Title: International experiences in low income countries aiming at Improving Access of patients with DM[1] and HBP[2] to chronic care including their essential routine medication

Literature Review for WHO
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[1] DM stands for Diabetes Mellitus
[2] HBP stands for High Blood Pressure, also known as Hypertension

Introduction & Background

As any other country Cambodia has to find a way to deal with the tremendous challenge from chronic NCD, in particular Diabetes Mellitus (DM) and its associated disorders such as High Blood Pressure (HBP) and dyslipidemias. The first diabetes surveys ever carried out inside Cambodia, took place in 2004 with technical assistance from one of the most experienced and renowned epidemiologists in this type of survey, Hilary King. He had been invited by WHO and the Cambodian Diabetes Association. Unfortunately the survey was carried out without strong involvement from the Ministry of Health' Department of Preventive Medicine. The survey results were published in the peer reviewed journal *The Lancet* (King et al., 2005). The epidemiological results and their interpretation give a snap snot of glucose (in)tolerance among Cambodian adults of 25 years and older in a rural and a semi-urban area. It provides prevalence figures not just of diabetes, but also of pre-diabetes, high blood pressure, pre-hypertension, and results with regards to BMI, weight, height, waist, smoking and physical activity by sex and age group. Five years onwards, again with support from WHO but this time through the MoH Preventive Medicine Department, a new survey, so called STEP survey, was done not measuring glucose intolerance but fasting blood glucose to determine diabetes prevalence. As it uses another method, this gives different results (UHS&MoH&WHO, 2010). The results of the latest survey put DM at almost 3% and HBP at among 1 in 10 Cambodian adults.

The difference between the 2 surveys is important: If we would extrapolate the published 2004 survey results and generalize them to the Cambodian population – something which is not scientifically warranted – we would have in 2010 as many as one million Cambodians with diabetes and or high blood pressure among the total Cambodian population of 13.5 million. However if use the STEPS results, this figure amounts to 700.000 people with DM or HBP, still an enormous number. On page 78 of the STEPS report there are several reasons given to help explain the differences in numbers. Whatever the real number of DM and HBP, any figure between 700000 and 1000000 remains surprisingly high given the "leanness" of the Cambodian people, and it does not augur well for the future when the population will increase its body weight. What is worrying is the speed of the rates' increase in Cambodia's neighboring countries (Le, Kusama, & Yamamoto, 2006) (Wichai, 2007) and in Asia in general (W. Yang & J. Lu, 2010) (A. Ramachandran, 2008) making it a priority to try to slow down the rate of these increases through effective primary prevention measures. With very good reason therefore the STEPS recommends to repeat this survey every 3 to 5 years.

Relevance

There are 2 further arguments that add to the relevance and urgency: The *first* is related to the ability of uncontrolled DM to compromise a person's natural defense mechanism against infectious disease. It lowers the immune system and make her or him more vulnerable to infection. In India DM was found to be responsible for 1 in 5 cases of Pulmonary Tuberculosis (Jeon & M. Murray, 2008)(Stevenson et al., 2007). The *second* argument is related to the demonstrated ability of NCD to impact negatively on a country's ability to attain the MDG (Stuckler, Basu, & McKee, 2010) and equitable economic growth. In similar tone we find (Fuster & Voûte, 2005).

Nor the size of the need and nor its negative impact on development in general are enough to justify any action if the proposed remedy is not effective or, perhaps, not cost-effective. But fortunately such remedies, including for Low Income Countries such as Cambodia, do exist. Further below the parameters for cost effective actions will be reviewed.

Secondary prevention of chronic NCD: to do or not to do

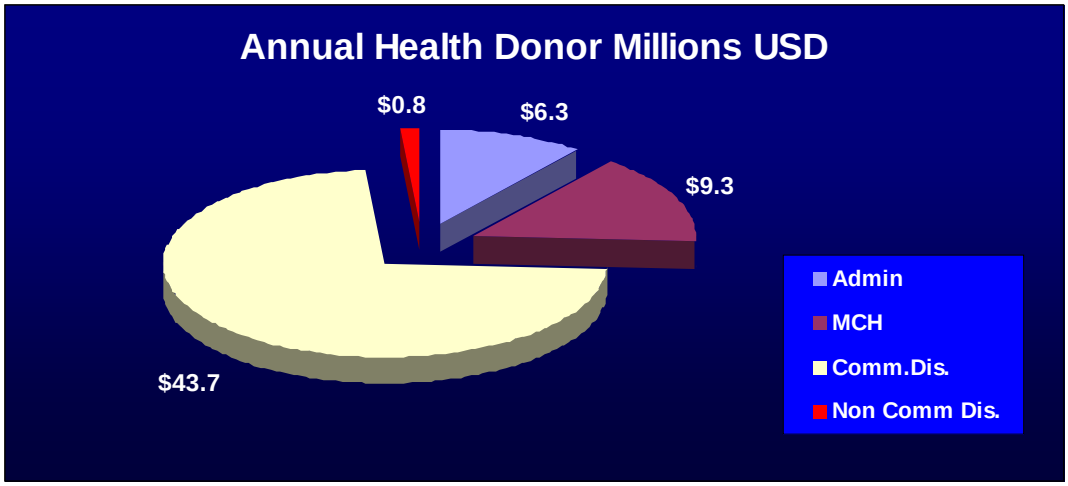
A particularly nasty dilemma is created for low- and lower/middle income countries with regards to the challenge posed by secondary prevention: Whereas in Cambodia the challenge is the complete absence of a *delivery system of basic chronic care* for these patients, the main problem in most other Low Income Countries (perhaps even in all) and in some LMIC in Asia where secondary prevention is indeed being offered, lies in the negative effects through impoverishment of the households with an affected member (S. Ding, Y. Chen, Feng, & Li, 2008). In summary the dilemma that emerges is: Damned if you do and damned if you don't (provide care).

Cambodia has had recent history of decades of war and conflict, during which its social and human capital was almost destroyed. In 1993, when the time for rehabilitation came, international assistance and resources were allocated for an widely agreed health sector master plan. It was based on a common vision of a public health system delivering what would now be called horizontal primary care. In 1996, the Council of Ministers officially approved the Health Coverage Plan mapping the country into "Operational Districts", with a health center as first point of contact delivering a Minimum Package of Activities by trained health staff, complemented by a Referral Hospital, meant to serve the health needs of 100.000 to 200.000 people. Because of the need for quick results and the inability of the Ministry of Health during the early nineties to manage successfully the enormous budgets that donors were ready to commit to make inroads into infectious diseases, the same donors financed the creation of vertical programs for TB and for HIV/AIDS. These programs had their own systems, independent from the rest of the Ministry of Health, for vertical supply, staffing, management and accounting and leadership, and were receiving inputs from large numbers of foreign consultants.

Explained by the country's recent history, Cambodia's public health services are only supposed to deliver acute care, i.e. "cures" and "one-off" treatments. Health maintenance, the type of chronic care that is needed for patients with chronic NCD was never included into the publicly provided primary care package, funded by the international donor community.

The exclusion of these services from the publicly provided package legitimized for almost two decades donor financing preferences that were strongly biased towards Communicable Diseases as exemplified by the pie in the graph below

Averaged 3 years 2007, 2008 and 2009:



Making a start to address chronic NCD

At the end of 2007, Cambodia launched its first National Strategy for the Prevention and Control of Noncommunicable Diseases 2007 - 2010, (Ministry of Health, 2009) developed with the technical assistance from a - temporarily hired by WHO - qualified volunteering Australian Endocrinologist, Dr Sally Duke, someone with extensive practical medical experience in urban and in rural settings in Cambodia. It is by every standard a useful policy document providing a first broad framework that outlines priorities for action, mostly for stewardship by the MoH to create institutional capacity for effective *primary prevention* by pursuing 3 main goals and, lastly a 4th goal: to work out a health financing strategy for an appropriate care model for chronic NCD. The 4th goal is about meeting the challenge of working out an appropriate and affordable model for *secondary prevention*, which does not have the disadvantages of causing health related poverty among chronic patients seen in other Asian economies but which does provide access to appropriate care for people diagnosed with chronic disease. The word “affordable” means here affordable for the government, as a co-payer and affordable for the users, its patients.

In the strategy there is an important role reserved for people with chronic disease as self-managers and also for peer education :

On page 4:

Health services in Cambodia remain almost totally orientated towards treating acute illness and disease, with very little provision for managing chronic diseases. This relates to areas such as human resources, essential medicines and data management. In particular, there is currently no framework or concept for outpatient care of NCDs at referral hospital level. People with diabetes, complicated hypertension, chronic renal and liver disease, rheumatic diseases and hematological conditions have extremely limited options for health care. If they can afford it, most will seek care from private doctors where there is no standardization of care and costs can be high.

As in other low income countries[8], Cambodia could explore the opportunities to reduce the costs related to secondary prevention by promoting self-management and adapting continuum-of-care models to the local context. In Cambodia, this could involve peer-educators, which in addition to reducing service costs, also has the potential to lead to better health outcomes[9].

The 2 quoted paragraphs above from of the National Strategy refer to evidence published in WHO Bulletin in 2003 (D. Fu et al., 2003) about the feasibility of self-management in a typical Asian urban setting. In fact, there is much additional literature and evidence available about self-management, expert patients, task shifting and peer education as will be described further down.

In 2009, after almost two decades, and encouraged by some of its donors and technical agencies, Cambodia's Ministry of Health relabeled the boxes of its health system. In an attempt to redress some of the huge imbalances between needs and resources, a special programme for NCD was created, as one of 3 major programs. the other 2 being continuations of what had been started earlier: a programme on infectious diseases (Communicable Diseases), and a programme on Maternal- and Child health that includes a special focus on neonatal care, framed within the wider issue of reproductive health. The new box implied that this brand new NCD programme had to be conceptualized and developed so that donor investments can be absorbed and handled as effectively as possible. Technical assistance commensurate with the new program's relevance & challenges has not been forthcoming though.

One problem that results from current labeling is that it is designed to accommodate for donor preferences instead of helping to steer donor commitments towards structured responses to the country's modern health needs. If the boxes would have been labeled acute care and chronic care, then the funds could have been used to create a more comprehensive approach to health care and better adapted to the current needs. But then also the Ministry of Health would have had to be restructured.

Reason for carrying out this literature review

Ever since it was first established in July 1989, MEDICAM has remained the health sector's coordination platform for all registered non governmental organizations working in the health sector in Cambodia. The "health NGO's are organized in Task Forces which advise the Ministry of Health on policy, programs and implementation issues. Besides a task force on Reproductive & MCNH, and one on Infectious Diseases, there also exists since 2009 a NCD Task Force in which several Cambodian and international NGO's meet to share their experiences in dealing with NCD health issues and action in the Cambodian context and formulate an opinion to inform policy makers. MoPoTsyo, member and vice chair of MEDICAM's NCD Task Force, undertook this literature review to prepare a policy brief for the Ministry of Health and its Development Partners on how to deal with the challenge in reaching Goal number 4 of the National Strategy but with a focus on Diabetes and its associated disorders.

Scope

This literature review aims to create a snapshot of what is already known about ***International experiences in low income countries aiming at Improving Access of patients with Diabetes and High Blood Pressure to chronic care including their essential routine medication***. There are 2 main reasons why it would be wrong to limit the scope of this review to international experiences related to patients with DM and HBP who have already been diagnosed:

The *first* argument is that by doing so we would exclude more than 70% of people with DM and more than half of those with High Blood Pressure (HBP). As we know from both surveys (King et al., 2005), (UHS&MoH&WHO, 2010) the percentage of undiagnosed diabetes is high compared to other countries. In countries with a well functioning health care system, the percentage of undiagnosed diabetes is only 30%.(Wareham, 2001). Therefore, we can argue that perhaps as many as 40% of undiagnosed Cambodian diabetics are not only in need of access to routine medication like the minority who has been officially declared "patients" but most of all is this group of undiagnosed individuals in need of being informed of their chronic NCD and on what to do about it. A patient is a person with the medical needs of a patient, independent of whether diagnosis by a doctor has occurred or not. The issue of screening is discussed further below.

The *second* argument is based on the need to change our approach in dealing with chronic NCD altogether, see The Lancet (Editorial, 2010). It says: "There is a glaring absence: no research on lifestyle interventions to prevent or reverse DM. Medicine might be winning the battle of glucose control but losing the war against DM". If we want to deal with this epidemic, we have to open our eyes to the problem in all its aspects and not just trying to supply medicines to those who turn to the system for

care. The importance of lifestyle changes as part of a continuum of care can hardly be overestimated (evidence listed further below).

For this review, we must therefore look not just at how other countries have so far been dealing with the whole formidable challenge of prevention of chronic NCD through better risk factor control (*primary prevention*), but also at ensuring that all their people with Diabetes and High Blood Pressure, whether they are aware of their needs or not, have access to appropriate care (effective lifestyle advice, control and their routine medication (*secondary prevention*). We will see that there are more failures than successes, in particular where it comes to vulnerable groups, ethnic minorities or uninsured groups. We summarize main lessons for the different options that exist for Cambodia itself to address the enormous and rapidly growing challenges posed by chronic NCD to the health and development of the Cambodian people. It is not the right moment to stick our heads into the sand.

Methodology of the review

The databases searched were: HINARI, Cochrane, Google Scholar, PubMed
The key words used (grouped by category):

- Primary Prevention; Secondary Prevention, Chronic Care Model;
- Diabetes, Hypertension, High Blood Pressure, CVD, Chronic NCD; Major illness
- Health Related Poverty, Iatrogenic Poverty, Catastrophic Health Expenditure,
- Low Income Countries, Low Resource Settings, Developing Countries,
- Access to Medicines, Essential Drugs, Revolving Drug Fund,
- Self Management, Expert Patient, Peer Education, Community Health Worker, Lay Health Worker, Task Shifting, Patient Empowerment;

Rising main chronic NCD including Diabetes

For a few decades already the main chronic NCD and the resulting mortality have been on the rise almost in every country (Zimmet, 2000) (Lopez, 2006) (Farmer et al., 2010) affecting nearly all populations: in rich countries as well as in developing countries including in Africa (Maher, Smeeth, & Sekajugo, 2010). The notable exception is Finland which even reversed the chronic NCD trends. Countries that keep the NCD monster manageable are typically countries where the government provided political support and fostered a strong involvement of communities in public health goals, interventions involving all stake-holding sectors. Most effective policies are supported with enforced legislation, based on community action and are well adapted to the local context (Pekka, Pirjo, & Ulla, 2002). However, this kind of success has so far been extremely rare.

As one of the main chronic NCD, Diabetes is striking some ethnical groups particularly hard and others much less (Diamond, 2003). This generates scientific debates on which factors precisely cause this sudden rise and how much they each contribute (Miranda, Kinra, Casas, Davey Smith, & S Ebrahim, 2008) and in particular in Asia (Chan et al., 2009)(A. Ramachandran, Wan Ma, & Snehalatha, 2010). Is it nature or nurture, in other words are specific genes the culprit or are environmental factors mostly responsible for the rapid but unequal rises that we can observe everywhere. It is likely that both genetic and environmental factors play a role, including factors "in utero" as babies with low birth weight are more likely to develop type 2 diabetes later in life (Zimmet, 2000) referring to a study in the UK. The prospective evaluation based on a 10 year follow-up in the USA among 75,521 women aged 38 to 63 years old shows convincing evidence that substituting whole for refined grain products may reduce the risk of type 2 DM (Liu et al., 2000). We can therefore speculate that in Cambodia the recent but rapid nationwide switch from eating hand-husked rice to perfectly white machine-polished rice, may be a significant factor increasing the risk of Type 2 DM as well. The resulting 3 times daily sharp glucose peaks from highly glycemic Cambodian rice (Seng Serey et al, 2007) may be a factor that is contributing significantly to the DM epidemic in this country. After some initial controversies, the therapeutic relevance of lower GI food has been clinically proven.(Wolever, D. J. Jenkins, a L. Jenkins, & Josse, 1991). Another but related issue: A reduction of cardiovascular events may be the result if obese persons reduce the percentage carbohydrates of total energy intake to sharply lower levels (20%) than commonly recommended (55%) in the USA (Jörgen V Nielsen & Joensson, 2008). There is conflicting evidence on the benefits of lowering carbohydrates for people with DM. (Accurso et al., 2008). For this aspect too more research is needed.

Rising chronic NCD cost

In 2007 the WorldBank published a comprehensive report on the public policy challenge for governments from "Middle Income Countries or "Low Income

Countries" (Adeyi, 2007). The havoc that NCD is wreaking everywhere is indeed truly impressive: in many industrialized countries it is the chronic NCD that are responsible for the spiraling out of control of health costs, (Yach, Stuckler, & Brownell, 2006) (WHO, 2008) (Suhrcke, 2006) (Clarke et al., 2010) notably in the USA where the political system has allowed short term commercial interests prevail over larger and long term public interests of the American people as a whole but which it seems unable to grasp and come to terms with. Only lowering the price of prescription drugs is not enough. (Choudhry & Shrank, 2010). But with regards to chronic NCD, on the individual household level the same thing is happening also in countries like China and India. Many if not all developing countries leave the population exposed to the economic costs of disease and chronic disease in particular (Kruk, Goldmann, & Galea, 2009) (A Kapur, 2007) (Kawabata, Xu, & Carrin, 2002) (A. Ramachandran et al., 2007) (S. Ding, Y. Chen, Feng, & Li, 2008) (Meessen & Criel, 2008) (Falkingham, 2004). The fact that a health professional can abuse his position by standing between the patient and his recovery in order to exploit the individual is rarely described (Dussault, 2008).

We can count on the fingers of one hand the number of nations which have invested in timely and effective primary prevention measures (Pekka, Pirjo, & Ulla, 2002) combined with effective secondary prevention, (Uusitalo, 1996) See for an example on the latter reduction of complications due to diabetes in the UK (Currie et al., 2005). The early example of Gambia where the DM patients are only 0.03% of the patients presenting themselves but consume 3.6% of the government health budget and overload the health system is described in (Rolfe, Tang, R. W. Walker, Bassey, & George, 1992); The danger of funding tertiary care at the expense of proper investments in primary care is highlighted in (WHO, 2008) . Related is the call from many authors for a revival of the principles of Alma Ata to help address the needs resulting from the rising epidemic from chronic NCD (Miranda, Kinra, Casas, Davey Smith, & S Ebrahim, 2008) but these calls remain mostly theoretical (Lawn et al., 2008) and lack proportionate material responses. This literature review was written at a time when most countries experience an economic crisis.

Chronic NCD in Developing Countries: the particular challenges

Commitment to effective primary prevention

There are only very few examples where governments of low income countries were strong enough to push through the required legal changes and create the inter sectoral alliances that are necessary to make primary prevention of chronic diseases effective as it involves multiple sectors including enforcement of legislation and regulation. In most Low Income Countries regulation of this kind is simply not effective. For a discussion about this particular aspect, see the example of India in (Peters & Muraleedharan 2008) For a world map in 2007 of country situations see (Koh, 2007) with Bhutan extraordinarily as developing country that booked success. It is also worth mentioning the

case of Mauritius as an example of successful lowering of blood serum cholesterol thanks to a change from palm oil, which is high in saturated fat, to soya bean oil resulting in a better lipid profile among its population see (Uusitalo, 1996). It raises the question to what extent low income countries are becoming a victim of globalization that urges them to open up their markets for commodities from western industries that are rich in transfats or with refined sugars and which are marketed aggressively targeting young people with smart campaigns to make them change to "modern lifestyles" that are in fact unhealthy when they become the "default" of these children's behavior. It is difficult for low income countries' governments who have to balance the short term economic interests related to foreign investments with the long term interests related to the health of their citizens. It is an opportunity for western food industries to shift attention away from strictly regulated western markets where governments have begun to protect their people to the free-for-all environment of low income countries where such protection measures do not exist. But there is *no* call for the kind of effective measures that are technically possible and which would be effective as primary prevention to protect the next generation in developing countries mentioned in the WDR 2007 called Development & the Next Generation (World Development Report (WDR), 2007).

Relatively very low awareness of diagnosis:

Awareness of hypertension found in Ghana and Cameroon in Africa (Agyemang, Bruijnzeels, & Owusu-Dabo, 2006) (Kamadjeu et al., 2006) were both lower (34% and 23%) than found by the survey in 2005 in Cambodia where about half of those with hypertension were aware of their condition. That figure is much higher than found in the STEP survey conducted in 2010(UHS&MoH&WHO, 2010), which found that only 23% of those with HBP aware of their condition. It is not clear how it can be so different.

The first survey found that more than 70% of people with DM in the rural area in Cambodia where the first survey took place were unaware of their condition (King et al., 2005). The recently conducted STEPS survey does not provide a figure for those diagnosed with DM by the survey but previously unaware that they have DM, so we cannot compare it with the earlier survey (UHS&MoH&WHO, 2010) as far as that would have been possible anyway given the different screening methodologies used by these 2 prevalence surveys. Similarly low awareness despite an even higher prevalence (9%) was found for example in an ethnic minority community in North Eastern India (Lau, 2005), more than 13% among a more representative rural Indian community (Andra Pradesh) where about half of DM cases found was diagnosed and half undiagnosed. The most recent figures representative for China show that among people with DM there, the rate of undiagnosed diabetes is 61% and that 10% of adults have diabetes.(W. Yang & J. Lu, 2010) ; Earlier trends in prevalence figures in China were obtained regarding from Qingdao province comparing 2006 with 2001 (Gao et al., 2009); Also in Thailand, where the government's scheme has substantially lowered the access to care for all patients, including chronic patients, the awareness of diagnosis of DM and HBP remain very low: more than half of people with DM are unaware (Wichai, 2007).A seven country comparison of 3 developed countries and 4 developing countries (but no Low Income

Country) also showed low awareness and a relationship between socio economic status and awareness of diagnosis in Thailand, in particular amnong men (Gakidou et al., 2011).

The poor have no or less access to health services :

Low literacy is correlated with low knowledge of DM and HPB, even in industrialized countries (M. V. Williams, Baker, Parker, & Nurss, 1998). There is evidence from many developing countries showing that in particular lower income groups there do not use health services for what they perceive as minor illnesses. They have no trust in the health service and worry about the high costs that using the professional services may bring. They hope that their illness will go away and only if it gets worse, they will go to see a doctor. (Chuma, Gilson, & Molyneux, 2007). Poverty related barriers problem delay care seeking in a chronic disease such as cancer in most developing countries with exceptions in Mexico and Colombia where specific health policies have included cancer treatments for poor people into insurance programmes (Farmer et al., 2010). A universal scheme such as in Thailand above lowers the threshold for poor people to have access to basic care and medication: 91% of those diagnosed has access to anti-glycemic drug agents and more than 70% had received lifestyle advice (Wichai, 2007) but the socio economic gradient nevertheless continues to hamper access to care (Gakidou et al., 2011). The Figure 2 of the survey also gives insight into the effectiveness of the care. Blood Pressure control among those diagnosed with diabetes always remains a big challenge everywhere, but the proportion of those effectively controlled is very low. Also with regards to glucose control and cholesterol the proportion of those treated but not controlled is always larger than those under control. The picture that emerges is that the Thai care system for diabetics is accessible but not pro-active.

The Andra Pradesh study from India, in a country where medicines are cheap, showed that 67% of rural diagnosed diabetics (Chow, 2006) were taking glucose lowering oral medication, with only 3% on insulin. Cambodia's DHS consistently show that access problem affects the health seeking behavior of the poor. The 2010 Cambodian STEP survey provides useful data into the low degree of schooling among those affected by DM and HBP, specified by sex. (UHS&MoH&WHO, 2010);

There is literature from several countries indicating that the prices that Insulin Dependent Diabetes Mellitus patients (IDDM = type 1 who need at least 50 units a day) or Insulin Requiring DM patients (IRDM = type 2 who must use insulin daily too but less units as their pancreas still produces insulin but not enough or it reacts too late to rapid raises in blood sugar levels) must pay high prices for their insulin and often face tremendous barriers to obtain regular supply (J. Yudkin, 2000)(Beran, J. S. Yudkin, & de Courten, 2005) (Beran & J. Yudkin, 2006)(Beran, McCabe, & J. Yudkin, 2008)(Balabanova, McKee, Koroleva, & Chikovani, 2009) (King et al., 2005). In Cambodia there are somewhere between 156,600 (UHS&MoH&WHO, 2010) and 250,000 patients with DM (King et al., 2005). Both Cambodian surveys how low access to diagnosis of DM and HBP is in Cambodia. When the Cambodian surveys are interpreted, one has to take into

account that the public service currently does not dispense routine medication for more than 3 to 5 days for chronic NCD and that buying regular prescription medication is usually not affordable. It is safe to assume that less than 20% of the chronic NCD patients receive care, an estimation based on available human resources and facilities able to treat and provide this type of care within the country.

Screening for Diabetes and High Blood Pressure

No literature was found with regards to cost benefit or cost effectiveness of screening for Diabetes in Developing Countries. Screening has been done in most countries to determine or monitor trends in prevalence in the form of surveys but not to actively find cases and add these to the already overburdened workload of the public services. In Developing countries public services struggle to provide care for the patients who present themselves, many of whom cannot afford the cost. Based on experience with Tuberculosis, one group of authors declares that active detection is not feasible and that any service should limit itself to patients who present themselves for treatment (A. Harries, A Jahn, R Zachariah, & D. Enarson, 2008). This opinion is not based on a study into cost effectiveness in low income contexts. And even if it were, findings from cost effectiveness studies cannot be simply applied from one particular context into another. Besides the ability of the health system to cope with increased case load, it matters if large proportions and large numbers of patients are undetected among the general population, or only a small proportion and a small number. In industrialized countries, such as the UK, with high trust in the health services and high rates of awareness there may be insufficient reason to screen for Diabetes (Wareham, 2001) because the people will seek a professional service provider as soon as they perceive something is wrong with their health as they have no reason to delay seeking health care. The health system can deal with the problems presented by the patient as they are still minor. Also, it matters which screening method is used and the type of human resources involved. Diabetes screening can be costly if it involves professional health staff in industrialized countries and sophisticated methods and equipment following the agreed standards of WHO.

Only the “awareness of chronic disease” is by itself of course not enough, but there is literature suggesting that awareness of their chronic disease, by itself does matter and may already have a positive effect on health outcome, for example among diabetics in India (A Kapur, 2007). A better diagnosis is welfare improving, in particular for the poor. Of particular importance in this respect is the India Study reported in annex 3 of the World Bank report, quoted earlier (Adeyi, 2007) which suggests that early diagnosis can help the poor adapt their behavior so they can cope better with their disease. Relevant is here that drugs are in general cheap in India.

Indirect costs are a barrier

For an extensive overview of the types of barriers encountered by people with DM in a developing country (Tunisia) see for example (Alberti, Boudriga, & Nabli, 2007). Even if

health services and medicines are free, like in Sri Lanka, coping with the indirect costs of chronic disease, such as diabetes, presents an enormous barrier for the poor. (Russel & Gilson, 2006) and this causes them to forego the "*free*" medical care. Distance and transport costs are also important barriers. In Sri Lanka, only one third of people with DM is undiagnosed (Katulanda et al., 2008) compared to more than 70% in Cambodia. Similarly in Cambodia these indirect costs were found a problem for poor people, in the form of food costs and transport costs (Hardeman, 2004) but this study did not look at chronic patients. This is also likely to have played a role in the large drop out, after the first visit to the MSF Belgium clinic in Takeo for DM and HBP patients, where the medicines were given out for free. The transport costs can easily exceed the costs of the medicines. AIDS patients were received financial support to come to collect their medicines, but the DM and HBP patients were not. (Isaakidis et al., 2010)

Lifestyle interventions and prevention

As mentioned in the introduction, there is almost no evidence about the effect of life style interventions to prevent chronic NCD in Developing Countries, although this is of enormous relevance in reducing the burden of disease, the more so in low resource settings. An improvement in lifestyle, provides opportunities not just to improve health, prevent or reverse diabetes and but also reduce dependence on medication (Ishine, 2008) as observed among a vulnerable group in Laos. There is more evidence available about the effect of lifestyle interventions to prevent diabetes in Middle Income Countries, and about the experience in China (Pan, 1997), and for example among male factory workers in Korea (Kang et al., 2010). For industrialized countries a review of the evidence with regards to smokers (weak but significant reduction) versus non-smokers (larger reduction), see (Narayan & Williamson, 2010) and also see (Knowler et al., 2002); Inability of health facilities to promote effective lifestyle changes due to work overload and health system stress are often mentioned. (Rolfe, Tang, R. W. Walker, Bassey, & George, 1992)(Neuhann, Warter-Neuhann, Lyaruu, & Msuya, 2002)(Isaakidis et al., 2010)

Self Management

There is different terminology that is being used once healing is no longer the exclusive realm of the physician. The problem is that the different terminology has different meanings in different health system contexts and partly overlaps. Terms such as expert patient, self-management, peer education, and task shifting are used in contexts of developing countries too, but the role the not professional health workers or patients play may be very different in the contexts of low income countries.

High income countries

The standards for self-management in Diabetes are given for the US context, see (Funnell et al., 2010). The experience with expert patients and self management is certainly not limited to Diabetes but extends to wide range of noncommunicable conditions, see for example (Cleland & Ekman, 2010) on the role of expert patients in "heart failure", not just as self-managers but also in helping other patients to adapt their lifestyles successfully.

Diabetes is a self-managed illness in which the decisions most affecting the health and the well being of patients are made by the patients themselves. Effective diabetes care requires patients and health care professionals to collaborate in the development of self-management plans that integrate the clinical expertise of the health care professionals with the concerns, priorities and resources of the patient. Collaborative diabetes requires a new "empowerment paradigm" (Anderson & Funnell, 2005).

On the involvement of lay health workers in the delivery of health services in high income countries there is a substantial amount of literature indicating it has modest positive effects and that they are at least as good as professionals (Baksi et al., 2008) but also among American Indians with native peer facilitators (Struthers, Hodge, De Cora, & Geishirt-Cantrell, 2003). Interventions in community settings with regards to Education on Self Management for Type 2 DM were found to be efficient and effective based on data on improved glycemic control gathered through a review of the available literature (Norris et al., 2002).

Two scientific reviews were found critical of the quality of evidence (Warsi, P. S. Wang, LaValley, Avorn, & Solomon, 2004). It found improvements in HbA1c but not in Fasting Blood Glucose. It found improvements in Systolic Blood Pressure but not in Diastolic Blood Pressure. So it is a mixed result.

Low- and Middle Income Countries

There is a lack of good evidence on how trained lay health workers (Peer Education) can help in secondary prevention of NCD (Beaglehole et al., 2008). He points to system wide problems: What is needed is not just self-management support, but also "decision

support" to back up lay health worker, and "delivery system design" which can become very challenging when people suffer from multiple conditions.

Middle Income Countries in Asia must make a choice on which workforce to choose to address the rising problem. This can mean an expanded role for nurses, see for example Taiwan (K.-Y. Lu, Lin, Tzeng, Huang, & Chang, 2006), but also an expanded role for the patients themselves. (D. Fu et al., 2003). For developing countries, there is literature on the opportunities of task shifting of professional tasks to lay health workers, very relevant also in developing countries with shortages of qualified professionals (Abegunde, 2007) and (McPake & Mensah, 2008) showing that, if properly trained, they are just as good in obtaining results as health professionals. It is unclear if "task shifting" leads necessarily to a loss of quality or how far we can go with task shifting in order to meet shortages in human resources. (Bärnighausen, E. Bloom, & Humair, 2010)

Involving the community: a mixed picture

Community health workers have been used in many different types of settings and in different levels of involvement (Standing & Chowdhury, 2008). In LIC it can be helpful to get things done through comprehensive action involving communities.

There is a lot of literature that already suggests that the involvement of communities in the care delivery can improves the quality of the service and coverage in developing countries (Amazigo M. Noma B. A. Boatin D. E., 1998). Specifically with regards to involving communities themselves in improving the performance of pharmacists, as they have many conflicts of interests, there is the description of Ghana (Smith, 2004) where the failures of proper incentives and their consequences are described with regards to community pharmacies.

The forceful argument" that there is no other option" has to be carefully explored. In Africa, with shortage of trained medical staff the options for scale up in HIV AIDS care are analysed in different scenarios with their consequences for the health system, see (Wim Van Damme, Kober, & Kegels, 2008); The writers argue that the delivery system has to be adapted and can be adapted because of the disastrous shortages in highly trained doctors and nurses as the only available human resources working in health care delivery. The experience of involving expert patients in delivery of care so far is still promising. An important lesson which has so far been learned is that community health workers have to be adequately remunerated. Just as importantly however, there remains a serious risk of neglect of quality of care due to lack of proper supervision (Hermann et al., 2009) and also (R Zachariah et al., 2009).

Diagonal approach

An alternative direction is called the diagonal approach (Coovadia & Bland, 2008) and similarly (B. Janssens et al., 2007) where a vertical response to an acute problem, in this

case infectious disease programs is suggested as vehicle to be expanded to the new challenges and needs presented by the chronic NCD in a form of decentralized primary care management that integrates both and moves away from acute care to chronic care.

The TB DOTS is also a candidate strategy that is being eyed by some experts (A. D. Harries, Rony Zachariah, Anil Kapur, Andreas Jahn, & D. a Enarson, 2009) for expansion of scope to cover Diabetes.

Access to Medicines through RDF in DC

The history of Revolving Drug Funds in DC goes back to the Bamako initiative of 1987 of UNICEF in Mali, as part of a comprehensive strategy to decentralize primary health care ensuring an adequate supply of essential drugs, later replicated to several other developing countries. Vietnam was an often quoted successful example. UNICEF has been advocating for increasing government support in the form of financing and subsidies, and reduce government dependency on NGO's for continuous supplies. (Umenai, 1996)(Umenai, 1998)(Mohamed Ali, 2009). However, these RDF's were mainly designed to meet health needs resulting from acute disease episodes, not maintenance treatments as required for chronic illnesses. With the rise of chronic NCD, the mismatch between what is offered and what is needed, grows proportionately, forcing people to seek alternative sources of care, including for routine medication.

Access to medicines for chronic NCD patients is problematic in most developing countries for many reasons, among which the high prices that patients must pay at the pharmacy outlet (van Mourik, Cameron, Ewen, & Laing, 2010).

There is a set of recommendations to improve access to medicines for patients in general (Laing, Hogerzeil, & Ross-Degnan, 2001). It does not have a separate set of recommendations for chronic patients compared to acute patients. All the recommendations, except the 8th aim to improve the situation through the supply side itself, the providers of health services. The 8th recommendation is to encourage active involvement by consumer organizations in public education about drugs, and devote government resources to support these efforts. Irrational use of medicines is often blamed on patients and consumer demand, in particular if the collection of data is organized via the regular professional health staff, for example in Laos (Murakami, Phommasack, Oula, & Sinxomphou, 2001), when the sale of the medicines benefits them as stakeholders.

Indeed, most RDF are owned by the health facilities. Many serve also to finance the facility running the health services (Fang & G. Bloom, 2008). This is simultaneously hailed as a characteristic of financial success of "the" primary care facility in modern China while it is also seen to lie at the origin of catastrophic health expenditure among households with a person with a chronic NCD as patient-users of the same health care model (S. Ding, Y. Chen, Feng, & Li, 2008). Particularly in Sudan and in China revenue from medicine sales in the public sector is used to finance other parts of the health

system. (van Mourik, Cameron, Ewen, & Laing, 2010), termed as "*excessive mark-up*" there. One month of treatment of high blood pressure costs on average 1.8 day wage of the lowest paid government staff, the outcome measure developed in order to compare affordability among different countries. Prices that are loaded with other items than the cost of the medicines and their distribution can be expected to lead to interruptions in adherence to treatment because they create financial barriers for struggling chronic patients. Indeed there should be concern if vulnerable chronic patients are forced to pay a higher price for the cost of their prescription drugs in order to finance costs of maintaining a health facility ready for other patients with acute health care problems who are not insured and have not been pre-paying a contribution for that purpose.

An article that analyses the balancing of prices of the drug prices and defends the necessity of these mark-ups in order to maintain sustainability of these RDF, in absence of government funding or subsidies, takes Kygyzstan as example studying several pharmacies there (Waning, Maddix, & Soucy, 2010), also (Waning et al., 2009) on how competition can influence local markets.

A discouraging example of a facility owned RDF in a Developing Country (Gambia) for outpatients with DM is the one funded by WorldBank in early 90ies (Rolfe, Tang, R. W. Walker, Bassey, & George, 1992).

An RDF for chronic patients ? Who knows

As seen in practice most RDF serve both categories of patients (acute plus chronic). The chronic patients form a rather defenseless and vulnerable minority whose regular and predictable "contributions" can be tapped to finance running costs of a general health facility. By cross subsidies their financing can enable the facility to provide at more competitive prices a set of acute services to a large numbers of acute care patients who use the system only once or rarely because they are not chronic. If this happens, and the evidence from China seems to suggest that it does (S. Ding, Y. Chen, Feng, & Li, 2008), this is not equitable although the facility may well appear to thrive (Fang & G. Bloom, 2008).

The idea to design a special RDF for the chronic patients is not new. Intuitively it makes sense to integrate it with other chronic diseases. See for a theoretical example for Epilepsy (Coleman, Loppy, & Walraven, 2002) in Gambia.

But no literature was found how best to ensure adequate affordable supply of medicines for for diabetes or high blood pressure. There is a painful shortage of evidence on best practices on how essential drugs for chronic patients can best be delivered. More attention should be given to the possible contribution of JPPI's (Joint Public Private Initiatives) in meeting the knowledge gap. It is a challenge to delimit the respective roles of government and private sector in this regard. (Irwin & Ombaka, 2004)

In summary

What we know from international experience:

- Diabetes and high blood pressure and all main chronic NCD are rising due to a combination of genetic and environmental factors.
- By neglecting these diseases completely, development towards MDG is slower than necessary; chronic disease can cause poverty and vice versa.
- A substantial part of the burden of Communicable Disease (TB) would not exist if Noncommunicable Disease (DM) would have been properly taken care of;
- If people start to eat healthier, become more physically active and stop smoking as much as 80% of main chronic NCD is preventable. Primary prevention is not organized specifically for diabetes or high blood pressure but for the main chronic diseases;
- Effective primary prevention is possible, also in developing countries, provided there is strong governmental commitment and support, backed up by legislation and comprehensive action involving communities.
- Task shifting from professional health workers to lay health workers has been successfully applied in a wide variety of contexts and health programs, including in low- and middle income countries and in high income countries, including in diabetes education; It can be successfully applied where is a shortage of professional human resources. There is some criticism on the quality of the evidence in high income countries where health professionals may have strong reasons to feel threatened by the implications of task shifting for future allocations of resources; There are concerns about neglect of quality of care as a result of task shifting without proper organization.
- The health service delivery system must be adapted so that it can accommodate lay health workers who take on more tasks;
- Community involvement often works well to improve service delivery and increase coverage of services in developing countries;
- Peer Education is often more effective or just as effective in diabetes as education by health professionals;
- Lifestyle interventions are more effective than treatment only by medication;
- An intensive lifestyle course has positive effects that last for many years after the course has ended;
- Distance is a serious barrier for people with chronic disease in developing countries;

What we do not know from international experience:

There are 3 domains of great unknowns:

- Service delivery systems for chronic care in LIC: For effective secondary prevention there are currently no replicable models from other Developing Countries for diabetes nor for high blood pressure, which appear suitable to create sustainable models in the Cambodia, at least not in the short term. The problem is that the existing models are either too expensive for the majority of the population including the average Cambodian chronic patient, and they can cause impoverishment among many of those who do attend. But obviously patients cannot do everything. So the question is: How to strike the right balance between "TASK SHIFTING" and "PROFESSIONALISATION" of medical services and care in environment of decentralized primary care for a developing country such as Cambodia?

- Performance and sustainability of RDF for DM and HBP with an adequate degree of ownership by (governing) communities of chronic patients in developing countries;

- Cost effective strategies to increase earlier awareness of diagnosis in diabetes and high blood pressure in developing countries, promoting earlier diagnosis linking with access to a continuum of care;

The field work of MoPoTsyo Patient Information Centre in Cambodia since 2005 is a useful beginning to generate data that are needed to analyze in order to get answers to some of the questions above.

In the following chapters this experience will be described.

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