



Pandemic diabetes: can developed-world health professionals do more to support care in developing countries?

Improving quality in a Sri Lankan diabetes clinic through competence-based education to support nurses caring for people with diabetes

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Abstract

Background: The world is witnessing a global diabetes pandemic, likely to have devastating consequences for people with diabetes unless there are adequate measures to improve capacity for diabetes care. In December 2006 the United Nations passed a resolution (UNR), recognising diabetes as a serious health threat of the 21st century. The Unite for Diabetes campaign has three phases, the final stage being the development of programmes to facilitate lasting benefits for people with diabetes, globally.

Aim: The developing world is witnessing the worst of the diabetes pandemic; such health communities are often least well-equipped to cope. Thus, there is a pressing need to adopt the UNR as a vehicle to catalyse improved capacity through measures including competence and skill development in these regions. An educational course of this nature was developed and implemented in Sri Lanka, in 2004. Consequently, diabetes specialist nurses, previously almost unseen in this developing nation, now run clinics and contribute to improvements in care for people with diabetes.

Conclusion: Although developed health economies face considerable challenges as the full effect of increased diabetes prevalence is felt, the humanitarian and economic consequences of this pandemic across the developing world cannot be ignored. Action must be taken soon. Sharing the skills and competencies perfected in the developed world must be an integral and prominent part of this process. Strategically, nurses specialising in diabetes will be among the most important groups involved in beginning the battle to combat this pandemic.

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Key Words

Diabetes in developing countries; pandemic diabetes; diabetes nursing; diabetes educators; competencies; United Nations Resolution (UNR) on Diabetes

Introduction

Approximately 246¹ million people across the globe have diabetes, with an estimated increase to 330 million predicted by 2025.² However, with the publication of the *IDF Diabetes Atlas 3rd edition* these prevalence estimates are being revised upwards.¹ The developed world has acknowledged this pandemic increase and most countries have produced, or are producing, effec-

tive and efficient programmes to tackle the situation. In recognition of this, the successful campaign for a United Nations Resolution (UNR) to recognise diabetes as a global health threat has been very welcome.³ The next phase of the UNR campaign is global action to start tackling the rapidly increasing burden caused by diabetes.⁴ Infrastructure development, training personnel and implementation



Figure 1. September 2006: the first Diabetes Nurse Specialist to be appointed following attendance at The International Course in Diabetes Nursing in South Asia sees a patient in her diabetes clinic (Colombo South Teaching Hospital)

of quality diabetes-care services will all help to achieve this.

Examples of how this agenda might be addressed include measures adopted in the UK, where national competency standards for professionals caring for people with diabetes⁵ have been developed and are likely to become mandatory in due course. The UK National Service Framework for Diabetes, set out by the Department of Health, is another example of a country-wide initiative taken within a developed nation to define standards for the advancement of diabetes care.⁶ Backed by commissioning tools and an integrated improvement programme, this initiative supports health communities that are implementing the necessary changes mandated by competency and service standards.^{7,8} Thus, health services in developed countries are already investing heavily in improving and extending diabetes care services.

In developed health communities, diabetes nurse specialists⁹ and educators¹⁰ are well established. Indeed, such roles are considered essential for the delivery of high-quality clinical care¹¹ and patient or

health professional education.¹² Arguably, it is at least partly through recognition of this that the importance of ongoing competencies for nurses specialising in diabetes have been recognised.¹³

However, even in developed health communities, staffing shortages affect specialist nurse provision,¹⁴ leaving room for improvement if the target patient:health professional ratios are to be met. For this reason the implementation of training to cascade core diabetes competencies down to non-specialist nurses and other staff has already commenced.⁵

Diabetes care in developing countries

Developing countries, especially those of southern Asia, face massive increases in their diabetic populations, ranging up to a projected 195% from present prevalence figures. This disproportionate increase has occurred, in part, because people from this region have a higher risk of developing diabetes at lower body mass indices than western populations,⁵ and are suffering a greater effect from the present global epidemic of obesity. The consequential increase in diabetic microvascular complications will itself be alarming; however, the most devastating outcome of increased type-2 diabetes prevalence will be a concomitant rise in cardiovascular deaths and morbidity.

In the heart of south-east Asia, Sri Lanka is a good example of a developing nation. It has a good track record for quality medical education and individual physician-patient care, and is at the epicentre of the diabetes pandemic. As an illustration, Sri Lanka has witnessed a rapid increase in diabetes prevalence in both urban and rural sectors over the past 10 years. The rural sector saw an increase in prevalence from 2.5% in the early 1990s to 8.5% in 2000,¹⁶ and these

trends have also been observed in the urban sector. Alarming data from the most recent national survey (conducted in 2005) indicate an overall prevalence of diabetes of 14%,¹⁷ which represents approximately 2.66 million out of the 19 million national population. Many new cases occur in people during early middle age, who may be lost to the workforce (and therefore tax-revenue generation) if they develop diabetes-related complications in future.

Medical training and post-graduate education in Sri Lanka is generally good. Post-graduate training of medical specialists is coordinated by the Post Graduate Institute of Medicine (PGIM) of the University of Colombo.¹⁸ Specialist training in diabetes is subject to the same academic rigour that applies in developed countries. By contrast, the post-qualification development of nursing and allied medical professionals does not share the same structure, and specialist nurses are rare. Professional nurse training commenced in 1879 in Sri Lanka, and the Ministry of Health of Sri Lanka is now responsible for recruitment and training of nurses. Upon qualifying, nurses are registered with the Sri Lanka Medical Council and unlike the UK, for example, there is no separate Nursing and Midwifery council.

Overall, the Sri Lankan health infrastructure is unlikely to be able to cope with the rapid rise in diabetes cases. Difficulties will probably be compounded by the fact that both primary and post-qualification non-medical staff (especially nurses) currently receive little formal training in diabetes management. Thus it is currently unlikely that most Sri Lankan nurses develop sufficient skills to ensure competence in delivery of diabetes care. To illustrate the



impact of these factors, several studies performed prior to the present national peak in diabetes caseloads showed an average time spent per diabetes consultation, using a traditional physician-patient care model, of 2–4 minutes.^{19–21} Furthermore, patient knowledge scores regarding diabetes and its complications varied between 15/40 and 5.3/9, implying that patient empowerment and self-management skills were sub-optimal. Further studies have demonstrated that patient knowledge and fasting plasma glucose levels can be improved in Sri Lanka, as elsewhere, by providing dedicated structured diabetes education and management.^{21, 22}

Although many attempts have been made to establish graduate nursing courses, only one institution – The Open University of Sri Lanka – provides such a course.²³ The Post Basic College of Nursing offers qualified nurses the opportunity to undergo further training, but presently this is limited to midwifery, psychiatry and administration.²³ Current estimates also indicate a shortfall of 25 000 general nurses in the government health care sector and a further 15 000 in the private sector. Thus, understandably, the main pressure is to provide basic training for additional general nurses. For these reasons (and unlike developed health economies, where far greater career advancement for nurses and specialist nurses is possible) diabetes specialist nurses and nurse practitioners are rare: effectively these roles do not exist. Thus, Sri Lankan nurses cannot currently offer significant contributions to curtailing and managing the diabetes pandemic.

United Nations Resolution on Diabetes

The United Nations Resolution on Diabetes (UNR) was passed at the

83rd plenary meeting on 20 December 2006.²⁴ This UNR recognises the severe risk posed by diabetes and the urgent need to pursue multilateral efforts, to promote and improve human health and provide access to treatment and health-care education. The resolution re-designates what was previously IDF Annual World Diabetes Day (held on 14 November) as a UN Day, to be observed annually. It calls upon the global community to take all steps to raise awareness of diabetes and its risks, as well as measures for prevention and cure (including education and mass-media campaigns). In addition, the UN calls upon all member states to develop national policies for the prevention, treatment and care of diabetes in line with sustainable health-care system development.

Recognition by the UN is simply the first step in a pre-defined case of need. Three phases were described: securing the resolution, celebration of the resolution to ensure maximum global publicity for diabetes, and (arguably most importantly) implementation of the resolution to achieve lasting benefits for people with diabetes throughout the world.²⁵ Influential arguments and strategies to deploy in support of implementation have been described,⁴ and international diabetes journals have devoted entire editions to publicise some of the existing attempts to mitigate the devastating toll that diabetes exerts in developing nations.²⁶

However, to equip workforces with the skills they need to care for and treat diabetes (be that a developed or developing world workforce) is dependent on clearly defined national workforce competencies and training initiatives that deliver these competencies to non-

skilled health care workers.²⁷ It therefore seems likely that the many professionals who already possess specialist knowledge will have much to offer in support of phase 3 of the *Unite for Diabetes* campaign.

Developing a training initiative to transfer diabetes care skills to nurses in Sri Lanka

Like other NHS organisations in the UK, Sherwood Forest Hospitals NHS Foundation Trust has maintained close post-graduate medical training links with the PGIM in Sri Lanka for several years. Accordingly, an innovative programme (accredited by the PGIM, Royal College of Physicians and Post Graduate Deanery) for training specialists qualified in Diabetes, Endocrinology and General Medicine, was developed.²⁸ This programme includes regular training visits to Sri Lanka.

Aware of the pressing need to improve equitable access to diabetes care and complication prevention, staff from the John Pease Diabetes Centre (JPDC) at the Sherwood Forest Hospitals NHS Foundation Trust developed a new course, to be held in Sri Lanka. The programme was developed by a multidisciplinary team from the JPDC, using educational objectives derived (see Appendix 1*) from the standards set by the IDF curriculum for diabetes education.²⁹ The programme (see Appendix 2*) was intended to guide Sri Lankan nurses to develop core skills and competencies in diabetes care. Previous experience gained while training medical delegates in Sri Lanka ensured that the content and format suited the audience. The first 2-day training course was attended by 66 Sri Lankan general nurses and took place in Colombo, in November 2004. As with the medical training courses, UK staff



time was given freely and taken as leave from the hospital. All costs, including flights and accommodation, were met in full through charitable donations raised by the visiting faculty.

The Course was run over two full days across a weekend and the faculty included consultant diabetologists, diabetes specialist nurses and specialist diabetes dietitians. The course was extremely well received by the general nursing delegates, which was evident from enthusiasm shown in the feedback questionnaire results. For example, 98% of delegates felt overall that the course was useful and the majority found the group work to be both useful and interesting. However, challenges were also identified, including overcoming language barriers and cultural differences. It was also evident that general nurses had a perception that the established hierarchical structure within Sri Lankan health care may limit the utility of training. Fortunately this pessimism seems to be ill founded, and it was truly a delight to visit the first diabetes nurse specialist appointed directly as a result of attending this course, as she saw patients at one of her (many) busy diabetes clinics at Colombo South Teaching Hospital, in September 2006 (Figure 1).

Conclusion

Nurses play a key role in patient management and education in modern day clinical diabetes care. For this reason the role of the diabetes nurse specialist is central to the provision of diabetes care in most developed countries. Currently a more archaic physician-patient model of care applies in many areas of the developing world, however the medical workforce is vastly underpowered to meet the emerging diabetes pandemic. Unfortunately it also

appears that if the Sri Lankan experience is typical, developing nations have not yet recognised the full potential contribution their nursing staff could make in mitigating the devastating impact to come.

We have described the successful implementation of one model to facilitate skills transfer from diabetes specialist staff from a developed health community to those in a developing country. Given that significant competency in diabetes care was already available in Sri Lanka and that many areas in the developing world are much worse off, it might be fair to comment that the initiative described took the easy option. However, the strong overall feedback, and the subsequent appointment of nurses specialising in diabetes as a direct consequence of the training initiative, demonstrate the benefits achieved. It seems very possible that similar potential gains can be offered to the developing world if training models can be developed elsewhere. The recent UNR Resolution and ongoing *Unite for Diabetes* campaign may offer a vehicle to facilitate such developments, as well as a catalyst for implementation.

It is inappropriate to assume that the developed-world model of health care will always offer the best local solutions in developing countries. However lessons can always be learned from existing systems of care, and the skills and competencies that exist in developed health communities are desperately needed in less fortunate regions. Morally it seems essential that those with developed and advanced skills share them with those who do not possess them, and nurses can play a significant role in achieving this goal.³⁰ In this way, the diabetes world may offer the best chance of combating the impact of the present diabetes pandemic.

Ultimately, it is most rewarding to return and see the results of skill sharing in the form of health professionals whose new posts and roles would not have been otherwise possible. These newly trained health staff offer real opportunities to improve the care of people with diabetes in their own communities. And, for the first time, they offer the potential for these skills to be nurtured, maintained and propagated within the developing world

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Conflict of interest statement:

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Further information:

Appendices containing the educational objectives and programme for the First International Course in Diabetes Nursing in South Asia are published online at the European Diabetes Nursing home page on the Wiley InterScience – www.interscience.wiley.com



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Appendix 1

Educational Objectives for the First International Course in Diabetes Nursing in South Asia

Diagnosis and classification of diabetes

In the past, diabetes was considered to be a single condition. However, it is now clear that this is a heterogeneous metabolic condition caused by many different mechanisms. Diabetes is now categorised based on differences in the cause, natural history and clinical characteristics of the disease. The aim of this section is to provide participants with a sound knowledge of the different metabolic disorders of glucose metabolism pathogenesis, clinical characteristics and diagnostic criteria.

Objectives

After completing this module, the participant will be able to:

- Discuss the incidence and prevalence of diabetes both globally and locally
- Describe the role of genetic and environmental factors, obesity and insulin deficiency in diabetes
- Describe the signs and symptoms of type 1 and type 2 diabetes
- Understand the differences between type 1 and type 2 diabetes in relation to clinical presentation, patient characteristics, pathogenesis
- Describe the role of insulin resistance in the development of type 2 diabetes and immunology in the development of type 1 diabetes
- Classify the different disorders of glycaemia: type 1 diabetes, type 2 diabetes, other specific types (such as maturity onset diabetes of the young [MODY], latent autoimmune diabetes in adults [LADA] and steroid-induced diabetes), gestational diabetes,

impaired glucose tolerance and impaired fasting glucose secondary to chronic disease in childhood (e.g. cystic fibrosis, haemoglobinopathies)

- Describe the emerging trend of type 2 diabetes in young people
- Explain the World Health Organization diagnostic criteria for the different disorders of glycaemia
- Discuss the appropriate use of the following tests: C-peptide, insulin antibodies, islet cell antibodies and GAD antibody assays, as well as urinalysis (urine glucose and ketones) and HbA_{1c} estimation.
- Identify appropriate treatment options for the different disorders of glycaemia, including early discussion about the likely need for insulin therapy in the future for type 2 diabetes
- Describe the natural history of diabetes, including primary and secondary failure of glucose-lowering medication.

Teaching strategies:

Case Studies, Lecture

Lecture: 1–2 h; Case Studies: 1–2 h

Resource personnel:

Diabetes Specialist Nurse or Endocrinologist

Evaluation of learning:

Successful completion of Case Study learning

Glucose lowering medication

Diet and exercise are first-line treatments for all people with type 2 diabetes, including the young. However, due to the natural history of type 2 diabetes, 50–75%

of patients are unlikely to achieve normoglycaemia through these measures alone. The microvascular complications of diabetes are associated with diabetes duration and poor control. Therefore, it is now well accepted that oral agents should be commenced earlier when they are most effective, rather than later, in the treatment of people with type 2 diabetes. The aim of this module is to provide the participant with an understanding of the different oral agents used to treat type 2 diabetes and why particular agents are chosen in preference to others.

Objectives

After completing this module, the participant will be able to:

- Identify appropriate treatment aims when using glucose-lowering medication
- Discuss the role of these medications in the management of type 2 diabetes
- Describe the different oral medications available, their mechanisms of action and maximum dosage of secretagogues, biguanides, thiazolidinediones and alpha-glycosidase inhibitors
- Discuss the need for dose titration to help avoid potential side effects
- Describe the specific contraindications for the use of each type C oral medication
- Discuss how and when to take the different oral medications
- Identify the appropriate time to commence treatment, and type of drug to use in different clinical situations
- Discuss strategies for improving tablet compliance



- Describe adjustment of glucose-lowering medication and the use of combination therapy, i.e. using insulin and oral medication together
- Discuss the use of oral medication in children with type 2 diabetes
- Define secondary oral failure
- Describe the management plan for a person in secondary failure.

Teaching strategies:

Case studies with discussion and feedback, self-directed learning
Case studies: 2 h

Resource personnel:

Endocrinologist, Diabetes Educator, Pharmacologist

Evaluation of learning:

Successful completion of case studies

Physical activity

Regular physical activity is particularly beneficial in management of type 2 diabetes. The aim of this module is to provide participants with knowledge regarding methods and conditions that can optimise benefits and minimise risks of regular exercise for people with diabetes.

Objectives

After completing this module the participant should be able to:

- Differentiate between aerobic and anaerobic exercise
- Describe characteristics of aerobic activity and resistance training, giving examples of each
- List the beneficial effects of regular exercise in both type 1 and type 2 diabetes, including lower blood glucose concentrations during and after exercise, improved insulin sensitivity, improved lipid profile, lower blood pressure, increased energy expenditure and increased cardiovascular conditioning

- Describe physiological consequences of exercise training in type 1 and type 2 diabetes
- Discuss the effects of exercise in relation to insufficient and excessive circulating insulin
- Recognise that individuals have real and perceived barriers to exercise
- Identify suitable recommendations for the intensity, duration and frequency for exercise for individuals
- Understand the differences between metabolic and cardiovascular fitness targets
- Describe the nutritional management around low, medium and intense forms of exercise
- Discuss the importance of correctly adjusting energy expenditure (e.g. frequency, intensity and duration of exercise) with the individual's clinical status and personal preferences
- Describe alternatives to exercise for people with micro or macrovascular complications of diabetes
- Describe alternatives to exercise for people with current or previous foot disease, ulceration, Charcot's arthropathy
- Describe alternatives to exercise in people with physical limitations (e.g. arthritis, amputation)
- Identify the appropriate investigations to complete prior to starting an exercise programme for people at risk
- Discuss the risk, prevention and treatment of exercise-induced hypoglycaemia in people taking insulin or glucose-lowering medication
- Recognise the prolonged effect of exercise in type 1 diabetes and the subsequent risk of hypoglycaemia many hours after exercise

Teaching strategies:

Lecture, Interactive Groups

Resource personnel :

Physicians, Nurses, Exercise Physiologists or Physical Therapists

Evaluation of learning:

Short assignment, development of an exercise plan

Insulin therapy

People with type 1 diabetes require daily insulin therapy for life. The majority of children and adolescents with diabetes have type 1 disease (at the present time). As the move to intensify diabetes management to reduce or delay the onset of complications continues, more and more people with type 2 diabetes will have insulin added to their oral glucose-lowering medication regimen or given in lieu of oral medication. The United Kingdom Prospective Diabetes Study (UKPDS) demonstrated that more than 50% of people with type 2 diabetes require insulin therapy after 5 years to achieve better control. Therefore, insulin therapy should never be used as a threat in the context of poor control. Insulin regimens are varied and should be tailored to the goals and lifestyle of the person with diabetes. The aim of the module is to provide participants with an understanding of insulin therapy in type 1 diabetes, Type 2 diabetes, gestational diabetes and other specific types of diabetes such as steroid-induced diabetes.

Objectives

After completing this module, the participant will be able to:

- Differentiate between the various types of insulin
- Discuss the durations of action of different insulins
- Identify factors affecting insulin requirements and absorption
- Describe side effects of insulin treatment including hypoglycaemia,



- insulin oedema, weight gain, lipohypertrophy and lipoatrophy
- Identify factors affecting insulin requirements and absorption, identify the source of insulin available within the participants healthcare setting (i.e. pork, beef, human recombinant DNA, analogues)
 - Explain different insulin regimens, including intensive insulin therapy and combination therapy with oral agents
 - Identify the appropriate type of insulin and regimen to use in different clinical situations
 - Identify strategies that could assist the person to overcome fears associated with commencing insulin therapy
 - Demonstrate preparation and administration of insulin using different methods (i.e. syringe, pens, Innovo™, pumps)
 - Understand the principles of insulin dosage adjustment
 - Teach people how to adjust their own insulin dosages in order to achieve their targets for blood glucose control
 - Discuss adjustment of insulin for special events (i.e. sick days, travel, physical activity, surgery, religious and cultural events)
 - Discuss the care of insulin and strategies for storing insulin in different parts of the world
 - Discuss management of insulin for pump users.

Teaching strategies:

Case Studies

Resource personnel:

Diabetes Specialist Nurse/
Endocrinologist

Evaluation:

Successful completion of case studies

Appendix 2 The educational programme

Day 1

Background lectures

- 10.00 The Sri Lankan diabetes perspective
- Local incidence and prevalence
 - Local rates of diabetes complications
 - Local service provision/providing opportunities in diabetes care in primary and secondary care environments
 - Mortality/morbidity data
- 10.30 Defining diabetes
- The normal physiology of glucose metabolism and the pancreas
 - Impaired glucose tolerance
 - Type 1 diabetes
 - Type 2 diabetes
 - Gestational diabetes
- 11.15 Complications of diabetes – Role of glycaemic control, BP, risk factors
- Retinal
 - Pedal
 - Renal
 - Metabolic syndrome and macrovascular disease
 - Psychological aspects

Interactive sessions on treatments for diabetes (including small group work sessions)

- 14.00 – 14.20 Oral therapies
- Diet
 - Oral hypoglycaemic agents
 - Complementary therapies
- 14.20 Insulin therapy



- Insulin regimens
- Injection devices
- Glucose monitoring

14.40 Group session 1

15.10 Group session 2

16.00 Group session 3

16.30 Group session 4

GROUP SESSION 1

Dietary management

- Compile healthy eating dietary advice
- Weight reduction
- Local context
- Glycaemic/fat indices of local foods
- Exercise

GROUP SESSION 2

Oral and complementary therapies

- Choosing the right drug
- Therapeutic targets
- The nursing role

GROUP SESSION 3

Insulin therapy

- Demonstration of devices
- Adjustment of insulin dose
- BM monitoring

GROUP SESSION 4

Managing case scenarios

- Case history provided by pre-course work
- Case histories provided by faculty

Day 2

Background lectures

09.45 Recognising and managing emergency complications

- Diabetic ketoacidosis
- Hyperosmolar non-ketotic states
- Hypoglycaemia
- Foot ulceration/infection
- Wound care

11.30 Aspects of hospital care for diabetes

- Monitoring
- Pressure areas
- Meals and snacks
- Diagnosing new cases
- Insulin prescription/administration



- 12.15 Aspects of diabetes care in the community
- Screening for complications
 - Setting glycaemic targets
 - Setting BP and lipid targets
 - Education

Interactive group sessions on wound care, setting targets and simple screening for pedal complication of diabetes

- 13.45 Group sessions 5–7
- 15.30 Group sessions 8 and 9

GROUP SESSION 5

Wound care

- Simple screening methods
- Dressings
- Cleansing

GROUP SESSION 6

Care orientated target setting (glycaemia)

- Case histories from pre-course work
- Model scenarios provided by faculty

GROUP SESSION 7

Screening for other complications (case studies)

- Eyes
- Renal
- Vascular disease

GROUP SESSION 8

Managing/assessing pressure areas

- Waterlow scores
- Care plans
- Dressings

GROUP SESSION 9

Case orientated target setting (blood pressure)

- Model scenarios

- 16.30 Summing up, including course evaluation (Guest of Honour)