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Non-Communicable Diseases in Vingunguti: Risk Factor Assessment and Intervention

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ABBREVIATIONS

CD	Communicable disease
CDI	Cambridge Development Initiative
HIS	Health information system(s)
MoSHW	Ministry of Health and Social Welfare
NCD	Non-communicable disease(s)

Non-Communicable Diseases in Vingunguti: Risk factor assessment and intervention

Anand Talwar[1]

ABSTRACT

CDI is aiming to increase NCD intervention efforts in Vingunguti, Tanzania, and devise a HIS for the area. In this paper, exploratory recommendations are given to the CDI regarding how to prevent the spread of NCDs in Vingunguti, and how CDI can gauge risk factors specific to the region. Based on the finding that asymmetric resource distribution and noncompliance to healthy behaviours are factors associated with increased NCD severity and mortality, it is suggested that increased collaboration with Tanzanian NCD-related NGOs and the Vingunguti community would be useful in preventing the spread of NCDs. Furthermore, it is also highlighted that CDI should conduct more research in Vingunguti to identify the risk factors specific to the region and devise tailored interventions. A longitudinal study involving a combination of WHO STEPwise approach and verbal autopsy to assess risk factors in Vingunguti are suggested. These recommendations are only exploratory and should be adapted in accordance to the actual risk factor dynamics that are revealed through future research.

Key words: Non-communicable diseases, Health information system, Verbal autopsy, STEP approach, Health

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I. Introduction

The significance of non-communicable diseases (NCDs) as a serious threat to public health is being increasingly acknowledged by NGOs, the media, and academia, which have all recognised how NCDs are accounting for increasing numbers of deaths. According to WHO, by 2020, NCDs are expected to account for 73 per cent of deaths and 60 per cent of the total disease burden in the world. NCDs have also been described as a 'silent epidemic' by the All China's Women Federation. Media outlets such as Caribbean 360 have turned their attention to how NCDs have become the leading cause of death in Jamaica. Ghaffar *et al.* (2004) have noted the burden of NCDs across South Asia. Bloom *et al.* (2012) have identified how the impact of NCDs is much more diffuse, while noting the global economic burdens associated with NCDs.

Particularly important in the fight against NCDs have been health information systems (HIS). Yusof *et al.* (2008) provide a comprehensive definition of HIS and argue that 'HIS assist healthcare organisations to gather, process, and disseminate information within the organisation and their environment. HIS incorporates a range of different types of systems, which may include patient systems, (and) administrative systems…'. Open MRS has highlighted the benefits of HIS for acute healthcare in developing countries, where there is no standardised health database. Positive projections by Health Standards for 2025 regarding multi-national corporation investment in HIS also suggest that there will be increasing scope for what can be done with HIS, enabled by decreased financial constraints.

The NCD and HIS issue is highly relevant to CDI's primary country of operation, Tanzania, given that the prevalence and mortality rates of diseases such as diabetes and hypertension have increased over the years (Mayige, 2011). CDI has also tried to raise awareness about NCDs in Vingunguti, through interventions such as women's health workshops on breast cancer. However, CDI has struggled to find ways to identify new NCD issues and evaluate current intervention programmes because of a lack of information consistency between hospitals. CDI is therefore attempting to develop an HIS in Vingunguti with relevant partner organisations.

In this paper, I provide exploratory recommendations to CDI as to how to prevent the prevalence and mortality of NCDs in Vingunguti. I focus on NCDs that are amenable to behavioural intervention, especially those associated with nutritional factors such as diabetes and hypertension. To do so, I provide answers to the following questions: What are the major risk factors associated with NCD severity and mortality? How can these risk factors be combatted? These recommendations are 'exploratory' because they are not based on studies in Vingunguti; inevitably, their implementation will be inflected by the particular NCD circumstances and operational capabilities in Vingunguti. I therefore also aim to provide recommendations for future research to CDI, regarding how to gauge NCD risk factors in Vingunguti that can be subsequently worked upon. I break down this task by answering two questions: What are the variables that

should be taken into account? What should be considered when implementing HIS that would compile NCD risk factor data in Vingunguti?

Accordingly, the structure of this paper is as follows. In the first section, I review literature of broad risk factors that increase NCD severity and mortality. In the second section, I propose recommendations on how CDI could combat these broad risk factors in Vingunguti. Noting the importance of knowing risk factors specific to Vingunguti, in the third section, I outline WHO's paradigmatic HIS that could be used by CDI. In the fourth and final section, I suggest how CDI can adapt WHO's approach into a longitudinal study in order to probe for a wider range of risk factors and recommend what should be considered, when creating a HIS that would organise accumulating risk factor data.

II. NCD Severity and Mortality Risk Factors

The first corpus of literature emphasises economic and healthcare efficiency factors, and the ability of healthcare systems to be effective with limited resources, as possible predictors of NCD mortality. Siddarthan *et al.* (2015) have highlighted that we can reduce NCD mortality through comprehensive health management, rather than disease specific frameworks. This is because disease specific frameworks have led to asymmetric deployment of health resources, with mortality consequences. For example, the shift in mortality from CDs to NCDs follows the HIV epidemic in Africa and an increase in HIV health system financing, such that the overall health system has been ill equipped to manage the financial implications of an epidemiological transition to NCDs. Affordability of NCD medicines also presents an ongoing challenge. For example, the average monthly cost for a patient with diabetes and hypertension would be $33, one-third of the average monthly income in Uganda.

The second corpus of literature emphasises social determinants of NCD mortality. For example, Abbo (2011) highlights that cultural and traditional beliefs play a large part in determining health perceptions of persons in East Africa especially on whether or not patients seek mainstream healthcare. Services for diabetes, epilepsy, depression and schizophrenia are frequently sought from traditional or faith healers. The Tanzania STEPS survey report (2013) also found that 15.1 per cent of hypertensive patients sought advice or remedy from traditional healers, and 10 per cent were receiving herbal or traditional remedy. Siddarthan *et al.* (2015) have shown structural factors including urbanization that has led to rapid increases in blood pressure among communities in East Africa. This may be because urbanization is associated with an increase in sales and consumption of prepackaged food higher in fat and salt and a nutritional transition with deleterious consequence in East Africa (Rascke & Cheema, 2008).

Continuing with social determinants, there also appears to be problems associated with getting community members to comply with healthy behaviours recommended by NGOs, stemming in

part from a lack of engagement on the NGO's part with the communities that do not feel involved with NCD prevention efforts. Indeed, during Community Conversations run by the East Africa NCD Alliance in Tanzania and Zanzibar, communities expressed concerns about meaningful involvement in NCD prevention. For example, one participant's advice to policy makers was 'to organize a group of experts who will then meet with the community to discuss in detail about the NCD and risk factors'. Another participant said 'education should be sufficiently provided. The community does not know that a drug user is a patient' (Muhimnili Methadone Clinic, Tanzania, Dar es Salaam, 2017). Communities interviewed also wished for influential actors to raise awareness about NCDs: 'The government should rebuke stigmatization, getting a disease doesn't mean you don't have value anymore' (Tanzania NCD Alliance, Dar es Salaam, 2017).

III. Reducing NCD Severity and Mortality

Addressing the economic and healthcare efficiency determinants of NCDs would be most effective where CDI has the support of Tanzanian governmental health departments such as MoSHW to supply health resources such as WHO essential medicines. This could reduce mortality associated with the asymmetric distribution of health resources. To obtain cooperation from Tanzania governmental health departments, CDI could work further towards building its image of reputability in Tanzania, so that relevant governmental health departments recognise it as an important actor.

The effectiveness of this approach has been highlighted by Siddarthan *et al*. (2015), who describe how civil society organisations have played an important role in setting in motion political action regarding NCD management. In 2014, the NCD Alliances of Uganda, Tanzania, Kenya, and Rwanda formed the East Africa NCD Alliance Initiative. The Initiative undertook a benchmarking survey in 2014 to document NCD responses in East Africa. The Initiative subsequently highlighted certain priorities which were incorporated into the East Africa Civil Society Charter, a call to action to regional governments that was presented at the United Nations High Level Review on NCD in July 2014. This demonstrates how in collaboration with other NGOs, CDI could build the momentum and catalyse NCD planning within government. As a starting point, CDI could perhaps collaborate with existing health NGOs in Tanzania, such as the Tanzania NCD Alliance, Tanzania Cancer Society, and the Tanzania Heart Foundation, in running community health workshops.

As for the social determinants of NCDs, the North Karelia Project provides an instructive model. According to the behavioural/social framework used in this 25-year intervention programme into NCD in the Finnish region, the project team must make the community feel a genuine sense of ownership over NCD prevention, in order to increase their knowledge about healthy behaviours and motivate compliance to them. In the Project, this was done through contacting local influential figures to champion healthier behaviours, and creating a strong media presence for the Project's activities through North Karelia radio. Furthermore, the behavioural/social framework

recommends getting community members themselves to assess socioeconomic risk factors to NCDs, therefore allowing them to gain first-hand knowledge about lifestyles related to NCD risk factors. A possible means of community integration that CDI could implement could be inviting interested community members to run community health workshops. CDI could also increase its presence in Vingunguti through exploring opportunities to feature on media channels regularly used by Vingunguti citizens, such as radio.

IV. STEP approach to Probing NCD Risk Factors

An important part of being able to draw up strategies for preventing NCDs in a given region is being able to measure and gather information on the general NCD situation in that region. I found the Tanzania STEPS survey report to be particularly illuminating. This is a part of a broader WHO STEPwise NCD monitoring programme, whose methods have potential to be applied to furthering NCD prevention efforts in Dar es Salaam.

The WHO STEPwise approach to NCD surveillance is intended as a tool to survey NCD risk factors in a standardised manner. It involved three steps: (i) Self-report by questionnaire to yield quantitative measures of health metrics associated with NCDs such as alcohol and tobacco consumption; (ii) physical measurements that may be symptomatic of NCDs, such as height and weight; and (iii) biochemical measurements that may be symptomatic of NCDs, yielded from blood samples. This method yields rich and specific quantitative data on the NCD risk-behaviours of participants, as highlighted by the Tanzania STEPS.

However, there are a few limitations to STEPS that should be highlighted if a similar framework is to be implemented by CDI for measuring Vingunguti-specific NCD risk factors. Firstly, yielding data for the questionnaire is very time consuming, being as it is so probing. Our CDI volunteers in Dar es Salaam are there for a limited time period, which means they would only be able to yield small amounts of data from such a labour-intensive method. Although WHO emphasises the importance of collecting a small amount of high-quality data, there are questions on the extent to which this data could be extrapolated across Tanzania. Available participants, for example, may only be those with more disposable income who can afford to take time out of work to be interviewed. The data collected may therefore only represent the NCD risk-status of a specific socioeconomic stratum.

Secondly, taking physiological and biochemical measures pose the problem of procuring appropriate measuring equipment. Indeed, whilst the manual highlights steps 1 and 2 (demographic, behavioural and physical measurements) are appropriate in low-resource settings, it hesitates to extend this assertion to step 3 (biochemical measurements), which may require access to laboratories and trained biochemical professionals. Procuring the appropriate equipment may have adverse funding implications if we cannot have this equipment donated.

Thirdly, in the previous section we have also seen there are many social determinants to NCDs, which would be equally important to survey so that we can identify exactly what problems we need to resolve in Dar es Salaam. The STEPS questionnaires as they are, may struggle to yield this data because there is emphasis on quantitative measurement which may obscure the potential insight participants can give into the social environment which may contribute to NCDs.

V. Recommendations

To resolve issues associated with time constraints by gathering health-related data, CDI could begin a longitudinal study into NCD risk factors in Dar es Salaam. The benefits of longitudinal studies have been highlighted by Holmes *et al.* (2010), according to whom longitudinal studies raise unexpected NCD issues that practitioners should resolve. For example, hypertension has been considered problematic only for wealthy and urban populations. Yet, blood measurement in several rural African locations have found a hypertension prevalence of 11-25 per cent, similar to that in high income countries (Barninghausen *et al.*, 2007). Another benefit highlighted in this paper is that longitudinal studies can allow us to discern the extent to which NCD risk factors are causal or coincidental. This is because we can identify repeated risk factor correlations with NCD outcomes, and as we amass more data over time, the degree of confidence we can attribute to this link increases. This may allow CDI to prioritise risk factors to be addressed, in accordance with the degree of confidence that they are affecting NCDs in Dar es Salaam.

There are several practical issues to be addressed when implementing a longitudinal study into NCD risk factors. First, there is the question of what variables could be assessed. Social factors that participants highlight may contribute to NCDs and could be taken as the independent variable. Physiological characteristics that may symptomize NCDs (as highlighted in WHO STEPS model) could be taken as the dependent variable.

Social factors could be identified through verbal autopsy, which is a research tool used to investigate probable causes of illness and death through interviewing a caregiver of the deceased, or the patient, about their experiences of the illness and asking what cultural factors they think may contribute to its cause (Fottrell, 2009). This has proved particularly useful in settings where there are health information gaps. Indeed, using verbal autopsy, Abera *et al.* (2017) found that NCD-attributed mortality was influenced by the type of relationship household members had with their respective heads of household. We can begin to quantify participant self-reports through content analysis to classify identified social risk factors into broader themes. The prevalence of a thematic risk factor can then be correlated with physiological indicators of NCD.

Data on participant's physiological characteristics in line with the WHO STEPS model step 2 is another recommended measure. This raises issues of procuring reliable physiological measurement tools such as weighing scales, which may have fundraising implications that would

need to be factored into project budgeting. Perhaps CDI could seek donations of measuring equipment. Implementing WHO STEPS model also require volunteer and community health workers to be trained in its methods during pre-Tanzania training.

Finally, there is a question of timescale and participants. A timescale that could allow CDI to gather useful amounts of data could be six years, gathering data biannually to maximise the amount of data gathered in accordance to human resource constraints (Abera *et al.*, 2017). CDI could collect data during its project work during the summer. CDI could recruit community health workers to which it is transitioning responsibilities, to gather data earlier in the year. Ideally, the longitudinal study would take a cohort design so that findings are not subject to confounding effects by individual differences between participants, especially important for physiological measures later described. This accentuates the importance of community health worker participation. Community health workers may have a rapport with community members that would be useful in attracting participants, as well as reducing chances of attrition.

As we amass longitudinal data over time, there is a need to systematically compile all of this into an accessible, organised database. The research team is indeed currently working on HIS to be implemented in Dar es Salaam, in collaboration with partner organisations. Sligo *et al.* (2017) provide instructive guidelines for successful HIS implementation that it may be wise for CDI to take into account. The HIS are less likely to work when they are seen to be unresponsive to the culture and needs of the organisation where they are implemented. Clinicians may query the impact of HIS on relationships with patients (Thomson *et al.*, 2016), fear new kinds of error being made because of clinical systems (Ash *et al.*, 2009), and may resist new HIS if they do not believe they improve efficiency (Li *et al.*, 2013). It would be important for CDI to interview whoever will regularly be using a HIS for a longitudinal study on their concerns about the new systems, and respond to those concerns in the design of the HIS.

VI. Conclusion

In this paper, I aimed to provide recommendations to CDI on how it can prevent the spread of NCDs in Vingunguti. I focused on nutrition-related NCDs amenable to behavioural intervention, such as diabetes and hypertension. In a literature review in which I considered evidence to bear on this question, I found that resource distribution and compliance are generally important factors associated with NCD severity and mortality. I recommended that CDI should collaborate with other NCD-related NGOs in Tanzania, and involve more community members in NCD interventions.

I also aimed to recommend to CDI directions for future research, concerning how to gauge NCD risk factors specific to Vingunguti. I recommended a longitudinal study using STEPS and verbal autopsy to assess social risk factors specific to Vingunguti that are related to NCD outcomes. Furthermore, I recommended that HIS that could compile results from this longitudinal study would have to accommodate the needs of its users so it is perceived to be beneficial.

These recommendations are not intended to be final and conclusive, but rather exploratory recommendations to get the ball rolling when it comes to NCD prevention in Vingunguti. This is because further research in Vingunguti may reveal risk factors, for which the intervention strategies highlighted in this paper may not be appropriate on the grounds of generality.

References

Abera, S.F., Gebru A.A., Biesalski H.K., Ejeta G., Wienke A., Scherbaum V. (2017). *Social determinants of adult mortality from noncommunicable diseases in northern Ethiopia, 2009-2015: Evidence from health and demographic surveillance site*. PLoS ONE 12(12): e0188968. https://doi.org/10.1371/journal. pone.0188968

Abbo, C. (2011). Profiles and outcome of traditional healing practices for severe mental illnesses in two districts of Eastern Uganda. *Global Health Action*, 4(1), 7117. doi: 10.3402/gha.v4i0.7117

Ash, J. S., Sittig, D. F., Dykstra, R., Campbell, E., & Guappone, K. (2009). The unintended consequences of computerized provider order entry: findings from a mixed methods exploration. *Int. J. Med. Inf.*, 78 (1), 69–76.

Bärnighausen, T., Welz, T., Hosegood, V., Bätzing-Feigenbaum, J., Tanser, F., & Herbst, K. (2007). Hiding in the shadows of the HIV epidemic: obesity and hypertension in a rural population with very high HIV prevalence in South Africa. *Journal of Human Hypertension*, 22(3), 236-239. doi: 10.1038/sj.jhh.1002308

Bloom, D.E., Cafiero, E.T., Jané-Llopis, E., Abrahams-Gessel, S., Bloom, L.R., Fathima, S., Feigl, A.B., Gaziano, T., Mowafi, M., Pandya, A., Prettner, K., Rosenberg, L., Seligman, B., Stein, A., & Weinstein, C. (2011). *The Global Economic Burden of Non-communicable Diseases*. Geneva: World Economic Forum.

Caribbean 360 (2018). Non-Communicable Diseases Leading Cause of Death in Jamaica. Retrieved from http://www.caribbean360.com/news/non-communicable-diseases-leading-cause-of-death-in-jamaica

East Africa NCD Alliance. Tableau Public. (2018). Retrieved from https://public.tableau.com/profile/william.guicheney#!/vizhome/OurViewsOurVoicesCommunityConversationExplorerV_1/DemographicAlternative

Fottrell, E. (2009). Dying to count: mortality surveillance in resource-poor settings. *Global Health Action*, 2(1), 1926. doi: 10.3402/gha.v2i0.1926

Ghaffar, A., Reddy, K., & Singhi, M. (2004). Burden of non-communicable diseases in South Asia. *BMJ*, 328(7443), 807-810. doi: 10.1136/bmj.328.7443.807

Galea, G. (2018). Global Action Needed to Stem Silent Epidemic - All China Women's Federation. [online] Womenofchina.cn. Available at: http://www.womenofchina.cn/womenofchina/html1/features/health/1806/2120-1.htm.
Health Standards (2018). Digital health trends 2017-2025. Retrieved from http://healthstandards.com/blog/2017/10/25/digital-health-trends-2025/

Holmes, M.D., Dalal S., Volmink J., Adebamowo C.A., Njelekela M. (2010). Non-Communicable Diseases in Sub-Saharan Africa: The Case for Cohort Studies. *PLoS Med*, 7(5): e1000244. doi:10.1371/ journal.pmed.1000244

Li, J., Talaei-Khoei, A., Seale, H., Ray, P., & MacIntyre, C. R. (2013). Health care provider adoption of eHealth: systematic literature review. *Interactive journal of medical research*, *2*(1).

Neiman, J. (2018). The Importance of Health Information Technology in Developing Areas | OpenMRS. Retrieved from https://openmrs.org/2017/07/the-importance-of-health-information-technology-in-developing-areas/

Puska. P., Vartiainen, E., Laatikainen, T., Jousilahti, P., & Paavola, M. (2009). *The North Karelia Project: From North Karelia to National Action*. Helsinki: Helsinki University Printing House

Raschke V. & Cheema B. (2008). Colonisation, the New World Order, and the eradication of traditional food habits in East Africa: historical perspective on the nutrition transition. *Public Health Nutrition*, ;7(11):662–674.

Siddharthan, T., Ramaiya, K., Yonga, G., Mutungi, G. N., Rabin, T. L., List, J. M., Schwartz, J. I. (2015). Noncommunicable Diseases In East Africa: Assessing The Gaps In Care And Identifying Opportunities For Improvement. *Health Affairs* (Project Hope), 34(9), 1506–1513. http://doi.org/10.1377/hlthaff.2015.0382

Sligo, J., Gauld, R., Roberts, V., & Villa, L. (2017). A literature review for large-scale health information system project planning, implementation and evaluation. *International journal of medical informatics*, *97*, 86-97.

Tanzania Steps Survey Report Ministry of Health and Social Welfare (2013). Retrieved from http://www.who.int/ncds/surveillance/steps/UR_Tanzania_2012_STEPS_Report.pdf

Thomson. F., Milne, H., & Hayward, J. (2016). Understanding the impact of information technology on interactions between patients and healthcare professionals. Retrieved from URL https://www.researchgate.net/profile/Kathrin_Cresswell/publication/280254171_Understanding_the_impact_of_information_technology_on_interactions_between_patients_and_healthcare_professionals_FINAL_REPORT_NHS_Connecting_for_Health_Evaluation_Programme_Project_010/links/55af9a7e08aeb0ab46682885/Understanding-the-impact-of-information-technology-on-interactions-between-patients-and-healthcare-professionals-FINAL-REPORT-NHS-Connecting-for-Health-Evaluation-Programme-Project-010.pdf

WHO (2003). *STEPS: A Framework for Surveillance*. [online] Available at: http://www.who.int/ncd_surveillance/en/steps_framework_dec03.pdf.

WHO. *WHO STEPS instrument*. Retrieved from http://www.who.int/ncds/surveillance/steps/instrument/STEPS_Instrument_V3.2.pdf

WHO. *The WHO STEPwise approach to noncommunicable disease risk factor surveillance.* Retrieved from http://www.who.int/ncds/surveillance/steps/STEPS_Manual.pdf

Yusof, M., Papazafeiropoulou, A., Paul, R., & Stergioulas, L. (2008). Investigating evaluation frameworks for health information systems. *International Journal Of Medical Informatics*, 77(6), 377-385. doi: 10.1016/j.ijmedinf.2007.08.004

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