



# **Out-of-pocket cost of cancer among Bangladeshi households: A field study**

**Presented by:**

**Abdur Razzaque Sarker, Ph.D**

Research Fellow, BIDS

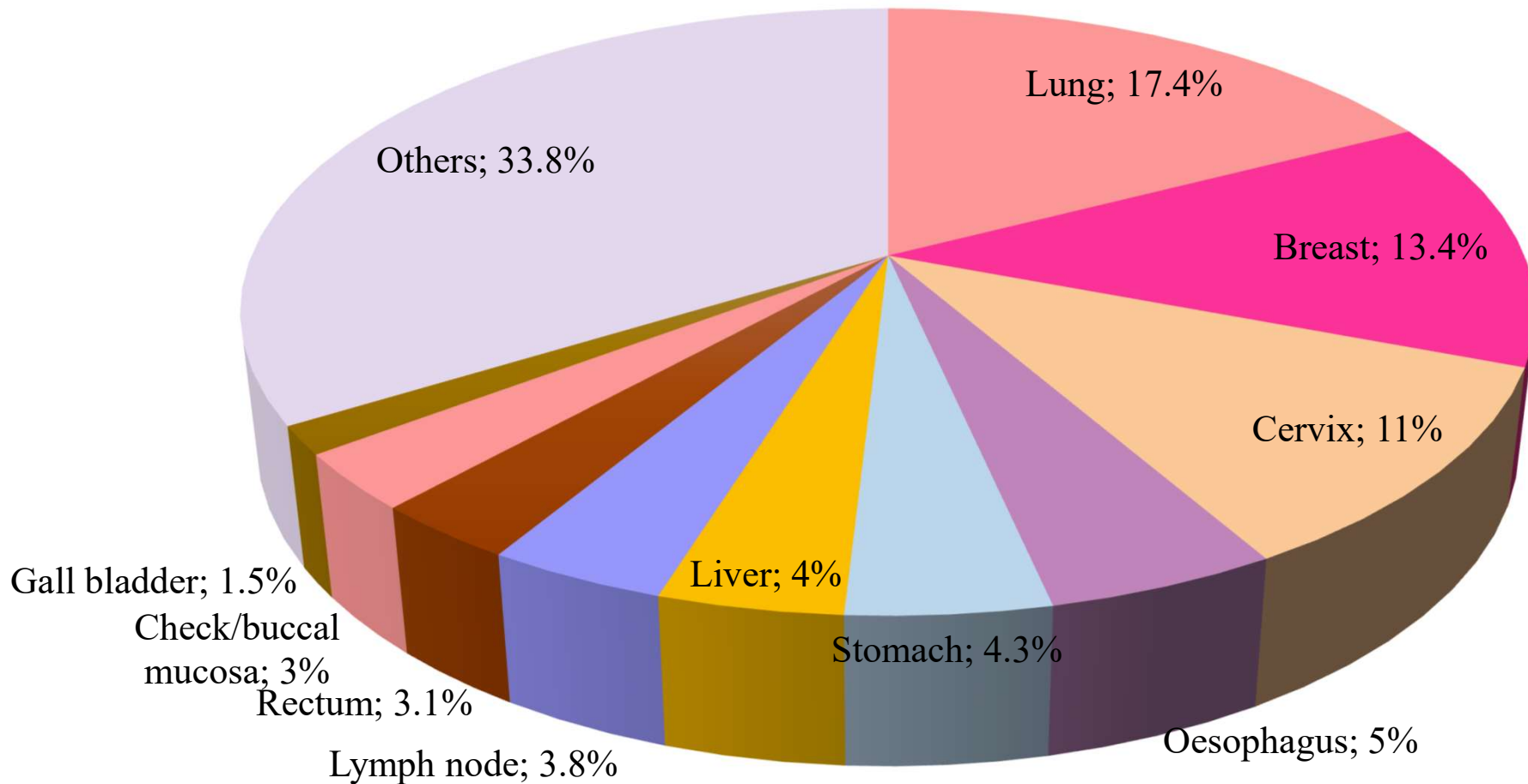
## Cancer: Global Perspective

- ❑ Cancer is increasingly a **global public health** issue
- ❑ In 2020, **19.3 million people** were **newly diagnosed** with cancer globally (WHO, 2021)
- ❑ Cancer is a leading cause of death worldwide, accounting for nearly **10 million deaths** in 2020 (WHO, 2022)
- ❑ Cancer is a **large group of diseases** that **can start in almost any organ** or tissue of the body **when abnormal cells grow uncontrollably**, go beyond their usual boundaries to invade adjoining parts of the body and/or **spread to other organs** (WHO, 2021)
- ❑ Cancer is often considered a **disease of ageing** as gastrointestinal (GI) cancer is very common among older
- ❑ However, about **400,000** children develop cancer worldwide every year (WHO, 2022)
- ❑ The most common cancers are breast, lung, colon and rectum, prostate, skin and stomach related cancers.

# Cancer: Bangladesh Perspective

- ❑ Cancer is one of the devastating public health problems in Bangladesh
- ❑ There are about **1.5 million** cancer patients in Bangladesh, with about **0.2 million patients** newly diagnosed with cancer in each year (Hossain, 2013)
- ❑ In 2020, **about 156,775** individuals were newly diagnosed with cancer while about **108,990** people died (Global Cancer observatory, 2022)
- ❑ The National Institute of Cancer Research and Hospital (NICRH) estimates that only 50,000 regularly go for treatment (Dhaka Tribune, 2022)
- ❑ Male and female exposed about **56%** and **43%** to the total cancer cases in Bangladesh (Globcan, 2022)
- ❑ The most common cancers in Bangladesh are **Breast, Lung, Oesophagus, Lip, Oral cavity, and Cervical cancers.**

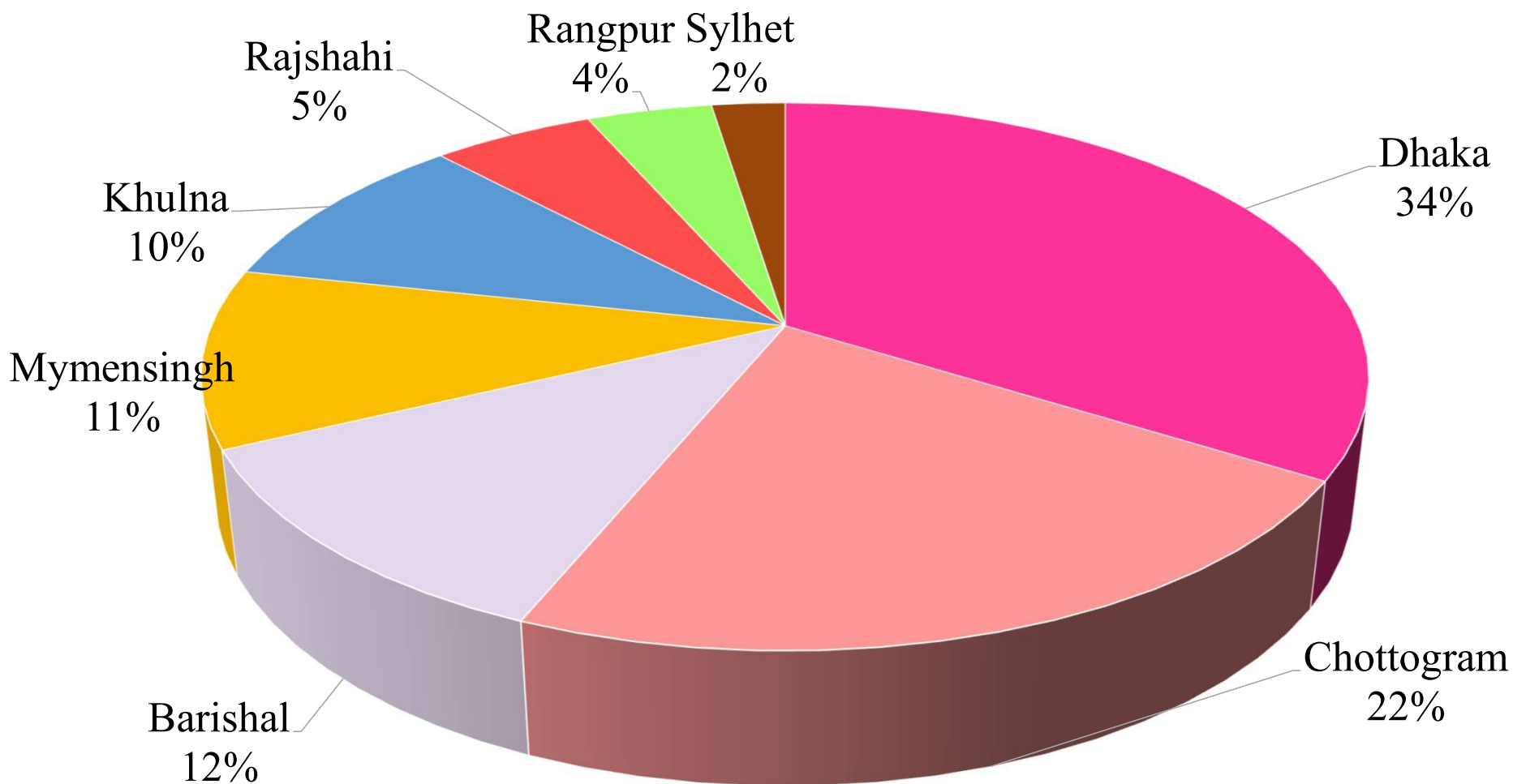
## Top 10 cancer in both sexes (2018-2020)



Source: Cancer registry report 2018-20



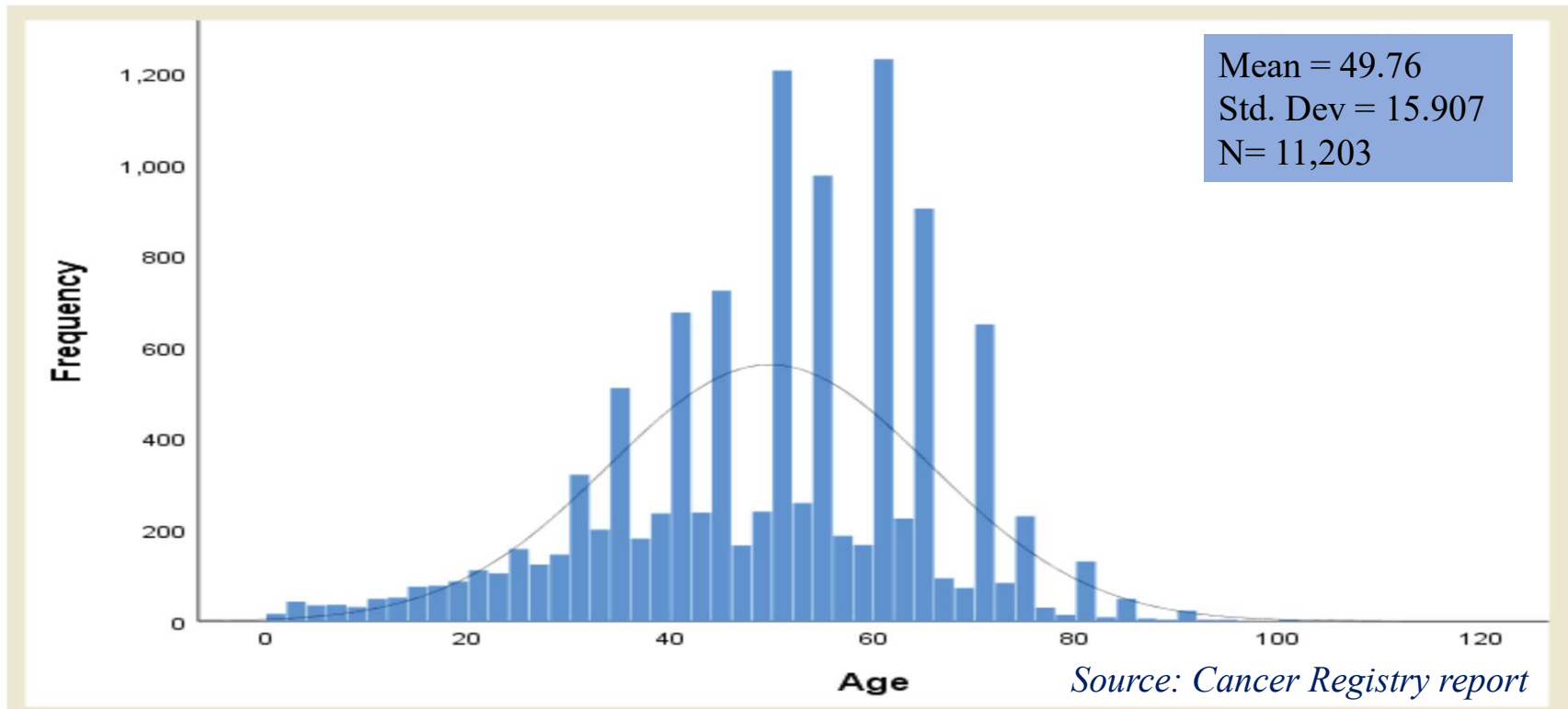
**Percent of Patient admitted in National Institute of cancer Research & Hospital (NICRH) in 2020**



Source: Cancer Registry report, 2020



## Age distribution of all cancers (2020)



❑ The incidence of cancer rises dramatically with age

❑ In 2019, the mean age of cancer patients was 51.39



## Cancer: Financial Perspective

- ❑ The financial burden of cancer is also **massive**
- ❑ The ever-increasing number of patients and the complications of the disease have imposed significant **direct medical and indirect costs** on patients, the health system and the government
- ❑ The economic burden of cancer was **€126 billion** in the European Union in 2016 (Andrade 2017)
- ❑ The economic burden of cancer in Spain was **about €9,016 million** (Andrade 2017)
- ❑ The average out of pocket expenditure was about **US \$4977 per in-patient** visit in **India** (Rajpal 2018)
- ❑ A cancer patient needs to face up to **BDT 639,835 annually** in Bangladesh (Hamid SA, 2021)
- ❑ National Cancer Research Institute reported that **a single cancer patient often** spends about **BDT 492,000 to BDT 810,000** for treatment care
- ❑ The costs vary with the age of the patient, types of cancer, the severity of the disease, length of stay in the hospital, length of stay in the ICU, and other various factors
- ❑ However, there are **very few studies** on households' economic burden of cancer in the context of Bangladesh

## Objectives of the study

The overall objective of this study is to estimate the **annual out-of-pocket (OOP)** cost of cancers in Bangladesh.

The specific objectives of the study are:

- 1) To estimate the overall out of pocket cost of cancer from households perspective
- 2) To assess the OOP cost across types of cancer
- 3) To estimate the cost burden and financial distress among Bangladeshi households





## Study Design

- A cross-sectional study design
- A hospital-based household survey was conducted
- Positive cancer patient confirmed by the hospital was our target sample
- The patient were selected from the three randomly selected hospital (1public + 1private +1 NGO-based hospital) in Bangladesh
- The randomly selected hospitals are:
  - National Institute of Cancer Research & Hospital, Mohakhali, Dhaka
  - Bangladesh Medical College and Hospital, Dhanmondi, Dhaka
  - Ahsania Mission Cancer and General Hospital – (AMCGH), Uttara, Dhaka



Public Hospital	Private Hospital	NGO-based hospital
<ul style="list-style-type: none"> <li><input type="checkbox"/> Bangabandhu Sheikh Mujib Medical University (BSMMU)</li> <li><input type="checkbox"/> Dhaka Medical College Hospital</li> <li><input type="checkbox"/> National Institute of Cancer Research &amp; Hospital</li> <li><input type="checkbox"/> Shaheed Suhrawardy Medical College &amp; Hospital</li> <li><input type="checkbox"/> Sir Salimullah Medical College &amp; Hospital</li> <li><input type="checkbox"/> Chittagong Medical College &amp; Hospital</li> <li><input type="checkbox"/> Faridpur Medical College Hospital</li> <li><input type="checkbox"/> Khulna Medical College Hospital</li> <li><input type="checkbox"/> M Abdur Rahim Medical College Hospital</li> <li><input type="checkbox"/> Mymensingh Medical College Hospital</li> <li><input type="checkbox"/> Rangpur Medical College Hospital</li> <li><input type="checkbox"/> Rajshahi Medical College Hospital</li> <li><input type="checkbox"/> Sylhet MAG Osmani Medical College Hospital</li> <li><input type="checkbox"/> Shahid Ziaur Rahman Medical College Hospital</li> <li><input type="checkbox"/> Sher e Bangla Medical College Hospital, Barishal</li> </ul>	<ul style="list-style-type: none"> <li>❖ Square Hospitals Ltd</li> <li>❖ Anwar Khan Modern Medical College &amp; Hospital</li> <li>❖ Apollo Hospital, Dhaka</li> <li>❖ BRB Hospitals Limited</li> <li>❖ United Hospital</li> <li>❖ Bangladesh Medical College &amp; Hospital (BMCH)</li> <li>❖ Combined Military Hospital (Dhaka)</li> <li>❖ Delta Hospital Limited</li> <li>❖ Enam Medical College &amp; Hospital</li> <li>❖ Green Life Medical College Hospital</li> <li>❖ Japan Bangladesh Friendship Hospital</li> <li>❖ Labaid Specialized Hospital</li> <li>❖ Specialized Cancer Research Hospital ltd.</li> <li>❖ Asgar Ali Hospital</li> <li>❖ Bangladesh Specialized Hospital Limited</li> <li>❖ Khawja Eunos Ali Medical College</li> <li>❖ North East Medical College</li> <li>❖ Parkview Medical College Hospital</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Ahsania Mission Cancer and General Hospital</li> <li><input type="checkbox"/> Ahsania Mission Cancer and General Hospital</li> <li><input type="checkbox"/> Bangladesh Cancer Society Hospital &amp; Welfare Home</li> <li><input type="checkbox"/> Gonoshasthaya Samaj Vittik Medical College &amp; Hospital</li> </ul>

## Sample

- ❑ We considered *the central limit theorem* to draw the sample size, i.e., at least 30 positive cases should be required to estimate the mean cost with an assumption of normal distribution (Levin & Rubin, 1991)
- ❑ We adopted the sample size calculation strategies proposed by the WHO based on the age groups (<5, 5 to 12, 13-19, 20-59 and 60+) and sources of care (public vs. private vs NGOs) for economic burden of illness study (WHO 2006)
- ❑ A total of 450 ( $30*5*3$ ) confirmed cancer patient was surveyed from the three hospitals- Public, Private and NGO level hospital
- ❑ Public hospitals play a major role in providing treatment for a relatively large population as the treatment cost in public hospitals is relatively lower
- ❑ However, people often frequently visited both in private and NGO based hospitals



## Patient selection

Name of the Hospital	Type of Hospital	Frequency	Percentage
National Institute of Cancer Research & Hospital (NICRH)	Public	150	33.33
Bangladesh Medical College Hospital (BMCH)	Private	151	33.56
Ahsania Mission Cancer & General Hospital (AMCGH)	NGO	149	33.11
Total		450	100



## Cost Estimation

- ❑ Cost analysis was performed using the **WHO guideline** for estimating the economic burden of non-communicable disease (WHO, 2005)
- ❑ A bottom-up **micro-costing approach** was used to generate the average annual OOP cost per patient (Drummond et al., 2005)
- ❑ **Out-of-pocket (OOP)** costs are defined as expenditures during treatment by households consisting of direct medical costs and direct non-medical costs
- ❑ **Direct medical cost** include those costs that were consumed for healthcare resources during cancer treatment (e.g., medicine, diagnosis, chemo, physician fee)
- ❑ The **direct non-medical cost** includes the cost of transportation, lodging/accommodation, food items,, etc.
- ❑ The **household cost burden** was measured by the percentage of total household earnings consumed by the course of treatment (Grietens et al., 2008)



# RESULTS



## Background characteristics (N=450)

Variables	N	%
<b>Age of the patient</b>		
Less than 20 years	41	9.11
21-40 years	105	23.33
<b>41-59 years</b>	<b>168</b>	<b>37.33</b>
60 or above years	136	30.22
Average age of the patient in years (mean, sd)	47.26	17.58
<b>Gender of the patient</b>		
Female	252	56
<b>Male</b>	<b>198</b>	<b>44</b>
<b>Educational status of the patient</b>		
No formal education	72	16
Up to primary	148	32.89
Secondary	164	36.44
Higher secondary	46	10.22
Higher education	20	4.44
<b>Household size</b>		
Less than 4 members	46	10.22
4-5 members	221	49.11
6-7 members	138	30.67
8 and more members	45	10

### Number of earners in household

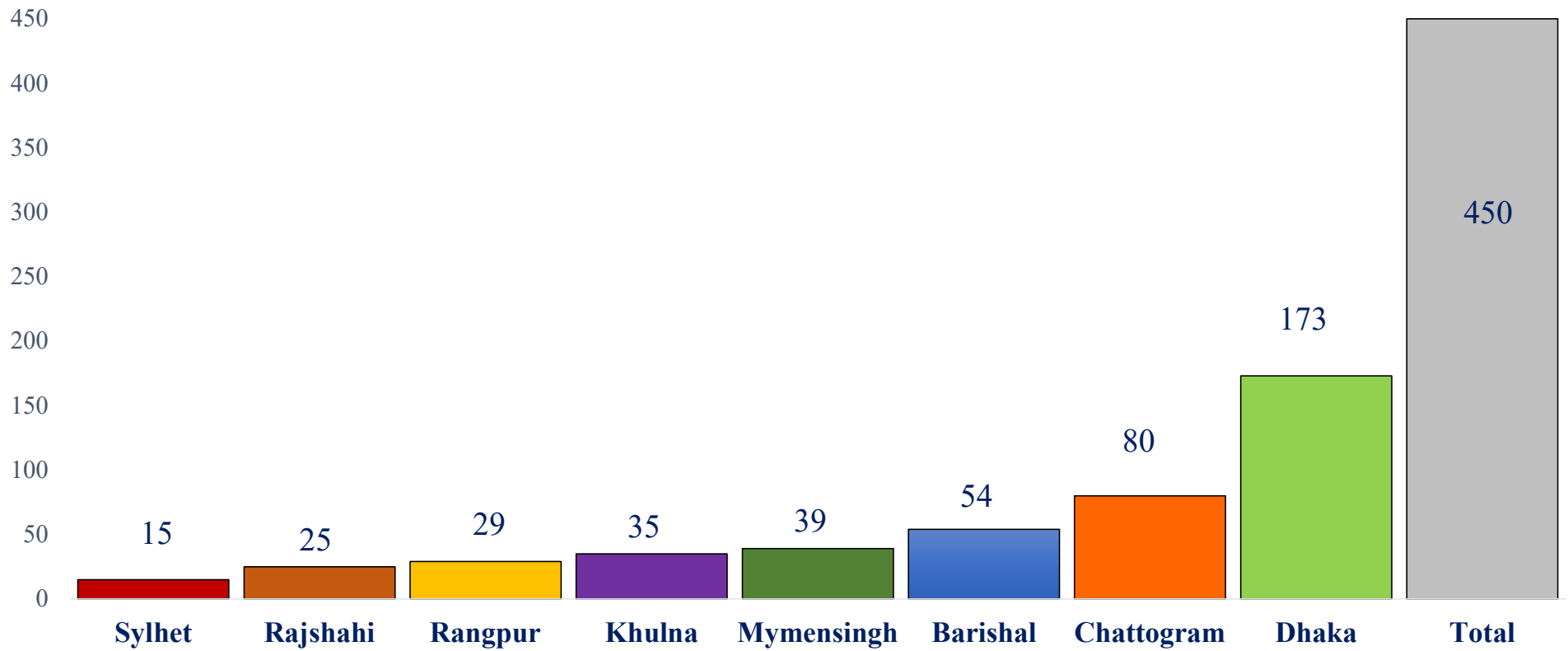
No earner	8	1.78
One earner	318	70.67
Two earners	104	23.11
Three or more earners	20	4.44

### Household monthly income by Income quintile (mean, SD)

Poorest	9730	9341
Poorer	15178	18260
Middle	21824	23143
Richer	31258	29498
Richest	56466	34528

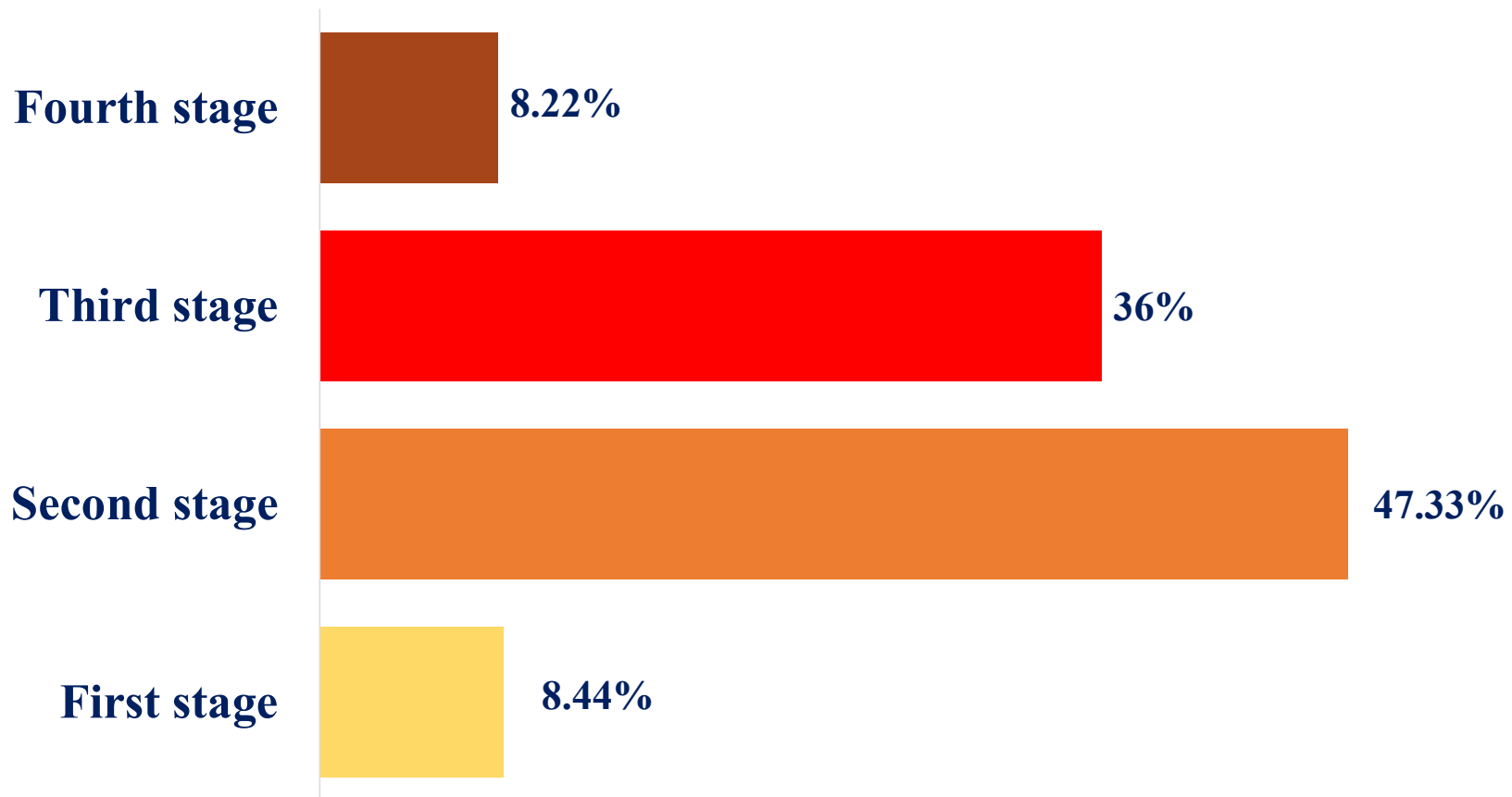


## Patients across divisions (N=450)



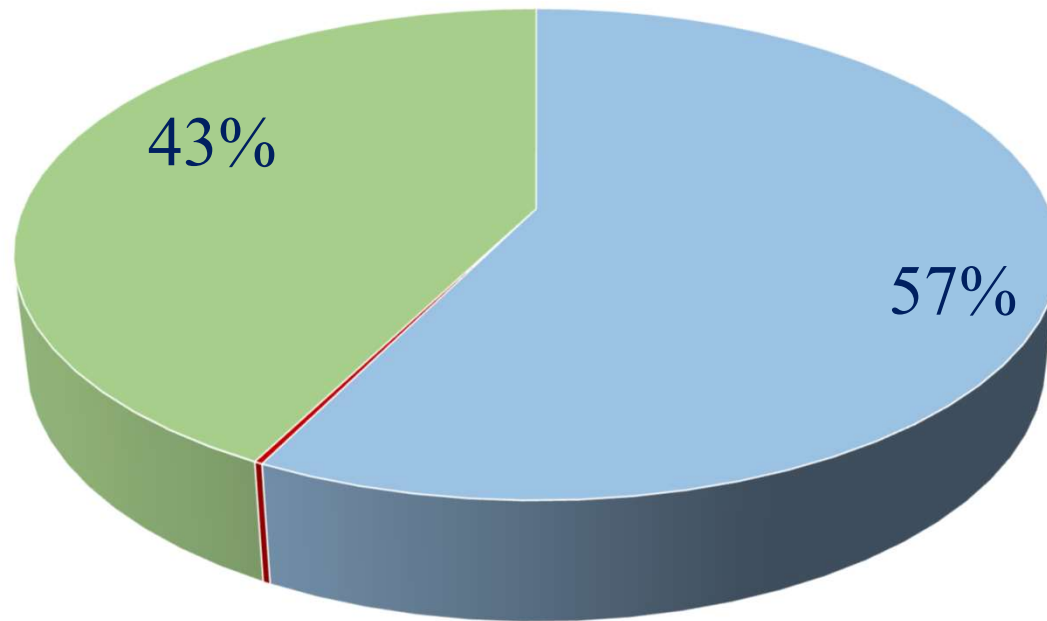


## Stage of the cancer at detection (%)





## Type of treatment received (%)

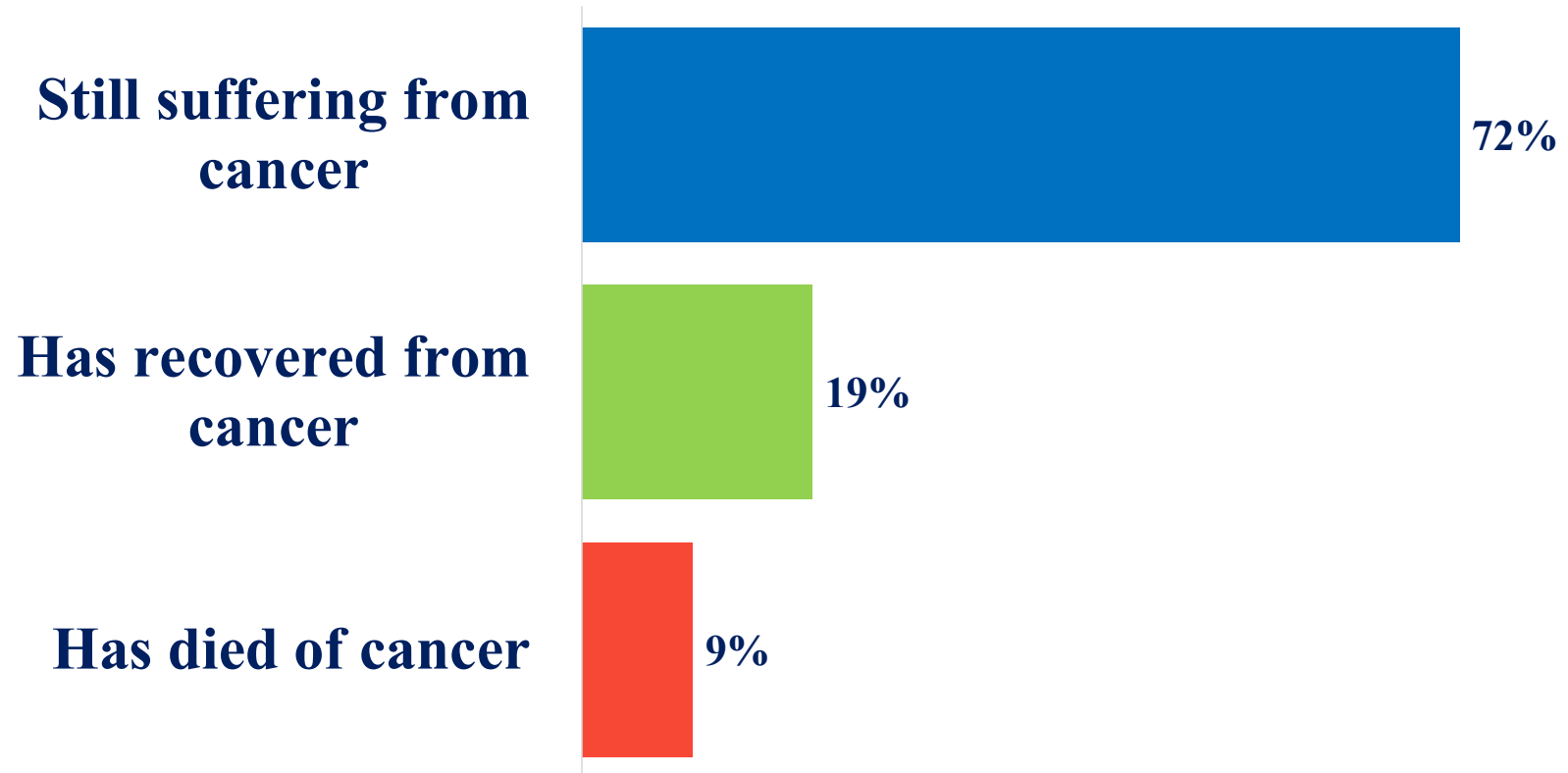


- Surgery & therapy both
- Only surgery
- Only therapy

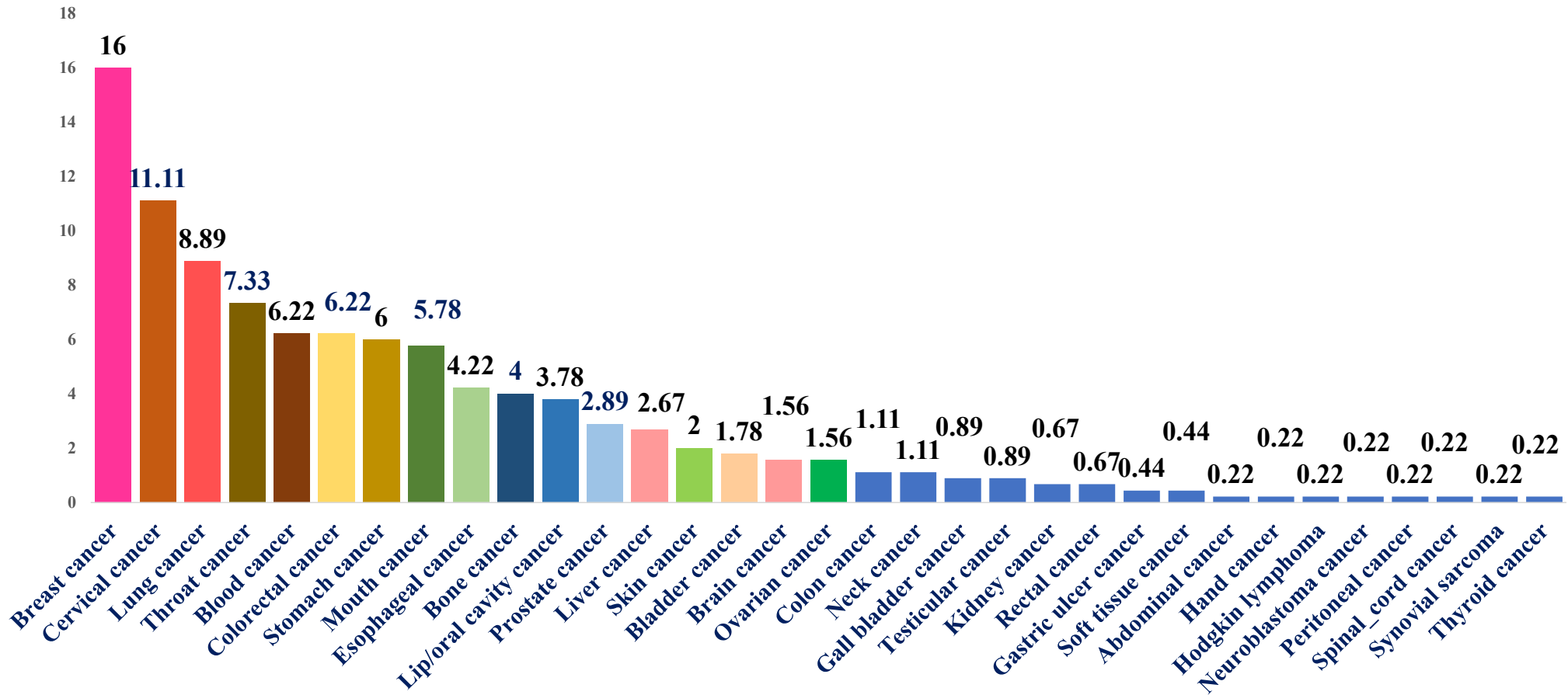




## Current status of patients (%)



# Distribution of cancer patients by cancer type (%)



## Annual direct (out-of-pocket) cost of cancer treatment from households perspective

Cost type	Cost item	Mean	SD	Minimum	Maximum	Median
Direct medical	Registration fee (n=450)	1845	1379	70	5,000	1500
	Consultation fee (n=424)	28808	28176	2,000	150,000	20000
	Medicine Cost (n=450)	165191	140019	30,000	10,00,000	130000
	Diagnostic Cost (n=450)	145718	112503	20,000	850,000	100000
	Bed fee (n=430)	51393	54316	5,000	350,000	30000
	Medical Equipment Cost (n=450)	42311	37889	2,000	2,00,000	30000
	Direct medical cost in abroad (n=23)	504348	456497	150,000	18,00,000	350000
Average total direct medical cost (n=450)		457,095	375,602	62,070	22,68,500	341,250
Direct Non-Medical	Transportation Cost (n=450)	20082	16326	3000	150,000	15000
	Food cost (n=450)	19258	14056	1500	100,000	15000
	Informal payment (n=376)	2004	1389	200	9,000	1750
	Caregiver expenditure (n=441)	28366	17173	2000	90,000	25000
	Accommodation cost (n=204)	24642	17621	5000	120,000	20000
	Other cost (n=450)	2583	3433	500	50,000	2000
	Direct non-medical cost in abroad (n=23)	160000	87282	50000	400,000	100000
Average total direct non-medical cost (n=450)		90,745	60,575	12,500	410,500	76,000
<b>Total direct cost (n=450)</b>		<b>547,840</b>	<b>420,171</b>	<b>80,770</b>	<b>25,00,000</b>	<b>415,000</b>

## Overall annual out of pocket cost (% of total cost)

Type of cost components		Overall		% of total cost
		Mean	SD	
Direct medical	Registration fee	1,845	1379	0.3
	Consultation fee	27,143	28164	5.0
	Medicine Cost	165,191	140019	30.2
	Diagnostic Cost	145,718	112503	26.6
	Bed fee	49,109	54141	9.0
	Medical Equipment Cost	42,311	37889	7.7
	Direct medical cost in abroad	25,778	150248	4.7
<b>Total direct medical cost</b>		<b>457,095</b>	<b>375602</b>	<b>83.4</b>
Direct Non-Medical	Transportation Cost	20,082	16326	3.7
	Food cost	19,258	14056	3.5
	Informal payment	1,674	1471	0.3
	Caregiver expenditure	27,799	17459	5.1
	Accommodation cost	11,171	17065	2.0
	Other cost	2,583	3433	0.5
	Direct non-medical cost in abroad	8,178	40219	1.5
<b>Total direct non-medical cost</b>		<b>90,745</b>	<b>60575</b>	<b>16.6</b>
<b>Total direct cost</b>		<b>547,840</b>	<b>420171</b>	<b>100</b>

## Annual OOP cost across stages at cancer detection (mean, SD)

Type of cost	First stage		Second stage		Third stage		Fourth stage	
	Mean (SD)	Median	Mean (SD)	Median	Mean (SD)	Median	Mean (SD)	Median
Direct medical cost	<b>274,556</b> (175390)	274,500	<b>447,678</b> (317974)	363,000	<b>483,486</b> (433922)	336,750	<b>583,230</b> (485041)	381,500
Direct non-medical cost	56687 (39460)	45,500	86280 (55728)	74,000	98693 (65492)	82,000	116635 (66166)	100,000
Total OOP cost	<b>331,243</b> (205709)	330,050	<b>533,958</b> (357940)	433,500	<b>582,178</b> (482325)	409,450	<b>699,865</b> (532706)	495,500

## Annual OOP cost of across wealth status of households

Wealth Quintiles	Average annual income	Annual average OOP cost of cancer	Diff
Poorest quintile	153,811	379,071	-225260
2nd quintile	190,517	446,471	-255954
3rd quintile	267,867	491,505	-223639
4th quintile	321,625	661,314	-339689
Richest quintile	579,857	768,692	-188835
Overall	299,211	547,829	-248618
Rich-poor ratio	3.77	2.03	
Rich poor difference	426,046	389,621	





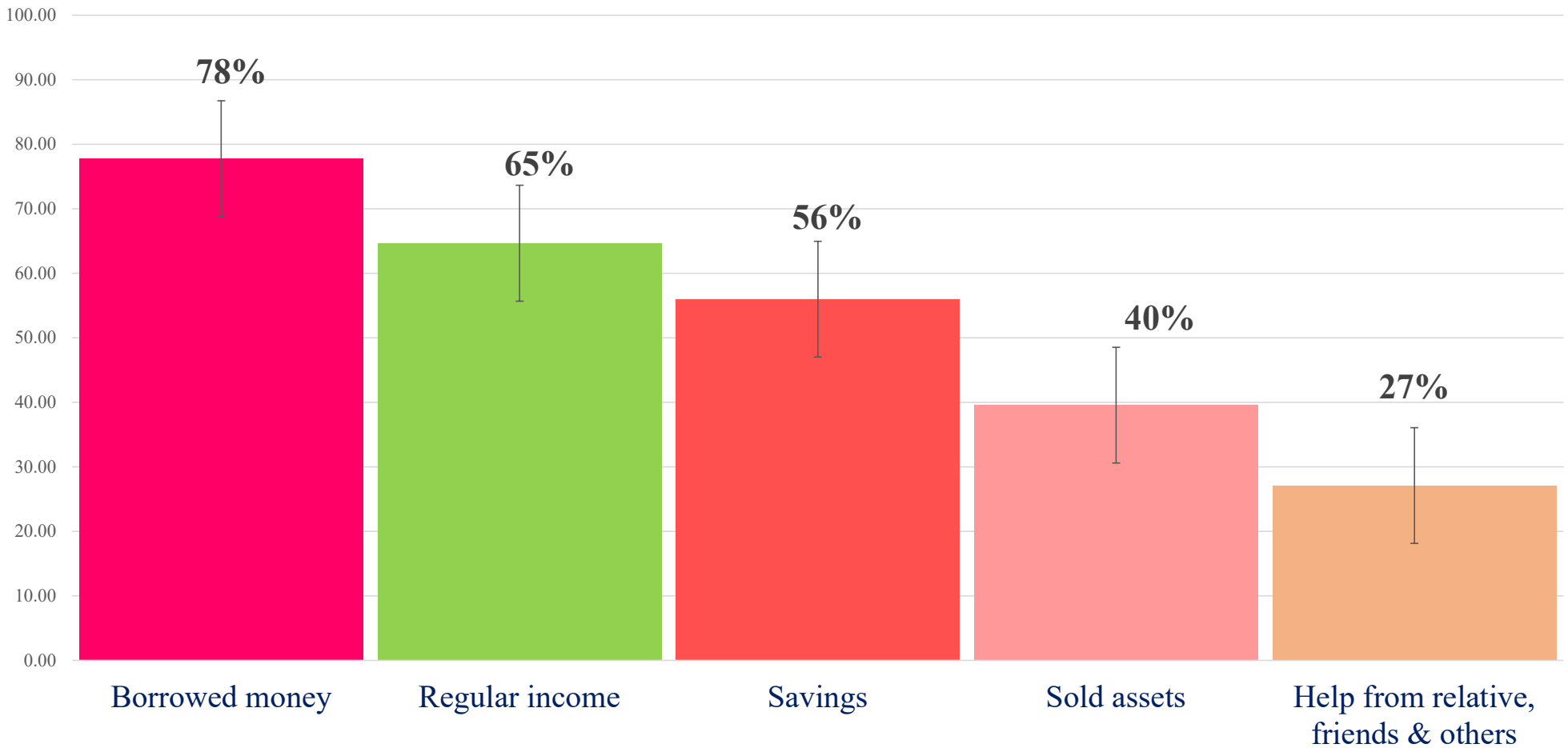
## Annual OOP costs across cancer

Cancer type	1 Year OOP Cost		
	Mean	SD	Median
Thyroid cancer	898,000	-	898000
Liver cancer	878,408	536509	760750
Bladder cancer	873,500	483559	752500
Colorectal cancer	814,836	553984	745750
Hand cancer	786,500	-	786500
Prostate cancer	751,000	443233	648500
Skin cancer	745,033	620898	473200
Blood cancer	624,439	330176	588750
Peritoneal cancer	610,500	-	610500
Stomach cancer	605,803	364263	503500
Lip/oral cavity cancer	594,359	410972	497000
Lung cancer	561,590	490371	401500
Cervical cancer	558,496	415881	471500
Esophageal cancer	542,337	403957	402800
Kidney cancer	529,333	414179	311000
Breast cancer	518,731	441472	405500
Ovarian cancer	487,871	401226	300800
Abdominal cancer	480,300	-	480300
Neuroblastoma cancer	445,700	-	445700
Gall bladder cancer	444,750	169121	460750
Brain cancer	442,400	285395	357000
Synovial sarcoma	438,400	-	438400
Hodgkin lymphoma	415,500	-	415500
Throat cancer	391,839	315396	313000
Bone cancer	354,933	166078	303000
Mouth cancer	322,154	213515	257100
Gastric ulcer cancer	321,500	99702	321500
Soft tissue cancer	301,750	63710	301750
Colon cancer	288,920	63991	254300
Rectal cancer	278,767	115551	258800
Spinal cord cancer	272,300	-	272300
Neck cancer	271,120	107938	312500
Testicular cancer	231,100	76840	265700
Overall	547,840	420171	415000

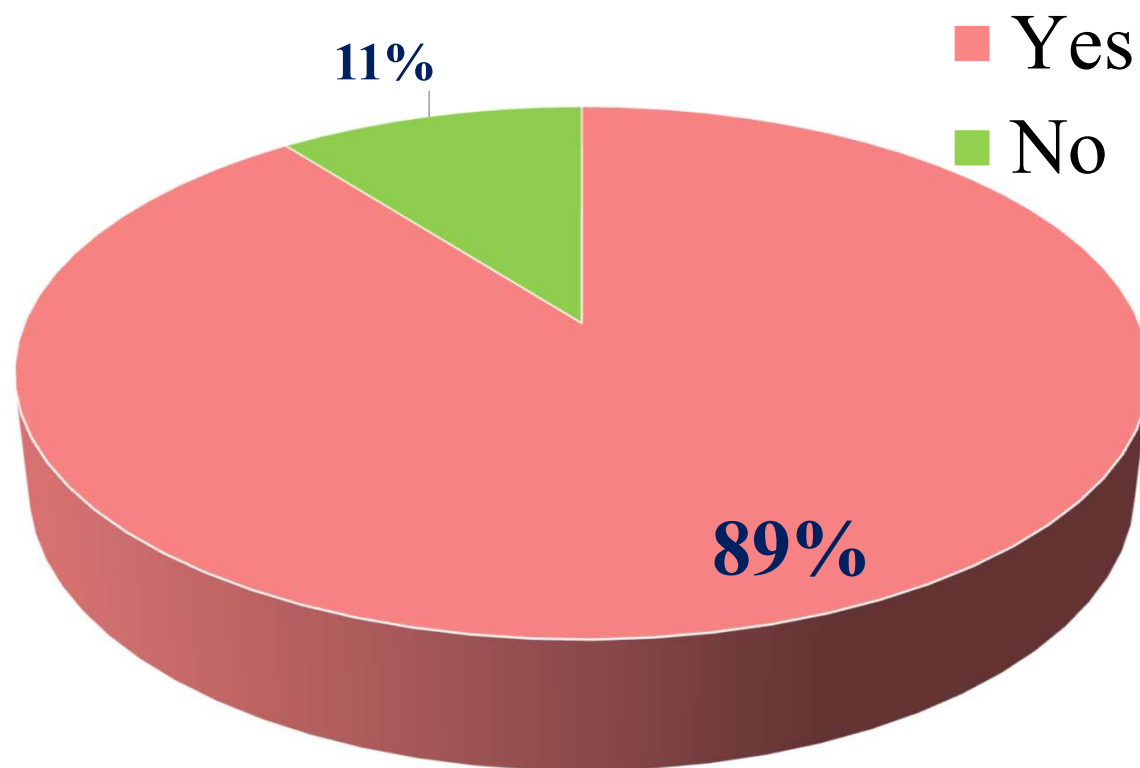
## Annual OOP cost between alive and dead cancer patients

Type of cost	Cost components	Dead		Alive	
		Mean	SD	Mean	SD
<b>Direct medical</b>	Registration fee	1,337	1089	1,896	1396
	Consultation fee	23,573	23302	27,501	28606
	Medicine Cost	164,122	137697	175,854	162926
	Diagnostic Cost	135,268	120141	146,765	111811
	Bed fee	45,378	52601	49,483	54342
	Medical Equipment Cost	39,000	41763	42,643	37519
	Direct medical cost in abroad	19,512	124939	26,406	152671
<b>Total direct medical cost</b>		<b>428,191</b>	<b>374417</b>	<b>470,548</b>	<b>391584</b>
<b>Direct Non-Medical</b>	Transportation Cost	19,805	14424	20,110	16521
	Food cost	19,268	10354	19,257	14385
	Informal payment	1,668	1497	1,739	1201
	Caregiver expenditure	27,585	15723	27,820	17641
	Accommodation cost	7,171	11760	11,572	17468
	Other cost	2,832	2525	2,558	3513
	Direct non-medical cost in abroad	4,878	31235	8,509	41028
<b>Total direct non-medical cost</b>		<b>83,207</b>	<b>44477</b>	<b>91,565</b>	<b>61951</b>
<b>Total direct cost</b>		<b>511,398</b>	<b>419848</b>	<b>562,113</b>	<b>453768</b>

## Coping mechanism for cancer treatment, % (multiple response)



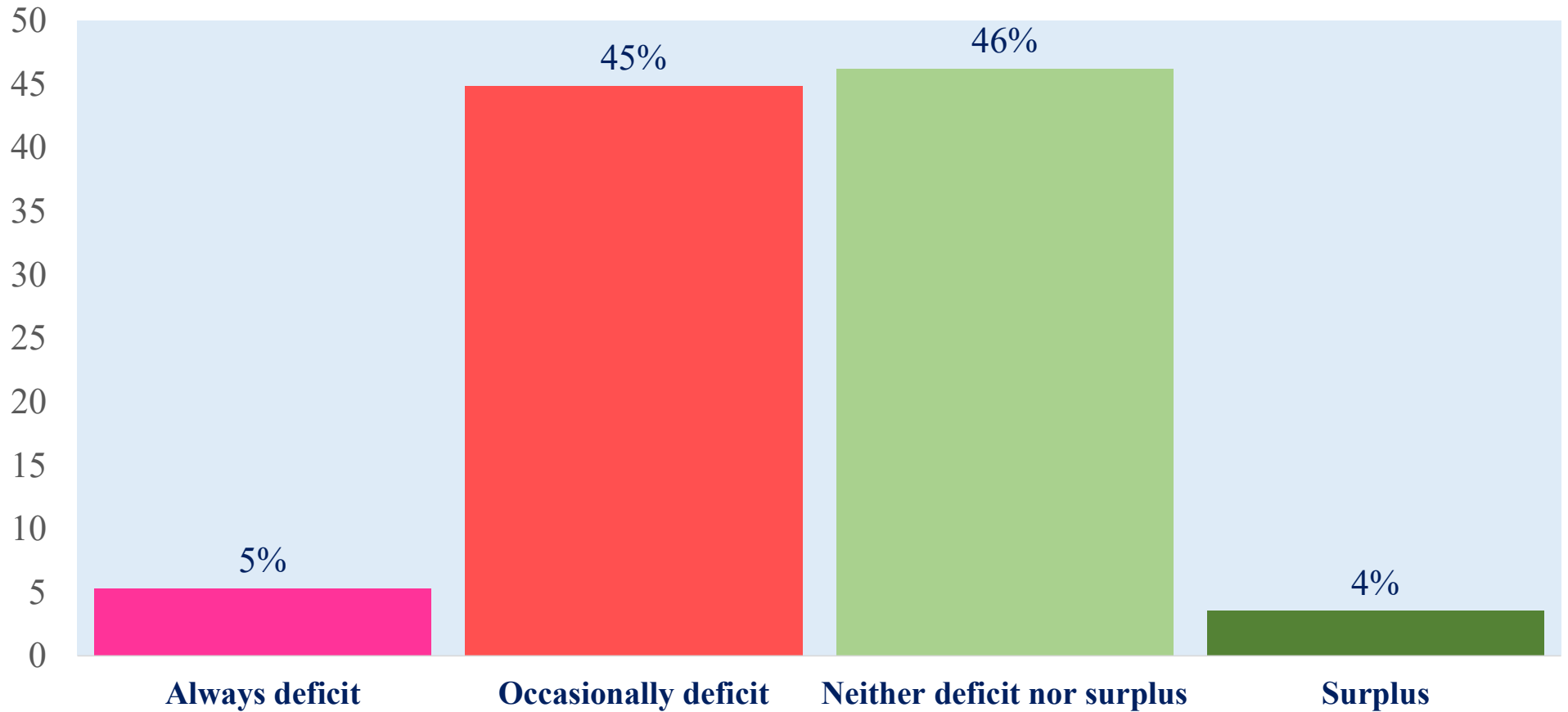
## Distress financing due to treatment of cancer



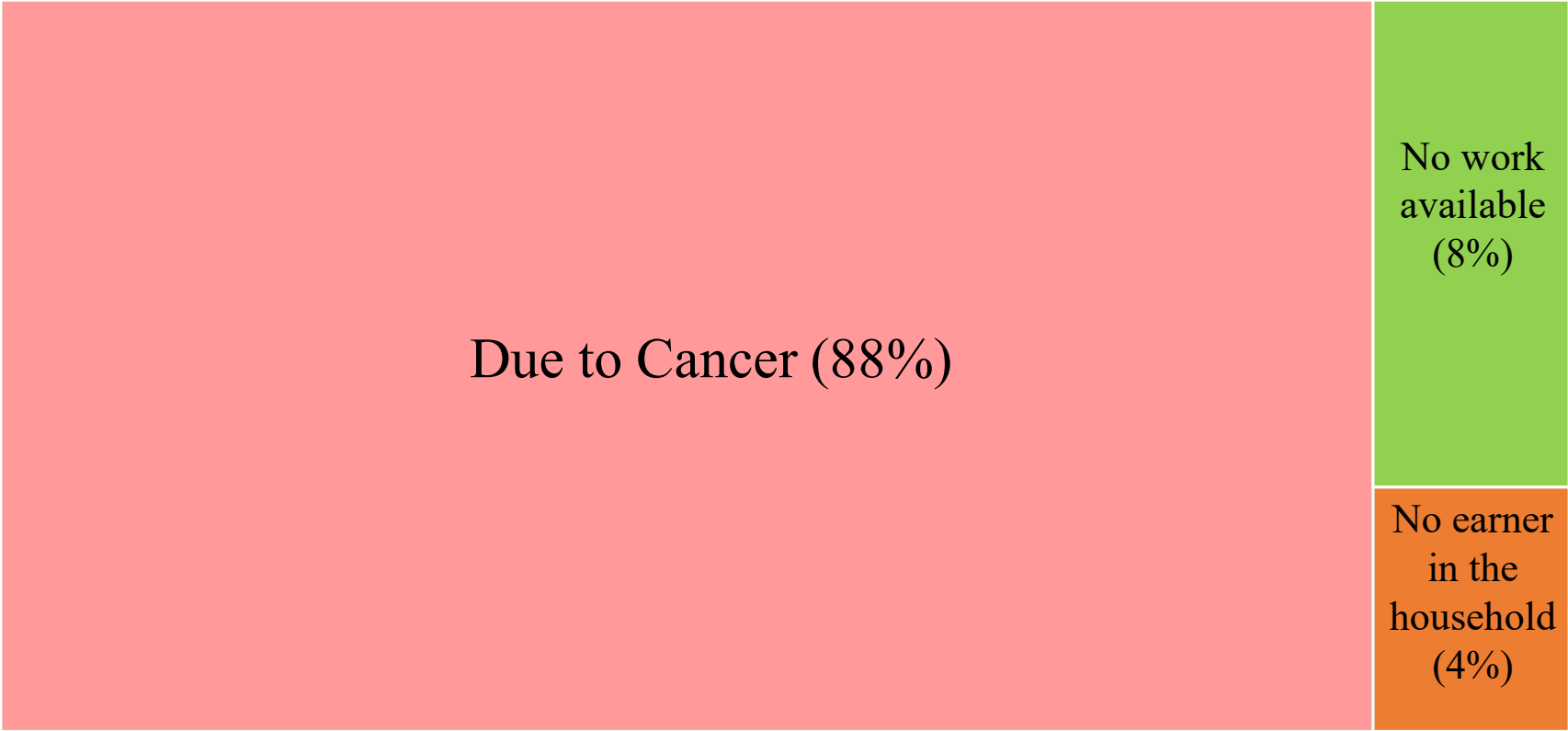
Wealth quintiles	Financial distress (%)
Poorest	99
Poor	99
Middle	99
Richer	90
Richest	60



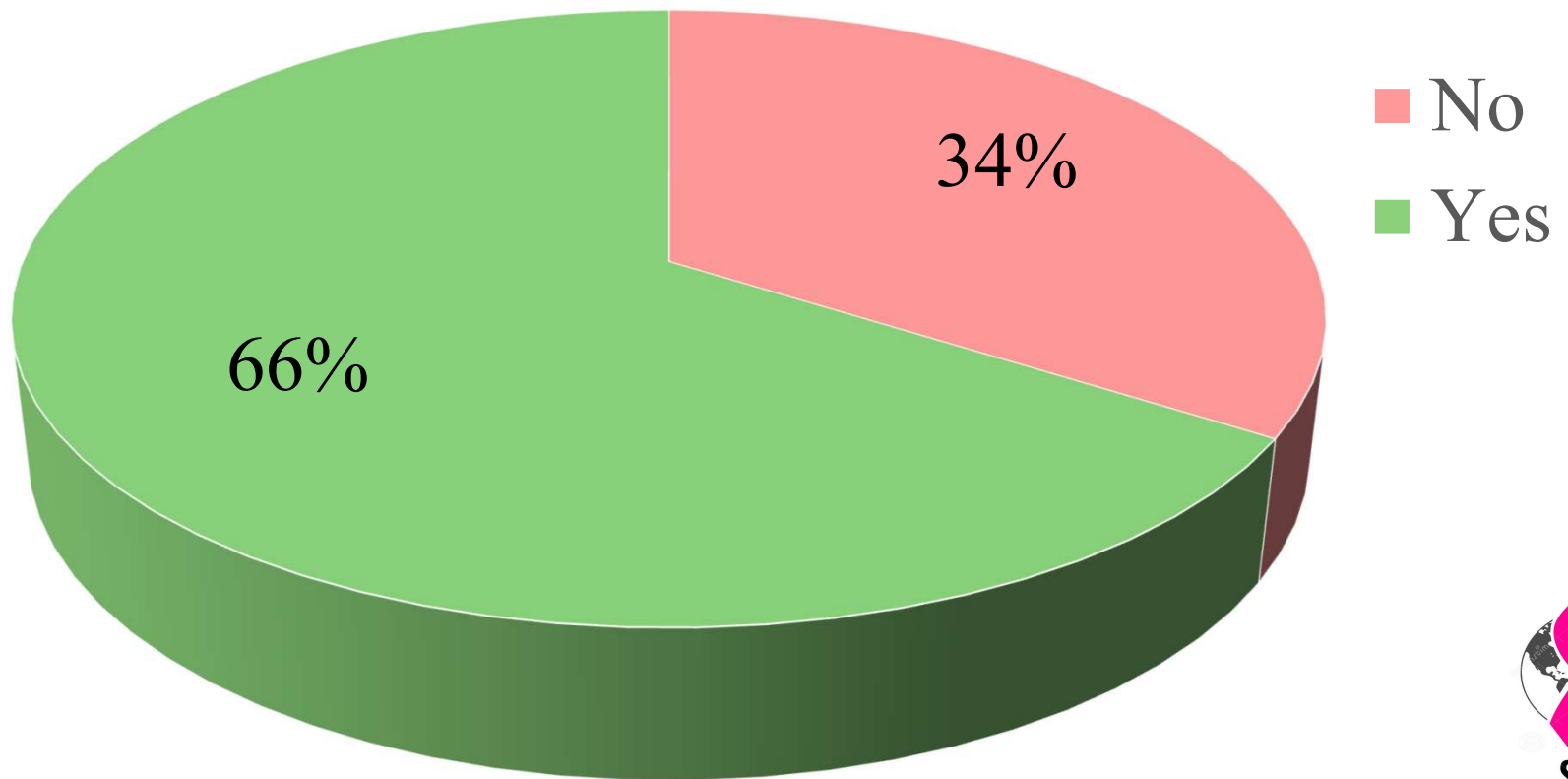
## Households' status by food consumption (%)



**Reason of deficit in food consumption (%)**



**Eating 3 (three) meals regularly in last 1 year (%)**



## Conclusions and Policy Recommendations

- ❑ The average annual OOP cost of illness of cancer was BDT 547,840 (Min BDT 81k – Max BDT 2500k)
- ❑ The average OOP cost of cancer **BDT 331,243 for 1<sup>st</sup> stage and BDT 699,865 for 4<sup>th</sup> stage**
- ❑ OOP cost of **drugs and diagnosis** accounting for the highest share of OOP cost
- ❑ **90% household** faced distress financing due to cancers in Bangladesh
- ❑ While **OOPE is greater for richest** households, the cost burden is greater for poorer households
- ❑ Hospitals should fulfill all the necessary diagnostic facilities and **promote early detection of cancer**
- ❑ More **expensive treatment drugs** should be produced by state-owned pharmaceuticals to reduce their cost
- ❑ The government can invest **an additional budget to safeguard patients** from financial catastrophic shock
- ❑ Cancer treatment should be brought **under an insurance mechanism** to make it more affordable.
- ❑ There is a need for policies to impart **financial protection** and expand the screening and **curative services for cancer**
- ❑ A **national cancer control policy** is a must !







**Thank You**



**BANGLADESH INSTITUTE OF DEVELOPMENT STUDIES (BIDS)**

