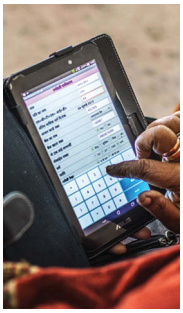

Chapter 17

Innovations in Community-Based Health Care for Cardiometabolic and Respiratory Diseases

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INTRODUCTION

Cardiometabolic conditions (cardiovascular diseases [CVDs], diabetes, and associated chronic kidney disease) and chronic lung diseases are the leading causes of premature mortality and morbidity among adults worldwide, including in many low- and middle-income countries (LMICs). The chronic nature of these conditions imposes a high burden on individuals and societies and creates substantial challenges for traditional health systems.

Prevention and early intervention are crucial. In addition to population-based approaches, key preventive strategies require the extension of health care delivery platforms to the community. This chapter reviews the evidence pertaining to two important strategies for extending health services into communities in LMICs for preventing and managing cardiometabolic and chronic lung conditions and risk factors. The first strategy focuses on task-shifting, defined as assigning health care management and prevention tasks to nonphysicians. A systematic review was performed of the published literature as it relates to cardiometabolic and chronic lung diseases. The second strategy focuses on self-management, with or without support from family or community-based peers. A narrative literature review was performed of literature related to the second strategy, given its broad and diverse focus. While the two strategies seek to extend health care delivery into the community, they are different in that the first strategy involves changing the health workforce structure and delivery of health care, while the second involves educating patients to understand the condition and empowering them to make informed choices in day-to-day management. These detailed reviews are accompanied by two case studies that outline examples of initiatives used in communities in LMICs.

TASK-SHIFTING FOR CARDIOMETABOLIC AND RESPIRATORY DISEASES IN LMICS

In many countries, primary care physicians are the first point of contact and the main providers of health care for individuals with noncommunicable diseases. In LMICs, too few doctors are available, and physician workforce disparities for rural and remote regions are substantial (Kar and others 2008; WHO 2006).

An alternative workforce that is structured around the community and the patient could potentially address this need. *Task-shifting* has been defined as shifting the delivery of services normally performed by physicians to health professionals with a different or lower level of education and training or to persons without formal health education who are trained to perform specific tasks (Lekoubou and others 2010). Task-shifting may be facilitated by medical technology, such as standardized diagnostic equipment linked to electronic decision

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support, which standardizes the performance and interpretation of certain tasks.

Task-shifting typically occurs in close collaboration with the medical profession (WMA 2009), potentially reducing costs and saving physicians' time (Abegunde and others 2007; Buttorff and others 2012; Mdege, Chindove, and Shehzad 2012). A study in Uganda reporting the potential impact of task-shifting on the costs of antiretroviral therapy and physician supply found that the estimated annual mean costs of follow-up per patient were US$31.68 for physician follow-up, US$24.58 for nurse follow-up, and US$10.50 for pharmacist follow-up (Babigumira and others 2009). In addition, task-shifting is a potentially efficient way to reorganize the workforce by ensuring better specialization and quality of care, allowing physicians to focus on the jobs that cannot be delegated (Callaghan, Ford, and Schneider 2010). A study in Rwanda found that task-shifting from a physician-centered to a nurse-centered model for antiretroviral therapy reduced the demand on physicians' time by 76 percent (Mdege, Chindove, and Shehzad 2012).

Task-shifting in health care began in the 1970s and 1980s, when auxiliary nurses in the Democratic Republic of Congo took on the role of providing health care because of a shortage of physicians. This shift allowed the few available physicians to use their time and expertise to manage people with more complicated diseases. Other LMICs in South Asia and Sub-Saharan Africa have used this approach for childhood conditions (Bang and others 1999; McCollum and others 2010) and for infectious diseases (Fairall and others 2012).

A Cochrane review assessing the performance of nonphysician health workers (NPHWs) in providing maternal and child health services indicated that task-shifting promoted immunization and breastfeeding, improved tuberculosis outcomes, and reduced childhood morbidity and mortality when compared with usual care (Lewin and others 2010). Growing evidence from countries in Sub-Saharan Africa suggests that task-shifting for antiretroviral therapy can help to curb the impact of HIV (human immunodeficiency virus) infection. A systematic review of HIV/AIDS (acquired immune deficiency syndrome) care in Sub-Saharan Africa found that task-shifting offered cost-effective and high-quality care to more patients than physician-centered care (Callaghan, Ford, and Schneider 2010).

Very few studies have examined the role of NPHWs in managing noncommunicable diseases in LMICs. Most of these studies have focused on a single risk factor or disease (Labhardt and others 2010; Lekoubou and others 2010) rather than on integrated disease management.

A Systematic Review

A systematic search was conducted for published studies of interventions that involved shifting tasks to NPHWs for the prevention or management of noncommunicable diseases in LMICs. For the purpose of this review, *NPHWs* were defined as a nurse or health care worker with no formal medical training. *Noncommunicable diseases* were defined as a range of chronic noninfectious conditions, including CVD, diabetes, hypertension, cancer, chronic obstructive pulmonary disease, neurological conditions, and mental health problems. A search was conducted using the following terms: *task-shifting, nonphysician health care workers, community health care worker, hypertension, diabetes, cardiovascular disease, chronic obstructive pulmonary disease, respiratory disease,* and *noncommunicable disease*. The data presented here reflect a subset of identified studies that focus on cardiometabolic and chronic lung diseases.

The databases reviewed were Medline via PubMed and the Cochrane library, and the search was conducted from May 26 to June 13, 2013. The search included all studies available up to and including May 31, 2013. Table 17.1 highlights the inclusion and exclusion criteria used. The review was limited to peer-reviewed, community-based studies in LMICs and studies that involved clinical interventions. Studies focusing on health education or health promotion and hospital-based studies were excluded. Only English-language reports were considered. The quality of studies was assessed on criteria such as study design, method of randomization, and sources of bias; no study was excluded on the basis of study quality. A meta-analysis was not performed because of the high levels of heterogeneity among studies in relation to the task-shifting model under evaluation, types of patients, and outcomes evaluated.

Characteristics of Studies

The search generated 3,009 articles, of which 9 were included in the review. Five studies were conducted in Cameroon, two in India, and two in South Africa (table 17.2). Five studies were based in rural regions, and four studies included both rural and urban regions. Studies involved task-shifting for the management of hypertension, CVD, diabetes, and respiratory diseases. Tasks were shifted predominantly from physicians to nurses (Coleman, Gill, and Wilkinson 1998; Gill and others 2008; Kaufman and others 2012; Kengne and others 2008; Kengne and others 2010; Kengne, Sobngwi, and others 2009; Labhardt and others 2010); there were two examples of shifting to other health workers (Joshi and others 2012; Kar and others 2008).

Table 17.1 Inclusion and Exclusion Criteria for the Systematic Review of Task-Shifting in Cardiometabolic and Respiratory Disease Prevention and Management

Inclusion criteria	Exclusion criteria
• Studies where a task usually performed by physicians is shifted to a different cadre of health care provider	• Studies primarily involving health education or health promotion interventions
• Disease conditions limited to cardiovascular disease, diabetes, hypertension, chronic obstructive pulmonary disease, and respiratory diseases	• Hospital-based studies
• Studies conducted in low- and middle-income countries	
• Intervention studies: randomized control trials, before-and-after studies, and other quasi-experimental studies	
• Community-based studies	
• Peer-reviewed articles	
• Articles in English	

Quality of Studies

Only two of the nine studies were randomized control trials (RCTs). The remaining studies evaluated the effects of the intervention by comparing outcomes before and after implementation in observational studies; these studies provided low-quality evidence of effectiveness. Three of the nine studies did not discuss sources of bias or limitations of the study findings; one did not report the details of the statistical analysis used. Some studies reported more than 40 percent of the patients lost to follow-up, further limiting the reliability of the evaluation findings (Kengne and others 2008; Labhardt and others 2010).

Does Task-Shifting Improve Health Care Effectiveness?

Process of care outcomes. The reviewed studies suggest that trained NPHWs may be able to identify individuals with noncommunicable diseases, including asthma (Coleman, Gill, and Wilkinson 1998), CVD (Joshi and others 2012; Kar and others 2008), hypertension (Coleman, Gill, and Wilkinson 1998; Kengne, Awah, and others 2009; Labhardt and others 2010; Labhardt and others 2011), and diabetes (Coleman, Gill, and Wilkinson 1998; Gill and others 2008; Kengne, Sobngwi, and others 2009; Labhardt and others 2010; Labhardt and others 2011). Findings from studies in which NPHWs were permitted to prescribe medications suggest that trained NPHWs may be able to treat patients according to study protocols for conditions such as asthma (Coleman, Gill, and Wilkinson 1998; Kengne and others 2008), hypertension (Coleman, Gill, and Wilkinson 1998; Kengne, Awah, and others 2009; Labhardt and others 2010; Labhardt and others 2011), and diabetes (Coleman, Gill, and Wilkinson 1998; Gill and others 2008; Kengne, Sobngwi, and others 2009; Labhardt and others 2010; Labhardt and others 2011). Several studies reported improved access to health care at the community level, although the metric used to evaluate access was usually not described (Coleman, Gill, and Wilkinson 1998; Kengne, Sobngwi, and others 2009; Labhardt and others 2010).

Disease control outcomes. Two studies reported disease control outcomes. An observational study from rural South Africa showed that trained NPHWs, with the help of treatment protocols and without the input of physicians, could achieve control in 68 percent of patients with hypertension, 82 percent with diabetes, and 84 percent with asthma, although preintervention rates were not provided for comparison (Coleman, Gill, and Wilkinson 1998). Another observational study from rural South Africa showed that nurses trained in the use of an algorithm could effectively diagnose and manage patients with diabetes, with significant reductions in glycated hemoglobin (HbA1c) described at 18 months, although the observational design limits the ability to ascribe such changes to the intervention (Gill and others 2008).

Treatment concordance. One study examined concordance between physicians and NPHWs for the diagnosis and management of CVD risk, showing a high level of agreement between NPHWs and physicians. The study reported that recommendations for drug therapy made by NPHWs guided by algorithms were the same as those made by physicians in more than 87 percent of patients with prior stroke or myocardial infarction (Joshi and others 2012).

Table 17.2 Summary Data from Published Studies Describing Task-Shifting for Prevention and Management of Cardiometabolic and Respiratory Diseases

Study	Country	Diseases addressed	Study type	Intervention	Outcome	Challenges	Cost-effectiveness analysis
Coleman, Gill, and Wilkinson 1998	South Africa (rural and urban)	Hypertension and diabetes, epilepsy, and asthma	Observational	• Protocol developed based on WHO guidelines • Patients initially screened by a doctor and followed up by NPHWs • Comparator: Usual care before intervention	• BP controlled in 68% of patients; blood glucose controlled in 82% of patients with type 2 diabetes[a] • Better adherence measured by self-report; improved from 79% at the first visit to 87% at the most recent clinic visit	High attrition of patients	No
Kar and others 2008	India (rural, urban, and slum)	Cardiovascular disease	Observational	• NPHWs trained in WHO protocol for CVD risk assessment • Comparator: Usual care before intervention	• Increase in knowledge of NPHWs regarding CVD risk factors and symptoms • Increase in referral of individuals with raised BP • Decrease in systolic BP (154.5–145.6 mmHg), increase in intention to quit tobacco (25.5–60.3%), and reported regular use of antihypertensive medication (34.8–58.3%)	None reported	No
Kengne and others 2008	Cameroon (rural)	Asthma	Observational	• Training of NPHWs for diagnosis and management of asthma • Monthly visit by physician • Patients identified and managed by nurses • Comparator: Usual care before intervention	• Increase in number of days without asthma attack[a]	41% lost to follow-up	No
Gill and others 2008	South Africa (rural)	Diabetes	Observational	• Training of nurses for diagnosis and management of diabetes using an algorithm • Comparator: Usual care	• Reduction in HbA1c from 11.6±4.5% at baseline to 8.7±2.3% at 6 months and 7.7±2.0% at 18 months	26% lost to follow-up	No

table continues next page

Table 17.2 Summary Data from Published Studies Describing Task-Shifting for Prevention and Management of Cardiometabolic and Respiratory Diseases (continued)

Study	Country	Diseases addressed	Study type	Intervention	Outcome	Challenges	Cost-effectiveness analysis
Kengne, Sobngwi, and others 2009	Cameroon (rural and urban)	Hypertension and diabetes	Observational	• Training of NPHWs • Clinical management algorithm • Comparator: Usual care before intervention	• BP decreased by 5.9/3.3 mmHg; fasting glucose decreased by 1.6 mmol/l	High attrition of patients	No
Kengne, Awah, and others 2009	Cameroon (rural and urban)	Hypertension	Observational	• Training of NPHWs • Comparator: Usual care before intervention	• BP decreased by 11.7/7.8 mmHg	High attrition of patients	No
Labhardt and others 2010	Cameroon (rural)	Hypertension and diabetes	Observational	• Training of NPHWs • Provision of equipment (sphygmomanometer, stethoscopes, blood glucose meters) • Drugs • Comparator: Usual care before intervention	• 100% retained equipment; 70% had functional blood glucose meter; 96% used antihypertensives; 72% used oral blood-glucose-lowering drugs[a] • Knowledge of NPHWs significantly improved • BP decreased by 22.8/12.4 mmHg; blood glucose decreased by 3.4 mmol/l	Changes in staff Low case detection High attrition of patients	No
Labhardt and others 2011	Cameroon (rural)	Hypertension and diabetes	RCT	• NPHW-led care. Group 1, treatment contract between patient and nurse plus free medication for a month for every four months of consecutively attended follow-up visits. Group 2, treatment contract plus letters reminding patients of a visit • Comparator: Usual care	• Retention rates in the intervention groups: 60% and 65% in groups 1 and 2, respectively; 29% in control group	50% lost to follow-up across the three arms	No
Joshi and others 2012	India (rural)	CVD (coronary heart disease and stroke)	Cluster RCT	• NPHWs trained to screen individuals at high risk of developing CVD • Algorithm-based care. • Comparator: Usual care	• The proportion of high-risk individuals identified was 12% greater in intervention villages (63.4% vs. 51.4%) • Agreement between the recommendations made by the trained NPHW and physicians was 88.5%	None reported	No

Note: BP = blood pressure; CVD = cardiovascular disease; HbA1c = glycated hemoglobin; mmHg = millimeter of mercury, a unit of pressure; mmol/l = millimoles per liter; NPHW = nonphysician health worker; RCT = randomized control trial; WHO = World Health Organization.

a. Preintervention data unavailable.

Is Task-Shifting Cost-Effective?

None of the studies reported cost-effectiveness outcomes.

What Are the Enablers of and Barriers to the Effectiveness of Task-Shifting Initiatives?

Potential enablers of task-shifting. Health system factors, such as training NPHWs; providing algorithms (Joshi and others 2012); disseminating protocols and guidelines for screening, treatment, and drug titration; and making medications available (Coleman, Gill, and Wilkinson 1998), aided the success of task-shifting interventions. Several studies included a training component specifically designed for NPHWs that involved the development of algorithms and protocols and the provision of training for screening, diagnosis, management, and follow-up for several diseases (Joshi and others 2012; Kengne, Awah, and others 2009; Kengne, Sobngwi, and others 2009; Labhardt and others 2010). Two studies reported significant changes in the knowledge level of NPHWs as a result of training and supervision (Kar and others 2008; Labhardt and others 2010). A study from Cameroon showed that knowledge regarding the choice of correct antihypertensive drugs improved substantially after training (from 17 to 94 percent) and remained high two years after the intervention (95 percent) (Labhardt and others 2010). A study from India indicated that the knowledge levels of NPHWs for CVD increased from 47 to 93 percent after a four-day training program (Kar and others 2008).

The provision of diagnostic and management protocols with treatment algorithms was another key element that appeared to facilitate task-shifting models (Joshi and others 2012; Kengne, Sobngwi, and others 2009). Two studies from South Africa and one from Cameroon developed detailed protocols for hypertension, diabetes, and asthma management based on World Health Organization (WHO) and other international guidelines (Coleman, Gill, and Wilkinson 1998; Gill and others 2008; Kengne, Sobngwi, and others 2009); similar protocols were developed for CVD screening and management in India (Joshi and others 2012; Kar and others 2008). Several studies included a task-sharing model in which physicians were available for consultation in complicated cases (Kengne and others 2010), for confirmation of the diagnosis, and for initiation of CVD treatment (Joshi and others 2012). A cluster RCT in rural Cameroon found that nurse-led facilitators who provided free medications and sent reminder letters retained patients at the end of one year. The retention rates in the two intervention arms were 60 and 65 percent, respectively, compared with 29 percent in the control group (Labhardt and others 2011).

Potential barriers to task-shifting. Potential barriers to successful task-shifting in these studies include poor staff retention, irregular supply of medications, and lack of equipment. A study in Cameroon reported that only 48 percent of the trained NPHWs were retained at the end of the two-year study period; this low rate of retention was primarily due to the transfer of staff to other public health facilities (Labhardt and others 2010). Some primary health centers did not have equipment to measure blood pressure or blood glucose and did not have protocols or guidelines in place to manage noncommunicable diseases (Coleman, Gill, and Wilkinson 1998; Joshi and others 2012; Labhardt and others 2010).

The availability of medications was identified as another challenge. Two studies had to provide the drugs to patients because the first-level health care center did not store sufficient quantities (Coleman, Gill, and Wilkinson 1998; Labhardt and others 2010). A cluster RCT in rural India showed that NPHWs could identify individuals at high risk of CVD with the help of an algorithm, but failed to demonstrate effects on outcomes, such as the number of medications prescribed or blood pressure and cholesterol levels. To obtain treatment, patients had to visit physicians located some distance away because NPHWs did not have authority to prescribe medications (Joshi and others 2012).

Discussion

Subsequent to this systematic review, further relevant information on task-shifting has emerged. An observational study involving Bangladesh, Guatemala, Mexico, and South Africa showed that trained NPHWs could effectively screen and identify patients at high risk of CVD (Gaziano and others 2015), and the concordance of diagnosis between NPHWs and physicians was 97 percent. This study indicated that shifting tasks to NPHWs was both cost-effective and cost saving. In addition, more data have been published in relation to the experiences of task-shifting in Latin America (Abrahams-Gessel and others 2015a, 2015b; Mendoza Montano and others 2015).

The acute shortage and maldistribution of the health workforce in LMICs is a major obstacle to improving outcomes for the prevention and control of cardiometabolic and chronic lung diseases. Historically, reorganizing the workforce for the delivery of maternal and child health significantly improved outcomes (Haines and others 2007). More recently, task-shifting has proved to be a viable and cost-effective option for the management

of HIV/AIDS in Sub-Saharan Africa (Callaghan, Ford, and Schneider 2010). High-income countries (HICs) such as Australia, the United Kingdom, and the United States have reengineered their workforces for improved efficiency. For example, tasks such as taking blood samples have been shifted to NPHWs like phlebotomists, who specialize in taking blood samples, freeing up physicians to provide other important services. Nurse practitioners in HICs are increasingly adopting many aspects of health care delivery that were traditionally the domain of physicians.

The adaptation and dissemination of prevention and treatment programs to community settings in the United States has relied heavily on NPHWs, with positive results. A review of translational research projects based on the Diabetes Prevention Program (Ruggiero, Oros, and Choi 2011) concludes that using trained community health workers for patient management and peer education can be as effective as using health professionals. This review suggests that key barriers exist to effective task-shifting for preventing and managing cardiometabolic and respiratory diseases in LMICs (box 17.1).

Although limited, published data suggest that the health workforce needs to be reengineered, in conjunction with changes in the health system.

The WHO, in consultation with experts from a wide range of fields, has formulated a set of 22 recommendations that provide guidance on task-shifting (WHO 2008b). These guidelines, developed in the context of the HIV/AIDS epidemic in Sub-Saharan Africa, have implications for other conditions, including noncommunicable diseases. Not all health care professionals support the concept of task-shifting (Zachariah and others 2009). Some view task-shifting as creating a competitive environment in which physicians compete with NPHWs for patients (Grumbach and Coffman 1998); others view it as unsafe for patients when care is provided in the absence of close physician supervision (Mullan and Frehywot 2007). The Sixtieth General Assembly of the World Medical Association (WMA) in 2009 adopted a resolution stating that task-shifting is a short-term solution to physician shortages in LMICs that should occur in close consultation with physicians and have patient safety as the central goal. The WMA recommends further research on models of care employing a physician-coordinated task-sharing approach rather than a task-shifting approach (WMA 2009).

More rigorous research clearly is needed to clarify the issues relating to quality of care, patient satisfaction, and health outcomes. Because RCTs are often costly and challenging in these settings, implementation studies using mixed-methods approaches may provide some of this much-needed evidence. Given that NPHWs are a potentially low-cost and sustainable option for managing noncommunicable diseases in resource-constrained settings, future studies should routinely incorporate cost and cost-effectiveness analyses.

Box 17.1

Barriers to Task-Shifting for the Management of Cardiometabolic and Respiratory Conditions

1. Lack of training of NPHWs in management
2. Inadequate referral pathways
3. Lack of strategies to retain trained staff
4. Inadequate screening and management tools
5. Inability of NPHWs to prescribe or titrate dosages of medications related to management or prevention of conditions.

Limitations of the Review

None of the studies in this systematic review reported process evaluation data, a critically important component for understanding contextual factors associated with uptake of the intervention that may influence the potential for scale-up. Furthermore, none of the studies discussed the role of incentives and remuneration, and research is needed on optimal workforce conditions for task-shifting. A factor likely to influence the feasibility of these initiatives is their acceptability to patients and communities. In expanding the role of NPHWs in managing chronic illness, a better understanding is needed of, for example, how patients might balance potential concerns about safety and efficacy with lower costs and improved access to care. Qualitative research is needed to address these questions.

This review was restricted to peer-reviewed articles published in English; it may have missed studies published in the gray literature and in languages other than English. No studies reporting negative results were identified, suggesting the possibility of significant publication bias. The low number of studies identified may also reflect the inability to publish because of poor quality. The majority of the study designs reviewed provided relatively poor-quality evidence; future

research on task-shifting should include much more robust evaluations of such strategies.

SELF-MANAGEMENT: ENGAGING PATIENTS AND CAREGIVERS

This section is based on a nonsystematic, narrative review of studies published through September 2013 that involved self-management of cardiometabolic conditions in LMICs. The search was conducted in Medline (Pubmed), Embase (Ovid), and the Cochrane library.

Behavioral changes are needed to prevent and manage cardiometabolic diseases (Newman, Steed, and Mulligan 2004). These changes include implementing healthy lifestyle choices; taking medications on an indefinite basis; and undertaking other preventive actions, including primary prevention of the condition for individuals at risk and secondary prevention of complications for individuals with the condition. To make these changes, individuals and their caregivers must make decisions on a daily basis. The term *self-management* means different things to different people and, occasionally, different things at different times to the same person (McGowan 2005). Self-management has been defined as the ability of the individual to manage the symptoms, treatment, and physical and psychosocial consequences of chronic diseases and to make lifestyle changes related to chronic conditions (Barlow and others 2002). The proponents of this definition stress that effective self-management involves the ability to monitor one's condition and to effect the cognitive, behavioral, and emotional responses required to maintain a satisfactory quality of life (Barlow and others 2002). Self-care is seen as a preventive strategy (Clark and others 1991; Grady and Gough 2014), and self-management includes tasks undertaken by individuals to limit or reduce the impact of disease (Clark and others 1991). We do not make such a differentiation here, given the absence of a clear-cut distinction between risk and disease states for many cardiometabolic conditions and the commonality of strategies for addressing prevention across the continuum of risk exposure.

Self-management strategies for chronic diseases have developed in recognition of the need to shift health care from traditional models of care that place patients in the role of passive recipients to models of care that recognize the pivotal role of patient-provider partnerships in achieving successful prevention and management (Bodenheimer and others 2002). The partnership paradigm embraces two conceptually similar but clinically separable principles: collaborative care and self-management education.

In collaborative care (also known as patient empowerment), providers and patients make health care decisions together. Collaboration entails patients acknowledging their responsibility to manage their conditions and providers encouraging patients to solve their own problems by supplying them with information. Internal motivation, as opposed to external motivation, is the determinant of change. Table 17.3 compares traditional and collaborative care in chronic diseases.

Self-management education occurs in the sphere of patient education and includes a plan to provide patients with problem-solving skills (table 17.4) (Bodenheimer and others 2002; Von Korff and others 1997). A patient with diabetes, for instance, will gain knowledge about diet, physical activity, and drugs that control blood glucose and will acquire technical skills for monitoring blood glucose through traditional patient education.

Self-management interventions seek to address the challenges that individuals face in achieving optimal health goals related to managing their noncommunicable diseases (Newman, Steed, and Mulligan 2004). These interventions vary in population targeted, delivery location, self-management tutors used, mode and format of delivery, and content of the intervention (Barlow and others 2002). Self-management interventions have been implemented as part of multifaceted approaches to chronic care (Arauz and others 2001; Barcelo and others 2010; Faria and others 2013; Galante and others 2012; Thakur and others 2009), and identifying the impact of each component on improving self-management or patient health status is a challenge.

Cardiometabolic Conditions Targeted in Intervention Studies

An overview of selected self-management interventions conducted in LMICs is presented in online annex 17A. Diabetes appears to be the most often targeted condition. This is a global trend, probably because diabetes is one of the conditions for which the evidence base for self-management interventions is more developed (Newman, Steed, and Mulligan 2004). The aims of these interventions tend to be diverse, addressing issues ranging from lifestyle modification to improving glycemic control using medications and coping with symptoms. Interventions in LMICs have also targeted hypertension; obesity; rehabilitation of patients with existing disease, such as coronary heart disease or stroke; and managing overall CVD risk (Fornari and others 2013; Mujica and others 2010).

Table 17.3 Comparison of Traditional and Collaborative Care in Cardiometabolic Diseases

Issue	Traditional care	Collaborative care
What is the relationship between patient and health care provider?	Health care providers tell patients what to do; patients are passive	Expertise is shared with active patients; health care providers are the experts about the disease, and patients are the experts about their lives
Who is the principal caregiver and problem solver? Who is responsible for outcomes?	Health care providers	The patient and health care providers are the principal caregivers; they share responsibility for solving problems and for outcomes
What is the goal?	Compliance with instructions; noncompliance is a personal deficit	Patients set goals, and health care providers help patients to make informed choices; lack of goal achievement is a problem to be solved by modifying strategies
How is behavior changed?	External motivation	Internal motivation; patients gain understanding and confidence to accomplish new behaviors
How are problems identified?	By professionals	By patients (for example, pain or inability to function) and by professionals
How are problems solved?	Health care providers solve problems for patients	Health care providers teach problem-solving skills and help patients to solve problems

Source: Adapted from Bodenheimer and others 2002.

Table 17.4 Comparison of Traditional Education and Self-Management Education

Issue	Traditional patient education	Self-management education
What is taught?	Information and technical skills about the disease	Skills on how to act on problems
How are problems formulated?	Problems reflect inadequate control of the disease	Patients identify problems they experience that may be related to the disease
What is the relationship of education to the disease?	Education is disease specific and teaches relevant information and technical skills	Education provides problem-solving skills that are relevant to the consequences of chronic conditions
What is the theory underlying the education?	Disease-specific knowledge creates behavioral change, which improves clinical outcomes	Greater patient confidence in the capacity to make life-improving changes (self-efficacy) improves clinical outcomes
What is the goal?	Compliance with the behavioral changes taught to improve clinical outcomes	Increased self-efficacy to improve clinical outcomes
Who is the educator?	Health professionals	Health professionals, peer leaders, and other patients, often in group settings

Source: Adapted from Bodenheimer and others 2002.

Theories of Self-Management Interventions

Historically, self-management interventions were based on an educational approach, providing information in a traditional didactic format. The expectation was that the more knowledge people received, the more likely they would be to engage in the behavioral changes required to manage their conditions (Lorig and Holman 2003). This approach is still reported in published models implemented and evaluated in LMICs.

However, with the growing understanding that knowledge alone is not sufficient to promote behavioral change, self-management interventions have increasingly been based on more complex theories (Lorig and Holman 2003; Newman, Steed, and Mulligan 2004). Theoretical models that have commonly been applied to cardiometabolic diseases in LMICs include social cognitive theory, the stress coping model, and the readiness-to-change construct of the transtheoretical model

(Newman, Steed, and Mulligan 2004). The evidence base does not support the use of any one theoretical framework; the appropriateness of each may be highly contextual. Many strategies for self-management interventions for chronic diseases have been based on cognitive behavioral therapy.

Target Populations in Self-Management Interventions

Self-management interventions for cardiometabolic diseases in LMICs have targeted individuals with existing diseases, people with risk factors for disease, family members or companions of persons with or at risk for disease, as well as providers assisting in the delivery of self-management interventions. The intended beneficiaries have often been the direct targets of self-management interventions. However, the complexity of managing multiple risk factors for preventing cardiometabolic diseases suggests that targeting the direct beneficiary alone is insufficient. Alternative approaches have been developed, such as using peer supporters and targeting family members or others. An increasingly adopted innovation is educating children to influence their parents. In Brazil, Fornari and coworkers intervened with schoolchildren to help to lower the cardiovascular risk of their parents (Fornari and others 2013).

Some evidence indicates that family interventions can improve outcomes for individuals with or at risk of chronic diseases (Fisher and Weihs 2000). However, the few available studies in this area have been conducted largely in HICs. In a systematic review of family intervention studies in people with diabetes, Armour and others (2005) found that family interventions were associated with improved diabetes-related knowledge in five studies and a significant improvement in blood glucose control in eight studies. In a trial in Chile that involved 243 patients with type 2 diabetes from three first-level clinics in Santiago, a family-based intervention significantly improved blood glucose control during the first six months of intervention, but not during extended follow-up (Garcia-Huidobro and others 2011). The family-based intervention consisted of two family meetings or visits at home, one individual counseling session, one counseling session with relatives, and one multifamily education session (Garcia-Huidobro and others 2011).

The involvement of health care providers in self-management interventions has often occurred in the context of multidisciplinary teams. Members of these teams include physicians, nurses, dieticians, physical therapists, pharmacists, psychologists, and lay health workers. The use of lay health workers in LMICs is appealing, considering the shortage of trained health workers in these settings. In addition to delivering interventions within health care facilities, NPHWs have been used for community-based interventions, particularly those occurring within households. In the Control of Blood Pressure and Risk Attenuation (COBRA) trial in Pakistan, trained lay health workers delivered a household self-management intervention for controlling blood pressure to several thousand individuals (Jafar and others 2010; Jafar and others 2011).

Pharmacists are another health professional group through which the delivery of self-management interventions is increasingly reported. A review to examine the effects of pharmacist-provided, nondispensing services on patient outcomes, health service use, and costs in LMICs identified 12 relevant studies. The review found that services targeting self-management can improve glucose levels as well as blood pressure and cholesterol levels and may improve the quality of life for patients with diabetes or hypertension. Furthermore, use of pharmacy services appeared to be associated with reduced use of other health care services (Pande and others 2013).

Education in Self-Management

Education is a key element of self-management support and should be targeted to individuals' circumstances (Novak and others 2013). The WHO Working Group on Therapeutic Patient Education has emphasized the importance of patient-centered education for the effective management of chronic diseases (WHO Working Group 1998). Education interventions for cardiometabolic diseases have been delivered using paper-based or electronic support, face-to-face or remote interaction, and individual or group meetings. Multidimensional approaches with both written information and opportunities for in-person education and discussion have been proposed as particularly effective strategies; group settings offer the potential additional benefit of peer support (Novak and others 2013).

A quasi-experimental before-and-after evaluation study in Brazil explored the effect of educational intervention on the outcomes of 51 adults with type 2 diabetes (mean age 57.6 years). The content of the program was informed by the difficulties that providers encountered during patient care. The topics covered were concepts, pathophysiology and treatment of diabetes mellitus, physical activity, nutrition, care and examination of feet, self-monitoring, hypoglycemia, chronic complications, special situations, and family support. The program was delivered via group interactive lectures (20 sessions per group) and complemented by individual consultations for persons with additional needs identified

during the group work. Consultations aimed to reinforce the strategies proposed during group meetings. They were conducted with approximately 15 participants who had difficulty maintaining their metabolic control or fitting in the group activities. The program was delivered over a five-month period by a multidisciplinary team including nurses, nutritionists, psychologists, a physical educator, and undergraduate students in nursing and psychology. Participation in the program was associated with improvement in the perceptions of patients regarding their general health status (Faria and others 2013).

In contrast to this high-intensity intervention, a structured public health group-based education program that was administered in two steps to young women (mean age 34 years) in Turkey was associated with significant six-month improvements in dietary habits and reductions in body weight, blood pressure, and prevalence of obesity. However, no economic evaluation was performed to determine cost-effectiveness (Kisioglu and others 2004). The intervention included educating the women about healthy cooking and physical exercise to reduce high blood pressure and weight.

Technology in Self-Management Interventions

Mobile technology applications, such as short message service (SMS) and multimedia message service (MMS), have been suggested as potentially convenient, cost-effective ways of supporting self-management. SMS and MMS programs could overcome barriers to patient education and self-management in LMICs because they are relatively inexpensive and accessible (mobile phone ownership is high and increasing in many LMICs). However, evidence to support their effectiveness remains very limited at the global level. A Cochrane review identified only four relevant studies, all conducted in HICs (de Jongh and others 2012). The review found moderate-quality evidence in support of improvement in individual's self-management capacity for diabetes as well as adherence to medications for diabetes or hypertension. The review further identified significant gaps in evidence regarding the long-term effects, acceptability, costs, and unintended effects of such interventions. A more recent RCT among Indian men with impaired glucose tolerance randomized to receive lifestyle-related SMS demonstrated that the incidence of type 2 diabetes was lower in the intervention group compared with the control (18 percent of participants in the intervention group developed type 2 diabetes compared with 27 percent in the control group; hazard ratio, 0.64; 95% confidence interval, 0.45–0.92; $p = 0.015$) (Ramachandran and others 2013). The use of text messaging to improve self-management is a major focus of current research, and data relevant to LMIC settings will be increasingly available.

More traditional telecare approaches have also been evaluated. In a short-term randomized trial involving 200 patients with hypertension recruited across clinics in Honduras and Mexico, an intervention comprising automated telephone care management plus home blood pressure monitoring was effective in improving the patients' perception of general health and satisfaction with care. Intervention patients had lower scores for depression and fewer medication-related problems. In the subgroup with high information needs at baseline, the intervention was associated with significant lowering of blood pressure (Piette and others 2012).

The effect of telephone-based self-management support for diabetes control was assessed in two primary care facilities in Chile (Lange and others 2010). The intervention consisted of six telecare self-management support encounters during a 15-month period. Telecare included providing support to participants and motivating them to continue their medications. Information was updated on their electronic health records, which providers could access during the next patient visit. Compared with usual care, participants in the intervention group maintained their blood glucose levels during follow-up, while the control group did not. In the intervention group, perceptions of self-efficacy were higher, compliance with clinic visits was greater, and visits for emergency care were fewer (Lange and others 2010).

Cost-Effectiveness of Self-Management Interventions

Only two studies assessed the cost-effectiveness of self-management interventions in LMICs. The cost-effectiveness of community-based strategies to control blood pressure was evaluated in the COBRA trial in Pakistan (Jafar and others 2011). The COBRA project randomized 1,341 individuals with hypertension in 12 randomly selected centers in Karachi to usual care or one of three intervention programs: (1) combined home health education (HHE) by lay health workers plus trained general practitioners, (2) HHE only, and (3) trained general practitioners only (Jafar and others 2009; Jafar and others 2010). The annual cost per participant was US$3.99 for the combined HHE and trained general practitioners, US$3.34 for HHE alone, and US$0.65 for trained general practitioners alone. The combined HHE and trained general practitioners was the most cost-effective intervention, with an incremental cost-effectiveness ratio of US$25 (95% confidence interval, 6–99) per millimeter of mercury (mmHg, a unit of pressure) reduction in systolic blood pressure (Jafar and others 2011).

The cost-effectiveness of home rehabilitation for ischemic stroke was evaluated in Thailand (Sritipsukho and others 2010). The study randomized 58 patients with ischemic stroke to either home rehabilitation programs or conventional hospital care. The Barthel Index and Modified Rankin Scale were used to evaluate the outcome measures, and success was defined as an improvement by at least one level of the outcome scale. The cost and number of successful cases were greater in the intervention than in the usual care group. For patients with mild or no disability, the incremental cost-effectiveness ratios were 14,212 Thai baht and 24,364 Thai baht, respectively, per one unit of change in the Barthel Index (Sritipsukho and others 2010). The authors found this result to be cost-effective when compared with gross domestic product per capita.

Discussion

Self-management initiatives for cardiometabolic diseases in LMICs and at regional and global levels are in their infancy. Evidence is accumulating from intervention research that supports self-management, but little is known about which components of those interventions work best in LMICs; virtually nothing is known about how to scale up models found to be effective in research settings.

Extensive reviews of self-management intervention studies around the world have identified general components that have been found to work well in diverse settings (de Silva 2011; Novak and others 2013). These components can assist in the development and implementation of strategies for promoting the uptake of self-management for chronic diseases in LMICs (box 17.2). However, for these strategies to be effective, the barriers and facilitators of the implementation, many of which are context specific, must be understood.

Furthermore, different strategies will likely have to be combined for the same condition within any given setting and at different times for the same individual to achieve the desired effect (figure 17.1). In available studies from LMICs, self-management has been implemented as a component of much broader interventions targeting chronic disease prevention and control. Most of these studies did not develop an evaluation framework to tease out the contribution of the self-management component from the overall effect of the intervention.

CONCLUSIONS

Innovative approaches to extending the care of people with cardiometabolic and chronic lung conditions into the community are likely to be crucial components of any suite of strategies to reduce the burden of disease in LMICs. Effective task-shifting to more affordable and community-based health care workers and effective consumer self-management are two important examples. For both, the current evidence base has critical gaps in addressing effectiveness, cost-effectiveness, and key understandings for scale-up, particularly in LMICs. Several large ongoing studies include aspects of self-management and task-shifting; many of these studies involve key stakeholders, including health care providers and patients, in developing the intervention

Box 17.2

Elements That Support Self-Management

The following elements support self-management for chronic diseases:

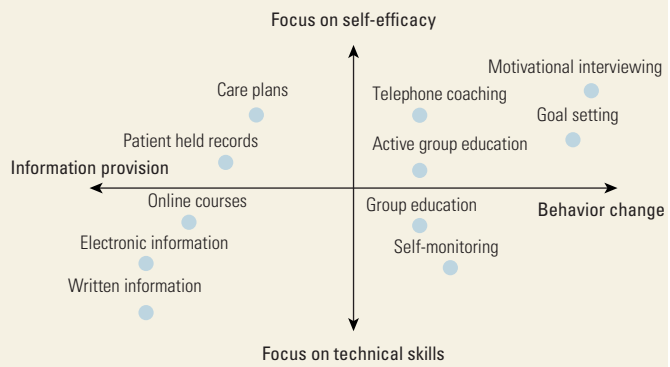
- Involving people in decision making
- Emphasizing problem solving
- Developing care plans as a partnership between service users and professionals
- Setting goals and following up on the extent to which goals are achieved over time
- Promoting healthy lifestyles and educating people about their conditions and how to self-manage
- Motivating people to self-manage using targeted approaches and structured information and support
- Helping people to monitor their symptoms and know when to take appropriate action
- Helping people to manage the social, emotional, and physical impacts of their conditions
- Using proactive follow-up
- Providing opportunities to share and learn from other service users.

Source: Adapted from de Silva 2011.

and in incorporating appropriate frameworks for broad evaluation of effectiveness, cost-effectiveness, acceptability, scalability, and sustainability. Such ongoing and new research is crucial and should provide important insights into practical and affordable community-based models of care in LMICs.

This chapter has provided insights into approaches that have the potential to be effective and scalable as well as factors that might impede or facilitate their utility.

Figure 17.1 Continuum of Strategies to Support Self-Management



Source: Adapted from de Silva 2011.

CASE STUDY 17.1: INVESTIGATING AN NPHW-LED CARDIOVASCULAR DISEASE RISK MANAGEMENT MODEL IN RURAL INDIA

Background

Cardiovascular diseases (CVDs) are the major cause of premature death and disability in India, yet few people at risk are able to access best practice health care (WHO 2008a).[1] In India, CVD risk factor levels are high, even in the rural population, which constitutes 70 percent of the total population. CVD is the leading cause of adult deaths in many rural Indian communities (Joshi and others 2006; Kinra and others 2010). Despite the availability of evidence-based guidelines for the prevention of CVD, the use of simple, affordable, preventive treatments (such as smoking cessation strategies and the use of aspirin, low-cost statins, angiotensin-converting enzyme inhibitors, and beta blockers) is very low in these communities (Joshi and others 2009). Numerous barriers exist at different levels of the health system, including lack of facilities, limited access to providers, and high out-of-pocket costs (Rao and others 2011). Mobile Health (mHealth) is a promising strategy for addressing some of these barriers, but very few mHealth interventions have been subject to robust evaluation.

This case study describes an innovative strategy, Systematic Medical Appraisal Referral and Treatment in India (SMARTHealth India), that consists of the following:

- Using a mobile device–based clinical decision support system (CDSS) for CVD risk management
- Shifting tasks from physicians to NPHWs
- Integrating the overall system within the government's primary health care infrastructure in rural India.

The objectives of SMARTHealth were twofold: (1) to develop a valid CVD risk assessment and management algorithm based on best practice national and international recommendations, with a focus on blood pressure management, and (2) to assess utility, preliminary effectiveness, and acceptability of the system among community members, NPHWs, and physicians.

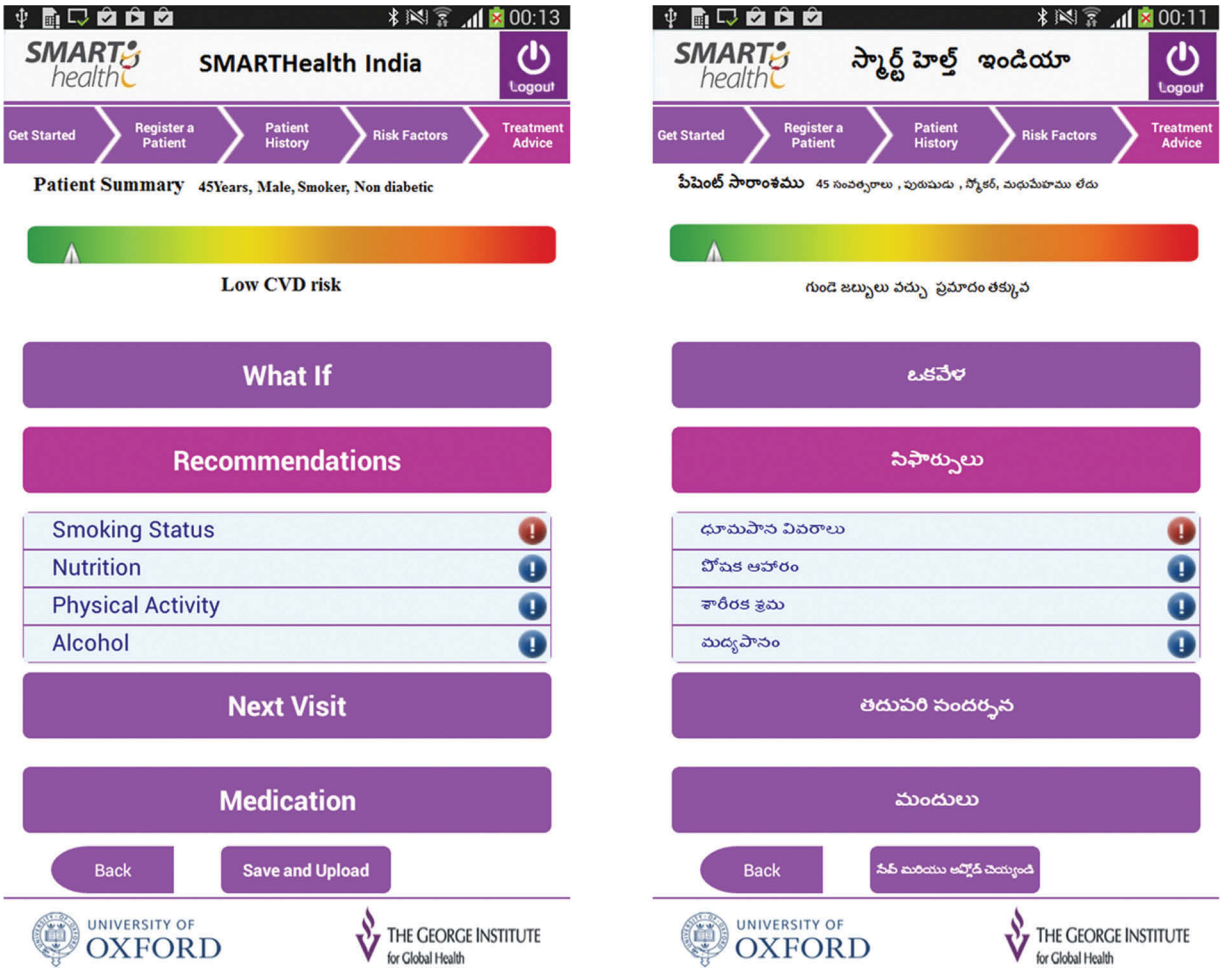
Methods

A mobile software application (app) was developed to deliver the CDSS, which was based on plain language clinical rules developed from standard guidelines that were subsequently programmed and translated. Formal five-day and one-day training courses were developed for the NPHWs and physicians, respectively, that focused on both the conditions targeted and the delivery of interventions. The algorithm was validated and field tested in 11 villages in Andhra Pradesh; the test involved 11 NPHWs and 3 primary health care physicians. NPHWs are usually female residents of the village with approximately a grade 10 education and are each responsible for an average of 1,000 residents in the village.

The mobile app takes users through a four-step process (patient registration, past medical history and medications, risk factor measurements, and treatment advice). To measure blood pressure, NPHWs and physicians use an automatic monitor to upload readings wirelessly into the app. Blood glucose, cholesterol (if available), height, and weight are entered manually. The treatment advice page provides the 10-year CVD risk for each participant; lifestyle, referral, and follow-up recommendations for NPHWs; and medication recommendations for physicians (figure 17.2).

A mixed-methods evaluation was conducted that consisted of clinical and survey data and in-depth patient and staff interviews to provide an understanding of the barriers to and enablers of use of the system. At the end of the study, all physicians and NPHWs participated in an in-depth interview, and selected community members participated in four village-based focus group discussions in separate groups by gender.

Figure 17.2 Treatment Advice Screen of the Application



Source: Praveen and others 2014.

Semistructured interviews were conducted by a researcher who was experienced in these field settings and proficient in English and Telugu. Interviews covered the following domains:

- Staff roles and responsibilities
- Patient, NPHW, and doctor satisfaction with using the app
- Staff knowledge and skills
- Impact of CDSS on usual work routines.

Findings

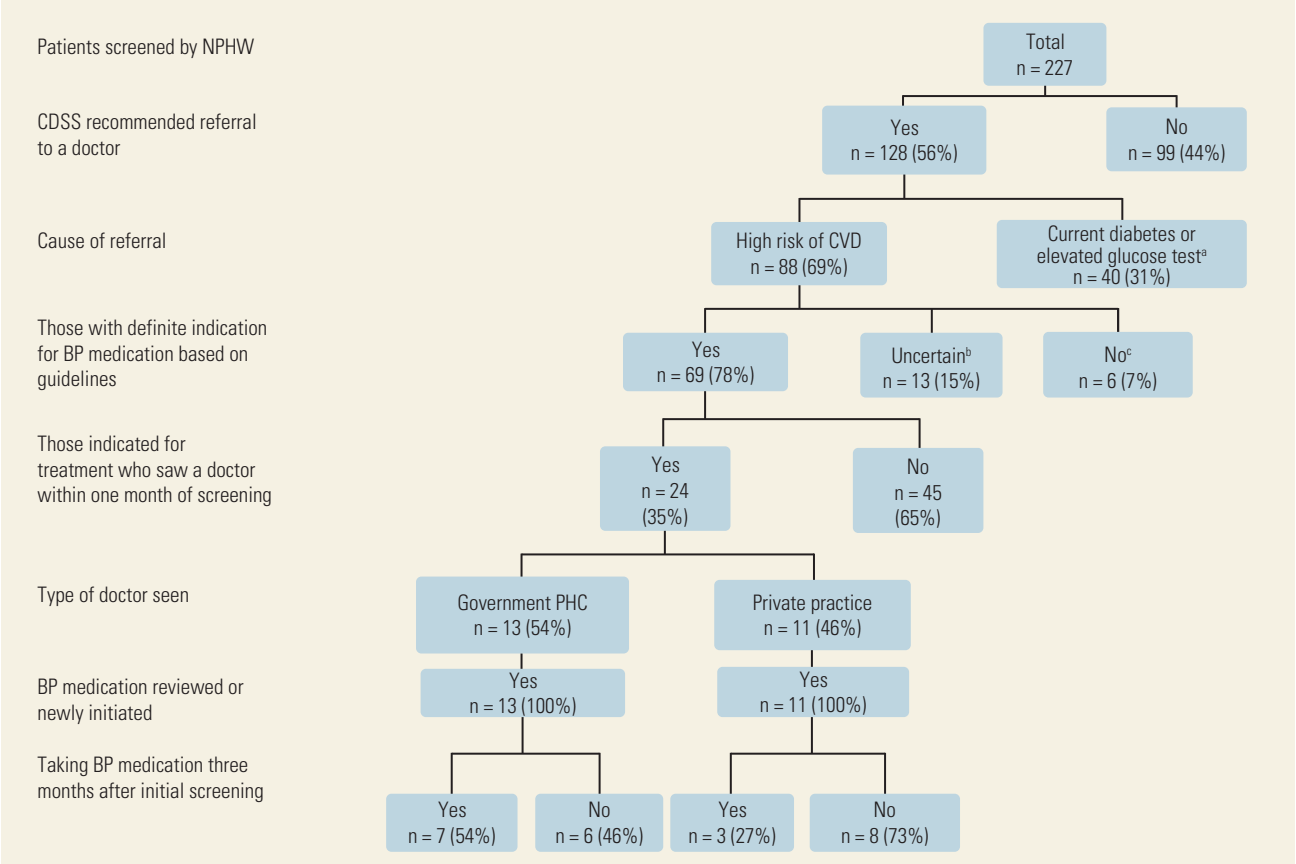
Quantitative Evaluation

During the pilot study, NPHWs and physicians used the CDSS to screen 227 and 65 adults, respectively. The NPHWs identified 39 percent (88) of patients for referral; 78 percent (69) of these referred patients were indicated for blood-pressure-lowering medication (figure 17.3). Only 35 percent (24), however, saw a doctor within one month of referral; of those who did, 42 percent (10) reported continuing medications at a three-month follow-up visit. Physicians identified and recommended 42 percent (10) of patients for blood-pressure-lowering medications. Overall, after three months, only 10 of 69 patients (15 percent) with an indication for blood pressure medications were actually taking them. This pilot demonstrated the need to strengthen the health system if task-shifting strategies are to be successful.

Qualitative Evaluation

All physicians and NPHWs participated in interviews, and four community focus groups were conducted.

Figure 17.3 Assessment and Management Pathway for Patients Screened by NPHWs



Source: Praveen and others 2014.
Note: NPHW = nonphysician health worker; CDSS = clinical decision support system; BP = blood pressure; CVD = cardiovascular disease; PHC = primary health center.
a. Either patients with a past history of diabetes who were not at elevated CVD risk (n = 9) or patients whose random capillary glucose tests were elevated (n = 31) (excluded from further analysis).
b. Patients diagnosed with peripheral vascular disease but lacking any other data to suggest high CVD risk (excluded from further analysis).
c. Patients with absolute risk of 20–30 percent and BP <140/90 or with absolute risk of 30–40 percent and BP <130/80 are not indicated for medications.

Three interrelated themes emerged from the interviews (figure 17.4):

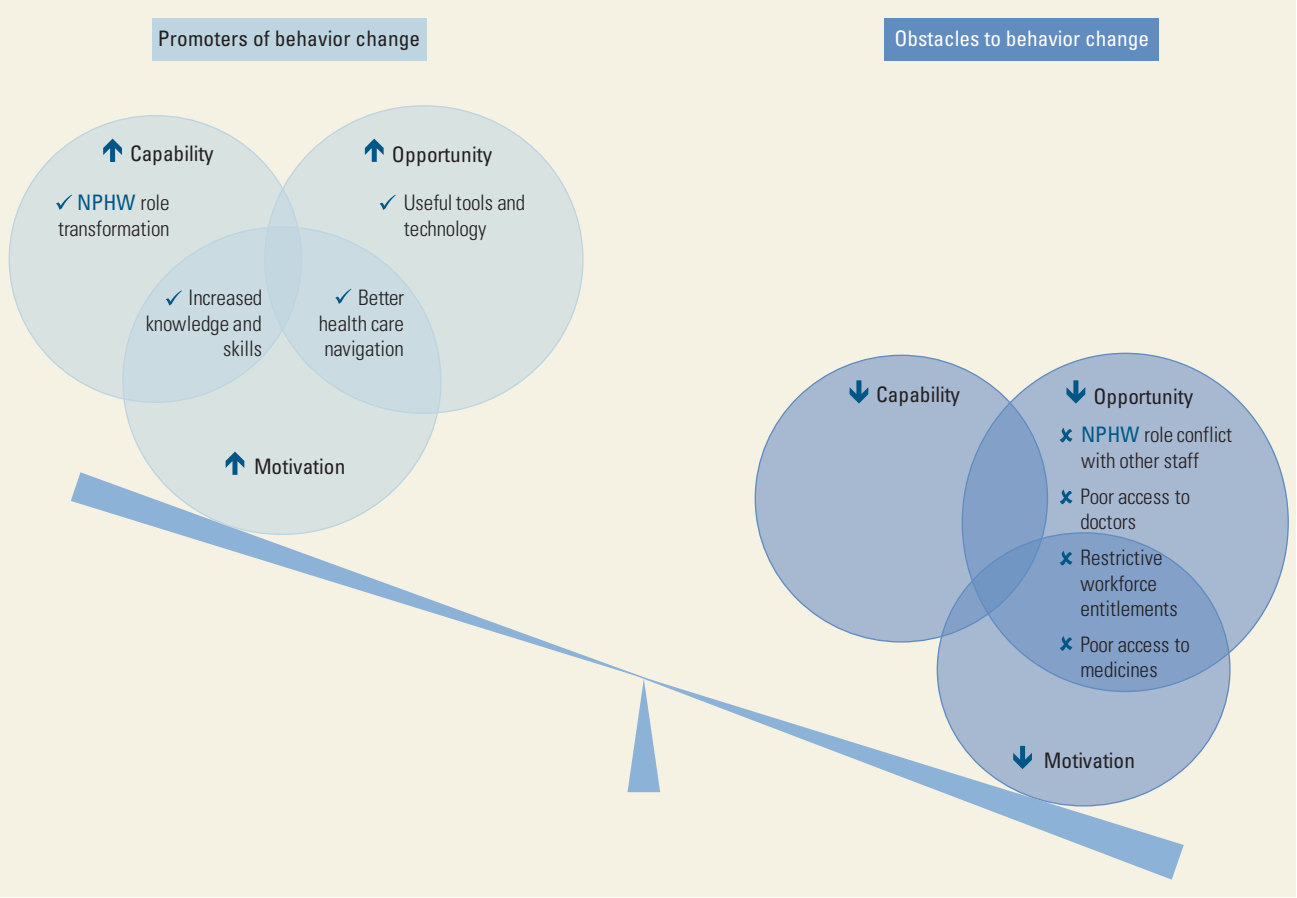
- The intervention strategy had potential to transform prevailing health care models.
- Task-shifting of CVD screening to NPHWs was the central driver of change.
- Despite high acceptability, actual transformation was limited by system-level barriers, such as access to physicians and medicines.

Conclusions

This feasibility study provided initial insights into the acceptability and preliminary effectiveness of a smartphone CDSS to improve detection, prevention, and management of cardiovascular disease in a first-level health care facility in India. It incorporated a technological solution with innovative workforce strategies to address the growing CVD epidemic. Broader systems issues, such as the inability of NPHWs to prescribe and dispense essential medications and integration of mHealth strategies within this broader context, are essential factors in maximizing the impact of such approaches.

The intervention strategy has been substantially modified to include a focus on health systems strengthening—providing government support through policy directives, ensuring the availability of essential medications, incorporating recall and reminder systems, modifying provider remuneration incentives, and incorporating a consumer support program for long-term drug adherence. It is being rigorously evaluated for clinical effectiveness and cost-effectiveness in a large cluster

Figure 17.4 Illustration of the Interview Themes in Context of the COM-B Model



Source: Praveen and others 2014.
Note: NPHW = nonphysician health worker.

randomized trial. If found to be successful, the findings are likely to advance knowledge on scalable strategies to improve access to effective health care for underserved populations in LMICs.

CASE STUDY 17.2: INVESTIGATING A COMMUNITY-BASED DIABETES CARE MODEL: THE MOPOTSYO MODEL IN CAMBODIA

MoPoTsyo Model of Care

More than 325,000 Cambodians have diabetes (IDF 2012) and require access to chronic care.[2] They face four main barriers when seeking services: financial, geographic, informational, and household.

MoPoTsyo is a nonprofit organization that started in 2005 with the goal of empowering people living with diabetes and hypertension to manage their diseases and eliminate the barriers to quality care. Since 2007, MoPoTsyo has screened more than 460,000 adults for diabetes. In 2011, PATH—known as the Program for Appropriate Technology in Health from 1980 until 2014 and now known simply as PATH—selected the MoPoTsyo Patient Information Center in Cambodia as an innovative care model for noncommunicable diseases in low-resource settings. This case study is based on information gathered during PATH's onsite investigation to identify the success factors of MoPoTsyo and its potential for replication.

Currently, 135 peer educators serving 16 districts help to facilitate services for 14,000 people living with diabetes and hypertension. The program includes three components, all managed by core staff at the head office:

a network of peer educators, a revolving drug fund, and contracted physicians.

MoPoTsyo peer educators must be diagnosed with diabetes, complete an intensive six-week course delivered by MoPoTsyo, shadow an experienced peer educator, and pass an examination. Once trained, peer educators lead group screening and information sessions in their homes. These sessions include monitoring blood glucose, blood pressure, heart rate, and weight; providing self-management education; answering member questions; and fostering peer support. Peer educators are organized under a diabetes program manager appointed jointly by MoPoTsyo and the local health authority in each operational district. Robust monitoring of peer educator performance and assurance of consistent quality standards are priorities.

MoPoTsyo procures medicines at international market prices and distributes them to 20 subcontracted community pharmacies, which sell them to MoPoTsyo members at prices fixed below market retail prices. Pharmacies with large sales volumes gain a 5–15 percent profit, and members benefit from a consistent supply of affordable medications.

Outcomes Achieved

An evaluation of 150 randomly selected MoPoTsyo patient records found significant reductions in fasting plasma glucose and out-of pocket expenses (Eggermont 2011; van Pelt and others 2013). The sensitivity and specificity of MoPoTsyo's screening approach, the relative health status of patients screened compared with alternative screening methods, and the operational and logistical implications of diagnosing people earlier in their disease process are being assessed.

Key Success Factors

An Interdisciplinary, Patient-Centered, Team-Based Model of Care

The MoPoTsyo model places the patient at the center, supported by a cross-disciplinary team consisting of a peer educator, a physician, and a pharmacist (Barr and others 2003; WHO 2002). Clearly defined roles, strong relationships, and good communication strategies among team members optimize care. The peer educator coordinates the team and helps patients to navigate the health system.

All team members record symptoms, progress, medical status, and medications in each member's patient care booklet. Peer educators monitor this information, including physicians' orders and patients' adherence to treatment. The booklets serve as identification when members purchase prescribed drugs. This simple information management and coordination system ensures that all team members are informed of the person's health status and care.

Reduced-Cost Community-Level Services

For most Cambodians, diabetes care is difficult; for example, patients often travel long distances for care, and no hospitals offer free diabetes care. MoPoTsyo reduces direct and indirect costs by providing services close to home, using the revolving drug fund, and managing relationships with contracted physicians and pharmacies. Patients pay US$5 for consultation, testing, and transportation, compared with US$30 or more in the private sector. Average monthly medication costs for MoPoTsyo members are US$5.50. Patients report that services and medications are convenient and helpful.

Use of Peer Educators to Enhance Trust and Model Good Disease Management

MoPoTsyo peer educators are viewed as trusted community leaders committed to self-managing their disease. A MoPoTsyo physician reports that many patients have more trust in peer educators than in health care professionals because peer educators set a good example in their lifestyle choices and how they manage their diabetes. Peer educators are not allowed to prescribe or sell medications and do not have a financial stake in medications or services, so patients see them as unbiased. Although peer educators receive a small amount of money as reimbursement for their costs, many report that they are motivated by the desire to manage their disease and the prestige they enjoy educating others to do the same, rather than by the money provided. Many hold jobs in their communities, often in leadership positions. The reputation of the peer educators as respected community members with elevated social status enhances the reputation of MoPoTsyo as a credible organization. Patient trust and respect for MoPoTsyo grows as their health improves.

A Dynamic, Well-Connected Leader

MoPoTsyo's chief executive officer and founder, Maurits van Pelt, has created a strong organization with staff members who are committed to enabling fellow Cambodians to self-manage diabetes and hypertension. MoPoTsyo staff report that van Pelt nurtures a team approach with on-the-job professional development and mentoring. The team has won the support of donors and buy-in from key stakeholders to incorporate the model into the government system.

Conclusion and Implications

The MoPoTsyo model of care offers a promising and affordable approach to the care and management of noncommunicable diseases in low-resource settings and offsets constraints that impede access to care. MoPoTsyo has made services more availabile by centering them in communities, providing medications through contracted pharmacies, and launching a peer education program. It also has provided comprehensive team-based care closer to home at a reduced cost.

ANNEX

The annex to this chapter is as follows. It is available at http://www.dcp-3.org/CVRD.

- Annex 17A. Examples of Self-Management Interventions for Cardiometabolic Conditions in LMICs and the Evaluation of Their Effects

NOTES

World Bank Income Classifications as of July 2014 are as follows, based on estimates of gross national income (GNI) per capita for 2013:

- Low-income countries (LICs) = US$1,045 or less
- Middle-income countries (MICs) are subdivided:
  (a) lower-middle-income = US$1,046 to US$4,125
  (b) upper-middle-income (UMICs) = US$4,126 to US$12,745
- High-income countries (HICs) = US$12,746 or more.

1. This case study was prepared by Devarsetty Praveen, Anushka Patel, Arvind Raghu, Gari D. Clifford, Pallab K. Maulik, Ameer Abdul Mohammad, Kishor Mogulluru, Lionel Tarrasenko, Stephen MacMahon, and David Peiris.
2. This case study was prepared by Claudia Harner-Jay, Ashley Morganstern, Bernhard Weigl, Jennifer Drake, Mary Beth Weber, and Helen C. McGuire.

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