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Research Article

Evaluation of the National Diabetes Prevention Program in Palestine: Implementation Achievements, Outcomes and Lessons Learned

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Abstract

Diabetes Prevention Programs (DPPs) aim to deliver prevention-based behavior change interventions to reduce incidence of diabetes. This study reports on the evaluation of the implementation of Phase 1 of the Palestine National Diabetes Prevention Program (PNDPP) which aimed to establish a national community-based approach to diabetes care and prevention, adopting a holistic approach to building communities' capacity to address diabetes. Within this aim, the program worked to launch three centers of excellence and six intermediate diabetes clinics in the North of the West Bank to act as referral centers; strengthen the national committee of non-communicable diseases (NCDs) to become active and operational; building capacity of health care providers to implement national protocols to strengthen diabetes care and prevention; provide quality and patient-centered diabetes care, treatment and management and screen for complications; and raise awareness of preventive measures for diabetes and NCDs within Palestinian communities. The evaluation employed qualitative and participatory methods. Information was derived from primary and secondary sources, including a desk review of program documents, interviews with key informants, focus groups discussions (FGDs) with project beneficiaries and 10 face-to-face interviews conducted with patients enrolled into the PNDP, to gain insight on their satisfaction and perceptions of the program. The evaluation was carried out using a matrix related to PNDP's outputs and outcomes assessed through several input, process and output indicators to measure the achievements of the project against its specific objectives and targets. The evaluation findings focused on the program's design-quality and relevance, effectiveness, efficiency of planning and implementation, impact, and sustainability. This is the first evaluation of a diabetes prevention program implemented in Palestine. We provide practical learning opportunities for the wider uptake and sustainability of diabetes prevention programs.

Keywords: Diabetes; Prevention; Implementation; Program; Evaluation

Abbreviations: AVH: Augusta Victoria Hospital; DCA: Dan Church Aid; DCCM: diabetes comprehensive care model; DPP: Diabetes prevention programs; FGD: focus groups discussions; GDM: Gestational diabetes mellitus; HCP: Healthcare providers; MENA: Middle East and North Africa; NCDs: Non-Communicable Diseases; NCCD: National Committee for chronic diseases; PNDP: Palestine National Diabetes Program; SDG: Sustainable; Development Goals; T2DM: Type 2 Diabetes Mellitus; UNRWA: United Nations Relief a Works Agency; WDF: World Diabetes Foundation.

Introduction

Diabetes is a critical challenge to global health. Along with cardiovascular diseases, cancer, and chronic respiratory disease, diabetes is one of the four main types of non-communicable diseases (NCDs) targeted by the World Health Organization (WHO) [1]. Nearly 50% of adults worldwide living with Type 2 Diabetes Mellitus (T2DM) are undiagnosed or unaware of their status, and at a higher risk of developing harmful complications [2]. The complications of diabetes (eg. cardiovascular disease, blindness, kidney failure, lower-extremity amputations) result in decreased quality of life, higher rates of disability, and an increased in use of health care services [3]. In the Middle East and North Africa (MENA) region, 1 in 6 adults (73 million) are living with diabetes. This number is expected to reach 95 million by 2030 and 136 million by 2045 [4]. Reflecting global trends, diabetes is a growing public health challenge in Palestine, ranking the 5th cause of all deaths in 2018 (7.5%), while also contributing to CVD, which is the leading cause of death in the country (31.5%) [5]. While estimates vary, it is generally agreed that the prevalence of diabetes in Palestine is high, compared to the worldwide prevalence. According to one estimate, diabetes prevalence for adults aged 25 and above is forecasted to increase from 20.8% in 2020 to 23.4% in 2030 [6]. In the context of Palestine, lifestyle changes due to urbanization and globalization have resulted in increased tobacco use, consumption of unhealthy diets, physical inactivity and obesity. In terms of tobacco use, there has been a clear increase in the prevalence of smoking among individuals aged 18 and above in the West Bank, as it increased from about 26% in 2010 to about 40% in 2021. In the Gaza Strip, the prevalence has increased from about 15% in 2010 to 17% in 2021 [7]. A systematic review conducted in 2019, showed that the prevalence of obesity and overweight among adults was18% and 30% respectively, while the prevalence among adults with NCDs was 49% and 40%, respectively [8]. It has been recognized these high prevalence's are attributed to the common sedentary lifestyles of adults in Palestine [8]. These demographic and epidemiological changes in the context of a longstanding stressful conflict situation further aggravate the increase of the NCD burden, in particular T2DM [9]. Lack of investment in preventative measures is also a major cause of the rapid and continuous rise of the NCD burden in Palestine. Managing diabetes risks is rendered challenging due to the humanitarian situation. The complexities of delivering and accessing healthcare in a conflict-affected setting impact the diagnosis, management, and treatment of diabetes. The longstanding blockade, mobility restrictions, checkpoints and resultant devastation of infrastructure have negatively affected the ability of health systems to respond to the growing health needs of a population facing a protracted humanitarian crisis. The poorly resourced healthcare system operates in a continuous state of crisis and emergency and there is limited access to qualified diabetes services. Diabetes Prevention Programs (DPPs) have been developed and implemented worldwide since the 1990s [10]. Trends underscore the need for well-tested and cost-effective prevention services, including diabetes education, outreach, regular screening for early diagnosis, and high quality of treatment and management of diseases and their complications. Previous diabetes programs have shown that diabetes incidence could be reduced through behavior change programs aimed at weight-loss and other modifications in lifestyle behaviors [11]. To recognize the critical need to address diabetes risks in conflict-affected Palestine, the World Diabetes Foundation (WDF) has partnered with multiple stakeholders in Palestine on diabetes prevention, management, and care. Throughout the past two decades, the WDF portfolio in Palestine has gradually expanded, starting with a collaboration in 2003 with Dan Church Aid (DCA) and the Augustus Victoria Hospital (AVH) in East Jerusalem in setting up a diabetes care clinic. Successive projects supported by WDF in collaboration with the DCA, AVH, Juzoor for Health and Social Development (Juzoor), the Palestine Ministry of Health (PMOH), and the United Nations Relief Works Agency (UNRWA), have focused on institutionalizing diabetes comprehensive care, and building the capacity within Palestinian health care system to deliver structured diabetes care services. In 2017, efforts to improve diabetes care for Palestinians took a major step when the key health stakeholders launched the Palestinian National Diabetes Program (PNDP). The first phase of the PNDP (2017-2020) brought together key health stakeholders in a single platform. The high visibility of the PNDP encouraged private, public, and civil sector actors, such as the Bank of Palestine, the Arab Bank, the Ramallah and Tubas Municipalities, Lions International, Caritas, other development agencies, local women organizations and the Steno Diabetes Center (Copenhagen) to join the program's efforts to prevent and treat diabetes and its life-threatening complications.

About the Palestinian National Diabetes Program (PNDP)

Phase I of the PNDP (2017-2020) was implemented in September 2017, uniting longstanding WDF partner organizations, including the Palestine Ministry of Health, and within the framework of the Ministry of Health National NCD Action Plan, as well as national efforts to promote implementation towards the Sustainable Development Goals (SDGs), in particular (SDG 3) 'Ensure healthy lives and promote well-being for all at all ages'. Based on evidence and lessons learned from previous WDF-funded projects in the Southern Region of the West Bank, Phase I aimed to improve access to diabetes care and prevention across the Northern Region, where diabetes services were scarce, and was based on with a gender sensitive approach with particular focus on women and their vulnerability to diabetes and Gestational Diabetes Miletus (GDM). The main objectives of thefirst phase of the PNDP (2017-2020) were to:

- Invest in three model centers located in the Northern and East Jerusalem districts to act as referral centers utilizing the diabetes comprehensive care model (DCCM) and implementing GDM protocols and upgrade three strategically located intermediate level clinics.

- Build the capacity of health professionals (doctors, nurses, school and community health workers) to implement national protocols to strengthen diabetes care and prevention, including lifestyle counselling, nutrition, and psychological support.

❖ Provide diabetes patients with consistent comprehensive care, management and screening for diabetes-related complications through and in coordination with partners, community health clinics & mobile clinic.

❖ Raise awareness of preventive measures for diabetes/ other NCDs, focusing on early preventative and lifestyle changes with a stronger outreach to pre-diabetic refugee women and to children and adolescents in schools, through stronger integration with the Ministry of Education and UNRWA school-based interventions.

❖ Strengthen the National Committee on non-Communicable Diseases (NCCD) to be active and operational.

As part of the completion of Phase I of the PNDP a final evaluation was conducted in July-August 2020, to assess the PNDP's performance and impact. In addition, a program booklet was developed to highlight the PNDP as a unique experience of local and international cooperation in developing, implementing, and monitoring a national diabetes care program closely aligned with broader national health plans. The booklet sheds light on twenty years of WDF experience in Palestine, culminating in the launch of the PNDP, and describes the process of building and sustaining a national program based on holistic approaches to the prevention and treatment of diabetes [12]. The objective of this paper is to present the implementation of the PNDP and evaluate the PNDP's outputs-outcomes assessed through several input, process and output indicators to measure the achievements of the project against its specific objectives and targets.

Methods

To ensure a rigorous and multifaceted program evaluation, an evaluation matrix was used to assess the performance of Phase I of the PNDP (2017-2022), with a specific focus on the contribution of the project to National plans, strategies, and policies. The evaluation matrix was conducted according to the evaluation criteria established by key stakeholders, focusing on relevance, effectiveness, efficiency, impact and sustainability (OECD's updated evaluation criteria) with a view to draw lessons and make recommendations for future projects. Specifically, the evaluation matrix aims to assess PNDP's outcomes and outputs through specific input, process and output indicators which measure the achievements of the project against its specific objectives and targets. Table 1 presents the specific objectives for Phase I of the PNDP. The evaluation was carried out between July and August 2020 by two evaluators.

Table 1: Objectives of Phase I of the PNDP.

Objective	Description
Objective 1 Increase in patients treated and complications managed	❖ Inaugurate well-equipped clinics and six intermediate primary health clinics ❖ Upgrade Diabetes Comprehensive Care Models physically and technologically ❖ Increase in detection of diabetes complications ❖ Decrease in number of amputations ❖ Increase in patients treated and complications managed
Objective 2 Strengthening the national committee of NCDs to become active and operational	❖ Utilize revised protocols ❖ Conduct 18 NCDs meetings and 9 National meetings
Objective 3 Capacity building of health care providers to implement national protocols to strengthen diabetes care and prevention	❖ Train 200 HCPs in diabetes screening/ management and prevention at mobile clinics ❖ Train 72 HCPs in diabetes screening/ management and prevention at AVH
Objective 4 Provide diabetes care, management and screening for complications	❖ Increase number of diabetic patients receiving treatment
Objective 5 Raise awareness of preventive measures for diabetes and NCDs within the community	❖ Conduct diabetes awareness campaigns in communities (including schools) ❖ Implement media campaigns ❖ Distribute materials and intervention guidelines to combat obesity among school students

Note. HCP= healthcare providers; AVH= Augusta Victoria Hospital; NCDs=non-communicable diseases

Study design and Data Collection

The evaluation employed qualitative and participatory methods. Information was derived from primary and secondary sources, including a desk review of relevant documents for the project, as well as interviews with key informants and focus groups discussions (FGDs) with project beneficiaries and other stakeholders. The desk review included review of the PNDP proposal, project descriptions for Phase I, presentations on the PNDP, memorandum of understanding (MOU), partnership agreements, the PNDP MOU, training guidebooks, letters of appreciations from all key stakeholders, PNDP progress reports, field visit reports, and reports by the WDF. In addition key informant interviews were conducted with 18 participants, which played major roles in the implementation of the project including members from the different partners working in the PNDP, and 10 face-to-face interviews were conducted with patients which received services throughout the implementation of the PNDP, to gain insight on their satisfaction and perceptions of the project. Ethical approval for the conduct of this evaluation was obtained from the PMOH.

Results

This section presents the main outcomes and achievements produced from Phase I of the PNDP. In addition it presents the findings of the evaluation according to the pillars of the evaluation matrix: relevance, effectiveness, efficiency, impact and sustainability.

PNDP Targets and Achievements

The PNDP has resulted in tangible achievements during the first phase, and generally exceeded its targets. Table 2 illustrates the main targets and achievements of Phase I of the PNDP which include the establishment of the three model centers in which over 23,500 diabetic patients and over 400 GDM patients were treated. Similarly, the six intermediate-level clinics that were established are now fully equipped with the necessary equipment needed to conduct thorough evaluation and management of diabetes and provide quality services,developed through strong adherence to existing protocols and healthcare providers (HCP) capacity development. They operate as referral centers for diabetic patients who are comprehensively managed and screened for complications including eye conditions and diabetic foot. Additionally, the PNDP led to the establishment of AVH mobile clinic, in which over 12,000 individuals were screened for diabetes during 2017-2020 (Table 2).

Table 2: The PNDP's main targets and achievements.

Performance Indicators	Target	Achieved
Total number of diabetic beneficiaries of 3 model clinics	25,000	23,687
Number of other HCPs trained in T2DM care	200	524
Number of patients in registry	14,500	16,025
Number of persons screened for T2DM through AVH mobile clinic	10,000	12,659
Number of patients diagnosed with diabetes related foot problems	5,000	3,975
Number of patients diagnosed with diabetic retinopathy	2,000	6,106
Number of women treated for GDM/Diabetes in pregnancy	750	407

Other achievements of the first phase include successful training by the AVH mobile clinic to 524 healthcare providers (HCPs) including on-job training and structural trainings at AVH diabetes care center, based on existing national and WHO guidelines on the implementation of national protocols to strengthen diabetes prevention and care. The training curriculum is available to be used on a national level and by all health providers, thus ensuring wider impact of the PNDP on the health system.

In addition to capacity building of HCPs, the program contained outreach and public education components, consisting of awareness raising and screening in UNRWA camps, rural communities, and schools, and dissemination of information, education, and communication materials. Over 30,000 refugees received awareness and educational sessions on diabetes, including diabetic patients already registered at the UNRWA project-based clinic. 150 pre-diabetic refugee women received educational sessions on diabetes prevention.

The PNDP also included campaigning events conducted in collaboration between the Ministry of Education and Juzoor in 43 governmental schools in the West Bank and Gaza in which over 7,000 students were reached and educated on diabetes prevention and healthy lifestyles. In total, the estimated PNDP outreach to communities was around 1.5 million as of March 2020.

PNDP Design, Quality and Relevance

The PNDP design consisted of four pillars highly relevant to improving services: accessibility (eg. Availability of model and intermediate clinics in various areas); quality (eg. improved clinical infrastructure and trained health care staff in comprehensive diabetic care); and improved integration and coordination (implementation of the National Steering Committee, information sharing, development of protocols and guidelines and conduct of awareness campaigns (prevention activities at various community level settings with stakeholders).

The project is highly relevant to the MoH's national diabetes care and prevention program and responds to its action plan further focusing on diabetic foot, eye care, and gestational diabetes targeting marginalized segments of the WB population. The inclusion and leading role of the Palestine MoH and UNRWA as the main health

care providers was essential to place diabetes care on the agenda at the national level and for the ensuring standardization of care. The inclusion of Juzoor has been important for training and linkages to community for awareness raising and prevention important in the holistic approach of promoting prevention and treatment.

Effectiveness of the PNDP

The project has measureable indicators with Monitoring and Evaluation (M&E) of activities and congruence between operation plans and reporting. In the last three years, the project has achieved and/or exceeded in most cases its targets. The model clinics/centers now work as referral centers for diabetic cases which are comprehensively managed and screened for complications including; eye complications through retinal camera, diabetic foot examination and management. The centers were equipped with instruments for evaluation and management of diabetic complications including digital eye screening camera Slit Lamp, Portable Laser machine for minor surgical retinopathy intervention, Foot care equipment/machines (Mono-filaments/Grinding machine/Mirror boxes/foot chair, etc.), HbA1c machine (G8), and Nursing equipment (scale, blood pressure machine, ECG machine, IT equipment (projector screens, LCD projectors, computers). The NCCD was established to ensure an active, ongoing and dynamic engagement with duty bearers and had the following role: 1) to gather all involved stakeholders to help coordinate diabetes care and prevention activities; 2) to prevent duplication of services; 3) to ensure proper dissemination and networking among all involved parties; and 4) to develop the national diabetes protocol, strategies and action plans related to diabetes care and other NCDs. These were tackled in one way or another in the project. The project trained more than those targeted for the types of training it set to train. Decision making among the members occurred through various methods. The SC with representation by partners met as per target especially when political support and strategic decisions are required or major events are planned. Reporting has been consistent with the operations plan. The narrative reports contain significant information on progress regarding activities implemented by the PNDP partners/implementers. The evaluators observed and as similar to other evaluations that the focus is on the activities/outputs more so than results in their reporting. Likewise the evaluators observed that the reporting remains at the output level and not the outcome level. Progress reports were developed every six months to monitor work towards targets. This was complemented by visits by DCA and Juzoor to centers and clinics, which comprised of monitoring the quality of care provided, training, inspecting equipment and speaking with staff.

Efficiency of Planning and Implementation

Overall project management was a shared responsibility and required timely input by all partners. At the inception of the project, there was a clear delineation of roles among all partners. There was a specific budget plan at the beginning of the year and it was followed strictly, with no over or under spending in any given period. The MoH and UNRWA received equipment and training for their staff with no direct funding. AVH received direct funding and payment was made according to service delivery provided by AVH. DCA was communicating with Juzoor directly on financial matters. A procurement plan was developed for the entire project with input from all partners on the purchase and distribution of items. A procurement committee with membership from all partners was established and met regularly to agree on the procurement process. The funds allocated to the PNDP represent reasonable value when compared to the procurement of equipment made and its positive impact on diagnosis and treatment of diabetics, the numbers of activities at the centers/clinics, individual and community levels and the impact of the activities on diabetes prevention and wellbeing in general.

Impact of the PNDP

The impact of PNDP is attributed to: 1) the new equipment provided to the clinics and centers 2) the capacity building of the staff which enabled the implementation of new services in these centers and clinics, 3) the positive impact on patients' diabetics care and wellbeing according to the monitoring of indicators through this project (no amputations compared to before, less referrals, accessibility to comprehensive diabetic care and others). The reviewed appreciation/support letters for the project point to the importance of continuing project efforts for its tremendous impact on the lives of diabetics, their families and the society at large. The upgraded centers which now have the appropriate equipment with trained HCP are now able to perform more advanced monitoring of diabetic foot and eye screening. The incorporation of these services at the mobile clinics takes the burden off other health care centers as well as patients whom are in need of care and are living in the most marginalized areas of Palestine which do not have the financial means to access healthcare services in the cities or cannot due to restrictions in mobility.

Sustainability of the PNDP

Sustainability is about maintaining and enhancing a program or program services for the long term. It includes elements such as establishing partnerships with other agencies and programs, identifying sufficient funding sources, and having the program perceived as a valuable community resource. To enhance the probability of sustainability, the partners in the PNDP promoted a multi-stakeholder network organizational model, which will facilitate long-term sustainability on a national level. The following best practice elements of sustainable networks (Table 3) were incorporated into the PNDP, as highlighted in the PNDP Phase I final evaluation report.

The first phase of the PNDP (2017-2020) brought together key health stakeholders in a single platform. The high visibility of the PNDP encouraged private, public, and civil sector actors, such as the Bank of Palestine, the Arab Bank, the Ramallah and Tubas Municipalities, Lions International, Caritas, other development agencies, local women organizations and the Steno Diabetes Center (Copenhagen) to join the program's efforts to prevent and treat diabetes and its life-threatening complications. In 2020, a second phase of the PNDP (2020-2023) was launched to build on successful strategies and models set forth in the first phase.

Table 3: The PNDPs best practice elements of sustainability.

Element	Description
Common identity	Shared vision of importance and work towards Diabetes care and raising awareness, sense of ownership by members of the PNDP and a clearly defined intended change in diabetic care pursued.
Joint Action	Recognition that there is added value in making change together rather than individually; strategies and activities were in line with PNDP objectives pursued and responsibilities were balanced amongst the PNDP members.
Flexible, democratic structures and processes	Non-hierarchal relational structure where all PNDP partners collaborated with transparent communication and reporting,
Internal Relations	Shared ownership (members driving the PNDP as a whole rather than just contributing to some activities). Participation in decision-making, planning, implementation and reporting is shared among members. The oversight by the Ministry of Health has been a key overarching catalyst.
External Relations	The PNDP partners are key health care providers and credible entities respected by beneficiaries and stake-holders and maintain work relations with stakeholders.
Resources	There have been significant in-kind contributions by the PNDP members: use of facilities, availability of staff for training amongst others etc.
Relevance	The PNDP fills a clear niche in the health care development context. It has provided partners with a shared purpose with progress on meeting the PNDP objectives.
Sustainability of results	The PNDP approach has prepared partners and communities to incorporate and sustain interventions over the long term.

The Second Phase leverages the momentum created in the first phase to make this multi-stakeholder platform sustainable and to amplify results for a future consolidated and sustainable diabetes response in Palestine. It is directly anchored in, and will contribute to the Ministry of Health's Action Plan on Non-Communicable Diseases (NCD) and the National Health Strategy 2017-2022, which prioritizes NCDs screening programs, including diabetes, and improved diagnostic services. The PNDP has generated tangible benefits and positive impact on the lives of diabetic Palestinians through the individual and collective work of this platform members and the program has demonstrated strong potential for policy, financial, and institutional sustainability. The relevance of PNDP to the mission and strategic objectives of partners is a key factor that will facilitate its long-term sustainability. The program has been relevant to the Ministry of Health's NCD priorities, and responds to its action plan with expanded focus targeting marginalized segments of the population. Similarly, it was aligned with UNRWA's approach towards prevention and treatment of diabetes and has met the awareness needs of the community and related work by municipalities, NGOs, and CBOs in the targeted locations. This inclusive design ensures the tackling of interrelated components which promotes complementarities amongst program components for effectiveness, efficiency and impact, and also ultimately for sustainability.

The core partners (AVH, DCA, UNRWA, Juzoor, Ministry of Health, and Ministry of Education) have expressed their commitment to sustaining and expanding diabetes/NCDs interventions, given the strength of coordination and impact of joint programming. In terms of financial sustainability, the core funder of the PNDP – WDF – has developed the potential of partners for receiving smaller grants for specific diabetes related activities. As such, financial sustainability, although most difficult to address in volatile environments as in Palestine, does not pose a significant challenge as the in-kind support by members can be leveraged to ensure the financial sustainability of the PNDP. The institutionalization of the PNDP, successful implementation and sustainability including leadership and management, multiple stakeholder involvement, patient representation, and dedicating adequate resources for implementation have positively impacted the PNDP and its outcomes. There is strongly voiced commitment towards the PNDP as a priority among all partners' agendas with ongoing political leadership and commitment at the national level. This cumulative national work feeds into strengthening impact in terms of reach and coverage and harmonization of services across service providers and sustainability with further work.

Discussion

Establishing easier access to health services; providing quality services based on the needs of communities; and spreading awareness in order to make appropriate lifestyle choices and health care decisions are steps towards strengthening diabetes prevention and treatment. The collaborations forged in implementing the PNDP between local Palestinian organizations and international organizations have played a vital role towards

a holistic approach on diabetes prevention and care at the national level. The support of the PNDP by a global international organization (WDF) was important to boost the integrated approach to diabetes prevention and care, promote and strengthen local collaboration and entice other stakeholders to join efforts. As funder and founder of the PNDP, and the 'umbrella' under which partners function, the WDF has not only facilitated multi-stakeholder partnerships but helped to encourage innovative strategies for improvements and achieving outcomes. Successive local partnerships with WDF contributed to longer-term local engagement and ownership in promoting diabetes services diagnostics, medical treatment, nutrition counselling, prevention, fundus screening and foot care; in training of HCP on diabetes protocols; in enabling AVH to become a national resource center

for diabetes; in establishing and continuously developing model/referral clinics using DCCM, and in reaching out to more patients and providing prevention education to more children, adolescents, and women using community-based approaches. In parallel to improving the capacity of the Ministry of Health, UNRWA, AVH, and other health stakeholders to deliver effective diabetes services and empowering patients in their self-care, the PNDP has focused on making diabetes a political priority, advocating for diabetes prevention and treatment and strengthening cooperation and coordination toward quality and comprehensive diabetes care. Having key service providers and supporters of diabetic care under the banner of PNDP has positioned diabetes prevention and care high on the national agenda. Potentially, this 'single disease focus' has made the key partners more effective in advocating for change thereby facilitating greater influence over the policy process. The multi-stakeholder umbrella under the Ministry of Health leadership has played a central role in developing, implementing and monitoring a program closely aligned with broader national health plans and strategies. Directly linking PNDP activities to the Palestinian Health Strategy, the NCD Action Plan, and the NCCD has been important to promote the PNDP at the national level and to create broader support with potential impact on the lives of thousands of diabetics in Palestine. In addition, the fact that PNDP implementers could meet with the Minister of Health or her deputy to secure support was essential to generate buy-in to the overall process and for follow-up activities as well as to secure further commitment towards the PNDP. Widening the partnerships built between longstanding WDF partners (DCA, AVH, UNRWA, Juzoor, Ministry of Health) to include the Ministry of Education – with its role as policy and decision maker – has also enabled the PNDP to have a multi-sectoral approach, thus ensuring alignment with education sector plans as well as health sector plans. Working with a wide range of stakeholders including the private sector, the media, municipalities, local women's associations, NGOs, the media (print, radio and TV), academics, and development aid agencies among others, the PNDP has engaged and mobilized general public on diabetes prevention. The PNDP with its focus on improving access to diabetes care and prevention for marginalized segments of the Palestinian population through equipping centers with the needed equipment and services, improving HCPs capacities and raising awareness at the community level is in line with the framework of the PMoH's National NCD Action Plan. Partners in the PDNP share the belief that addressing NCDs and diabetes is important and is a shared responsibility in which they need to strengthen the coordination between the different sectors, improve the quality of services provided, localize services and transfer knowledge and skill gained through capacity development to others. Establishing easier access to health services, providing quality services based on the communities' needs and spreading awareness in order to make appropriate lifestyle choices and health care decisions are steps towards strengthening diabetes prevention and treatment. The collaborations forged in implementing the PNDP between local Palestinian organizations and international organizations have played a vital role towards a holistic approach on diabetes prevention and care at the national level. The support of the PNDP by a global international organization (WDF) was important to boost the integrated approach to diabetes prevention and care, promote and strengthen local collaboration and entice other stakeholders to join efforts.

A direct and significant result of the first phase of the PNDP was bringing together main healthcare stakeholders working at the local/national level in a single platform. Under the PNDP, a networking model has thus been promoted by the partners, sharing the same vision about the importance of diabetes care and prevention, promoting an integrated approach and having clear and complementary roles and responsibilities in addressing diabetes.

Lessons Learned

There are various lessons learned from the PNDP which may enrich approach and experience in developing and running other national diabetes programs or other NCD programs on a national or smaller scale and in various realms. Table 4 illustrates the lessons learned from Phase I of the PNDP.

Table 4: Lessons Learned from the PNDP.

The PNDP design included four pillars highly relevant for addressing diabetes and in general for national health systems strengthening: accessibility of services (through improved availability of model and intermediate clinics and mobile clinics), *quality of services* (through upgraded clinical infrastructure and trained health care staff in comprehensive diabetic care), *community awareness raising* (through prevention activities, including campaigns, with stakeholders on lifestyle modifications at various community level settings), and *improved integration and policy coordination* (NCCD, sharing of information, protocols and guidelines). In essence, these four pillars were implemented using integrated
Accumulative and incremental work that builds on previous successes will pay off. The PNDP was launched following long-term funding support by WDF to diabetes care over nearly two decades with longstanding partners. Successive funding cycles were needed to pilot the interventions and models (especially the DCCM) that are replicable. For instance, successful WDF-funded projects in the Southern region of the West Bank were replicated to the Northern region, enabling wider coverage and reach. These cycles were also important for creating the grounds for related policy advocacy and policy formulation. Commitment of donor to long term partnership is crucial for institutionalization of achievements to enhance likelihood for sustainability. A related lesson is thus that **long-term core funding positively impacts policy and program sustainability.**
Local management of funds by a national organization through international funding must be encouraged. Local/national organizations are able to manage program funds channeled through international organizations based on their fund management record. If capacity is available within the national organization then such fund management should be encouraged and pursued instead of channeling funds through a third party. On the one hand, this arrangement would result in overhead savings; which may be allocated instead to implementation of program activities and outputs. On the other hand, experience in fund management strengthens the national organization's financial management capacities and its ability to shoulder additional funds. A process of incrementally increasing national organizations' fund management responsibilities is favored to ensure accountability and effectiveness.

National programs require commitment from highest levels. The engagement of the Ministry of Health is a driving force especially in countries were the Ministry has multiple roles including policy formulation and service provision as is the case in Palestine. A healthy work relationship between the Ministry of Health and stakeholders towards a national program is imperative for success. This requires early engagement of stakeholders in the process, capitalizing on their strength with clear mandates and roles towards a program.
Engagement of stakeholders towards institutionalization is essential. National level policy making and implementation include multiple stakeholders with varied interests and priorities. Dialogue among stakeholders facilitates consensus building through collective identification of challenges, shared goals and interests, and creation of solution pathways. This can shape joint planning and implementation for long-term efficiency. The joining of forces by stakeholders from the government, private sector and civil society sectors resulted in a combined effort that surpassed any change that could be affected by either of the sectors on their own.
Systematic and timely awareness raising on a program and celebration of its success in reaching milestones entice others to join. Throughout the implementation of the PNDP, civil society, public, and private sectors have joined in to support and contribute to scaling up of program activities with increased coverage. To entice others to join and support meant ensuring the visibility of the PNDP, the credibility of the partners, and successes in improving the well-being of the society. It is a process of confidence building that requires years of effort and quality work showcasing the impact of interventions.

Recommendations and Future Research

The general recommendation from this evaluation is to consolidate, expand and strengthen capacity with particular focus in coordination, service delivery, raising awareness, and budget allocation. In terms of coordination, the evaluation concluded there needs to be further efforts made to strengthen coordination roles between PNDP partners and member organizations, particularly focusing on strengthening the role of the PMOH, as the leading organization of the PNDP. Further clarity and understanding of roles/responsibilities and mandates of involved members/with strengthened governance and contribution will lead to increased effectiveness and efficiency. In terms of service delivery, there is need to develop indicators of success or positive change at an individual and community level, based on previous achievements of the PNDP, and develop further expertise in monitoring and evaluation to integrate success indicators, particularly in schools as well as the general public. In terms of raising awareness, evaluators also conclude there is a need for further networking and integration with MoE for more school-based interventions regarding lifestyle modifications and there needs to be increased focus in the MoE and UNRWA schools on prevention of childhood obesity as a preventive measure of diabetes. Finally, it was concluded there is need to explore if the PNDP model implemented by WDF and other key service providers can be further replicated across other areas in Palestine as well as other fields of preventionsuch as mental disorders and other chronic diseases. Furthermore, as there is a rapid rise in diabetes rates in Palestine, another recommendation of the evaluation is to invest in more model clinics in other locations including procurement of equipment and training for healthcare providers. It is also recommended for the future, to conduct more comprehensive reporting of data and indicators collected throughout the PNDP, to better feed into assessment of PNDP's impact and wider health benefits to further demonstrate the success of the PNDP as well as potential for scaling-up. Previous project evaluations recommended future reporting should be conducted and produced on an outcome level.

Conclusion

Examining and evaluating the impact of the PNDP and potential lessons learned across the Palestine healthcare system has many important implications. Findings from this evaluation will help inform future diabetes prevention efforts across Palestine, as well as the implementation of future diabetes prevention programs across the country, in the region and other countries around the world, with similar humanitarian settings. We provide practical learning opportunities for the wider uptake and sustainability of programs like the PNDP. Future implementers might wish to ensure responsibilities for each actor are more clearly defined prior to implementation, ensure early engagement with new providers, and offer mechanisms/forums for sharing learning methods.

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Conflict of Interest

The authors declare that they have no competing interests. Ethics approval and consent to participate Ethical approval was obtained from the Palestine Ministry of Health.

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Availability Of Data And Materials

The data used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Authors' Contributions

HA, VA, YS, and LN contributed to the writing of the manuscript. HA and VA conducted the evaluation and analysis of the data. All authors reviewed and edited the manuscript. UK supervised the evaluation and the implemention of the PNDP. RA helped in coordinating the implementation of the PNDP.

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