A brief review of the history of paediatric gastroenterology

ED Nel
Department of Paediatrics and Child Health, Faculty of Medicine and Health Sciences, Stellenbosch University and Tygerberg Academic Hospital, Stellenbosch, South Africa

Introduction
Paediatric gastroenterology has become an established subspecialty in the last two decades in developed and some developing countries. In South Africa however it has only recently been registered by the Health Professions Council and it is appropriate to review the development of the discipline in view of increasing local interest.

Roots of paediatrics
Although the specialty of paediatrics is less than 200 years old, early physicians already recognised that the diseases of children and their treatment differed from those of adults and that intestinal diseases were an important cause of morbidity. Hippocrates wrote “In the different ages the following complaints occur: to little and newborn children, aphpae, vomiting, coughs, sleeplessness, frits, inflammation of the navel, watery discharges of the ears” and “At the approach of dentition, pruritus of the gums, fevers, convulsions, diarrhoea, especially when cutting canine teeth, and in those who are particularly fat, and have constipated bowels”. The Roman physician Soranus later wrote on, among other topics, the treatment of diarrhoea in infants and their feeding.

Many centuries later during the Renaissance, advances in the understanding of anatomy and physiology lead to new texts dealing with the care of children. Importantly, there was a growing realisation of the importance of mother and child care including the importance of infant nutrition. Paediatric gastrointestinal diseases such as coeliac disease and cyclic vomiting were described in the late nineteenth century although it would be some years before their aetiology and effective treatment would be established.

The first paediatric hospital was founded in 1802 in Paris and today continues as the Necker Enfants Malades Hospital. The founding of this hospital was followed by paediatric hospitals in Berlin (1830), St Petersburg (1834), Vienna (1837), London (1852) and the USA (1855). The establishment of these institutions played an important role in the development of the specialty of paediatrics and improved medical care for children in their respective countries and eventually world-wide.

Early paediatricians already realised the importance of intestinal disease and feeding practices as causes of death in childhood and the focus of paediatric research and advocacy in the early twentieth century was on the promotion of breastfeeding and safe infant feeding. This, in large part, lead to the founding of professional bodies such as the American Pediatric Association and to the introduction of legislation intended to improve maternal and child health.

Despite these advances, the recognition of paediatrics as a distinct specialty internationally and in South Africa lagged behind the other large specialties such as internal medicine, surgery and obstetrics. The first paediatrician in South Africa was Louis Leipoldt. After training at Guy’s from 1902 to 1907, he returned to South Africa and was appointed medical inspector of schools in the Transvaal where he described the effects of chronic malaria and malnutrition in children. After also serving as medical inspector of schools in the Cape Province, he moved to Cape Town in 1925 where he lectured in paediatrics and famously made the contentious, and probably tongue-in-the-cheek, statement that children could be raised on wine. It was however only during the late 1950’s and early 1960’s that the specialty started to develop in South Africa. In 1956 the Red Cross War Memorial Children’s Hospital was opened and paediatric departments were established in other medical schools throughout the country. Much of the early research in paediatrics focussed on the management of severe malnutrition and diarrhoeal disease. This coincided with developments in Europe and England and the imminent emergence of the discipline of paediatric gastroenterology.

Origins of Gastroenterology
The first national gastroenterology society was established in Germany in 1895. Shortly after this the American Gastroenterology Society was established in 1897 and this...
was followed by other societies, it would however be some time before paediatric gastroenterology would be recognised as a separate discipline.

The development of the specialty of paediatric gastroenterology was driven by a number of factors. From the mid-twentieth century there was a growing realisation that children with complicated gastrointestinal and liver disease were not receiving optimal management. New disorders were described and new treatment modalities became available. Children with intestinal failure could be supported with parenteral nutrition, malabsorption syndromes such as cystic fibrosis could be effectively treated, more effective enteral nutrition became possible through new products and administration routes such as gastrostomy, and drug therapies became available for liver and intestinal diseases such as autoimmune hepatitis and inflammatory bowel disease. Surgical management of liver diseases such as biliary atresia were described and liver and to a lesser extent small bowel transplantation became possible in young children. Together these factors contributed to the growing realisation that children suffering from gastrointestinal and liver disease required care by paediatricians with specialised expertise.

Interest in specific diseases created an awareness among paediatricians of the importance of intestinal and liver disease. The improved understanding of coeliac disease in the 1960’s and its effective treatment stimulated research into other intestinal diseases. Early research also focussed on the aetiology and management of chronic and persistent diarrhoea, an area to which South African researchers made significant contributions. The description of congenital enteropathies changed our understanding of intestinal function. Liver diseases, such as the familial cholestatic syndromes, that are unique to children were described opening the field of paediatric hepatology.

Technological advances allowed improved diagnosis and treatment of many paediatric diseases. Initially, small bowel biopsies in children were performed with a Crosby capsule designed for adult use. The use of this device in children was unfortunately associated with intestinal perforation, a complication that decreased after the introduction of a smaller capsule designed specifically for children. Capsule biopsy has now largely been replaced by endoscopic biopsy. Although the calibre of endoscopic equipment initially was not suitable for young children, smaller calibre endoscopy equipment suitable for paediatric use became available in the last two decades. Non-invasive tests such as the xylose absorption test improved understanding of intestinal disease in children in the first years of the paediatric gastroenterology. More sophisticated methods of assessing intestinal permeability subsequently became available that were suitable for use even in young children. Techniques to measure disaccharidase and other enzyme activity were developed leading to the discovery of new malabsorption syndromes and allowing effective treatment of these conditions. Similarly technological advances in hepatology played a crucial role in the development of the discipline. This included the introduction of safe techniques for liver biopsy in infants and children, improved laboratory diagnostics and imaging. The importance of these technological advances in the development of paediatric gastroenterology and hepatology cannot be underestimated. They have however, to a large extent, moved the discipline outside the competence of the general paediatrician.

The increasing complexity of the disease spectrum with which children with intestinal and liver disease presented and the challenges of diagnosis and appropriate management, meant that general paediatricians and gastroenterologists caring for adult patients became increasingly uncomfortable treating these disorders. The subspecialty of paediatric gastroenterology, hepatology and nutrition was consequently born out of a clinical need to provide optimal care to children. In Europe and the Americas this occurred at a time when other subspecialties also started to develop. In South Africa subspecialties would only be established some years later.

Organisational Development
The first society of paediatric gastroenterology was founded in Europe in 1967 and held its first meeting in 1968. This society, initially named the European Society for Pediatric Gastroenterology, later became the European Society of Pediatric Gastroenterology, Hepatology and Nutrition. This name change reflects the expanding scope of the discipline and particularly the importance of nutrition in the care of children with gastrointestinal and liver disease. Other societies followed: the North American Society of Pediatric Gastroenterology, Hepatology and Nutrition (1973), the Latin American Society for Pediatric Gastroenterology and Nutrition (1974), the Asian Pan Pacific Society of Pediatric Gastroenterology (1983) and the Commonwealth Association of Paediatric Gastroenterology and Nutrition (1994).

Formal training and certification of paediatric gastroenterologists became necessary as the discipline expanded. Technical expertise required increased, and treatments became more complex. Training guidelines were developed in the USA in the 1980’s and the first certification examinations were offered in 1990. In the United Kingdom centres for training were approved in 1997 and examinations were introduced.

In South Africa, the first paediatric gastroenterologists were registered in 2008 and the first certification examination was offered in 2010. The curriculum, developed by the senior paediatric gastroenterologists in South Africa in 2006-2007, is based on North American, UK and European curricula. Presently there are four centres in South Africa that are registered training centres and 13 registered paediatric gastroenterologists. Two centres offer paediatric liver transplantation. Training has been advanced by further initiatives such as those organised by SAGES (the Paediatric Session at the SAGES Congress), the Gastroenterology Foundation (the Fellows’ Weekend, the Paediatric Interest Group Meetings), and ESPGHAN (Post Graduate Course in Paediatric Gastroenterology, ESPGHAN Gastroenterology Fellowship).

Challenges to Paediatric Gastroenterology in South Africa
The aphorism that children are not small adults is as true for paediatric gastroenterology as for any other discipline in
paediatrics. Maturational changes in intestinal absorption, oral tolerance, motility, immune function, nutritional requirements, liver function, pharmacokinetics and pharmacodynamics influence the disease spectrum, natural history, and treatment of paediatric gastrointestinal and liver disease. Diagnosis, treatment, and prognosis are determined by age.

Paediatric gastroenterology is arguably one of the broadest subspecialties in paediatrics. In addition to a thorough knowledge of intestinal and liver disease, the gastroenterologist needs to be familiar with developmental physiology, intermediate metabolism and inborn errors of metabolism, immunology and all aspects of paediatric clinical nutrition. The paediatric gastroenterologist also has to lead a multidisciplinary team that cares to children with the many chronic diseases that they encounter in their practice.

Despite encouraging progress in the subspecialty in recent years in South Africa, we are still confronted by a number of challenges.

**Workforce**
A survey conducted in 2006 in North America estimated that there were 8.1-9.2 paediatric gastroenterologists per million children in the USA and 6.6–8.2 per million children in Canada. New Zealand has proportionally less subspecialists with 4.5 paediatric gastroenterologists per million children. In both North America and New Zealand it is thought that there are not enough subspecialists to meet the service needs of children in their countries.

In South Africa there are at least 15 million children under the age of fifteen years with less than 1 paediatric gastroenterologist per million children. Children with severe gastrointestinal and liver disease are mostly cared for by general paediatricians and occasionally by adult gastroenterologists. Most of these children should be seen by paediatric gastroenterologists to ensure optimal care. It is however unlikely that current training programmes or employment opportunities in the state sector will meet the countries’ need in this regard.

**Facilities**
Although paediatric gastroenterology does not have the same emphasis on procedures as adult gastroenterology, many children will require diagnostic and therapeutic procedures. Most children will require either a general anaesthetic or conscious sedation during procedures. Access to anaesthetic services is often limited in South African and many units do not have age appropriate equipment (e.g. narrow calibre endoscopy equipment). Necessary procedures are consequently often not performed or are done under suboptimal conditions.

**Research output**
In Europe and North America, the establishment and expansion of paediatric gastroenterology have been closely linked to research initiatives. This is illustrated by the role that research into coeliac disease and other paediatric malabsorption syndromes provided in the founding of ESPGHAN. This organisation retains a strong research agenda promoting cooperation between different units and regularly publishing guidelines and position statement based on the results of current research.

Although South African paediatricians made a significant contribution to diarrhoeal disease and malnutrition research in the previous century, in the last two decades little original local research has been published. Staff shortages in units and heavy commitment to service delivery have presumably stilled this important component of the specialty. This has important implications for the discipline and the care of children in South Africa.

Basic epidemiological information on paediatric gastrointestinal and liver disease in South Africa is lacking. In the absence of a well-developed research programme in South Africa, it is unlikely that the subspecialty will mature or that the health needs of children will be adequately addressed.

**Conclusion**
Paediatric Gastroenterology is a relatively young subspecialty that has developed to meet the needs of children with intestinal and liver disease. It confronts the clinician with unique challenges but is also extremely rewarding. Although the subspecialty in South Africa is in its infancy, recent initiatives to improve training will strengthen the discipline and improve the quality of care given to children in our country.

**References**