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## Review article

# Know thy neighbors: The status of cardiac surgery in the South Asian countries around India

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## ABSTRACT

**Objectives:** The South Asian neighboring countries of India include Bangladesh, Bhutan, Nepal, The Maldives, Pakistan and Sri Lanka. Interestingly all these countries possess either a land or a sea border with India and no border among themselves. These countries have historic, cultural, ethnic and genetic links with India. The paper describes the developmental history and current status of cardiac surgery in these countries.

**Methods:** Thorough search of the printed and electronic materials has been made. The authors visited all these countries and contacted the eminent surgeons personally or through mails. All the information is cross-checked and compiled. Record keeping is not well organized in most of these countries. Best information often came from unusual sources like Anesthetists' society or the corporate houses.

**Results:** Four of these countries Bangladesh, Nepal, Pakistan and Sri Lanka have their cardiac surgical programs. Collectively they perform around 38000 cardiac operations a year which is a quarter of the cases performed in India. These countries are important sources of medical tourism in India which is worth 3 billion US\$ of business annually.

**Conclusion:** When the number of operations per million populations is considered, Bangladesh and Nepal are lagging behind India where as Pakistan has a comparable figure. Sri Lanka with 265 cardiac operations/million populations has the best figures in the region. However when compared with the Western countries even the Lankan figures also look quite inadequate.

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## Introduction

South Asia is the south central part of the Asian continent. The countries and people of this area have long standing historic and cultural links. Union of India is the biggest country of the region today. The South Asian neighboring countries of India are Bangladesh, Bhutan, Nepal, Maldives, Pakistan and Sri Lanka. Interestingly all these countries possess either a land or a sea border with India and no border of any kind among themselves. Some of these borders are surprisingly long. For example the India-Bangladesh border is the 5th longest international border of the World stretching along 4096.7 km with densely populated areas on both sides.<sup>1</sup> Indian borders with Pakistan, Nepal and Bhutan are also quite long (Table 1). Sri Lanka is separated from India by the Palk Strait.

These countries are also important sources of medical tourism in India. Medical tourists visiting India annually contribute around 3 billion US\$ worth of business. Medical tourism has grown rapidly during the past decade and several Asian countries have become dominant destinations.<sup>2</sup> Investment in the medical industry is recognized as an important way of increasing GDP, improving services and boosting tourism.<sup>3</sup> The number of all visitors to India from Bangladesh is the second highest only next to USA. In terms of the number of medical tourists to India, Bangladesh tops the list. Out of 56129 persons visiting India with medical visa in 2013, Bangladeshis alone numbered 17814 (31.7%).<sup>4</sup> Other south Asian countries also send significant number of medical tourists to India. The number of medical tourists to India rose to 134344 in 2015. It is estimated that medical tourism business in India may reach US\$ 8 billion by 2020.<sup>5</sup>

Friend or foe whatever be the status, these south Asian countries have strong historic, cultural, ethnic and genetic ties with India. China and Myanmar, the two other countries bordering India are quite different in this regard. Knowing the current status of the South Asian neighbors may be of strategic importance for the Indian physicians and surgeons.

## Objective

Objective of this study is to describe the current status of cardiac surgery in the south Asian countries neighboring India. It starts with a brief description how cardiac surgery began in any particular country. It also includes the present situation, the annual number of cardiac operations, cardiac surgeons, cardiac anesthetists and perfusionists. The paper would also describe about the number of centers offering cardiac surgery, their performance and geographical distributions. This article would be of interest for the Indian surgeons and their counterparts of the neighboring countries along with the policy makers to develop strategies to deal with the current gap in access to cardiac surgery.

**Table 1**  
Indian frontier with the South Asian neighbors as of 2015.

Country	Length of border	Remarks
Bangladesh	4096 kms	5th longest international border of the World
Pakistan	3323 kms <sup>a</sup>	There are areas of dispute along the Jammu and Kashmir region
Nepal	1751 kms	Along Uttarakhand, Uttar Pradesh, Bihar, West Bengal & Sikkim
Bhutan	699 kms	Along West Bengal, Sikkim, Assam and Arunachal
Sri Lanka	100 m	One of the shortest international borders of the World (not mentioned in some references)

<sup>a</sup> The length of border with Pakistan described here is according to the website of the Ministry of Home Affairs, Government of India. Length of de facto border along the line of control may be different.

## Methods

Record keeping and data compilation in these countries are not well organized in most cases. Authentic information is hard to find. Best information often came from unusual sources like Anesthetists' society or the corporate houses. The major manufacturers of cardiac surgical disposables were contacted for the numbers from their own database. Thorough search of the printed and electronic materials has been made. The authors visited all the neighboring countries of India and contacted the eminent surgeons personally or through mails. All information is cross-checked and then compiled. However no personal or individual data was accessed, hence possibility of breach of patient confidentiality is not there.

## Pakistan

Closed heart operations in Pakistan began by the native surgeons in the late 1950s at a few centers of Karachi, Lahore and Rawalpindi. But open heart operations began by Dr Donald Edward Bowes, a Canadian born missionary surgeon in 1967–68 at United Christian Hospital Lahore.<sup>6,7</sup> Among the locals an army surgical team performed the first open heart surgery of undivided Pakistan on the 4th of March 1970 at the Rawalpindi Military Hospital<sup>8</sup> (Fig. 1). The chief surgeon was Dr Lieutenant Colonel Ali Masood Akram and the chief cardiologist was Dr Major Md Abdul Malik representing the Western and Eastern parts of the then Pakistan respectively. Pakistan broke apart in 1971 and Eastern Part became an independent country, Bangladesh.

Regular cardiac surgical program among the civilians began in the remainder (West) of Pakistan with the establishment of National Institute of Cardiovascular Diseases at Karachi in the early 1970s. Following the era of Dr Bowes, cardiac surgery in the northern region of Punjab began again around 1978 at the Mayo Hospital Lahore.

The estimated number of cardiac operations of Pakistan performed in 2016 is more than 20 thousand. These operations were performed by around 160 surgeons in more than 40 centers with the help of about 100 perfusionists. With bigger population of the North, the centers of Lahore, Rawalpindi and Islamabad in the Punjabi heartland now dominate the numerical scenario. In the south, Karachi is still the most important venue hosting several major centers. Interestingly the historic city of Peshawar in the North-Western Khyber Pakhtunkhwa province has 6 centers performing cardiac surgery (Fig. 2A). Table 2 contains a list of major centers in Pakistan offering cardiac surgery with their geographical locations. Pakistani surgeons perform almost all varieties of cardiac operations except too complicated complex congenitals and cardiac transplantations.

## Bangladesh

At Dhaka closed heart operations began in the 1960s when it still was the capital of the then East Pakistan. Major Malik, the chief

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