

ORIGINAL ARTICLE

Treatment Cost of Wilms Tumor in BangladeshTania Taher¹, Afiqu Islam², Kaisar Haroon³, Nushrat Jahan Urmy⁴, Naima Roshni⁵**ABSTRACT**

Wilms tumor is the most common primary malignant renal tumor of childhood. Treatment of Wilms tumor consists of surgery, chemotherapy and occasionally radiotherapy. Counseling of parents, regarding the treatment cost is one of the most important components of treatment. However, as there is no published article or data is available in Bangladesh regarding the actual treatment cost of the disease, it becomes very difficult for the paediatric oncologists and paediatricians to give exact idea to the parents about the treatment cost. This cross-sectional, observational study was aimed to ascertain the treatment cost of Wilms tumor in Bangladesh. The study was done in the Department of Paediatric Hematology & Oncology and Department of Paediatric Surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU) Hospital and Department of Paediatric Surgery of Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh, between December 2010 and May 2011. Sixteen patients were enrolled from indoor and outpatient department of both the hospitals. Data was collected by interviewing parents and checking the order for chemotherapy. Investigation cost and medicine cost was calculated from money receipt of the hospital and medicine store respectively. Data was noted in the prepared questionnaire form and cost of treatment of individual patient was calculated. The treatment cost including operative, chemotherapy and radiotherapy cost was calculated in free bed and paying bed of both the hospitals. In free bed, treatment cost for stage-I was USD 427.26, while for stage II-IV was USD 529.35. In paying bed, treatment cost was USD 548.59 for stage-I, USD 653.24 for Stage II-IV, and USD 2802.71 for relapsed cases with intensive chemotherapy. In private hospitals, treatment cost was USD 756.35 and USD 858.44, for stage-I and Stage II-IV respectively. To conclude, treatment cost depended upon the staging, histology and whether the treatment was done in Government Hospital or private hospital. However, if a child with Wilms tumor presents at earlier stage, the treatment is quite affordable at around USD 425 in government tertiary level hospital in Bangladesh.

Keywords: Wilms tumour, nephroblastoma, treatment cost, Bangladesh

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INTRODUCTION

Wilms tumor also called nephroblastoma, is curable and fifth most common type of all childhood tumors. It accounts for approximately 6% of all childhood cancers. 90% of all kidney cancers in children are Wilms tumor. The

incidence of Wilms tumor is approximately 8 cases per million children <15 year of age.¹ The treatment used to treat Wilms tumor (i.e., surgery, chemotherapy and occasionally radiotherapy) is an example of success achieved through a multidisciplinary collaboration of the National

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Wilms tumor Study group (NWTSG) and the Society Internationale D' oncologie Pediatrique (SIOP).² The last three decades have witnessed great improvement in the treatment of Wilms tumor with high cure rates in the more developed countries. However, the chances of survival are poor in developing countries, because of limited access to appropriate specialist care. Data in the medical literature on the treatment cost of Wilms tumor in developing countries are limited.³ The cost of chemotherapy should not be reduced to drugs alone. Since location is also a factor in price, transportation organizations sometimes add their own costs, which the hospitals generally carry over to the patient. Hospital fees and service fees associated with the administration of the drugs and the patient care needed afterward must also be calculated, and these differ from place to place. Given the many factors, the actual cost of chemotherapy tends to vary considerably.

Although a good number of patients are treated and cured in Department of Paediatric Hemato-oncology of Bangabandhu Sheikh Mujib Medical University (BSMMU) Hospital and other tertiary hospitals in Dhaka city, Bangladesh, the actual treatment cost for different childhood malignancy in Bangladesh, has not yet been identified. As Wilms tumor is curable and fifth most common paediatric malignancy, it is needed to find out the total treatment cost of Wilms tumor, including all three modalities of treatment.

METHODS

This cross sectional, observational study was conducted in the Department of Paediatric Hematology & Oncology and Department of Paediatric Surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU) Hospital and Department of Paediatric Surgery of Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh, between December 2010 and May 2011. A total of sixteen patients diagnosed with Wilms tumor and aged <15 years were enrolled in the study. At enrollment patients' demographic and clinical characteristics were recorded.

Total treatment costs included both operative and chemotherapy costs. To measure the operative cost, the preoperative investigation costs, surgical drugs and equipment costs, OT charge and bed cost were included. Similarly, to determine the chemotherapy related costs, we summated cytotoxic chemotherapy drugs costs, general

drugs costs and also relevant investigations costs. Since the treatment cost varied according to the staging of Wilms tumor, final results, i.e., total treatment costs were represented the stage wise treatment costs for each patients. Then all costs were summated and converted into US Dollars according to Bangladesh Bank's currency conversion rate (i.e., 1 USD=83 BDT, as per average conversion rate observed during the study period).

Data was compiled, coded and analyzed. Data analysis was done using MS-Excel sheet in the computer. Data was expressed in bar diagrams.

RESULTS

The mean treatment costs for stage-I and stage-II with favorable histology were estimated USD 424.54 and USD 547.64 in free bed and paying bed respectively. However, in private hospitals, the average treatment costs raised up to USD 751.54 (Figure 1). The mean treatment costs for stage-III & stage-IV and stage-II with unfavourable histology were estimated USD 525.98 and USD 649.08 in free bed and paying bed respectively. However, in private hospitals, the average treatment costs raised up to USD 852.97 (Figure 2). Only one patient presented with relapse and he was admitted in paying bed. His total cost was found USD 2784.86 (Figure 3).

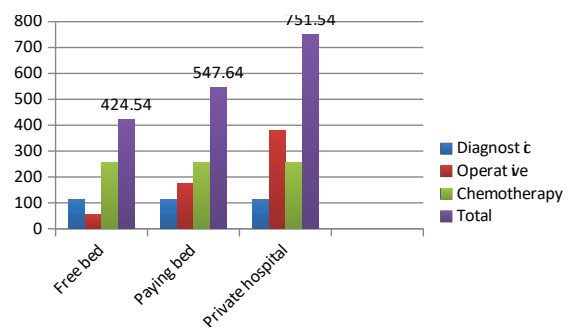


Figure 1: Treatment costs (in USD) for stage-I and stage-II with favorable histology.

DISCUSSION

Wilms tumor is the commonest primary renal neoplasm in children. The present study also tried to find out the total treatment cost of Wilms tumor. We found that treatment cost varied between USD 427.75 and USD 655.03 in patients of stage-I to stage-IV. However, treatment cost was found much higher (USD 2802.71) for relapsed cases

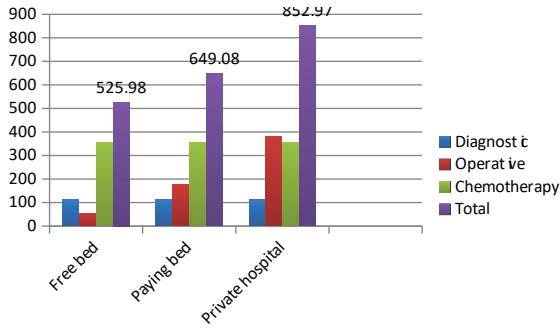


Figure 2: Treatment costs for stage-III, stage-IV and stage-II with unfavorable histology.

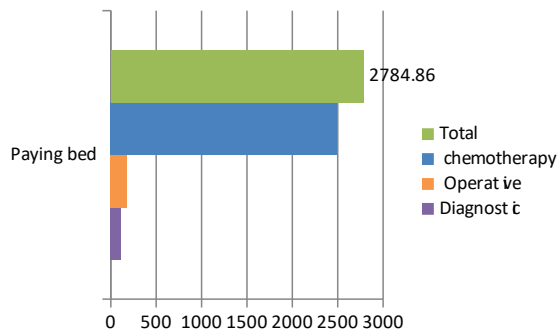


Figure 3: Treatment cost for relapsed case with intensive chemotherapy.

with intensive chemotherapy. Treatment cost also became much higher, if the operation was done in private hospitals. Because investigation cost, medication cost and per-operative cost and post-operative cost was much expensive in those hospitals. In non-government hospitals, treatment cost was USD 756.35 and USD 858.44, for stage-I and stage II-IV respectively. Two patients of stage-III got radiotherapy. One of them had favourable histology and the other had unfavourable histology. Total radiotherapy cost for favourable histology was USD 51.30 and for unfavourable histology USD 102.60. Although chances of complications like septicaemia, anemia are much lower in Wilms tumor; only few patients needed blood transfusion and broad spectrum antibiotics for severe septicaemia. This caused an additional burden of about USD 13.47–98.75; severe septicemia and antibiotic was prescribed for seven days. Other accessory medications like I/V cannula, dextrose saline, microburette set cost about additional USD 4.5 per episode. Literatures regarding the treatment cost of Wilms tumor are lacking in Bangladesh, as well as in neighboring country and also in abroad.

In a study done by Carrico et al., the medical and imaging records of 60 patients (28 male, 32 female; aged 3 days to 12.6 years) in NWTs IV were analyzed.⁴ The total patient cost for imaging was USD 442,180; that is USD 94,212 for initial and USD 347,968 for follow-up studies. Many areas of potential cost savings were identified. Protocol compliance was variable.

Barr et al. showed the mean total expenses (in 1986) incurred by families of childhood cancer patients over the entire course of therapy are CAD 26,070 for acute lymphoblastic leukemia CAD 20,074 for Wilms tumour, and CAD 10,376 for neuroblastoma.⁵

A study was designed by the Wilms tumor study group in 1995 in USA to evaluate the efficacy, toxicity and cost of administration of different regimens for the treatment of Wilms tumor. The charges for treatment with dactinomycin and doxorubicin administered by two different schedules. The study reported an annual savings of approximately 779,259 USD, for all children with Wilms tumor of stages I-IV/favourable histology, could be achieved by the use of the short, pulse-intensive (i.e., single-dose) treatment regimens. The pulse-intensive administration schedule for the treatment of children with Wilms tumor permits administration of chemotherapy at a substantially lower total treatment cost.⁶

Another study showed that the charge for treatment with the short pulse intensive treatment regimens (6 months) for all children with stages I through IV favourable histology Wilms tumor was approximately one half of that with the long standard treatment (15 months) regimens.⁷ Similar observations were reported by Fung et al., as they stated that cost and cost-effectiveness of treatment vary by type of childhood cancer, its complexity including duration of chemotherapy, need for surgery, and need for supportive care. For example, treatment costs seem higher in cancers requiring longer chemotherapy duration or requiring surgery, such as Wilms tumor.⁸

In the context of Bangladesh, treatment costs tend to increase further, depending upon the lodging and transport cost. Investigation costs during follow up will add additional cost. Another study reported that costs of cancer treatment and financial catastrophe in families relating to cancer patients are alarmingly high in Bangladesh.^{9,10} However, earlier cancer diagnosis and implementation of

government financial health protection schemes are crucial and urgent to alleviate the enormous economic burden and ensure equitable access to care for the patients.¹⁰

Further studies are needed in future including those factors into consideration. This study was done only in two tertiary care hospitals and there is no published data, regarding the treatment cost of Wilms tumor in Bangladesh. Multicenter study throughout the country are needed; hence, that we can give the actual picture of treatment cost of Wilms tumor to the people of Bangladesh.

CONCLUSION

In the present study, treatment cost depended upon the staging, histology and whether the treatment was done in government hospital or private hospital. Hence, it can be concluded that if a child with Wilms tumor presents at earlier stage, treatment is affordable at around USD 425 in government tertiary level hospital in Bangladesh. Hence, if proper counseling of

parents can be done regarding the affordable cost and favorable outcome of Wilms tumor at earlier stage, prognosis will be much better for children.

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Ethical approval: Ethical approval was obtained from the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. As our participants were minors (<15 years), we sought assent from them as well as written informed consent from their parent(s) or legal guardian.

Authors' contribution: Conceptualization and design of the study: T Taher, A Islam; Patient selection and interviews: T Taher, K Haroon, N Roshni; Data scrutiny, compilation and analysis: T Taher, K Haroon, NJ Urmy; Manuscript preparation, editing and final submission: T Taher, A Islam, K Haroon, NJ Urmy, N Roshni.

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