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A Primary Health Services Model for Low- and Middle-Income Countries

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ABSTRACT

Most health care needs can be addressed through first contact primary health services which are associated with better access health outcomes and population health, and greater health equity. Community-oriented primary care is medical practice that takes responsibility for the health of a defined population. The key components of such practice are community health workers, virtual care providers, and ambulatory facility centers.

The internet with immediately accessible health expert information such as diagnostic and treatment guidelines, and the availability of new point-of-care diagnostic capacities such as ultrasound imaging, have significantly changed the optimal scope of primary health services.

This communication suggests what that scope can be in low- and middle-income countries.
Primary health services can:

- *Be for individuals of all ages.*
- *Be comprehensive in addressing prevention (through detailed attention to ecological stressors as causes of systemic inflammation), diagnosis and treatment of biological and psychosocial illness, and virtual home hospital care.*
- *Have high non-professional: professional (physician) staff ratios.*
- *Provide education, coordination, and management*
- *Be navigational for specialty care*
- *Help control patient health expenditures*
- *Promote public health and social justice*
- *Offer procedures for diagnostic imaging with ultrasound, pulmonary function assessment, gynecological examinations, and treatment of common traumatic injuries.*
- *Embrace A.I. tools and clinical research.*

A parallel scope of physician tasks as human health biology psychology and education practitioners can be intellectually, emotionally and financially rewarding. Broader training in biological and health, but critically in social and humanistic domains, will be essential to achieving successful development of these models.

Keywords

Primary health services, Middle-Income countries, Virtual home hospital care.

Introduction

Primary care is only the health service component or function associated with better access, better health outcomes, decreased hospitalization and emergency room use rates [1]. An American National Academy of Medicine Consensus report added that critically, primary care is the foundation of better population health and heath equity [2]. The Alma Ata declaration asserted that primary health care is the key to achieving health for all [3].

The Institute for Healthcare Improvement suggests a triple aim for health services [4].

1. Improving patient experience, meaning care which is accessible, affordable, and of impactfully high quality
2. Improving population health
3. Reducing per capita costs

My belief is that first, this definition puts too much emphasis on the process of patients' care, without fully acknowledging the challenge of accessibility, and then that what should be emphasized is the overall outcome of care which is a product of its quality. In my view, there is, inappropriately, a major focus on patient happiness, when the focus should be on the well-defined metrics of quality: efficacy, safety, efficiency, patient-centeredness, timeliness and equity [5,6]. The sum of these measures produces a total outcome of maximizing impact on human potential.

Secondly, the broad goals of health care have to include increasing social justice societal cohesiveness and employment, with relationship building, all of which support mental, emotional and physical well-being for populations.

Finally, this triple aim definition completely ignores a central challenge in meeting these aims: the need to improve providers' experience by better spelling out their time and tasks. The scopes of primary health services and the operational tasks of providers need to be well defined [7,8]. For primary care physicians the scope needs to be appropriate, and intellectually, emotionally and financially rewarding. Peter Drucker perhaps said this best: "What is important is not how to do things right, but how to find the right things to do." Defining such scopes for a primary health system and its physician providers in a low- and middle-income country is the goal of this communication [8]. Obviously, addressing these multiple aims of health systems must be central to this goal. For many low- and middle-income country settings, such as those in rural Bangladesh where the author works, these aims are currently being very poorly met, which makes Drucker's admonition critical.

Further better addressing these aims is occurring in the context of a major shift from hospital centered to community-oriented and ambulatory care-anchored health systems, including virtual home hospital care [9].

Brief Background History for Defining the Scopes of Primary Health Systems and Providers' Services

The exponential growth in biomedical knowledge confers high complexity on maximally impactful patient management. Hoff's history of the development of family medicine in the United States over the last 75 years offers some important lessons [8]. The growth of several financially more remunerative medical specialties challenged the identity and relevance of primary care services. Age, gender, procedure-centered, and organ or problem type medical specialtists asserted they offered better quality, but generally acute-crisis care (Table 1).

Table 1: Specialties practicing primary care medicine (U.S.).

Age-based
Pediatrics
Internal medicine
Geriatrics
Gender-based
Obstetrics and gynecology
Surgery (for breast problems)
Procedure-targeted
Surgery—minor trauma
Orthopedics-trauma, chronic joint problems
Dentistry
Organ or problem-based
Palliative care
Cardiology-hypertension
Endocrinology-diabetes
Pulmonology-asthma
Infectious disease-respiratory and gastrointestinal infections

The growth of specialty medical practices and decline in numbers of primary care practitioners seen in the United States is being replicated to greater or lesser extents worldwide. These trends need to be considered first in light of the descriptive epidemiology of health problems. The global burden of disease studies has highlighted the most burdensome and changing regional diseases and injuries internationally [10]. Specifically, ischemic heart disease, depression and anxiety disorders, lower respiratory tract diseases, road injuries and diabetes continue to be the most common and increasing problems [10]. Additional clinician-reported reasons for visits include hypertension, arthritis and back pain, and patient-reported reasons for visits include abdominal symptoms, dermatitis, fever, headache, and fatigue [11]. All of these conditions are often chronic and demand long-term management. The major ecological stressors contributing to these processes through systemic inflammation include malnutrition, both undernutrition and obesity; substance abuse-tobacco, drugs and alcohol; psychosocial conditions-most importantly financial insecurity; level of health literacy; limited physical activity; environmental conditions-poor water and air quality, and high heat and humidity; chemical exposures-lead, arsenic, microplastics, fossil fuel-derived endocrine disruptors including PFAS (forever chemicals), and pesticides; viral illnesses-SARS-Co-V2, dengue, hepatitis B virus; and poor oral health [12]. What this lengthy health stressors summary list highlights is the importance of causes of ill-health, which are not in the scopes of specialty medicine at all. This descriptive epidemiology highlights the changing tasks of medicine [13].

The capacities for point-of-care services are evolving rapidly: specifically, information technology facilitation of access to expert information over the internet and with links in patient-centered electronic medical records; diagnostic and treatment guidelines; and tele-consults with digital imaging of relevant diagnostic information—radiologic images, electrocardiograms, and pictures

of dermatologic conditions, for examples. Further, in-clinic diagnostic ultrasound imaging of breast, abdomen, and pelvic organs is facilitating more efficient and rapid diagnoses [14,15].

Added to these capacities are the prospects for near-term artificial intelligence (A.I.) applications [16]. First, natural language processing, which offers efficiency and appropriate data seeking, but in reducing dependence on personal interviews, this technology lessens opportunities for relationship building that increases social cohesion, and employment. Second, large language models (LLMs) can create better technical summaries of clinical records, but for patient-centered medical records where again obtaining the data by provider interview is relationship building, are such models appropriate [17]? LLMs could collect specific patient-relevant ecological information and record these data in EMRs [12]. As suggested by Licklider 65 years ago, the appropriate goal should be man-computer symbiosis [18].

The Scope of Primary Health Services and the Tasks of Primary Care Physicians

In these foregoing contexts, I suggest for low- and middle-income country settings the following framing of realistically achievable primary health care services (Table 2), and their diagnostic tools and special treatment capacities (Table 3).

Table 2: The scope of primary health services.

Health services which are:
• Community, home and ambulatory facility-anchored.
• For patients of all ages.
• First contact
• Team-provided
• Patient-relational, not problem-only in content.
• Comprehensive, and include appropriate diagnostic procedures for most regionally common, and urgent medical conditions.
• Sources of continuous condition management.
• Counselling, education, and health system navigational sources for patients.
• Public health -goal promoting

A Formal Definition of a Primary Health Services System

"This center provides comprehensive and personal care for patients of all ages with any health problem. The center has a team of medical assistants, technicians, dental and medical officers who can help with most health conditions. This team welcomes you to your community health home. We can help with urgent problems like asthma, back stomach or tooth pain, or an injury like a broken bone, and ongoing conditions like hypertension, diabetes, anemia, or special problems in women. We can get help from specialty doctors using the telephone and internet. We do diagnostic tests like ultrasound examinations, chest and bone X rays, electrocardiograms, and blood and breathing tests. We can help you get soon to a specialist doctor if that is necessary. We provide dental and physical therapy treatments (to help you recover from an injury or joint or muscle pain problem). We are here to keep you healthy, get you well rapidly if you are sick, and help you manage chronic conditions successfully."

How Can Primary Health Services Be Better, that is More Than Just Specialist Feeder Operations?

The services listed in Tables 2 and 3 follow logically from the previous descriptive epidemiology data, public health ecology data and indicate how primary health services can be better, that is more patient-centered and not just specialist provider feeder operations [10-12]. Two issues about such models immediately arise. First, the multiple capacities to address all of the listed items imply creation of centers with at least double-digit numbers of staff, not just minimally provider staffed clinics. Fundamentally, these models demand team staffing, with high non-professional: professional (physician) staff ratios. It is under these circumstances that economies of scale can make such models financially sustainable, and that comprehensiveness-the key function of such primary health services- can be achieved. Second, choosing to make the scope adult or pediatric is appropriate.

Table 3: Primary health services point-of-care procedural diagnostic tools, and special treatment capacities.

Diagnostic tools:
Breast ultrasound
Abdominal ultrasound
Pelvic ultrasound
Carotid artery ultrasound
Thoracic ultrasound
Echocardiography
Chest and bone X rays (digital)
EKG (digital)
Spirometry
Oximetry
Acoustically augmented stethoscopic cardiac and pulmonary examinations
Retinal fundoscopy
Special treatments
Physical therapy (back and knee pain)
Injections (as for joints)
Dental procedures
Casting (for fractures)
Injury/trauma stabilization and management
Emergency medical problem management:
Asthma, T.I.A., myocardial infarction,
Cardiac arrhythmias, pneumonia, diarrhea

Defining the specific scope of a primary heath physician practitioner makes clearer the important role of such services in achieving impactfully high quality of care (Table 4).

It is the comprehensive holistic aspect of these system and individual physician practitioner work scopes that is central to significantly impactful quality of care. Consideration of several items makes this statement obvious. Optimal diagnosis and management of complex human health problems cannot be achieved without the full breadth of patients' ecological and historical data, and without counselling, educational and health system navigation. Specialist medical care for the most common health conditions described above, is all too commonly a blind man and elephant exercise. These item expectations for primary health physicians are achievable and

not unrealistic. The foregoing discussion of the limited numbers of common conditions and the resources immediately available for managing these suggests that the expertise called for in table 4 is attainable. Currently, medical literature champions diagnostic wizardry in the emerging explosion of biological knowledge. The everyday medical conditions and needs of patients worldwide are what primary health practitioners are challenged to address optimally [10-13].

Table 4: Primary health physician position scope or range of tasks.

A primary health physician is a human health biology psychology and education practitioner who is:
• An individual patient/personal comprehensive holistic chronic and urgent problem-solving preventive, diagnostic-evaluative, treatment provider and health optimizing manager. • A technical and psychosocial health team virtual and ambulatory services coordinator and leader. • A proceduralist for selected on-site diagnostic tests, and interventions (dental for example). • A personal patient counsellor and educator, including options and their costs. • A specialist care navigator • A public health champion and promotor • A virtual home hospitalist
Specific primary health physician subspecialists can be:
• Virtual, urgent, and home hospitalists • Women's problems, and ultrasound proceduralists • Adult or pediatric patient caregivers

When patients develop less common medical conditions or complex diagnoses, the central roles of primary health physicians and services become even more important. At Amader Gram, we have developed the model described in table 5, for diagnosis and management of patients with cancer.

Table 5: A cancer diagnosis and management primary health services model

• Primary health services ambulatory care facility one stop diagnosis: history, examination and imaging by primary care specialists and pathologic tissue biopsy procedures on-site by visiting consultants. (breast core biopsy; cervix colposcopic biopsy; head and neck: lip or oral cavity direct tissue biopsy; pharynx/larynx endoscopic tissue biopsy; or cervical lymph node biopsy; lung: pleural effusion cytology or endobronchial lesion biopsy or transbronchial aspiration cytology; liver: (primary or metastatic disease-imaged) needle biopsy; esophageal/stomach: endoscopic biopsy. • Ambulatory care facility primary specialist team, pathologist and as appropriate surgical, medical and radiotherapy oncology specialist, and organ biopsy specialist tumor board meetings followed by meetings of these providers with the patient (and family members) at which a management plan and specific financial costs are discussed. • Surgical and radiotherapeutic treatments provided in patient-elected facilities. • Medical oncology directed treatments provided with primary specialist team in primary health services ambulatory care facilities.

Our early experience with this model in women with breast cancer has been very encouraging. Previously, women with suspicious breast lesions were referred to surgeons, patients visited often distant multiple facilities, and time and limited financial resources were expended in often-inappropriate tests ordered by different specialists. Our breast problem clinic rarely ever saw such patients again, and our follow-up efforts usually determined that patient care had been very poor. Under the new model, every patient has been cared for by the specialists at the tumor board and patient/family meetings, and treatment management has been in our primary health clinic. Patients like the arrangement under which they have an "anchor" health clinic to turn to for problems. They are particularly appreciative of the provision of detailed cost information upfront which includes information about costs in other facilities. Our clinic has limited funds for patient care costs, which we use primarily to pay for immediate tissue biopsy and tumor marker pathology studies. This practice seems to earn us trust which is critical in securing subsequent patient adherence to recommended management. The specialists have been supportive of this model because patients don't disappear, and guideline-recommended diagnostic and treatment programs actually get completed for their patients. They express a sense of greater satisfaction in their work which they associate with the comradery of tumor board gatherings. Such meetings are central to achieving high quality care and shortening the time from development of established new diagnostic and treatment approaches to their applications in clinical practice [19]. As we expand the services in our center, we now plan to put this model into practice for diagnosis and management of malignancies other than breast, and to consider how we can modify the model for non-malignant conditions such as ischemic heart disease and diabetes. Specifically, we are exploring how we can bring specialty consultants to our ambulatory care clinic to see patients together with primary health services staff to facilitate holistic care.

In such arrangements, the first task of consultants will be to audit patients' EMR records and any laboratory or imaging data and reports, and to confirm and extend relevant historical and physical examination findings. Then as in the model suggested in table 5, the primary health team and the consultant will confer on appropriate approaches to further diagnosis and treatment. Following this the team and the consultant will meet with patients and families. For consultants, we are considering arranging for multiple such case visits on a single day. The challenges with such consultation models are service and consultant work efficiency and developing a sustainable business model. In situations where primary health services are part of larger medical systems, with surgical capacities, the efficiency may be notably better than the usual separate specialty consultation visit model. From quality-of-care perspectives, particularly patient-centeredness, it seems likely that such service models will be good.

Broadening the Scope of Training is the Key to Development of Excellent Primary Health Services

For physician and administrative leaders to be successful in developing the models presented in this communication,

significantly new training experiences are needed [7,8]. While some of this training should be in biological and health domains---public health ecology, epidemiology, and technical-procedural—the major calls are to develop or adapt social and humanistic courses (Table 6). The teachers for such training are most likely to be found in higher education institutions with liberal arts and business schools. My sense is that in the listed areas in table 6, brief -days at most- focused courses could accomplish attainment of critical operational skills. Our Amader Gram approach to these challenges is to seek teachers to present courses in our ambulatory facilities.

Table 6: Primary health service providers training.

• Teamwork and team health services management
• Leadership
• Public health ecology
• Procedures
• Quality of interventions assessment
• Community networking
• Social work
• Psychology and behavioral health
• Education and counselling
• Advocacy (as in reviewing the cost aspects of diagnostic and treatment options)

Conclusion

There are growing demands for more and better primary heath services in low- and middle-income countries. Bold but realistic, comprehensive and well-defined scopes of the tasks of primary health services and medical practitioners can provide the bases for addressing these socially-just challenges. Training courses targeting specific social and humanistic skills will be critical to successful development of services that well address the common conditions and ecological determinants of health that LMIC populations face.

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