



FACTORS CONTRIBUTING TO SUCCESS OF INTERVENTIONS IN AFRICA: AN APPROACH TO COMBAT CHRONIC AND NON-COMMUNICABLE DISEASES

A Report Developed for the Engage Africa Foundation

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EXECUTIVE SUMMARY

Introduction and Background

The Engage Africa Foundation is committed to fighting chronic diseases in Africa by raising awareness on how to prevent and manage chronic and non-communicable diseases (NCDs). NCDs are likely to become the leading cause of death in 2030, with these diseases not only impacting the population's health and wellbeing, but also economic productivity within African regions. This research project was undertaken to identify the key priorities and evidence-based best practices regarding interventions designed to combat NCDs in Africa.

Methodology

The research question for this project is to understand *what makes an intervention effective for preventing and managing chronic and non-communicable diseases in African countries, while using the lens of health outcome, behaviour change, and cost effectiveness.*

The following databases were reviewed: PubMed, Scopus, Sage Journals, ProQuest Research Library, EBSCOhost, Cochrane Library, and Health Evidence. Search inclusion criteria included articles published since 01/01/2007 and in the English language. Filters utilized for the fields were "Title, Abstract, Keywords" or "Abstract"; if there were too few articles (less than 5), "All Fields" were utilized instead. The keywords utilized include: "Africa", "effective intervention", "chronic disease", "non-communicable disease", "diabetes", "hypertension", "cancer", "cardiovascular disease", "stroke", "prevent*", "manag*", "health outcome", "behaviour change", "cost-effective*", and "economic evaluation". Using these keywords, four separate literature searches were conducted, with unique objectives:

- A generic search to capture relevant articles to the topic;
- Tailored search focused on interventions and associated health outcomes;
- Tailored search focused on interventions and their impact on behaviour change; and
- Tailored search focused on the cost-effectiveness of interventions.

Once the searches were complete, the titles of the articles were entered into a Microsoft Excel database, and reviewed to assess its relevance to the research question. At this point, duplicate

articles were removed. Then, abstracts of the remaining articles were reviewed, while removing any irrelevant articles, which led to a final list of articles requiring review for the project.

Results

This systematic literature review of over 110 articles revealed unique insights about what contributes towards an intervention's effectiveness to combat chronic and NCDs in Africa.

Literature findings highlighted the following interventions or focus of intervention:

- Behavioural interventions
- Collaborative partnerships
- Community-based interventions
- Educational interventions
- Group education
- Mass media
- Standardized guidelines
- Task-shifting/resource optimization
- Technological interventions

Discussions regarding interventions from research findings were categorized into each of these areas, while paying close attention to where (i.e. regions) the interventions were implemented, the disease profile of focus, associated health outcomes of the intervention, any potential cost-savings, as well as the overall effectiveness of the intervention.

Discussion and Conclusion

Through a detailed analysis of the intervention areas above, this research study identified a number of interventions that span across varying levels (structural, community, and individual), that are promising within African regions. The study concluded that the following areas of interventions are feasible in Africa to combat chronic or NCDs, based on its overall effectiveness in addressing

the diseases, improvement in healthcare outcomes, contribution towards behaviour change, and cost effectiveness:

- **Task-shifting or resource optimization**, which focuses on shifting the responsibility of healthcare providers to other non-physician professionals, to address the issue of insufficient human resources;
- **Collaborative partnerships**, which emphasizes building partnerships across different (private and public) groups to collaboratively combat chronic and NCDs;
- **Standardized guidelines** to encourage a systematized approach to healthcare;
- Incorporating **education** as a focus of interventions;
- **Community-based interventions** to encourage social integration and a community-based approach to combatting common conditions such as diabetes;
- **Mass media** to raise awareness on public-health related issues; and
- **Technological innovations** through the means of mobile technologies to improve access to healthcare.

Limitations

Study limitations were as follows:

- Possible missing search terms that may have been relevant to the study;
- Search results that may have been excluded because of the inclusion criteria (peer review status, date range, and language); and
- Selection criteria based on article title may have led to exclusion of other relevant findings.

INTRODUCTION & BACKGROUND

When people think of what constitutes killer diseases in Africa, what comes to mind are diseases such as tuberculosis and malaria. This is because for many years now, the primary focus on disease control in Africa has been on communicable diseases as well as maternal, perinatal, and nutritional causes of morbidity and mortality (Marquez, 2012). However, the 2011 United Nations Summit on Non-Communicable Diseases (NCDs) emphasized the importance of chronic and non-communicable diseases as a global health challenge (Marquez, 2012). In contrast to communicable diseases, NCDs are diseases that are *not* transmitted from one person to another. The four main types of NCDs in Africa are cardiovascular diseases, cancers, chronic respiratory diseases, and asthma (WHO Africa, 2017). It is estimated that NCDs are likely to become the leading cause of death by 2030. This increasing burden of NCDs will not only impact the population's health and wellbeing, but it will also affect economic productivity of the nations (The Conversation, 2017).

The Engage Africa Foundation is a firm believer that non-communicable diseases within low and middle-income countries needs to be of priority for these reasons stated above. According to the African Division of the World Health Organization, risk factors for NCDs primarily include behaviour driven by social and economic determinants. Thus, the Engage Africa Foundation has undertaken a research project to better understand the effectiveness of interventions intended to combat NCDs. The goal for this research activity is to provide recommendations to key stakeholders about where priorities should be focused on, based on evidence-based best practices.

Three unique perspectives were utilized to examine the research findings: health outcomes, behaviour change, and cost-effectiveness. Interventions were assessed by evaluation how the program impacts health outcomes, as it is critical to assess whether or not the intervention successfully achieved what it was intended to. Since the focus is on NCDs, the ultimate objective of interventions is to improve the health outcomes of the African population. Therefore, it is important to ensure that the interventions effectively meet this goal. Secondly, behaviour change was identified as another lens of evaluating the effectiveness of interventions. This is because lifestyle factors, defined by an individual's behaviour, have consistently been linked with conditions that ultimately lead to NCDs. Lastly, It is important to consider cost-effectiveness

analysis, which is key to policy makers to help assess which interventions provide the highest value for money. As mentioned by (Mendis & Chestnov, 2013), cost-effectiveness refers to “the efficiency with which an intervention produces health outcomes” (Mendis & Chestnov, 2013, p. 315). An intervention that is recognized as “very cost-effective” refers to one that generates one extra year of healthy life, or averting one year of disability-adjusted life, for a cost that is less than the average annual gross domestic product (GDP) per person (Mendis & Chestnov, 2013). This definition was adopted from the World Health Organization.

METHODOLOGY

This project will attempt to answer the following research question: **What makes an intervention effective for preventing and managing chronic and non-communicable diseases in African countries (using the lens of health outcome, behaviour change, and cost effective)?**

To answer the research question above, this project will carry out a systematic review of literature obtained from a number of databases, selected based on their scope and relevance to the African context. These databases include: PubMed, Scopus, Sage Journals, ProQuest Research Library, EBSCOhost, Cochrane Library, and Health Evidence. The key words were entered in the search fields; in some cases, the key words were searched under “All Fields” and in other cases, the search was conducted under “Title, Abstract, Keywords” or “Abstract”. The decision to use "All Fields" versus "Title, Abstract, Keywords" or "Abstract" was based on the number of results that the search produced. The objective was to generate articles under "Title, Abstract, Keywords" or "Abstract" but if there were too few articles (less than 5), the decision was made to utilize "All Fields" instead, to generate a greater number of article results. In addition, date and language filters were also applied; only articles published after 01/01/2007 and in the English language were selected for review. Table 1 below documents the specific search strategy applied within each database.

Table 1: Literature Review: Search Strategy

Database	Search Fields	Additional Filters
PubMed	All Fields	Articles published since 01/01/2007; Articles published in the 'English' language
Scopus	Title, Abstract, Keywords	Articles published since 01/01/2007; Articles published in the 'English' language
Sage Journals	All Fields	Articles published since 01/01/2007; Articles published in the 'English' language
ProQuest Research Library	Abstract	Articles published since 01/01/2007; Articles published in the 'English' language
EBSCOhost	All Fields	Articles published since 01/01/2007; Articles published in the 'English' language
Cochrane Library	Title, Abstract, Keywords	Articles published since 01/01/2007; Articles published in the 'English' language
Health Evidence	All Fields	Articles published since 01/01/2007; Articles published in the 'English' language

The key search terms that were utilized in this research project includes: “Africa”, “effective intervention”, “chronic disease”, “non-communicable disease”, “diabetes”, “hypertension”, “cancer”, cardiovascular disease”, “stroke”, “prevent*”, “manag*”, “health outcome”, “behaviour change”, “cost-effective*”, and “economic evaluation”. The asterisk denotes the truncation of the word, so that the search encompasses all forms of the word. For example, “prevent*” would include “prevention”, “prevented”, “preventing”, among others.

Four unique searches were conducted, where each search included a string of keywords specific to the goal of the search.

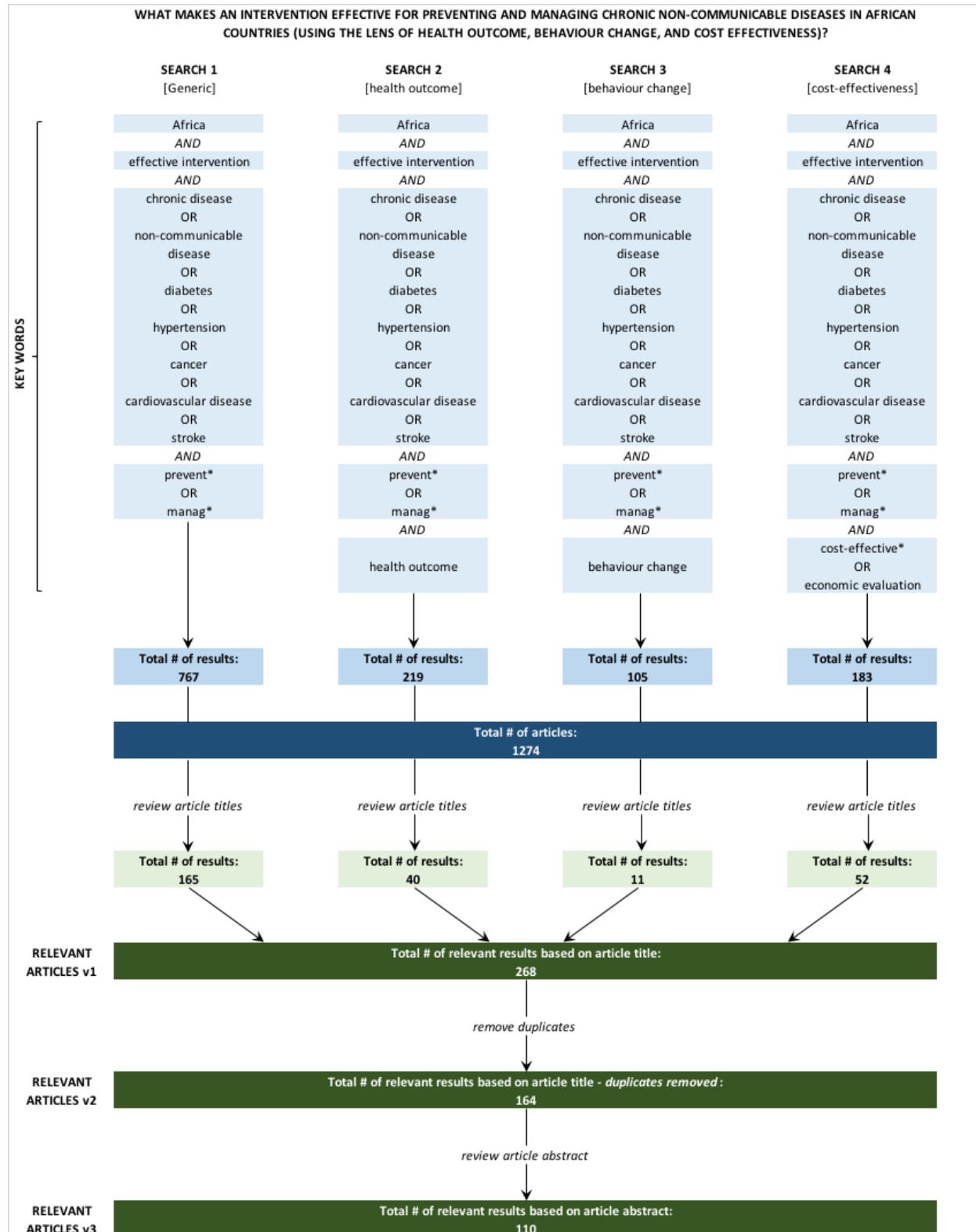
- A generic search was conducted to capture relevant articles to the topic. This search included the following key words: “Africa”, “effective intervention”, “chronic disease”, “non-communicable disease”, “diabetes”, “hypertension”, “cancer”, cardiovascular disease”, “stroke”, “prevent*”, and “manag*”
- The goal of the second search was focused on interventions and their associated health outcomes: “Africa”, “effective intervention”, “chronic disease”, “non-communicable disease”, “diabetes”, “hypertension”, “cancer”, cardiovascular disease”, “stroke”, “prevent*”, “manag*”, and “health outcome”
- The goal of the third search was to focus on the impact of interventions on behaviour change: “Africa”, “effective intervention”, “chronic disease”, “non-communicable disease”, “diabetes”, “hypertension”, “cancer”, cardiovascular disease”, “stroke”, “prevent*”, “manag*”, and “behaviour change”
- The goal of the fourth search was focused on the cost-effectiveness of interventions: “Africa”, “effective intervention”, “chronic disease”, “non-communicable disease”, “diabetes”, “hypertension”, “cancer”, cardiovascular disease”, “stroke”, “prevent*”, “manag*”, “cost-effective*”, and “economic evaluation”.

Once the searches were conducted, the titles of the articles were populated into a Microsoft Excel database and were reviewed to assess its relevance to the research question. During this process, duplicate articles were removed from the database. Following this, the abstracts of the remaining articles were reviewed for its relevance to the project. This led to a final repository of articles that were reviewed at its entirety.

Following the review of the literature gathered from this exercise, additional literature was explored on a case-by-case basis to supplement current findings. The following section (Figure 1) visually presents the research process that this project undertook.

RESULTS

Figure 1: Search Strategy Process Map



This comprehensive research process that entailed the review of over 110 articles provided unique insights into what contributes towards an intervention's effectiveness. As seen in Table 2 below, specific programs were either categorized as interventions or a focus of intervention. These programs were then assessed by their associated health outcomes based on the focused disease profile. Key information presented in this table are related to the regions covered, to demonstrate its feasibility within African regions, and cost-savings analysis, to demonstrate whether these interventions are financially feasible.

Table 2: Summary of Interventions Assessed for Effectiveness

Intervention / Intervention Focus	Relevant articles	Regions covered	Focus disease profile	Associated health outcomes	Cost-savings	Effectiveness of intervention
Behavioural interventions	Murphy et al., 2015; Jones & Geneau, 2012; Kadobera et al., 2016; Baltussen & Smith, 2012; Ngalesoni et al., 2017; (Mendis & Chestnov, 2013); Aikins, Boynton, & Atanga, 2012; Arden-Close & McGrath, 2017; Wu & Khlangwiset, 2010	South Africa, Uganda, Tanzania, sub-saharan Africa, Africa (overall)	Diabetes, hypertension, tobacco use, cardiovascular diseases, chronic diseases, liver cancer, cancer	Health outcomes include: - greater adoption of healthier behaviour - reduction in HbA1C - reduction in cholesterol and blood pressure - decrease in tobacco use - reduction in aflatoxin induced liver cancer - decrease in blood pressure - decrease in CVD - decrease in diabetes incidence - decrease in vision loss	Five out of nine reported to be cost effective	Three out of eight reported to be effective, remaining did not provide information.
Collaborative partnerships	Esterson et al., 2014; Aikins, Boynton, & Atanga, 2012; Oluwole & Kraemer, 2013; Vijver et al., 2013	Ghana, Malawai, Mauritius, Tanzania, Kenya, Africa (overall)	Diabetes, chronic diseases, women's cancer, cardiovascular diseases	Health outcomes include: - improved screening rates - improved community awareness	One out of five interventions reported cost-effectiveness and no information was provided for 4 of the interventions.	Three out of the five interventions were found to be effective
Community-based interventions	Oti et al., 2013; Vedeathan et al., 2017; Aikins,	Kenya, South Africa, Cameroon, Uganda, Nigeria,	Cardiovascular diseases, chronic	Health outcomes include: - CVD risk reduction - improved BP control	All studies (eight) except two	7 out of the 10 interventions were successful in

Intervention / Intervention Focus	Relevant articles	Regions covered	Focus disease profile	Associated health outcomes	Cost-savings	Effectiveness of intervention
	Boynton, & Atanga, 2012; Slingers & Villiers, 2009; Arden-Close & McGrath, 2017; Fisher et al., 2012; Modibbo et al., 2016; Bosu, 2015; Mendis & Chestnov, 2013	West Africa, Africa (overall)	diseases, hypertension, diabetes, cervical cancer	<ul style="list-style-type: none"> - improved symptom management - improved blood pressure - improved diet - improved BMI - improved blood sugar - increased cancer awareness & screening - improved physical activity and diet - decrease in vision loss - decreased diabetes incidence 	reported cost-effectiveness	achieving its goals; three did not report a change.
Educational interventions	Murphy et al., 2015; Esterson et al., 2014; Mendis & Chestnov, 2013; Mendenhall & Norris, 2015; Kassahun, Gesesew, Mwanri, & Eshetie, 2016; Gaziano, Bertram, Tollman, & Hoffman, 2014; Kaddumukasa, 2015; Almobarak, 2016; van de vijver et al., 2013; Gopalan et al., 2016; Bosu, 2015; Dube et al., 2014; Makuma et al., 2017	South Africa, Ghana, Tanzania, Malawi, South Africa, Ethiopia, Uganda, Sudan, Kenya, West Africa, Africa (overall)	Diabetes, hypertension, stroke, cervical cancer, hypertension, blood pressure, cardiovascular diseases	Health outcomes include: <ul style="list-style-type: none"> - greater adoption of healthier behaviour - reduction in HbA1C - reduction in cholesterol and blood pressure - patients with foot complications fell from 24% to 8% - amputation rate in patients (due to diabetic foot complications fell from 22% to 10%) - reduced at-risk drinking - increased treatment medication adherence - reduction in non-fatal CVD events - improved screening rates - increased awareness, knowledge, self-efficacy - decrease in diabetes incidence and vision loss 	Five out of thirteen interventions reported cost-effectiveness. No information was provided for the remaining.	All interventions (except for 1) found to be effective in meeting its goals
Group education	Olmen et al., 2015; Mash, Kroukamp, Gaziano, Levitt, 2015; Mash et al., 2012; Mbachu, Dim, & Ezeoke, 2017;	Congo, South Africa, Nigeria, Senegal, Cameroon	Diabetes, cervical cancer, cardiovascular diseases	Health outcomes include: <ul style="list-style-type: none"> - Better medication adherence - Improved HbA1C - Reduction in blood pressure - No significant outcomes on patients with diabetes - weight loss 	Five out of six interventions reported cost-effectiveness, and one did not provide	Four out of six interventions reported to be effective in raising awareness, one reported to be not effective at onset

Intervention / Intervention Focus	Relevant articles	Regions covered	Focus disease profile	Associated health outcomes	Cost-savings	Effectiveness of intervention
	Foley & BeLue, 2017; Aminde et al., 2017			- increased awareness among participants	information related to this.	but effective at 1-year post intervention
Mass media	Mendis & Chestnov, 2013; Aikins, Boynton, & Atanga, 2012; Abiodun et al., 2014; Perl et al., 2014; Doherty, 2014	South Africa, Ghana, Nigeria, Senegal, Kenya, West Africa, Africa (overall)	Chronic diseases, cervical cancer, smoking, type 2 diabetes, cardiovascular diseases	Health outcomes include: - increased awareness of cervical cancer, diabetes, hypertension - increased screening rates - better understanding of recommendation and medication adherence - decrease in blood pressure - decrease in CVD - decrease in vision loss	Three out of six interventions reported cost effectiveness; one intervention reported the potential of cost-effectiveness, and two interventions reported no information.	Four of out the six interventions were found to be effective in raising awareness regarding the issue.
Standardized guidelines	Esterson et al., 2014; Gama et al., 2015	Ghana, sub-Saharan Africa	Diabetes, chronic airway diseases	Health outcomes include - early detection of diabetes complications - improved patient outcomes - decreased number of complications	Both reported to be cost-effective	Both reported to improve the care provided by professionals as well as patient quality of life
Task-shifting / resource optimization	Esterson et al., 2014; Kawonga & Fonn, 2008; Abdul et al., 2008; Gaziano, Bertram, Tollman, & Hoffman, 2014; Leon et al., 2015; Labhardt et al., 2011; (56); Vedanthan et al., 2014; Kengne et al., 2009; Joshi et al., 2014	Ethiopia, South Africa, Cameroon, Uganda, South Africa, Nigeria, Senegal, rural African environments, resource-limiting settings of Africa, low and middle income countries	Diabetes, non-communicable diseases, cervical cancer, glaucoma, hypertension, diabetes	Health outcomes include: - improved management of diabetes - improvement in decision support - reduction in HbA1C - decreased BMI - improved lifestyle measures - improved education - greater availability of screening services - improved 1 year retention rates - increased participation in clinics - improving access to healthcare	Seven out of eleven interventions reported cost-effectiveness; remaining did not provide information	Seven out of eleven interventions were reported to be effective in improving access to care. One needs to be supplemented with national strategies.

Intervention / Intervention Focus	Relevant articles	Regions covered	Focus disease profile	Associated health outcomes	Cost-savings	Effectiveness of intervention
Technological interventions	Esterson et al., 2014; Grace et al., 2016; Kingue et al., 2013; Leon et al., 2015; Khan et al., 2013; Hoffman, Cook, & Levitt, 2014; Chow et al., 2016; Muller et al., 2016	Malawai, sub-saharan Africa, Cameroon, South Africa, Africa (overall), low and middle income countries	Diabetes, arterial hypertension, high blood pressure, diabetic retinopathy, cardiovascular diseases, non-communicable diseases	Health outcomes include: - improved behaviour change (adherence behaviour) - improvement in blood pressure - improved access to care - improved attitude to health condition - improved retinopathy treatment (blind cases averted) - reduction in health costs - improved quality of life - improved physical activity and diet	Five out of eight interventions reported cost-effectiveness and three did not provide information related to cost-effectiveness	7 out of the 8 interventions were found to be effective.

Findings from this research activity produced several interventions that have been noted to be effective in the African context. These interventions were broadly categorized, as shown in Table 2. Specific details regarding each of these areas are as follows:

- **Behaviour and technology-related interventions:** Interventions aimed at the individual level, such as behavioural specific programs or technological interventions, were found to be both cost-effective and successful in addressing health outcomes. Half of the behaviour-focused interventions were found to be effective in achieving its desired outcomes. Information regarding the rest were not provided. On a similar note, two-thirds of these interventions reported cost-effectiveness, suggesting its feasibility in African settings. With respect to technological programs, although only five out of eight interventions specifically discussed cost-effectiveness, an analysis by Muller et al. (2016) suggests its economic viability due to the ability of technology to reach wide populations with limited resources.
- **Collaborative partnerships:** In the five interventions that discussed collaborative partnerships, only one reported to be cost-effective, while this information was not provided for the rest.
- **Community-based interventions:** Many literature findings have commented on the effectiveness of community-based interventions in combatting chronic and NCDs. These studies were conducted in different African countries and demonstrated effectiveness in tackling conditions such as cardiovascular diseases, diabetes, hypertension, stroke, cancer, among others. Majority of these interventions were reported to be cost-effective, suggesting its feasibility within African nations. Incorporating education within community-based interventions have been documented within the literature; findings related to this approach documented its cost-effectiveness and its effectiveness overall in addressing issues pertaining to diabetes, cardiovascular diseases, and cervical cancer.
- **Education:** Research pertaining to education encompassed a number of African regions, and majority of these interventions were noted to be successful in addressing issues regarding chronic and non-communicable diseases. These interventions proved to enhance healthcare outcomes, such as improving blood pressure, BMI, diet, cancer screening rates. Although information regarding cost-effectiveness was lacking for many educational interventions, those who did provide information regarding these suggested

promising results; that these interventions would indeed be feasible in African settings to be effective against chronic and NCDs.

- **Standardized guidelines:** Findings from the literature have shown that utilizing standardized guidelines have not only improved the care provided by healthcare professionals but also improved the patient quality of life through early detection of diabetes complications and decreasing the number of diabetes associated complications. Although only a limited number of researchers discussed this specific intervention focus, the two that did both found this approach to be cost-effective.
- **Task-shifting and resource optimization:** The idea of task-shifting and resource optimization has been identified through this research project, as an efficient means of combatting a number of chronic and non-communicable diseases. Among the interventions that focused on task-shifting and resource-optimization, more than half reported both cost-effectiveness as well as effectiveness in improving access to care for patients facing diabetes, hypertension, and other non-communicable diseases. Cost-effectiveness was especially demonstrated as physicians were not involved.

DISCUSSION

The focus of interventions that emerged from research findings were: community, education, group education, collaborative partnerships, mass media, technical innovations, standardized guidelines, task-shifting / resource optimization, and behavioural interventions. These intervention areas will be organized in a way similar to how Aikins, Boynton, and Atanga (2012) approached chronic disease prevention from the lens of structural, community and individual approaches. The structural approach as a method of combatting chronic and non-communicable diseases requires policy changes that target specific chronic diseases or risk factors. Fiscal changes may also be necessary, such as adjusting the taxes on food, alcohol, tobacco, or subsidizing exercise equipment (Aikins et al., 2012). Such changes typically require collaborations between public and private industries; but Aikens et al. (2012) also proposes international collaborative partnerships to enhance the intellectual, technical, and financial capacities of African countries. Secondly, Aikens et al. (2012) discuss a community approach to chronic disease prevention, which involves the participation of mass media to provide public health education via radio, television, and newspaper. This approach also incorporates voluntary and advocacy organizations for public education, as well as institutions (such as schools) to promote school-based interventions (Aikins et al., 2012). Lastly, Aikens et al. (2012) reviews the individual approach to chronic disease prevention, which targets interventions at the behavioural level (such as tobacco cessation, increased physical activity, and dietary change) as well as pharmacological interventions.

Interventions at the Structural Level

A number of interventions have emphasized the importance of collaborative partnerships across different groups of stakeholders. Although cost-effectiveness was not discussed for majority of the interventions, the one that did discuss it, commented on its feasibility within African regions. Development of partnerships enable stakeholders to utilize their own unique strengths to complement the skillset of the other stakeholders involved (Esterson et al., 2014). This allows the joint forces to collectively accomplish more and cover greater grounds than if they were on their own. For this reason, when programs take this approach, it has been found to

effectively tackle diseases such as cancer, cardiovascular diseases, among others. In doing so, evidence shows that both screening and community awareness rates were improved. In one instance of a partnership between governmental stakeholders and private organizations, the intervention resulted in the doubling of cancer screening rates among women (Oluwole & Kraemer, 2013).

The use of standardized guidelines and algorithms were also found to contribute to the success of interventions in an African context. Standardization of such materials help inform healthcare professionals as to what is expected of them and encourage consistent care offered to all patients, which contributes to positive health outcomes (Esterson et al., 2014).

Another reason contributing to the poor treatment and control of chronic and NCDs is insufficient human resources (Esterson et al., 2014; Vedanthan et al., 2014). This project suggests that the issue of the insufficient physician workforce can be effectively (both with respect to finances and health outcomes) managed through resource-optimization. Insufficient physician workforce becomes problematic in countries such as Kenya, where only physicians are authorized to manage hypertension (Vedanthan et al., 2014). Patient visits to health centres did not result in productive interactions, because these interactions took place with burnt out doctors who perpetuate feelings of fear and dishonesty; therefore, physicians' motivation to educate and provide appropriate care for patients are quite low (Mash et al., 2012). Task redistribution refers to shifting specific tasks to healthcare workers of different levels of training, to encourage and promote efficient use of human resources (Vedanthan et al., 2014). Evidence has shown that non-physicians have effectively supported the management of hypertension, heart failure, and diabetes (Vedanthan et al., 2014). In areas where doctors are scarce, increasing the responsibility of nurses or other healthcare workers demonstrated promising benefits (Esterson et al., 2014).

Interventions at the Community Level

Educational interventions were among the most common interventions documented in the literature, which were also found to be cost-effective. Education may have emerged as a common theme potentially because lack of education and awareness have consistently been recognized as an obstacle in accessing healthcare services within African countries. A number of sources have documented that overall, the African population does not have sufficient knowledge about

diabetes and hypertension management, which consequently prevents individuals from health-seeking behaviours and achieving greater health literacy (22, Tewahido & Berhane, 2017). This is common in many African countries, where individuals of low socioeconomic status lack health literacy as well as the self-efficacy to be able to cope with the burden of self-care. Lack of knowledge about healthcare conditions have also been linked with poor medication adherence (Kassahun, Gesesew, Mwanri, & Eshetie, 2016). Education is important not only for patients, but for healthcare practitioners as well. A number of sources have reported that the knowledge of primary healthcare physicians regarding hypertension and management, cancer screening and awareness in Africa is suboptimal (Gaziano, Bertram, Tollman, & Hoffman, 2014, McFarland et al., 2016). During patient interactions, many doctors have been reported to not discuss lifestyle modifications (Parker et al., 2011). In order to ensure the success of interventions, it is important for educational initiatives to address the quality of care provided by doctors and nurses (Esterson et al., 2014). Education can be implemented within interventions in Africa in a variety of ways. Providing education through the means of facilitating community lectures and flash cards, in one instance, were found to be more effective than through pamphlets (Abiodun et al., 2014). In another instance, It was reported by Abiodun et al. (2014) that providing education about breast and cervical cancers is more effective through peer counselling sessions than through printed materials. Multimedia health education, based on a movie, also led to improvement in awareness and knowledge about cervical cancer and screening (Abiodun et al., 2014).

The use of mass media within interventions have been linked with several positive outcomes. It not only acts as a useful tool for education purposes, but has also been linked with improved screening rates, decreased blood pressure, better behavioural adherence, among others. Among the six interventions relevant to this factor, only three provided information regarding its cost-effectiveness.

Findings from this research study suggests that community-based interventions have great potential in African communities, due to its positive health outcomes as well as its cost-effectiveness. This is not surprising, as the African culture holds family as a very strong value. The actions and beliefs held by family members significantly influence one another. Research suggests that there is great potential in social support and social networks. Social integration has been found to contribute to healthier choices and enhance medication adherence (Vedeathan et al., 2017). Among the number of reasons diabetic individuals listed for not exercising regularly,

Tewahido and Berhane (2017) highlighted that these reasons include lack of interest, lack of motivation, and busy schedules. Social support has been found to be quite advantageous to support diabetes care. A positive social network fosters an environment for individuals to talk about their problems associated with diabetes, walk together, and work towards changing the perception of norms related to diabetes (Vedeathan et al., 2017; Mendis & Chestnov, 2013; Mendenhall & Norris, 2015). Peer support also helps subdue the fear associated with diabetes, manage the condition, and reduce associated risks (Fisher et al., 2012). Social support can also be illustrated in the form of assisting in daily management of conditions and providing ongoing social and emotional support (Fisher et al., 2012). An example of community-based interventions is couple-based interventions, where partners help one another in supporting healthy behaviour change (Arden-Close & McGrath, 2017). It was found that interventions that target couples are more likely to present long term maintenance of behaviour change (such as participating in physical activity or exercise programs) when both members of the couple are involved (Arden-Close & McGrath, 2017). Arden-Close and McGrath (2017) also found that individuals are more likely to participate in preventative cancer screening in circumstances where their partner is involved as well. Group medical visits are another form of community-based intervention, which entails a clinical encounter between one (or more) clinician(s) and a group of patients (Vedeathan et al., 2017). Group medical visits in fact increased the efficiency of care delivery, quality of care, encourages self-efficacy and enhances social support (Vedeathan et al., 2017). In addition, these visits also enhance group cohesion which promotes exchanges of shared experiences (Vedeathan et al., 2017).

Interventions at the Individual Level

A number of interventions have focused on specific behaviour, such as tobacco and alcohol use, which are risk factors to a number of chronic diseases such as diabetes, hypertension, liver cancer, and other cardiovascular diseases. These interventions that were behaviour specific resulted in greater adoption of healthier behaviour, decrease in tobacco use, decrease in blood pressure, among others.

Studies reviewed in this research project have documented the potential success of technological innovations in Africa (Esterson et al., 2014; Kingue et al., 2013). Telemedicine

interventions have successfully been employed in low and middle-income countries to improve access to adequate care for chronic disease in the circumstances of limited human resources (Kingue et al., 2013). This research study investigated the implementation of varying technological interventions across different African countries, in its attempt to combat chronic and NCDs. Most of these interventions were found to be effective in improving adherence behaviour, physical activity, diet as well as other health outcomes such as improvements in blood pressure, access to care, and improved attitude towards healthcare. For example, specific elements of the SMS text messaging, relating to the content, tone, and timing contributed to its positive reception (Leon et al., 2015). The personalized SMS text messages had a polite and respectful tone which fostered a sense of respect and value (Leon et al., 2015). This enabled participants to feel comfortable in accessing and receiving their SMS-text messages (Leon et al., 2015).

CONCLUSION & RECOMMENDATIONS

The primary purpose of this research project was to determine what makes interventions effective in preventing and managing chronic and non-communicable diseases in African countries. The research activity revealed a number of features that contribute towards the success of interventions. These features were assessed with respect to its effectiveness in improving health outcomes, ensuring behaviour change, and whether or not it will be cost effective. These interventions can be examined at the structural, community, and individual levels, to demonstrate varying levels of impact across the healthcare system. The following interventions or intervention focus areas were found to be the most promising in African regions:

- **Task-shifting or resource optimization**, a cost-effective method of addressing the issue of insufficient human resources (mainly physicians) faced by many sub-Saharan African countries. Task-shifting looks at shifting the responsibility of the healthcare provider to other professionals, such as nurses or traditional healers.
- **Collaborative partnerships** are a method of developing partnerships across different groups and levels of stakeholders to complement each other's skills. In a successful public-private partnership intended to address women's cancer control, the intervention contributed to doubling the rate of cancer screening.
- **Standardized guidelines** have been found to address the needs of healthcare professionals, by ensuring a systematized approach to healthcare.
- **Interventions that incorporate education:** Incorporating education in a cost-effective manner can be achieved in a number of ways, from community lectures to peer counselling and distribution of printed materials.
- **Community-based interventions** have demonstrated effectiveness in contributing to healthy behaviour change many African countries. By organizing interventions that promote health promotion at a community level, it has been found that social integration leads to better health choices and enhanced medication adherence.
- **Mass media** has been identified as a cost-effective and successful tool to educate the public on health-related issues, including restricting access to alcohol and tobacco, addressing unhealthy diet, and promoting physical activity.

- **Technological innovations** enable the provision of mobile technologies to improve access to healthcare at a low implementation cost. Mobile health technologies successfully aid in facilitating follow-up for patients, adhering to clinical attendance, improving healthcare service delivery, and healthcare in general.

LIMITATIONS

It is important to consider the following limitations of this research project.

- It is possible that the search terms that were utilized in this methodology were not all-inclusive. There is a chance that there are other search terms which were not considered when starting the research project, which could have resulted in more relevant search results.
- Secondly, this project only included peer-reviewed published articles, in the English language, from January 2007 to February 2018. This approach may have excluded research that may not have been peer-reviewed, or in other languages, or published before 2007.
- Thirdly, the selection criteria of assessing the relevance on the article based on the title may have been limiting as it could have led to exclusion of other articles that could have been relevant.

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