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Burden of Childhood Diseases at Baptist Hospital Mutengene: A Retrospective Survey

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Abstract

Childhood diseases, pediatric cancer burden, Baptist Hospital Mutengene, Cameroon.

The pattern of disease burden has changed worldwide in past decades. Non communicable diseases, including cancers, are the main cause of mortality and morbidity in both high income countries (HICs)and low and middle income countries (LMICs). Pediatric oncology is not seen as a child health priority in most LICs like Cameroon amongst many others where pediatric cancer data are fragmented. The objective of this study was to generate data on childhood diseases at Baptist Hospital Mutengene(BHM) and to measure the burden attributed to pediatric cancerusing incidence, mortality, cancer related admission and quality of life in cancer survivors in order to guide resource allocation to the pediatric ward. A retrospective cohort study and a secondary data analysis were conducted from 2006 to 2013. Communicable diseases (malaria, chest infection and diarrhea) constitute the main burden of childhood diseases at BHM based on incidence and mortality. Pediatric cancers led by Burkitt lymphoma are contributing to an extent to the burden of childhood diseases with a proportionate incidence of 1 to 2 cases per 1000 per year and an admission rate of 31.8 per 1000 per year. 26 (13%) of 193 Burkitt lymphoma patients suffered a disability in the course of their illness and treatment and 2 (7.6% of the 26 but 1% of the 193) had a permanent disability due to Burkitt lymphoma, the leading pediatric cancer at BHM .Pediatric cancers contribute to increasing the burden of childhood diseases at BHM based on incidence, admission rate and quality of life of cancer survivors.

A large and increasing proportion of global childhood mortality and morbidity is due to non-communicable disease (NCD) and 6.0% and 18.6% of deaths, in low and middle income countries respectively, among children aged 5 to 14 years are due to cancer (Magrath I, 2013). The burden of childhood cancer has improved during the last decade in HICs where the cure rate has reached 80% (Gupta S, 2014). In HICs 75 to 79% of children with cancer have a 5 years event free survival, but these tremendous advances in the outcome of childhood cancers in HICs are not concomitantly observed in LMICs where 80% of childhood cancers occur with only a20% cure rate (Howard S.C, 2008). Policy makers are not aware of the current and future magnitude of the burden of cancer (Jemal A, 2012) and of the availability of effective resource adapted treatment protocols (Gopal S, 2012). In Cameroon Pediatric haemato-oncology as a subspecialty was only available at the Chantal Biya foundation children hospital in Yaoundé. The NGO World Child Cancer (WCC) analysis of childhood cancers in Cameroon concluded that there was a lack of locally appropriate protocols for most treatable and easily diagnosed childhood cancers, lack of trained healthcare professionals to administer chemotherapy drugs, and lack of funding for curative drugs and palliative care (WCC, 2013). As part of a twining project between Stellenbosch University/Tygerberg Children's Hospital (TCH) of South Africa and the Cameroon Baptist Convention Health Board (CBCHB) hospitals, Banso Baptist Hospital (BBH), Mbingo Baptist Hospital (MBH), and Baptist Hospital Mutengene (BHM), the Beryl Thyer Memorial

Africa Trust (BTMAT) and World Child Cancer (WCC), three pediatric cancer units now offer comprehensive effective care at minimal cost in the north and south west regions of Cameroon (WCC, 2013). At BHM children diagnosed with cancer are admitted to the general pediatric ward and treated by a team consisting of a physician generally a GP, a pediatric oncology nurse locally trained to administer chemotherapy, and a hospital based pediatric palliative care service. The burden of childhood cancer in this health care setting has not been estimated before.

Pediatric cancer survivors face life-long health issues, including serious chronic conditions and secondary cancers (Melissa M, 2003)

In most LMICs population based childhood cancer registries are non-existent. In Zambia only one out of 9 children suffering of cancer is diagnosed, registered and reported(Jeremy S et al, 2014).

Challenges in treating cancer effectively in LMICs include the lack of availability of trained personnel, essential chemotherapeutic agents, cost of treatment, late stage at presentation, limited or no radiotherapy, limited surgical expertise and supportive care, which all contribute to a low cure rate (Gopal S 2012, WCC 2013, Jeremy S 2014).

In Cameroon statistics of pediatric cancers are rare and fragmented (Enow Orock, G 2012). Three hospitals - based pediatric cancer registries have been established at BBH, MBH and BHM. 111 new cancers in children aged 0 to 15 years were registered in the POND registry at these three CBCHB hospitals in 2013 (CBC HB annual report 2013). The population based cancer registry of Cameroon in Yaoundé has been discontinued because of a lack of financial and, human resources (Enow Orock G 2013).

The objective of this study was to generate dataon childhood diseases at BHM in order to quantify the burden attributed to pediatric cancer in this setting, and to guide decision making in the allocation of resources to the child health department.

The specific objectives were to determine the incidence and mortality of childhood diseases, to calculate childhood cancers related admissions, childhood cancer proportionate incidence and mortality, and to determine the quality of life of survivors of childhood cancers following treatment at BHM.

Methods

A facility based data review retrospective cohort study based was conducted. The research was conducted at Baptist hospital Mutengenein the SW Region of Cameroon. BHM offers medical, spiritual and psychosocial care. The hospital attends to more than 8000 patients per month with different health problems and from various towns like Buea, Limbe, Tiko, Kumba, in the South West Region, and Douala, Nkongsamba, in the Littoral Region.

In December 2013 medical staff at BHM included 12 permanent medical doctors and 74 nurses, with an annual OPD attendance of 106 894, an in-patient attendance of 4 532. The total bed capacity of 87 included 10 beds in the pediatric ward. Members of staff included a dentist, an orthopedic surgeon, an internist and an ophthalmologist.

Pediatric cancer care started in 2006 with treatment of patients with BL. Since then treatment has also been implemented for Kaposi sarcoma, retinoblastoma and Wilms tumors with standardized protocols and supportive care. Children with incurable cancers are offered palliative care.

The study population included all children aged 0 to 15 years seen at BHM from January 2006 to December 2013 at both outpatient and inpatient departments.

The study population was divided into yearly cohorts in order to better calculate the yearly proportionate incidence and mortality of childhood cancers and other childhood illnesses, pediatric cancer admission rate and bed occupancy

Specific data collection tools were used to capture the annual number of pediatric (0 to 15 years) patients at both inpatient and outpatient departments, childhood illnesses incidence and

mortality, pediatric bed occupancy and pediatric cancer relate admission, and the quality of life of survivors of Burkitt lymphoma.

The research proposal was approved by the Cameroon Baptist Convention Institutional Review board (IRB).

Data were obtained from the hospital statistic office, the CBC HB annual reports, the pediatric cancer registry (POND), individual pediatric cancer patient records, and from a previous survey on the outcome of patients diagnosed with BL complicated by paraplegia at diagnosis. Obstetric Labour, delivery, and post-natal ward discharge registers were studied. All new cases of selected childhood illnesses were recorded in order to calculate the proportionate incidence of ten selected childhood illnesses. Data on pediatric mortality were obtained from the hospital's monthly report forms.

All data we reanalyzed with Microsoft excel.

Results

BHM experienced an expansion in terms of patient attendance, bed capacity, number of deaths and number of doctors. The number of pediatric deaths remained relatively stable below 100 (table 1) with mild fluctuations and an average of 36.9 cases per 1000 per year (SD: 10.2). Pediatric inpatient attendance increased slowly by 8.5% with a gradual relative decreasing bed capacity compared to adults (from 13.6% to 11.4%). Death registration was not available for 2008. Figures in Table 1 were obtained by calculating the average number of deaths for the years 2007 and 2009.

The incidence of different childhood diseases is listed in Table 2. Malaria was the leading cause for consultation in children. The trend of malaria incidence shows a consistent decrease during the study period. The proportionate incidence of childhood cancer was one to two cases per 1000 children per year and ranked 5th after malaria, diarrhea, respiratory infections and anemia. HIV related illnesses, injuries/accidents, malnutrition and neonatal sepsis were not common causes of ill health.

During 2008 incidence data were only recorded for 3 diseases namely cancer, neonatal asphyxia and injury/accident. The incidence for the other diseases in the table was obtained by calculating the average of the number of new cases of each disease for the years 2007 and 2009.

Malaria, neonatal sepsis and asphyxia, anaemia, respiratory infections and diarrhea were the leading causes of death amongst children at BHM (Table 3). Data of neonatal asphyxia proportionate mortality were available and recorded only for the last 3 years of the study period. Cancer, HIV, malnutrition and injuries/accidents were infrequent causes of child death. Mortality data for 2008 were only available for neonatal sepsis. For other causes of death the average of total deaths recorded during 2007 and 2009 was used.

The proportionate incidence of pediatric cancers is provided in Table 4. The 156 cases include 96 males and 60 females, showing a clear male predominance. BL, the most common cancer, accounted for 88.4% of all cases. Kaposi sarcoma, retinoblastoma and rhabdomyosarcoma are gradually being diagnosed. Kaposi sarcoma affects mostly males. Analysis of other cancers is not possible due to the small numbers.

Seventy six per cent of newly diagnosed pediatric cancers came from Southwest region (SWR), mostly from the Fako division (44%) where BHM is located, Meme division (22%), Ndian division (7%) and Manyu division (4%). There was no case from the Kupemanenguba and Lebialem divisions. All the retinoblastoma patients were not from the SWR. Other patients came mainly from the neighbouring Littoral region (Wouri and Mungo divisions), and a few from the South and Centre regions. One patient came from Chad. The cancer admission rate per 1000 children/year is detailed in Table 5.

The pediatric inpatient service is highly utilized with average annual bed occupancy of 104.7% (SD 15.5).Admissions due to cancer were averagely 31.8 per 1000 per year (SD12.8). Both the bed occupancy and cancer related admissions showed a gradual decrease during the last 3 to 4 years of the study period.

Paraplegia was present at diagnosis in 26/193 (13.5%) children diagnosed with BL at BHM since the onset of the service. Twelve cases died during or after treatment. Of the 14 long term survivors 12 (86%) had completely recovered and two (14%) were disabled with neurological sequelae.

Discussion

The organization of a health care system and a health care service, medical treatment services included, requires planning and is part of public health administration. Proper planning and organization of a care and treatment program is difficult without the availability of organized data. Many articles have reported poor documentation and organization of pediatric cancer programs and medical services in LMICs in contrast to HICs (Valsecchi MG 2008, Ribeiro RC 2008, Jeremy S et al, 2014).

In 2008, the annually reported incidence of cancer was 12.7 million globally while the reported number of death due to cancer was 7.6 million (Kim JL 2014; Ferlay J, 2010). The 5-year global cancer prevalence was estimated to be 28.8 million in 2008 (Bray F, 2008). According to prediction LMICs are expected to host close to 60 per cent of world cancer by 2050. Knowing the prediction helps and guides public health administrators in the allocation of resources for prevention (Bray F, 2006).Contrary in our study data on incidence and mortality of most childhood diseases were not available for the year 2008. All pediatric admissions and discharges for example are recorded in the general medical ward admission/discharge register that mixes both adults and children in the same register. Our study therefore identified underreporting of cases, the weakness and poor quality of the disease surveillance system, which prevails in many other countries (Bonita R). A recent study at the Windhoek Central Hospital, the only pediatric oncology-referring centre in Namibia, concluded that the incidence of cancer was very low compared to other countries because many cancers were still not diagnosed or reported, and others were not treated in the country (Stefan DC et al, 2014). Pediatric cancer data at BHM however were complete because of the existence of a comprehensive pediatric cancer program with a registry office using POND to record data of all pediatric cancer occurrences, and because of the presence of individual patients' data collection tool well documented by a pediatric oncology nurse and the supervising physician. This study therefore confirms the important role of cancer registries in the documentation of cancer epidemiology (Gupta S et al. 2014).

The trend analysis of performance indicators of interest to this study shows a considerable increase of most indicators with patient attendance and other indicators having doubled during the study period (table 1), with exception of the pediatric outpatient and inpatient departments attendance, and the pediatric bed capacity that have increased only by 19.5%,8.5% and 66. 6% respectively (table 1). Childhood illnesses, compared to adults illnesses, contribute to the burden of disease at BHM with 14, 9% of overall OPD attendance, 21,5% of overall admission and 23,7% of overall death cases (table 1)because of lack of adequate pediatric OPD and inpatient services as shown by the trend of pediatric bed capacity in contrast to adult bed capacity for example that restrict the demand of pediatric services. These observations are similar to those of the HIV-AIDS control program in Cameroon and in other high HIV burden countries where there is a big gap between adult and pediatric care and treatment services due to quasi absence of organized pediatric HIV care and treatment services resulting in under diagnosed, poor linkage to treatment programs, poor treatment uptake and report of small number of children leaving with HIV who initiate treatment in contrast to adults(PMTCT global report 2014).

Although the pediatric inpatient attendance has increased by only 8.5%, the utilization rate of the pediatric ward exceeded the bed capacity as shown by the trend of pediatric annual bed occupancy rate, which was > 100% most of the time (4 years out of 7) with an average of 104.7% (SD: 15.5). The average admission rate due to cancer was 31.8 per 1000 per year, SD:12.8,(table 5). This means that the demand of pediatric inpatient service is far bigger than the actual pediatric inpatient service capacity that BHM administration is offering. The implication is that some pediatric patients, including those with cancer, are very often admitted in the adult ward where they are mixed with adult patients. There is therefore an urgent need to create additional capacity to treat children, a pediatric inpatient department with a spacious ward and its own staff members separated from the adult, or "*general medical ward*", and which must be able to accommodate all pediatric patients and provide a section for pediatric cancer patients.

The trend analysis of the annual proportionate incidence and mortality of 10 selected childhood illnesses placed malaria in the first position and cancer in the fifth with a relatively stable incidence of 1 to 2 new cancer (s)case (s) per 1000 children per year just behind diarrhea, chest infections and anemia in term of incidence(table 2).The trend of malaria incidence showed a consistent decline over time during the study period. The decline of malaria incidence corresponds with the WHO report on the global trend of malaria incidence (WHO 2014). In term of mortality, malaria, chest infections, neonatal sepsis, anemia and diarrhea were successively the top five leading causes of pediatric death(table 3). Cancer was among the least reported causes of death at BHM in our study because many patients with advanced disease and treatment failure die at home rather than in the hospital, and therefore are not captured by hospital death data. Simple, inexpensive chemotherapy can achieve a cure rate of up to 60% at 1 year, implying that at least 40% will die of their illness (Hesseling PB et al, 2012). Some factors (underreporting, incomplete data, the setting) may bias the ranking of childhood diseases incidence and mortality in our study but, our review clearly shows that infectious diseases constitute the burden of childhood diseases at BHM and pediatric cancers are gradually contributing to the burden of disease. The distribution of childhood cancers occurrence at BHM is similar to that reported from the Chantal Biya Foundation pediatric oncology centre in Yaoundé (Enow-Orock G. Eet al, 2012), and in a study conducted in children aged 0–15 years in the pediatric oncology ward at the university teaching hospital (UTH) of Lusaka in Zambia. The Zambian findings are consistent with reports from other LMICs in Sub Saharan Africa (Jeremy S. et al, 2014).Burkitt Lymphoma is the leading cancer in children at BHM, and predominates in males. Two of the 26 BL patients with paraplegia,(1 male and 1 female) had permanent squeal indicating that 13% of patient with Burkittlymphoma are at risk of living with a disability (paraplegia) in the course of their illness, and 1 %are left with permanent disability (paraplegia).

We noted that most children diagnosed with cancer at BHM come from the SWR and mainly from four divisions - Fako, Meme, Ndian and to a certain extent Manyu. No cases came from Lebialem or Kupemaneguba divisions probably because of lack of outreach and sensitization, topography and bad roads to and in these two divisions. Some cases did come from the Mungo and Wouri divisions in the Littoral region which shares it's boundary with the SWR through these two divisions mentioned above. A few cases came from far regions like the Central and South regions, and even from a neighboring country, Chad, due to awareness of the pediatric cancer program at CBC HB hospitals

Conclusions

BHM is expanding its services at a fast rate. Although the burden of disease at BHM attributed to childhood illnesses represent less than 25% of the overall burden of disease in this setting as shown by OPD, in patient attendance and mortality data, the pediatric inpatient service is

overburdened with an average annual bed occupancy rate of 104%, underscoring the need for urgent expansion of this service

Annual trends of childhood diseases reveal that communicable diseases led by malaria, diarrhea and chest infections contribute far more to the burden of pediatric diseases than cancers. There are gaps in registration and reporting of the incidence and mortality affecting our disease surveillance system, and the need for strategies to improve on data collection tools and reporting systems. Pediatric mortality at BHM showed a stable trend even though death due to cancer occurs more in the community after discharge from the hospital or even before admission because some children had never consulted a western health service provider. Cancer led by BL, occurs at the rate of 1 to 2 per 1000 children per year at BHM. With the pediatric cancer outreach program that aims to create awareness of early warning signs of pediatric cancers in the communities and among health care workers we can predict that if sensitization is done in the two divisions of the SWR not yet reached by the program (Lebialem and Kupemanenguba), the number of new cases of pediatric cancers will increase at BHM as demonstrated by cases coming from far regions like the Centre and South regions that are aware of the treatment program. The completeness and accuracy of pediatric cancer data is due to the existence of the POND cancer registry and good quality of primary data collection tools (patient treatment records).

In seven years of existence the pediatric cancer program of BHM has expanded and now covers 66, 7 % of the SWR where the hospital is located, and pediatric cancers are gradually contributing more to the burden of pediatric diseases at BHM. It would be of interest to incorporate the cost analysis, DALYs and QALYs into the analysis. Time constraints prevented this. Recommendations to the BHM administration are to increase the bed capacity in the pediatric ward, and to improve the health information management system.

Limitations of this study were that it was limited to a review of a health facility data retrospectively over a time period, and not a case control cohort study.

Conflict of interest

We declare no conflict of interest

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References

[1]. Magrath I, Steliarova-Foucher E, Sidnei E, Ribeiro RC, Harif M, et al (2013). Pediatric cancer in low-income and middle-income countries. Lancet Oncol 14: 3104–3116 [PubMed]

[2]. Gupta S, Rivera-Luna R, Ribeiro RC et al (2014). Pediatric Oncology as the Next Global Child Health Priority: The need for national childhood cancer strategies in low- and middle-income countries, PLoS Med. Jun 2014; 11(6): e1001656. Published online Jun 17, 2014.doi: 10.1371/journal.pmed.1001656 PMCID: PMC4061014

[3]. Howard SC, Metzger ML, Wilimas JA, Quintana Y, Pui C-H, et al (2008). Childhood cancer epidemiology in low-income countries. Cancer 112: 461–472 [PubMed]

[4]. Jemal A, Bray F, Forman D, O'Brien M, et al (2012).Cancer burden in Africa and opportunities for prevention. Cancer 2012;118:4372-84. VC 2012 American Cancer Society.

[5]. Gopal S, Wood WA,Hesseling PB, Mitsuyasu RT (2012).Meeting the challenge of hematologic malignancies in sub-Saharan Africa. www.bloodjournal.org online March 28, 2012 doi:10.1182/blood-2012-02-387092 originally published online 2012 119: 5078-5087.

[6]. World Child Cancer (2013). Project facts sheet for Cameroon. www.worldchildcancer.org

[7]. Melissa MH; Ann CM; Yutaka Y, et al(2013) Health Status of Adult Long-term Survivors of Childhood Cancer: A Report From the Childhood Cancer. JAMA. 2003;290(12):1583-1592 (doi:10.1001/jama.290.12.1583)
[8]. Jeremy S. Slone mail, Chunda-Liyoka C, Perez M et al(2013).Pediatric Malignancies, treatment outcomes and abandonment of pediatric cancer treatment in Zambia: Published: February 21, 2014 DOI: 10.1371/journal.pone.008910
[9]. Enow-Orock G. E, Pondy A, Doumpe P, Koki N, Lemerle J(2012).A pediatric oncology group pilot study on childhood cancers at the Chantal Biya Foundation Yaounde, Cameroon: Report of 350 cases. Scientific research and essays Vol. 7(25), pp. 2237-2241, 5 July, 2012. Available online at http://www.academicjournals.org/SRE
[10]. Cameroon Baptist Convention Health Board (2013), Activity report. www.cbchealthservices.org
[11]. Enoworock G. (2013).Childhood cancer in Yaoundé, Cameroon. Proceedings of the second CBC childhood cancer symposium.A decade of dedication. 29 Nov 2013. CBC health services complex, Mutengene.
[12]. Jeong Lim Kim, Kyoung-Hee Cho, Eun-Cheol,Woo Hyun Cho (2014). A single measure of cancer burden combining incidence with mortality rates for worldwide application. Asian Pac J Cancer Prev, 15 (1), 433-439.
[13]. Bray F, Ren JS, Masuyer E, Ferlay J (2013). Global estimates of cancer prevalence for 27 sites in the adult population in 2008. Int J Cancer, 132, 1133-45.
[14]. Bray F, MÃller B (2006). Predicting the future burden of cancer. Nat Rev Cancer, 6, 63-74
[15]. Valsecchi MG, Steliarova-Foucher E (2008). Cancer registration in developing countries: luxury or necessity? Lancet Oncol 9: 159–167. doi: 10.1016/s1470-2045(08)70028-7
[16]. Ribeiro RC, Steliarova-Foucher E, Magrath I, Lemerle J, Eden T, et al (2008). Baseline status of paediatric oncology care in ten low-income or mid-income countries receiving my child matters support: a descriptive study. Lancet Oncol 9: 721–729. doi: 10.1016/s1470-2045(08)70194-3
[17]. Bonita R, BeagleholeR,KjellströmT (2006). Measuring health and disease Chapter 2, Basic epidemiology 2nd edition. World Health Organization
[18]. Stefan DC, Baadjes B, Kruger M (2014).Incidence of childhood cancer in Namibia-the need for registries in Africa.The Pan African Medical Journal. 2014;17:191. Permanent link: http://www.panafrican-med journal.com/content/article/17/191/full. Doi:10.11604/pamj.2014.17.191.3830
[19]. UNAIDS 2014 PROGRESS REPORT ON THE GLOBAL PLAN towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive
[20]. WHO (2014).World malaria report, global malaria programme, World Health Organization, 2014 updates
[21]. Hesseling PB.(2012). The SIOP Burkitt lymphoma pilot study in Malawi. Medical and pediatric oncology 200; 34:142

APPENDICES

Table 1: BHM performance indicators 2006 - 2013

SN	Indicators	2006	2007	2008	2009	2010	2011	2012	2013
1. Workload									
In and out patients ' load		**56,064**	**52,829**	**59,728**	**61,795**	**87,550**	**96,629**	**99,157**	**111,426**
Doctors		5	4	4	4	3	6	8	12
Nurses		30	43	43	31	42	63	72	74
2. OPD attendance									
D	Total OPD attendance:	53,346	50,465	56,689	58,898	84,180	93,252	95,270	106,894
N	Paediatric OPD attendance:	13,346	11,766	13,058	11,174	12,943	10,696	15,219	15,960
% of Pediatric OPD attendance		**25%**	**23,3%**	**23%**	**18,9%**	**15,3%**	**11,4%**	**15,9%**	**14,9%**
3. Inpatient attendance									
D	Total inpatient attendance:	2 718	2 364	3 039	2 897	3 370	3 377	3 887	4 532
N	Paediatric inpatient attendance:	898	510	639	696	750	706	777	975
% pediatric inpatient attendance		**33%**	**21,5%**	**21,2%**	**24%**	**22,2%**	**20,9%**	**19,9%**	**21,5%**
4. Bed capacity									
D	Total bed capacity	44	45	44	47	50	50	81	87
N	Paediatricbed capacity	6	6	6	6	6	6	7	10
%¨of pediatric bed capacity		**13,6%**	**13,3%**	**13,6%**	**12,7%**	**12%**	**12%**	**8,6%**	**11,4%**
5. Mortality									
D	Total Deaths	83	49	75	100	165	114	106	139
N	Paediatricdeaths	45	22	30	38	50	26	47	37
% of pediatricdeath		**54, 2**	**44, 89**	**40**	**38**	**33, 3**	**22, 6**	**44, 3**	**23,7**

Key: SN - Serial number, D - Denominator, N – Numerator, NA: not available

Table 2: Incidence of childhood diseases (per 1000)

SN	Indicators	2006	2007	2008	2009	2010	2011	2012	2013
D	**Paediatric OPD consultations**	**13,346**	**11,766**	**13,058**	**11,174**	**12,943**	**10,696**	**15,219**	**15,960**
N1	• New malaria cases	2575	1741	1462	1182	2113	1578	1852	2061

I1	**Malaria incidence**	**193**	**148**	**120**	**106**	**163**	**147**	**121**	**129**
N2	• New diarrhoeal diseases	83	145	178	211	330	211	270	250
I2	**Diarrhoeal diseases incidence**	**6**	**12**	**15**	**19**	**25**	**20**	**18**	**16**
N3	• New Chest infection	342	162	214	265	247	294	367	294
I3	**Chest infection incidence**	**20**	**14**	**16**	**24**	**19**	**27**	**24**	**18**
N4	• New HIV related illnesses	12	11	13	14	16	11	14	11
I4	**HIV related illnesses incidence**	**0 ,8**	**0,9**	**1**	**1**	**1**	**1**	**0,9**	**0,6**
N5	• New cases of Anaemia	23	18	45	71	70	30	28	57
I5	**Anaemia incidence**	**2**	**2**	**3**	**6**	**5**	**3**	**2**	**3**
N6	• New Malnutrition cases	02	00	00	00	00	02	05	06
I6	**Malnutrition incidence**	**0,1**	**00**	**00**	**00**	**00**	**0,2**	**0,3**	**0,3**
N7	• New Neonatalsepsis cases	00	00	00	00	00	00	00	05
I7	**Neonatalsepsis incidence**	**00**	**00**	**00**	**00**	**00**	**00**	**00**	**0,3**
N8	• Neonatal asphyxia	16	14	15	21	15	18	21	13
I8	**Neonatal asphyxia incidence**	**1**	**1**	**1**	**2**	**1**	**2**	**1**	**0,8**
N9	• Cancer	04	25	16	26	21	16	23	25
I9	**Cancer incidence**	**0,3**	**2**	**1**	**2**	**2**	**1**	**2**	**2**
N10	• Injuries/accidents	00	00	02	00	00	01	08	00
I10	**Injuries/accidents incidence**	**00**	**00**	**0,1**	**00**	**00**	**0,09**	**0,5**	**00**

Key: SN - Serial number, D - Denominator, N – Numerator, I – Incident, NA-Not available

Table 3: Proportionate Childhood illnesses mortality per 1000 children per year

SN	**Indicators**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
D	**Over all paediatric death**	**45**	**22**	**30**	**38**	**50**	**26**	**47**	**33**
N1	• Death due to malaria	02	02	05	08	03	02	03	05
I1	**Malaria specific mortality rate**	**40**	**90**	**167**	**210**	**60**	**70**	**60**	**150**
N2	• Death due diarrhoeal diseases	05	01	02	03	00	00	00	04
I2	**Diarrhoeal diseases specific mortality rate**	**111**	**45**	**67**	**78**	**00**	**00**	**00**	**121**

N3	• DeathdueChest infection	09	00	03	06	01	01	05	01
I3	**Chest infection mortality rate**	**200**	**00**	**100**	**157**	**20**	**38**	**106**	**30**
N4	• Death due HIV related illnesses	03	01	02	03	00	01	00	01
I4	**HIV related illnesses mortality rate%**	**60**	**40**	**67**	**70**	**00**	**38**	**00**	**30**
N5	• Death due to Anaemia	08	01	03	05	03	02	02	03
I5	**Anaemia mortality rate**	**177**	**45**	**100**	**131**	**60**	**76**	**42**	**90**
N6	• Death due to malnutrition	00	00	02	03	01	00	00	00
I6	**Malnutrition mortality rate**	**00**	**00**	**100**	**70**	**20**	**00**	**00**	**00**
N7	• Death due to neonatal sepsis	00	06	04	02	06	03	05	01
I7	**Neonatal sepsis mortality rate**	**00**	**272**	**133**	**52**	**120**	**115**	**106**	**30**
N8	• Death due to neonatal asphyxia	00	00	00	00	00	03	06	05
I8	**Neonatal asphyxia mortality rate**	**00**	**00**	**00**	**00**	**00**	**115**	**128**	**151**
N9	• Death due to cancer	00	00	02	03	00	00	02	00
I9	**Cancer mortality rate**	**00**	**00**	**67**	**70**	**00**	**00**	**42**	**00**
N10	• Death due to injuries/accidents	00	00	00	00	00	00	00	00
I10	**Injuries/accidents mortality rate%**	**00**	**00**	**00**	**00**	**00**	**00**	**00**	**00**

Key: SN - Serial number, D - Denominator, N – Numerator, I – Incident

Table 4: Proportionate incidence of Childhood cancers per 1000 children per year

SN	Common childhood cancers at BHM	2006	2007	2008	2009	2010	2011	2012	2013
D	**Yearly pediatric consultations**	13,346	11,766	13,058	11,174	12,943	10,696	15,219	15,960
N1	• New cases of Burkitt lymphoma	4	23	16	26	20	13	19	17
1	**Burkittlymphoma incidence**	**0,3**	**2**	**1**	**2**	**2**	**1**	**1**	**1**
N2	• New cases of Wilm'stumor	00	00	00	00	00	00	00	01
2	**Wilmtumor incidence**	**00**	**00**	**00**	**00**	**00**	**00**	**00**	**0,06**
N3	• New cases of retinoblastoma	00	00	00	00	00	00	02	01
3	**Retinoblastoma incidence**	**00**	**00**	**00**	**00**	**00**	**00**	**0,1**	**0,06**
N4	• New cases of Kaposi sarcoma	00	00	00	00	00	00	01	03
4	**Kaposi sarcoma incidence**	**00**	**00**	**00**	**00**	**00**	**00**	**0,07**	**0,2**
N5	• Other lymphomas	00	00	00	00	00	2	00	02

5	**Other lymphomas ' incidence**	**00**	**00**	**00**	**00**	**00**	**0,2**	**00**	**0,1**
N6	• New cases of other leukemias	00	00	00	00	00	00	00	00
6	**OtherLeukemias' incidence**	**00**	**00**	**00**	**00**	**00**	**00**	**00**	**00**
N7	• New cases of acute lymphoblastic leukemia	00	00	00	00	00	1	00	00
7	**Acute lymphoblasticleukemeia incidence**	**00**	**00**	**00**	**00**	**00**	**0,09**	**00**	**00**
N8	• New cases of 0rhabdomyosarcoma	00	00	00	00	01	00	00	01
8	**Rhabdomyosarcoma incidence**	**00**	**00**	**00**	**00**	**0,08**	**00**	**00**	**0,06**
N9	• Other **cancers**	00	02	00	00	00	00	01	00
9	**Other cancers incidence**	**00**	**0,2**	**00**	**00**	**00**	**00**	**0,07**	**00**
	Total number of new childhood cancers	4	25	16	26	21	16	23	26
	Overall incidence of childhood cancers	**0,3**	**2**	**1**	**2**	**2**	**1**	**2**	**2**

Key: SN - Serial number, D - Denominator, N – Numerator,

Table 5: Childhood cancer admission rate per 1000 admission per Year

INDICATOR	2006	2007	2008	2009	2010	2011	2012	2013
Paediatric admissions	898	510	639	696	750	706	777	975
Paediatric bed capacity	6	6	6	6	6	6	7	10
Number of pediatric hospital days	2839	1749	2210	2088	2642	2408	2513	3766
Bedoccupancy rate	**130%**	**80%**	**101%**	**95%**	**121%**	**110%**	**98%**	**103%**
Number of childhood cancers admissions	5	26	21	30	26	22	26	26
Childhood cancers admission rate	**6**	**50**	**32**	**43**	**34**	**31**	**33**	**26**