

Import of Health Care Services from India: Is it complementary to or Substitute of the National Health Service of Bangladesh?

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Abstract: Bangladeshi patients visit neighbouring country India for importing medical care. The patients from this country often go to India for those medical interventions what was already available in-home country. Hence, the question is to evaluate whether the trade in health services between these two countries is originating from substitution or complimentary effects. This paper analysed this question based on the nature of health service uses by Bangladeshi patients in India and in Bangladesh. It also analyses health outcomes and economic benefits of receiving health care abroad and in-home country. Health outcomes are measured in QALY gains calculated using EuroQol procedure. The findings of the paper suggest that foreign health services are complimentary to national health services. Bangladeshi patients use health services in Kolkata in India for comparatively better treatments. Patients gain more QALY when they get treatments abroad. The relative price of medical treatments is also lower in the case of treatments abroad. The paper concludes with the opinion that cooperation between countries for trade in health services may reduce cost, may make available necessary health care more equitable. The trade in health services may bring in economic gain for both countries.

Keywords: Trade in health services, Complementary, Substitute, Healthcare, Cross-border healthcare, Quality of healthcare

Date of Submission: 11-12-2019

Date of acceptance: 26-12-2019

I. Introduction

Thousands of patients from Bangladesh are going abroad for medical care every year and import health services. About 80 percent of them go abroad for treatments even though those are available in local hospitals and a lion share of it goes to India (Paul, 1999; Hasan, Howlader, & Islam, 2002). The outflow of patients is increasing in spite of significant improvement in local health services. This trend indicates the possibility of existence of some limitations in local health systems of Bangladesh that motivate citizens to import health care from other countries (Rahman, 2000). The foreign health systems may be either substitute of complement to the local system. The primary objective of this paper is to evaluate whether substitution or complementary effect is the cause of trade in health care services between Bangladesh and India.

The issue of substitution versus complimentary has been analysed in three stages. First is to find out types of diseases for which patients usually go to hospitals in foreign countries and for which they prefer local hospitals. It may help to understand the nature of health services utilisation by patients. Second is the effectiveness of medical care in hospitals. Effectiveness is measured in terms of Quality Adjusted Life Years (QALY). QALY gains are health outcomes of medical treatments in hospitals and a rational choice to measure effectiveness. It is a generic measure and useful for use across a wide range of health intervention. The EuroQol procedure is the selected method for calculation of QALY gains. An objection against this choice may be that EuroQol is culture specific measure and is designed for European applications. However, applications of this methodology among Bangladeshis living in England have demonstrated its acceptability (Brooks, 1996). Third is the analysis of the relationship between expenditure and QALY gain. In developing countries like Bangladesh and India, where out-of-pocket is the primary health financing method, improved quality of health care is related to ability to pay expenses for treatments. Better quality medical care may be available at higher prices and vice versa. Hence, the calculation of cost elasticity of QALY gain may help to evaluate cost efficiency of receiving treatments at home and abroad.

The Indian city of Kolkata is most popular foreign destination general Bangladeshi patients because of the same language, culture and inexpensive living. It also has easy communication with all parts of Bangladesh. It has potential to substitute health facilities of Bangladesh. Inside the country, the capital city Dhaka is the medical hub of Bangladesh. Data were collected from secondary and tertiary level private sector hospitals of both city e to evaluate whether Kolkata can substitute Dhaka or complementary.

II. Research Method

Source of Data

Primary data were collected from Dhaka in Bangladesh and from Kolkata in India through an observational study using an interviewer administered questionnaire. Interviewers met patients at hospitals when they were about to leave for home after completing treatments. Criteria for hospital selection were popularity and quality. Only the best quality, popular hospitals were selected in the cities of Dhaka and Kolkata. Three groups of patients were interviewed – Bangladeshi patients received treatments in hospitals of Dhaka (BD); Bangladeshi patients received treatments in hospitals of Kolkata (BK); and Indian patients received treatments in hospitals of Kolkata (IK). The interviewer asked patients about their health status before and after treatments and, also other relevant issues. Total size of the sample is 350 and consists of 150 Bangladeshi patients in Dhaka (BD), 120 Bangladeshi patients in Kolkata (BK) and 80 Indian patients in Kolkata (IK). This study could not increase the sample size for financial constraints.

With an objective to calculate QALY, the EQ-5D health profile descriptive system was included in the questionnaire. Patients provided information on their state of health before and after treatments in the respective hospitals on five dimensions - mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Trained interviewers helped the patients to understand the EQ-5D health profile table, but the selection of health states for each dimension was patients' own.

Data Analysis

SPSS is the primary software for data analysis. All statistical calculations are performed using this software, including hypothesis tests. The formula provided by the EuroQol Group called "EuroQol Scoring Formula" for UK population is used here to calculate health utility weights of patients before and after treatments (EuroQol, 2013). Using these utility weights for health of patients, QALY gain for each patient from treatments in a hospital has been calculated using the following formula where Q is QALY gain, a health utility weight of patient after treatment, U_b health utility weight of patients before treatment, and D is the length of treatment in a hospital in the days.

$$Q = (U_a - U_b) \times \frac{D}{365} \quad [1]$$

The assumption of this paper is that in a system of out-of-pocket payment method, people can buy better quality health care if they have the ability to pay higher prices. Hence, we assume that QALY gain is a function of expenses of treatment. For comparison, the linear relationship between QALY and expenses has been determined separately for three groups of patients. The function is given below, where C is a log value of total payment by patients to hospitals for their treatments and g is patient group. The log value of the expenses has been used to remove large fluctuation in cost data.

$$Q_g = f(C) \quad [2]$$

The cost elasticity of QALY gain is the following;

$$\frac{dQ_g}{dC} = \frac{d}{dC} f(C) \quad [3]$$

Hypothesis of Study

There is a set of hypotheses for analysis of the objective of this paper. 5 percent significant level ($\alpha = 0.05$) is common for all hypothesis testing. The first hypothesis is intended to understand types of diseases that influence Bangladeshi patients to select medical treatments in Dhaka and Kolkata. The null hypothesis is, "Bangladeshi patients used to select medical facilities where they expect to get better quality without being influenced by the nature of diseases". Here the data are counted data and non-parametric χ^2 statistics are appropriate for testing this hypothesis.

The second hypothesis test is intended to see whether there are any differences in the health utility weights of three groups of patients at the beginning of treatments. Equal health utility weights at the beginning of treatments are assumed for all three groups of patients. Application of one-way ANOVA is an appropriate technique for hypothesis testing, where patient group is a factor and health utility score is the dependent variable. The hypothesis is the following.

$$\left. \begin{array}{l} H_0 : \sigma_{BD} = \sigma_{BK} = \sigma_{IK} \\ H_a : \sigma_{BD} \neq \sigma_{BK} \neq \sigma_{IK} \end{array} \right\} \quad [4]$$

In the third case, there are two hypotheses to make pairwise comparisons among three groups of patients to evaluate mean QALY gains from treatments at hospitals. In all cases, null hypotheses assume equality in the means of QALY gains. Two independent samples t-test (two tail) procedure is used to test hypotheses. The followings are null and alternative hypotheses.

$$\left. \begin{array}{ll} (a) H_0 : \mu_{BD} = \mu_{BK} & \text{and} \quad H_a : \mu_{BD} \neq \mu_{BK} \\ (b) H_0 : \mu_{IK} = \mu_{BD} & \text{and} \quad H_a : \mu_{IK} \neq \mu_{BD} \end{array} \right\} \quad [5]$$

III. Result

Table 1 shows the three main diseases for using medical care in hospitals of Dhaka are accidents, burns and injuries (22.0%); urinary system diseases (16.7%); and bacterial, viral and parasitic diseases (12%); all together 50.7 percent. Similarly, three major causes for using medical facilities in Kolkata by Bangladeshi patients are cancers (35.8%); heart diseases (12.5%); and urinary system diseases (10.8%); altogether 59.1 percent. This utilisation scenario is evidence of differentiated uses of medical facilities at two different locations. The calculated χ^2 of the table 1 is 62.317 and p value is 0. Calculated χ^2 is significant at $\alpha = 0.05$ and $df = 10$ when critical χ^2 is 18.31. We may reject the null hypothesis and assume a significant difference in the pattern of use of medical facilities in two cities of Dhaka and Kolkata. This finding may lead to the argument that health facilities in two cities may be complimentary in nature. If they were substituted to each other, the pattern of use of health facilities in two cities could be similar. Patients might utilise health facilities as an alternative to each other. This is not the case and a signal for the complimentary relationship between health services of two cities.

Table 1: Uses of medical facilities in the cities of Dhaka and Kolkata for difference diseases by Bangladeshi patients

Diseases	Bangladeshi patients in Dhaka (%)	Bangladeshi patients in Kolkata (%)
Accidents, Burns and Injuries	22.0	5.8
Urinary System	16.7	10.8
Bacterial, Viral and Parasitic Diseases	12.0	4.2
All Other Diseases	12.0	10.0
Digestive System	11.3	5.8
Blood Circulatory System	8.7	4.2
Cancer	6.0	35.8
Heart disease and rheumatic	4.0	12.5
Respiratory System	3.3	5.8
Central Nervous System	2.0	4.2
Obstetric and Pregnancy	2.0	0.8
Total	100	100

Health utility weight at the beginning of treatments

Table 2 presents the information that average health utility weight of Bangladeshi patients in Kolkata before treatments used to be higher than Bangladeshi patients in Dhaka and Indian patients in Kolkata. It suggests that patients go abroad for medical care with higher health utility weight. Calculated one-way ANOVA statistics support the variability among means. This statistic is significant at $\alpha = 0.05$ and the null hypothesis H_0 ($\sigma_{BD} = \sigma_{BK} = \sigma_{IK}$) may be rejected. Moreover, data analysis shows that about 95 percent of the Bangladeshi patients in the hospitals of Kolkata had their initial treatments in hospitals of own country. Later they came to India for better treatments. Indian patients in Kolkata also have lower average health utility weight at the start of treatments. Hence, maybe patients go abroad when they need more treatments of better quality. It is again pointing to the complimentary relationships between health services of Dhaka and Kolkata.

Table 2: Average health utility weights of different patients before treatments started at hospitals and One-Way ANOVA statistics

Patient group	Average Health Utility Weight before Treatment	One Way ANOVA Statistics	
		F	Significance (p)
Bangladeshi patients in Dhaka	-0.1954	3.15	0.044
Bangladeshi patients in Kolkata	-0.1038		
Indian patients in Kolkata	-0.2626		

Comparative QALY gains from treatments

Table 3 shows, Bangladeshi patients gain more QALY in Kolkata than other two groups of patients. It means patients went abroad gained more QALY than patients went for treatments in local hospitals. To be sure about this fact, pair wise hypothesis tests are performed. Mean QALY gains of Bangladeshi patients in Dhaka (BD) and Bangladeshi patients in Kolkata (BK) are tested. The calculated t statistics for this hypothesis is -3.125 and $p < 0.05$ ($p = 0.002$). Hence, the null hypothesis is not valid and difference in mean QALY gains is statistically significant. In case of hypothesis test of two samples, Bangladeshi patients in Kolkata (BK) and Indian patients in Kolkata (IK), the calculated t value is 1.535 and $p = 0.127$ ($p > 0.05$). Hence, null hypothesis remains valid and there is no significance difference between QALY gains between these two groups of patients. These findings may lead to the assumption that Bangladeshi patients used to achieve more QALY when receive treatments in Kolkata and that is statistically similar to QALY gains of Indian local patients. Health services in Kolkata complement the quality deficiency in health services in Dhaka.

Table 3: Mean QALY gain from treatment in hospital

Patient groups	Mean QALY Gain from Treatments	Coefficient of Variation of QALY Gain (%)
Bangladeshi patients in Dhaka	0.012	251.5
Bangladeshi patients in Kolkata	0.029	198.7
Indian patients in Kolkata	0.019	137.2

Costs and QALY gains

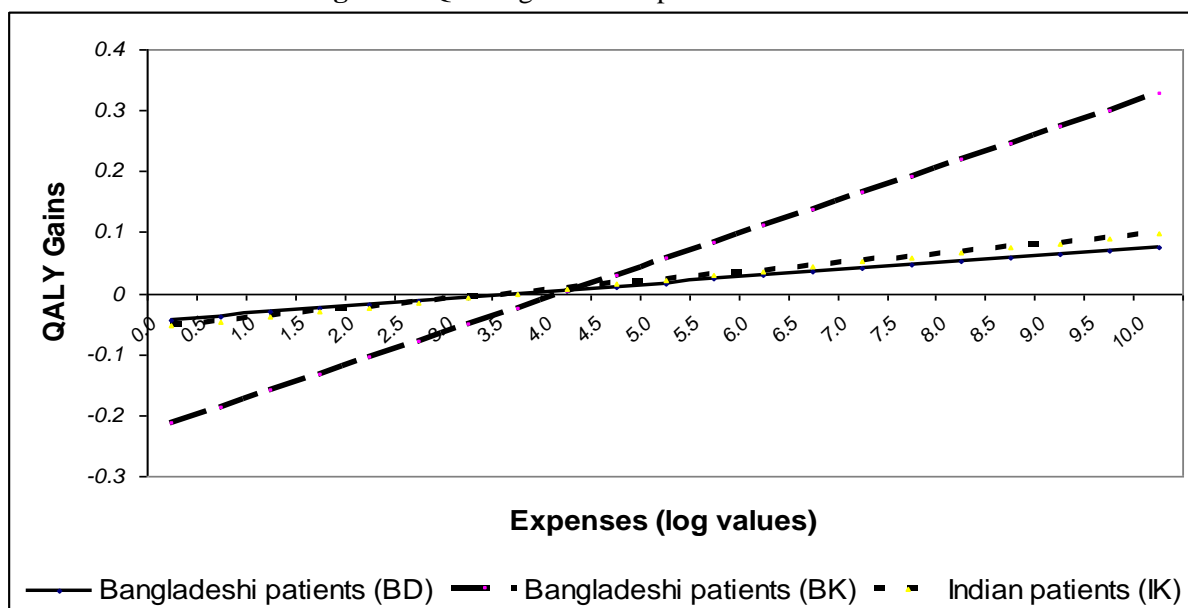
Linear regression models for all three groups of patients are developed where QALY is dependent variable and the total expense of treatment is independent variable. Table 4 shows all three regression models. Among the three models, the regression for Bangladeshi patients in Kolkata is statistically significant at $\alpha = 0.05$ and have higher R value. Other two models are significant only when $\alpha = 0.10$. The higher the slope of regression for Bangladeshi patients in Kolkata suggests that this group gets better quality treatments abroad for their expenses. Local patients both in Dhaka and Kolkata gain less QALY for money they spend.

Cost elasticity of QALY gain for Bangladeshi patients in Kolkata is 0.054 and significantly higher than the other two groups of patients. It is 4.5 times more than Bangladeshi patients in Dhaka and 3.6 times higher than Indian patients in Kolkata. Cost elasticity of QALY gains of Indian patients in Kolkata is 1.25 times higher than that for Bangladeshi patients in Dhaka. The figure 1 shows graphically the impacts of cost elasticity of QALY gains. The evidences supported that treatments at Kolkata have higher value for money than Bangladesh. In the context of the observed relationship of this paper, QALY gains for the period of treatment in hospital for a spending of US \$ 1,000 should give 0.015 to patients in Dhaka, 0.045 to Bangladeshi patients in Kolkata, and 0.019 QALY to Indian patients in Kolkata.

Table 4: Regression models for three groups of patients

Patient Group	Coefficients		R	R Square	ANOVA Statistics	
	Constant (b_0)	Variable (b_1)			F	Significance (p)
Bangladeshi Patients in Dhaka (BD)	-0.043	0.012	0.141	0.020	2.893	0.091
Bangladeshi Patients in Kolkata (BK)	-0.215	0.054	0.365	0.133	17.664	0.000
Indian Patients in Kolkata (IK)	-0.053	0.015	0.190	0.036	2.872	0.094

Figure 1: QALY gains for expenses of treatments



IV. Discussion

Bangladeshi patients used to go to Kolkata for taking medical care for chronic diseases while they use local medical care facilities more for infectious diseases, accidents, etc. The nature of uses suggests that patients use foreign health care for obtaining advanced and better treatments. In fact, the foreign health system can complement the deficiencies in the local health system.

Second important distinction in uses pattern is the level of the health utility weight at the beginning of treatments. Local patients at Dhaka and Kolkata entered in hospitals with lower health utility weights compared to Bangladeshi patients abroad. It supports the universal hypothesis that nearer the medical facility higher is its utility. Foreign health services are unable to fulfil the urgent and immediate requirements of patients. However, patients may go to another country with diseases, but at with higher health utility and enjoy quicker health improvements in a foreign country. More QALY gains by Bangladeshi patients in Kolkata from treatments is supported for this fact.

Another finding is the higher value for money of medical treatments abroad. The figure 1 shows visually more return for money in terms QALY gains for Bangladeshi patients abroad. For some unknown reasons the relationship between expenditure and health improvement is not statistically significant in case of local health systems. Bangladeshi patients in Dhaka and Indian patients in Kolkata achieved less health improvements at the same level of expenditures compared to patients abroad – Bangladeshi patients in Kolkata. Local health systems are cost insensitive after a certain level of health recovery. Probably this is x-inefficiency of health systems to local patients. On the other side, business motives and reputations of health care organisations may motivate them to provide better health care to foreign patients. However, this paper cannot give any definite conclusion in this regard and it needs further research and analysis. Analysis of findings leads to three conclusions.

First, foreign health services are in general, complimentary to national health services. Countries with deficiency in health facilities may utilise health services available in other countries. This may provide benefits by making available better medical facilities to citizens and help avoiding development of expensive health facilities within the country when resources are scarce.

Second, patients may gain at least equal, if not more, health recovery in a foreign country. Hence, cooperation between countries for reciprocal health services is now a real possibility. Trade in health services should be considered seriously in those countries where there are adequate skilled health professionals. Third, buying health care abroad is cost-effective for patients from Bangladesh. Many countries have cost inefficiencies in their health systems. Outsourcing health services may be a good strategy for cost containment for those countries.

V. Conclusion

The Indian health system is complementary to health care available in Bangladesh. Quality gaps and deficiencies in local systems encourage Bangladeshi citizens to import health services from India. Trade in health services between these two countries helps Bangladeshi patients to get required quality healthcare at

competitive costs. The careful combination and regional integration of national health systems of these two countries may provide various economic and health benefits. Cooperation between them in the form trade in health services may reduce the cost of health care around the world and may make distribution of health facilities more equitable. More research and investigation is now necessary to unveil true economic benefits of health care abroad under globalisation and free trade regime.

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Abu Hena Reza Hasan and SayadaJannatunNaim. "Import of Health Care Services from India: Is it complementary to or Substitute of the National Health Service of Bangladesh?". IOSR Journal of Economics and Finance (IOSR-JEF), vol. 10, no. 6, 2019, pp. 10-15.