

Early Results of a Distance Learning Paediatric Surgery Programme in Mozambique

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Abstract

Introduction: A pre-graduate training programme in paediatric surgery was applied to students in four medical schools of Mozambique. In this paper, we evaluate the early results of the programme. **Materials and Methods:** A pre-graduate training programme was developed and applied in two stages, theoretical education available at an online platform and a face-to-face session. To evaluate the programme, a diagnostic test was applied to all participants before the face-to-face session and, the same test, was applied again at the end of the session. **Results:** A total of 236 students participated in the programme. Forty-four per cent had a negative score on the diagnostic test. When the test was repeated, 91.9% had a positive score, and the difference between the scores in both tests reached statistical significance ($P < 0.05$). The participants who completed the first phase of the programme presented a higher median score in both tests ($P < 0.05$). **Conclusions:** The diagnostic tests allowed us to verify there was an increase in knowledge before and after the face-to-face session. There was also a significant difference between those participants who completed the online phase of the programme and those who did only the face-to-face session, which allows us to conclude that the online teaching programme was effective.

Keywords: Long-distance teaching, Mozambique, paediatric surgery, pre-graduate medical training

INTRODUCTION

Most of sub-Saharan Africa, and also Mozambique, suffer from an overall severe physician shortage with patients having particular limited access to surgical care.^[1-4]

In Mozambique, a country with an estimated population of 29 million people,^[5] of whom 45% are under 14 years of age,^[3] paediatric surgery is not part of the curriculum of medical schools.

Technological development, globalisation and the Internet promote and facilitate access to information everywhere, even in low- and middle-income countries (LMICs).^[4]

Based on these premises, we developed a pre-graduate training programme in paediatric surgery, with an important part based on long-distance teaching.

MATERIALS AND METHODS

The programme was created with the collaboration of the Paediatric Surgery Department of our hospital and Health 4Moz, ONGD. The programme was applied to students in the last year of their medical degree, in four Mozambican Medical Schools: Lúrio University (UniLúrio) in Nampula city, Instituto Superior de Ciência e Tecnologia Alberto Chipande in Nampula and Beira city and Universidade Eduardo Mondlane and Instituto Superior de Ciências da Saúde de Moçambique in Maputo.

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The programme was applied in two stages:

1. Theoretical education, consisting of eight modules addressing different paediatric surgery topics, that were available at an online platform – Moodle (e-learning). There was a total estimated time for learning of 12 h, and the content was available between February and May 2017 in the 1st year, September and October 2018 in the 2nd year and from March to May 2019 in the 3rd year. At the end of each module, the participants had to perform a multiple-choice test, and only upon passing the test, they would have access to the next module. Each module consisted of pre-recorded lectures, and there was also reading material available to complement the lectures
2. Face-to-face session, in a trip to Mozambique in July 2017, November 2018 and June 2019, with clinical case discussion sessions (lasting 4 h) and a hands-on session (lasting 2 h) covering wound treatment and suture techniques, and basic paediatric trauma life support with the use of simulation models.

During the entire time the programme was available online, the participants could use online forums available on the platform to ask questions, and those questions would be answered on a daily basis.

To evaluate the programme and knowledge acquisition, a diagnostic test was applied to all participants before the face-to-face session and, the same test, was applied again at the end of the session.

Statistical analysis

Statistical analysis was performed using the IBM® SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp and Microsoft® EXCEL; we used descriptive statistics, Friedman test and KruskalWallis test.

RESULTS

We had a total of 236 participants in the programme in the 3 years [Table 1 shows the participant's distribution by year and by institution]. The first phase of the programme (e-learning) was completed by 61.1% ($n = 173$). We have registered that reaching close to the deadline of the programme's first phase, there was an increase of requests for access to the platform.

Table 1: Participants by year of programme and by institution

	UniLurio, Nampula	ISCTAC, Nampula	ISCTAC, Beira	UEM, Maputo	ISCTEM, Maputo	Total
2017	34	-	39	-	-	73
2018	36	-	28	-	-	64
2019	44	14	29	7	5	99
Total	114	14	96	7	5	236

ISCTAC: Instituto Superior de Ciência e Tecnologia Alberto Chipande, ISCTEM: Instituto Superior de Ciências da Saúde de Moçambique, UEM: Universidade Eduardo Mondlane

From the entire group, 44.3% had a negative score on the diagnostic test, and the test score median was 10/20. When the test was repeated at the end of the face-to-face training, 91.9% ($n = 217$) had a positive score, the median score was 14/20 and the difference between the scores in both tests reached statistical significance ($P < 0.05$). Globally, there was an increase in knowledge of 40%.

The participants who completed the first phase of the programme presented a higher median score in both tests, and this difference is statistically significant ($P < 0.05$).

DISCUSSION

Surgery is now recognised as an essential component of global public health, as evidenced by the Lancet Commission on Global Surgery and the World Health Assembly resolution on Strengthening Emergency and Essential Surgical Care and Anaesthesia as a Component of Universal Health Coverage.^[6,7] There are estimates that surgical disease is responsible for 11%–30% of the global burden of disease, and congenital anomalies are increasingly recognised as an important global cause of paediatric disease.^[1] In LMICs, in which more than 90% of congenital anomalies are estimated to occur, the human and financial cost of those is particularly severe.^[1]

It is well known that there is an insufficient surgical workforce worldwide,^[4,8] and in the particular case of paediatric surgery in Mozambique, it is reflected on the only four paediatric surgical specialists (and one foreign doctor) working in the whole country, with two trainees being formed.

Contemporary humanitarian efforts to help meet the high demand for paediatric surgery services and education in LMICs have taken several forms.^[2] One well-known and common way of contributing to surgical care delivery to LMICs is the surgical volunteer trips.^[1,2] While these programmes represent an effective measure in the short term, usually their emphasis is on the delivery of care rather than on training the local surgeons.^[1,2] Other forms of delivering care and education, found in the literature, are faith-based mission hospitals, academic collaborations and teaching workshops.^[2]

As noted by Sitkin and Farmer,^[1] regardless of the model of education or delivery of care, developing and sustaining domestic paediatric surgical capacity is a critical long-term priority.

Taking into consideration that paediatric surgery is not part of the medical training curriculums in universities in Mozambique, the recognition and importance of some of the congenital conditions might not be valued by the newly trained doctors. Hence one of the main goals to the creation of this pre-graduate programme was to make the participants aware of the most common and important paediatric surgical diseases and to recognise which should be promptly managed.

A big part of our pre-graduate programme was based on an online platform. This allowed for the delivery of pre-recorded

lectures that were available throughout the entire time of the programme and could be reviewed as many times as necessary, reading material to complement the lectures and online forums which allowed question asking and discussions about the lecture themes.

Internet has become a very useful tool, nowadays, to provide education.^[2,9] We find, in the literature, several examples of education models developed using technology and Internet as a way of delivery. GlobalCastMD^[10] is a virtual platform where surgeons can attend online symposia; Stay Current: Paediatric Surgery^[11] is a mobile application with a vast multimedia library, podcasts, guidelines and discussions on paediatric surgery and paediatric surgery didactic conferences were shared weekly between an academic centre in Durban and surgeons in remote provinces in South Africa.^[12]

Using this Internet platform allowed us to deliver education over a long distance, in an almost inexpensive way. As already noticed by Raigani *et al.*^[9] the ease of access to the web-based content and the reduced or non-existing cost are important advantages of this method.

We registered that there was a delay in getting access to the online platform, with a rise in use towards the deadline of the programme. This might have happened due to the unfamiliarity with online teaching programmes and also due to technical difficulties. Despite the advantages of Internet use to deliver teaching, it is well known that slow Internet connectivity may be a drawback and that Internet penetration in sub-Saharan Africa remains low.^[2,9]

The application of diagnostic tests allowed us to verify that there was increase in knowledge before and after the face-to-face session, and this difference was statistically significant.

There was also a significant difference between those participants who completed the online phase of the programme (with higher median scores in both the pre- and post-test) and those who did only the face-to-face session, which allows us to conclude that the online teaching programme was effective.

In the face-to-face session, students had the opportunity to discuss clinical cases, learn and train suture techniques and also learn and apply basic life support (BLS) coupled with trauma initial assessment in simulation models. Knowledge of BLS and delivery of effective cardiopulmonary resuscitation techniques has been proven to increase the chances of survival of patients.^[13,14] The literature shows that medical students are valuable resources to increase BLS skilled individuals in the community,^[15] thus our inclusion of this important theme in our training programme.

We believe that better diagnostic capability and knowledge of the most common paediatric surgery diseases is an important asset and may help improve paediatric health in Mozambique.

In the future, the application of this programme to other medical schools and training local trainers will allow us to make more solid conclusions.

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Conflicts of interest

There are no conflicts of interest.

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