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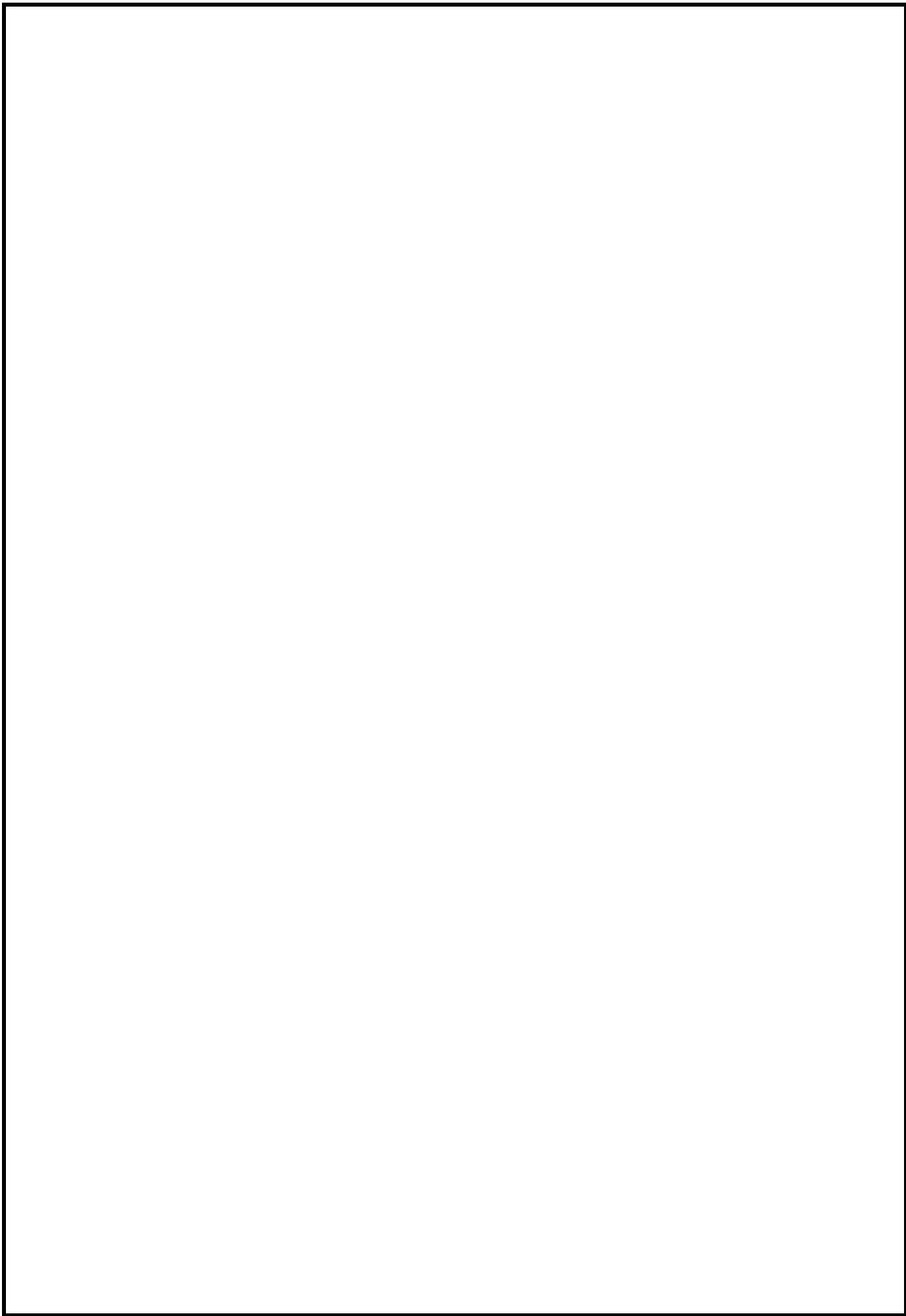
Graduate Study Program

Assessment of Implementation of Weekly Multidisciplinary Team Decisions for
Pediatrics Solid Tumor Patients at SPHMMC, Addis Ababa, Ethiopia

By; Abeba Mengesha (MD, Pediatric Resident)

Addis Ababa, Ethiopia

March, 2024 (GC)





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Academic Research Paper Submission Guide

Name of investigator	Abeba Mengesha (MD, Paediatric Resident)
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Abstract

Introduction: Multidisciplinary care (MDC) is recognized as the best practice in the treatment planning and care for patients with cancer since 1995 G.C and Multidisciplinary team (MDT) discussions are the major component of MDC. MDT provides a comprehensive care for pediatric cancer patients that results in reduced treatment delays, improved care processes, improved treatment outcome, higher adherence to guidelines and enhanced support for both patients and their families. Here, we assess the implementation of MDT decision in SPHMMC for pediatrics solid Tumor patients and identify barriers to its effective implementation and provide valuable inputs that help to increase the Effectiveness of the implementation made.

Objective: The aim of this study is to assess the Implementation of multidisciplinary team decisions for pediatrics solid Tumor patients in SPHMMC

Methods: institution based cross sectional study was conducted among patients discussed on MDT from April 2022 to December 2023. Data was collected using a Data abstraction sheet from MDT format followed by review of medical records. Data was entered into kobo toolbox application format and entered into a computer and statistical analysis was performed using SPSS version 27.0 for windows. Descriptive analysis was used to describe the percentages and number distributions of the variables in the study.

Result: A total of 148 MDT cases were included in the study. The average age of presentation was 3.7 years & most came from oromia region, followed by Addis Ababa. Retinoblastoma was the most commonly discussed cancer, followed by Wilms tumor, rhabdomyosarcoma, germ cell tumors and Hodkins lymphoma. 113 (76.3%) of the cases were discussed for the first time & 212 distinct management decisions were reached, of which 156(73.6%) were subsequently implemented. Decisions on follow up and palliative care followed by chemotherapy, EUA, surgery and Consults/ communications to other departments were most likely to be successfully enacted. Laboratory and imaging recommendations were less likely to be carried out. Absence of modality for the implementation of MDT decision made in the current set up is the major reason for non implemented MDT decisions, followed by illness and financial reasons. Timely implementation of MDT decisions was made for chemotherapy, Pathologic testing, EUA and consultation to other departments. Surgical decisions and cystoscopic biopsy took longer duration for implementation.

Conclusion and recommendation: MDT discussions are the standard of care for patients with cancer worldwide. Adaptation of MDT discussions as a routine of care for pediatrics solid tumor patients is a major step up for improving the quality of care given in SPHMMC. All cancer centers in the country should also incorporate this standard of care into their practice. The success of the MDT discussion can further be augmented by increasing the accessibility of important modalities of diagnosis & treatment as genetic testing, intraarterial chemotherapy & radiotherapy respectively. Raising Public awareness on the benefits of community based health insurance will also help in relieving the financial burden and increase effectiveness of care given.

Key words: Multidisciplinary care, Multidisciplinary team, Implementation, SPHMMC, Pediatric Solid Tumor Patient

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ACRONYMS AND ABBRIVATIONS

SPHMMC= Saint Paul's Hospital Millennium Medical College

MDC= Multidisciplinary care

MDT= Multidisciplinary team

TB= Tumor Board

MTB= Multidisciplinary Tumor board

HIC= High income countries

LMIC= Low and Middle income countries

FMOH=Federal Ministry of Health

PI= Principal Investigator

SPSS=Statistical Package for Social Science

CHAPTER ONE: INTRODUCTION

1.1. BACK GROUND OF THE STUDY

Multidisciplinary care (MDC) is an integrated team approach in health care where medical health professionals of diverse specialties gather together and apply their knowledge and skills to provide all relevant treatment options and collaboratively develop an individual treatment and care plan.

Beginning in the late 1990s, Multidisciplinary approaches began in hospitals and large healthcare systems, first, to deal with complex medical issues often chronic, illnesses.

The institutional tumor board which involved candid discussions among specialists was among one of the first forms of multidisciplinary cancer care that helped to guide patient care. This model was instrumental in progressing the care of individual patients out of highly specialized research centers into community facilities, greatly increasing access to quality care for the majority of patients with cancer [1].

The acceptance of the tumor board model as a successful method of administering multidisciplinary care is evident as disease-specific tumor boards/cancer conferences became requirements for program certification under the American College of Surgeons Commission on Cancer[2] and American Academy of Pediatrics for pediatric cancer centers [3],[4]. These consultations were advisory in nature and occurred monthly, with a focus on assessing the patient's condition at a single point in time. This leads to shift of tumor boards toward prospective treatment planning and now the American College of Surgeons Commission on Cancer mandates that a minimum of 75% of cases presented at tumor boards should have a prospective approach.[5] Over time, the coordination of cancer care continues to evolve to a more proactive, interactive structure with team concept.[6]

These multidisciplinary teams provide a unique and the most effective approach to the early detection, accurate diagnosis, and appropriate treatment for various childhood cancer diagnoses worldwide. Now, MDTs represent best practice for pediatric cancer programs[5]. Currently, The 5-year survival rate of children with cancer who live in high income countries is 80% [7]

However, Pediatric cancer centers with comprehensive multidisciplinary teams are often limited to developed countries and far fewer resources are available in underdeveloped areas of the world where 80% of childhood cancer diagnosis occur[7]. It is estimated that only 25% of children diagnosed with cancer in low to middle income countries will survive[8] and can be as low as 10% in some East African Countries [9]. The establishment of a multidisciplinary pediatric oncology unit, utilizing protocol-based therapy and local support has been shown to approximately double (from 32% to 63%) the 5-year event-free survival in a region with otherwise limited resources[10]

Therefore, we have undertaken a review of the weekly pediatric MDT meeting at SPHMMC to assess the implementation of MDT decisions made which help us to identify and improve any obstacles hindering its effective implementation.

1.2. STATEMENT OF THE PROBLEM

Establishment and effective implementation of MDT decision is considered the best practice for pediatric cancer programs[5]. The crucial role of the MDT decision in providing individualized multidisciplinary patient review, improving accurate diagnoses, enhancing timely appropriate treatment and fostering learning has been well-documented in HICs[11]. Given these inherent attributes of MDT, it is likely they would play an important role in the management of pediatric cancer in LMICs; however, the role, effectiveness and challenges in LMICs have not been documented [12]. One study shows that establishment of MDT for cancer care nearly double the 5-year event-free survival in ALL patients in a region with otherwise limited resources[10].

These results can be reflected on our patients if the decisions of MDT discussions are effectively implemented. Therefore, we have undertaken a review of the weekly pediatric MDT meeting at SPHMMC to assess implementations of MDT decisions made and identify barriers present against its effective implementation.

1.3. RATIONALE OF THE STUDY

The aim of this paper is to assess the implementation of MDT decision made for pediatrics solid Tumor patients in SPHMMC. As MDT approach become the standard of care for cancer patients, assessing the implementation of MDT decisions made helps to identify and overcome barriers to its effective implementation, which helps in further improving the service given.

The data obtained in this study can be used by concerned bodies for planning and standardizing MDTs for cancer patients in the Country and other resource limited setups and any Barriers found to its effective implementation can be pointed out to be improved so as to increase the quality of patient care given.

This study also provides baseline information on execution of pediatrics MDT decisions made in Ethiopia and can be used by other researches to expand knowledge on effectiveness of MDT decision implementation and barriers present to its successful operation.

CHAPTER TWO

LITERATURE REVIEW

Weekly MDT meeting is widely recognized as an integral part of the management of cancer worldwide and Countries like USA[2], UK[11] and Australia[13] also use it as a requirement for the management of cancer patients. MDT decisions enable all cancer patients to benefit from the wisdom of a variety of specialist team members who share their expertise, professional perspective, and knowledge during the management decision process. Many studies have shown that MDT approach results in improvements of diagnosis [14]and better adherence of guidelines [13], and few studies have even shown increased survival of patients [15],[16]. The benefits of MDT decisions can effectively be used when decisions are executed as planned and finding barriers to its implementation also helps to find ways to correct them.

A study at C.S. Mott Children's Hospital, University of Michigan review 158 multidisciplinary Tumor board discussions from July 2012 to April 2014 and result shows that 35% had alterations in radiologic, pathologic, medical, or surgical interpretation of clinical data following multidisciplinary discussion. Of these, 64% had changes to the initial recommendation for clinical management. [17]

A study done on Determinants of treatment plan implementation in MDT meetings for patients with chronic diseases by prospective mixed methods study of 12 MDTs in London and North Thames from 370 MDT meetings, interviews with 53 MDT members, and from 2654 patient medical records found that 78% of patients had their MTB plans successfully implemented (81% for hematologic malignancies). Their analysis further showed that implementation was more likely in MDTs with clear goals and processes and a good 'Team Climate and difficulty with implementation commonly arose from patient or family choice and difficulties in engaging patients with the service. Further, patients from more deprived areas were less likely to have their treatment plans implemented. [18]

A similar study from the UK on implementation of MTB decisions found that of 273 decisions studied, 41 (15%) were not implemented. The most common reasons for non-implementation were co-morbid health issues that had not been discussed sufficiently at the MTB, the influence of patients' treatment preferences and subsequent clinical information[19]

A Systematic Review done to assess Quality of Care Management Decisions by Multidisciplinary Cancer Teams from Electronic databases in May 2009 on 37 studies shows Failure to reach a decision at MDT discussion was found in 27–52% of cases and Decisions could not be implemented in 1–16% of cases.[20]

Another systematic review done to assess the impact of Tumor board on cancer care by reviewing 5 publications between 2008 and 2017 shows significant impact of TBs on patient assessment and diagnosis with higher accuracy in staging. In reference to treatments, the five reviews showed that TB discussion led to changes in patient management/clinical practices. Two of the studies also reported an increased adherence to guidelines.[21]

A study conducted to evaluate the efficacy of pediatrics MTB in Uganda from May–October 2018, though retrospective chart review, analyses decisions made for 95 patients and the result shows only 57% of management decisions reached during MTBs were implemented. Of these decisions, decisions on chemotherapy were the most likely to be successfully enacted (87.9%), followed by radiotherapy (60%) and surgery (57%). Consults and laboratory/imaging recommendations were less likely to be carried out. There were often significant delays in management, with ~22% of successfully implemented decisions being enacted with a delay of 4 weeks or greater [12].

A study conducted at Tikur Anbessa specialized Hospital on 147 colorectal cancer patients discussed on MTB between March 2016 and November 2017 shows that 98% of patients presented to Tumor boards from the beginning, as new patients had complete clinical staging and had more evidence-based approach compared with those patients who had received treatment before MTB presentation. [22]

In conclusion MDT decisions are made to be implemented; so that patients can benefit from the collaborative wisdom of all the team members. In addition to the well-recognized benefits of MDTs, implementation of MDT decisions also helps in assessing the efficacy of MTBs indirectly in other settings [19],[18, 20]. Therefore, we have undertaken a review of the weekly pediatrics MDT meeting at SPHMMC to assess the characteristics and effective implementation of decisions made.

CHAPTER THREE

OBJECTIVES

3.1. General Objectives

The general objective of the study is to assess the implementation of the weekly MDT decisions made for pediatrics solid Tumor patients in SPHMMC.

3.2. Specific Objectives

- Determine the number and characteristics of patients discussed at the weekly pediatric MDT meeting over a 1year and 8 month time period
- Document the number and type of management decisions reached at these meetings
- Evaluate the timely execution of MDT decisions made
- Identify the reasons behind non-executed MDT decisions

CHAPTER FOUR

METHODS AND MATERIALS

4.1. Study Area and Period

The study is conducted in SPHMMC Pediatrics oncology unit. St. Paul's millennium medical college is the largest hospital in the capital Addis Ababa with a catchment population of more than 5 million. The hospital was established in 1969 by the late emperor Haile Selassie in collaboration with the German Evangelical Church and is currently governed by a board under the federal ministry of health. In addition to an inpatient capacity of more than 700 beds, on average 2000 emergency and outpatient clients are seen daily in the hospital.

The pediatric oncology patients are seen at EOPD, Oncology follow up clinic and oncology ward which was established by Dr. Tadele Hailu in collaboration with hospital staffs in 2020GC. It starts its service with 6 bed containing oncology ward for solid tumor patients only and is now expanded with 18 bed ward giving service for both solid tumors and hematologic malignancies. Currently, SPHMMC has 2 Pediatrics Haematologist Oncologists and has a regular weekly MDT meeting with paediatric Surgeons, Radiologists and Ophthalmologists every Wednesday morning from 9:30 Am to 12:00Am since from April 2022. Neurosurgeons, neurologists and endocrinologists attend the session intermittently on demand. The MDT which is led by Dr. Mamude Dinkiye discusses on selected cases after brief history, current status, relevant laboratory, imaging and pathology results are presented by pediatric oncology team. The case is then discussed, with the MDT deciding on final management recommendations. The primary oncology team, consisting of pediatric hematologist oncologists and pediatric residents are responsible for the ongoing care of patients.

Since from April 2022, the pediatric oncology team keeps on recording the summary of the cases with MDT decisions both separately and on the chart of patients using its specific format prepared for this purpose.

4.2. Study period

This study is a retrospective review of all MDT records from April 2022 to December 2023.

4.3. Study design

Institution based cross sectional study was conducted to assess the effectiveness of implementation of multidisciplinary cancer care given for pediatrics solid Tumor patients in SPHMMC

4.4. Source population

The source population was all pediatrics solid Tumor Patients seen at EOPD, pediatrics ward, oncology follow up clinic and oncology ward at SPHMMC

4.5. Study Population

The study population was all pediatrics solid Tumor Patients discussed by weekly MDT meeting from April 2022 to December 2023 at SPHMMC

4.6. Eligibility: Inclusion and Exclusion Criteria

4.6.1 Inclusion Criteria

Subjects for the study included all pediatrics solid Tumor Patients at SPHMMC discussed by weekly MDT meeting from April 2022 to December 2023.

4.6.2 Exclusion criteria

Patients with lost or incomplete charts were excluded from the study

4.7. Sample size determination

The sample size in this cross sectional survey is all patients discussed at Pediatrics MDT meeting from April 2022 to December 2023

4.8. Sampling techniques and procedures for record reviews.

MDT forms of all pediatrics solid Tumor Patients discussed by weekly MDT meeting from April 2022 to December 2023 was analyzed. First, the MDT records were reviewed to determine the patients discussed at the MDTs within the time frame. Using the MDT records, the patients' diagnoses and management plans/medical decisions proposed at the MDT were recorded. Next,

the chart of each patient discussed at the meeting was reviewed to assess the implementation of MDT decisions made and find reasons for subsequent non-executed management decisions.

4.8.1 Methods of Data Collection for record reviews

The data was collected by using data abstraction sheet prepared after through reviewing of previous literature. The Questioner had a total of 12 questions which contain part I: Patient demographic variables containing 3 questions. Part II: MDT discussion (5 questions), part III: MDT implementation (4 questions). Data was collected from both MDT form and patient medical records. First MDT forms were revised and each plan/decision was coded in one of the following categories: chemotherapy, surgery, radiation therapy, open or core needle or cystoscopy guided biopsy, consult, pathologic, laboratory, imaging and others. Next, using the patients' charts and MDT records, the following data was collected: age, Sex, Address, diagnosis, stage of the tumor, management decisions made, implementation of decisions, time frame taken for implementation of MDT decisions and reasons for non-executed decisions.

Documentation beyond patients' charts were not pursued (i.e., if a result, outcome or event was not documented in the patient's chart, the decision was coded as not implemented).

Radiotherapy is not available in SPHMMC and patients are referred to other institution for the service. There is No documentation present regarding the execution of the decision and all are documented as not available.

The Card numbers of the patient was documented in order to prevent missing and duplication of data and it was erased after data collection is completed.

4.9. Variables

- ✓ Age
- ✓ Sex
- ✓ Address
- ✓ State of MDT discussion
- ✓ Diagnoses of patients presented at MDT meeting
- ✓ Staging &/ risk stratification of the cases presented
- ✓ Management decisions reached at MDT meeting

- ✓ Date of MDT discussion
- ✓ Date of MDT decision implementation
- ✓ Time taken for implementation of MDT decisions
- ✓ Reasons of non-implemented management decisions

4.10. Data Quality Control

To assure the quality of data, structured data collection tool was used.

4.11. Methods of Data Analysis and interpretation

After the data was at hand then it entered into Kobo tool box. Data was then cleared and analysed using SPSS version 27 software package. The generated data was compiled by frequency tables, graphs and pie charts.

4.12. Ethical considerations

The proposal was submitted and approval from the ethical committee of SPHMMC was obtained on **August 2023 with the Ref number**

4.13. Operational Definition

MDTs: a group of health care professionals from various fields come together to discuss and collaboratively develop individual's treatment plan. It is led by pediatric oncologist and consists of pediatric surgeon, radiologist, Pathologist, Ophthalmologist, Neurosurgeon and various members of healthcare professionals involved in patient care.

MTB: used inter-changeably with MDT. Although in MTB the physician presenting the case for multiple medical disciplines at a single point of time ultimately weighs the recommendations and determines the course of treatment whereas MDTs allow for collaborative consultation continuously along the treatment pathway.

Chemotherapy: the use of conventional cytotoxic drugs for the treatment of malignancies. When chemotherapy regimen is initiated, terminated or altered during the MDT, this event was coded as a chemotherapy decision.

Surgery: When surgery is planned during MDT, this event was coded as surgical decision.

Radiation therapy: When radiotherapy is decided during the MDT, this event was coded as radiotherapy decision.

Biopsy: If open, core Needle, cystoscopic biopsy was planned, this event was coded as biopsy.

Laboratory: If a laboratory request was recommended by the MDT, this event was coded as a lab decision.

Pathologic test: when cytologic, IHC & histopathology were planned, it was coded as pathology test decision. Surgical or biopsy decision that definitely is followed by pathologic testing were Not coded as pathologic testing

Imaging: If imaging request was recommended by the MDT, this event was coded as imaging decision.

EUA: when evaluation under anesthesia was planned for retinoblastoma cases, it was coded as EUA

Enucleation: the surgical removal of the entire globe and its intraocular contents with preservation of all the other periorbital and orbital structures. When Enucleation is decided during the MDT, this event was coded as Enucleation decision.

Palliative care: medical care aimed at optimizing quality of life for patients. When palliative care is decided during MDT, this event was coded as palliative care decision.

Consult/communicate other department: when consultation to other department that is Not represented in the MDT was made, this event was coded as Consult/communicate

Timely implemented decisions: Chemotherapy decisions implemented in less than 3 days of decision are labeled as Timely. Decisions that require anesthesia evaluation & operation room set up as biopsy, EUA, enucleation & surgery implemented within 7 days of decision were coded as timely.

Advanced tumors: Tumors that are stage 3, 4 and risk stratified as high are coded as advanced. Group E & extra ocular retinoblastoma are also coded as advanced.

Other Any significant decision that did not reach fit into any of the above categories was coded as other. Examples include: deciding to present again at future MDT, laser therapy and steroid

New cases: cases discussed for the first time to MDT are coded as new cases.

When the MDT discussion resulted in the change of a diagnosis, this event was recorded. Of note, only changes in cancer diagnosis, not changes in disease extent, were coded as changes in diagnosis.

4.14. Plan for dissemination of results

After the data was analyzed, the results of the research were presented to SPHMMC's department of Pediatrics and child health. The findings was sent for publication on relevant scientific journals and disseminated online so that they can be of use for other academic researchers and clinical practitioners. They will also be presented on different conferences and professional society meetings like Ethiopian Society of Pediatrics and child health. The data can also serve as a base line for future studies.

5. Results

From April 2022 to December 2023, in 1year and 8month period, 85 weekly MDTs were held. 185 cases were presented during these 85 meetings, for an average of 2 cases discussed per MDT. 35 patients with missing charts were excluded from the analysis, leaving 148 cases included in the final analysis.

5.1 Socio demographic profile

The cases analyzed include 81 males and 67 females, with an average age of 3.7 years (range: 6 days to16 years). Majority of the patients discussed came from oromia region (65 patients), followed by Addis Ababa, Amhara and central and Northern region (Table 1)

Figure 2 sex distribution of patients discussed at MDT

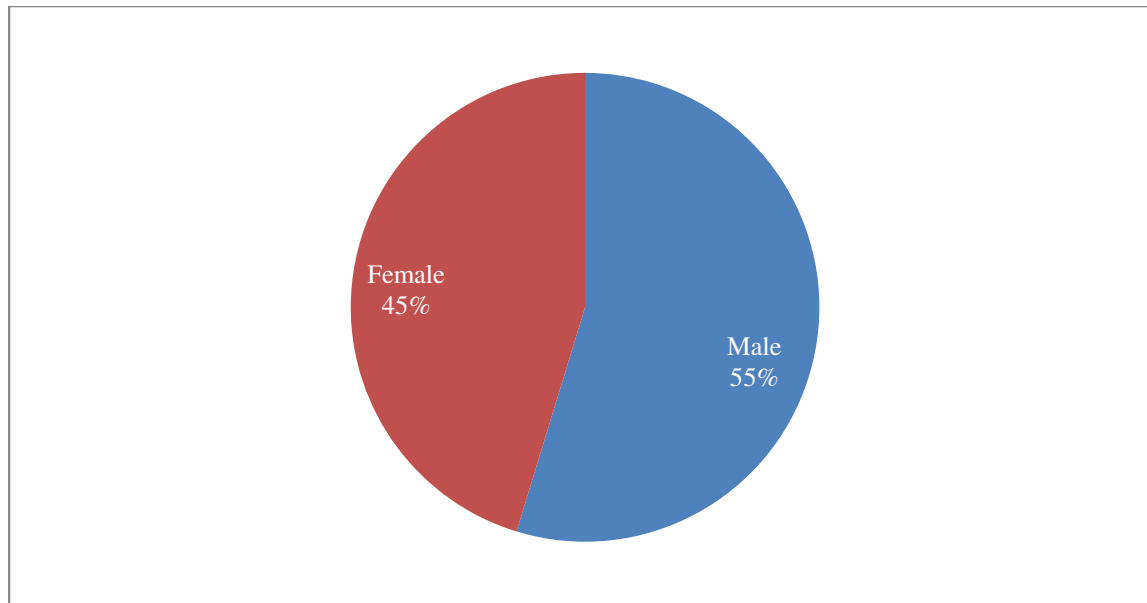


Table 2 region of residency of patients of MDT cases discussed

Region of residency	Frequency	Percent
Oromiya region	65	43.9 %
Addis Ababa	39	26.4 %
Central and northern region	14	9.5 %
Amhara region	12	8.1 %
Somali region	5	3.4 %
Benshangul Gumuz	5	3.4 %
Omotic region	3	2 %
Sidama region	2	1.4 %
Dire Dawa	2	1.4 %
Harari region	1	0.7 %
Total	148	100 %

Table 2 Age of patients discussed on MDT

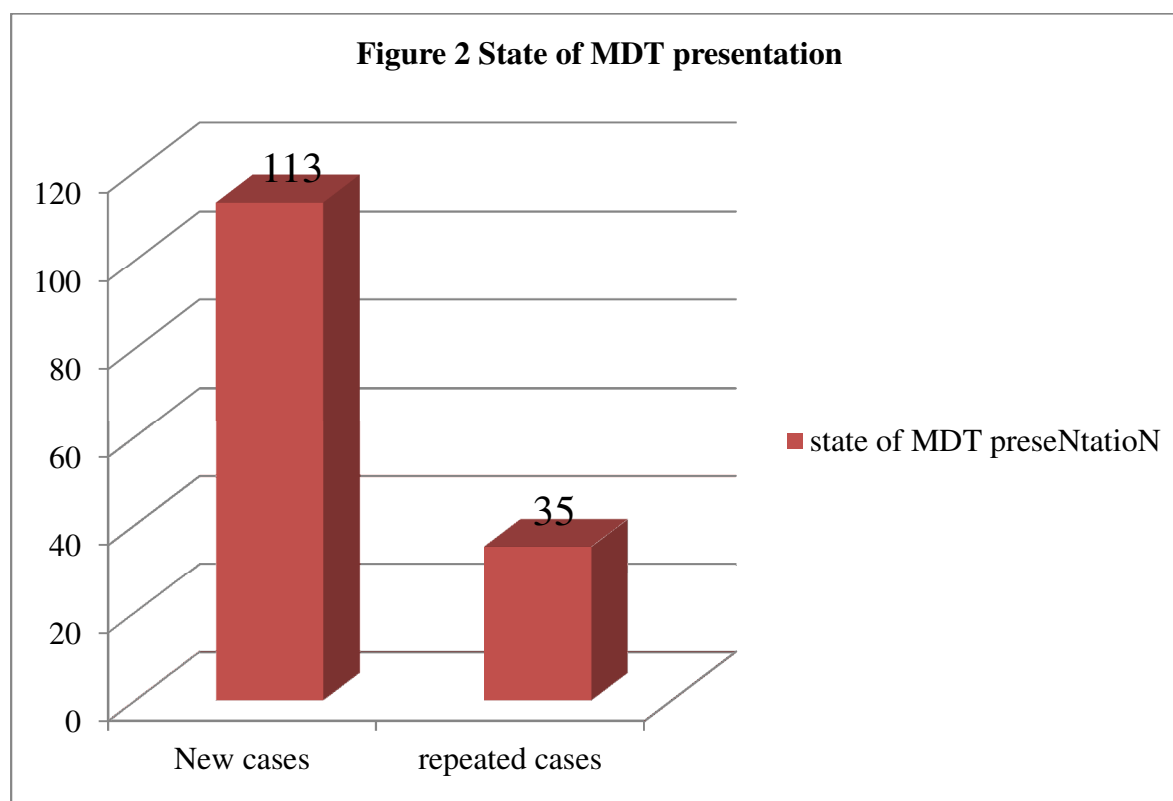
		Frequency	Percent
Age	0-30 days	2	1.4 %
	3- 6 months	2	1.4 %
	6-12 months	9	6.1 %
	1- 3 years	42	28.4 %
	3-6 years	40	27.0 %
	6- 12 years	38	25.7 %
	12- 14 years	7	4.7 %
	14 - 16 years	8	5.4 %
Total		148	100.0 %

5.2 MDT discussions

The MDT discussed 113 different cases (Figure 2)of which 88 of the cases were discussed for the first time followed by mid cycle assessment in 29 cases, repeated for further discussions in 15 cases and treatment completion in 14 of the cases. 2 patients are presented due to recurrence of tumor after treatment completion (Table 3).

Table 3 state of MDT presentation

State of MDT presentation		Frequency	Percent
	First time	88	59.5 %
	Mid cycle	29	19.6 %
	Repeated for further discussion	15	10.1 %
	Treatment completion	14	9.5 %
	Recurrence	2	1.4 %
	Total	148	100.0 %



Retinoblastoma (38 patients discussed) was the most commonly discussed cancer, followed by Wilms tumor, rhabdomyosarcoma, germ cell tumors and Hodgkins lymphoma (Table 4).

109 (73.7 %) of the cases discussed by MDT have proper staging with 71 (65%) of the cases have advanced tumor followed by intermediate and low grade tumors each accounting for 19 (17.4%) of the cases (figure 3 & 4)

Retinoblastoma, Hodkin lymphoma, Primary brain tumors and nasopharyngeal cancer had all presented cases properly staged/graded (Table 5)

Table 4 Diagnosis of patients discussed

Diagnosis		Frequency	Percent
	Retinoblastoma	38	25.7 %
	Wilms tumor	25	16.9 %
	RMS	21	14.2 %
	Germ cell tumor	14	9.5 %
	Hodgkin lymphoma	9	6.1 %
	Neuroblastoma	8	5.4 %
	Unspecified	6	4.1 %
	Brain tumor	5	3.4 %
	Ewings sarcoma	3	2 %
	Hepatoblastoma	3	2 %
	NoN Hodgkin lymphoma	3	2 %
	Lymphangioma	3	2 %
	Nasopharyngeal cancer	2	1.4 %
	Lymphoma	2	1.4 %
	Adrenocortical tumor	1	0.7 %
	Vestibulochoclear and trigeminal schwanoma	1	0.7 %
	Hemangioma	1	0.7 %
	Benign spindle cell neoplasm	1	0.7 %
	Osteosarcoma	1	0.7 %
	Papillary thyroid carcinoma	1	0.7 %
	Total	148	100 %

Figure 3 presence of appropriate tumor stage

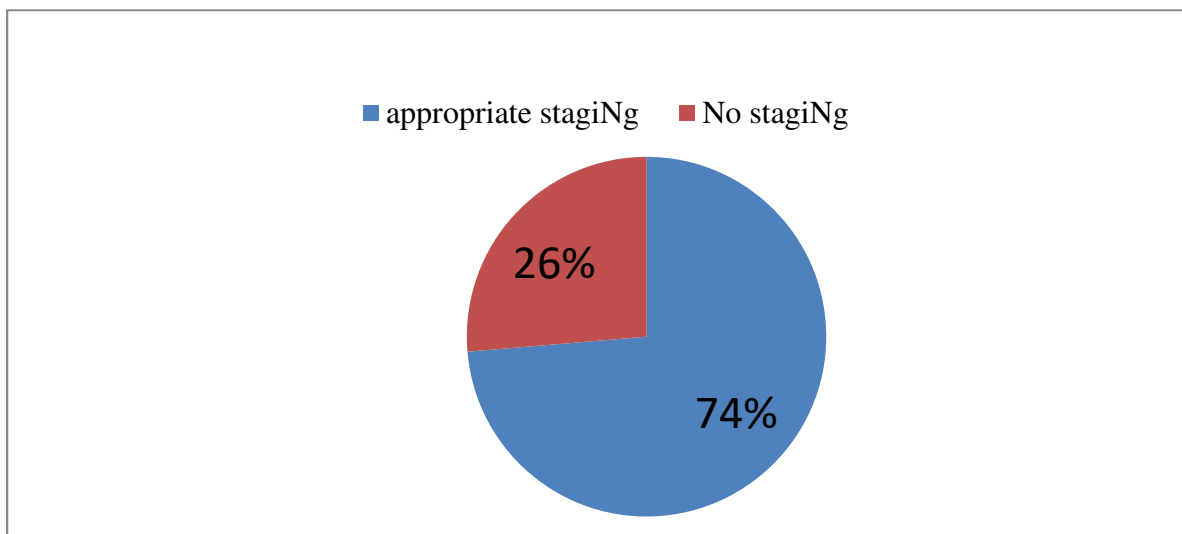


Figure 4 Staging of tumor

■ advanced tumor ■ intermediate ■ low stages

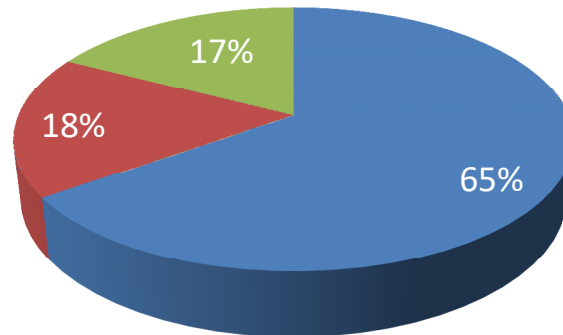


Table 5 Diagnoses of the patient *
presence of appropriate staging or grading or risk stratification of tumor Cross tabulation

		presence of appropriate staging of tumor		
		No	yes	
Diagnoses of the patient	Retinoblastoma	0	38	100 %
	Primary brain tumor	0	5	100.0%
	Hodgkin lymphoma	0	9	100.0%
	Nasopharyngeal cancer	0	2	100.0%
	Osteosarcoma	0	1	100.0%
	Wilms tumor	4	21	84%
	Neuroblastoma	2	6	75%
	RMS	6	15	71.4%
	Germ cell tumor	8	6	42.9%
	Ewings sarcoma	2	1	33.3%
	Non Hodgkin lymphoma	2	1	33.3%
	Lymphangioma	2	1	33.3%
	Unspecified	5	1	16.7%
	adrenocortical tumor	1	0	0
	Hepatoblastoma	3	0	0.0
	Vestibulochoclear & trigeminal schwannoma	1	0	0.0
	Hemangioma	0	1	0.0
	Benign spindle cell neoplasm	0	1	0.0
	Lymphoma	2	0	0.0
	Papillary thyroid carcinoma	1	0	0.0
Total		39	109	73.7%

Totally, 113 unique cases were discussed during the MDTs and 212 distinct management decisions were reached. Chemotherapy, biopsy, Surgery, Follow up and palliative care were the most common MDT decisions made (Table 6)

Table 6 MDT decisions made

MDT Decision		Frequency	Percent
	Chemotherapy	56	26.40%
	Biopsy	25	11.70%
	Surgery	21	9.90%
	Follow up and palliative care	21	9.90%
	Radiotherapy	17	8.00%
	Pathologic test	17	8.10%
	Enucleation	13	6.10%
	Consult and/ communicate other department	11	5.20%
	Imaging	10	4.70%
	EUA	7	3.30%
	Laboratory test	5	2.40%
	Refer	4	1.90%
	Others	3	1.50%
	Genetic test	2	0.90%
	Total	212	100%

5.3 MDT implementation

From the 212 distinct management decisions, 156 were subsequently implemented. Decisions on follow up and palliative care (19/21) were the most likely to be successfully enacted, followed by chemotherapy (48/56), EUA (6/7), surgery (17/21) and Consults/ communications to other department (9/11). Radiotherapy, intraarterial chemotherapy and genetic testing are not available in our center and all patients are referred to other institutions. Pathologic and imaging recommendations were less likely to be carried out (Table 7)

Table 7 implementation of MDT decisions

	Yes	No	Execution in percent
Others (laser, steroid, repeat discussion)	3	0	100 %
Follow up and palliative care	19	2	90.5 %
Chemotherapy	48	8	85.7 %
EUA	6	1	85.7 %
Consult &/ communicate other department	9	2	81.8 %
Surgery	17	4	81 %
Laboratory test	4	1	80 %
Enucleation	10	3	76.9 %
Biopsy	19	6	76 %
Refer	3	1	75 %
Pathologic test	12	5	70.6 %
Imaging	6	4	60 %
Radiotherapy	0	17	0
Genetic test	0	2	0
	156	56	73.6%

Absence of modality for the implementation of MDT decision made in the current set up is the major reason for non implemented MDT decisions, followed by illness and financial reasons. 9/56 patients were lost from follow up and specific reason for loss cannot be identified (Table 8)

Table 8 Reasons for non-executed MDT decision

	Frequency	Percent
Inaccessibility	26	46.4 %
Lost from follow up	9	16.1 %
Illness	7	12.5 %
Financial	5	8.9 %
Left against medical advise	5	8.9 %
Family Need more time to decide	3	5.4 %
Went abroad	1	1.8 %
Total	56	100 %

More than half of the patients for whom chemotherapy decisions are made were already started on chemotherapy and decision resumed as per protocol (29 patients). The mean duration for implementation of the new chemotherapy decisions is 4 days (range from 0 days to 22 days). Pathologic testing, EUA and consultation to other departments are implemented on an average of 3 days. Surgical decisions and cystoscopic biopsy took longer duration for implementation, 43 days and 107 days respectively. The overall average time for implementation of MDT decisions is 15.2 days (Table 9, Figure 4, 5, 6, 7, 8, 9, and 10)

EUA, follow up & palliative care, referral & other decisions had 100% timely implementation followed by chemotherapy 91.6% and imaging 83.3%. Biopsy and surgery decisions had poor timely implementation of decisions each accounting for 57.8% & 29.4% respectively. None of the laboratory decisions had timely implementation (table 10)

Table 9 Time for implementation of MDT decisions

MDT Decisions	Range of days for MDT decisions implementation	Mean duration of MDT decision implementation
Refer	0 day	0 day
EUA	1 – 6 days	3 days
Consult and/ communicate other department	1 – 11 days	3 days
Pathologic test	1 – 8 days	3.7 days
Others (laser, steroid, repeat discussion)	0 – 7 days	4 days
Follow up and palliative care	As per protocol	
Chemotherapy	0 – 22 days	4 days
Imaging	2 – 47 days	12 days
Enucleation	1 – 42 days	17 days
Laboratory test	15 – 22 days	19.5 days
Surgery	0 – 153 days	43 days
Biopsy	0 – 212 days	58.5 days
Total	0 – 212 days	15.2 days

Figure 5 Number of days for chemotherapy

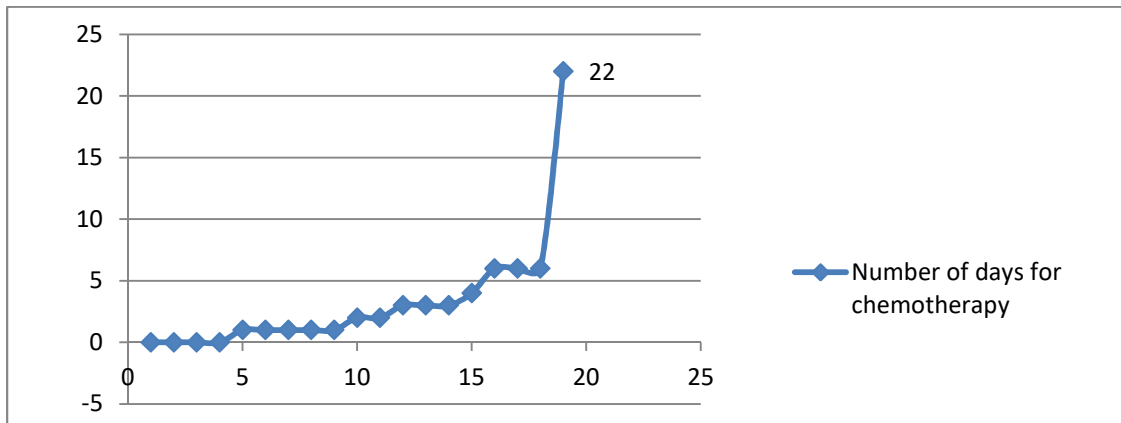


Figure 6 Number of days for surgery

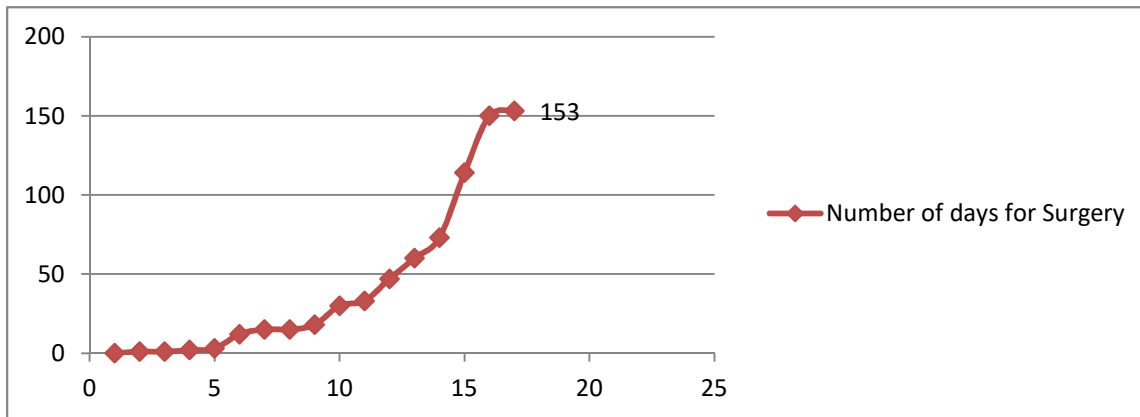


Figure 7 Number of days for biopsy

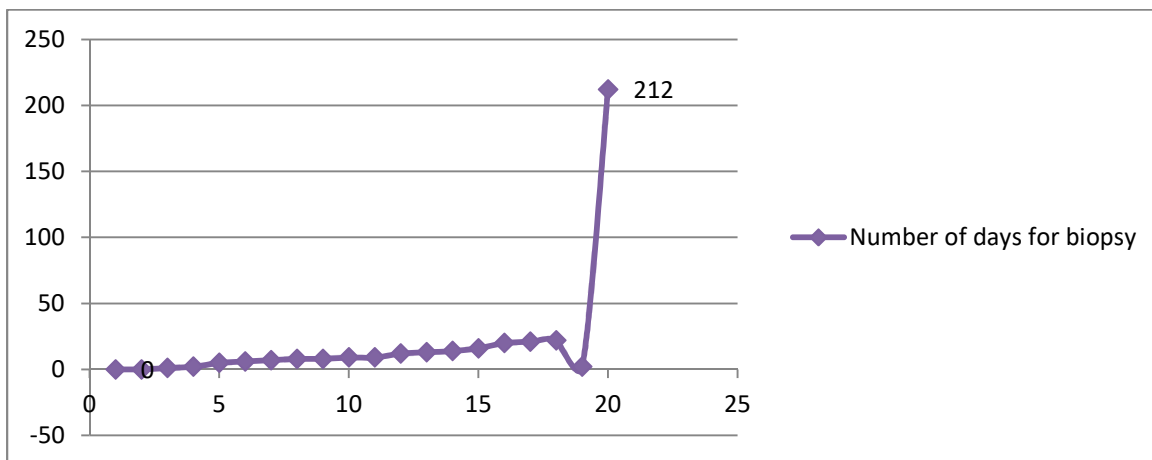


Figure 8 Number of days for imaging

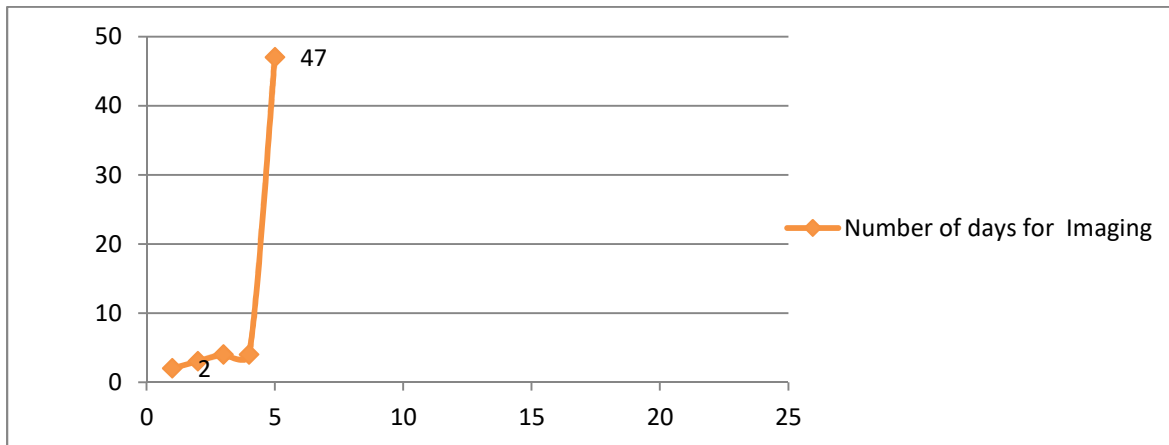


Figure 9 Number of days for laboratory testing

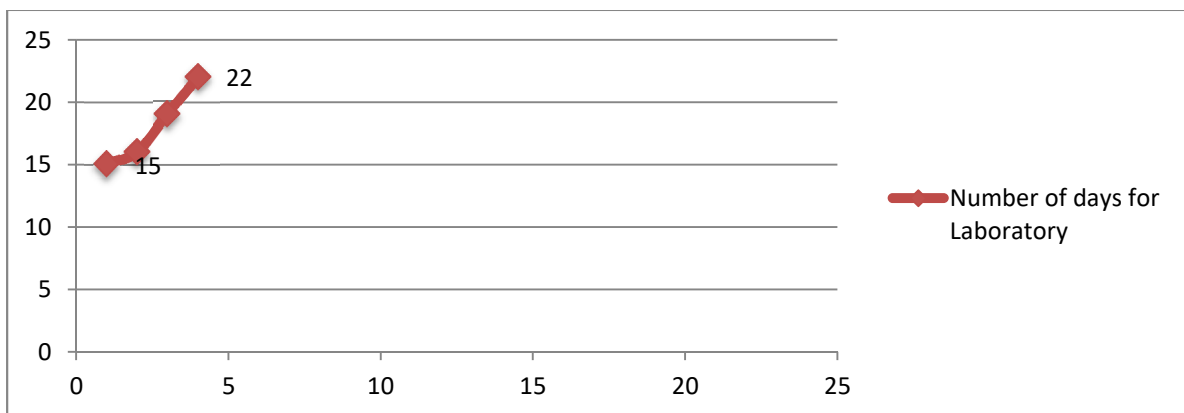


Figure 10 Number of days for Pathologic testing

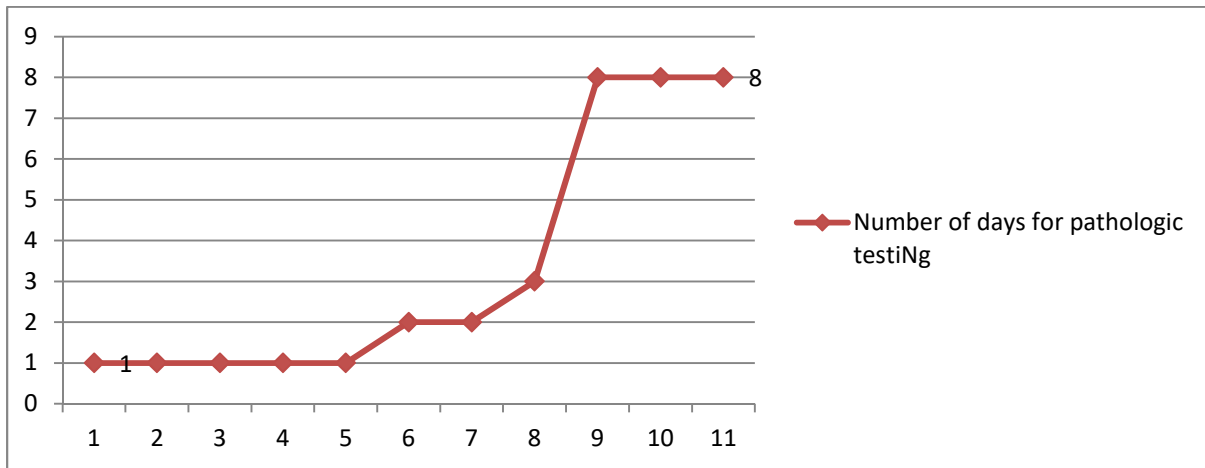


Figure 11 Number of days for Enucleation

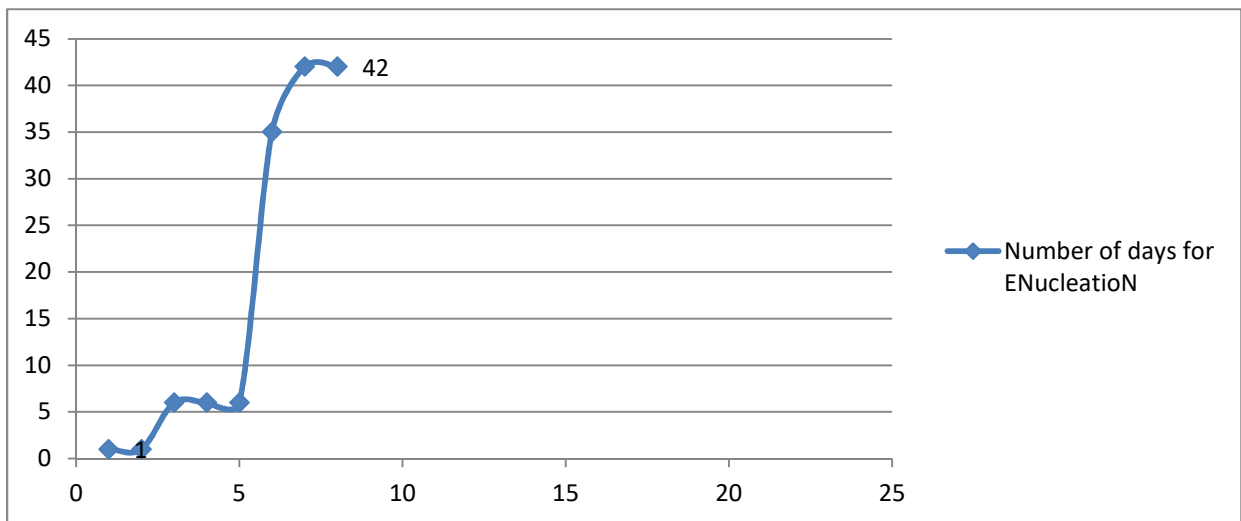


Figure 12 Number of days for EUA

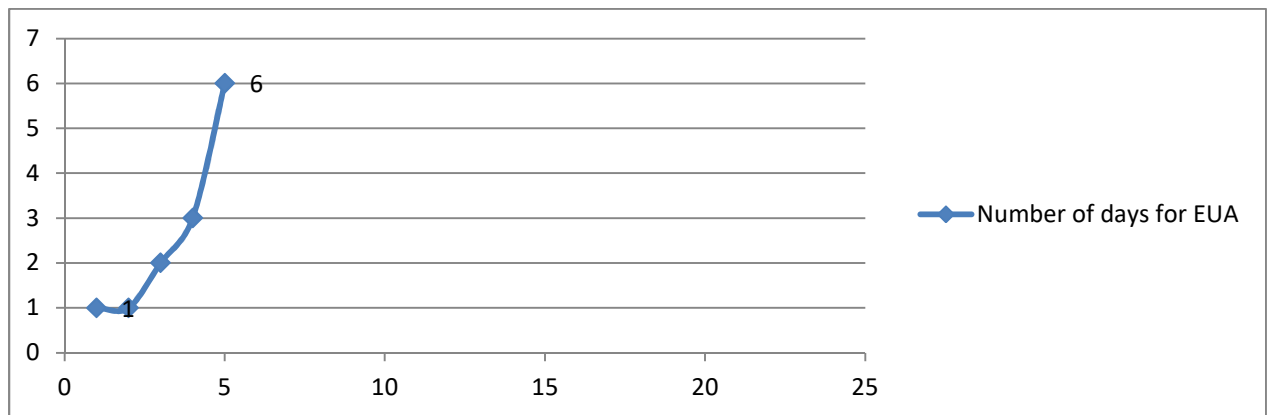


Table 10 Timely implementation of MDT decisions

EUA	6/6	100%
Refer	3/3	100%
Others	3/3	100%
Follow up and palliative care	19/19	100%
Chemotherapy	44/48	91.6%
Imaging	5/6	83.3%
Pathologic test	9/12	75%
Enucleation	7/10	70%
Consult and/ communicate	6/9	66.6%
Biopsy	11/19	57.8%
Surgery	5/17	29.4%
Laboratory test	0/4	0%
Total	118/156	75.6%

6. Discussion

The results of this analysis gives further insight on the very few MDT practices present in a sub-Saharan African setting, with 148 cases representing 113 unique patients presented in a 1 year and 8 month period. The MDT resulted in 212 distinct management decisions, with 3 changes in diagnosis. The Number of cases discussed and presented shows wide variation based on the country where the study takes place. A study at C.S. Mott Children's Hospital, University of Michigan review 158 multidisciplinary tumor board discussions from July 2012 to April 2014 and result shows overall 35% of alterations with 7.6 % radiologic, 3.9% pathologic, 2.5% medical and 7% surgical change of interpretation of clinical data following multidisciplinary discussion [17]. When compared to other similar settings, Study done by Paul E George on Analysis of management decisions and outcome of a weekly multidisciplinary pediatric tumor board meeting in Uganda include 226 decisions on 126 cases presented in 6month period which shows an average of 7 cases discussed per MDT [23]. Similar results were published from the experience of the first MTB in Ethiopia when the summary of first year of establishment is reported by Biniyam Tefera Deressa and his colleagues on Multidisciplinary Management of Colorectal Cancer in Tikur Anbessa Specialized Hospital from March 2016 to November 2017 that reviews 147 cases discussed within the 1year and 8 month period [22]. The establishment of the new pediatric oncology unit along with integrating the first MDT meetings as standard of care for pediatric solid tumor patients in SPHMMC was a slow process that requires strong leadership to familiarize oncology team with the presentation and documentation of the specific format prepared and organizing other departments to engage and actively participate in weekly MDT sessions. There are still gaps in engaging radiology and pathology department in weekly MDT sessions. This contributes to the few Number of cases presented per MDT initially and the less number of diagnosis changes seen after MDT.

109 (73.7 %) of the cases discussed by MDT have proper staging with 71 (65.1%) of the cases have advanced tumor followed by intermediate and low stages each accounting for 19 (17.4%) of the cases staged. This shows lower staging information as compared to other studies. Richard K. Freeman in his study on 117 patients from 2001 to 2007 to assess the effect of a multidisciplinary thoracic malignancy conference on the treatment of patients with esophageal cancer found that complete staging evaluation increased from 72% to 98% after multidisciplinary

evaluation and adherence to National Comprehensive Cancer Network treatment guidelines increased from 83% to 98% [24]. A study by Ying-Jiang Ye on Impact of multidisciplinary team working on the management of colorectal cancer found increament in staging of cancer from 41.1% pre-MDT to 81.3% post-MDT [25]. A study on Multidisciplinary Management of Colorectal Cancer in Tikur Anbessa Specialized Hospital, Ethiopia, showed that 60% of cases discussed had stage III and stage IV disease with 98% of cases presented to MTB had complete clinical staging as compared to only 52% of those who underwent surgery before the tumor board [22]. Although the study doesn't compare the complete staging before and after the introduction of MDT, the completeness of staging of cases presented to MDTs is still Low. The possible reasons include unavailability of some of the investigations needed for complete staging, financial obstacles present for doing further investigation outside, unavailability of some of the investigations needed for complete staging, inconsistency in availability of important modalities of staging in the hospital and social & financial burden of the illness.

The study shows 73.6 % of all MDT decisions were implemented despite the absence of some of the most important therapeutic modalities for cancer patients as radiotherapy. Regardless of the availability of the diagnostic or therapeutic modality in our institution, MDT meetings made the decisions and patients are referred to other institutions to get the unavailable service while continuing to get the other cares provided at our institution. This result of MDT implementation is less than the degree of implementation seen in developed countries and shows higher degree of execution when compared to similar studies in African setting. Prospective study done by J.M. Blazeby at Bristol Royal Infirmary between October 2003 and March 2004 on Analysis of the clinical decision making in multi disciplinary cancer teams had found 273 decisions being made and 41 (15.1%) were not implemented. Study done on 3815 patient cases to assess the adherence of the recommendations made in 3 of 14 tumor boards at the Center for Integrated Oncology at the University Hospital Bonn, Germany, from June 2014 to December 2016, showed that 80.1% of all recommendations were implemented [26]. Systematic review by Yara L. Basta in 2017 to assess the Value of Multidisciplinary Team Meetings for Patients with Gastrointestinal Malignancies included 16 studies and 8018 patients from 1995 to 2016 from US, UK, Germany, Netherlands, Canada, China and New Zealand showed implementation rate ranging from 90 to 100% [27]. However, the results from Uganda showed poor implementation of management decisions, with only 57% of those management decisions being subsequently implemented [23].

Decisions on follow up and palliative care were the most successfully enacted decisions with 90.5% of execution, followed by chemotherapy (85.7%), EUA (85.7%), Consults/ communications to other department (81.7%) and surgery (81%) . Radiotherapy, intraarterial chemotherapy and genetic testing are not available in our center and all patients are referred to other institutions. Laboratory /imaging recommendations were less likely to be carried out. Results are comparable to study at Uganda which showed that 88% of chemotherapy decisions were enacted followed by radiotherapy in 60%and surgery in 57%. Labs/consults were less likely to be implemented [23]. The study speculated that chemotherapy protocols are determined by the oncology team with the availability of chemotherapy agents in mind, so these medicines are typically available for patients.

The same works for our setting and further investigations ordered after MDTs are less likely to be implemented as most of them are not available at our hospital and families already spent more money with prior tests and won't be willing to spend more costly investigations outside at private setups. Decisions that require involvement of many departments is also less likely to be implemented which possibly shows gap in interdepartmental communication.

The study shows inaccessibility (46.4%) followed by loss from follow up (16.1%) and illness (12.5%) as the major reasons for nonimplemented MDT decisions. A study by J. M. Blazeby demonstrated that 43.9% of MDT decisions were Not implemented due to comorbid health issues, 34.2% due to patient choice and 19.5% due to New clinical information available [19]. A systematic review done by Yara L. Basta on 16 studies shows the reasons for not following MDT decisions were comorbidity (45%) and patient preferences (35%), followed by new clinical information (10%), different opinion of the treating physician (5%) and unknown (5%) [27]. Study by Rosalind Raine's on Determinants of treatment plan implementation in multidisciplinary team meetings showed that difficulty with implementation commonly arose from patient or family choice and difficulties in engaging patients with the service [28]. S. Hollunder also demonstrate that patient wish (36.5%), patient death (26%) and doctoral decision, due to the patient's comorbidities or side effects of the treatment (24.1%) are the most important reasons for the deviances from MDT decisions [26]. Study by Paola Friedrich on Barriers to Effective Treatment of Pediatric Solid Tumors in 7 centers that were members of the Central American Association of Pediatric Hematologists and Oncologists (AHOPCA) found that treatment abandonment rate correlated inversely with health economic expenditure per capita and life expectancy at

birth [29]. Correlation studies done in our study shows that there is No correlation between implementation of MDT decisions with diagnosis of tumor(r 0.033) and stage of tumor (r 0.015). Socioeconomic status and educational background of parents is not assessed in our study.

The study uniquely assesses the range and average time for implementation for each MDT decisions made. The mean duration for implementation of the new chemotherapy decisions is 4 days (range from 0 days to 22 days). Pathologic testing, EUA and consultation to other departments are implemented on an average of 3days where as Surgical decisions and cystoscopic biopsy took longer duration for implementation, 43 days and 107 days respectively. EUA, follow up & palliative care, referral & other decisions had 100% timely implementation followed by chemotherapy 91.6% and imaging 83.3%. Biopsy and surgery decisions had poor timely implementation of decisions each accounting for 57.8% & 29.4% respectively. None of the laboratory decisions had timely implementation. A study done in Uganda shows 29 of 129 successfully implemented decisions were enacted with a delay of 4 weeks or greater (22.5%) [23]. Another study on Impact of Multidisciplinary Care on Processes of Cancer Care by Eberechukwu Onukwugha showed Median time to treatment from date of diagnosis was 7 days for colorectal cancer and time to treatment was shorter among patients treated in cancer centers reporting high or moderate MDC levels compared with patients treated at low MDC giving centers [30]. Our MDTs have no anesthesia representation and the surgeons have often not met the patient prior to MDT presentation. These factors along with few operating rooms and difficulty of reserving ICU beds as needed with scarcity of blood products could be the possible reasons for the longer time taken for implementation of decisions requiring surgery & OR set up.

There are areas that need to be strengthened with further improvement in our MDT practices. The presence of Data clerk for hematology and oncology unit for the past 8 months is a huge step up that improves quality of documentation and analysis of cases but the lack of formal way of scheduling cases and later on absent mechanism for follow up of MDT decisions made needs to be changed with few modification of the MDT format present. Formal Notification of members of MDT outside of oncology team about the summary of the case prior to presentation also helps during discussion as it enable them to further read and be prepared before coming to MDT meetings.

Despite the challenges, the pediatric MDT at the SPHMMC had remarkable successes with implementation of 73.6% of its decisions made. The MDT has expanded since its establishment and

now comprises a varied team that incorporates key departments and their respective leaders. The MDT actively promotes different opinions, which is a crucial characteristic enabling in-depth discussion on complex patient cases. The advantages of the MDT go beyond patient care, the opportunity to question and discuss cases benefits the numerous trainees and also help various specialists to learn from one another, enhancing both knowledge and professional growth. Additionally, MDTs serve as valuable mechanisms for advancing and enhancing research endeavors.

Strength and limitation of the study

This is the first study in Ethiopia on pediatrics MDT practice and findings can serve as a base line for further studies & standardization of MDT practices in the country. The use of Prospective data collection on some of the cases discussed during data collection period is also the strength. The study mainly used retrospective method that requires data collection from charts. Poor documentation and missing of patient records are some of the limitations

Recommendation

For hemato oncology unit

- Formal way of scheduling MDT & date of schedule should be recorded
- Assigning specific focal person for scheduling, organizing & following implementation of MDT
- Specific date for implementation of MDT decisions should be included on the form with assigning specific person to follow
- Formal interdepartmental way of communication should be created

For SPHMMC

- Expand its laboratory & pathology services further
- All year & 24hr available Service of CT, MRI
- Should work to avail important modalities of treatment in cancer as radiotherapy, intra-arterial chemotherapy
- Promote community based health insurance by all

For MOH & policy makers

- Nationalize MDT as standard of care for all cancer patients
- Equip hospitals as of the standard for the care they give

For researches

- This is an open area of research and various topics Needs to be addressed which are not covered by the scope of this study. Assessment of Quality of MDT, Concordance with standard guideline, Factors associated with poor implementation & Effect of MDT on survival of patients are some of the topics that Needs to be addressed.

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Annexes

Data abstraction sheet

Section 1. Socio demographic		
1.1.	Age	_____ years
1.2	Sex	1. Male 2. Female
1.3.	Residency	1. Addis Ababa 2. Oromia 3. Amhara 4. Central and northern region 5. Somali region 6. Benshangul Gumuz 7. Omotic region 8. Sidama region 9. Dire Dawa 10. Harari region
Part II: MDT discussions		
2.1	What is the current state of MDT presentation?	1. First time 2. Mid cycle assessment 3. Treatment completion 4. Repeated for further discussion
2.2	What is the Diagnosis of the patient?	1. Wilms tumor 2. Neuroblastoma 3. Hodgkin lymphoma 4. NoN Hodgkin lymphoma 5. Retinoblastoma 6. Adrenal tumor 7. RMS 8. Ewings sarcoma 9. Teratoma 10. Brain tumor 11. Hepatoblastoma 12. thyroid carcinoma

		13. osteosarcoma 14. Nasopharyngeal cancer 15. Others Specify others
2.3	What is the stage of the disease?	
2.4	Was the diagnosis changed by MDT	1. Yes 2. No If yes what is the change of dx made
2.5	What is the Management decision reached at MDT meeting?	1. Observation 2. Chemotherapy 3. Radiotherapy 4. Surgery 5. Palliative care 6. Core Needle biopsy 7. Open biopsy 8. Imaging 9. Laboratory test 10. Pathology test 11. EUA 12. Enucleation 13. consultation/ communication 14. Others a. Specify others
Part III: MDT implementation		
3.1	Is the MDT decision implemented?	1. Yes 2. No
	If Yes If No, what are the reasons of non-implemented management decisions	What is the date of MDT discussion What is the date of MDT implementation 1. Financial 2. Social 3. other illness 4. unavailability of Rx modality 5. others ○ specify others

APPROVAL SHEET

Assessment of Implementation of Weekly Multidisciplinary Team Decisions for Pediatrics Solid Tumor Patients at SPHMMC, Addis Ababa, Ethiopia

Submitted by:

_____	_____	_____
Name of Researcher	Signature	Date

Approved by:

1. _____	_____	_____
Name	Signature	Date

2. _____	_____	_____
Name	Signature	Date

3. _____	_____	_____
Name	Signature	Date