Looking Beyond the Issue Of Access to Insulin: What is Needed for Proper Diabetes Care in Resource-Poor Settings

Abstract

Insulin's indispensible nature is recognized by its inclusion in the World Health Organization's Essential Medicines List. Despite this insulin is still not available on an uninterrupted basis in many parts of the developing world. The International Insulin Foundation has conducted in-country assessments and, based on these findings, found that the barriers to access to insulin were more to do with problems linked to distribution, tendering and government policies than purely accessibility and affordability issues. These barriers lead to poor outcomes for people with diabetes, but access to medicines alone cannot improve levels of health in developing countries. Aspects such as strong political will and local champions, epidemiological data, trained healthcare workers and diabetes associations are just as necessary. Strengthening health systems and developing sustainable and locally owned solutions are vital to improve health and healthcare for people with diabetes and other chronic conditions in resource-poor settings.

Introduction

Insulin is vital for the survival of people with type 1 diabetes and is used to improve management of blood glucose in people with type 2 diabetes. Insulin's indispensible nature is recognized by its inclusion in the World Health Organization's (WHO) Essential Medicines List [1]. Despite this insulin is still not available on an uninterrupted basis in many parts of the developing world [2-6]. The reasons for this are linked to the problems of affordability (being able to meet the expense of a given good) and accessibility (the right or privilege to make use of something). In order to address the problem of access to insulin it is essential to understand how medicines get to the individuals needing them and how issues of affordability and accessibility impact overall access.

For this purpose the International Insulin Foundation (IIF) developed the Rapid Assessment Protocol for Insulin Access (RAPIA) in order to assess the path of insulin and other diabetes-related supplies and to identify problems with affordability and accessibility. In addition this protocol helps identify other barriers to proper diabetes care. This report will highlight the lessons learnt from the IIF's in-country experience.

The IIF has conducted such assessments in Mali (2004), Mozambique (2003), Nicaragua (2007), Vietnam (2008) and Zambia (2003). Based on these findings, it was found that the barriers to access to insulin were more to do with problems linked to distribution, tendering and government policies than purely accessibility and affordability issues. However, these difficulties in accessing insulin were only part of the larger problems of accessing proper diabetes care and treatment. These included access to syringes, tools for diagnosis and follow-up, availability of trained healthcare workers, government policies and the role of diabetes associations. The absence of this "essential package" for diabetes care has led to poor outcomes with the life expectancy of a child with newly diagnosed type 1 diabetes in much of sub-Saharan Africa being as short as one year [7, 8]. The life expectancy in Mali and Mozambique were found to be 12 months and 30 months respectively [9]. This is in comparison to a life expectancy of 50 or more years for a child newly diagnosed with type 1 diabetes in industrialized countries.

Through the IIF's work it has become apparent that the supply of insulin alone will not improve outcomes for people with diabetes. Insulin, syringes and testing equipment need to be present at adequate facilities with the right infrastructure and personnel. The IIF has identified 11 points necessary for a "positive" diabetes environment. These are:

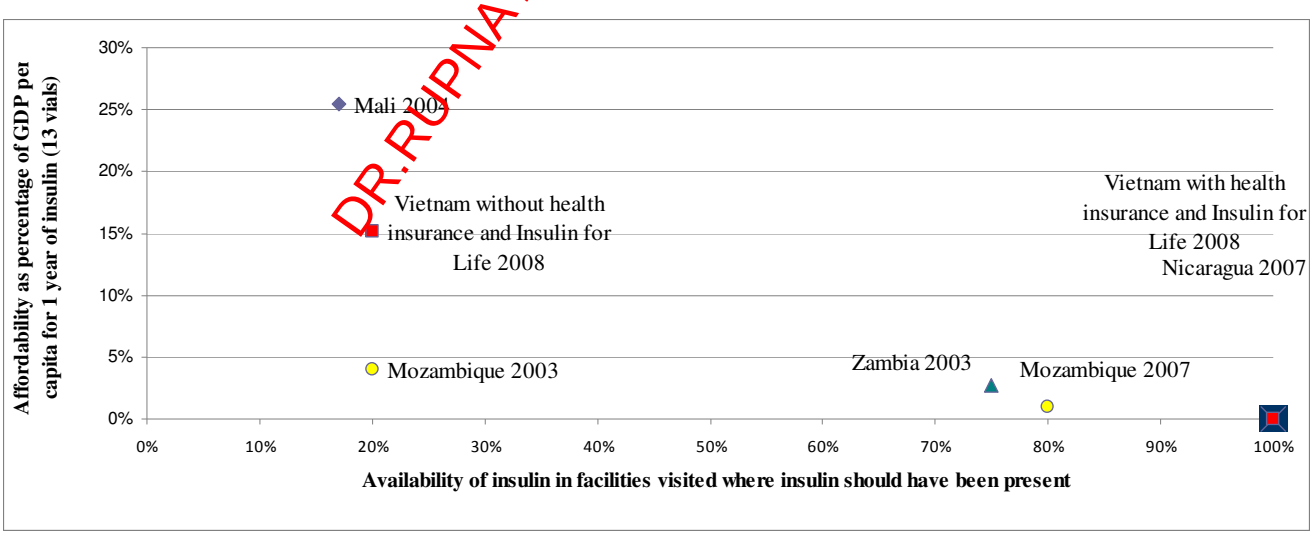
1. Organization of the health system
2. Data collection
3. Prevention
4. Diagnostic tools and infrastructure
5. Drug procurement and supply
6. Accessibility and affordability of medicines and care
7. Healthcare workers
8. Adherence issues
9. Patient education and empowerment
10. Community involvement and diabetes associations
11. Positive policy environment

Points 5 and 6 are directly related to the issue of affordability and availability of insulin. However the issue of improving the lives of people with type 1 diabetes needs to look beyond this small part of improving diabetes care in order to create a health system able to manage all aspects of diabetes care.

Lessons learnt from five countries

In looking at affordability and availability of insulin and other diabetes supplies, it is important to examine the differences in these factors between different areas of a country and between the public and private sector. In the five countries surveyed, people living in urban areas and near large tertiary facilities had better access to insulin and diabetes care than those living in rural areas.

Figure 1 Affordability and availability of insulin

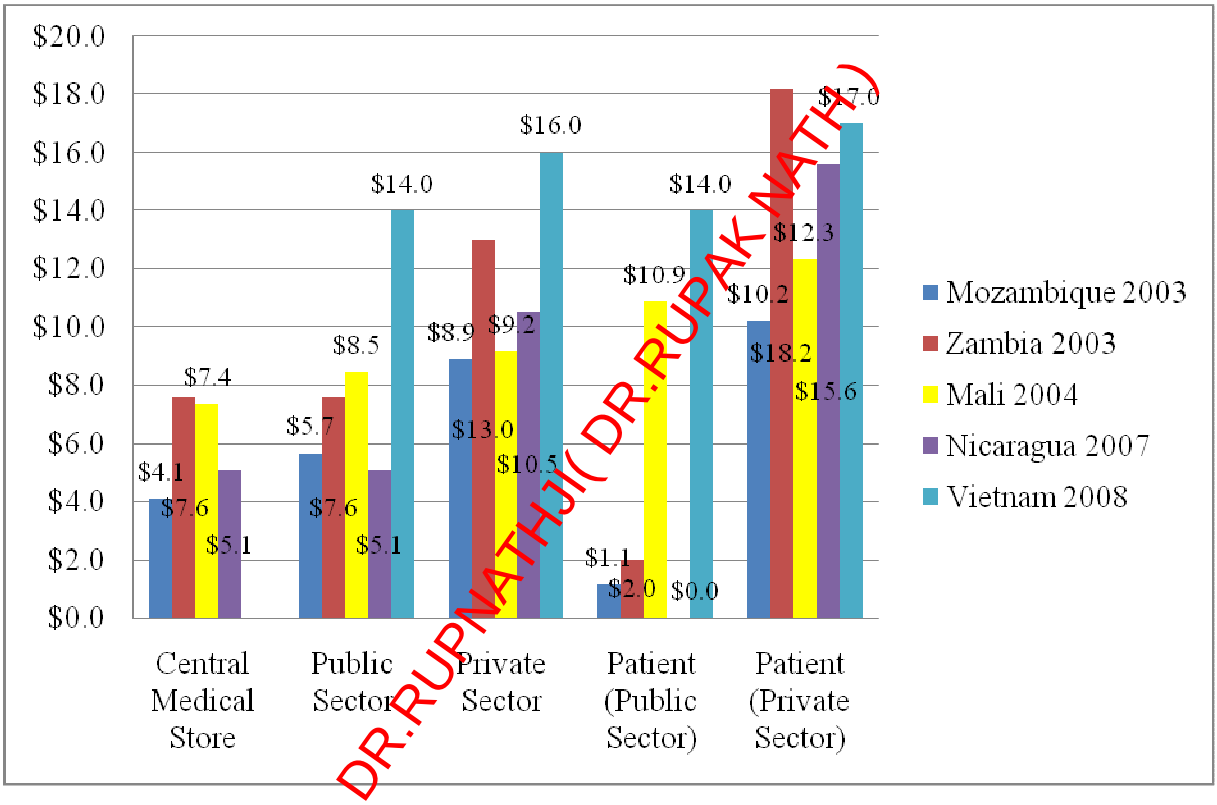


The Figure above shows the availability and affordability of insulin. This was impacted by government policies affecting affordability (free insulin in Nicaragua, subsidies in Mozambique and Zambia, health insurance in Vietnam) and also policies with regards to tendering and distribution, and the level of the health system at which insulin should be available. In Mozambique in 2003, for example, Maputo Province represented only

11.3% of the total population, but received 77.3% of the national annual amount of insulin ordered [10].

In none of the countries was there one single price for insulin. Instead, prices were dependent on location of purchase, the complexity of the supply chain and the method by which the medicine was purchased. Figure 2 shows the different prices of insulin at different levels of the health system. Again policies and organization of the purchasing of medicines had an impact on the prices of medicines. Some countries had import duties and Value Added Taxes (VAT) on insulin. Other factors such as a lack of centralized tendering in Vietnam, and facilities that were charged for storage and transportation in Mozambique also had an impact on the price of insulin.

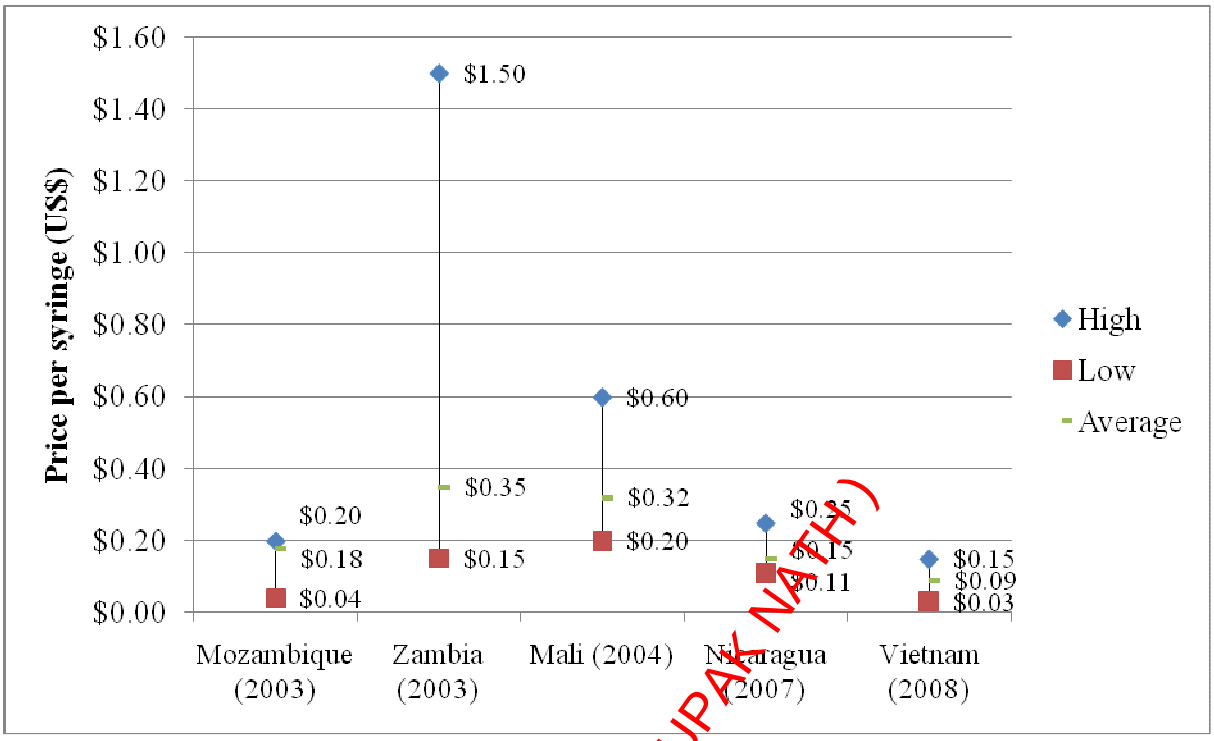
Figure 2 Average prices of insulin (10 ml 100IU)



Note: in the public sector in Vietnam people with health insurance receive insulin for free, while those without pay an average of USD14.00.

It is not enough to have access to insulin; syringes are needed for its delivery. Syringes were not readily available in the public sector in all the countries surveyed, and, except for Nicaragua, had a VAT levy. The Figure below details the maximum, minimum and average prices paid for an individual single-use disposable syringe.

Figure 3 Price range per syringe in Mali, Mozambique, Nicaragua, Vietnam and Zambia



Affordability and availability of diagnostic tools was also an issue. In Mali a urine glucose test cost USD0.89 and a blood glucose test USD2.38 on average. In Mozambique laboratory tests for inpatients were free and some outpatients needed to pay a fee of USD0.21 for blood glucose testing. Tests were free for all people with diabetes in Nicaragua. In Vietnam the Table below describes the average costs for different tests.

Table 1 Comparison of costs for laboratory tests in Vietnam

Average Cost USD	Urine Glucose	Blood Glucose	HbA1c
Reported by health facilities	0.86	1.22	3.88
Reported by people with diabetes	*	1.68	6.12

**no reported use of urine glucose tests by people interviewed*

In addition to the possible cost barrier there is also the actual availability of the testing equipment when the person with diabetes goes to the health facility for initial diagnosis or follow-up.

Table 2 Availability of testing equipment

Country	Presence of urine glucose strips	Presence of ketone strips	Presence of blood glucose meter
Mali	54%	13%	43%
Mozambique	18%	8%	21%
Nicaragua	59%	54%	95%
Vietnam	82%	59%	100%
Zambia	61%	49%	54%

In looking at overall costs for diabetes in each country, the cost of insulin was the most expensive aspect of diabetes care only in Mali. In two countries (Mozambique and Vietnam) travel costs were actually the highest item of expenditure. In Nicaragua and Zambia, syringes represented the largest item of expenditure. The data are presented in the Table below.

Table 3 Cost of diabetes care

	Insulin	Syringes	Testing	Consultation	Travel	Total per year	Percent-age of per capita income
Mali (2004)	38%	34%	8%	7%	12%	$339.4	61%
Mozambique (2003)	5%	24%	1%	9%	61%	$273.6	75%
Nicaragua (2007)	0%	73%	0%	0%	27%	$74.4	7%
Zambia (2003)	12%	63%	6%	6%	12%	$199.1	21%
Vietnam (2008)	39%	8%	5%	3%	46%	$427.0	51%

Assumptions:

1. 1 vial of insulin per month
2. 1 syringe per day
3. 1 blood glucose test per month
4. 1 consultation per month
5. Travel for 1 consultation per month
6. 'income' defined as per capita gross domestic product (GDP)

People with type 1 diabetes in Nicaragua had the lowest financial burden due to diabetes because of the availability of free insulin, testing and consultations. However this still represented 7% of annual income. In the other countries the burden was much higher. Despite a low burden on the individual in Nicaragua, the items of diabetes care provided free still need to be paid for and, in this case, it is the health system that pays. The cost for insulin alone was upwards of USD90 per person per year.

Lessons learnt

Access to medicines alone cannot improve levels of health in developing countries. For this reason it is important to expand the concept of access to medicines to encompass that of access to treatment for the benefit of people with diabetes and the success of health systems in general [11].

Healthcare workers

One vital factor is the role of healthcare workers in the initial diagnosis of type 1 diabetes and its ensuing management. Healthcare workers in these five countries rarely encounter people with type 1 diabetes. This lack of familiarity and lack of tools for proper diagnosis mean that diabetes is likely to be missed or misdiagnosed in many people. Diabetes in people presenting in a coma may be misdiagnosed as cerebral malaria or HIV/AIDS [10].

Diabetes associations

In addition the diabetes association plays a vital role in education, support, advocacy and, sometimes, the care of people with diabetes. Another important factor is the Ministry of Health and its recognition of diabetes as a health problem in its country. This involves development of a national diabetes strategy, support to clinicians and the diabetes association, and ensuring accessibility and affordability to insulin and other aspects of treatment. One example where progress has been made in this area can be found in Mozambique. With support from Diabetes UK and the IIF, the Ministry of Health has developed an integrated National Non-Communicable Disease Plan, including diabetes, while the diabetes association plays an expanded role in providing education and support to people with diabetes. In addition there has been a political decision to provide medicines at USD0.20 per prescription, which means that people now pay only around USD0.20 for a month's supply of insulin [12].

Policies, data and training

Based on the IIF's experience in Mozambique and elsewhere, it is observed that strong political will and local champions are necessary for a national diabetes programme to be established and diabetes to be recognized as a health problem. This political will can be generated through different means, but one necessity is the collection of data on the size and scope of the problem of diabetes. In many countries data have been collected through the WHO STEPwise approach [13] and the RAPIA.

The development of a national diabetes programme or policy is needed to ensure continuity and provide guiding principles. This should help establish the organization of the health system for care, medicines and other tools necessary for diabetes management. This should also include such elements as prevention and address the issues of accessibility and affordability of medicines and care. In parallel, education for healthcare workers needs to be implemented, both for those in training and those already practising. Healthcare workers need to work towards culturally adapted patient education and empowerment, in conjunction with the diabetes association [14]. This is often done by organizing centralized training of trainers who then return to their local provinces or districts and train their colleagues on the job.

The diabetes association could also play an essential role in pushing a diabetes programme or policy forward and providing support to people with diabetes. In several countries where the IIF has worked, a powerful partnership between the diabetes association and the Ministry of Health has taken action on diabetes care forward in a way that neither organization could have undertaken on its own. Diabetes associations and Ministries of Health can collaborate in raising awareness, organizing training and providing social support for people with diabetes.

Conclusion

Former US President Bill Clinton has said, "Until we build the human and physical infrastructure needed to deliver effective treatment, programs will not succeed" [15]. This was in reference to HIV/AIDS, but the same is true for diabetes. Collaboration is needed between IDF, WHO, international and local NGOs and Foundations, and between countries (South-to-South collaborations, twinning initiatives such as those between Diabetes UK and Mozambique, and the Norwegian Diabetes Association and Zambia) to get these initiatives underway. However the only way to ensure that sustainable and locally owned solutions exist is to improve the healthcare systems which are a vital component of improving health and healthcare for people with diabetes and other chronic conditions in resource-poor settings.

References

1. World Health Organization. *The 15th Model List of Essential Medicines.* Geneva : World Health Organization, 2007.
2. Deeb, L, Tan, M and Alberti, K. Insulin availability among International Diabetes Federation member associations. *Diabetes Care.* 1994, Vol. 17, 3, pp. 220-3.
3. McLarty, D, Swai, A and Alberti, K. Insulin availability in Africa: an insoluble problem? *Int Diabetes Digest.* 1994, Vol. 5, pp. 15-17.
4. Savage, A. The insulin dilemma: a survey of insulin treatment in the tropics. *Int Diabetes Digest.* 1994, Vol. 5, pp. 19-20.
5. Alberti, K. Insulin: availability and cost. *World Health Forum.* 1994, Vol. 15, p. 16.
6. International Diabetes Federation Task Force on Insulin. *Survey on access to insulin and diabetes supplies 2006.* Brussels : International Diabetes Federation, 2006.
7. Castle, W and Wicks, A. A follow-up of 93 newly diagnosed African diabetics for 6 years. *Diabetologia.* 1980, Vol. 18, pp. 121-3.
8. Makame, MH; for the Diabetes Epidemiology Research International Study Group. Childhood Diabetes, Insulin, and Africa. 1992, Vol. 9, 6, pp. 571-3.
9. International Insulin Foundation. *Diabetes Foundation Report on insulin-requiring diabetes in sub-Saharan Africa.* London : International Insulin Foundation, 2005.
10. Beran, D, Yudkin, J S and de Courten, M. Access to care for patients with insulin-requiring diabetes in developing countries: case studies of Mozambique and Zambia. 2005, Vol. 28, 9, pp. 2136-40.
11. Beran, D, McCabe, A and Yudkin, J S. Access to medicines versus access to treatment: the case of type 1 diabetes. *Bulletin of the World Health Organization.* 2008, Vol. 86, 8, pp. 648-9.
12. Silva Matos, C and Beran, D. Improvements in care for people with diabetes in Mozambique. *Diabetes Voice.* 2008, Vol. 53, 2, pp. 15-17.
13. World Health Organization. STEPwise approach to chronic disease risk factor surveillance (STEPS). 2008. [Cited: 5 March 2008.] http://www.who.int/chp/steps/riskfactor/en/index.html.
14. Beran, D. *The Diabetes Foundation Report on implementing national diabetes programmes in sub-Saharan Africa.* London : International Insulin Foundation, 2006.
15. Clinton, W J. Turning the tide on the AIDS pandemic. *NEJM.* 2003, Vol. 348, 18, pp. 1800-2.