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Abstract

Background. The World Health Organization (WHO) 2021 global TB report, until the COVID-19 pandemic, reported that TB was above HIV/AIDS as the leading cause of death from a single agent. TB is known to account for about 33% of all deaths associated with HIV. The risk of contracting TB is approximately 10-37 folds higher among PLHIV. Ghana, faced with the TB and HIV epidemic, implemented the WHO's TB/HIV collaborative policy guidelines to lessen the burden of TB among PLHIV. Active TB case-finding through TB screening and Isoniazid Preventive Therapy (IPT) initiation among PLHIV is one essential intervention in the policy.

Since the implementation of the intervention over two decades, screening targets have not been achieved. Information on the coverage of TB screening among PLHIV HIV visiting HIV clinics in Ghana is available. This information indicated that, despite the impact of TB in HIV-positive people, TB screening coverage among HIV clients has been low and fluctuated a few years after the implementation of the TB screening intervention among HIV clients. But there is no information on fidelity and determinants of implementing the intervention of TB screening among PLHIV, which is a crucial factor in determining the success of implementation. If available, information on implementation outcomes such as fidelity (adherence to guidelines), and implementation barriers can help identify the bottlenecks to successful implementation, and inform strategies for improving implementation processes and outcomes to achieve successful intervention outcomes.

Therefore, this PhD thesis aims to 1) assess the fidelity of the active TB case-finding through TB screening IPT initiation intervention among PLHIV attending HIV clinics in Ghana, and 2) explore implementation determinants of the TB screening intervention among PLHIV attending HIV clinics in Ghana. This is to provide context-relevant evidence that could inform the design of appropriate implementation strategies for supporting or strengthening implementation efforts in Ghana. The specific objectives included: determining the provider level fidelity to clinical protocols of the intervention; evaluating the influence of moderating factors on provider fidelity of the intervention; determining the facility level fidelity to the intervention; comparing the

moderating factors by facility level; determine an overall implementation fidelity using a composite of provider and facility level guidelines of the intervention, and exploring the determinants of implementation of the intervention among PLHIV attending HIV care clinics in Ghana.

Methods. The research was cross-sectional and explorative, conducted in 27 selected district hospitals with HIV or ART centres in Ghana. These 27 hospitals were purposively selected because, in the year 2018, they were identified to have started the initiation of IPT among HIV clients who have been confirmed of not having TB in Ghana. Fidelity was assessed at the provider, facility and combined levels. Items in the guideline related to the providers were grouped into three components (TB diagnosis – 10, TB awareness – 4, TB symptoms questionnaire – 2 items). At the facility level, the items were grouped into four components - intensive TB case-finding among PLHIV (ITCF) 5 items, IPT initiation (IPT) 3 items, TB infection control (TIC) 5 items and programme review meeting (PRM) 5 items. A summation of items score was used to determine fidelity scores. A computed median fidelity score was used in this study as the cut-off point due to lack of reference for determining what constituted a high-level fidelity or a low-level fidelity. Opportunity-based weighting approach was used to assess the combined fidelity. In addition, we conducted Focus Group Discussions (FGD) and Indepth Interviews (IDIs) to explore the determinants of implementation of the intervention.

Results. A total of 226 HIV healthcare providers and 27 facility managers were interviewed. Also, 8 FGDs with HIV healthcare providers and 17 IDIs with TB/HIV coordinators were conducted.

At the provider level, 60% (135) of the HIV healthcare provider were females, and their mean age was 34.5 years (SD=8.3). Majority were clinicians [63% (142)] and had obtained post-secondary non-tertiary educational level [62% (141)]. The proportion of the healthcare providers categorized to have implemented the intervention with high fidelity was 53% (119). Also, 56% (126), 53% (120), and 59% (134) of them implemented the TB diagnosis, TB awareness and TB symptoms questionnaire components, respectively, with high fidelity., Female healthcare providers (AOR=2.36, 95%CI: 1.09–5.10, p=<0.029), those with tertiary education (AOR=4.31, 95%CI: 2.12–9.10, p=0.040), and clinicians (AOR=1.78, 95%CI: 1.07–3.50, p=0.045) were more likely to

adhere to the guidelines compared to their counterparts, after adjusting for the clinic as cluster effect.

At the **facility** level, the median adherence score for ITCF component was 85.7% (IQR: 85.5-100.0), for IPT was 0% (IQR: 0-66.7), for TIC was 33.3% (IQR: 33.3-50.0), and for PRM components it was 90.0% (IQR: 70.0-90.0. Overall, the median adherence score for the facility was 62.1% (IQR: 58.6-65.1), with 17 clinics (63%) scoring above the median, categorized as high adherence. High adherence facilities had statistically significant lower PLHIV clinic attendees per month (256 (IQR: 60-904) than low adherence facilities 900 (IQR: 609-2622); p=0.042), and lower HIV provider workloads (28.6 (IQR: 8.6-113) than low adherence facilities 90 (IQR: 66.7-263.5); p=0.046). The high adherence facilities had most of the screening guidelines (76%, p<0.01) and questionnaire (80%, p<0.01) available on-site.

Also, at the combined level, the weighted fidelity median score was 67% (IQR: 59.9 – 74.9%), and the TB screening coverage was 71.3% (IQR: 56.9 – 96.7). The weighted fidelity of delivery is statistically associated with TB screening coverage (p<0.01). Facilities with TB IE&C materials available had significantly (p=0.025) higher median fidelity score (75.4% (74.9 – 88.5)) than their counterparts (65.7 (59.4 – 72.6)). All the other moderating factors investigated have no statistical association with weighted fidelity of delivery (p>0.05) except IE&C.

Participants in the qualitative study (phase 2) recognised TB screening as an essential intervention to decrease TB's burden among PLHIV. In addition, ease in TB screening for PLHIV, existing good communication and referral systems, effective goals setting and feedback mechanisms, good recognition for the need of the intervention by HIV healthcare providers, and the role played by existing chemical sellers were indicated by the HIV healthcare workers and coordinators as the main facilitators that promote the implementation of the TB screening among PLHIV.

The study also identified factors such as high workload, no transportation, nature of the disease, non-reimbursement of ancillary cost, lack of staff, no staff motivation, no in-service training, old infrastructures, lack of privacy and space, inadequate resources (laboratory), non-availability of enablers for clients and health works were also identified by the participant main barriers hindering the TB screening implementation among PLHIV attending HV clinics.

Conclusion. The study assessed fidelity of delivery at the different levels of health delivery, their related factors and determinants of implementation of TB screening at the HIV or ART clinics. Combined provider-facility fidelity was revealed as a practical approach to assessing implementation fidelity at the health facility. The separate fidelities showed the extent of implementation of the intervention guidelines as planned at the various levels. Hence, variations observed in the fidelity levels and related factors needed further investigation. The findings are critical in the wake of the rising public health importance of the double burden of TB and HIV in low- to middle-income countries like Ghana.

Implementation of TB screening is critical in PLHIV in Ghana. Programme managers, facility managers and TB/HIV coordinators should be devoted to ensuring HIV healthcare workers have regular in-service training, motivated through reimbursement of intervention-related costs and the provision of adequate space and privacy to ensure successful implementation of TB screening amongst HIV clients. Participants, especially HIV healthcare providers have accepted the intervention and therefore used the ease of the TB screening tool, feedback and supervision and their good network and communication to promote the implementation of the TB screening intervention among PLHIV attending HIV clinics.

Hence, knowledge of fidelity and both facilitators and barriers of implementation, and how to address them can inform the planning and implementation of the TB screening in HIV clinics and ART centres in Ghana and similar contexts across low- and middle-income countries worldwide.

Key Contribution. Most fidelity assessments were done at the provider level, however, this PhD has added fidelity assessment at the programme or facility level and especially combined facility-provider level which is missing in the implementation literature. Hence, it is an extension of knowledge and methodological innovation in implementation science. In addition, this study has demonstrated how to categorise fidelity into high or low fidelity.

This research reveals where efforts can be targeted to improve implementation fidelity to increase and achieve targets of TB screening coverage among PLHIV in Ghana. In addition, it showed the barriers to be addressed by the National TB Control Programme to ensure successful implementation of the intervention in Ghana.