non-communicable diseases indicators are poor at both national and subnational levels with Taraba State located in the worst affected region (Northeast) of Nigeria (DHS, 2019). Assessing the impact of community engagement/participation on Public health diseases indicators may help the policy makers, programme implementers to guide strategies in public health diseases interventions.

Taraba Health System

The health system of the State operates at three tiers of Government with tertiary health facilities like the Federal Medical centre (FMC) Jalingo and upcoming Federal University teaching hospital Wukari and National Orthopedic hospital Jalingo are owned by the Federal Government, the sixteen General/ First Referral hospitals are owned by the State Government while all the Primary Health care (PHC) facilities are owned by the LGAs. Data from the State Ministry of Health showed there are seven hundred and thirty four (734) health facilities across the State. The level of service delivery of the health facilities is presented in the chart below;
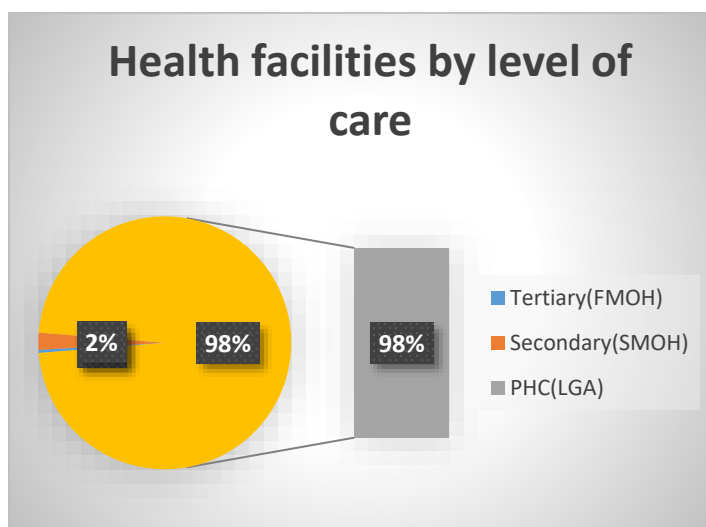

Figure 1: Pie chart of Taraba health facilities by level of care

Ninety eight percent of the health facilities are the Primary Health Care (PHCs) and 2% are secondary health facilities while tertiary constitute less than 1%. The PHCs are been managed under the State Primary Health Care Development Agency (SPHCDA).

However, the facilities by ownership; Private health facilities constitute 22% and the Government (LGA, State and Federal government) contribute 78% as presented in the pie chart below;
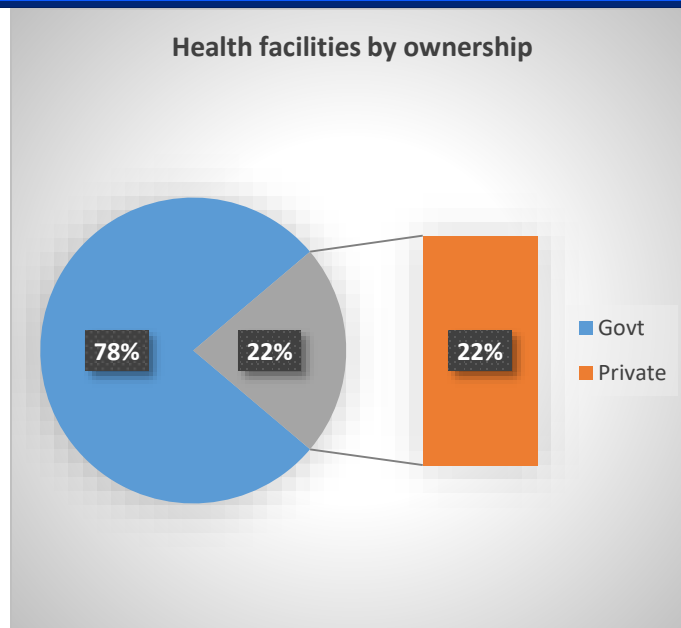
Figure 2: Taraba State health facilities Private/Govt ownership

Methodology

Study Area

Taraba state is one of the 36 states of the Federal Republic of Nigeria with estimated population of 3.5M (from 2006 census, 3% annual growth) as at 2019 people. Taraba State is located in the Northeastern region of Nigeria (DHS, 2019). This population figure may be higher due to the influx of IDPs form the neighboring states of Adamawa, Yobe and Borno (Lenshie & Yenda, 2016). The state has sixteen (16) Local government areas and 168 political wards that is politically divided into three senatorial zones namely; the north, central and southern senatorial zones. The map of Nigeria showing the location of the state and LGAs is shown in figure 1 below.

Figure 3: Map of Nigeria showing Taraba state and LGAs

Taraba state has an estimated population of 3.5M people that has a lot of hard to reach communities. There are mountainous areas like Sardauna, Gashaka, Yorro, Zing, Karim lamido, Takum and Ussa LGAs. The River Benue and its major tributaries like River Taraba, Donga and Kashimbilla transverse the State. Some communities are inaccessible especially during the peak of the raining season between July and September.

Majority of the State population are sustenance farmers and few Fishing communities around the River Benue and its tributaries. Few civil servants at the Federal, State and LGA levels. The State is second to Sokoto State with Poverty hand count index of 87.72% and high level of illiteracy rate (NBS, 2020). Poverty and high illiteracy rate are both drivers of TB transmission in the community.

Data Collection

Data of TB community outreaches conducted in Taraba state in 2019 were used for analysis and State TB data for three years before the outreaches and three years after the outreaches. TB case notification from the state TB control programme was requested by the researcher at the state level and these data were verified from the respective LGA TB treatment register. Data were presented as presumptive and confirmed TB cases in 2016, 2017 and 2018 (before intervention) and presumptive and confirmed TB cases in 2019, 2020 and 2021 (after intervention) and was analysed for impact. The data for the interventions were collated and analysed

Collated data were cleaned and analysed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 27 for calculating the proportion of increase or decrease in notification and advance statistical analysis respectively.

A total of six local government areas (LGAs) were involved in this study with three serving as intervention and three as controls. Each LGA had three pre-intervention data time points (2016, 2017, and 2018) for presumptive TB cases identified and three comparable pre-intervention data time points for the number of confirmed TB diagnosed. Similarly, each LGA also had three post-intervention data time points (2019, 2020, and 2021) for presumptive TB cases identified as well as three data time points for the confirmed TB cases diagnosed after the intervention had been instituted. Thus, a total of 36 data points was obtained for the pre-intervention and post-intervention periods respectively across the control and test areas. The map of Taraba State showing the intervention and control LGAs is presented in figure 4 below;
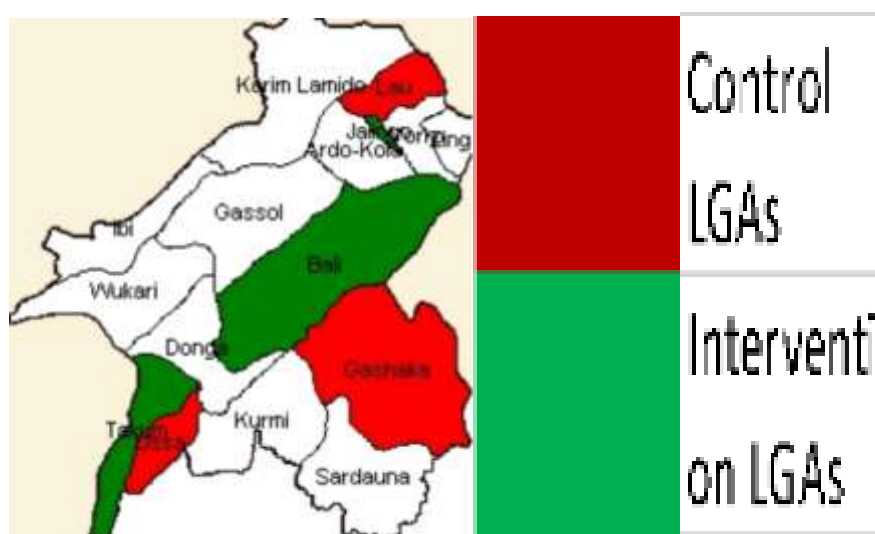

Figure 4:: Map of Taraba showing intervention and control LGAs

This research utilized a Split plot analysis of variance for Two-way repeated measure mixed design to test the statistical significance of the difference in the changes in presumptive TB identified cases and cases diagnosed before and after the intervention (over the six-year period) across the control and test areas while accounting for the role of time. Graphical plots of the linear change in the variable of interest is shown for both the intervention and control areas and we report analysis of variance of the mean measures together with associated p-values with significance set at 5%.

To estimate a significant difference-in-difference, this analysis approach created a between-subject factor (independent variable), which was the intervention as half of the subjects were intervention and half control, and a within-subject factor (independent variable) which was time – to represent the pre-intervention and post-intervention periods. The operation was conducted in SPSS version 27 and the analysis created an additional variable of the product of the two independent variables (Time*Intervention). The Box's M test for the equality of multiple covariance and the Levene's test for homogeneity were both ran. The Mauchly's test for sphericity was not conducted as there are only two levels of the within-subject independent variable time.

The Plots show the difference in the changes of presumptive and TB cases diagnosed over the time period between the pre-intervention and post-intervention. Time was plotted on the horizontal axes and denoted as T1 for pre-intervention and T2 for post-intervention while presumptive and confirmed cases were plotted on the vertical axes.

Google scholar and PubMed search engines were used to search for publications in other places on the impact of community outreach/participations in other communicable diseases and non-communicable diseases, recent articles on community impact on the disease indicators were done. Artificial intelligence (AI) was used to such for articles on community engagement and Public health interventions.

RESULTS DISCUSSION

Impact of Community Outreach on TB Case Notification Taraba State

The intervention took place in total of twenty-two communities; 10 in Bali LGA, 9 in Jalingo and 3 in Takum Local Government Areas (LGAs). Total of five thousand one hundred and thirty-three (5133) people were screened clinically for Tuberculosis. Two thousand and fifty-one presumptive TB cases (2051) were identified translating to 40% of the people screened. These presumptive TB cases contributed 22.5% to the total presumptive cases notified in the three intervention LGAs in 2019. 2051 presumptive TB cases identified were tested (100%) and 126 (6.1% of presumptive TB cases tested) were confirmed TB cases and were placed on treatment (100% of confirmed TB cases placed on treatment).

The outreaches contributed 6.4% to the total TB cases notified in the three ILGAs in 2019, while the intervention contributions to their 2019 TB notifications was 16%, 4% and 9% for Bali, Jalingo and Takum LGA respectively. Bali LGA intervention contribution to the annual case notification of the LGA was the highest among the intervention LGAs, while Jalingo LGA intervention contributed the least to the annual TB case notification. The cascade of the results of the intervention is summarized in the chart figure 5 below;
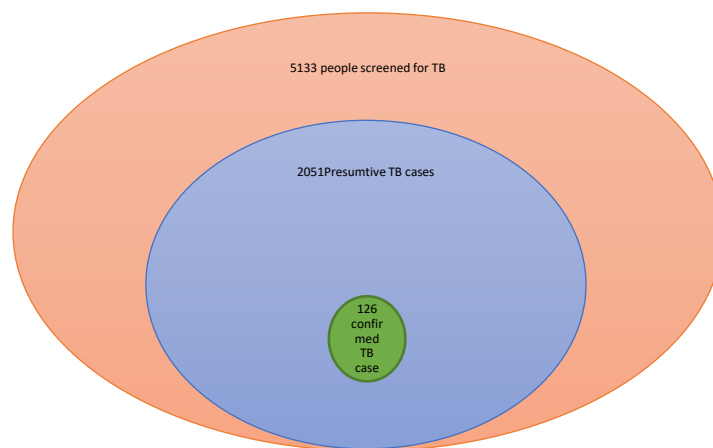

Figure 5: Summary of TB outreach data in the 3 iLGAs

The intervention contributed 2051(22%) presumptive TB cases to the total presumptive TB cases notified by the three intervention LGAs in 2019. This means without the intervention 22% of the presumptive TB cases notified would have been missed. The trend of presumptive TB cases in the intervention LGAs and Control LGAs is presented in the chart figure 6 below;
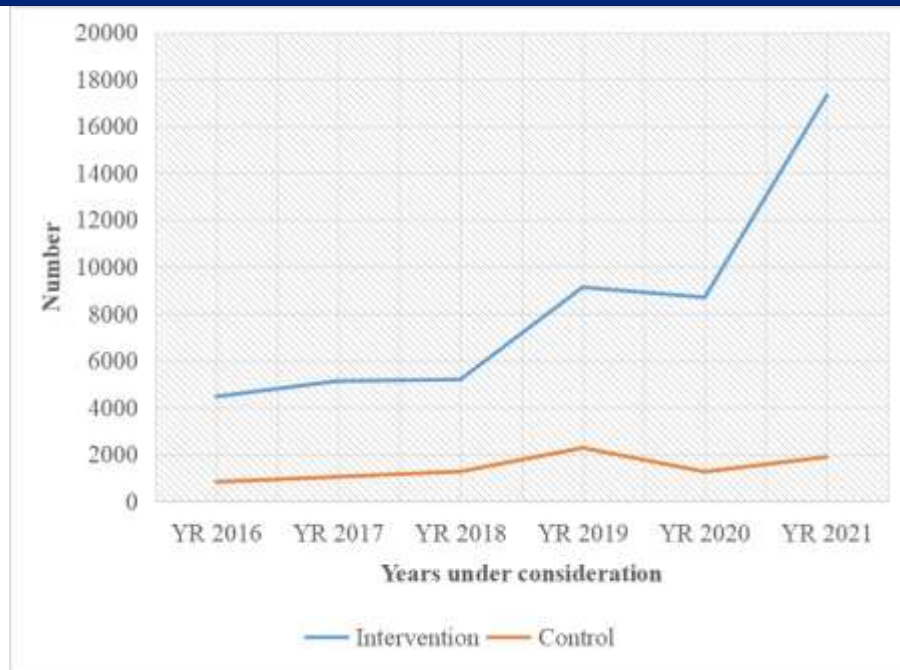
Figure 6: Trends of presumptive TB cases notified in ILGA/CLGA 2016 to 2021

Total presumptive TB cases notified in the three LGAs increased by 76% in 2019 compared to 2018. Similarly, the intervention contributed 126 (6.4%) confirmed TB cases to the total TB cases notified in the three intervention LGAs in 2019. These 126 TB cases would have been missed if the intervention did not take place or would be presented late to the facility.

There was 76% increase in total presumptive TB cases notified in the ILGAs in 2019 compared to the total presumptive TB cases notified same LGAs in 2018. However, the presumptive TB cases contribution to the total presumptive cases notified in the three intervention LGAs in 2019 was 22%. Trends of presumptive and confirmed TB notification 2016 to 2019 in both ILGA and CLGA presented in the Figure 7 and 8 respectively;
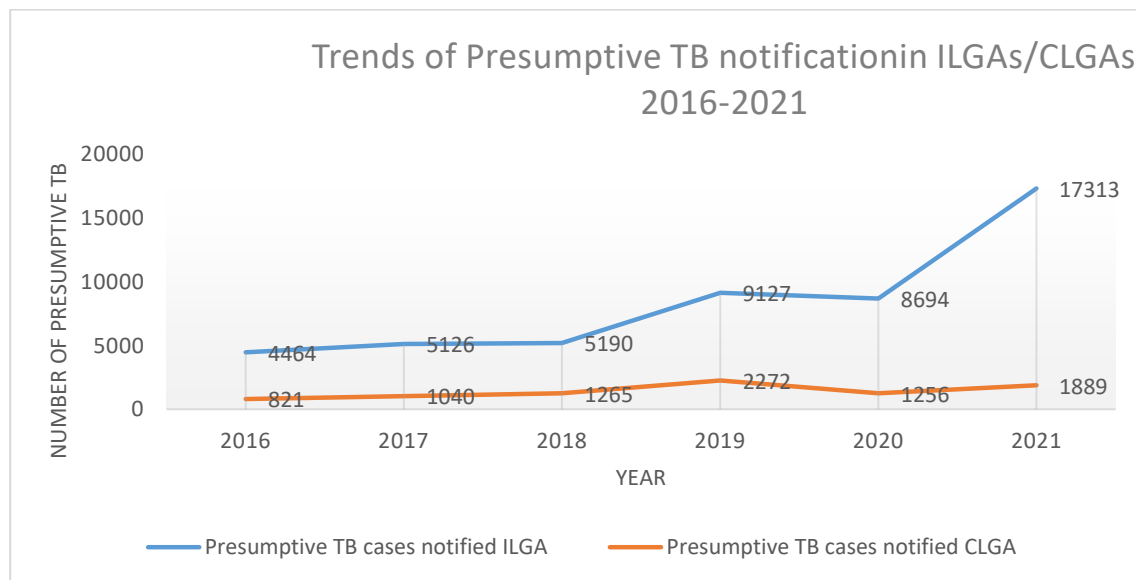

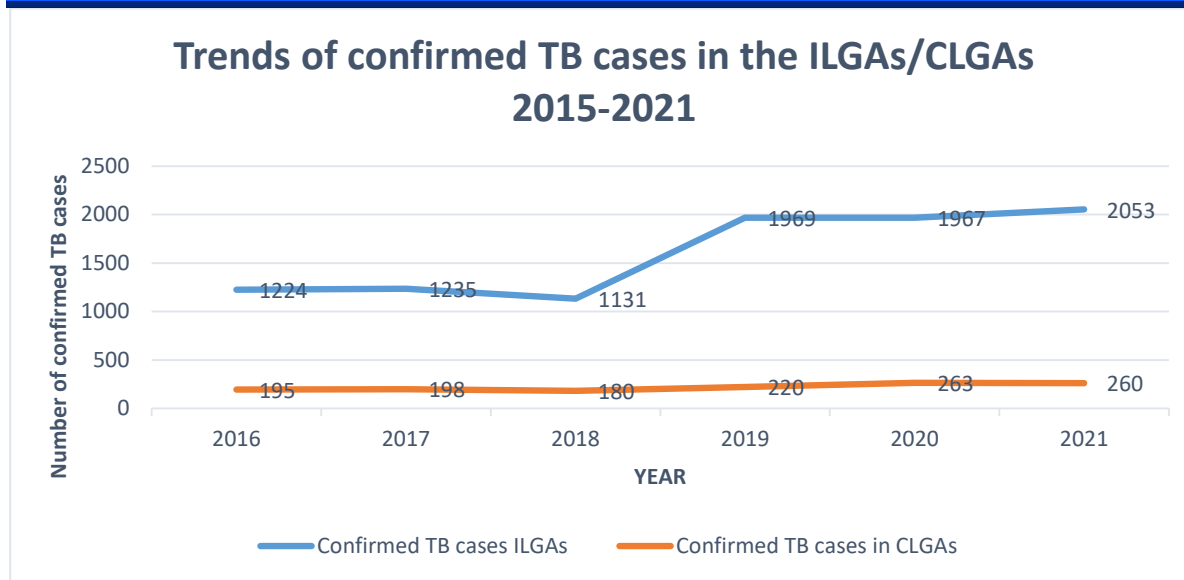*Figure 7: Trends of Presumptive TB notification in ILGAs/CLGAs 2016-2019*

Figure 8: Trends of confirmed TB case notification in ILGA/CLGA 2016 to 2021

As presented in the graph in figure 6 and 7 above, presumptive TB cases increased significantly on an upward trends after the intervention in 2019 in the three ILGAs. Similarly, confirmed TB case notification increased significantly in the three intervention LGAs.

The estimated marginal means of measure of impact for both Presumptive TB cases and confirmed TB cases between pre-intervention (T1) and post intervention (T2) shows significant increase in the ILGAs compare to the CLGAs as presented in plot figure 9 below;
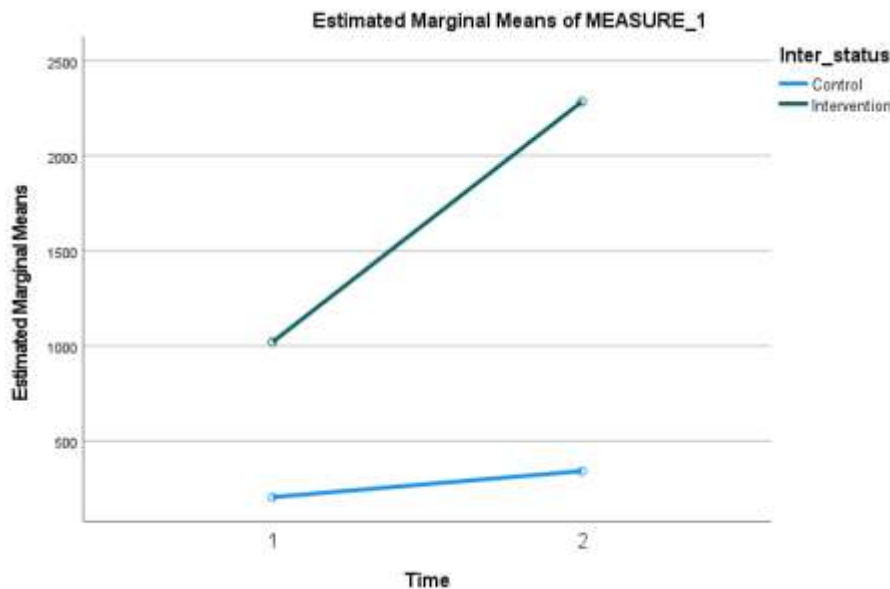

Figure 9: Estimated marginal means of measure of both presumptive and confirmed TB cases

Similarly, the same plots was ran for presumptive TB cases and confirmed TB cases separately between pre-intervention and post intervention, there were significant increase in both presumptive TB cases and confirmed TB cases between T1 and T2 in ILGAs compared to CLGAs as shown in the figure 10 and 11 respectively below;
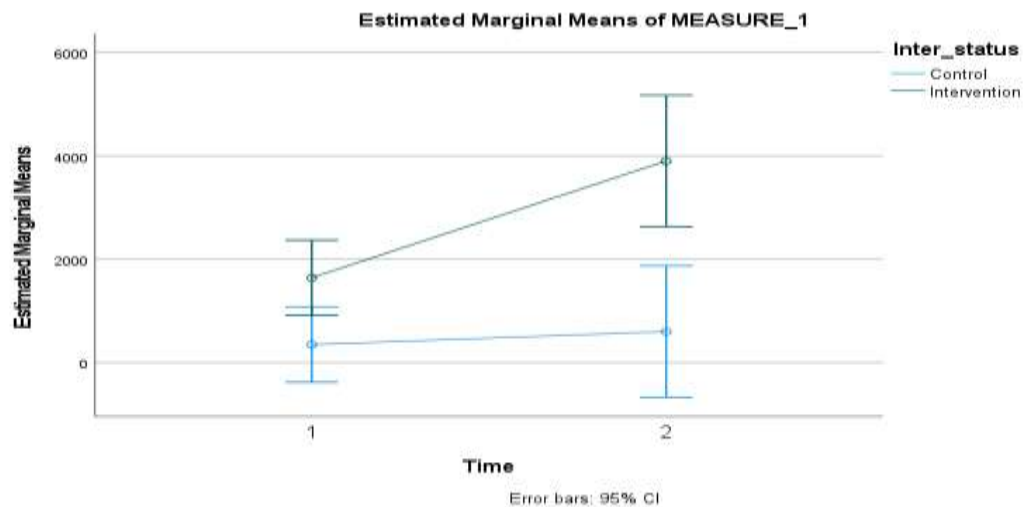
Figure 10: Estimated marginal means of measure presumptive TB ILGAs and CLGA between T1 and T2

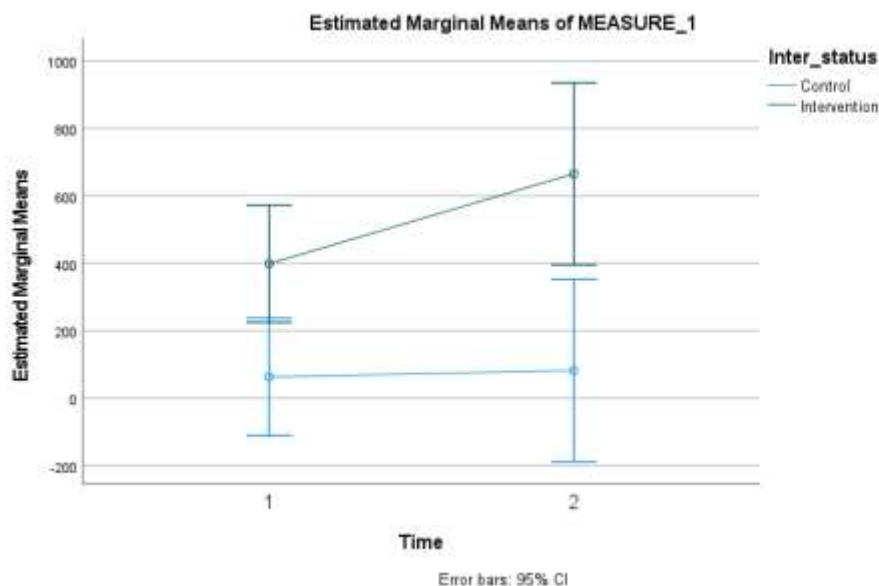*Figure 114: Estimated marginal means of measure Confirmed TB cases in ILGAs and CLGA between T1 and T2*

There is significant increase in both presumptive and confirmed TB cases between pre- intervention and post intervention period compare to the CLGAs. The intervention do not only impact on the TB notification in the ILGAs but there is significant increase in TB case notification of the State as presented in the figure 12 below;
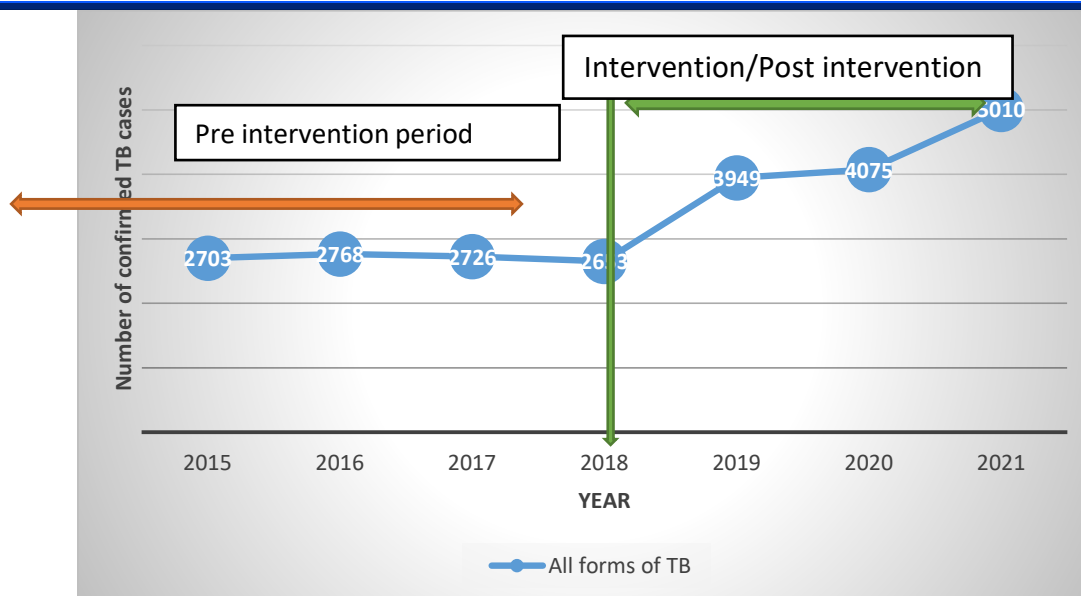
Figure 125: Trends of confirmed TB cases notified in Taraba state 2015 to 2021

Though the immediate impact on the presumptive and confirmed case notification (percentage of the State notification) might not be significantly high but the indirect impact might have contributed to the upward trends of the state TB annual case notification.

Impact of Community Outreach on TB Indicators in Nigeria and Globally

Various community engagement strategies have significantly improve TB case detection and notification globally, creating public awareness, reducing stigma and early treatment initiation (Smith, et al., 2020). Kato reported positive impacts of community outreach initiatives such as community health workers engagement, awareness creation on TB case notification and treatment outcomes in sub-Saharan African countries and resource limited settings(Kato, M., et al., 2018). An intervention/control study conducted in Ethiopia assessing the effect of village outreach on TB case detection shows that; the proportion of patients with >3 months' symptom duration was 41% in the intervention group compared with 63% in the control group (P<0.001). Pre-treatment symptom duration in the intervention group fell by 55–60% compared with 3–20% in the control group. The intervention was effective in improving the speed but not the extent of case finding for smear-positive TB in the intervention (Shargie et al., 2006).

In a guided community TB case notification in northern Uganda among key population, over all TB case notification in the intervention districts increased from 171 to 223 per 100,000 population between the baseline months of October–December 2016 and end line month of April–June 2017. TB patient contacts had the majority of TB positive cases identified during active case finding (40, 6.1%). Fishing communities had the highest TB positivity rate at 6.8%. Prisoners accounted for the lowest number of TB positive cases at 34 (2.3%) (Karamagi et al., 2018). In a systematic review study of intervention to increase TB case detection involving the community reported increase in TB case detection especially in the community with TB prevalence rate of more than 5% (Mhimbira et al., 2017). Community engagement has also impacted positively on TB notification in other studies conducted in other developing countries like Peru (Galea et al., 2022), Cambodia, Myanmar and Mozambique (Lorent et al., 2015).

A multifaceted community outreach conducted in the remote communities of southern Nigeria reported TB notifications in intervention areas increased by 112.9% compared to baseline and increased by 138.3% when compared to expected notifications based on historical trends. In contrast, control population notifications increased by 101% and 49.1%, respectively. Community volunteers indicated a preference for community outreach activities (Eyo et al., 2021).

In Kaduna State Nigeria, community based Directly Observed Treatment (DOT) on treatment adherence and outcomes has been reported positively among TB patients. Cure rate increased significantly (Awosan et al., 2019). Similar finding has been reported in Enugu State South eastern Nigeria (Nwokediuko et al., 2013).

In another study conducted at the northeast Nigeria, in the internally Displaced population (IDP) camps shows significant increase in TB and HIV notification after outreach in the camps (Abdullahi et al., 2020). Similarly, outreach intervention in Sardauna LGA in Taraba State showed positive impact on the TB case notification compared to a control Kurmi LGA (Nzunde et al., 2020).

Impact of Community Outreach/Participation on other Infectious Disease Indicators

Engagement of communities has improved sensitivity of Acute Flaccid Paralysis (AFP) surveillance at the peripheral and local levels in Niger (Ndiaye et al., 2003). Community engagement in Poliomyelitis eradication programme in Nigeria has significantly improved Polio vaccination coverage in Nigeria (Akinyemi et al., 2021). Also, community engagement in Polio eradication programme in northern Nigeria has improved programme acceptability and immunization coverage. Baseline and end line population-based random household surveys conducted in 2009 and 2013 showed improved community knowledge, increased use of antenatal care and immunization services, and a decrease in maternal, infant, and under-5 mortality after community engagement. In the project areas, the maternal mortality ratio fell from 1,270 to 1,057; under-5 mortality decreased from 160 to 90.1 per 1,000 live births, and infant mortality decreased from 90 to 46.9 per 1,000 live births. The overall coverage of fully immunized children rose from 2.2% to 19.3% (McArthur-Lloyd et al., 2016).

The implementation of community engagement strategies in the polio programme has enhanced coverage, acceptability and ownership of health programmes in high- risk areas such as hard- to- reach and conflict- affected communities, which would have otherwise been difficult to achieve. Community engagement has been beneficial and has encouraged the adoption of health services by individuals who have negative beliefs and attitudes by engaging them to discuss the basis of their beliefs and encouraging them to proffer solutions to issues they identified (Akinyemi et al., 2021).

Impact of Community Outreach/Participation on Non-Communicable Diseases Indicators

Community engagement through social mobilization has improved tackling of Non- Communicable Diseases (NCDs) in El Salvador (Caperon et al., 2021). Use of community interventions in communication to the community on reducing risks of NCDs in two developing resource constrained countries of India and Indonesia has impacted positively on the control of NCDs in those researched areas of India and Indonesia (Krishnan et al., 2011).

(a) Impacts on Diabetes Mellitus and Hypertension Indicators

In a systematic literature review and meta-analysis, evidence suggests that community-based interventions may reduce the incidence rate of T2DM and may positively affect anthropometric indices and HbA1C (Shirinzadeh et al., 2019). In a study in Japan; a country with high prevalence of Hypertension reported the prevalence rate of hypertension was 43.7%, and 44.1% of the respondents were involved in civic participation. Community-level civic participation, but not social cohesion or reciprocity, was negatively associated with hypertension in the total population (prevalence ratio (95% confidence interval): 0.98 (0.96–0.99), P = 0.004) and female group (0.97 (0.95–0.99), P= 0.015), and the association neared significance in the male group (0.98 (0.96–1.005), P = 0.13) after adjustment for individual-level social capital dimensions including civic participation, individual-level covariates, and population density as a community-level covariate. The interaction between community-level civic participation and sex in relation to hypertension was significant (P = 0.012). There was a contextual preventive relationship between community-level civic participation and hypertension (Nakagomi et al., 2019).

Community engagement initiatives are crucial in raising awareness about the risk factors, symptoms, and complications associated with hypertension and diabetes mellitus. Educational workshops, health fairs, and outreach programs conducted in collaboration with community organizations help disseminate vital information to at-risk populations. By increasing knowledge and promoting healthy lifestyle choices, communities can play a proactive role in preventing and managing these chronic conditions as reported by Jones and colleagues in 2017 (Jones et al. 2017).

Community engagement fosters support networks and resources for individuals with hypertension and diabetes mellitus to adopt healthier behaviors and self-management practices. By organizing exercise classes, cooking demonstrations, support groups, and peer counseling sessions, communities empower individuals to make positive changes in their daily lives. This collaborative approach enhances adherence to medication regimens, dietary recommendations, and physical activity guidelines (Brown et al. (2019).

Community engagement efforts bridge gaps in healthcare access and ensure that individuals with hypertension and diabetes mellitus receive timely and appropriate care. Through partnerships with local clinics, mobile health units, and community health workers, underserved populations can access screenings, monitoring, and treatment services. This proactive approach reduces barriers to care and promotes early detection, leading to better disease management outcomes (Garcia et al. 2020).

Impacts of Community Engagement on Cancer Indicators

Leveraging community networks such as community health workers, religious organizations, traditional leaders, and educational institutions increased awareness of cervical cancer. Working within existing social structures and training community members through the research effort were promising methods for addressing the disparities in cervical cancer incidence and mortality among communities (Habila et al., 2021).

Community engagement in identifying and setting priorities, decision-making, implementing, and evaluating potential solutions helps people share their views and encourages a sense of ownership and increases the likely success of healthcare interventions in security challenged communities (Durrance-Bagale et al., 2022).

Community engagement plays a crucial role in raising awareness about cancer risk factors, symptoms, screening options, and available resources. By involving community members in educational campaigns, workshops, and outreach programs, individuals are empowered to make informed decisions about their health. This approach has been shown to increase knowledge about cancer prevention and early detection, leading to improved health-seeking behaviors as reported by Johnson (Johnson et al, 2018).

Community participation in cancer screening programs has significantly increase the uptake of screening tests such as mammograms, Pap smears, and colonoscopies. By community engagement using community health workers, local organizations, and healthcare providers, barriers to access and utilization of screening services can be addressed. This collaborative approach results in more individuals being screened for cancer at earlier stages when treatment is most effective as reported by Smith, L., et al in a systematic review (Smith et al. 2020).

Community engagement efforts also play a vital role in providing support to cancer patients, survivors, and their families. Peer support groups, survivorship programs, and community-based services help individuals navigate the challenges of a cancer diagnosis, treatment, and recovery. By fostering a sense of community and belonging, these initiatives contribute to improved quality of life, mental well-being, and overall health outcomes (Brown et al. 2019).

Discussion of Findings

Community TB outreach positively impacted on presumptive TB case notification in Taraba State Northeastern Nigeria. Consequently impacted on confirmed TB case notification. This means community outreach and engagement if guided can improve TB case notification and other TB control indicators as reported in other studies in Nigeria (Eyo et al., 2021). This is similar to findings in other Sub-Saharan African countries and resource limited settings like Taraba State in the northeastern Nigeria (Kato et al., 2018). This is also in agreement with global findings on how various community engagement had impacted positively on TB case notification and other indicators (Smith et al., 2020). Improving TB case notification is critical in reducing the burden of TB disease in the community. Detecting TB cases early and placing them on treatment apart from treating the patient to be cured is contributing to reducing the transmission of the disease. Long duration treatment of TB requires community involvement to ensure successful treatment completion.

Other infectious diseases of Public health important like Poliomyelitis had indicators positively impacted by the good community engagement and participation (Akinyemi et al., 2021).. This is demonstrating community engagement to be critical in Public health disease control and interventions. This is more important especially in the hard to reach communities which is typical of Taraba State.

Non-communicable diseases like Hypertension, Diabetes mellitus and Cancers indicators have significantly impacted by community engagement. These have been reported globally and locally by other researchers (Nakagomi et al., 2019). Apart from improving the diseases indicators, community engagement improves sustainability and acceptability and success of interventions (Durrance-Bagale et al., 2022).

Improved public knowledge on Hypertension and diabetes mellitus diseases, risk factors, healthy dietary habits and access to care have been attributed to good community engagement. This if implemented in the resource limited setting like Taraba State might improve the indicators of these disease control.

Similarly, community engagement improved public awareness about cancer diseases, risk factors, symptoms, screening options available in the locality. This has also increased uptake for the screening and early diagnosis and treatment thereby improving the

key performance indicators and the quality of public health. This community engagement if correctly implemented in public health interventions will improve public health diseases key indicators in Taraba State.

Conclusion

In conclusion, community outreach/engagement plays a crucial role in improving public health diseases key indicators, as demonstrated in TB and other diseases control. The case study of Taraba State demonstrates the positive impact of community engagement in raising awareness, increasing access to care, and ultimately reducing the burden of TB in the region. By harnessing the power of community outreach/engagement, we can continue to make strides towards achieving better health outcomes for all individuals. The power of community engagement in improving public health disease indicators is not limited to infectious disease intervention, other non-communicable diseases intervention like hypertension, diabetes mellitus and cancers can utilize community engagement for better results and acceptability.

Community engagement and participation play a pivotal role in the control and management of hypertension and diabetes mellitus. By fostering collaboration, education, and access to resources, communities can empower individuals to lead healthier lives and effectively manage these chronic conditions. Also, community engagement and participation are essential components of comprehensive cancer control strategies. Empowering communities to take an active role in cancer prevention and care, we can make significant strides in reducing the burden of cancer and improving the health and well-being of individuals worldwide. Federal health authority and the State Ministry of health and partners to consider community engagement as a critical strategy in diseases (both communicable and non-communicable) control interventions.

REFERENCES

Abdullahi, S. A., Smelyanskaya, M., John, S., Adamu, H. I., Ubochioma, E., Kennedy, I., Abubakar, F. A., Ago, H. A., Stevens, R., & Creswell, J. (2020). Providing TB and HIV outreach services to internally displaced populations in Northeast Nigeria: Results of a controlled intervention study. *PLoS Medicine*, *17*(9), 1–20. https://doi.org/10.1371/JOURNAL.PMED.1003218

Akinyemi, O. O., Adebayo, A., Bassey, C., Nwaiwu, C., Kalbarczyk, A., Fatiregun, A. A., Alonge, O. O., & Owoaje, E. (2021). Assessing community engagement in Nigeria polio eradication initiative: Application of the Consolidated Framework for Implementation Research. *BMJ Open*, *11*(8), 1–11. https://doi.org/10.1136/bmjopen-2021-048694

Brown, K., et al. (2019). Impact of Community Support Services on Cancer Patient Well-Being: A Qualitative Analysis. Journal of Psychosocial Oncology, 37(2), 189-202.

Brown, S., et al. (2019). Impact of Community-Led Lifestyle Interventions on Hypertension and Diabetes Self-Management: A Longitudinal Study. Journal of Health Behavior and Lifestyle, 15(3), 278-292.

Caperon, L., Arakelyan, S., Innocenti, C., & Ager, A. (2021). Identifying opportunities to engage communities with social mobilisation activities to tackle NCDs in El Salvador in the context of the global COVID-19 pandemic. *International Journal for Equity in Health*, *20*(1), 1–13. https://doi.org/10.1186/s12939-021-01559-3

DHS. (2019). Nigeria Demographic and Health Survey Key Indicators Report. *National Population Commission (NPC) Nigeria and ICF. 2019. Nigeria Demographic and Health Survey 2018 Key Indicators Report.Abuja, Nigeria,and Rockville, Maryland, USA:NPC and ICF*, *May*.

Durrance-Bagale, A., Marzouk, M., Tung, L. S., Agarwal, S., Aribou, Z. M., Ibrahim, N. B. M., Mkhallalati, H., Newaz, S., Omar, M., Ung, M., Zaseela, A., Nagashima-Hayashi, M., & Howard, N. (2022). Community engagement in health systems interventions and research in conflict-affected countries: a scoping review of approaches. *Global Health Action*, *15*(1). https://doi.org/10.1080/16549716.2022.2074131

Eyo, A. S., Obot, V. O., Onyedinachi, O., Vasquez, N. A., Bigio, J., Sanaie, A., Beulah, F., Ette, U., Uju, D., & Rahman, M. T. (2021). A multi-faceted approach to tuberculosis active case finding among remote riverine communities in southern Nigeria. *International Journal of Environmental Research and Public Health*, *18*(18). https://doi.org/10.3390/ijerph18189424

Galea, J. T., Puma, D., Tzelios, C., Valdivia, H., Millones, A. K., Jiménez, J., Brooks, M. B., Yuen, C. M., Lecca, L., Becerra, M. C., & Keshavjee, S. (2022). *A structured community engagement strategy to support uptake of TB active case-finding. 12*(1), 18–23.

Garcia, M., et al. (2020). Community Health Worker Interventions on Hypertension and Diabetes Control: A Comparative Effectiveness Study. Journal of Community Medicine, 25(4), 432-447.

Habila, M. A., Kimaru, L. J., Mantina, N., Valencia, D. Y., McClelland, D. J., Musa, J., Madhivanan, P., Sagay, A., & Jacobs, E. R. (2021). Community-Engaged Approaches to Cervical Cancer Prevention and Control in Sub-Saharan Africa: A Scoping Review. *Frontiers in Global Women's Health*, *2*(July), 1–12. https://doi.org/10.3389/fgwh.2021.697607

Hawkins, C. V. (2023). Community engagement. *The Palgrave Handbook of Global Sustainability*, *3–3*, 2169–2177. https://doi.org/10.1007/978-3-031-01949-4_143

Jones, R., et al. (2017). Community-Based Health Education Programs for Hypertension and Diabetes Awareness: A Systematic

Review. *Journal of Community Health Promotion*, 20(2), 145-160.

Johnson, A., et al. (2018). The Impact of Community-Based Health Education on Cancer Awareness and Early Detection. *Journal of Community Health*, 45(3), 321-335.

Karamagi, E., Sensalire, S., Muhire, M., Kisamba, H., Byabagambi, J., Rahimzai, M., Mugabe, F., George, U., Calnan, J., Seyoum, D., & Birabwa, E. (2018). *Improving TB case notification in northern Uganda : evidence of a quality improvement-guided active case finding intervention*. 2, 1–12.

Krishnan, A., Ekowati, R., Baridalyne, N., Kusumawardani, N., Suhardi, Kapoor, S. K., & Leowski, J. (2011). Evaluation of community-based interventions for non-communicable diseases: Experiences from India and Indonesia. *Health Promotion International*, 26(3), 276–289. https://doi.org/10.1093/heapro/daq067

Lenshie, N. E., & Yenda, H. B. (2016). THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES Boko Haram Insurgency , Internally Displaced Persons and Humanitarian Response in Northeast Nigeria. *The International Journal Of Humanities & Social Studies*, 4(8), 141–150.

Lorent, N., Choun, K., Malhotra, S., Koeut, P., Thai, S., Khun, K. E., Colebunders, R., & Lynen, L. (2015). Challenges from tuberculosis diagnosis to care in community-based active case finding among the urban poor in Cambodia: A mixed-methods study. *PLoS ONE*, 10(7). https://doi.org/10.1371/journal.pone.0130179

McArthur-Lloyd, A., McKenzie, A., Findley, S. E., Green, C., & Adamu, F. (2016). Community Engagement, Routine Immunization, and the Polio Legacy in Northern Nigeria. *Global Health Communication*, 2(1), 1–10. https://doi.org/10.1080/23762004.2016.1205887

Mhimbira, F. A., Cuevas, L. E., Dacombe, R., Mkopi, A., & Sinclair, D. (2017). Interventions to increase tuberculosis case detection at primary healthcare or community-level services. In *Cochrane Database of Systematic Reviews* (Vol. 2017, Issue 11). https://doi.org/10.1002/14651858.CD011432.pub2

Nakagomi, A., Tsuji, T., Hanazato, M., Kobayashi, Y., & Kondo, K. (2019). Association between community-level social participation and self-reported hypertension in older Japanese: A JAGES multilevel cross-sectional study. *American Journal of Hypertension*, 32(5), 503–514. https://doi.org/10.1093/ajh/hpz028

NBS. (2020). *Nigeria Poverty and Inequality Report, 2019: Executive Summary*. May, 1–27.

Ndiaye, S. M., Quick, L., Sanda, O., & Niandou, S. (2003). The value of community participation in disease surveillance: A case study from Niger. *Health Promotion International*, 18(2), 89–98. https://doi.org/10.1093/heapro/18.2.89

Nzunde, M., Adamu, H. I., Saleh, J.-E. A., Ugwu, C., & Agbu, A. (2020). The Impact of Community Outreaches on Tuberculosis Case Notification in Sardauna Local Government Area, Taraba State, Nigeria. *OALib*, 07(10), 1–9. https://doi.org/10.4236/oalib.1106856

Shargie, E. B., Mørkve, O., & Lindtjørn, B. (2006). *Tuberculosis case-finding through a village outreach programme in a rural setting in southern Ethiopia : community randomized trial*. 024489(05).

Shirinzadeh, M., Afshin-Pour, B., Angeles, R., Gaber, J., & Agarwal, G. (2019). The effect of community-based programs on diabetes prevention in low- and middle-income countries: A systematic review and meta-analysis. *Globalization and Health*, 15(1), 1–13. https://doi.org/10.1186/s12992-019-0451-4

Smith, L., et al. (2020). Community Engagement Strategies to Promote Cancer Screening Uptake: A Systematic Review. *Cancer Prevention Research*, 12(4), 567-581.

WHO. (2022). *World Health Organization Global Tuberculosis Report 2022*. https://www.who.int/teams/global-tuberculosis-programme/tb-reports