



## Chapter 3: Results

### Part A. Status of childhood cancer care services at tertiary and secondary level hospitals

#### 3.1 Participation rates

A total of 137 tertiary level hospitals, 101 secondary level hospitals, 26 state nodal officers/NPCDCS officers and 13 civil society organizations/non-governmental organizations (CSOs/NGOs) had been approached for their participation, out of which 137 tertiary level hospitals, 92 secondary level hospitals, 16 State nodal officers/NPCDCS officers and nine civil society organizations/non-governmental organizations (CSOs/NGOs) consented to participate.

#### 3.2 Type of hospitals

Table 1

Type of hospital	Major source of financial support								
	Government		Private		Charitable/NGO		N	%	
	n	%	n	%	n	%			
Tertiary level hospitals	Medical college hospital	53	68.8	11	31.4	6	24.0	70	51.1
	Super speciality (oncology)	12	15.5	8	22.8	12	48.0	32	23.4
	Multispecialty with dedicated oncology unit	12	15.5	16	45.7	7	28.0	35	25.5
	<b>Total number of tertiary hospitals</b>	<b>77</b>	<b>56.2</b>	<b>35</b>	<b>25.5</b>	<b>25</b>	<b>18.2</b>	<b>137</b>	<b>100</b>
Secondary level hospitals		<b>64</b>	<b>69.5</b>	<b>23</b>	<b>25.0</b>	<b>5</b>	<b>5.4</b>	<b>92</b>	<b>100</b>



### 3.3 Average number of childhood cancer cases treated every year

#### 3.3.1 Tertiary level hospitals: Average number of new cases of childhood cancers treated per year (2018-2020) at tertiary hospitals

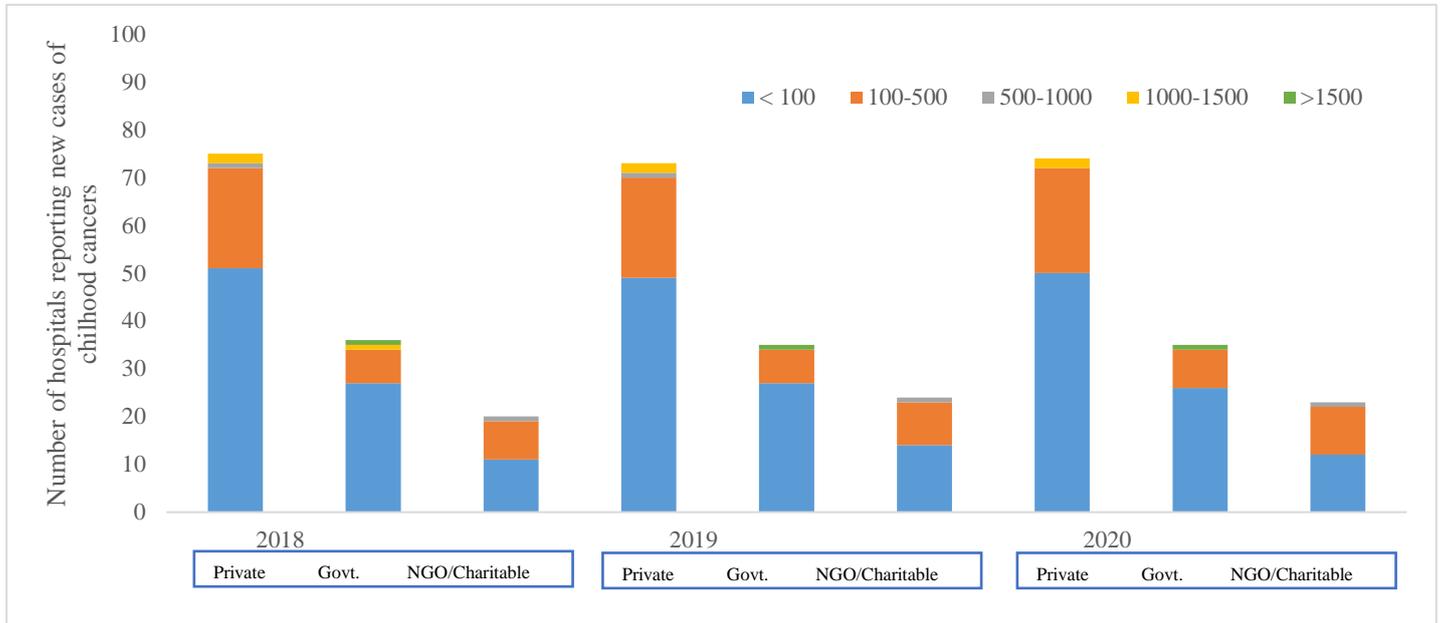


Fig. 3

#### 3.3.2 Average number of childhood cancer cases treated per year (average over the last three years) at secondary hospitals

Out of the 92 secondary level hospitals, 36 hospitals (39.1%) were providing childhood cancer care services

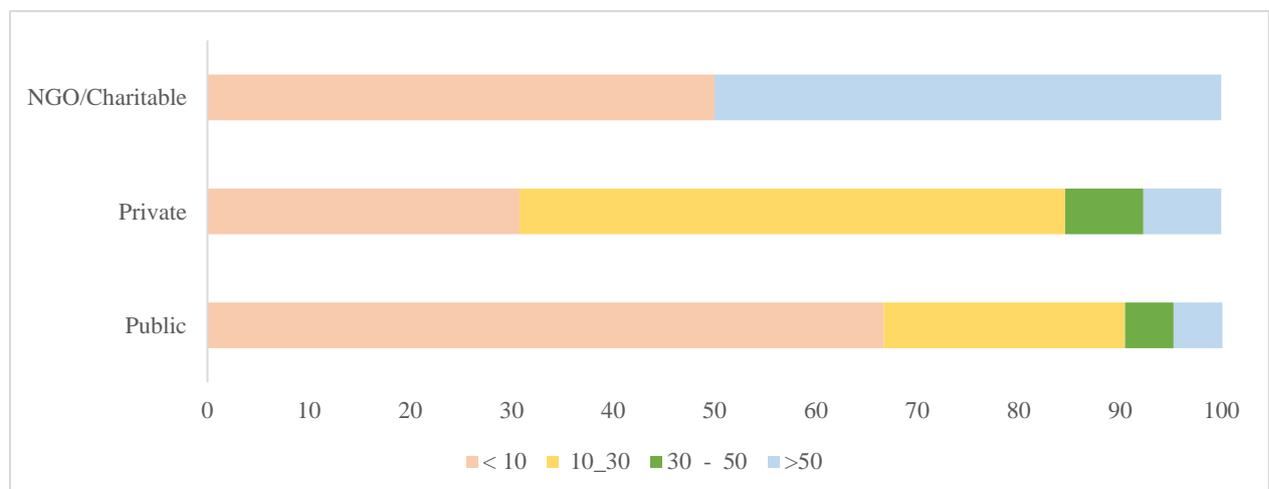


Fig. 4



### 3.4 Referral linkages

#### 3.4.1 Tertiary level hospitals

##### 3.4.1.1 Percentage of tertiary level hospitals with referral linkages with lower tier health facilities

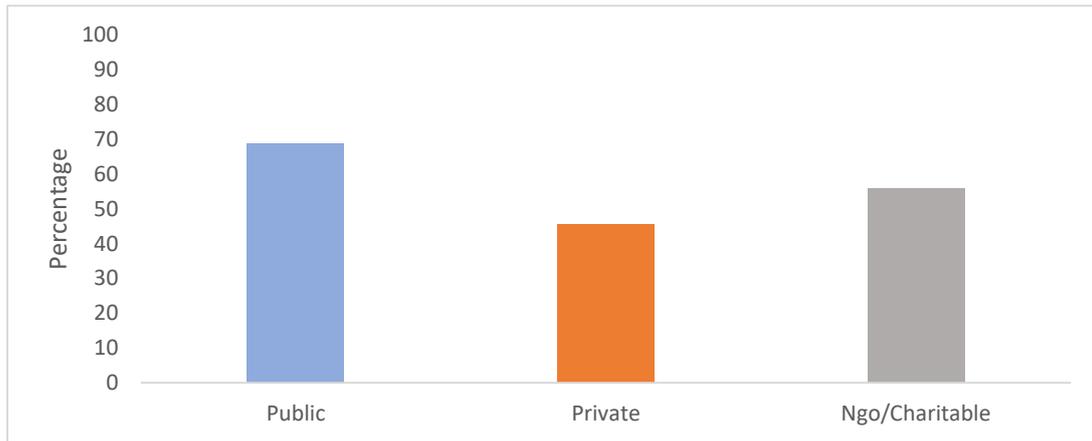


Fig. 5

##### 3.4.1.2 Means of obtaining referral of patients from lower tier health facilities.

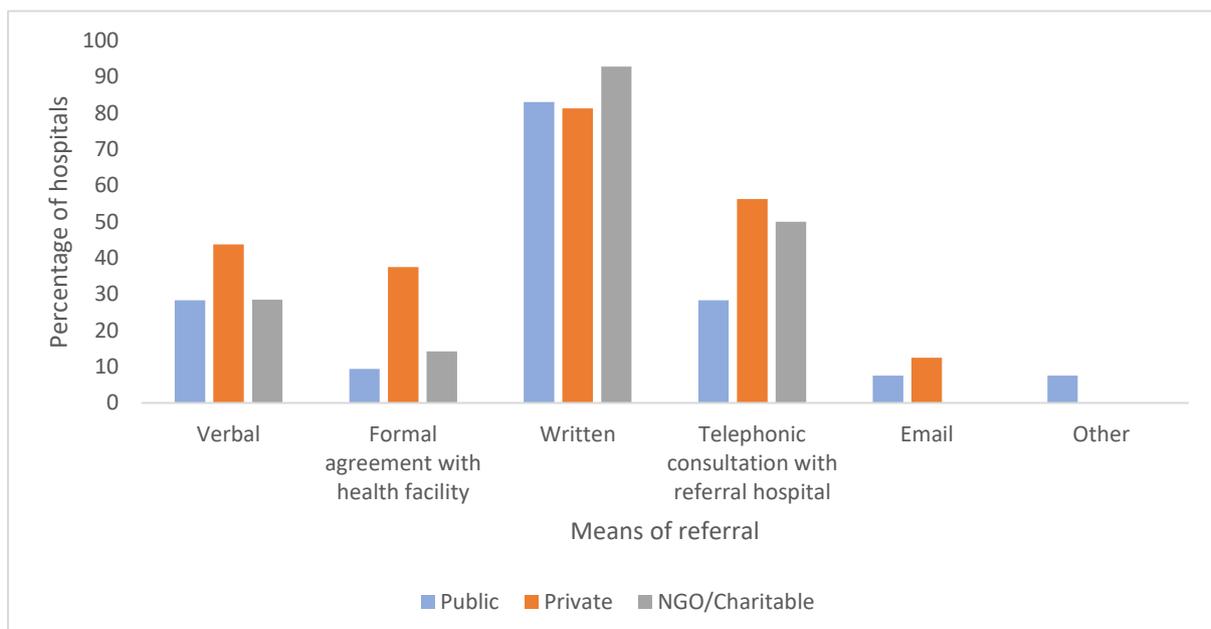


Fig. 6



### 3.4.2 Secondary-level hospitals

#### 3.4.2.1 Private/public/charitable hospitals having referral linkages with cancer treating (tertiary) facilities

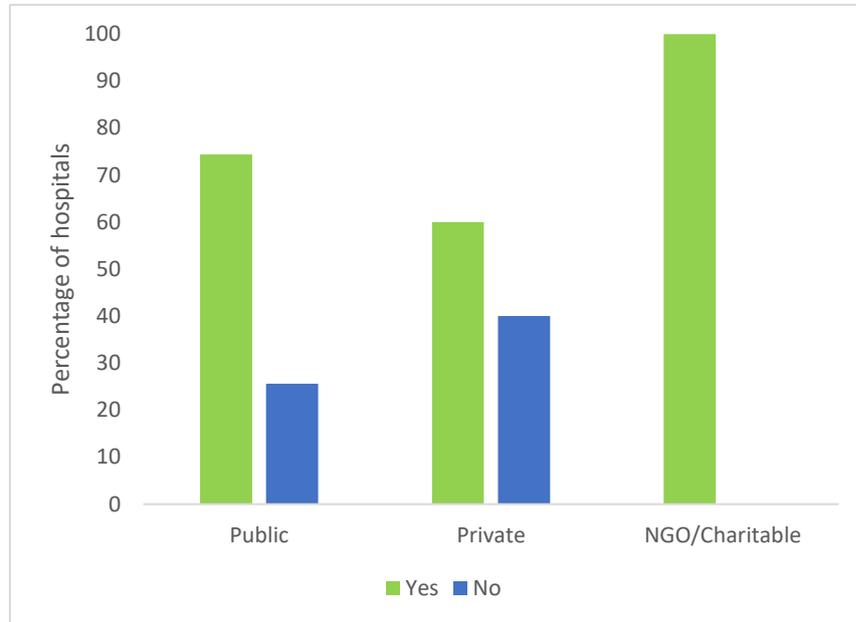


Fig. 7

#### 3.4.2.2 Means of referring patients to tertiary level cancer treating centres.

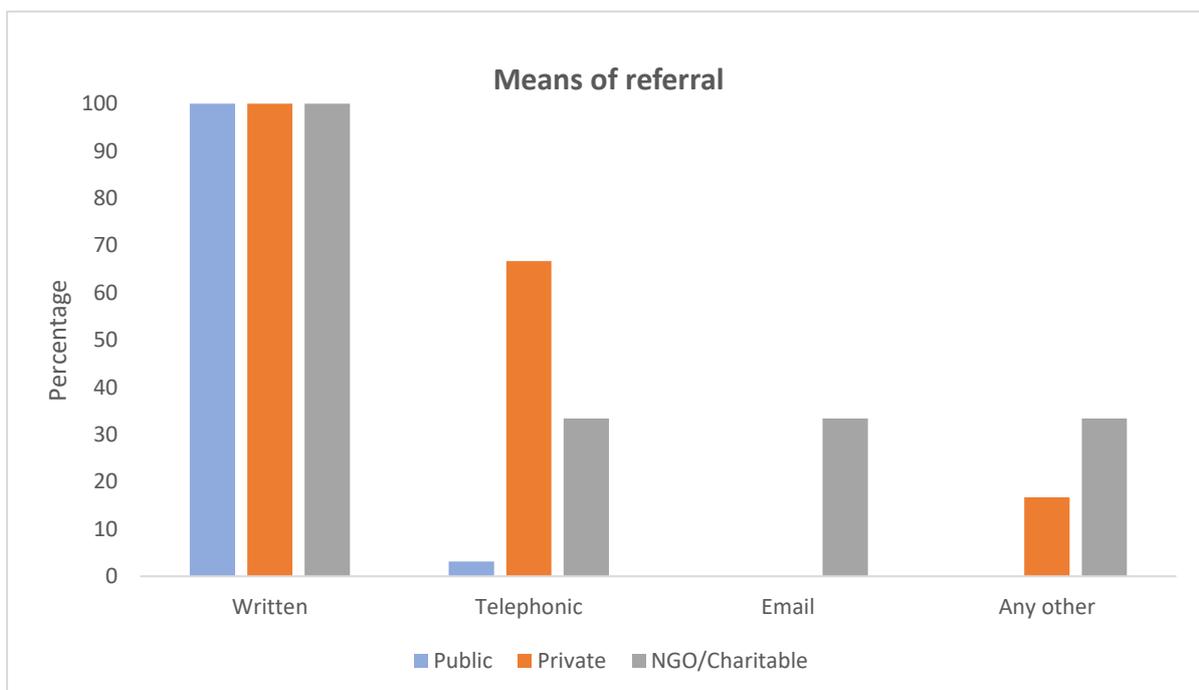


Fig. 8



### 3.4.2.3 Private/public/charitable hospitals having referral linkages with primary non-cancer treating facilities

**Table 2**

Referral linkage with primary level/non-cancer treating health facilities						
	Public (n = 64)		Private (n = 23)		Charitable (n = 05)	
	n	%	n	%	n	%
Yes	39	60.9	12	52.1	2	40
No	25	39.1	11	47.9	3	60
Mechanism of obtaining referred cases						
	Public (n = 39)		Private (n = 12)		Charitable (n = 02)	
	n	%	n	%	n	%
Written	37	94.8	12	100	2	100
Telephonic	4	10.2	7	58.3	0	0
Any other	2	5.1	0	0	0	0

## 3.5 Cancer care departments and care coordination

### 3.5.1 Tertiary level hospitals

#### 3.5.1.1 Availability of childhood cancer treatment-related departments, according to funding

**Table 3**

S. No.	Department	Public		Private		NGO/charitable	
		n = 77		n = 35		n = 25	
		n	%	n	%	n	%
1	Pediatric oncology	32	41.6	17	48.6	16	64.0
2	Medical oncology	35	45.5	22	62.9	15	60.0
3	Radiation oncology	52	67.5	24	68.6	17	68.0
4	Surgical oncology	41	53.2	24	68.6	17	68.0
5	Pediatric medicine	60	77.9	24	68.6	16	64.0
6	Medicine	47	61.0	20	57.1	11	44.0
7	Haematology	33	42.9	20	57.1	13	52.0
8	Pediatric surgery	48	62.3	20	57.1	11	44.0
9	surgery	55	71.4	19	54.3	11	44.0
10	Ophthalmology	50	64.9	21	60.0	9	36.0
11	Musculoskeletal oncologist	7	9.1	7	20.0	9	36.0
12	Orthopaedics	61	79.2	23	65.7	12	48.0
13	Neurosurgery	47	61.0	23	65.7	10	40.0



S. No.	Department	Public		Private		NGO/charitable	
		n = 77		n = 35		n = 25	
		n	%	n	%	n	%
14	Radiology	66	85.7	31	88.6	22	88.0
15	Nuclear medicine	27	35.1	18	51.4	11	44.0
16	Pathology	71	92.2	31	88.6	24	96.0
17	Palliative medicine	37	48.1	20	57.1	18	72.0

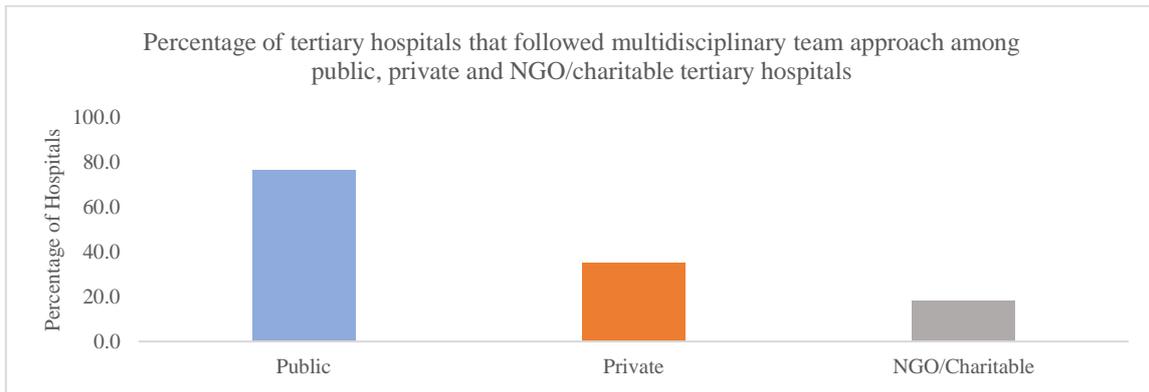
### 3.5.1.2 Availability of supportive care facilities

**Table 4**

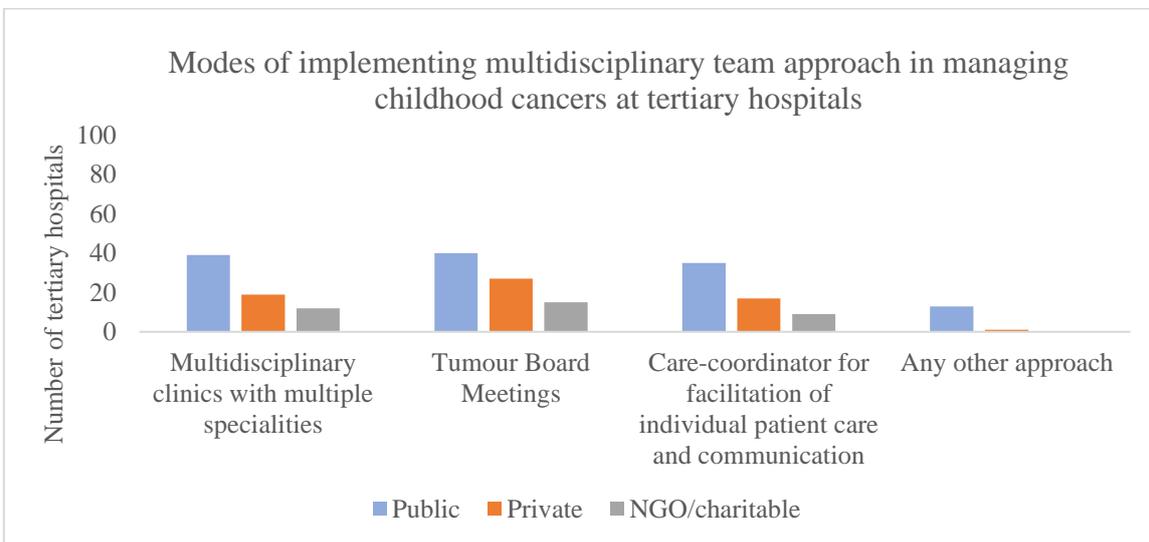
S. No.	Supportive care facilities	Public		Private		NGO/charitable	
		n = 77		n = 35		n = 25	
		N	%	n	%	n	%
1.	Blood bank	72	93.5	30	85.7	18	72.0
2.	Nutritional rehabilitation	54	70.1	32	91.4	20	80.0
3.	Physiotherapy	72	93.5	34	97.1	21	84.0
4.	Psychological counselling	61	79.2	27	77.1	22	88.0
5.	Parental education	58	75.3	25	71.4	17	68.0
6.	Occupational therapy	39	50.6	19	54.3	14	56.0
7.	Hospice care	26	33.8	13	37.1	6	24.0
8.	Dental care	69	89.6	32	91.4	14	56.0
9.	Play therapy	29	37.7	10	28.6	7	28.0
10.	Growth and development	60	77.9	29	82.9	16	64.0
11.	Immunization	66	85.7	32	91.4	16	64.0
12.	Fertility preservation services	14	18.2	11	31.4	4	16.0
<b>Social support</b>							
13.	Social support	51	66.2	24	68.6	22	88.0
14.	Parental groups	29	37.7	14	40.0	14	56.0
15.	Accommodation/lodging for patients and caregivers	40	51.9	15	42.9	17	68.0



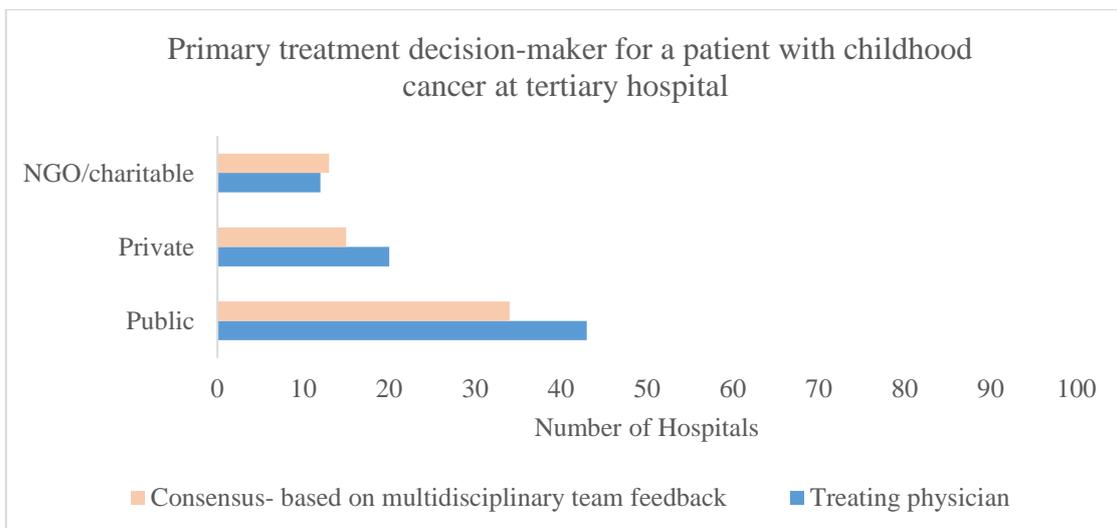
### 3.5.1.3 Multidisciplinary team approach



**Fig. 9**



**Fig. 10**



**Fig. 11**



### 3.5.1.4 Mechanism of follow-up of patients (apart from hospital visits)

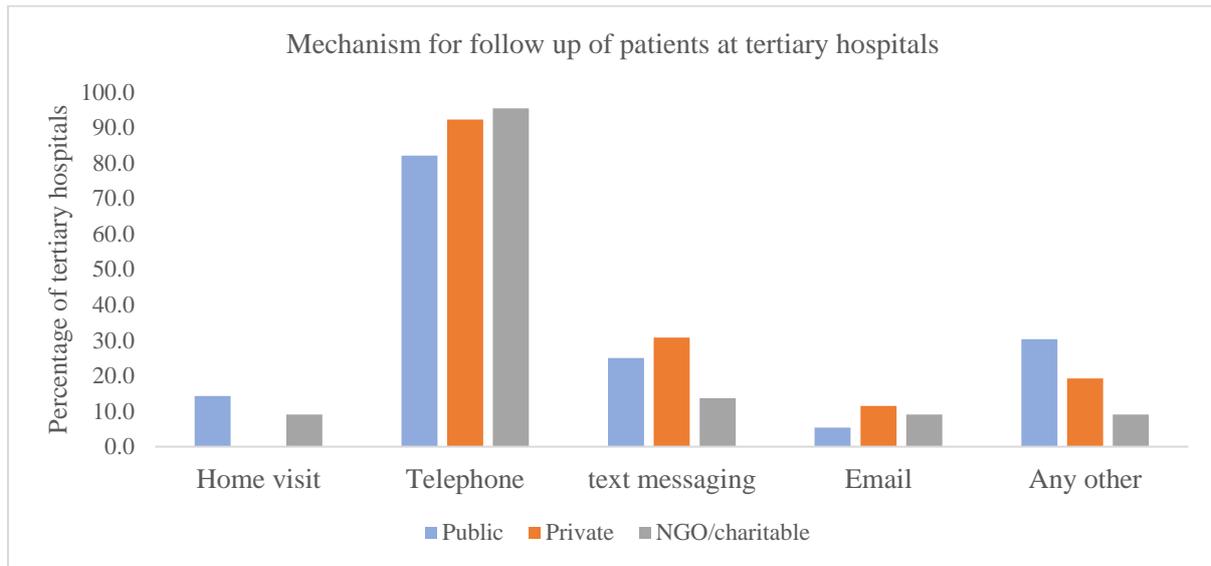


Fig. 12

### 3.5.2 Secondary-level hospitals

#### 3.5.2.1 Availability of childhood cancer-treating facilities

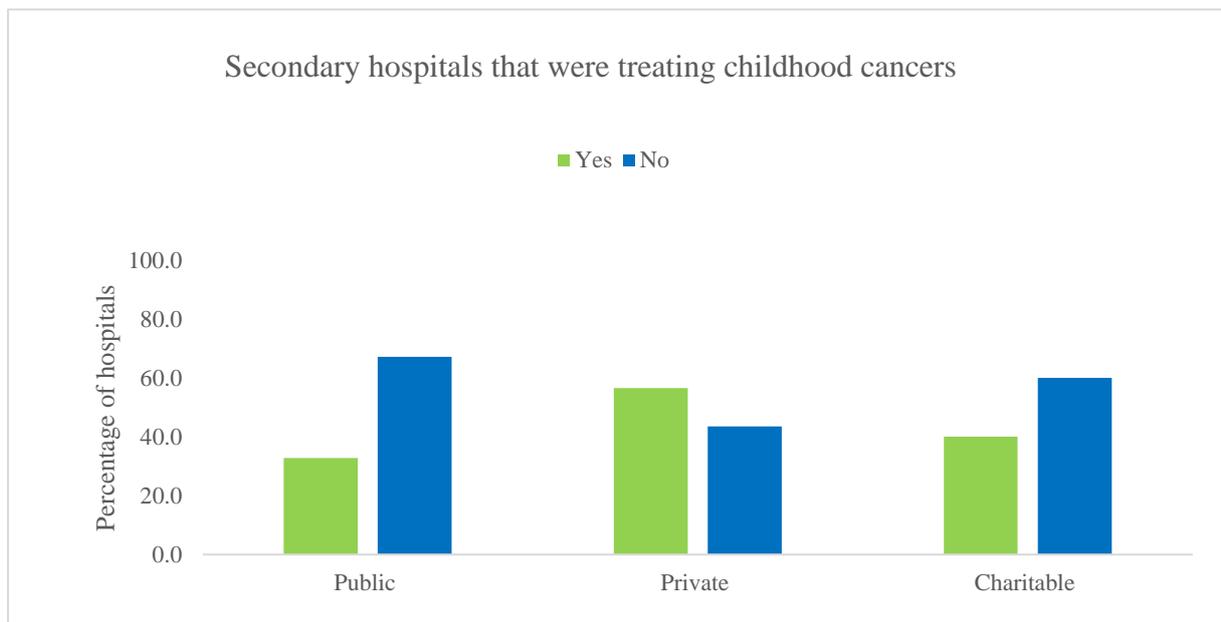
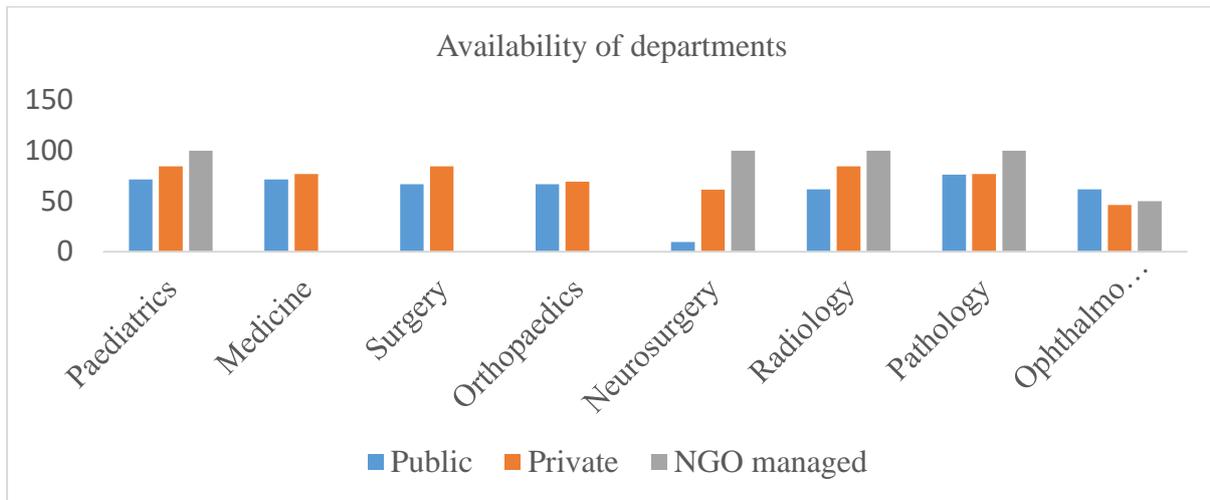


Fig. 13

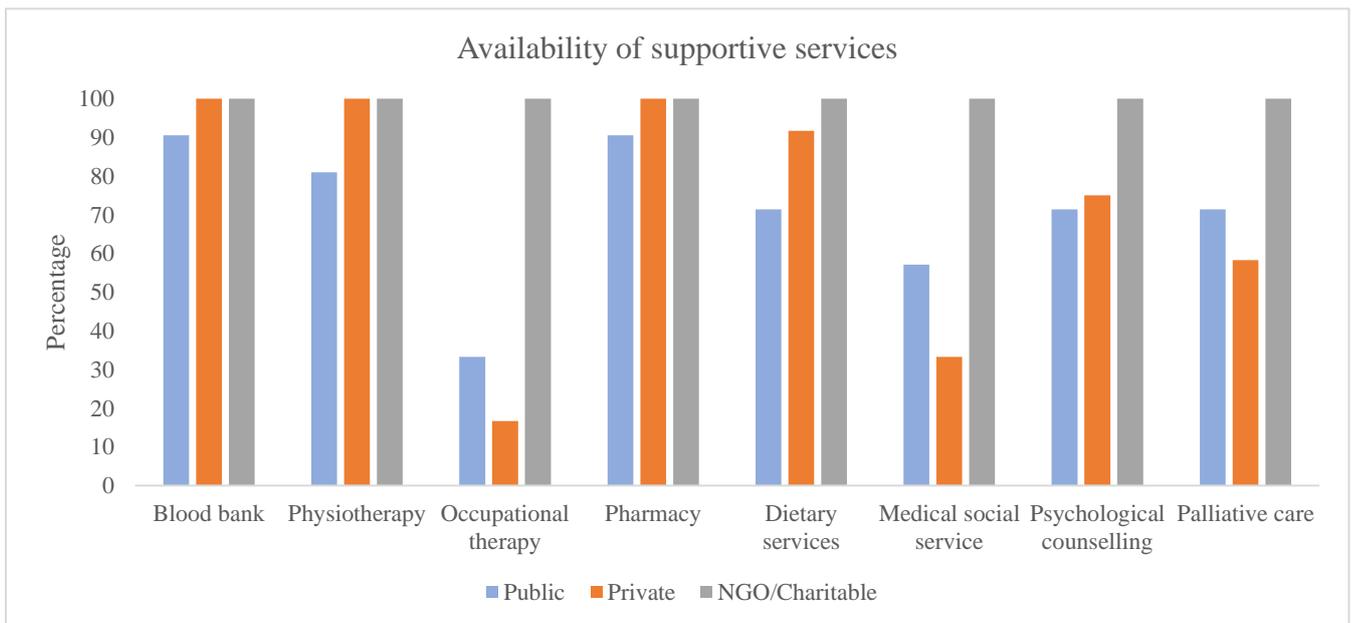


### 3.5.2.2 Availability of departments for childhood cancer treatment



**Fig. 14**

### 3.5.2.3 Availability of supportive care facilities



**Fig. 15**



## 3.6 Availability of diagnostic facilities

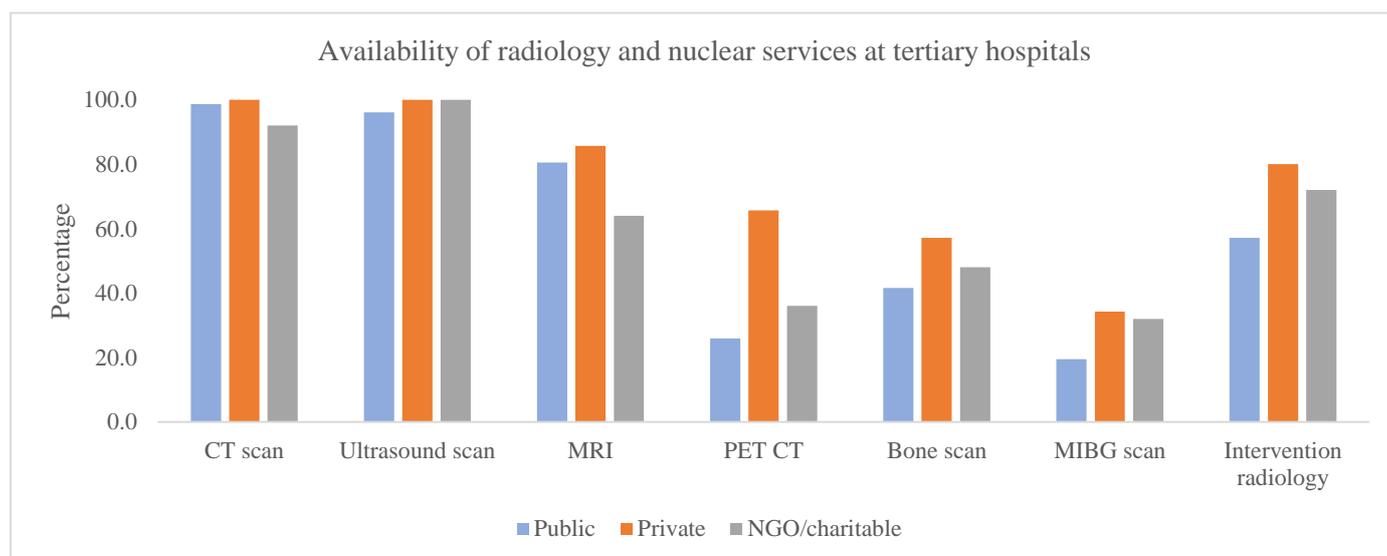
### 3.6.1 Tertiary hospitals

#### 3.6.1.1 Availability of laboratory services – tertiary hospitals

**Table 5**

S. No.	Laboratory services	Public		Private		NGO/charitable	
		n = 77		n = 35		n = 25	
		n	%	n	%	n	%
1.	Histopathology	73	94.8	32	91.4	21	84.0
2.	Immunohistochemistry	45	58.4	25	71.4	17	68.0
3.	Flowcytometric Immunophenotyping	26	33.7	21	60.0	10	40.0
4.	Cytogenetics	15	19.4	12	34.2	8	32.0
5.	Tumour markers	48	62.3	29	82.8	19	76.0
6.	Fluorescence in situ hybridization (FISH)	15	19.4	10	28.5	7	28.0
8.	HLA typing	12	15.5	8	22.8	5	20.0
9.	Therapeutic drug monitoring	21	27.2	11	31.4	8	32.0

#### 3.6.1.2 Availability of radiology and nuclear medicine services at tertiary hospitals



**Fig. 16**



### 3.6.2 Secondary hospitals: availability of diagnostic investigations

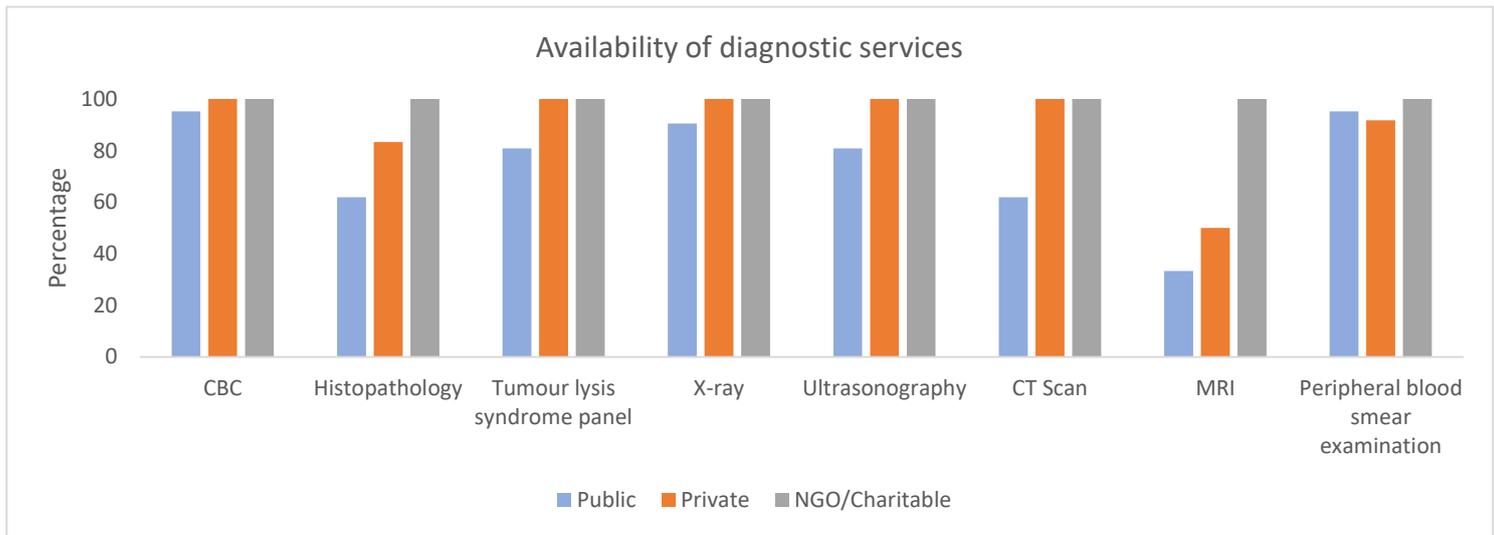


Fig. 17

## 3.7 Cancer-specific treatment procedures

### 3.7.1 Tertiary hospitals

#### 3.7.1.1 Availability of specified procedures and treatment interventions

Table 6

Treatment intervention	Public (n = 77)		Private (n = 35)		NGO/charitable (n = 25)	
	n	%	n	%	n	%
Bone marrow aspiration	70	90.9	34	97.1	24	96.0
Bone marrow biopsy	67	87.0	34	97.1	24	96.0
Lumbar puncture	75	97.4	35	100	24	96.0
Central venous line	70	90.9	35	100	20	80.0
Small core biopsy	67	87.0	34	97.1	25	100
Excision biopsy	72	93.5	35	100	25	100
Drug infusion chemotherapy	60	77.9	29	82.9	22	88.0
Intrathecal chemotherapy	59	76.6	28	80.0	22	88.0
Immunotherapy	45	58.4	25	71.4	17	68.0
Cobalt-60 teletherapy	37	48.1	13	37.1	11	44.0
Linear accelerator	42	54.5	25	71.4	15	60.0
Brachytherapy	40	51.9	20	57.1	13	52.0
Haemopoietic stem cell transplantation (HSCT)	16	20.8	19	54.3	8	32.0
Focal therapy	16	20.8	11	31.4	9	36.0



### 3.7.1.2 Availability of written protocols

**Table 7**

Written protocol	Public (n = 77)		Private (n = 35)		NGO/charitable (n = 25)	
	n	%	n	%	n	%
Administration of chemotherapy	50	64.9	27	77.1	22	88.0
Management of febrile neutropenia	56	72.7	28	80.0	20	80.0
Management of central venous access devices	53	68.8	26	74.2	19	76.0



### 3.8 Human resources

#### 3.8.1 Availability of human resources for childhood cancer care

**Table 8**

S. No.	Human Resources	Public				Private				NGO/charitable			
		Tertiary (n=77)	%	Secondary (n = 21)	%	Tertiary (n=35)	%	Secondary (n = 12)	%	Tertiary (n=25)	%	Secondary (n =1)	%
1.	Pediatric oncologist (Pediatrician working exclusively with childhood cancer)	37	48.0	-	-	19	54.3	-	-	16	-	-	-
2.	Paediatrician	-	-	6	28.6	-	-	11	91.7	-	-	1	100
3.	Pediatric oncosurgeon	11	14.2	3	14.3	6	17.1	7	58.3	7	28.0	1	100
4.	Pediatric surgeon	41	53.2	6	28.6	19	54.3	5	41.7	10	40.0	1	100
5.	Pediatric intensivist	30	38.9	-	-	15	42.9	-	-	10	40.0	-	-
6.	Medical oncologist	36	46.7	7	33.3	27	77.1	7	58.3	17	68.0	1	100
7.	Surgical oncologist	42	54.5	10	47.6	27	77.1	6	50.0	18	72.0	1	100
8.	Radiation oncologist	58	75.3	2	9.5	26	74.3	3	25.0	18	72.0	1	100
9.	Haematologist	38	49.3	12	57.1	21	60.0	3	25.0	16	64.0	1	100
10.	Palliative care physician	29	37.6	17	81.0	17	48.6	10	83.3	18	72.0	1	100
11.	Radiologist	74	96.1	2	9.5	34	97.1	7	58.3	23	92.0	1	100
12.	Neurosurgeon	54	70.1	16	76.2	26	74.3	8	66.7	12	48.0	1	100
13.	Orthopedician	68	88.3	18	85.7	28	80.0	10	83.3	19	76.0	1	100
14.	Pathologist	77	100.0	-	-	34	97.1	3	25.0	23	92.0	-	-
15.	Nuclear medicine specialist	29	37.6	17	81.0	24	68.6	11	91.7	11	44.0	1	100
16.	Anaesthetist	77	100.0	16	76.2	34	97.1	5	41.7	24	96.0	1	100
17.	Ophthalmologist	65	84.4	-	-	27	77.1	1	8.3	12	48.0	-	-

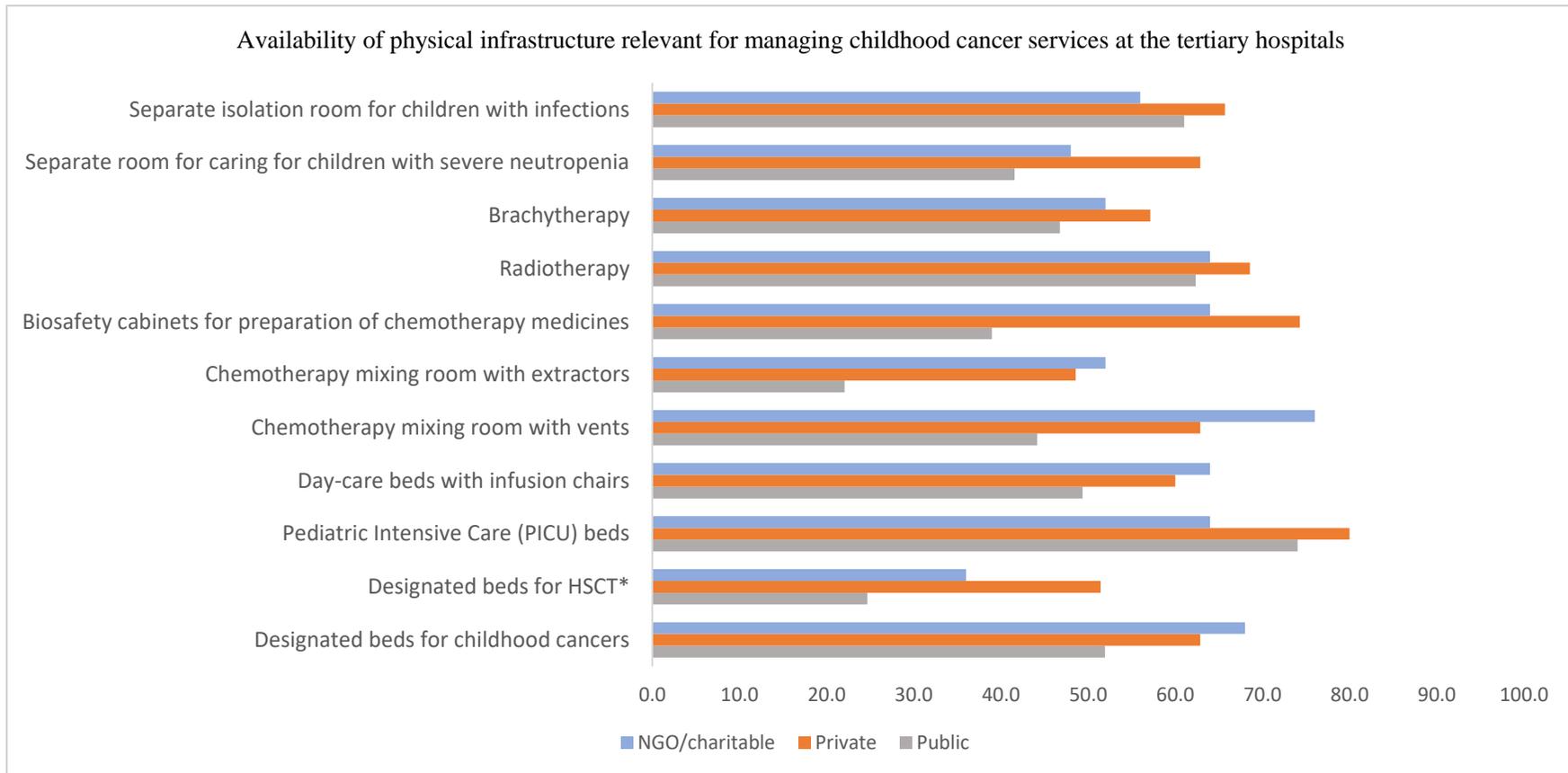


S. No.	Human Resources	Public				Private				NGO/charitable			
		Tertiary (n=77)	%	Secondary (n = 21)	%	Tertiary (n=35)	%	Secondary (n = 12)	%	Tertiary (n=25)	%	Secondary (n =1)	%
	<b>Paramedical</b>												
1.	Nurses trained in pediatric cancer	32	41.5	-	-	17	48.6	-	-	18	72.0	-	-
2.	Nurses	-	-	18	85.7			12	100.0			1	100
3.	Specialist palliative care nurse	28	36.3	-	-	12	34.3		0.0	13	52.0	-	-
4.	Cytotechnician	36	46.7	5	23.8	23	65.7	3	25.0	15	60.0	1	100
5.	Radiation therapy technician	54	70.1	3	14.3	26	74.3	6	50.0	17	68.0	-	-
6.	Radiographer	68	88.3	16	76.2	34	97.1	9	75.0	23	92.0	-	-
7.	Medical physicist	46	59.7	6	28.6	24	68.6	5	41.7	17	68.0	-	-
8.	Nuclear medicine technologist	26	33.7	-	-	24	68.6	2	16.7	11	44.0	-	-
9.	Physiotherapist	73	94.8	16	76.2	34	97.1	9	75.0	21	84.0	1	100
10.	Dietician	64	83.1	11	52.4	33	94.3	9	75.0	22	88.0	1	100
11.	Occupational therapist	32	41.5	6	28.6	17	48.6	2	16.7	13	52.0	1	100
12.	Social worker	59	76.6	9	42.9	24	68.6	2	16.7	20	80.0	1	100
13.	Counsellor	50	64.9	15	71.4	24	68.6	6	50.0	19	76.0	1	100

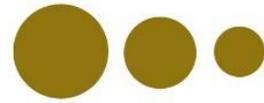


### 3.9 Physical infrastructure

#### 3.9.1 Availability of physical infrastructure relevant for managing childhood cancer services at the tertiary hospitals

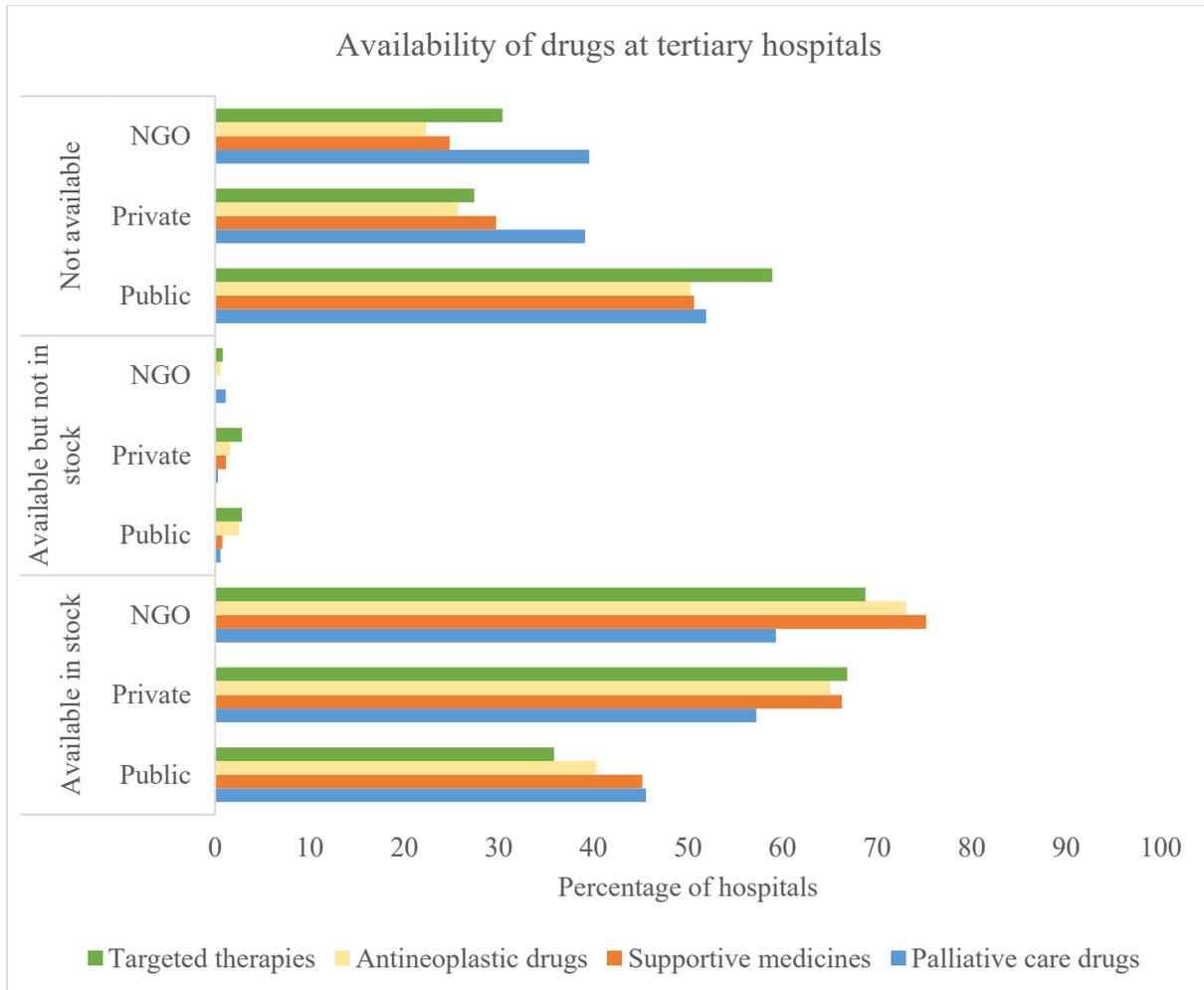


**Fig. 18**



### 3.10 Medications for treating childhood cancer

#### 3.10.1 Availability of medications at tertiary hospitals\*

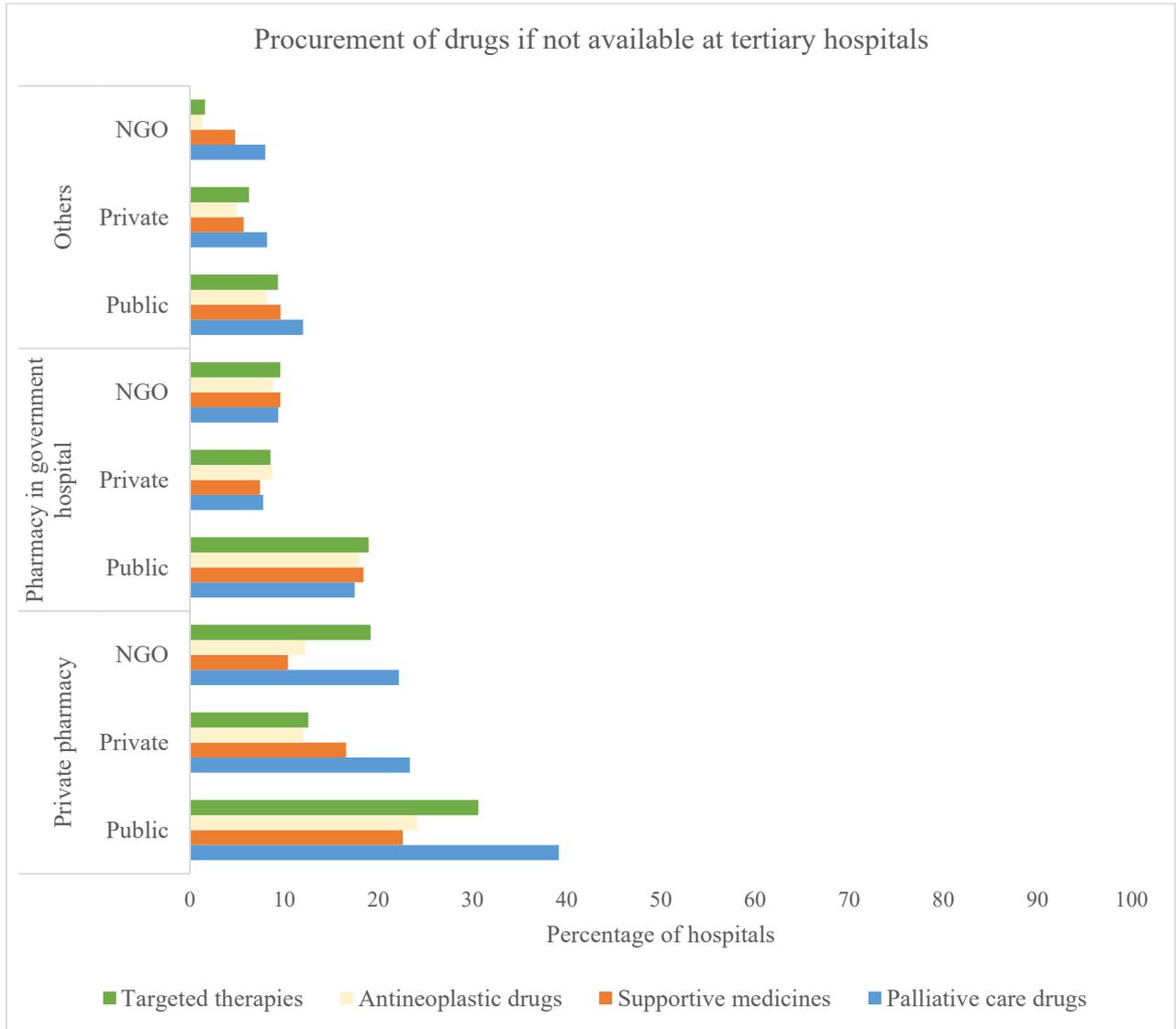


**Fig. 19**

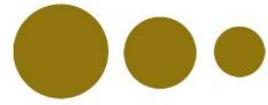
*\*Detailed drug-wise figures are shown in the annexures*



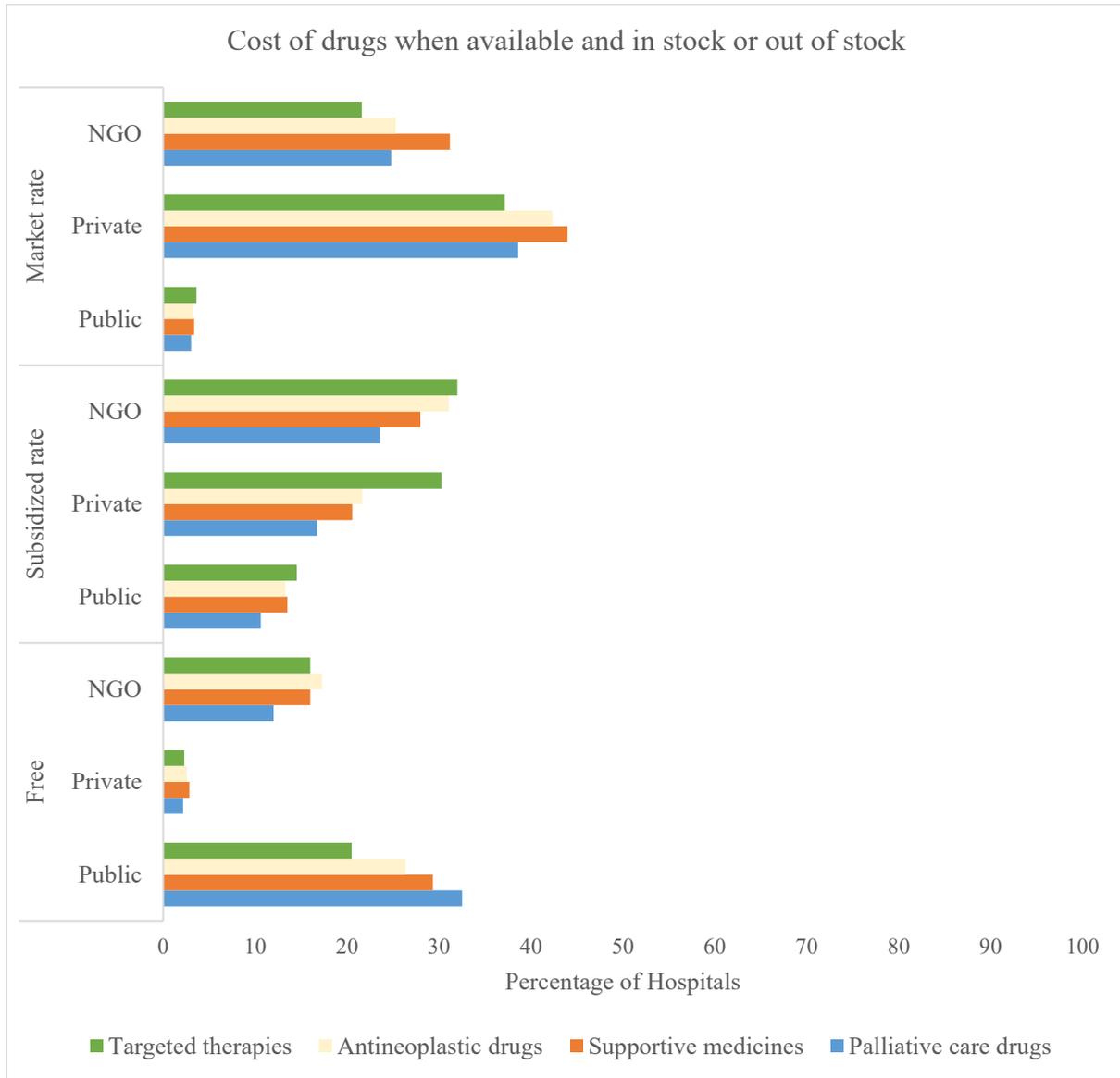
### 3.10.2 Procurement of medications when not available at tertiary hospitals



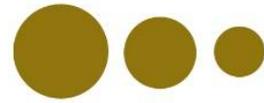
**Fig. 20**



### 3.10.3 Cost of medications at tertiary hospitals



**Fig. 21**



### 3.10.4 Availability of cancer-treating drugs at secondary level hospitals

#### 3.10.4.1 Public hospitals

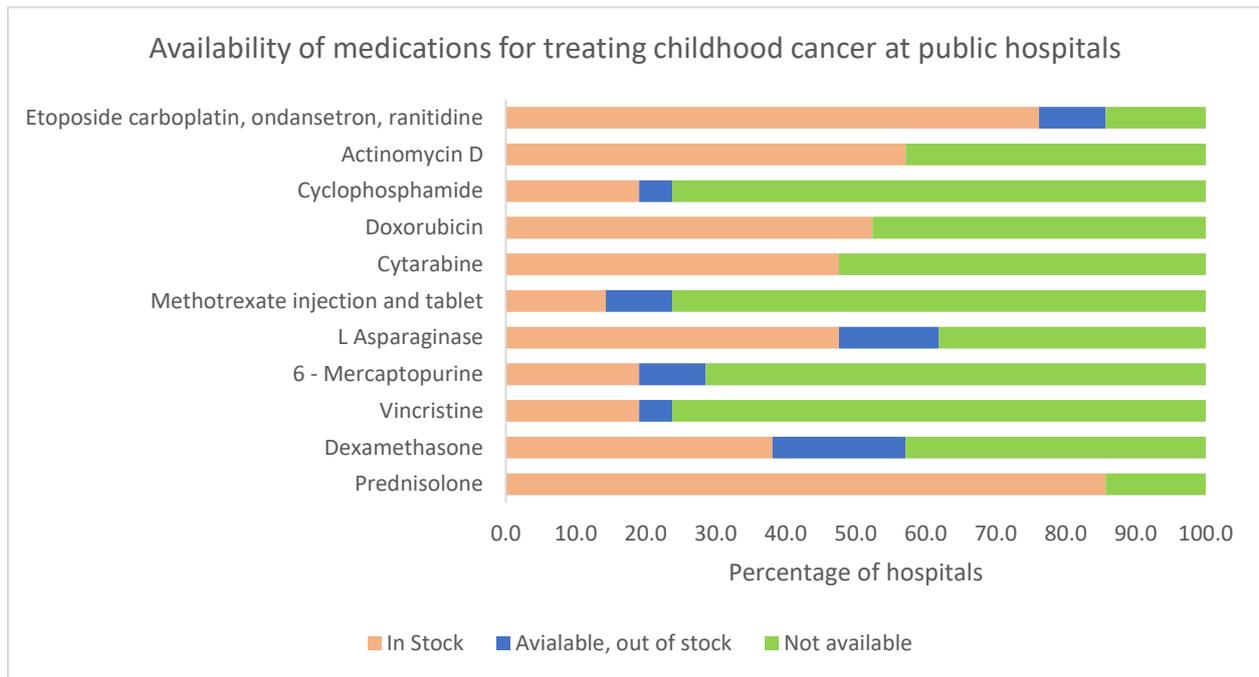


Fig. 22

#### 3.10.4.2 Private hospitals

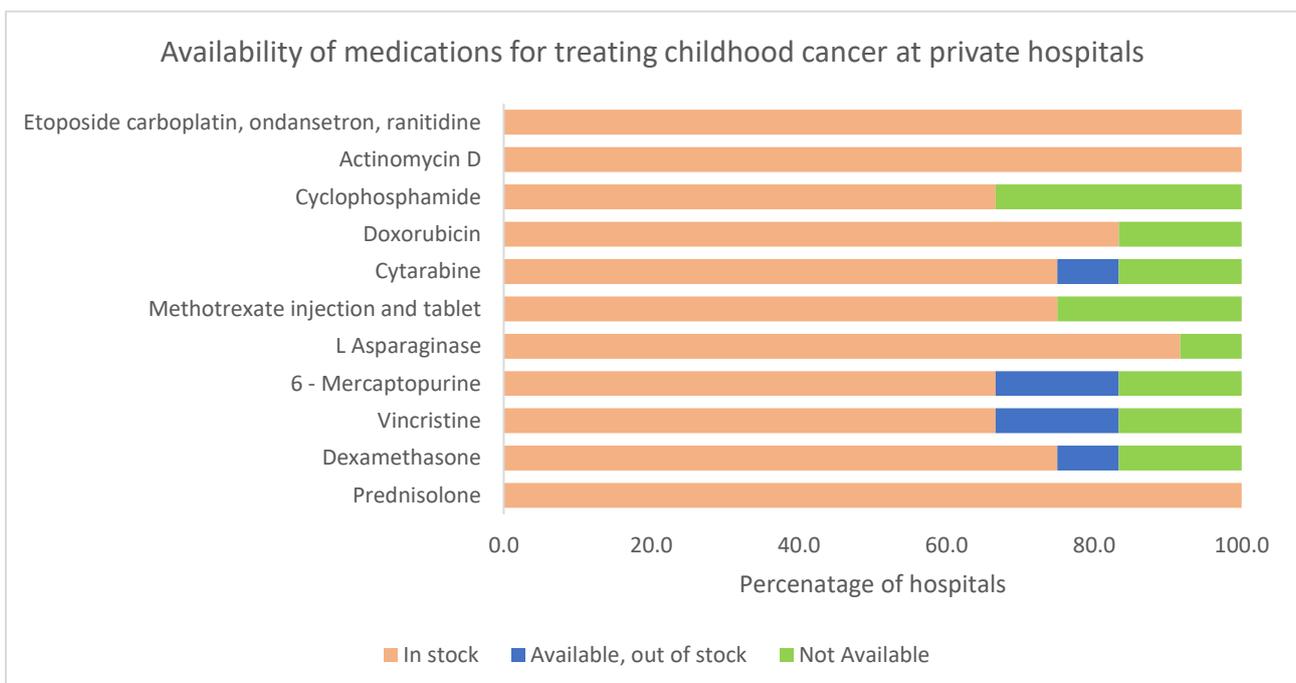
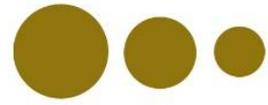


Fig. 23



### 3.11 Treatment guidelines

**Table 9: Percentage of tertiary hospitals using treatment guidelines for the management of specific cancers**

Cancer type	Public (n = 52)		Private (n = 23)		NGO/charitable (n = 19)	
	n	%	n	%	n	%
Leukaemia	51	98.07	23	100	19	100
Lymphoma	50	96.15	23	100	19	100
Brain tumours	47	90.38	20	86.95	17	89.47
Neuroblastoma	48	92.30	21	91.30	17	89.47
Wilms tumour	50	96.15	22	95.65	18	94.73
Bone cancer	45	86.53	22	95.65	18	94.73



### 3.12 Financing of treatment

Table 10

Financing mechanism		Public				Private				NGO/charitable			
		Tertiary (n = 77)	%	Secondary (n = 21)	%	Tertiary (n = 35)	%	Secondary (n = 13)	%	Tertiary (n = 25)	%	Secondary (n = 1)	%
1	Ayushman Bharat Scheme	63	81.8	13	61.9	16	45.7	6	46.2	12	45.7	0	
2	Govt health insurance: CGHS	42	54.5	-	-	11	31.4	-	-	13	31.4	-	-
3	Govt health insurance: ESI	18	23.4	-	-	27	77.1	-	-	15	77.1	-	-
4	Govt health insurance: Any other	3	3.9	-	-	11	31.4	-	-	1	31.4	-	-
5	Any other state-specific scheme	44	57.1	11	52.4	28	80.0	10	76.9	19	80.0	1	100
6	Private insurance	32	41.6	3	14.3	24	68.6	10	76.9	19	68.6	1	100
7	Hospital-based insurance	19	24.7	1	4.8	5	14.3	0		4	14.3	0	-
8	Self-financed	-	-	11	52.4	-	-	10	76.9	-	-	1	100
9	Funding provided by charitable organizations	-	-	10	47.6	-	-	3	23.1	-	-	1	100
10	Any other	-	-	8	38.1	-	-	6	46.2	-	-	1	100



### 3.13 Pediatric oncology training programmes

Table 11

S. No.	Courses	Availability of training courses at tertiary hospitals							
		Public		Private		NGO/charitable		Total	
		n	%	n	%	n	%	n	%
1	D.M. pediatric oncology	4	5.2	0	0.0	1	4.0	5	3.7
2	FNB in pediatric oncology	4	5.2	3	8.6	2	8.0	9	6.7
3	IAP PHO Fellowship	4	5.2	3	8.6	4	16.0	11	8.1
4	Fellowship in pediatric oncology (Besides FNB and IAP PHO)	3	3.9	2	5.7	4	16.0	9	6.7
5	Diploma in oncologic nursing	6	7.8	3	8.6	3	12.0	12	8.9
6	Certificate course in pediatric oncology for nurses/doctors	4	5.2	2	5.7	2	8.0	8	5.9
7	Any other	4	5.2	4	11.4	4	16.0	12	8.9



### 3.14 Childhood cancer related activities on awareness and early diagnosis

**Table 12**

Type of activity	Public				Private				NGO/charitable			
	Tertiary		Secondary		Tertiary		Secondary		Tertiary		Secondary	
N	n	%	n	%	n	%	n	%	n	%	n	%
Availability of IEC (Information, Education and communication) material -pamphlets/posters in waiting areas	40	51.9	10	47.6	21	60.0	6	46.2	13	52.0	1	100
Social media campaign	21	27.3	7	33.3	15	42.9	4	30.8	13	52.0	1	100
Public talks/seminars by experts	42	54.5	6	30.0	23	65.7	6	50.0	14	56.0	1	100
Training of all cadre of health care providers for early diagnosis	29	37.6	7	33.3	18	51.4	3	23.1	11	44.0	1	100
Screening for retinoblastoma in siblings of a patient with retinoblastoma	-	-	5	23.8	-	-	3	23.1	-	-	1	100
Any other	4	5.1	2	11.1	2	5.7	1	8.3	4	16.0	1	100

### 3.15 Medical record system at tertiary hospitals

**Table 13**

Medical record system at tertiary hospitals	Public (n = 77)		Private (n = 35)		NGO/charitable (n = 25)	
	n	%	n	%	n	%
Electronic system for patient records in tertiary Hospitals	40	51.9	24	68.5	20	80.0



### 3.16 Research activities among the tertiary hospitals

Table 14

Research activities among the tertiary hospitals	Public (n = 77)		Private (n = 35)		NGO/charitable (n = 25)	
	n	%	n	%	n	%
Active paediatric oncology clinical research program at Hospital or paediatric oncology unit/ward	19	24.6	9	25.7	8	32.0



## Part B. Barriers and facilitators in the delivery of childhood cancer services in India

### 3.17 Challenges faced in diagnosing and treating childhood cancers

#### 3.17.1 Tertiary level hospitals

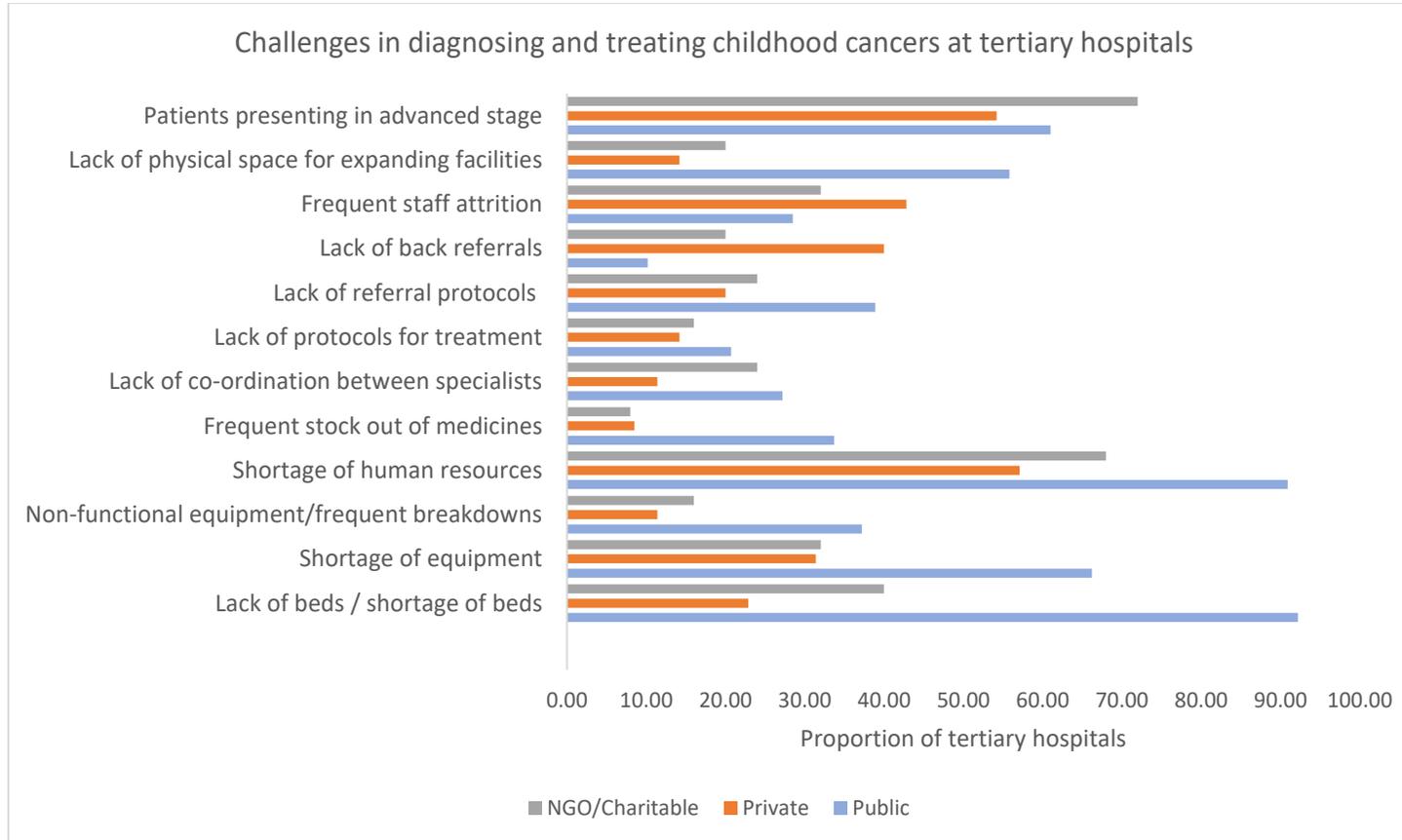


Fig. 24



### 3.17.2 Secondary level hospitals

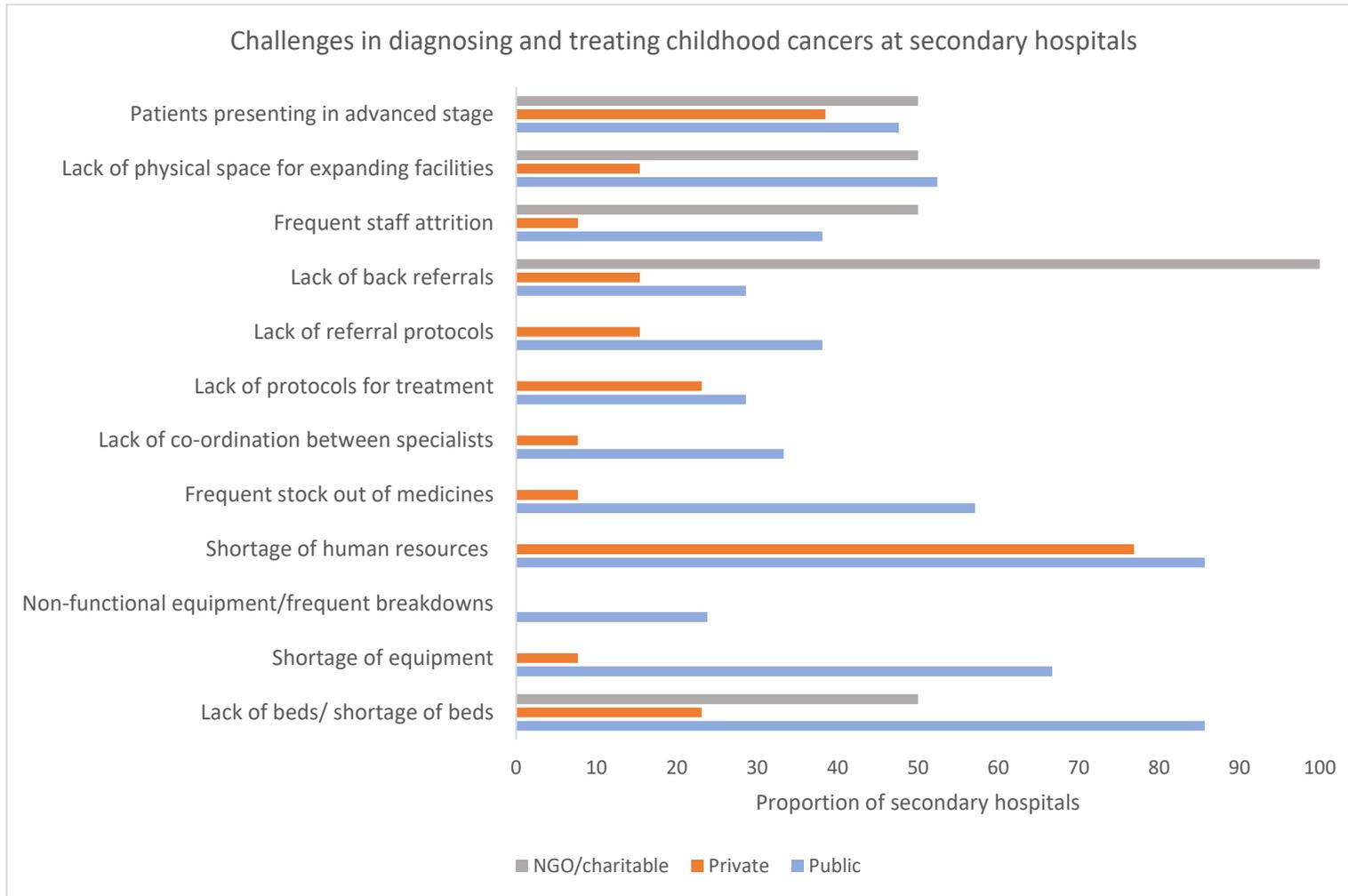


Fig. 25



### 3.18 Challenges faced by patients and caregivers regarding treatment

#### 3.18.1 Tertiary level hospitals

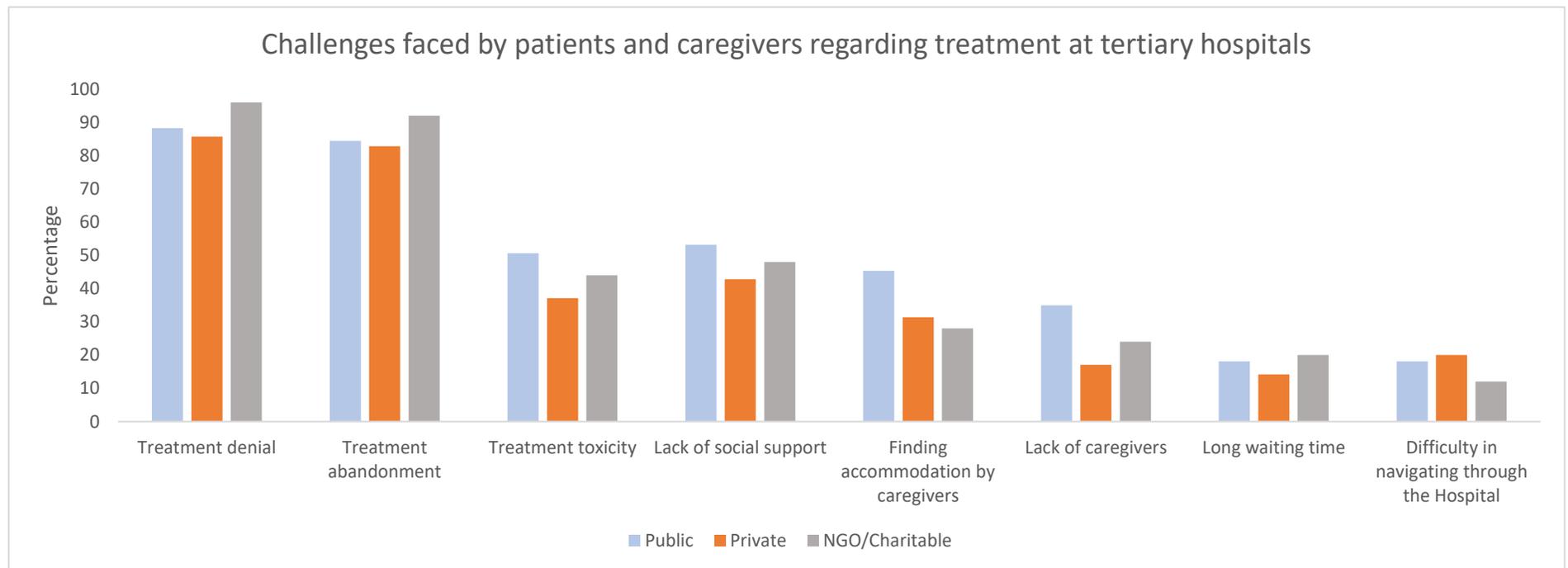


Fig. 26



### 3.18.2 Secondary level hospitals

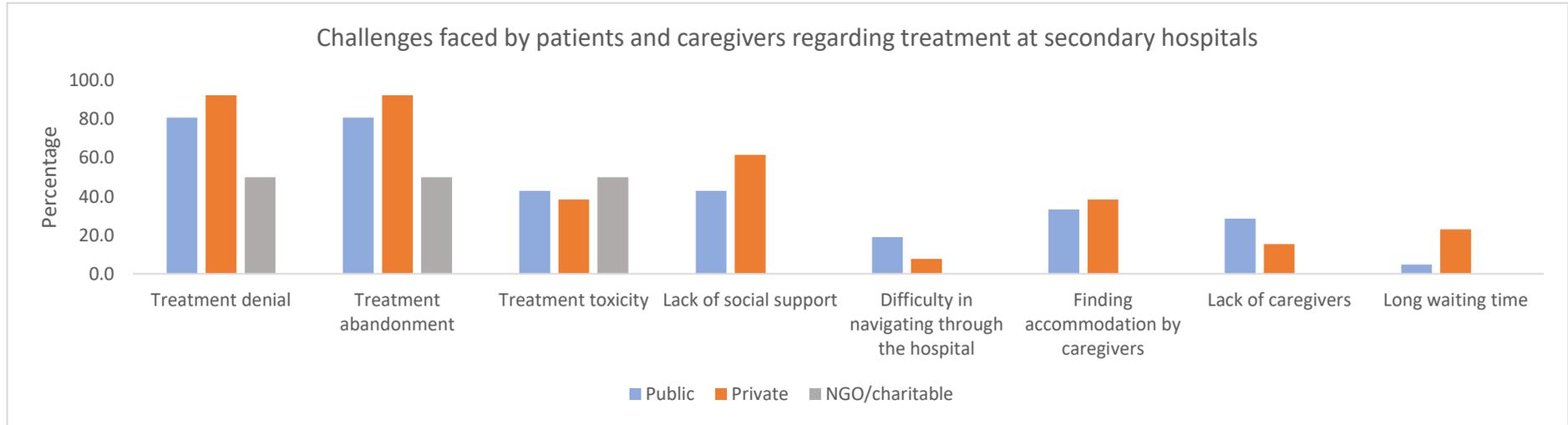


Fig. 27

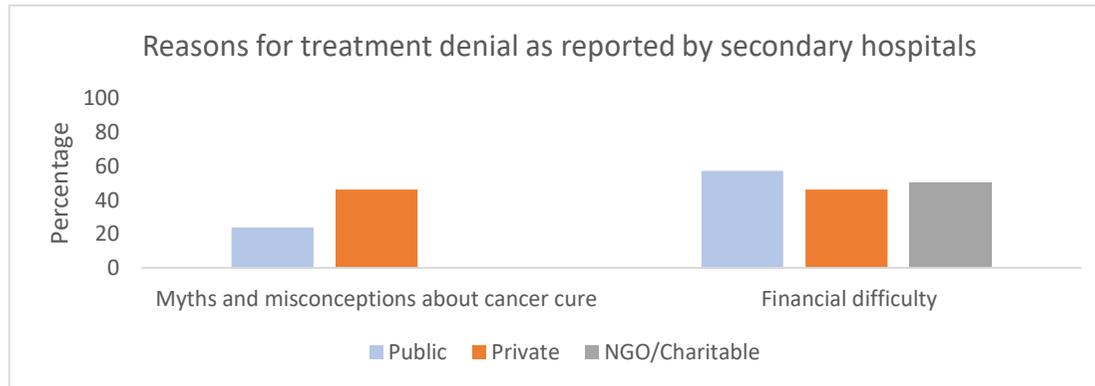
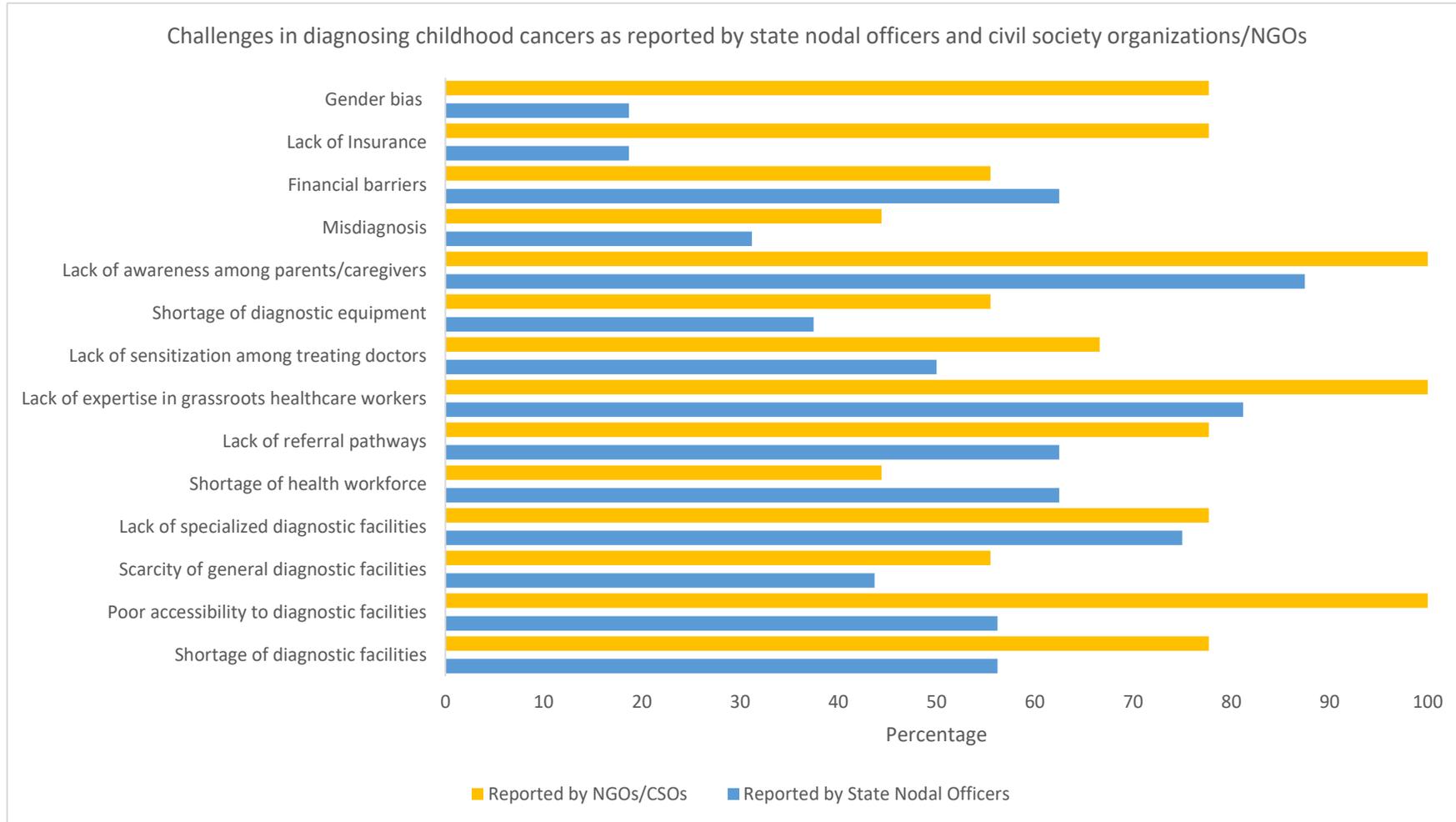


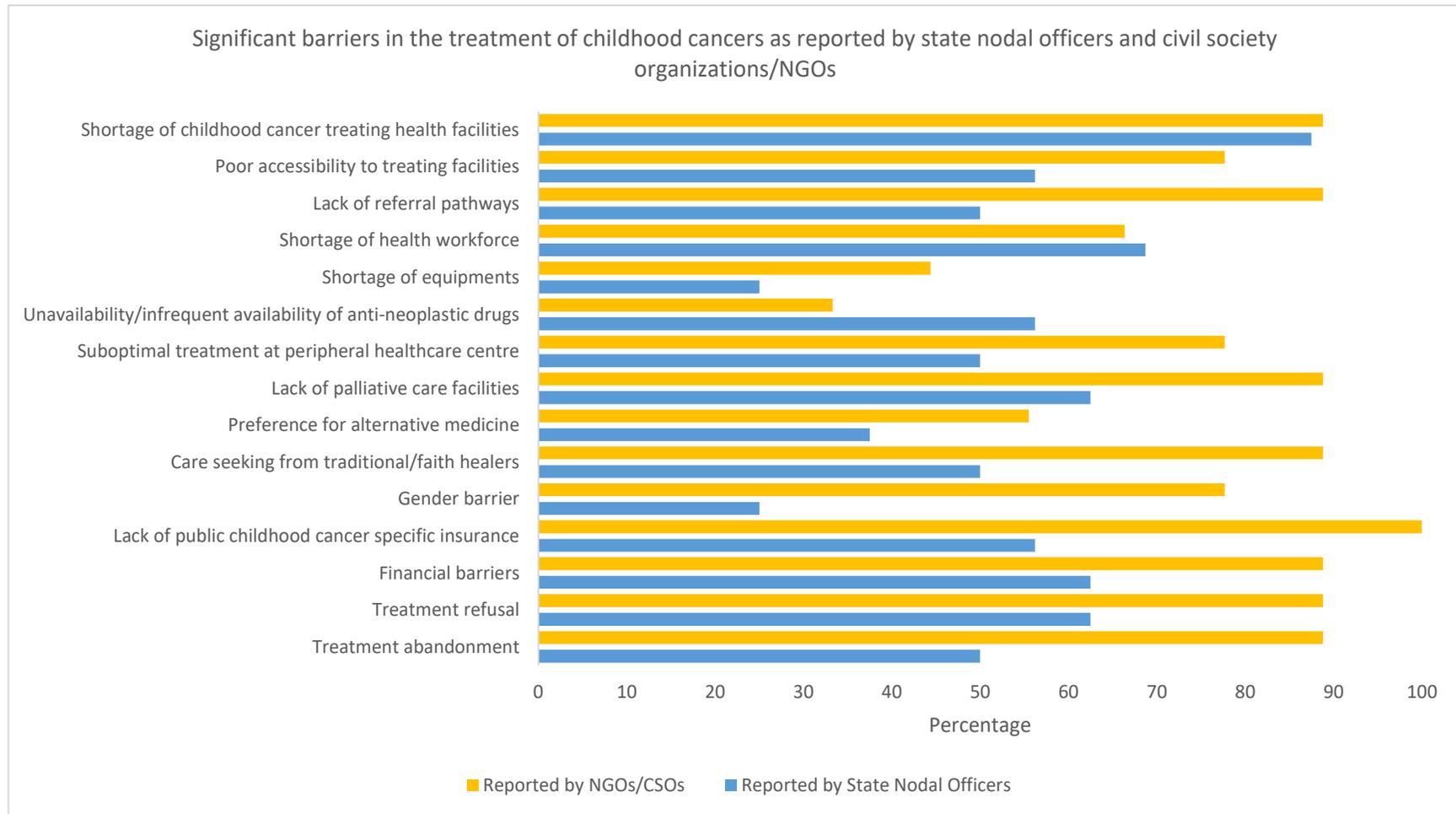
Fig. 28



### 3.18.3 State nodal officers and civil society organizations/ NGOs'



**Fig. 29**

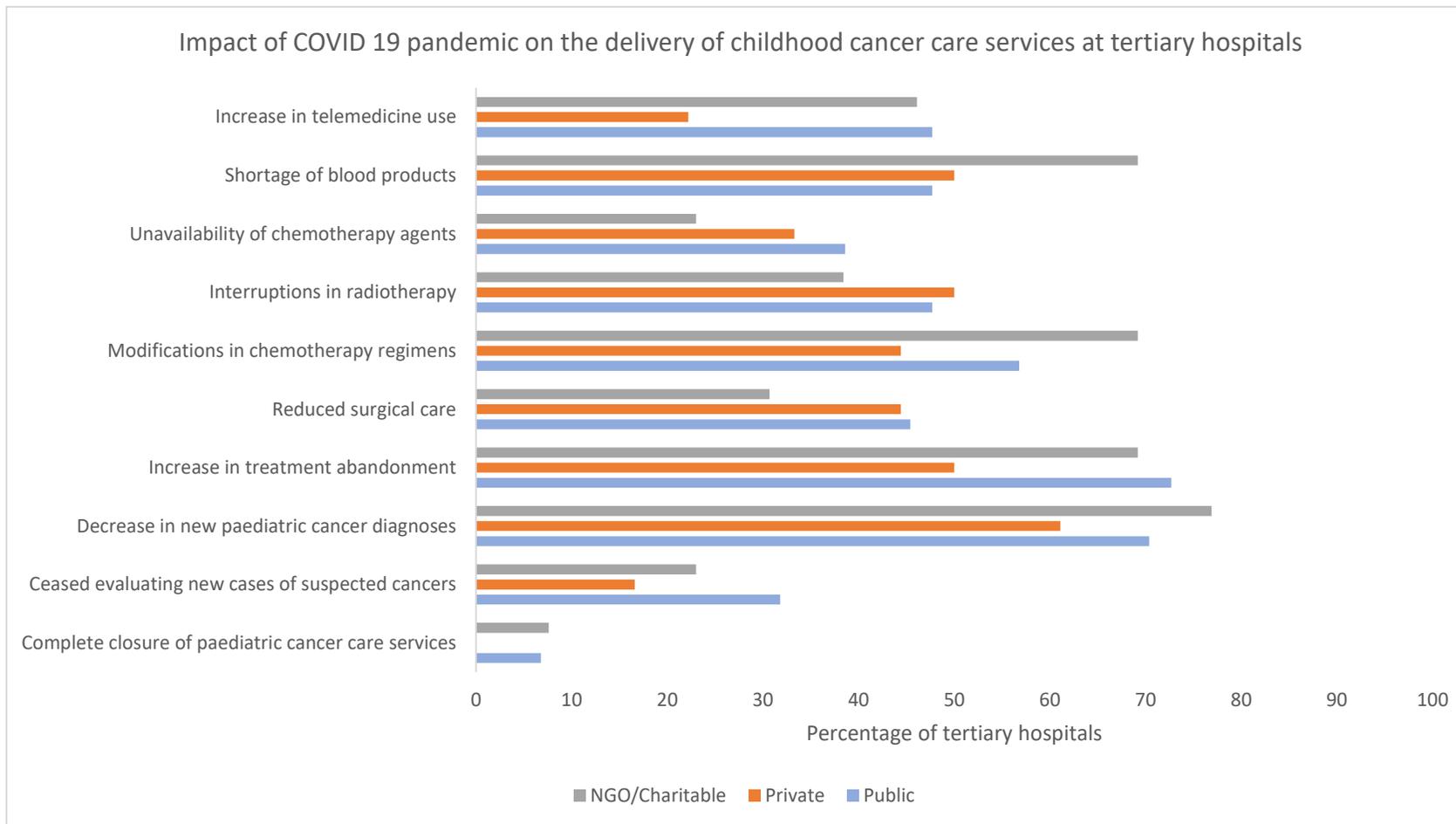


**Fig. 30**



### 3.19 Impact of COVID 19 pandemic on the delivery of childhood cancer care services

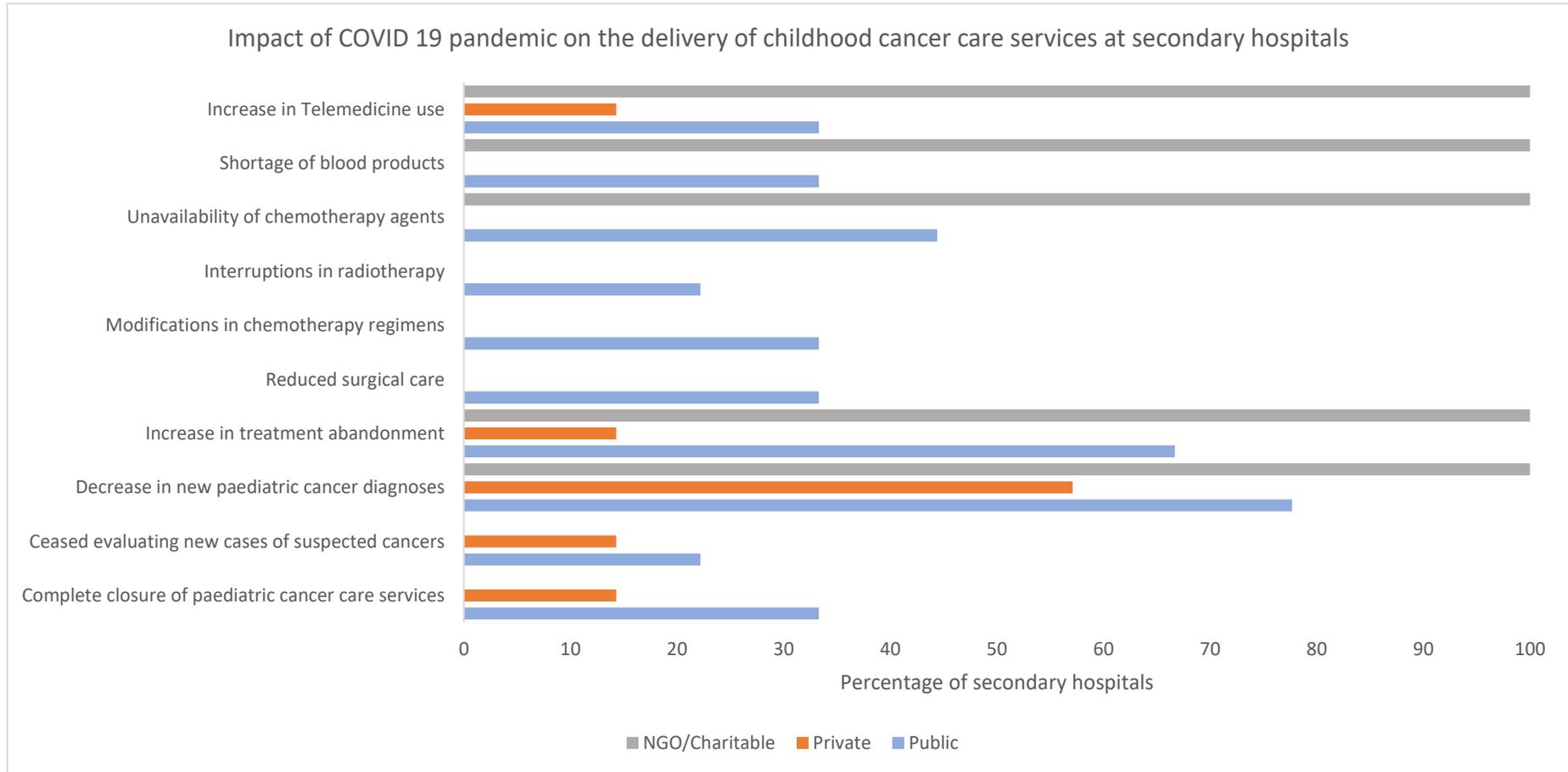
#### 3.19.1 Tertiary hospitals



**Fig. 31**



### 3.19.2 Secondary level hospitals



**Fig. 32**