SHORT COMMUNICATION

AFFORDABLE AND HIGH-QUALITY OUTPATIENT ADULT MEDICAL CARE

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Abstract

In low- and middle-income countries (LMIC) like Bangladesh, hospitalization-requiring care for all is usually adequately provided by public institutions for poorer, and private hospitals for wealthier citizens. In contrast, outpatient medical care and pharmaceuticals require out-of-pocket payments by patients. How to provide such services which are affordable and of effectively high-quality, has been difficult to define. With increasing non-communicable disease (NCD) case-burdens in cancer and cardiovascular diseases in LMIC/Bangladesh, addressing these service challenges is becoming more urgent.

We have been working to provide medical care for women with breast problems and have identified in this setting the following components as critical to meeting this affordability/quality challenge: 1. Maximal use of information technology tools; 2. Increased paraprofessional staffing; 3. Diagnostic pathways and care guidelines which are evidence-based.; 4. Increased point-of-care diagnostic services; and 5. Implementational research.

While broad societal issues of poverty, human rights, governance, and education strongly influence the quality of medical care, local systemic solutions are needed if the 2030 WHO Sustainable Development Goal of lowering morbidity and mortality from NCDs by one third, is to be met.

Key words: *Outpatient care, affordable care, high-quality care*

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In low- and middle-income countries (LMIC) like Bangladesh, hospitalization-requiring care for all is usually adequately provided by public institutions for poorer, and private hospitals for wealthier citizens. In contrast, outpatient medical care and pharmaceuticals require out-of-pocket payments by patients. New businesses and their models are mostly targeting a growing urban emerging middle-class clientele, with commercial solutions. Markets have mostly ignored the much larger populations of patients at the bottom of the age-population pyramid. Paralysis and neglect best characterize cancer medicine for most citizens in LMIC, where cost issues scare government officials, big businesses (such as diagnostic laboratories) and major pharmaceutical companies control what care is given for everyone, and often the majority of any funds for cancer is spent on diagnostic investigations and systemic treatments of marginal value.

Further, it is becoming clear that access to care—at best with universal health coverage, which is very much a priority concern in LMIC— is not enough and is not necessarily associated with measurable improvements in patient outcomes.[1] Beyond access, to be useful care needs to be of sufficiently high-quality with six key features: effective, safe, patient-centered, efficient, timely and equitable, to achieve measurable patient outcome improvements.[2]

In the development field broadly, there has been a shift in focus toward local community and small-scale enterprise (e.g. 'social business') solutions to poverty.[3] Applied to medicine, this focus suggests that greater efforts in defining local solutions may provide useful models.[4] In these contexts, we share here our experience developing a Breast Problem Clinic over the last several years, which efforts we believe, have supported some keys to creating affordable and sufficiently high-quality outpatient medical care services, applicable more broadly to other NCDs.

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Outpatient care "solutions" allowing affordable and high-quality care

We have previously reported our general experience with breast cancer in Bangladesh [5]. Here we report our specific experience in developing a Breast Problem Clinic, focusing on service components which we now believe have been critical to achieving a more generalizable and sustainable outpatient business model for a high-quality, affordable service. In Table 1 are these components, following which each is discussed in detail.

Table-I

Suggested 'solution' components for sustainable, affordable outpatient medical services

- Intense information technology tool use.
- Increased paraprofessional staffing
- Evidence-based diagnostic pathway and treatment guidelines
- Increased point-of-care diagnostic testing
- Implementation research

Information technology tools-electronic medical records

From provider and patient viewpoints, the key informational technology development has been the evolution of electronic medical records (EMRs). EMRs have allowed a transition from a primarily paper-based industry, to one where greater accountability for services and more pro-active efforts in public health are possible.

The benefits of EMRs for health care providers are multiple: clarity of medical information because of use of electronic recording instead of handwriting and an associated reduction in errors; increased safety because relevant data critical to care is more openly available—such as allergy information; the addition of required components have led to increased reliability of the medical record and increased completeness; greater transferability is possible with real time sharing of medical information; greater transparency of information occurs; auditability is more achievable; immediate retrievability of information is possible; multiple providers can access information simultaneously; efficient and permanent record storage occurs; after learning, increased job satisfaction of practitioners is reported; and finally reminder tools can be incorporated (as for immunizations) which can increased the efficiency and quality of care.[6]

The benefits of EMRs for patients include: faster care because legible information is promptly available; transparency for patients and doctors alike; demystification and education about patients' own medical situation because of transparency; the availability of a permanent record; clarity of the information and associated ability of patients to correct mistakes; an EMR for a patient is a step in direction of having all his/her critical health information in one place instead of in multiple medical care site 'silos'; encouragement of more patient-centered care by having information available for the practitioner instead of having to start from baseline with each patient encounter; increased safety because major diagnoses and problems are more evident; and finally, as for practitioners, EMRs facilitate greater likelihood of comprehensive care with tools like immunization reminders.

What are the critical elements of an EMR?

From our experience, focusing on patient care issues, the critical templates/elements of an EMR are listed in Table-II.

Table-II

Critical sections for an adult EMR

- Major problem/diagnoses list
- Complete vital signs
- Previous medical information; immunization status
- On-line test and prescription ordering
- Laboratory and radiology reports on-line
- Point-of-Care (P-O-C) testing reports
- Current visit complete note, with common problem templates
- Previous visit notes and summaries
- Written current visit summary

The first and most critical template is a "Major problem/diagnoses" list. The completeness and precision of this list develops over time at a specific care site. In Bangladesh because of the high prevalence of hypertension, diabetes or pre-diabetes; under/overnutrition; asthma; back pain; and, headache/head pain, all of which conditions, associated complications and their treatments so frequently bear on any responsible decisions about new problems, creation of such a list which often includes these problems, is really essential to good patient care.

Any medical intervention must take account of all vital signs (Blood pressure, heart rate, weight and heightàcalculated body mass index -BMI, pain score; and, as appropriate, respiratory rate, temperature).

Previous medical information/reports should be listed in chronological order, and summarized. Critical immunization status information should cover: Flu vaccine; tetanus; pneumonia vaccine; Hepatitis B and HPV vaccine status.

Critical to the efficiencies that an EMR system can provide is the capacity to order laboratory and imaging tests and prescriptions on line and to receive and laboratory and radiology reports on-line.

Any point-of-care testing reports should be recordable in the EMR. From our experience, in which we do high-resolution ultrasound imaging in all our breast problem patients, we have a report template which is completed as the procedure is done.

The current visit complete note should include the problem history, and physical examination findings following from common problem templates as appropriate (Chest/lung/asthma; breast; abdominal; gynecologic; back pain; head and neck; diabetes-related).

For patient education and record purposes, it is critical that there be a written current visit summary, a paper copy of which is given to patient at the conclusion of the visit. This summary template automatically should include: Major problem/Diagnoses list; current vital signs; current test reports; immunization status; and written summary of visit.

How do we create and operate our EMR?

The major challenges with EMRs have been their introduction into ongoing medical services, with established routines and work expectations.[7] Physicians generally consider record keeping to be a task that others should perform, and thus are resistant to taking the time and undergoing the training to become facile in using an EMR system. From individual physician perspectives, in addressing particular patient problems, the added benefits of often lengthy EMR interaction/paper/bureaucratic work, do not justify the effort and time they are asked to spend. However, from broader health care perspectives and observers, EMR use is all about improving health care *for patients*, over long periods of time, which in fact the evidence suggests occurs. A further general issue with EMRs, is the "natural" evolutionary process for any software program through which an elegant, powerful, and helpful tool adds and adds features which are susceptible to problems, and the whole program becomes more vulnerable to major malfunction. As this process occurs, what for the user could be done with one click, now requires multiple clicks, with associated time and frustration. Overall the challenge of developing and using an EMR system is one of not allowing the perfect to become the enemy of the good.

We developed an EMR which we began using in our one site center from early on, which circumstances must be acknowledged to have made this process much more manageable for us.

The key operational matter we have found is that we employ technician-nursing assistants who have become primary EMR record creators. They record demographic information, start major diagnosis/problem lists, assemble in the record previous medical information, and determine and record vital signs. We believe that having such niche paraprofessional workers is key to making EMR more acceptable and standardized procedure. A variation of such an approach in the United States has been to have scribes who create all the record information[7]. Following this, our medical officers review the preliminary record, focus on patient history and examination by face to face interaction, and then afterwards write and revise/polish written EMR documents (e.g. diagnoses/problem list; current visit note; point-of-care testing results; visit summary) and give feedback to EMR technician paraprofessionals to increase their record-creating skills and capacities.

There are two critical issues with regard to the principal professional care providers and EMRs: first these individuals must themselves write and revise the specific above-noted noted information in the EMR—these records are their professional records. Second, record entry and patient interaction should be separate activities by medical officers. The patient-professional encounter should be face-to-face and not professional face-to- EMR screen; the focus should be the patient relationship, not record writing for the central part of the encounter.

EMR Pros and cons:

By far the biggest issues about EMR use have been the start-up costs of the hardware and software, the introduction and learning time to get to routine, and efficient use for facility staff, and the loss of practice revenue associated with the down time during which staff are being trained[6,7]. EMR packages "off-the-shelf" are expensive and often seemingly not suited to the perceived needs of specific medical services. Development of one's own facility EMR is however also expensive and significantly staff-time-consuming. Once introduced there are regular EMR maintenance costs. Business departments of medical facilities have been more enthusiastic about EMRs when there is a major component which facilitates billing; indeed, most EMR systems currently in place in LMIC are essentially billing systems. There are security and privacy issues with EMRs for which many LMIC have not developed protective policies.

Sidebar: Case study: 65-year old woman with Clinical stage IIA, triple negative breast cancer. The guideline evidence-based intervention of choice was neoadjuvant chemotherapy. Major issues however concerned the

cardiovascular and renal safety of such treatment. The critical past history which it took days to sort out, and for which complete information was never available because of care at different institution and inaccessible records, included coronary artery disease (CAD), with reported single vessel disease by angiogram 4 years previously; diabetes; and kidney disease characterized by microalbuminuria and estimated depressed glomerular filtration rate, all essential in providing and allowing high quality care—in this case particularly safe and appropriate care.[8]

Beyond the use of EMRs, information technology applications in our center have been critical in allowing patient appointment scheduling, and efficient staff communications.

Increased paraprofessional staffing

A major critic of inefficient medical business models, Clayton Christensen, argues that disruptive innovation is needed with first technological enabling: routinization of previously unstructured processes which allow ownership of parts of processes by "technological specialists".[9] This kind of innovation in medicine in Asia started with cataract care—in which the specific steps in preparing for and doing cataract surgery were broken down, and responsibility for each step was given to single individuals who became very expert with that activity. High volume with such care became possible and such volume begets lower costs and high quality. For most medical outpatient visits, the necessary assemblage and recording of previous and current relevant data are significantly time-consuming, usually of the most costly staff individuals in the system—physician practitioners. As discussed above, taking the EMR record and information-requiring process, and routinizing it as physician assistant/nursing assistant work, frees up physicians to better use their skills and time.

In our system of care for breast problems, a second routine activity—ultrasonography of the breasts—has also become a paraprofessional technology niche for our nurses.[10] In a specialty care system like ours, focusing only on problems of one organ, where we felt that use of this imaging procedure was justified in every case, the experience and expertise of our nursing staff rapidly become huge—with hearing patients' histories, seeing their breasts, examining their breasts, and then after initial training, doing ultrasonography, and generating a written report in the EMR. Thus, ultrasonography of a single organ can quickly become an area of technical expertise for one paraprofessional. Ultrasonography is particularly important because the WHO estimates that 70% imaging can be done with this technology.[1]

A third area of paraprofessional staffing is counselling and patient education. Interactions at medical care facilities are often new, confusing, frightening and stressful for patients and their families. Over time, effective patient care comes about because of good understanding by the patient and his/her family of the medical problem from which the patient suffers, and consequent better compliance with high-quality interventions. Limited patient understanding leads to wasted health care resources with "doctor-shopping", and non-compliance with recommended interventions. In high-income countries, trained teacher patient "navigators", visitor, or "accompangnateurs" have been included as part of health care teams as a strategy to address this component of care. We have employed such counsellors in our Breast Problem Center and have found that they decompress the time pressures on medical officers for explanations, and appear to be associated with significant patient satisfaction with their care. These counsellors explain before the medical officer interactions and ultrasound examinations what will happen in the visit, and then work with patients after their formal visit encounter to go over the written visit summary. With sometimes pre-written educational materials, and "protocols", such educator-navigators can contribute meaningfully to each of the named quality measures: efficacy, safety, cost-effectiveness, patient-centeredness, timeliness, and equity [2]. Importantly, educational components of medical care, which physicians often have little time for or provide poorly, are addressed.

Paraprofessional: clinical nurse practitioner or technical nursing assistants, should and can develop positions to care for patients with: 1. Gynecological problems and abdominal complaints, each potentially benefiting from ultrasound examinations; 2. Pulmonary, especially asthmatic complaints, together as appropriate with on-site chest x rays; 3. Hypertension and diabetes conditions; and 4. Common dermatologic and oro-pharyngeal problems, where matching of photographed patient lesions with identified conditions in pictionaries, can be done.

Critical to efficient and high-quality paraprofessional care is the development of rigorous and evidenced-based diagnostic pathways and treatment guidelines to direct clinical practice—our third critical component solution to affordable and high-quality care.

Evidence-based medicine-diagnostic pathways and treatment guidelines

Increasingly, highest quality care is being provided when there are EMR or other easily available linkages to evidence-based clinical practice guidelines. This has been most seen in cancer care in high-income countries

with comprehensive guidelines such as those provided by the National Comprehensive Cancer Network (NCCN) in the United States (nccn.com). Instead of relying on physician memory and knowledge, optimal medical care systems are actively using clinical practice guidelines and diagnostic and treatment pathways, and assessing physician performance in audits against these. Such guidelines in cancer have been a major tool in addressing excess laboratory blood testing and imaging use, each of which practices are often associated with high false positive test results [12]. An advanced form of this problem is seen with commercial medical service models which offer hi-tech (and expensive) genetic molecular diagnostics testing when such testing is likely to provide little or no clinical benefit.[13] The NCCN site offers additionally patient educational materials, which can be the bases for circumstance-specific training for counsellors. We have created Bangladeshi guidelines for both breast problem diagnosis and management, and palliative care (agbreastcare.org; ag-palliativecare.net). Our efforts are Bangladeshi-circumstance-adapted, and take into account the full breadth of issues defining a high-quality intervention instead of only efficacy, particularly cost-effectiveness and safety. Across the board of common adult medical problems referred to above, internet searches can locate developed materials or already long-used pathways and guidelines to allow developing a clinic or center's own pathways and algorithms. As for EMR creation there are some upfront time and financial costs, but the returns in getting to affordable and high-quality care systems are high, and for both practitioners and patients such developed systems are very satisfying.

Point-of-care (P-O-C) diagnostics

80% of truly necessary imaging can be done on site with ultrasound and basic radiology—chest X ray and plain bone x ray imaging.[11] Multiple site fragmentation of care with such testing, is inefficient, and frequent drop out or incompletion of planned or ordered imaging tests is common when patients have to go to another facility for such testing. A further benefit of on-site or what is called point-of-care (P-O-C) diagnostic testing is that there can be greater correlation of relevant information with the imaging results when these are conducted by the same staff at one site. Our use of high-resolution breast ultrasound has been a very satisfying P-O-C approach, which patients particularly appreciate when they are shown their images.[10] We further try whenever possible to promptly do surgical breast biopsies of suspicious masses or clinical findings on site, again avoiding common loss to follow up or follow through of recommended tissue sampling.[5]

Radiology (chest X ray) or laboratory capacity for complete blood counts or basic chemistries in-house, extend this concept and again allow, at the time of the initial encounter, greater likelihood of reaching some conclusion about patients' common problems and how to approach them. Increasingly non-invasive technologies for blood testing are likely and will make P-O-C testing even more convenient.

A further extension of the concept of P-O-C diagnostics is the transmission of patient data from home using sensors or questionnaires on 'apps". We are doing this with a symptom questionnaire for palliative care—essentially offering a tele-home hospice system (ag-palliativecare.net).[14]

The essence of the increasing P-O-C capacities is that "one-stop" care to medical problem solutions should be and can be a major goal of adult outpatient care systems.

Implementational research

Our sense is that Bangladesh needs far more evaluation and more formal research into how to implement changes in outpatient medical systems to achieve greater affordability and high quality. As Abed has emphasized, scaling up health programs doesn't make sense absent a "solid evidence base regarding effectiveness" [15, Foreward, pxxi). Our experience developing our palliative care system and with our breast ultrasound experience are both examples of how such research can so much help define better ways forward.[10,14]

Conclusions and take-home ideas

If Bangladesh and other LMIC are going to meet the 2030 WHO Sustainable Development Goal of lowering morbidity and mortality from NCDs by one third, considerably more exploration and communications about outpatient adult medical care solutions are going to have to occur. Local experimentation is key. Foci on tight business models and on patient-centered care are critical. We all need idea champions for solutions like the ones we suggest here. Bangladesh has contributed much to thinking about how to scale up demonstrated effective health programs to take to higher levels.[15]

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