Original Article

Health system readiness to deliver integrated noncommunicable disease and antenatal care in Kyrgyzstan, Tajikistan, and Vietnam

Téa E. Collins, Svetlana Akselrod, Anshu Banerjee[1], Aliina Altymysheva[2], Mekhri Shoismatuloeva[3], Pham Thi Quynh Nga[4], Daria Berlina[5], Ketevan Chkhatarashvili, Flaminia Ortenzi, Josephine Exley[6], Luke N Allen[7]

Global Noncommunicable Disease Platform, Communicable and Noncommunicable Diseases, World Health Organization, [1]Department of Maternal, Newborn, Child and Adolescent Health and Ageing, World Health Organization, [5]Policy and Advocacy, Global Noncommunicable Disease Platform, Communicable and Noncommunicable Diseases, World Health Organization, Geneva, Switzerland, [2]World Health Organization Country Office, Bishkek, Kyrgyzstan, [3]World Health Organization Country Office, Dushanbe, Tajikistan, [4]Office of the WHO Representative in Vietnam, Hanoi, Vietnam, [6]Department of Health Services Research and Policy, London School of Hygiene & Tropical Medicine, London, [7]Global Primary Care, Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, UK

ABSTRACT

Introduction: Globally, noncommunicable diseases (NCDs) are a leading cause of death among women of reproductive age. Reproductive, maternal, newborn, and child health (RMNCH) services provide an important opportunity to prevent, detect, and manage NCDs. Yet, NCD and mental health care remain poorly integrated into RMNCH services in many settings. We aimed to explore the feasibility of integrating NCD and mental health interventions into RMNCH interventions in Kyrgyzstan, Tajikistan, and Vietnam.

Materials and Methods: We conducted a secondary analysis of data from a WHO project on integrating NCD and mental health interventions into RMNCH services across three countries. Our analysis used the WHO health systems building blocks framework to structure inquiry and synthesis across key areas such as service delivery, workforce, and governance.

Results: Maternal mortality remains high in all three countries and antenatal care is hospital oriented. We identified several common barriers at the primary care level, including inadequate knowledge of NCDs and mental health conditions among healthcare workers, a lack of essential equipment, and weak coordination among healthcare providers across levels of care. Integrated management is not routinely included in training programs and adherence to clinical guidelines remains low.

Conclusions: The healthcare systems in all three countries are not well prepared to provide integrated care. Greater emphasis is needed on strengthening primary care to ensure high-quality integrated services. Alongside updating training programs and securing the availability of essential equipment and commodities, there is a need to update clinical protocols on integrated management and revise monitoring systems to support quality improvement. The global level needs to address the research gaps and provide more support to countries to prioritize integrated care.

Keywords: Antenatal care, child health, guidelines, integrated care, maternal, newborn, noncommunicable diseases, policy, pregnancy, reproductive

Introduction

The increasing prevalence of noncommunicable diseases (NCDs) and their risk factors, such as obesity, diabetes,

Address for correspondence: Dr. Téa E. Collins, Global Noncommunicable Disease Platform, Communicable and Noncommunicable Diseases, World Health Organization, 20 Avenue Appia, CH-1211, Geneva, Switzerland.
E-mail: collinst@who.int

Access this article online	
Website: https://journals.lww.com/ijnc	Quick Response Code
DOI: 10.4103/jncd.jncd_74_24	

How to cite this article: Collins TE, Akselrod S, Banerjee A, Altymysheva A, Shoismatuloeva M, Nga PT, *et al.* Health system readiness to deliver integrated noncommunicable disease and antenatal care in Kyrgyzstan, Tajikistan, and Vietnam. Int J Non-Commun Dis 2024;9:150-9.

Submitted: 06-Aug-2024 **Revised:** 07-Aug-2024
Accepted: 12-Oct-2024 **Published:** 30-Dec-2024

hypertension, and mental health conditions, is resulting in a shift in the global pattern of maternal mortality from direct to indirect causes.[1-4] While estimates of the burden of NCDs in pregnancy vary,[5] accumulated evidence indicates that pre-existing chronic conditions account for 15% of maternal deaths.[6]

NCDs also increase the risk of spontaneous abortion, stillbirth, congenital malformations, infant respiratory distress syndrome, and birth injuries[7-10] and can affect future pregnancies and the long-term health of women and their babies.[11]

Interventions to prevent and manage NCDs are well known; however, these have been poorly integrated into reproductive, maternal, newborn, and child health (RMNCH) services. Care seeking for RMNCH, specifically antenatal care (ANC), represents a golden opportunity to prevent, detect, and manage NCDs for women, especially those who may otherwise not access NCD care.[12] The 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."[13]

In 2020, the WHO initiated a project to "Improve the Quality of Hospital Care to Reduce Maternal, Newborn and Child Deaths and Accelerate the Achievement of the SDG Health Targets" in collaboration with the Ministries of Health in Kyrgyzstan, Mongolia, Tajikistan, and Vietnam to identify and scale up quality of care services to reduce maternal, newborn, and child deaths. As part of this project, an assessment was undertaken to examine the extent to which NCD and mental health interventions had been integrated into existing ANC services. To explore cross-cutting lessons, a secondary analysis was conducted to review the feasibility of integrating NCD and mental health services into RMNCH care and to identify challenges, and future opportunities for optimizing the delivery of integrated services.

Materials and Methods

We undertook a secondary data analysis of data previously published as part of the WHO Project.[14-17]

Description of the underlying project

Full methods of the assessments conducted in each of the countries are provided in the source documents.[14-17] In brief, the project consisted of a literature review in all three countries, followed by country site visits in Kyrgyzstan and Tajikistan. Pandemic restrictions meant it was not possible to conduct site visits in Vietnam. The project was started in late 2020, with data collection occurring in 2021.

The literature review aimed to identify relevant research and policy documents on the integration of NCDs and RMNCH in each country. In addition, the reference lists of included papers were searched and, in Kyrgyzstan and Tajikistan, the national Ministry of Health's NCD focal points supplied national policy documents, evaluation reports, and health facility quality assessments.

Policymakers, program managers, healthcare providers, and health policy experts in Kyrgyzstan ($n = 17$) and Tajikistan ($n = 21$) with expert knowledge in RMNCH and NCD care were purposively sampled. Participants were identified through consultation with the WHO Country Offices' NCD National Professional Officers and country Ministry of Health Project focal points. The assessment team conducted participatory informal conversations in Russian that involved interactive dialogues. The topics covered included (1) the challenges to delivering high-quality integrated care; (2) the availability of up-to-date national protocols/guidelines on integrated RMNCH and NCD care; (3) adherence to national protocols of care; (4) the alignment of the national guidelines with national and international quality of care standards; (5) the need for additional guidelines to ensure efficient prevention, screening and treatment of NCDs during RMNCH care; and (6) the most important indicators to assess the quality of integrated RMNCH and NCD care. The data were recorded in field notes and recruitment continued until thematic saturation was achieved.

Facility assessments were conducted in Kyrgyzstan (October 11–29, 2021) and Tajikistan (November 15–December 2, 2021) to understand the current status and challenges related to integrating NCD prevention, diagnosis, and treatment into ANC. Within each site, quality of care and health system barriers to improved integration of services were assessed using the WHO facility assessment tools.[18,19] The teams also reviewed a random sample of case histories and outpatient records of pregnant women with hypertension in Tajikistan and the medical records of pregnant women issued from ANC visits in Kyrgyzstan. Medical records were randomly selected by facility staff.

In Tajikistan, the project team visited six primary and secondary care facilities in Dushanbe city and reviewed 22 medical records. In Kyrgyzstan, the project team visited

two primary care and two secondary care facilities in Issyk-Kul, Karakol, and Balykchy and reviewed 25 medical records.

Cross-cutting analysis

The data were triangulated using Spencer and Richie's framework analysis, developed for action-oriented policy analyses,[20] and five of the WHO's health system's six building blocks [Figure 1]: service delivery, health workforce, information, medical products, vaccines and technologies, and leadership/governance.[21] We did not explore financing as it lay outside the remit of the original project.

We used matrices to summarize the main findings from each study component in each country and unified summary tables to integrate all our data at the analysis stage.

Ethics

Ethical approval was not required for this study, as it is based on secondary analysis of data that is publicly available.

Results

We present our findings narratively, starting with an overview of the national context and each country's health system before summarizing the extent of integration in each setting.

Country context

In all three countries, the Ministries of Health are responsible for developing health policies and technical guidelines,[22-24] and all have established strategies to support Universal Health Coverage (UHC) for financial protection and improved population health outcomes. Health expenditure per capita in Kyrgyzstan and Tajikistan is the lowest in the WHO European Region and considerably lower than in Vietnam [Table 1].[23-25]

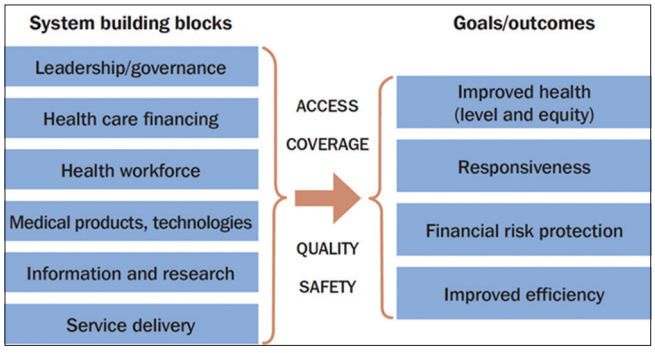

Figure 1: The WHO Health System building blocks

Out-of-pocket payments are high in all three countries, ranging from 71% in Tajikistan to 36% in Kyrgyzstan in 2019.

All three governments provide essential benefits packages, but the population coverage and services included vary. Kyrgyzstan has a single mandatory health insurance fund (MHIF) established in 1996, with a defined state-guaranteed benefit package,[23] providing free access to emergency and primary care, free outpatient specialist care with referral, and inpatient care with referral. Just under 70% of the population is covered and many services require copayments. Since 2015, the MHIF has covered free hospital care for women during pregnancy and childbirth and children under 5 years.[26]

In Tajikistan, the types of services provided and population groups entitled to services free of charge are listed in Decree No. 600 of 2008. It includes emergency medical care, primary care, and specialized outpatient services, as well as inpatient and hospital care.[27] Limited RMNCH services are covered;[28] pregnant women who are registered and attended at least four ANC visits are entitled to hospital delivery and can access all basic investigations without additional costs. All other patients are subject to copayments that vary between 50% and 100%, depending on a referral by a primary care doctor (50%) and place of residence (80% for residents of the district where care is sought; 100% for nonresidents).[29]

Vietnam introduced a national social health insurance program in 2009 that covers all ambulatory services, as well as basic and advanced hospital services, and includes an extensive list of subsidized medicines {Le QN, Blizzard L, Si L, Giang LT, Neil AL. The evolution of social health insurance in Vietnam and its role towards achieving universal health coverage. Health Policy OPEN. 2020;1:100011.}. The government fully subsidizes insurance premiums for children under six, the elderly, "poor persons," and ethnic minorities. In 2018, the program covered almost 87% of the population {World Health Organization, #16}.[25]

All three countries have achieved significant reductions in maternal, newborn, and child mortality; however, mortality rates remain high [Table 2]. Kyrgyzstan approved standards for ANC provision in 2018 including nine ANC visits, with recommendations for healthy eating, iron and folic acid supplementation; screening, prevention, and treatment of infections, including syphilis and HIV; screening for anemia; and interventions for physiological symptoms. Two ultrasound examinations are recommended, plus an additional one if required before delivery.[30]

Table 1: Country characteristics and key socioeconomic and health indicators

Characteristics/indicator	Kyrgyzstan	Tajikistan	Vietnam
Population (millions in 2023)[1]	7.1	10.1	98.9
Median age of population (years in 2024)[2]	25.3	22.1	32.9
Urban population (percentage total population in 2023)[1]	37.8	28.2	39.5
GDP growth (annual percentage in 2023)[1]	6.2	8.3	5.1
Poverty rate (at the international poverty line of $3.65/day)[1]	11.3 (2022)	25.7 (2015)	4.2 (2022)
Domestic general government health expenditure per capita, PPP (current international $ in 2021)[1]	161.0	85.0	229.1
Domestic general government health expenditure (as percentage of current health expenditure in 2021)[1]	53.4	24.2	42.7
Out-of-pocket expenditure (as percentage of current health expenditure in 2021)[1]	40.7	63.5	40.0
External health expenditure (as percentage of current health expenditure in 2021)[1]	5.9	12.1	3.8
Medical doctors per 10,000[3]	21.5 (2021)	21.3 (2021)	8.3 (2016)
Nurse and midwifery personnel per 10,000[3]	44.2 (2020)	53.7 (2020)	14.5 (2016)

Sources - 1=World Bank Group. World Bank Development Indicators (online database). Available at: https://databank.worldbank.org/source/world-development-indicators, 2=United Nations, Department of Economic and Social Affairs, Population Division. Available at: https://esa.un.org/unpd/wpp/, 3=WHO Global Health Workforce statistics database. Available at: https://www.who.int/data/gho/data/themes/topics/health-workforce. GDP - Gross domestic product, WHO - World Health Organization, PPP - Purchasing power parity

Table 2: Overview of key maternal and child indicators

Characteristics/indicator	Kyrgyzstan	Tajikistan	Vietnam
Maternal mortality ratio (number of deaths per 100,000 live births in 2020)[1]	50	17	46
Infant mortality rate (deaths per 1000 live births in 2022)[1]	15.4	26.7	16.2
Under-5 mortality rate (deaths per 1000 live births in 2022)[1]	17.32	30.3	20.3
Attendance for ANC 4+ (percentage of women)	94.3 (2018)[2]	64.2 (2017)[3]	88.2 (2020–2021)[4]
Attendance for ANC 8+ (percentage of women)	42.8 (2018)[2]	14.4 (2017)[3]	52.7 (2020–2021)[4]
Skilled birth attendance (percentage of women)	99.8 (2018)[2]	94.8 (2017)[3]	96.1 (2020–21)[4]

Sources - 1=UNICEF. UNICEF Data Warehouse. Cross-sector indicators. Available at: https://data.unicef.org/resources/data_explorer/unicef_f/, 2=Indicator measured for women age 15–49 years with a live birth in the last 2 years. Kyrgyz Republic Multiple Indicator Cluster Survey 2018: Survey findings report. Bishkek, Kyrgyzstan: National Statistical Committee of the Kyrgyz Republic and United Nations Children's Fund; 2019 General Statistics Office and UNICEF. 2021, 3=Indicator measured for women age 15–49 years with a live birth in the 5 years. Tajikistan: Demographic and Health Survey 2017. Dushanbe: Statistical Agency under the President of the Republic of Tajikistan, Ministry of Health and Social Protection and ICF. 2018, 4=Indicator measured for women aged 15–49 years with a live birth in the last 2 years. Survey measuring Vietnam SDG Indicators on Children and Women 2020–2021, Survey Findings Report. Hanoi, Vietnam: General Statistics Office. UNICEF - United Nations International Children's Emergency Fund, SDG - Sustainable Development Goal, ANC - Antenatal care

Vietnam's national strategy on reproductive healthcare services highlights the need for at least four ANC consultations for uncomplicated pregnancies. Responsibility for delivering this care rests at the primary care level (commune health stations); however, women can seek care in hospitals if they wish. ANC includes one visit in the first trimester, a second visit in the second trimester, and two visits in the final trimester. Community health stations are responsible for performing uncomplicated delivery and for assisting with home delivery. In cases of early recognition of labor complications such as obstetric hemorrhage or newborn problems such as asphyxia, community health stations are to refer patients to upper-level facilities.

Integration of noncommunicable diseases into reproductive, maternal, newborn, and child health

Domain 1: Leadership and governance

All three project countries have developed and adopted evidence-based standards and protocols for ANC and the management of NCDs. Tajikistan has specific protocols for the management of diabetes, heart disease, and hypertension during pregnancy, while Vietnam has developed protocols for the screening and management of diabetes and pre-eclampsia. No country has developed guidelines on mental health. In all three countries, the Ministries of Health have led the development of guidelines, but we found that key professional associations, including physicians and nurses, were not consulted. In Tajikistan, the development of the guidelines for the management of NCDs during pregnancy was undertaken in parallel with guidance developed for obstetric and gynecological services, with little coordination between professionals. This was identified as one reason for the low implementation of treatment protocols. Further, guidelines are more reflective of the ideal conditions than the realities of the working environment, in terms of the availability of staff, essential equipment, and commodities.

Domain 2: Health workforce

All three countries have low numbers of healthcare workers [Table 1], due to perceived inadequacies in pay, career paths, and educational opportunities. Tajikistan, in particular, has experienced high levels of migration of health workers in search of higher wages and better working conditions.[31] In both Tajikistan and Kyrgyzstan, health workers' average salaries are lower than the

workforce average, and, while in Vietnam, health workers' basic salaries are comparable to other sectors, a significant part of the health workforce has left because of low remuneration.[22,24,29,30,32,33]

All three countries fall short of WHO's "indicative threshold" of 445 doctors, nurses, and midwives per 100,000 people required to deliver UHC.[34] Shortages are compounded by inadequate skills and inequitable geographical distribution, with rural and remote regions experiencing the greatest shortages; this maldistribution was more prominent in Tajikistan compared to Kyrgyzstan and Vietnam.[23,26,35-37]

In all three countries, physicians and nurses at the hospital level did not have adequate knowledge or resources to screen women for the risk of postpartum depression. Similarly, primary care clinicians and midwives were found to have a poor understanding of NCDs, for example, the need to routinely screen patients for hypertension in Kyrgyzstan.

The assessment revealed that training programs were outdated. In Vietnam, for example, training programs do not include care integration.[38,39] We did not identify any preservice training or continuing education opportunities related to mental health for RMNCH in any country. Training opportunities have also been developed as part of the implementation of the WHO package of essential NCD interventions starting in 2014.[40,41] However, a 2017 evaluation found that there was no systematic training for those staff who missed the initial sessions.[40] The evaluation found only a few doctors and nurses were able to precisely define cardiovascular risk.

Domain 3: Information

The three countries faced similar challenges, including poor data quality due to the absence of proper verification, supervision, and monitoring of data collection and reporting processes; lack of quality indicators in some programmatic areas; limited data collection; inadequate information and communications technologies for digitalization; fragmentation due to multiple vertical information systems; limited availability of disaggregated data by age, sex, region, and socioeconomic status; and lack of capacity to collect and analyze data.[30,42-44]

The review of medical records in Kyrgyzstan and Tajikistan identified that NCDs were poorly documented. Medical records in Kyrgyzstan did not include a dedicated section on NCDs and their risk factors, nor did they mention the mental health of pregnant women and new mothers, while medical records in Tajikistan did not contain information on risk factors for NCDs. In Vietnam, there were no requirements to report common NCDs among pregnant women.

Domain 4: Medical products, vaccines, and technologies

Physical and financial access to essential medicines remains challenging in Tajikistan, with significant regional differences. For instance, the WHO Essential Medicines and Health Products Price and Availability Monitoring Mobile Application (EMP MedMon) identified regional disparities in the availability of medicines used in the treatment of chronic conditions and there was a 10-fold price variation for a core list of 21 medicines.[45] Kyrgyzstan has partially addressed these issues through a series of health reforms that established a well-developed pharmacy network and made a wide range of medicines available across the country. In addition, in 2020, the government started regulating prices for selected medicines on the Additional Drug Package, to decrease financial hardship.[23] Despite these efforts, our review identified a lack of essential diagnostic and treatment equipment. For example, pregnant women must travel to hospitals or private clinics for ultrasounds, cervical screening, and sexually transmitted infections as the necessary medical equipment is not available in primary care facilities. Literature from Vietnam also indicates low availability of essential medicines for the treatment of NCDs, particularly at the primary level.[38,39,46]

Domain 5: Service delivery

All three countries had equal access to hospital-based maternity services, although access was more limited in rural and remote areas, especially in Tajikistan. In both Kyrgyzstan and Tajikistan, the assessment identified major gaps in the timely identification of risk factors for NCDs and potential complications during pregnancy in primary care [Table 3]. In Vietnam, a 2019 maternal mortality survey found health workers did not adhere to ANC guidelines; history taking, physical examination, obstetric examination, screening tests, and health and nutrition counseling were not routinely performed.[47]

Patients in all settings bypass primary care to seek care at higher-level facilities, resulting in overcrowding of hospitals for conditions that could be managed in primary care. A 2018 assessment in Kyrgyzstan found patients mistrust primary care and believed hospital staff were better qualified and more capable.[30] Further, both staff and patients lacked clarity on the scope of services that were provided at primary care, with physicians often referring

Table 3: Overview of key findings from health facility assessment in Kyrgyzstan and Tajikistan by World Health Organization's Health system building blocks

WHO HS building block	Kyrgyzstan	Tajikistan
Leadership/governance	No national protocols for the management of NCDs in pregnant women Existing clinical protocols often do not mention the prescription of calcium supplements and low-dose aspirin Guidelines and protocols are available on the Ministry of Health and Social Development website. Protocols and guidelines for the diagnosis and management of stroke and acute coronary syndrome reviewed were found to be evidence-based, comprehensive, and detailed, and included references and the strength of evidence for recommendations, even if they were not recently updated	43 standards and protocols for ANC and pregnancy complications, including one for preeclampsia; these are reported to be adapted from WHO guidelines. According to key informants, implementation of the protocols is often hindered by a lack of funding, resources, and capacity of health workers Several protocols based on evidence and international guidelines have been developed for the sexual, reproductive, maternal, newborn, child and adolescent health services Developed and adopted protocols for the management of most NCDs, including diabetes and hypertension, includes protocols for the management of those conditions during pregnancy. Similar protocols have been developed for obstetric and gynecological services. However, development processes have been undertaken in parallel, with very little coordination between professionals. This was identified by respondents as one of the reasons for the nonuse and nonimplementation of treatment protocols. In a fragmented system, obstetric and gynecological services are using both standard (official) protocols and others developed by themselves, which negatively influences the quality of the provided care There were no protocols for the management of gestational diabetes Unclear recommendations (if not their absence) regarding prevention and treatment in the discharge in both case histories and outpatient cards. According to doctors, such recommendations are given to patients by hand
Health workforce	Shortage of qualified health care staff, especially medical doctors in remote and rural areas. Indeed, physicians prefer to work in hospitals in the capital and other urban settings. In addition, nurses and feldshers available at primary care facilities can perform only a limited set of services independently There is a lack of understanding among health workers of the need to routinely screen patients for hypertension	More than half of the patients were consulted by specialists as follows: 77.3% by cardiologists, 68.2% by therapists, and 45.5% by endocrinologists. Patients were less frequently examined by ophthalmologists (40.9%), and rarely by neurologists (<10%)
Medical products, vaccines, and technology	Lack of adequate diagnostic and treatment equipment at primary care facilities Pregnant women must go to hospitals or private clinics for ultrasound examinations Screening for cervical cancer and sexually transmitted infections not available at the primary care level	
Information	Medical records did not include a dedicated section on NCDs and their risk factors, nor did they mention the mental health of pregnant women and new mothers While medical cards had an insert on HIV and antibiotic resistance, a checklist for surgery, and a checklist for installing a catheter, there were no inserts on NCDs and their risk factors. NCD risk factor counseling was not assessed. There were also no data on the mental health of pregnant women and new mothers	Medical records (at both primary and hospital levels) did not contain information on risk factors for NCDs, nor did they contain information regarding the 10-year risk of CVD on a risk scale
Service delivery	A 10-year CVD risk nomogram was not regularly used. All medical records were missing a definition of CVD risk Measurements assessing the risk of eclampsia were present in 10% of medical records Blood pressure was measured at each outpatient hospital visit and daily for hospitalized patients. Blood pressure measurements are not performed routinely at primary care facilities Cholesterol levels were generally not measured, even if risk factors for hypercholesterolemia were present (e.g. age over 40, obesity) 30% of women were not weighed, and BMI was rarely calculated	In all institutions visited, blood pressure was regularly monitored using assessment sheets. In most cases, therapists, cardiologists, and, if necessary, endocrinologists were consulted. In 100% of cases, a complete blood count was performed to determine platelets and a urine test was conducted to detect proteinuria At neither the primary care - nor the hospital level was there adequate monitoring of diabetes mellitus, even in cases of gestational diabetes mellitus. In 90% of cases, glycated hemoglobin was not checked At the hospital level, liver tests, blood coagulation system, and creatinine determination without calculating the glomerular filtration rate were conducted and recorded in

Contd...

Table 3: Contd...

WHO HS building block	Kyrgyzstan	Tajikistan
	Antihypertensive medicines were generally prescribed according to protocols, but in 10% of cases, there was no timely administration of medicines Primary care facilities are underutilized, while hospitals are overcrowded for conditions that can be managed on an outpatient basis Lack of trust in primary care doctors and a generalized assumption that hospital doctors and specialists are better qualified and more capable Patients and staff lack clarity on the scope of services provided, resulting in patients choosing to go directly to hospitals, and family doctors often referring patients to specialists - even when not necessary Coordination among care providers, including referral of patients from primary care to specialists, referral back to primary care, and follow-up after referral, remains a major challenge in the country	50% of medical cards. In 90% of cases, medical records included the results of an ECG. In 100% of cases, if necessary, antihypertensive therapy and magnesium therapy were prescribed. Only 9% of patients received hypertensive medicines before pregnancy, while 77% of pregnant women received antihypertensive therapy for the hypertensive disorder during the observation period, and magnesium therapy was prescribed in 50% of cases strictly according to indications. None of the patients were taking metformin, glibenclamide, or statins, which is important, given their teratogenic and embryotoxic effects Echocardiographic examination was performed in 14% of cases, and arterial wall stiffness was not determined for any case 32% of cases prescribed low-dose aspirin and 27% prescribed calcium supplementation to prevent preeclampsia. For 10% of cases of preeclampsia, a consultation with a neurologist was recorded 60% of the medical records did not contain information about consultation with an ophthalmologist Results of the analysis determining lipid metabolism not recorded in any medical records reviewed Over-hospitalization of patients with ambulatory-sensitive conditions, which could be treated better and more efficiently at the outpatient level

NCDs - Noncommunicable diseases, WHO - World Health Organization, HS - Health system, CVD - Cardiovascular disease, BMI - Body mass index, ECG - Electrocardiogram, ANC - Antenatal care

patients to specialists for basic ANC and NCD issues.[30,40,41] A similar picture emerged in Vietnam, where pregnant women with diabetes or hypertension were referred to higher-level facilities for treatment and management.

Discussion

Integrated health services have the potential to address evolving population health needs, reduce pressure on health systems, improve the quality of services delivered, and promote health equity. In this study, we assessed the extent to which NCD care has been integrated into RMNCH in three countries. The health systems of Kyrgyzstan, Tajikistan, and Vietnam were found to be ill-suited to providing continuous integrated care with a person-centered approach.

Strengthening primary care and improving the quality of services is a prerequisite for implementing integrated care models. Our analysis highlights several barriers to integration in primary care including underutilization of primary care, low knowledge of healthcare workers, and outdated workforce training programs. Other barriers included a lack of essential medicines and equipment to diagnose and treat NCDs, fragmentation of health service provision, and poor integration of NCD indicators into health information systems and inadequate policies and legal frameworks.

Healthcare workers were found to have insufficient knowledge of how to detect and manage NCDs and their risk factors during pregnancy. Both preservice and in-service training were found to be insufficient and health workers struggle to maintain their skills once in post. The competencies needed to deliver integrated care need to be considered from planning a health workforce based on desired competencies through to a competency-based education, training, and continuing professional development program.[48] Preservice education needs to correspond to high-quality care standards. Evidence demonstrates that the introduction of integrated care requires specific skills and competencies.[49] In all settings, there is a need to develop and deliver continuing medical education in the timely detection of high-risk pregnancies, with a focus on hypertension, CVD, diabetes, and pre-eclampsia.[48] Finally, education and training needs to be interdisciplinary to build the skills needed for integrated care.[50]

There is a need to develop and update clinical protocols for the detection, management, and timely referral of high-risk pregnant women between primary and hospital care. Political leadership is needed to provide a coherent vision of integrated NCD and RMNCH care. To optimize the quality, uptake, and use of national guidelines, protocols and implementation strategies should be developed in partnership with all relevant stakeholders and adapted to local contexts.[51]

There is a need to ensure that healthcare workers are familiar with clinical protocols and services are delivered in accordance. Countries should seek to develop a monitoring system to assess adherence. To support this, medical records need to be revised to capture NCDs and their risk factors during pregnancy, and health information systems need to be strengthened to provide reliable data to support the monitoring of care at all levels of the health system.

Strengths and limitations of the approach

There is a lack of evidence characterizing countries' efforts to integrate NCD care and RMNCH. Our analysis provides insight into the current state of integration of NCD care into ANC in three countries and provides clear areas for action that are likely to be of relevance elsewhere. COVID-19 travel restrictions limited data collection. Within Kyrgyzstan and Tajikistan, only a limited number of facilities in one or two regions of the country were included. This means that findings are not necessarily nationally generalizable. Healthcare financing was beyond the scope of this paper and further research will be needed since it has been identified as a key barrier to the delivery of high-quality integrated care.[52] This study assessed the extent to which NCD care is currently integrated into ANC services and it was beyond the scope of this assessment to examine the provision of NCD care more generally. However, the findings that rates of screening are low and inadequate training of the health workforce are likely to have implications beyond RMNCH services and further research could usefully examine the extent to which NCD care provision is poor more generally or whether the issues identified are specific to ANC.

Conclusions

A lack of health worker training, poor adherence to existing protocols, and an overdependence on secondary care currently hamper the delivery of integrated NCD/ANC care in Tajikistan, Kyrgyzstan, and Vietnam. A paucity of medication and supplies in facilities serving poorer populations is another cross-cutting issue. The global health community's understanding of how to integrate NCDs into RMNCH care is in its infancy. Further research is needed to gain a better understanding of the implementation strategies and different hurdles hampering the provision of integrated care.

At the global level, research should address the most common questions and challenges related to improving the capacity of the health workforce to provide NCD care within RMNCH. At the national/local level, research should focus on context-specific questions and solutions to support evidence-based decision-making.

Ethical approval

Ethical approval was not required for this study, as it used secondary data that is publicly available.

Acknowledgments

The authors would like to thank members of the "Improve the Quality of Hospital Care to Reduce Maternal, Newborn and Child Deaths and Accelerate the Achievement of the SDG Health Targets" project for their steer throughout the study. We would like to thank the WHO country offices in all three countries.

Financial support and sponsorship

The study was funded by the World Health Organization. The authors alone are responsible for the views expressed in this article and they do not necessarily represent the decisions, policy or views of the World Health Organization.

Conflicts of interest

There are no conflicts of interest.

References

1. NCD Countdown 2030 Collaborators. NCD countdown 2030: Worldwide trends in non-communicable disease mortality and progress towards sustainable development goal target 3.4. Lancet 2018;392:1072-88.
2. Hussein J. Non-communicable diseases during pregnancy in low and middle income countries. Obstet Med 2017;10:26-9.
3. Nair M, Nelson-Piercy C, Knight M. Indirect maternal deaths: UK and global perspectives. Obstet Med 2017;10:10-5.
4. Souza JP, Tunçalp Ö, Vogel JP, Bohren M, Widmer M, Oladapo OT, *et al*. Obstetric transition: The pathway towards ending preventable maternal deaths. BJOG 2014;121 Suppl 1:1-4.
5. Firoz T, Pineles B, Navrange N, Grimshaw A, Oladapo O, Chou D. Non-communicable diseases and maternal health: A scoping review. BMC Pregnancy Childbirth 2022;22:787.
6. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, *et al.* Global causes of maternal death: A WHO systematic analysis. Lancet Glob Health 2014;2:e323-33.
7. Barnes S, Ramanarayanan D, Amin N. The Unseen Side of Pregnancy: Non-Communicable Diseases and Maternal Health. The Wilson Centre; 2022. Available from: https://www.wilsoncenter.org/publication/unseen-side-pregnancy-non-communicable-diseases-and-maternal-health. [Last accessed on 2023 Aug 12].
8. Kapur A, Hod M. Maternal health and non-communicable disease prevention: An investment case for the post COVID-19 world and need for better health economic data. Int J Gynaecol Obstet 2020;150:151-8.
9. Kapur A. Links between maternal health and NCDs. Best Pract Res Clin Obstet Gynaecol 2015;29:32-42.
10. Montagnoli C, Zanconato G, Cinelli G, Tozzi AE, Bovo C, Bortolus R, *et al.* Maternal mental health and reproductive outcomes: A scoping review of the current literature. Arch Gynecol Obstet 2020;302:801-19.
11. Hanson MA, Gluckman PD. Developmental origins of health and

disease – Global public health implications. Best Pract Res Clin Obstet Gynaecol 2015;29:24-31.
12. Brumana L, Arroyo A, Schwalbe NR, Lehtimaki S, Hipgrave DB. Maternal and child health services and an integrated, life-cycle approach to the prevention of non-communicable diseases. BMJ Glob Health 2017;2:e000295.
13. World Health Organization. Integrated Health Services – What and Why? Geneva: World Health Organization; 2008; Technical Brief No. 1. Available from: https://terrance.who.int/mediacentre/data/sage/SAGE_Docs_Ppt_Apr2014/10_session_child_health_services/Apr2014_session10_integrated_health_services.pdf. [Last accessed on 2023 Oct 05].
14. World Health Organization. Integrating Services for Maternal, Newborn and Child Health and Noncommunicable Diseases at District-Level Facilities: Kyrgyzstan, Tajikistan and Viet Nam. Geneva: World Health Organization; 2023. Available from: https://iris.who.int/handle/10665/373539. [Last accessed on 2023 Dec 11].
15. World Health Organization. Integrating Services for Maternal, Newborn and Child Health and Noncommunicable Diseases at District-Level Facilities: Kyrgyzstan. Geneva: World Health Organization. 2023. Available from: https://iris.who.int/handle/10665/374309. [Last accessed on 2023 Dec 11].
16. World Health Organization. Integrating Services for Maternal, Newborn and Child Health and Noncommunicable Diseases at District-Level Facilities: Tajikistan. Geneva: World Health Organization. 2023. Available from: https://iris.who.int/handle/10665/374829. [Last accessed on 2023 Dec 11].
17. World Health Organization. Integrating Services for Maternal, Newborn and Child Health and Noncommunicable Diseases at District-Level Facilities: Viet Nam. Geneva: World Health Organization; 2023. Available from: https://iris.who.int/handle/10665/374178. [Last accessed on 2023 Dec 11].
18. World Health Organization. PEN Plus Facility-Level Assessment Checklist. Geneva: World Health Organization; 2020.
19. World Health Organization. Euro Facility Assessment Checklist. Geneva: World Health Organization; 2018.
20. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman A, Burgess RG, editors. Analyzing Qualitative Data. London: Routledge; 2002. p. 173-94.
21. World Health Organization. Everybody's Business: Strengthening Health Systems to Improve Health Outcomes: WHO's Framework for Action. Geneva: World Health Organization; 2007. Available from: https://www.who.int/publications/i/item/everybody-s-business----strengthening-health-systems-to-improve-health-outcomes. [Last accessed on 2023 Aug 10].
22. Oanh TT, Phuong NK, Tuan KA. Sustainability and Resilience in the Vietnamese Health System. Partnership for Health System Sustainability and Resilience (PHSSR); 2021. Available from: https://www3.weforum.org/docs/WEF_PHSSR_Vietnam_Report.pdf. [Last accessed on 2023 Aug 10].
23. Rechel B, Lessof S. Health Systems in Action: Kyrgyzstan. Copenhagen: WHO Regional Office for Europe & The European Observatory on Health Systems and Policies; 2021. Available from: https://www.who.int/europe/publications/i/item/9789289051804. [Last accessed on 2023 Aug 10].
24. Khodjamurodov G, Sodiqova D, Akkazieva B, Rechel B. Tajikistan: Health system review. Health Syst Transit 2016;18:1-114.
25. World Health Organization. Health financing in Viet Nam. Available from: https://www.who.int/vietnam/health-topics/health-financing. [Last accessed on 2023 Dec 11].
26. Moldoisaeva S, Kaliev M, Sydykova A, Muratalieva E, Ismailov M, Madureira Lima J, *et al*. Kyrgyzstan: Health System Review. Health Systems in Transition 2022;23:i-150.
27. Jacobs E. The politics of the basic benefit package health reforms in Tajikistan. Glob Health Res Policy 2019;4:14.
28. Ministry of Health and Social Protection of Tajikistan, UNICEF. Technical Assistance to the Ministry of Health and Social Protection in Defining and Costing the Minimum Reproductive, Maternal, Newborn, Child and Adolescent Health Service Package: Final Report. Dushanbe: United Nations Children's Fund; 2018.
29. World Health Organization. Assessment of Sexual, Reproductive, Maternal, Newborn, Child and Adolescent Health in the Context of Universal Health Coverage in Tajikistan. Copenhagen: WHO Regional Office for Europe; 2021. Available from: https://www.who.int/europe/publications/i/item/9789289055680. [Last accessed on 2023 Aug 10].
30. World Health Organization. Assessment of Sexual, Reproductive, Maternal, Newborn, Child and Adolescent Health in the Context of Universal Health Coverage in Kyrgyzstan. Copenhagen: WHO Regional Office for Europe; 2020. Available from: https://www.who.int/europe/publications/i/item/9789289055512. [Last accessed on 2023Aug 10].
31. Bandaev I, Kurbonova R, Samuilova M. Tajik healthcare workers on the move: Causes, consequences and responses. Cahiers d'Asie Centrale. 2018;27-28:305-30.
32. CEIC Data. Kyrgyzstan gross average salary; 2023. Available from: https://www.ceicdata.com/en/kyrgyzstan/gross-average-salary/gross-average-salary. [Last accessed on 2023 Dec 11].
33. Viet Nam General Statistics Office. Result of the Viet Nam Household Living Standards Survey 2018; 2018. Available from: https://www.gso.gov.vn/en/data-and-statistics/2020/05/result-of-the-vietnam-household-living-standards-survey-2018/. [Last accessed on 2023 Aug 11].
34. WHO. Global Strategy on Human Resources for Health: Workforce 2030. Geneva: World Health Organization; 2016. Available from: https://iris.who.int/bitstream/handle/10665/250368/9789241511131-eng.pdf?sequence=1. [Last accessed on 2024 Jun 18].
35. Robinson S, Bernd R. Health Systems in Action: Tajikistan. Copenhagen: WHO Regional Office for Europe & The European Observatory on Health Systems and Policies; 2022. Available from: https://iris.who.int/bitstream/handle/10665/362327/9789289059206-eng.pdf?sequence=1. [Last accessed on 2024 Jun 18].
36. World Health Organization. Human Resources for Health Country Profiles: Viet Nam. World Health Organization Regional Office for the Western Pacific. 2018. Available from: https://iris.who.int/bitstream/handle/10665/260006/9789290618348-vie.pdf?sequence=1. [Last accessed on 2024 Jun 18].
37. Quan NK, Taylor-Robinson AW. Vietnam's evolving healthcare system: Notable successes and significant challenges. Cureus 2023;15:e40414.
38. World Bank. Quality and Equity in Basic Health Care Services in Vietnam: Findings from the 2015 Vietnam District and Commune Health Facility Survey. Washington (DC): World Bank; 2016. Available from: https://microdata.worldbank.org/index.php/catalog/2728. [Last accessed on 2023 Jul 27].
39. Kien VD, Van Minh H, Giang KB, Ng N, Nguyen V, Tuan LT, *et al.* Views by health professionals on the responsiveness of commune health stations regarding non-communicable diseases in urban Hanoi, Vietnam: A qualitative study. BMC Health Serv Res 2018;18:392.
40. Collins D, Farrington J, Kontsevaya A, Altymysheva A. Improving the Implementation of a Package of Essential Noncommunicable (PEN) Disease Interventions in Kyrgyzstan: Mixed Methods Service Evaluation of Pilot Health Centres. Copenhagen: WHO Regional Office for Europe; 2017. Available from: https://www.who.int/europe/publications/m/item/improving-the-implementation-of-a-package-of-essential-noncommunicable-(pen)-disease-interventions-in-kyrgyzstan--mixed-methods-service-evaluation-of-pilot-health-centres. [Last accessed on 2023 Jul 27].
41. Kontsevaya A, Farrington J. Implementation of a Package of Essential Noncommunicable (PEN) Disease Interventions in Kyrgyzstan: Evaluation of Effects and Costs in Bishkek after One Year. Copenhagen: WHO Regional Office for Europe; 2017. Available from: https://www.who.int/europe/publications/m/item/implementation-of-a-package-of-essential-noncommunicable-(pen)-disease-interventions-in-kyrgyzstan-

evaluation-of-effects-and-costs-in-bishkek-after-one-year. [Last accessed on 2023 Jul 27].
42. World Bank. Vietnam National and Provincial Primary Health Care Scorecards. Washington (DC): World Bank; 2019. Available from: https://hdl.handle.net/10986/33964. [Last accessed on 2023 Oct 05].
43. Division of Country Health Policies and Systems D, Metrics and Analytics Unit. Health Information System Assessment in Tajikistan: Summary Report. Copenhagen: WHO Regional Office for Europe; 2021.
44. Teo HS, Huong DL. Improving Efficiency in the Health Sector: An Assessment of Vietnam's Readiness for Integration of Care. Washington, DC: World Bank; 2020. Available from: https://hdl.handle.net/10986/33772. [Last accessed on 2023 Jul 27].
45. World Health Organization. MedMon – WHO Essential Medicines and Health Products Price and Availability Monitoring Mobile Application; 2018. Available from: https://wwwwhoint/news/item/18-02-2018-medmon-mobile-application. [Last accessed on 2024 May 15].
46. Tran QA, Le Tu H, Hoang Van M. Availability and readiness of communal health services: Results from 2015 Vietnam district and commune health facility survey. Int J Healthc Manage 2021;14:1206-12.
47. Viet Nam Ministry of Health). Maternal Mortality and Response Surveillance Assessment Report; 2019.
48. Langins M, Borgermans L. Strengthening a Competent Health Workforce for the Provision of Coordinated/Integrated Health Services: Working Document. Copenhagen: WHO Regional Office for Europe; 2015.
49. Barraclough F, Smith-Merry J, Stein V, Pit S. Workforce development in integrated care: A scoping review. Int J Integr Care 2021;21:23.
50. Akselrod S, Collins TE, Hoe C, Seyer J, Tulenko K, Ortenzi F, *et al.* Building an interdisciplinary workforce for prevention and control of non-communicable diseases: The role of e-learning. BMJ 2023;381:e071071.
51. Breda J, Wickramasinghe K, Peters DH, Rakovac I, Oldenburg B, Mikkelsen B, *et al.* One size does not fit all: Implementation of interventions for non-communicable diseases. BMJ 2019;367:l6434.
52. Nolte E. Financing and reimbursement. In: Amelung V, Stein V, Goodwin N, Balicer R, Nolte E, Suter E, editors. Handbook Integrated Care. Cham: Springer International Publishing; 2017. p. 165-87.