Proposal

Strengthening Breast Cancer Care in Rural Chakwal, Punjab: A Pilot Initiative

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June 2019

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Executive Summary

Breast cancer is the most common cancer in women and the second most common cancer worldwide. According to GLOBOCAN, the global burden of cancer database, roughly 2.08 million new breast cancer cases were diagnosed in 2018, accounting for 11.6% of all new cancer cases worldwide. Globally, trends indicate that rates of breast cancer are increasing in low- and middle-income countries (LMIC), partially as a result of epidemiologic shifts caused by longer life expectancy and the adoption of western diet and lifestyle. This is the case in Asia which accounts for 43% of the new breast cancer cases and 50% of breast cancer deaths in the world.

Pakistan has emerged as one of the countries with the highest burden of breast cancer. On average, it is estimated that one out of every nine Pakistani women will develop breast cancer during their lifetime. In 2018, it was estimated that Pakistan experienced 34,066 new cases of breast cancer in its borders, accounting for 36.8% of total new cancer cases among Pakistani women. Similar to many LMICs, breast cancer among women in Pakistan is usually diagnosed in its advanced stages. In Pakistan, this occurrence is linked to individual and system level factors.

Due to cultural and religious norms, people in Pakistan shy away from talking breasts and breast cancer. As a result, many women have limited knowledge on the early symptoms of breast cancer. Additionally, the lack of investment in Pakistan's health care system has led to a scarcity of available and affordable resources for women. A major deficit identified is the gap of services in primary and secondary care facilities to diagnose and refer patients to tertiary facilities for treatment.

The proposed intervention for this pilot project is therefore two-fold: increasing awareness of breast cancer in high risk women (33-55 years old) and strengthening the health system through the development of a standard diagnostic and referral system to tertiary level hospital. The interventions proposed are in accordance with Breast Health Global Initiative (BHGI) recommendation for breast cancer management in low-resource settings. The intervention will take place in the district of Chakwal. Chakwal has been chosen because it possesses characteristics common for rural districts in Punjab, Pakistan. Punjab is the most populous province in Pakistan and houses the Shaukat Khanum Memorial Cancer Hospital and Research Center (SKMCHRC), Pakistan's largest cancer hospital. It is also the only province collecting regional data on breast cancer. The availability of high quality data is necessary to measure effectiveness and impact of the project in order to determine how the intervention should be scaled up throughout the country.

1.0 Introduction

Background

Breast cancer is the most prevalent cancer in women and the second most common cancer worldwide (1). According to GLOBOCAN, the global burden of cancer database, roughly 2.08 million new breast cancer cases were diagnosed in 2018, accounting for 11.6% of all new cancer cases worldwide (2). Breast cancer is also the leading cause of mortality among women, contributing to 15.0% of cancer related deaths (2**)**. Although breast cancer has a higher prevalence in the developed countries, global trends indicate that rates of breast cancer are increasing in low- and middle-income countries (LMIC), partially as a result of epidemiologic shifts caused by longer life expectancy and the adoption of western diet and lifestyle (2,3) This is the case in Asia which accounts for 43% of the new breast cancer cases and 50% of breast cancer deaths in the world (2).

Unlike their counterparts in developed countries, women in developing countries face much worse outcomes after a breast cancer diagnosis. Globally, 5-year breast cancer survival rates are 40% in low income countries compared to over 80% in high income countries (4). For many LMICs, the low survival rates have been attributed to lack of early detection programs, resulting in higher proportion of women presenting with later stages of the disease.

Breast Cancer

Women are more susceptible to breast cancer than men as they have higher levels of estrogen and progesterone (5). While the precise causes of breast cancer are still unclear, risk factors include genetic, hormonal, environmental, and lifestyle factors (6). Research indicates that 5% to 10% of breast cancer cases are caused by heredity and genetic factors, including family history of breast cancer or ovarian cancer and inherited mutations of breast cancer susceptibility genes - BRCA1 and BRCA2, respectively (6). Other known risk factors are related to menstruation (early age at menarche, later age at menopause), reproduction (nulliparity, late age at first birth, and having fewer children), exogenous hormone intake (oral contraceptive use and hormone replacement therapy), nutrition (alcohol intake), and anthropometry (greater weight, weight gain during adulthood, and body fat distribution) (6). The wide breadth of risk factors means that no woman is immune. In order to improve the odds of survival and cure, international standards promote the diagnosis of breast cancer in earlier clinical stages (7). Many countries, mostly those with middle to low human development index (DHI), lack the resources and capability to adhere to these recommendations. One such country is the Islamic Republic of Pakistan.

Breast Cancer in Pakistan

Breast cancer in Pakistan is treated as a provincial matter as the country lacks a national cancer registry (8)**.** As such, GLOBOCAN uses the Punjab Cancer Registry (PCR), which is currently the only active population-based registry, and facility level data to extrapolate country level data for a myriad of cancers including, but not limited to, breast cancers (8)

In Pakistan, breast cancer is mostly diagnosed in women in their fourth decade of life, a contrast to the West where it occurs, on average, after the age of 60 years (9). In 2018, it was estimated that Pakistan experienced 34,066 new cases of breast cancer in its borders, accounting for 36.8% of total new cancer cases among Pakistani women (10). The age-related incidence rate and age-standardized mortality rates of breast cancer in Pakistan are among the highest in Asia at 43.9 and 23.3 per 100,000 women, respectively (10). On average it is estimated that one out of every nine Pakistani women will develop breast cancer during their lifetime (10). In Pakistan, more than 50% of patients present with breast cancer at stage II and III during initial diagnosis, with a significant proportion presenting at stage IV (9,11).

When one considers that Pakistan is the sixth most populous country in the world (with a population of over 200 million people), that 49% of the population is female, and that the majority of the population is under the age of 65 years old, the gravity of the situation starts to become apparent (12). Many women become afflicted with this disease at some point in their lives, when they are the most vibrant and productive. Concurrently, a multitude of factors delaying their presentation to the health care system leads to further advancement of the disease. The overall effect is that women have higher rates of morbidity, disability and mortality.

Barriers

The literature indicates that lack of knowledge, lack of resources for early detection, and the cultural stigma associated with breast cancer are the main barriers to the early diagnosis of the disease in Pakistan.

A cross-sectional survey conducted in the capital city of Pakistan, Islamabad and the multi-ethnic city of Karachi, found that although over 94% of the women interviewed were aware of breast cancer, only 40% had adequate knowledge of the symptoms, risk factors and early detection techniques (13). Studies also showed that less than 30% of women knew how to perform physician self-examinations at home and the majority of women had difficulties interpreting symptoms such as breast lumps (13,14). It is safe to assume the numbers are worse in rural areas. Educating women about the risks and symptoms of breast cancer, therefore, constitutes a major step towards its early detection, as women will be able to gauge their risk level and take appropriate measures. Pakistani women also expressed being fearful of the personal and social ramifications of having the disease, including but not limited to, social isolation and divorce (13,14). These fears speak of the lack of awareness of breast cancer and its prognosis among the general public.

Poor understanding about breast cancer is also evident in Pakistan's formal health system. A study conducted in a teaching hospital in Pakistan found that only 35% of the registered nurses were knowledgeable about breast cancer and its risk factors (16). Therefore, it is necessary to also provide training to the health personnel on the diagnosis and treatment of breast cancer.

Pakistan's public health care system is ill equipped to manage the increasing burden of non-communicable diseases such as breast cancer. In fact, up until the mid-1990s, Pakistan had to

train their oncologists overseas as it lacked a national training program in the country (17). Despite the extensive network of health infrastructure in each level of care, Pakistan's public health system is characterized by inadequate expenditure, poor quality of services and poor access to and utilization of services (16). This is due to the fact that the government of Pakistan spends only US $37.99 per capita per annum on healthcare, which is lower than the US $44 recommended by the World Health Organization for essential health services (19).These shortcomings have resulted in over 80% of the population seeking care in the private health system (18). In most cases costs are passed on to patients, as evidenced by the fact that 91% of 63.4% of private health expenditure is financed out-of-pocket by households.14 Therefore, it is not surprising that many Pakistani women delay treatment and care for their symptoms for fear of causing a financial strain on their families (13,14).

The lack of investment in the public health sector has led to shortages of health professionals, as most of them opt out to work overseas or in the private health sector in the urban areas (20). This has resulted in only 125 oncologists of all descriptions working in the country in both the private and public sectors (17). Furthermore, the majority of the 70 public hospitals which have the capacity to diagnose and treat cancer are located in major urban centres, posing an extra barrier to over 64% of the population living in rural areas.

Culture and tightly held beliefs around gender also pose significant barriers to breast care in Pakistan. Pakistan is mostly a Muslim majority and conservative country (21). In this environment, it is still a taboo to talk about breast cancer as it references to a reproductive organ. Women are always reluctant to discuss issues pertaining to breast health or voice concern about their breast to health care professionals (14). These cultural norms must be taken into consideration when designing an intervention, in order to address the delaying of presentations of breast cancer symptoms to the health facilities.

The issue of gender is also a cause of concern for Pakistani women. Pakistan operates under a patrilineal system, where decisions pertaining to the wellbeing of the family members are made by the male authority figures (22). Many women have to negotiate with their family members and husbands' to access health services. This usually acts as a deterrent, as it may be embarrassing for women to expose their symptoms and concerns regarding their breast health to a senior male family member in order to be granted permission, offered accompaniment, and/or given resources to access the health facilities. Moreover, in Islam, interactions between men and women are frowned upon when they are outside the bounds of familial relationships (16). As such, women may be reluctant to talk to male health care professionals about health problems (13,14). The proposed intervention must accommodate these tightly held beliefs, to be accepted by women in Pakistan.

2.0 Problem Tree

As a first step, a problem tree was developed to articulate the problem, identify its root causes and develop a deeper understanding of these underlying causes. The core problem is 'Late diagnosis of breast cancer for women in Pakistan'. There are four underlying reasons for this: (1) All women are not screened; (2) Women identify the lump, but do not consider is as a problem; (3) Women recognize the lump as a problem, but do not take action; and finally (4) they seek care, but do not receive appropriate care. The problem tree analysis broke down this complex problem into its root social, cultural, gendered, and health system causes. See Annex 1.

3.0 Objective Tree

Based on our Problem Tree analysis an Objective Tree was developed. With the aim to reduce the mortality rate due to breast cancer in Chakwal district, our goal is to 'Promote early detection of breast cancer in Pakistani women'. We aim to achieve this through 2 key objectives:

1) Increase early diagnosis and treatment of breast cancer by ensuring that women are diagnosed with breast cancer at stages 1 and 2,
(2) Increase the 5-year survival rate of breast cancer among women in Chakwal district.

We hope to achieve these objectives by:

1) Ensuring more women screen themselves through self-breast examination and seek early care if they have any symptoms suggestive of breast cancer.
2) Strengthen the rural Primary health care system to provide appropriate care and referral. This will include:

See Annex 2 for a detailed Objectives Tree.

4.0 Achieving the goal: Program Theory of the Breast Cancer Chakwal initiative

This proposal aims to improve early detection of breast cancer in Chakwal district, Pakistan through the implementation of 2 inter-related projects. Project 1 is a Health Education Initiative. In accordance with Breast Health Global Initiative (BHGI) recommendation for breast cancer management in low-resource settings (23), this arm of the intervention will give women, especially those at the highest risk (age 35-55) the knowledge to identify early symptoms of breast cancer and when to seek care. Project 2 will strengthen the existing public-sector district and tertiary level health care system to provide an evidence-based standard diagnostic and referral system for breast cancer. We discuss each in detail below

4.1 Project 1: Health Education messages around breast cancer

Evidence suggests increased awareness of breast cancer among women is associated with early detection of the disease, which will then result in a lower proportion of women presenting with

late-stage disease (24). Therefore the core objective of Project 1 is to increase knowledge of breast cancer in high-risk age group of women (35-55 years old) in Dist. Chakwal.

We propose three health education interventions:
(1) A breast cancer communication campaign in the district.
(2) A survivor advocacy initiative based on the concept of peer- transfer of knowledge
(3) A Lady Health Worker-based initiative to provide one-to-one health education, information on how to conduct a breast self-examination (BSE), as well as provide referral information to the women who have already detected a lump in their breasts. Lady Health Workers (LHW) are the pillar of Pakistan's community health worker program that provides primary health care in the country's vast rural areas. Each LHW has a catchment area of about 1500 people or 200 households.

See Annex 3 for a Logical Framework of Project 1.

4.1.1 **Breast Cancer communication campaign**

As discussed above, talking about breast cancer is a challenge in conservative Pakistan. We cannot, therefore, draw upon traditional health education communication strategies using mainstream media advertisements (TV, billboards, or banners). However, outpatient antenatal clinics in Pakistan is one place in the health system where only women are present. Moreover, over 90% of pregnant women seek antenatal care and they are, without an expectation, accompanied by elder women, mothers or mothers-in-law. The latter are the target group for breast cancer.

This breast cancer communication campaign will consist of a pre-tested health education 'infomercial' to transmit the Breast Cancer message using TV screens specially installed in the waiting rooms of antenatal clinics at BHU, RHC, THQ, and DHQ levels. The message will consist of: what is breast cancer, what are the early and late symptoms, and the possible benefits of early diagnosis. It will further teach and promote self-examination of breasts among women (25). Information about survival rates, possible treatments, and the fact that the disease is not transmittable will be provided. Special TV screens will be securely installed in the antenatal clinics, which women, both young and old can watch while they wait to be seen by the health care providers.

4.1.2 **Survivor Advocacy**

Rather than health professionals educating members of the public, the Survivor Advocacy approach believes the survivors of breast cancer are better qualified to share knowledge of breast cancer, its early and late symptoms, and the benefits of early diagnosis. Survivor advocacy is based on principles of peer-education, a health education approach in which peer-educators provide the knowledge and help create new social norms around the benefits of seeking early health care. Peer-educators are believed to be effective teachers as they share knowledge, values and behaviors with people receiving the information. The Survivor advocacy approach is

a particularly useful approach for reaching women in Pakistan as this is a context characterized by women's seclusion and *purdah*. Rural women, in particular, have limited access to information networks beyond their *biradari* networks. A *biradari* or the extended family, is a social network whose members are related by blood.

Our Survivor Advocacy program will consist of two components:

(1) ***Identifying Survivor Advocates***: Our survivor advocacy program will extend beyond survivors of breast cancer to include female family members of survivors of all kinds of cancer including mothers of children who survive cancers and wives of men surviving various cancers. These advocates will be recruited from the major cancer treatment hospitals including Shaukat Khanum Can Hospital. All potential advocates will be approached and invited to attend on-going training workshops.

(2) Training the advocates: A curriculum will be developed to train the Survivor advocates focusing on self-examination of breasts, the importance of seeking early care, possible treatments, and the fact that the disease is not transmittable. The training sessions will be a regular, ongoing activity in hospitals that provide advanced cancer care.

4.1.3 Lady Health Workers

The Lady Health Workers provide a range of primary health care, family planning and maternal and child health care in their catchments areas. Since its inception in 1994, the scope of services provided by LHW have expanded from maternal and child health services to include community management of infectious diseases, outreach campaigns, and disease surveillance (15). Currently, there are over 110,000 active LHWs providing services to over 70% of the population (15).

Given their central role as the community-based health worker, we aim to train the LHW to teach women how to conduct breast self-examination and how to refer women to the appropriate health care centers if a woman detects a lump in their breast. They will also be trained to transmit the main messages of the communication campaign - that there are effective treatments for BC, and there are survivors who can confirm it.

4.2 Project 2: Health Systems Strengthening

Project two aims to strengthen the existing rural Primary Health Care system to provide the standard diagnostic and referral system for early detection of breast cancer. It is based on the evidence-based Model for Early Detection of Breast Cancer in Low-Resource Areas (27) and will consist of:

a. Improving the knowledge of breast cancer among health personnel in primary and secondary healthcare centers,
b. Strengthen the capacity of existing primary and secondary health centers to effectively and efficiently screen and diagnose breast cancer,
c. Establishing a breast cancer referral system across primary, secondary and tertiary healthcare systems to improve early detection of breast cancer. It is intended that through

implementation research, a replicable model of the intervention will be developed resulting in a national scale-up of the intervention in Pakistan.

To ensure each woman with a suspected breast lump the following system will be established.

4.2.1 ***Lady Health Worker (LHW) training and referral system****:*

As discussed above, LHWs will be trained to refer women with suspected breast lumps to the BHU or RHC for a clinical breast examination. This will be documented in the LHWs health management information system (HMIS) that is shared through all levels of the health system. This registration will ensure the patient can be followed up throughout the referral and diagnostic process and reduce the probability of loss to follow-up.

4.2.2 ***Primary Level (BHU, RHC):***

At the BHU and RHC levels, a Lady Health Visitor (LHV) will be trained to conduct a clinical breast examination (CBE). If the CBE is positive, the patient will be referred to a secondary level facility where further diagnostic procedures will take place. If the CBE is negative, the patient will be recommended for follow-up after 3 months. At 3 months, if there is again no focal finding, then an annual CBE is recommended. These tests will also be documented in the HMIS.

4.2.3 ***Secondary Level (THQ, DHQ):***

Nurses at THQs and DHQs will also be trained to conduct CBEs. If the CBE is positive (either found at the secondary level or referred from a primary facility), they will perform an ultrasound triage to evaluate. If the ultrasound shows results that are indicative of cancer or is a benign mass, a nurse will then perform a fine needle biopsy (FNB). The sample will be sent to the lab where a medical laboratory technician will send a photo via telemedicine to a tertiary level facility for diagnosis. This will be documented in the HMIS.

4.2.4 ***Tertiary Level (Shaukat Khanum Memorial Cancer Hospital or any hospital in Rawalpindi):***

A cytopathologist or oncologist at the tertiary level facility will diagnose the FNB sample and send the results back to the nurse at the secondary level facility where the patient was seen. The results will be documented in the HMIS and a notification will be distributed to the nurse (at secondary level facility) and the patient. The secondary level will be responsible for follow-up of the patient, with assistance from the LHW that manages the catchment area where the patient is from.

To establish this system, the following activities will be carried out:

1) Equip THQs and DHQs with fine needle biopsy (FNB) and telemedicine equipment.
2) Develop a curriculum and training program to improve the knowledge and awareness of breast cancer among health practitioners. This includes: training nurses at the BHU, RHC, THQ and DHQ level to conduct clinical breast examination (CBE), nurses at the secondary care level (i.e., THQs and DHQs) to perform ultrasound and Fine-needle biopsy, lab technicians to perform the smear, use the microscope, and send a photo to a tertiary hospital. If required, cytopathologists at tertiary hospital will be provided in-service training on how to read the

telemedical smear and send the results back to the respective secondary care practitioner for follow-up.

The training curriculum will incorporate information about the burden of breast cancer in Chakwal, skills around breast examination, ultrasound, telemedicine, and communication skills to follow-up with patients. Plans will be developed for re-training to sharpen new knowledge and teach new skills consistent with emergent advances in BC diagnosis (e.g., every 2 years).

3) Develop a standardized referral protocol for breast cancer, from the lady health workers, basic health units, rural health centres, THQs, DHQs, and tertiary hospitals, so that patients are referred to the appropriate level of care efficiently and effectively. This referral procedure will be culturally sensitive and will take into consideration existing socio-political and economic contexts within the district.
4) Equip the existing health management information systems (HMIS) with the capacity to incorporate breast cancer indicators, including follow-up of patients, appointment/referral periods, and treatment prescribed. To do so, we propose to hire a consultant who will examine the existing HMIS and provide recommendations to strengthen data management, patient follow-up, and overall increase the data available for breast cancer. This increased data availability will in turn increase the awareness of the burden of breast cancer in Pakistan among health practitioners and decision-makers. To supplement this, all health practitioners who will be working with the HMIS, whether through data collection, management, or use, will be trained on its proper operation.
5) Build in a robust monitoring and evaluation system to monitor both processes and outcomes and ensure resources are being used effectively. This includes a request for proposals to conduct implementation research, in order to document indicators, evaluate program, lessons learned and ensure the production of a replicable model that can be scaled up nationwide. Throughout the planning, development, implementation, and evaluation cycle of the breast cancer diagnosis and referral program, we will build a robust stakeholder consultation process to ensure the program's effectiveness, acceptability, feasibility, and sustainability.

See Annex 4 for a Logical Framework of Project 2.

Staff required

These personnel were identified based on their current roles and scope of practice. Compliance with professional and legal standards, the governing board, and funding agencies were also taken into consideration to ensure that health leadership will allow the respective practitioners to perform their specified breast cancer roles in addition to their existing responsibilities.

Health Providers			
Level	**Personnel**	**Responsibilities**	**Supervisor**
Primary Care (LHW, RHC, BHU)	LHWs	Referral procedure Assist with patient navigation (i.e., follow-up) Health promotion (i.e., conduct BC SBE awareness sessions in their catchment areas)	LHW Supervisor
	LHVs	Referral procedure Perform CBE	LHV Supervisor (Doctors)
Secondary Care (THQ, DHQ)	Nurses	Perform CBE, FNB Follow-up with patient upon receiving diagnosis	Head nurses
	Radiologists	Ultrasound triage	Radiologist Supervisor
	Medical lab technicians	Perform smear and send to cytopathologist via telemedicine	Lab technician Supervisor
Tertiary Care (e.g., teaching hospitals)	Cytopathologists and/or oncologists	Diagnosis from FNB procedure Send results back to respective nurse at secondary level	Pathologist/oncologist Supervisor

For the first phase of the project, the supervisors (e.g., head nurses) will be trained for the procedure so that they can conduct the responsibilities. The quality of their work will be monitored closely by the implementing management structure and feedback will be provided to health workers throughout implementation. At its second phase, the project will train additional practitioners to expand the number of personnel that can conduct the BC diagnostic procedures. These additional practitioners will be supervised by the health workers trained at phase I, who have first-hand experience on how to conduct the procedures at high quality. This will serve as the handover of the system from the implementing management structure to the health facility. If necessary, training sessions for the second phase should also include modules on leadership and monitoring procedures for health personnel supervisors to ensure a strong supervisory capacity.

5.0 Implementation Plan

The proposed initiative will be implemented by Dr. Rabia Bhatti in partnership with the Government of Pakistan, the Rawalpindi Medical College Team (RMCT) and the Real Medicine

Foundation (RMF). Dr. Rabia Bhatti, the primary author of the initiative, is a board-certified breast cancer surgeon from the United States of America. She is clinical assistant professor of surgery at Midwestern University, Illinois, Director of the Breast Program in Resurrection Medical Center in Chicago, St. Mary's Hospital in Chicago and West Suburban Hospital in Oak Park, Illinois, respectively. She will be supported by Dr. Zubia Mumtaz, Professor and Program Director, Global Health, University of Alberta, Canada and Director Research, Real Medicine Foundation.

The management structure will be developed as various partners are identified and tasks shared. The RMF will participate in this project through developing educational material, recruiting LHW and BC survivor trainers, and developing an advocacy curriculum for BC survivors.

Project Personnel		
Activity	**Personnel**	**Responsibilities**
Project Management	Project Manager	Lead the initiative Conduct stakeholder engagement Recruitment of staff Monitor budget, program delivery, implementation, results, etc. Ensure resources are being used effectively and efficiently
	Monitoring and Evaluation Specialist	Develop monitoring and evaluation system and perform m&e to identify both intended and unintended outcomes (bi-annual)
	Logistics	Handle all logistical matters, including procurement and equipping of health facilities Support with stakeholder engagement Support with effectiveness and efficiency of resource use
Diagnostic and referral procedure development and training	Subject matter experts (e.g., breast cancer surgeon, health training expert, public health expert, MOH representative, etc.)	Develop feasible and sustainable standard referral and diagnostic procedure. Develop curriculum and conduct training for health practitioners. Develop procedure and identify responsible person to ensure that re-training occurs every X years to keep people updated with new knowledge and motivated to complete this job at high quality.

Data management	Consultant	Develop and add BC indicators to existing HMIS.
Health Education	IT Consultant	Equip antenatal clinics with display screens (public health awareness)
	Health Education Communication Expert	Develop health education curriculum and training plan for LHW and BC survivors. Conduct stakeholder consultation with BC and public health expert regarding relevance of training curriculum. Organize educational and training activities.
	Real Medicine Foundation Trainers	Recruit and train BC survivors on advocacy Train the trainers: Train LHWs to conduct BSE training to catchment area

6.0 Timeline

See Annex 5

7.0 Ethical Considerations (Gender & Environment)

We understand and hold as a priority to be mindful and aware that any intervention should and will be based on what is appropriate for the cultural setting where it will be developed - in this case, taking into account the highly conservative nature of the Pakistani culture. Guided by the ethical principles of autonomy, beneficence, non-maleficence, and justice, this proposal is committed to working in partnership with members of the community to ensure its cultural-appropriateness, effectiveness, acceptability, and sustainability.

Importantly, our project design has been developed through a gender-sensitive lens. We recognize that our initiatives do not apply to everyone equally and there are many gender and diversity issues to consider. A gender-sensitive lens helps us to recognize and move beyond our assumptions that interventions affect everyone equally and find ways to address unique needs. For instance, we propose to train nurses in the health facilities to conduct clinical breast exams and fine needle biopsy, taking into consideration that almost 80% of nurses in Pakistan are females. This ensures a culturally appropriate health worker-patient contact or relationship.

Furthermore, all activities will be implemented with environmental sustainability principles. We will procure locally sourced materials to reduce pollution created by travel and use recyclable

education materials for training. We do not expect our project to have any impact on noise or pollution levels as we are committed to the most efficient use of scarce resources.

8.0 Risk Assessment

Assumptions/Risks	Mitigation Strategies
The government of Pakistan will support the development and implementation of the project	Involve the government of Pakistan from the beginning of the initiative development to ensure acceptability of the program. Establish transparency, accountability, and trust. Report process and outcome evaluation results annually.
Hospital policy, professional and legal standards allow nurses and other paramedicals to perform fine needle biopsy.	Conduct stakeholder consultation to ensure proposed procedures are in compliance with professional and legal standards, governing board and funding agencies.
Trained personnel will be available at all times to perform procedure	Establish clear roles and responsibilities and ensure strong supervisory capacity.
THQ and DHQ have electricity to power microscope when required	Develop an auxiliary procedure in the case that electricity is unreliable.
Patient's result will be communicated in a timely manner by the tertiary hospital	Establish clear roles and responsibilities and ensure strong supervisory capacity.
Patients will accept mastectomy as a prognosis	Build skills development in patient communication to the training curriculum to ensure health practitioners are equipped to respond appropriately to their patients.
Health personnel will not use materials provided for FNB for other purposes, resulting in out-of-stock	Establish clear roles and responsibilities and ensure strong supervisory capacity.
Referral system and communication between LHW, BHC, RHC, THQ, DHQ and tertiary will be sustained over time	Establish clear roles and responsibilities and ensure strong supervisory capacity. Develop a handover procedure with the government of Pakistan to ensure maintenance and sustainability of the program after project completion.
Practitioners trained on data collection will regularly collect complete data for monitoring purposes and adhere to confidentiality	Train all relevant health staff on proper data collection, use, and confidentiality (built into curriculum) Establish clear roles and responsibilities and ensure strong supervisory capacity.
HMIS is functional	Hire consultant to analyze the existing HMIS for functionality.
Community members are aware of BC services, trust the health workers, and seek their care	Supplement breast cancer procedures with public health education regarding the burden of breast cancer, its symptoms, and the services available. Add skills development in building patient trust to the health practitioner training curriculum.

BC survivors will participate and commit to this project	Actively involving and engaging BC survivors when developing BC curriculum strategies.
Display screens will remain in place and function properly.	Establish clear roles and responsibilities to ensure that display screens will be safe and secure. Regularly inspect and maintain the display screen system.
Antenatal clinics will have electricity to power display screens.	Provide alternative power resources such as power generator or solar panel

9.0 Budget

See Annex 6.

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