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Integrating Noncommunicable Diseases into Antenatal Care in Cameroon: A Triangulated Qualitative Analysis

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Cover photo: Antenatal outreach clinic in the Mbengwi Health District, northwest region of Cameroon. Photo courtesy of E. Yeika.

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Abstract

Noncommunicable diseases (NCDs) have important implications for pregnancy outcomes and the subsequent health of women and their children. The aim of this study is to determine the status of NCD and maternal health program integration, identify barriers to integration, and explore what would be required to deepen integration of NCD care into antenatal care in Cameroon. We used two methods of data collection and synthesis: a desk review of policy documents and protocols and a series of key informant interviews with health system experts and managers working in public, private, and faith-based health facilities at central, regional, and district levels. Although screening for blood glucose and blood pressure occurs during antenatal care, post-diagnosis management is not well-integrated and often requires referral to specialists in higher-level health facilities. Key barriers to integration include lack of guidelines for the management of NCDs, financial constraints for facilities and patients, and shortages of health workers, medications, and supplies for laboratory investigations. Further integration of services for NCDs during pregnancy will require national guidelines backed up by system-wide strengthening of health information systems, insurance coverage, supply chain management, and human resource capacity, particularly in remote areas.

Introduction

The burden of noncommunicable diseases (NCDs) is rising in low- and middle-income countries, including Cameroon.[1–4] Hypertension prevalence in Cameroon increased from 24.1 percent to 37.1 percent between 1994 and 2018, which is above the sub-Saharan African hypertension prevalence average of 30.0 percent.[5,6] The prevalence of diabetes in Cameroon is also notable, with more than 7.0 percent of the population living with pre-diabetes and a further 5.8 percent with type 2 diabetes mellitus in 2018.[7] Although diabetes prevalence data in Cameroon are not disaggregated by sex and age, diabetes prevalence has been increasing over the years and is higher among women during pregnancy because of gestational diabetes.[8] The overall prevalence of gestational diabetes mellitus in Cameroon is estimated at 20.5 percent, more than double the rate of 9.0 percent in sub-Saharan Africa as a whole.[8,9]

This growing burden of NCDs has important implications for the health of pregnant women and their children. Hypertensive diseases in pregnancy constitute the second leading cause of maternal mortality globally, and over 8 percent of maternal deaths in Cameroon are attributed to hypertensive diseases.[10] Gestational NCDs are associated with very poor birth outcomes such as obstructed labor, postpartum hemorrhage, congenital malformations, birth injuries, neonatal hypoglycemia, and infant respiratory distress syndrome.[11,12] Maternal NCDs during pregnancy can also have an impact on the health of children even into adulthood. For instance, gestational diabetes is associated with higher risks of obesity and diabetes diagnosis in adolescence and adulthood.[13,14] One potential mechanism for this relationship is that maternal hypertension and diabetes may affect intrauterine programming through epigenetic mechanisms that operate before conception and during gestation.[15]

The high burden of NCDs among pregnant women coupled with the impact on the health outcomes of women and their children underlies the importance of addressing these conditions by integrating NCD services within maternal healthcare services. The World Health Organization (WHO) defines integration as "the management and delivery of health services so that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system."[16] There are several frameworks for integration, including process-based, user-led, and health system-based definitions.[17,18] In this paper, we are guided by the definition of the "integrated health service delivery" put forth by the WHO Regional Office for Europe, which outlines the ways in which integration can occur within each of the health system functions.[17,18]

Integrating NCD services into existing health programs is a known strategy to overcome the imminent challenges of access to NCD services and improve coverage of NCD care.[19,20] Reproductive healthcare services can be entry points for NCD prevention among women and children in resource-limited settings where NCD services may be less available.[12,21] NCD integration into maternal health programs offers an important opportunity to support early diagnosis and enable better management of these conditions during pregnancy, with the potential for intergenerational health benefits.[12,22]

The Cameroon health system is structured into three main levels: the central level comprising general hospitals, university teaching hospitals, and central hospitals; the intermediate level comprising regional hospitals; and the peripheral, operational level comprising district hospitals, and medicalized and integrated health centers. Maternal healthcare delivery in Cameroon is organized as a vertical program, embedded into all levels of the healthcare delivery system using the 2016 WHO recommendations on antenatal care (ANC).[10] In 2016, Cameroon had three specific centers for diabetes management while 50 district hospitals offered diabetic clinics and educational activities related to diabetes, hypertension, and other cardiovascular disease prevention.[23]

The extent of integration of NCD and maternal health services in Cameroon has not been previously documented. This study aimed to determine the status of NCD and maternal health program integration in Cameroon, identify barriers to integration, and explore what would be required

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to deepen integration of NCDs in maternal health programs. The primary NCDs of interest for this study were diabetes and hypertension, including both pre-pregnancy diagnoses and pregnancy-associated conditions such as gestational diabetes, pre-eclampsia, and eclampsia.

Methods

We conducted a desk review of policy documents and national protocols to characterize the current status of integration. We followed this with a series of key informant interviews to explore experiences of service integration and perspectives on barriers and facilitators to future integration efforts.

Desk Review

Document Selection

Using Google Scholar and the websites of the Ministry of Public Health and Cameroon Baptist Convention Health Services, we searched for national policy documents, strategic plans, and clinical guidelines related to NCDs and maternal health in Cameroon published between 2010 and September 2021. This search took place in November 2021 using the following key words: noncommunicable diseases, NCD, NCDs, maternal health, antenatal care, diabetes, hypertension, pre-eclampsia, and cardiovascular diseases. We reviewed the bibliographies of identified publications to identify any additional policy documents and protocols. We requested additional documents from general, regional, and district hospitals, the Directorate of Disease Control and Prevention, and Cameroon Baptist Convention Health Services.

Data Extraction and Analysis

The identified documents were reviewed by one author (EY), and data were extracted into a Microsoft Excel spreadsheet using the following categories: type of policy document, title, date of publication, period of relevance, content related to NCD/maternal health integration, and the level of healthcare delivery where integration occurs. We populated the data templates for each document retrieved and extracted relevant quotes to highlight specific points.

In-Depth Interviews

Setting and Participants

We conducted key informant interviews with Cameroon health system experts selected from the three levels of the health system (central, intermediate, and peripheral). These health system experts included government officials working under the Directorate of Disease, Epidemics, and Pandemic Prevention and Control; staff in the Cameroon Baptist Convention NCDs Program; health system managers from both public and private institutions, including hospital directors; and district medical officers. We identified these partners through professional networks and snowball sampling.

Data Collection and Analysis

We conducted semi-structured qualitative interviews using a defined interview guide. This guide included questions on current practices related to NCDs and maternal health service integration, opportunities for greater integration and potential barriers, and facilitators to such future efforts. One author (EY) conducted interviews in person, via Zoom, or via telephone calls. We conducted and audio-recorded interviews in English. We then uploaded full audio recordings online and transcribed them. Thereafter, we manually cleaned and de-identified transcripts. We conducted interviews until thematic saturation.

We conducted a deductive thematic analysis using Taguette, an online software for qualitative coding.[24] We developed the comprehensive codebook based on the study research questions and preliminary review of the transcripts.[25] Codes included elements of the health system building blocks (such as "health workforce," "financing," and "guidelines and protocols") and more specific patient-side barriers to service delivery (such as "late presentation to care" and "awareness of NCDs"). Two authors (EY and EK) read transcripts, and labeled relevant words, phrases, and sentences of text with the defined codes.[26] These codes were then merged into themes through consensus between the two authors. For example, we combined the codes "referrals," "affordability of the patient," and "additional appointment" into the theme around challenges in the current referral system. Throughout this process,

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we re-read the transcripts to confirm emerging themes. Findings around barriers to integration are summarized by health system building block.

Ethical Considerations

This study was approved by the Institutional Review Board of the Faculty of Health Sciences, University of Buea, reference 2021/1512–17/UB/SG/IRB/FHS. The study was also reviewed by the RTI International Institutional Review Board and determined to be not human subjects research (study 00021697). All participants provided informed consent before taking part in the interviews. Electronic data were stored on a password-secured hard drive and backed up centrally on the RTI network with access limited to the research team.

Results

Document Review

This review identified five policy documents that met inclusion criteria (two strategic plans, one development plan, and one protocol/algorithm) (Table 1).

The National Integrated and Multisector Strategic Plan for the Control of Chronic NCDs in Cameroon (2011–2015) was the most recent strategic plan for NCDs. The stated aim of this document was to develop a multisector approach to prevent or delay the onset of NCDs and their complications. The plan outlined specific objectives that guided the response to NCDs at the local, regional, and national levels and in the policies of related ministries. Interestingly, this strategic document did discuss aspects of NCD/maternal health integration.

The Health Sector Strategy (HSS) (2016–2027) was developed to accelerate the advancement of human capital for growth and sustainable development in line with the indications and recommendations of the growth and employment strategy.[23] One of the specific objectives of the current HSS was to reduce the prevalence of major NCDs by at least 10 percent by 2027. The HSS establishes that all district and regional hospitals are to manage cardiovascular diseases and diabetes, with the exception of medicalized health centers and integrated health centers. The HSS plan outlined a commitment to achieve Universal Health Coverage for in Cameroon before 2027, including health financing reform. This document identified integration as a priority strategy that can be used to control NCDs and other areas of health, but it fails to outline specific strategies for integration.

The 2016–2020 National Health Development Plan (NHDP) was developed as an operational plan to support implementation of the 2016–2027 HSS. The general objective of the NHDP was to instruct health system actors at regional and district levels to make accessible quality priority essential specialized services and care in at least 50 percent of regional and district hospitals. The NHDP defined procedures for regional and district hospitals for 5 years and emphasized priority interventions, including

Table 1. Characteristics of screened policy documents

Type of policy document	Title	Period of relevance of policy document	Document focus	Action plan for NCD/maternal health integration
Strategic plan	National Integrated and Multisector Strategic Plan for the Control of Chronic Noncommunicable Diseases in Cameroon	2011–2015	NCDs	No
	Health Sector Strategy	2016–2027	General	No
Development plan	National Health Development Plan	2016–2020	General	No
Protocols and algorithms	Procedures and Algorithms in Reproductive Health in Cameroon	2018	Maternal, perinatal, and neonatal health	No
	National Protocol for Hypertension Management	2019	Hypertension	No

NCD = noncommunicable disease.

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maternal, newborn, child, and adolescent healthcare. It recommended greater community partnership for control of the most common communicable diseases and NCDs. The NHDP evaluation plan proposed targets and performance indicators to measure the effect of selected activities on projected results.

We identified national procedures and algorithms for ANC, a document that was published in 2018. This document envisioned a comprehensive ANC package that includes promotion, prevention, and curative health services for women during pregnancy. The comprehensive ANC package includes measurement of fasting blood glucose to screen for gestational diabetes, but the protocol did not explicitly include management of hypertensive disorders (eclampsia, pre-eclampsia) and diabetes during pregnancy. The national protocol for hypertension management that existed in health facilities did not include the management of hypertensive disorders during pregnancy.

In-Depth Interviews

Overall, we conducted 11 in-depth interviews with health system experts at the central level ($n = 4$), regional level ($n = 3$), and peripheral level ($n = 4$).

Current Status of Integration

Please see Table 2 for quotes relevant to the key findings. When asked about NCD/maternal health integration, most respondents discussed screening or managing conditions during pregnancy. The most widespread example of integration was screening for high blood pressure and blood glucose during routine antenatal care appointments. Respondents noted that management of these conditions once diagnosed was less commonly integrated in ANC services. Some participants reported that uncomplicated cases could be managed within the health facility where they received ANC care. This management included ongoing monitoring at ANC appointments, prescription of essential medications, and guidance on lifestyle modifications. However, many participants stated that upon diagnosis they were referred to a specialist for further clinical investigations and appropriate management. As a result, the ability to integrate care within a health facility depended on the presence of such specialists within the facility.

Barriers to Integration

Affordability and Financing

Key informants frequently cited affordability of services as a challenge or barrier to NCD management in Cameroon. Although screening for gestational diabetes and hypertensive conditions in pregnancy are included in the standard ANC package, follow-up consultations and investigations for ongoing management were neither included nor subsidized. Many participants also mentioned affordability as a challenge within the referral system, as patients may not always follow up on their referrals to more specialized facilities because of the associated cost. Many participants stated that it falls to individual health structures to develop schemes to support patients who are unable to pay for services. They proposed that the government should introduce a fee exemption policy for women with NCDs during pregnancy.

In addition to affordability, key informants noted that NCDs have been neglected in funding priorities, which limits the ability of health facilities to offer and integrate NCD services. Several participants expressed an interest in integration as a means to reduce the cost of services. A few participants also shared that their facilities receive support in terms of financing, medicines, and equipment from nongovernmental organizations, bilateral partners, and multilateral partners.

Several participants discussed the existence of performance-based financing programs to incentivize referrals and integration of services in hospitals and health centers. Performance-based financing is a policy approach in which some proportion of payments to health facilities are based on their results or performance, in this case using the referral system.[27] One participant shared that key barriers to integration are the sources and structure of financing for maternal health and NCDs in Cameroon. Collaboration across separate programs is a challenge when they are vertically governed and financed.

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Table 2. Key findings and emblematic quotes

Finding area	Emblematic quotes
Current integration of NCDs in antenatal care in Cameroon	*Screening for hypertension and diabetes among pregnant women is a routine practice in my district and this is in the national protocol for antenatal care.* [Interview 10] *For those who are diagnosed at early stages and are at the mild level, we manage them with them with medications we have, i.e., the first-line medications.* [Interview 6] *There is a bottom-up referral system put in place in management of patients. These women are classified into the high-risk group and therefore required to be followed up by a doctor.* [Interview 11]
Cost and affordability of NCD services	*…treatment and follow-up for pregnant women can be a big additional cost which is not subsidized by the government like other expenses incurred during pregnancy and delivery.* [Interview 9] *When we refer patients for holistic management they have to pay, and sometime these specialists demand sums that are above the financial ability of these patients.* [Interview 1] *Complete fee exemption for ANC is needed. Though the ANC program is well organized in Cameroon, there are routine investigations, but funny enough, women cannot afford all laboratory tests recommended during pregnancy by [the] ANC program.* [Interview 10]
Fragmentation of healthcare funding	*NCDs are neglected when it comes to funding. Funds are concentrated on HIV and malaria programs. We don't even have any NCDs programs existing in our facility like the malaria and HIV programs.* [Interview 9] *The maternal health program is another entity which has its own funders and their own rules and regulations. It functions vertically, with aspects that take care of NCDs. …Since funds come from multiple sources, there is need for agreement between the funders based on their objectives.* [Interview 11]
Insufficient health workforce capacity	*Most district hospitals and medicalized health centers lack specialists and are deficient in equipment and health staff. I don't see integration [as] possible at this level of the health system until the government improves on the minimum packages of care for these hospitals.* [Interview 7] *We need to maintain the momentum of [the] same level of knowledge by always conducting in-service training to acquire new knowledge and competencies of new personnel that come in.* [Interview 8]
Availability of medications and commodities	*In our bigger facilities, in semi-urban and urban areas, we can easily conduct the basic assessments… but in more remote areas these diagnostic capacities are absent.* [Interview 2] *I think if the funds are available, the facility needs to maintain a good supply chain and to top up the pharmacy.* [Interview 4] *Because we are the first level of the health system and in an enclaved location, it is difficult to have all essential drugs.* [Interview 6]
Barriers to effective referrals	*When [we] receive patients, there are…time[s] that we need [to make a] referral to the regional hospital for [a] specialist because we can't handle all their health problems here.* [Interview 3] *There are still challenges in the referral system in the sense that patients may not go for referrals due to financial reasons and that often hospital[s] don't provide counter referrals.* [Interview 7]
Process for protocol development	*We have protocols established at the level of this hospital, but we take into consideration the international guidelines. We may modify depending on our context. There are no national protocols.* [Interview 9]
Need to build capacity at lower levels of the system	*How do we retain these staff? Simple, very simple: creating special pay packages for workers in remote areas, providing them with social amenities... Even if we train more doctors without giving them good salaries, they will emigrate to the western world.* [Interview 7] *I would say that [the] national program…should focus on peripheral level especially on the district hospitals and medicalized health centers.* [Interview 9]
National-level policy solutions	*A social health system for example is the ideal solution. Here the pregnant women will bear little [or] no cost of management of NCDs in pregnancy.* [Interview 1] *Currently the NCDs and maternal and child health activities exist separately. And so it's important to bring the key actors in these two different systems together and then include other stakeholders to forge a common platform for integration to begin.* [Interview 2]
Gaps between policy and practice	*These programs and protocols are produce[d] at the ministry but implementation is not always perfect…The regional delegate and chief medical officers are the ones to ensure that these actions and program guidelines are respected.* [Interview 7]

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Health Workforce

Participants indicated that the ability of an individual facility to provide integrated management depends on the capacity, infrastructure, and staff of that facility. Given the concentration of NCD services and specialists in specialized and urban facilities, these facilities are better able to provide coordinated and integrated care for pregnant women diagnosed with diabetes or hypertensive conditions. Many participants reported that facilities at the district and sub-district levels have a limited number of nurses and doctors and experience frequent staff turnover in addition to a lack of specialists. One participant from a specialized hospital mentioned employing task shifting to improve efficiency for routine procedures.

Many participants indicated that staff at their facilities have limited awareness of NCDs and ability to apply protocols for diagnosis and management, especially for early-stage diagnoses. As a result, many highlighted the need for staff training sessions and ongoing refresher trainings.

Access to Medicines, Supplies, and Equipment

Limitations in infrastructure and equipment availability were reported to constrain providers' ability to conduct screening and management. These issues were noted particularly for public sector facilities and rural district hospitals. In contrast, the participants representing private sector and specialized facilities reported good availability of medicines and infrastructure to support NCD service delivery.

In terms of access to medicines to support management of diabetes and hypertensive conditions, respondents noted both affordability and availability as challenges. The exception was one participant who indicated that their health facility received medicines as a donation from a bilateral partner.

Referral System

Key informants frequently discussed referrals as a key piece of managing diabetes and hypertensive conditions for pregnant women. Although participants reported that the referral system is laid out well in theory, many indicated that challenges with operationalization limit its effectiveness. Key challenges include the distance patients have to travel to complete the referral, the cost of the referred services, and difficulty sharing information between the facilities making and receiving the referral. Several participants pointed to performance-based financing as an approach that has strengthened the quality of the referral system.

Protocols for Screening and Management

Key informants indicated that national protocols do not set out guidelines for screening and managing most NCDs. The Directorate of Disease Control and Prevention, CBC Health Services, and Resolve to Save Lives have developed a protocol for hypertension management, but it has not been widely disseminated. Instead, many participants reported that their facilities have developed local protocols based on international guidelines and the experience of the facility's providers. Several participants commented that protocols focus on treatment of the conditions, primarily medication use, with no guidance on counseling or diet and lifestyle modifications.

Potential Solutions

Participants identified several potential solutions to address the barriers to greater integration of NCDs and maternal health in Cameroon. The most cited solution was to improve availability and distribution of specialists and well-trained health workers to ensure that more patients can receive care without need for a referral. Several participants suggested improving the pay of health workers at facilities in more rural areas to incentivize workforce retention. In addition to improving availability of specialists in these facilities, several participants suggested that the primary care level of the system should be the emphasis of strengthening efforts, because these facilities are where most people access care. A few participants also suggested that creation of a social health insurance system would help to improve issues around affordability and availability of services for NCDs.

Several key informants shared considerations for the development and success of Cameroon's national NCD strategy. One participant noted the importance of ensuring that national-level stakeholders, including funders and implementers, are brought together

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through this plan to determine how to better integrate services. A few key informants highlighted the importance of ensuring that any developed programs and strategies are implemented.

Discussion

The integration of NCDs into ANC in Cameroon remains limited. Screening for diabetes (blood glucose measurement) and hypertension (blood pressure measurement) is the primary example of integrated service delivery. These services are included in the national ANC package, which entitles women to receive these services at no cost during pregnancy. Participants reported that screening does occur as part of routine ANC practice, although this finding would be supported by improved availability of quantitative evidence regarding service delivery practices. ANC screenings exemplify integration across many health system building blocks: hypertension and diabetes screenings are guaranteed in the ANC package (leadership and governance) and are eligible for fee exemption in public facilities (health financing).[28] The defined ANC package is cascaded to the definition of what services occur at each ANC appointment (health service delivery). Health workers throughout the system receive training to conduct these measurements based on the defined services for their facility level (health workforce). Although there are limitations in the delivery of these services based on availability of diagnostic supplies, the framework for integration is present.

What happens after screening? Significant barriers inhibit full integration of NCD management through ANC and beyond. At the level of leadership and governance, Cameroon does not have an active strategic plan for management of NCDs, and none of the identified national health strategic documents and guidelines outline a clear plan for integrating NCDs and maternal healthcare services. At the national level, identified barriers include gaps in the health information and financing systems. Although many African countries have developed policy frameworks and strategies to address the increasing NCD burden, implementation has been hindered by unfavorable prioritization, insufficient resource allocation, and an absence of practical, feasible integration models.[29] National-level prevention and control programs for chronic NCDs (mainly diabetes and hypertension) have been established in Cameroon, but their effect has been curtailed by limited budgetary allocations.[30]

The central challenge to integration is that peripheral facilities do not have what they need to deliver services to patients on site, leading them to refer patients to district and regional hospitals for further investigations, treatment initiation, and better management. Specialist providers are not present in most rural and peripheral health facilities, and participants indicated an overall shortage of health workers in these facilities. This shortage has been well-documented as caused by workforce migration to urban areas, poor working conditions, and limited opportunities for professional development.[31] Workforce migration has been compounded by socio-political instability in the northwest, southwest, and far north regions of Cameroon, where the largest numbers of health staff have deserted health facilities.[32]

Limitations in the availability of equipment, supplies, and medications further compound the health workforce challenges for rural and peripheral facilities. Although the National List of Essential Medicines for Cameroon specifies first-line medication for diabetes and hypertension should be available in all health facilities, including integrated health centers, key informants identified the affordability and availability of these medicines as challenges. Key informants also identified challenges with availability of supplies and equipment to support diagnosis and laboratory investigations as contributing to the need to refer patients to the district or regional hospital. A 2016 survey of health facility readiness for diabetes management in western Cameroon found that availability of supplies for diabetes management was inadequate, particularly in public facilities and at the level of integrated health centers.[33] Although 91 percent of facilities did have a glucometer with test strips in this survey, only 50 percent of public facilities and 40 percent of integrated health centers had oral anti-diabetic drugs available. Similarly, only 20 percent of facilities had guidelines for diabetes management. In a 2017–2018 survey of selected government and faith-based health facilities, pharmacies, and informal vendors in

western Cameroon, first-line drugs metformin and glibenclamide were available in 77 percent and 73 percent of these health facilities, respectively.[34]

Mechanisms for referral have a critical role to play in any health system, even when services are integrated. However, challenges in Cameroon's referral system limit its utility. The central challenges identified were the distance patients have to travel to additional facilities, the cost of services at more specialized facilities, and limitations in information exchange between facilities. Participants also reported limitations in staff knowledge and awareness of NCDs, a barrier that has been reported in prior studies in Cameroon.[35] For example, a 2016 survey of health facilities in western Cameroon found that only 10 percent of health personnel surveyed had received training on diabetes management, and these staff were primarily those based at the district hospital.[36]

Despite these challenges, participants identified the promise of integration to strengthen the availability of NCD services for women during pregnancy. Achieving greater integration will require stronger national leadership and governance structures, cascaded down the levels of the health system. Although the HSS identifies "integration" as an implementation strategy, a specific national strategy for NCDs and for integration of NCDs and maternal health services is needed to translate this goal into action. This strategy should include the creation and dissemination of national protocols for screening and managing NCDs during pregnancy, a notable gap identified by our review. Organizations such as the International Diabetes Federation, American Diabetes Association, and the United Kingdom National Institute for Health and Care Excellence have published guidelines for diagnosing and managing diabetes and hypertension in pregnancy that might be valuable starting resources.[37–39] These protocols should ideally be specified by facility level, with identified points for referral, and include plans for health worker training. Task shifting has shown promise for delivery of diabetes services in Cameroon. A nurse-led model of diabetes management in primary care trialed between 1998 and 2000 demonstrated reduced fasting capillary glucose and blood pressure.[40] Similarly, a trial of task shifting to nonphysician clinicians for management of hypertension and diabetes in rural health facilities demonstrated improvements in fasting plasma glucose and blood pressure.[41]

To be effective, a national strategy and protocols for screening, diagnosis, and treatment should be components of larger national commitments to health system strengthening. There is a need for continuity of care to ensure that women who are diagnosed with pregnancy-related NCDs receive the care they need during and after pregnancy to monitor their risk of subsequently developing type 2 diabetes or other NCDs. Several participants identified the potential benefit of adopting a social health insurance system to address challenges with affordability of services, and availability of financing for facilities and supplies. Similarly, performance-based financing mechanisms, already in place to incentivize referrals, could be amended to include indicators to incentivize full integration of NCDs into ANC.

Although we made every effort to identify relevant documents, it is possible that some potentially relevant documents are not publicly available for review. The qualitative interviews were completed with health providers and policymakers. We sought for the interviews to be illustrative of different viewpoints and positions, but their limited number may not fully reflect perspectives across the entire health system. Given that English is widely spoken in professional settings in Cameroon, we do not expect that language limited depth or contributed to selection bias in our interviews. By focusing this study on providers and policy makers, we excluded patient perspectives and experiences.

Conclusions

In Cameroon, national NCD and maternal health programs exist as largely vertical and separate entities, limiting the integration of NCD diagnosis and treatment into ANC. This represents a missed opportunity. The integration of NCDs into maternal health care delivery is promising in Cameroon, yet it will require a shift in approach that moves beyond considering NCDs as separate needs distinct from holistic, person-centered care. High-quality,

appropriately integrated care is most needed where it is most difficult: in remote, hard-to-reach areas at the periphery of the health system. These areas must be prioritized in future efforts to strengthen and integrate delivery of NCDs into ANC. Future strategic documents and plans should include practical guidance on how to integrate NCDs and maternal health services.

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