

Promoting Excellence in the Care of Pediatric Endocrine Diseases in the Developing World

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KEY WORDS

promoting pediatric endocrine care, developing world

ABBREVIATIONS

DSD—disorder of sexual development
ESPE—European Society for Paediatric Endocrinology
GPED—Global Pediatric Endocrinology and Diabetes
ISPAD—International Society for Pediatric and Adolescent Diabetes
NCD—noncommunicable disease
T1DM—type 1 diabetes mellitus
WHO—World Health Organization

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abstract

On behalf of the Global Pediatric Endocrinology and Diabetes group, the authors provide a perspective on the rights of a child as enshrined in the United Nations Convention on the Rights of the Child (1989) concerning the care of pediatric endocrine disorders and diabetes mellitus, throughout the world, with particular reference to care in resource-constrained settings. In this article, we define the spectrum of health care needs of the child with an endocrine disorder and how they may be addressed, in terms of education, research, and development of sustainable programs for improved health outcomes. We emphasize the responsibilities of medical communities, the pharmaceutical industry, and relevant governments in promoting and supporting such concepts. *Pediatrics* 2013;131:e573–e578

For a long time, efforts to improve public health in developing countries have mainly focused on communicable and infectious diseases. Today, noncommunicable diseases (NCDs) are recognized as a major cause of morbidity in such countries, where populations face the double burden of infectious disease and NCD. The increasing need for care of NCDs, which are thought to lead to the death of 36 million people every year¹ in the developing world, was recognized at the recent United Nations Summit on NCDs at the United Nations General Assembly in September 2011.²

Pediatric endocrinology relates to the diagnosis and management of diseases of the hormonal system in children and adolescents, including diabetes and disorders of growth and puberty, sexual development, thyroid function, adrenals, calcium and bone metabolism, and more recently, obesity and its complications. The importance of delivering expert pediatric endocrine care to children and adolescents living in low-income countries has been emphasized previously. The Declaration of Kos (1993)³ from the International Society for Pediatric and Adolescent Diabetes (ISPAD) proclaimed its commitment to the United Nations Convention on the Rights of the Child and the St. Vincent Declaration⁴ of 1989, to promote optimal health, social welfare, and quality of life for all children and adolescents with diabetes throughout the world. In addition to these events, in 2006 a position statement from the Lyon joint meeting of all pediatric endocrine societies set out a statement of minimal acceptable care for children with pediatric endocrine disorders.⁵

Implementation of the latter statement has begun by establishing Global Pediatric Endocrinology and Diabetes (GPED), a nonprofit, nongovernmental organization that aims to improve the care of children and adolescents with endocrine disorders who reside in resource-constrained environments, through advocacy, provision

of training and educational opportunities, development of research programs, and by ensuring that pediatric endocrinology and diabetes are taught appropriately in medical and nursing facilities in developing countries. GPED has been endorsed by all regional professional societies for pediatric endocrinology and diabetes⁶ and comprises an international group of 70 pediatric endocrinologists from developed and developing countries.

As shown through the specific examples that follow, GPED is committed to addressing the unique challenges associated with the promotion of excellence in the care of pediatric endocrine diseases in developing countries in a structured manner. Key to this approach is the recognition of specific deficits regarding prevalence of endocrine disorders, lack of trained personnel or diagnostic tools to address identified disorders, and limited resources for expensive medications and treatment tools and for research funding or collaborative studies that would provide implementation of public health interventions, as discussed in the following paragraphs.

LACK OF INFORMATION REGARDING THE PREVALENCE OF PEDIATRIC ENDOCRINE CONDITIONS IN DEVELOPING COUNTRIES

Determining whether a condition is common or uncommon in a specific setting is a key step toward prioritization of medical needs. Too often, prioritization of needs is based on published data from research performed in developed countries. For instance, whereas type 1 diabetes mellitus (T1DM) is common in populations from Western Europe, it appears to be rare in China.⁷ In many parts of sub-Saharan Africa, both the incidence and prevalence of T1DM in children and adolescents are currently underestimated or unknown not only

because of poor availability of glucose testing but also because of lack of training of health professionals to diagnose the disease and the absence of public health research initiatives addressing this question.⁸ When T1DM is systematically recognized owing to the development of clinics in the community, however, it is clear that the prevalence of T1DM is much higher than previously recognized.^{9,10} Disorders of sexual development (DSDs) are another example of a group of conditions that cause major physical and psychosocial burden to affected subjects and their families. Owing to secrecy, sociocultural factors, and poor access to expert advice and diagnostic tools, there are few data on the prevalence and types of DSDs in many low-income countries; however, GPED members who are working in clinics with African trainees and colleagues commonly see these conditions, suggesting that DSDs are also underdiagnosed or underreported.¹¹

GPED is committed to working with health professionals and local governments to better define priorities in different countries and cultures, including supporting health professionals in the development of research projects aimed at clarifying the prevalence and burden of specific endocrine diseases and advocating for resources with local governments to reach this goal. For instance, severe complications of T1DM, including visual impairment, blindness, and renal failure, are commonly observed in young adults living in countries where adequate diabetes care is not available, indicating suboptimal care of the disease. Such complications would be expected to be postponed or prevented with even minimal interventions and improved medication availability. Evidence for the magnitude of this problem is already being sought in the existing program in Kenya supported by the European Society for Paediatric Endocrinology (ESPE)

and GPED, to provide a basis for seeking government funding to improve care.

RECOGNITION OF PEDIATRIC ENDOCRINE DISORDERS IS AFFECTED BY LACK OF TRAINING OF HEALTH PROFESSIONALS AND LACK OF KNOWLEDGE OF THE FAMILIES

Dehydration with vomiting from infectious diseases, poor weight gain from malnutrition, and mental retardation from neonatal asphyxia are common causes of mortality and morbidity in low-income countries; however, these clinical presentations also may be suggestive of symptoms of diabetes ketoacidosis, adrenal insufficiency, or severe congenital hypothyroidism that go unrecognized because of insufficient health professional training. Education also should address optimizing the choice of laboratory tests and management under existing financial constraints, such as optimal use of available insulins in diabetes, storing insulins in homes without power supplies, or utilizing traditional accepted treatments. There is an urgent need to create and establish educational opportunities for health care workers in areas where expertise and training is currently lacking. GPED members aim to facilitate and assist with such program development.

Opportunities for training must be and are being provided, by setting up education programs within countries, as has occurred in Nairobi, Kenya, where an 18-month fellowship program for pediatricians to provide expertise in pediatric endocrinology was established in 2006. This program is staffed by ESPE and ISPAD volunteer senior pediatric endocrinologists and diabetologists, with ongoing commitment to 2014. Pediatricians from countries within Africa come to Nairobi for 6 months of training, followed by return to their own country for 9 months to develop a clinic, undertake a research

project, and consolidate knowledge, with a subsequent review and examination period in Nairobi. Fellows of this training program have successfully passed final examinations established on European standards. A similar program for West Africa has commenced in Lagos by using this model. Funding for these initiatives has been provided by the World Diabetes Foundation.¹² Success also has been seen in Khartoum, where >2000 young people receive pediatric and adolescent endocrinology and diabetes services in another successful model, despite economic and political turmoil.

Similar programs should be instituted in other regions of the world to provide educational support that will lead to sustainable careers for local pediatric endocrinologists, who should progressively take over responsibility for ongoing training in their countries. It is impressive to see how pediatric endocrinology and diabetes centers are being developed in countries where this specialty was almost nonexistent, by fellows who graduated from the Pediatric Endocrine Training Centre for Africa program in Kenya. The enthusiasm and quality of new training programs, organized and run solely by past fellows of the Pediatric Endocrine Training Centre for Africa initiative, is also reflected in the annual organization of high-quality scientific meetings by the African Society for Pediatric and Adolescent Endocrinology. The third annual African Society for Pediatric and Adolescent Endocrinology conference was organized in Lagos in March 2012, and the 2013 conference is to take place in Durban, South Africa.

Training programs should serve the needs of developing countries, have a timeline for achievement of independent educational standards that are competitive with current Western medical practice, and should establish objective and examinable measures for quality of education provision. Local large-center resources should be used

for training in smaller centers. Our existing programs in Kenya and Nigeria include such measures and should be considered as models for new areas of local medical expertise. Distance-education modules should be promoted, with better use of Web and satellite communication, as are being trialed in India to reach remote areas. Specific grants should be made available for this purpose, through international medical bodies and through government, to ensure sustainability. GPED is in a position to support such grants.

In addition to intensive training programs in Africa, ESPE has organized funds and short teaching programs in Eastern Europe and the Maghreb, with the support of industry. ISPAD offers similar training opportunities, also including South America and the Caribbean, and GPED members provide teaching staff for these endeavors and nurture liaison among all initiatives.

Opportunities for further training should be provided, via minifellowships to other countries for short periods. Such a program has been implemented with remarkable success in Latin America under sponsorship of the Latin American Society of Pediatric Endocrinology. Continuing medical education through attendance at international meetings for pediatric endocrine trainees and endocrinologists from low-income countries should be facilitated, as is currently made available through ESPE, ISPAD, and the Pediatric Endocrine Society. Educating endocrine fellows to provide ongoing sustainable training for others as part of the process will ensure sustainability. Similar opportunities should be provided for continuing education for allied health professionals such as nurses, dietitians, psychologists, nurse educators, and exercise physiologists, for both diabetes and endocrinology, and some have already commenced.⁹ Educational material is needed at several levels. For pediatric endocrinologists and trainees, this material currently includes

a free, regularly updated, e-learning portal with lectures accessible through the ESPE, ISPAD, and Latin American Society of Pediatric Endocrinology Web sites.^{13–15} Several societies also offer reductions in membership fees and journal subscriptions based on financial need. A diabetes manual for developing countries, adaptable for local circumstances, has been produced by the Changing Diabetes in Children project, and is available for free Internet download.^{13–15} A new textbook of pediatric endocrinology, specifically designed for use in a resource-constrained setting, is now available and being distributed at no cost, in such settings.¹⁶

Simple patient educational material should be available in multiple languages, to facilitate dissemination, understanding, and cooperation with medical treatment. Such initiatives already exist.¹⁷ Approaches to industry to make these available are currently being negotiated through GPED members, with translation of current booklets now agreed on and being undertaken in Hindi, as a first initiative in India.

EXPERT OPINION

Facilitation of links to recognized endocrinologists throughout the world with specialist expertise, willing to provide dialogue in a regular and considered way on issues concerning pediatric endocrinology and diabetes, will increase knowledge and improve clinical care by and for all participants. Regular contacts between pediatric endocrinologists in developing countries who are aware of the country-specific health problems and Western-trained consultants with clinical experience in developing countries will reduce any impediment to providing appropriate advice in developing countries. Funding is being sought to upgrade the existing GPED Web site⁶ and to provide a confidential area for clinical case discussions.

AVAILABILITY OF DIAGNOSIS AND MANAGEMENT TOOLS NEEDS TO BE TAILORED TO THE NEEDS AND CAPACITY OF LOW-INCOME COUNTRIES

Access to ongoing medical supplies must be a priority, even for rare diseases.¹⁸ Minimum requirements for adequate endocrine care on a nationwide basis include access to clinical facilities with appropriate diagnostic tools and provision of essential drugs, as detailed in the World Health Organization (WHO) Model Lists of Essential Medicines,¹⁹ alongside management tools such as glucometers and glucose testing strips. Existing examples of success include availability of insulin by the Life for a Child program²⁰ and the Changing Diabetes in Children programs in Africa, Bangladesh, and India. Although there have been successes in some areas,^{21,22} an essential tenet of increasing drug access in low-income settings must take into account basic human rights and trade agreements and commercial rights.^{21,23} Many pharmaceuticals for endocrine care are inexpensive, while being life-sustaining.²⁴ Although governments are accountable for providing essential drugs, the pharmaceutical industry should be encouraged to take the initiative to ensure uninterrupted supply of essential medicines at accessible costs. GPED will continue to lobby for cooperation and support in these areas. Better diagnostic and treatment facilities are required to develop adequate skills for clinically based diagnosis when resources are limited. Specific expertise in specialized areas requires practitioner education at all levels, with access to rapidly available and accurate radiology and genetic testing in centers of excellence. These areas need to be developed in each country. GPED members may provide this expertise, in consultation with local experts from each country who may subsequently take over this responsibility in each place. In

specific instances, collaboration between developing and developed countries may be necessary to provide appropriate diagnostic tools that may not be considered a priority in low-income settings. For instance, diagnosis of DSDs may require DNA mutational analysis and filter-paper hormonal assays and expertise to decide optimal methodologies to be used for genetic testing. International networking with provision of such services is already underway, with multiple laboratories worldwide providing diagnostic information free of charge to those areas where costs are prohibitive or facilities are unavailable.

Creation of local pediatric clinical endocrine and diabetes services where none currently exist but where medical staff and administrative support are available is imperative. The major focus of treatment and care for diabetes and other endocrine disorders in the developing world to date has been directed toward the care of adults by adult physicians. As a consequence, children (especially those in nonurban regions) are faced with a heavy burden of endocrine disease, with a substantial proportion of children dying without proper diagnosis and treatment.⁹ In addition to expertise in endocrine diseases and diabetes, pediatric endocrinologists bring their experience in family-centered care and age-specific approaches to clinical problems. A primary aim of the GPED task force is to create and establish educational opportunities for pediatric health care workers in areas where expertise and training are currently lacking.

Development of technological expertise is urgently needed. Opportunities for training for laboratory staff must be established, with links to international laboratory expertise and to quality-control standards. Provision of assistance to locate and establish partners in diagnosis and research, together with training in laboratory techniques, is facilitated by GPED and its members.

Programs for the neonatal screening of less common conditions, such as congenital hypothyroidism or adrenal hyperplasia, are yet to be enacted worldwide. Difficulties include choice of screening program and the availability of incidence data to evaluate the cost-benefit ratio of implementing these programs. Ensuring that appropriate conditions are met, such as monitoring iodine sufficiency of the population to prevent inappropriately high recall rate after screening for hypothyroidism, or organizing the timing for discharge and availability for timely follow-up to ensure prompt treatment of congenital adrenal hyperplasia, are important decision factors. Currently, loss to follow-up with lack of early treatment remains a major financial public health burden to a community. GPED aims to assist countries in establishing processes for follow-up and recall of affected infants, for effective location and tracing of families with abnormal screening results. This process is being facilitated through presentations and discussions at international conferences and forums.

INSUFFICIENT COLLABORATION BETWEEN PEDIATRIC ENDOCRINOLOGISTS AND GOVERNMENT AUTHORITIES MAY AFFECT THE IMPLEMENTATION OF SIMPLE AND AFFORDABLE PUBLIC HEALTH MEASURES

The WHO has recognized the need to address micronutrient deficiencies in developing countries, including iodine and vitamin D deficiency.^{25,26} Iodine deficiency is the most common cause of congenital hypothyroidism and causes permanent mental retardation. It is prevented by compulsory, affordable iodization programs in most countries where iodine deficiency has been identified; however, WHO urinary iodine data from 2007 in schoolchildren from 130 countries revealed that iodine intake is still insufficient in 47 countries.²⁷

Calcium deficiency has been demonstrated to be a major cause of nutritional rickets in the developing world.²⁸ Education of health care workers, with vitamin provision and implementation of large-scale treatment programs, is required for effective reduction and eradication of this major health burden. As the number of locally trained pediatricians increases in the developing world, devolution of responsibility for such strategies will facilitate effective care, together with extended education for communities.

The combination of intrauterine growth retardation, still common in many low-income countries, followed by a progressive increase in Western lifestyle (poor diet and decrease in physical activity), is paving the way for an epidemic of obesity and type 2 diabetes in the developing world that will trigger a major public health crisis.^{29,30} GPED supports the large numbers of public health programs currently in place to address intrauterine growth retardation, recognizing that this holds a key to current and future epidemics.

GPED training courses encourage collaboration between those trained in pediatric endocrinology and public health authorities and support advocacy and research that will provide an evidence base for government-funded, large-scale programs addressing these issues.³¹

LACK OF FUNDING FOR QUALITY RESEARCH PROJECTS THAT ADDRESS THE CLINICAL NEEDS OF LOW-INCOME COUNTRIES

Promotion of research partnerships with established centers of excellence for cooperative research endeavors is encouraged and facilitated by GPED. The impact of carefully planned research projects in resource-constrained countries that identify areas of need and appropriate methodologies for intervention and best reflect the needs of communities is likely to be large, given

the current lack of adequate information in many areas. In turn, results of research are an absolute requirement for sourcing future funding opportunities.³¹ Care should be taken to ensure that the highest ethical standards of clinical research conducted in developing countries are achieved, in particular to ensure that studies are relevant to the needs of developing countries and that participating countries receive direct health benefits from their participation in the studies.³² Seeding funds for research may need to be assisted through grant opportunities in wealthier countries, promoted via GPED, but local outcomes remain essential for creation of future platforms for ongoing and extended funding opportunities through local and national governments and universities. GPED programs also aim to facilitate training in ancillary planning, cost analyses, record keeping, establishment of database methods for diagnosis, tracking, and epidemiology as essential public health strategies.

CONCLUSIONS

The global burden and threat of NCDs in children constitutes one of the major challenges for development in the 21st century, which undermines social and economic progress throughout the world and threatens the achievement of internationally accepted development goals.

In agreement with the statement from the regional societies for pediatric endocrinology,³ GPED is committed to decreasing global inequalities in pediatric endocrine practice and to promoting minimal acceptable care. GPED aims to change health outcomes for children with endocrine disease in developing nations, by providing an opportunity for a high standard of medical care, delivered by competent local pediatric endocrinologists and other health care workers. Specialist societies from around the world need to work together to help address these issues.

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