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Information technology implementing globalization on strategies for quality care provided to children submitted to cardiac surgery: International Quality Improvement Collaborative Program – IQIC

A tecnologia da informação implementando a globalização nas estratégias de qualidade para o atendimento às crianças submetidas à cirurgia cardíaca: o Programa de Colaboração Internacional – IQIC

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Abstract

Introduction: Congenital heart diseases are the world's most common major birth defect, affecting one in every 120 children. Ninety percent of these children are born in areas where appropriate medical care is inadequate or unavailable.

Objective: To share knowledge and experience between an international center of excellence in pediatric cardiac surgery and a related program in Brazil.

Methods: The strategy used by the program was based on long-term technological and educational support models used in that center, contributing to the creation and implementation of new programs. The Telemedicine platform was used for real-time monthly broadcast of themes. A chat software was used

for interaction between participating members and the group from the center of excellence.

Results: Professionals specialized in care provided to the mentioned population had the opportunity to share to the knowledge conveyed.

Conclusion: It was possible to observe that the technological resources that implement the globalization of human knowledge were effective in the dissemination and improvement of the team regarding the care provided to children with congenital heart diseases.

Descriptors: Heart Defects, Congenital. Cardiovascular Surgical Procedures. Telemedicine.

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Abbreviations, acronyms & symbols

CHL	Children's HeartLink
IQIC	International Quality Improvement Collaborative
RACHS-1	Risk Adjustment in Congenital Heart Surgery

Resumo

Introdução: Doenças cardíacas congênicas são consideradas o maior defeito ao nascimento, afetando uma em cada 120 crianças. Noventa por cento destes recém-nascidos encontram-se em áreas onde os cuidados médicos são inadequados ou indisponíveis.

Objetivo: Compartilhar o conhecimento e a experiência entre um centro de excelência internacional em cirurgia cardíaca pediátrica e um programa correlato no Brasil.

Métodos: Estratégia utilizada pelo programa foi baseada

em modelos de suporte tecnológico e educacional a longo termo advinda daquele centro, contribuindo para criação e efetivação de novos programas. Foi utilizada plataforma de Telemedicina para transmissão mensal em tempo real dos temas. Um programa de chat foi utilizado para a interação entre os membros participantes e o grupo do centro de excelência.

Resultados: Os profissionais especializados no cuidado dessa população tiveram a oportunidade de participar do conhecimento transmitido.

Conclusão: Pode-se observar que os recursos tecnológicos que implementam a globalização do conhecimento humano foram efetivos na disseminação e aprimoramento da equipe no que diz respeito ao cuidado às crianças com cardiopatias congênicas.

Descritores: Cardiopatias Congênicas. Procedimentos Cirúrgicos Cardiovasculares. Telemedicina.

INTRODUCTION

The establishment of surgical programs for children with congenital heart disease in developing countries is a major step to improve surgical outcomes, since most of them are deprived of appropriated medical care [1]. Although congenital heart surgery in developing countries offers access to children who would otherwise die, surgery when required is particularly challenging and associated with high mortality [2].

In 2007, clinical leaders providing surgical cardiac care to children around the world congregated at the Global Forum on Humanitarian Medicine in Cardiology and Cardiac Surgery in Geneva. The existence of potential contributing factors to mortality that may be specific to children receiving cardiac surgery in developing countries was discussed, and it became evident that there are few benchmarks to identify specific risk factors and assess the performance of these surgical programs.

In an effort to address these gaps, the International Quality Improvement Collaborative Program (IQIC) was launched.

In 2008, Children's HeartLink (CHL), a nongovernmental and nonprofit organization; the Boston Children's Hospital in Boston, USA; the Humanitarian Association Coeurs pour Tous in Geneva, Switzerland; the Dr. K. M. Cherian Heart Foundation in Chennai, India; and the International Children's Heart Foundation in Memphis, USA, established the foundations of the **International Quality Improvement Collaborative for Congenital Heart Surgery in Developing World Countries (IQIC)**, with the hope of fostering collaboration between programs of developed and developing countries (twinning programs) [1].

The IQIC is managed by Boston Children's Hospital of Harvard Medical School. The program's vision is to facilitate the collaboration of health teams from around the world working to create a culture of patient safety and quality improvement of the infrastructure for children receiving con-

genital heart surgery in developing world programs. The mission of the IQIC is to reduce mortality and major complications for children undergoing congenital heart surgery in developing world programs. To achieve the goals, the collaborative program aims to create strategies for quality improvement in order to reduce mortality and major complications for these programs in developing countries [1,2].

IQIC was divided in two phases:

- Phase 1 included data collection and analysis. After the first year, participating sites continue assessing the data and start Phase 2 to implement quality improvement strategies targeted at drivers of mortality;

- Phase 2 includes participating in monthly educational modules and webcasts broadcast from Boston Children's Hospital in a telemedicine platform. The webcasts are focused on improving team-based practice through nurse "empowerment", training, infection prevention and implementing safe operative practices [1,2].

Phase 1: IQIC Database (Benchmarking Data)

Data collection and analysis

Data collection began in 2008 and the first participant sites were: the Cardiovascular Surgery Unit of Guatemala (Guatemala), the Armed Forces Institute of Cardiology (Pakistan), the Frontier Lifeline Hospital (India), the National Children's Cardiac Surgical Center (Belarus), and the Shanghai Children's Medical Center (China).

Teams of doctors and nurses from each location supervised data collection and the management of the project. They submit diagnoses, procedures and clinical information to a centralized repository using Web tools. Assessment of surgical outcomes and risk-adjusted mortality rates are used as benchmarking for comparison between the participating sites. Detailed information about the data collection process on the web portal and completion of the forms are found in the Database Reference Guide.

The Boston Children's Hospital maintains the project database. Data are sent to generate semi-annual confidential reports for each site. Benchmarking data can be used to assess the performance of programs and the improvement of quality in the driver of each participating institution (Chart 1).

Risk adjustment in congenital heart surgery (RACHS-1)

Risk-adjusted mortality rates are obtained using the Risk Adjustment in Congenital Heart Surgery (RACHS-1) method. Each surgical procedure is classified into one of six predefined risk categories based on the RACHS-1 method. Risk 1 category represents low mortality risk whereas risk 6 category represents high risk. Additional clinical factors integrated into RACHS-1 include age, prematurity and major non-cardiac structural abnormalities. The RACHS-1 method has been validated and applied in databases in the United States and Europe [3].

Phase 2: Implementation of strategies for quality improvement: modules for learning – Web seminars

The goal of this implementation is to assess the sustain-

ability of a collaborative model for quality improvement. It aims to identify mortality drivers and create strategies focused on quality improvement for obtaining satisfactory outcomes.

Since January 2010, the Boston Children's Hospital has conducted monthly Webinars to facilitate dialogue and disseminate learning for quality knowledge.

The modules are based on three mortality drivers: team-based practice; reduction of infection at the surgical site; and perioperative safe practice (Chart 2).

Each module includes a series of three educational sessions developed from elementary to advanced levels.

The main goal of the seminars is to provide a collaborative learning experience that is flexible enough to be adapted according to the needs of each site.

The Boston Children's Hospital develops modules and provides assistance to sites for the implementation of interventions on quality improvement. The modules include: an overview of the problem; learning objectives; implementation and problem solving based on case studies; and tools for assessment (Chart 2).

Chart 1. IQIC database: benchmarking data.
Data Collection and Analysis

Registration and procedure	Follow-up
Registration must be completed with the following items:	
1. Demographic information	
2. Preoperative status	
3. Patient's diagnosis	
4. Surgical procedure	
5. Outcome/Complications	
	Patients' registration to be completed 30 days after the procedure
	6. 30-day follow-up

Chart 2. Key driver diagram.

Objective	Key drivers	Strategy changes
	Safe perioperative practice	Use a checklist for surgical safety to record immediate measures in a process based on evidence (i.e., antibiotics administered within 60 min after surgical incision)
Reduction of 30-day mortality rates associated with congenital heart surgery	Reduction of surgical site infection	Focus on hand hygiene of all members dealing with patients' care
	Team-based practice	Train nurses with nursing practice based on evidence
		Guidance for nurses in infirmaries and ICUs on how to carry out reports Total 24 h of entry and exit Accurate daily records of patients' weight

Core Curriculum Outline

Module 1: Team-based practice: effective communication and team work

- Elementary: Clear communication and efficient team work;
- Intermediate: Care in the postoperative after pediatric cardiac surgery: important considerations in nursing;
- Advanced: Resources management during crises at the intensive care unit.

Module 2: Reducing surgical site infections and bacterial sepsis

- Elementary: Prevention of healthcare - Associated infections: creating a hand hygiene culture;
- Intermediate: Prevention of bacterial sepsis - blood-stream infections;
- Advanced: Prevention of bacterial sepsis - Surgical site infections.

Module 3: Safe perioperative practice

- Elementary: Implementation of a checklist for surgical safety in congenital heart surgery (Session I);
- Intermediate: Implementation of a checklist for surgical safety in congenital heart surgery (Session II) [4].

Advanced Modules:

Modules with advanced content that expanded on the mortality drivers were also created. The themes are as follows:

- Heart embryology;
- Arrhythmias;
- Congenital heart defects;
- Pain and nutrition management;
- Respiratory management in the postoperative period and prevention of pneumonia;
- Fetal circulation;
- Hypoplastic left heart syndrome, anatomy and physiology.

Partnership and participation of the Cardiology and Pediatric Cardiovascular Surgery Service of São José do Rio Preto (SECCAP) and the Base Hospital of the Medical School of São José do Rio Preto (FAMERP) in the IQIC program started in 2009, at the suggestion and request of the American organization CHL. Its primary objective was a suitable control of data to enable effective actions to improve the care provided to children with heart diseases in Brazil [5].

At that time, our service began the collection of data and improvement of this methodology and after June 2010 all Brazilian data from the service were included in the world database, alongside numerous centers in developing countries.

This integration has advanced considerably, not only due

to the data sent to date, but also due to the webinars, which are broadcast monthly throughout the year via a telemedicine platform.

Prior to the scheduled broadcast, each lesson is submitted for translation (Brazilian Portuguese) and contextualization. On the scheduled day and time, the local team meets and the translated and contextualized lessons are attended at the same time the lessons are being broadcast by the IQIC team directly from Boston. Synchronous interaction is accomplished through the use of chat rooms for questions and answers between the local team and the IQIC team.

Thus, this joint participation between the two programs with the goal of putting into practice the quality improvement of care provided to children with congenital heart diseases has only been possible through technological resources implementing globalization on this knowledge.

Authors' roles & responsibilities

AMPS	Main author, text drafting, content expert, review of the text development
UAC	Specialist in the area
FB	Checking of text development, spelling and layout

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