Philippine Costs in Oncology (PESO): Describing the Economic Impact of Cancer on Filipino Cancer Patients Using the ASEAN Costs in Oncology Study Dataset

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ABSTRACT

Background. Cancers are among the top causes of mortality in the Philippines. The treatment regimens are also costly and put Filipinos at risk of financial catastrophe. The economic impact, however, has not been documented.

Objective. This analysis aimed to describe the economic impact of cancer in the Philippines and analyze predictors of financial catastrophe among Filipino cancer patients.

Method. The analysis used the dataset from the ASEAN costs in oncology study, a prospective study of adult cancer patients in Southeast Asia. Cancer patients were recruited at time of diagnosis and were monitored in terms of health outcomes, costs, and quality of life. Multinomial regression models were generated to assess predictors of death and financial catastrophe.

Results. Information from 909 respondents in the Philippines was included in the analysis. Overall, 240 (26.4%) of the cohort were dead at the end of the study while 40.6% were still alive at Month 12 but had experienced financial catastrophe. Mean combined Month 3 and Month 12 out-of-pocket expenditure was PhP181,789.00 (n = 458, sd = 348,717.47). Belonging to higher income groups (vs. belonging to the lowest two) was significantly associated with lower risk of financial catastrophe. Insurance did not confer significant change in risk of death or financial catastrophe.

Conclusion. Cancer can be a significant economic burden for Filipinos leading to financial catastrophe. Insurance mechanisms at the time of study failed to protect against catastrophe.

Key Words: adult patients, cancer, cohort studies, health financing, multinomial regression model, Philippines

INTRODUCTION

Malignant neoplasm or cancer remains within the top three causes of mortality in the Philippines, making it a priority burden of illness in the country.[1] It also remains one of the most challenging diseases in the diagnostic, therapeutic, and psycho-socio-cultural-economic domains. Each patient's journey with a life-limiting illness such as cancer is unique. The concept of "total pain" or "total suffering" indicates that there are many factors which contribute to the experience of pain and other physical symptoms and each patient must be treated with the knowledge that physical symptoms cannot be treated in isolation.[2]

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The concept of total suffering brings together not just physical pain from the disease per se but also social, spiritual, cultural, and psychological aspects greatly impairing quality of life (QoL), as well as the adverse events from the cancer therapy including financial toxicity. Financial toxicity refers to the way out-of-pocket (OOP) expenses can drain the wallets of cancer patients, poison QoL, and, in fact, become an adverse event of treatment.[3] Thus, effective control of suffering is a realm not exclusive to the control of the disease per se but must involve the consideration of all aspects of total suffering as well. This underlines the multidisciplinary nature of the management of cancer in and beyond the confines of the clinic to legislative and public health care policy.

The Philippine health care system is not exempt from high OOP expenditure and its impact on health and economic outcomes. The Family Income and Expenditure Survey disclosed that of the Philippine Peso (PhP) 100 spent for healthcare, PhP54 is paid directly out of the pocket of a Filipino patient.[4] (1USD = PhP41.1) Given the Philippine unemployment and under-employment rates of 7% and 20%, respectively, and with 26.5% of the population living below the poverty line, the probability of financial catastrophe (spending more than 30% of household income for health services after basic subsistence needs have been met) would already be high.[5,6]

In the setting of cancer, costs would immediately pile up, and on the outset, is an expected high cost of acute and immediate care. After that, the costs are long term costs due to long chemotherapy or radiotherapy cycles and follow-up care. Finally, the person would likely stop working due to the disease and the household income is expected to decrease.

Prior to the Asean CosTs In ONcology (ACTION) study, no study has been done looking at the economic impact of cancer in the local Philippine household, to set out significant awareness that continuing more public and economic management of this disease by government has to be done. Most studies examining the economic burden of cancer have been conducted in high-income settings; little is known about its economic impact in low- and middle-income settings. The financial implication of a cancer diagnosis may not be equitable since OOP payments are the principal means of financing health care in most low- and middle-income countries.[7]

In the ASEAN region, countries - including those with universal health coverage - rely heavily on OOP financing.[8] In 2012, the George Institute for Global Health, University of Sydney instigated a study of new cancer patients in the ACTION study, to increase cancer awareness and inform priority setting, assess the economic and health impact of cancer, and provide compelling evidence to the argument for effective cancer control policies and timely access to affordable treatment in low- and middle-income ASEAN countries.[9] The Philippines was one of the countries which contributed to this study. The *PhilippinE CostS in Oncology* (PESO) study analyzed part of the ACTION dataset and presented the economic impact of cancer in the Philippine setting. This study aimed to describe the changes in the financial status of Filipino cancer patients from diagnosis to one year later.

METHODS

Overview of ACTION study

The ACTION study was a prospective cohort study examining the economic impact of cancer on Philippine households, mainly in Metro Manila. Patients diagnosed with a first time cancer were consecutively recruited from medical oncology clinics in five hospitals located in the capital region: Philippine General Hospital (PGH), Jose R. Reyes Memorial Medical Centre (JRRMMC), St. Luke's Medical Center in Quezon City, National Kidney and Transplant Institute (NKTI), and Veterans Memorial Medical Center (VMMC). Patients needed to be aged 18 years and over, aware of their cancer diagnosis, and were willing to participate in follow-up interviews. Participants were interviewed (face-to-face or by telephone) at baseline, and at 3 and 12 months after diagnosis.

The following participants' data were collected: age, sex, marital status, country of residence, highest level of education attained, employment status, recent experience of economic hardship (whether in the previous 12 months they were unable to make any necessary household payments (e.g. food, housing) or needed assistance to do so), annual household income, and health insurance status.[10] In terms of clinical characteristics, cancer site and TNM tumor stage were obtained from medical records. Health-related quality of life was assessed using the EuroQol (EQ-5D).[11] A full description of the entire set of variables assessed in the study (including QoL and mental health) is given in the primary ACTION study protocol.[8] The QoL and mental health results of the PESO study would be written in another paper.

The primary outcome at 12 months was financial catastrophe (FC) following treatment for cancer, defined as OOP costs at 12 months equal to or exceeding 30% of annual household income.[12,13] OOP costs represented hospital and non-hospital health care costs which were directly incurred by patients at point of delivery and not reimbursed by insurance. The second key outcome was all-cause mortality. FC and death were recorded at both follow-up interviews.

Methods and statistical analysis for the PESO study

The de-identified Philippine dataset was extracted from the full ACTION dataset. The dataset was reviewed and cleaned using Excel and Stata. EQ-5D Weighted Scores were recomputed using the Thailand EQ-5D 3L value sets; other quality of life scores were not re-computed. Quality of life was measured using the EQ5D tool and weighted using Thai values as there are no Philippine weights currently available. Variables on income status such as change in income group or shift down to lowest income group were generated. Data analysis was done using Stata 12.

A multinomial logistic regression model was developed to assess association of baseline characteristics to outcome at the end of the study. Death was treated to be a mutually exclusive event from alive with financial catastrophe similar to the full analysis conducted using the full PESO dataset. Relative risk ratios (RR) and 95% confidence intervals (CIs) for death and FC were estimated, relative to being alive without experiencing FC, thus allowing for death as a competing risk to FC. RR of FC and death were exclusive outcome measures related to one another and in one model.

The model parameters used in the final model were socio-demographic attributes (sex, age group, level of education), household income (collapsed into four groups), insurance status, experience of economic hardship, paid work status, cancer-related parameters (site and stage), baseline health-related quality of life and receiving treatment.

Ethical clearance

The ACTION study was approved by the University of Sydney's Human Research Ethics Committee, the University of the Philippines Manila Research Ethics Board, and the ethics committees of all the Philippine study sites prior to the initiation of the study. Written informed consent was obtained from all participants prior to entry into the study. This is a country-specific analysis covered under the ACTION protocol and intended use of the data.

RESULTS

Cohort and household profile

There were 909 patients who were included in the study from the Philippines. At baseline about 58% of the patients were female, 75% were married, and with a mean age of 52 (SD: 3) years. In terms of education, 76% had secondary or higher education. About 46% were household heads and 32% were spouses of the head. The household roles of the others in relation to the household head were: offspring (13%), parent (3%), and others (6%).

The average number of household members was 5 (SD: 3) with an average of 2 (SD: 2) dependents. Around half (49%) owned land and most (64%) owned their houses. Almost all had the basic utilities like electricity (94%), running water (95%), and toilet facility indoors (97%) but few owned a car (8%) or a motorcycle (15%). Of households with school-age children, 3% had children not going to school.

Many were in the lower income bracket (Table 1) earning less than PhP51,500 (21.48%) or PhP51,500-103,000 (21.92%) annually (1USD = PhP41). Forty percent (40.0%) had no insurance. Among those with at least one form of insurance (n = 475), 65.5% reported having government insurance or were covered by the Philippine Health Insurance Corporation (PhilHealth), 24.0% had employment-based insurance, 10.1% had private ones, and 0.4% had community insurance (Note: Some people had more than one insurance source).

Table 1. Income and occupation indicators of the cohort at baseline and Month 12

	Baseline (%)	Month 12 (%)
Household income bracket (PhP)	n = 908	n = 581
≤51,500	21.48	37.18
51,501 – 103,000	21.92	25.47
103,001 – 154,500	13.66	10.33
154,501 – 206,000	10.57	7.57
206,001 – 257,500	5.51	4.13
257,501 – 309,000	3.52	1.89
309,001 – 360,500	3.08	1.03
360,501 – 412,00	1.10	0.34
>412,000	6.28	4.30
Do not know	12.89	7.75
Source of income	n = 909	n = 581
Wage, crops and businesses	85.26	76.25
Gifts, remittances and others	14.74	23.75
Occupation (excluding unemployed)	n = 361	n= 118
Elementary occupation	3.05	21.19
Professional/managers	26.04	18.64
Agriculture/factory/craft	20.78	21.19
Service/sales	39.61	25.42
Clerical/technician/military	10.53	13.56
Participation in work	n = 909	n = 581
Doing paid work	40.0%	20.8%
Doing house work	76.0%	46.0%

Note: 1USD = PhP41.1

Income changes and economic hardships

At baseline, roughly 43% belonged to the two lowest income brackets (≤ 103,000 per year) and at the end of the follow-up, 63% belonged to these income brackets. When we tracked individuals with data from both baseline and Month 12, one could see that many of the respondents had experienced decreased income. About 51% had a decrease in income with 25% falling to the lowest income bracket; 35% had no change in income, and 14% had an increase in income. (Figure 1).

At Month 12, the proportion of households who earned their income such as crops, agricultural side lines, family
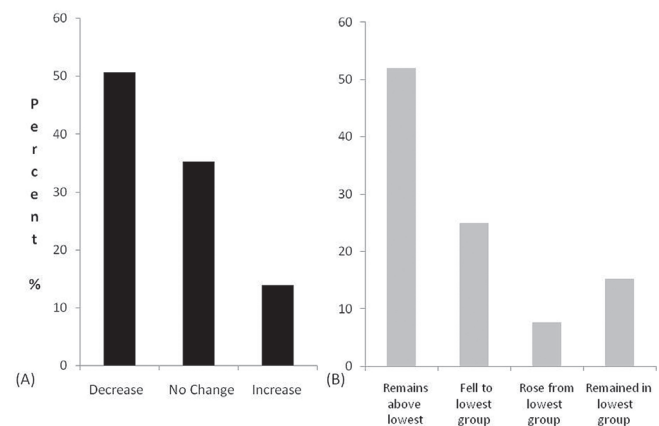

Figure 1. Shift in income of cohort from baseline to Month 12 (A) Change in income group (n = 536); (B) Shifting down to lowest income group (n = 532).

business, and wages (76.25%) decreased compared to baseline (85.26%) while households who received income through remittances and gifts increased (from 14.74% to 23.75%). These changes were significant (McNemar test p-value = 0.000). There was also a change in types of employment with decreases in individuals involved in professional (from 26.04% to 18.64%) and sales (from 39.61% to 25.42%) work with corresponding increase in people involved in elementary occupations (i.e. those needing minimal skills) (from 3.05 to 21.19%) (Table 1). There was an increase in number of patients not working at Month 12 (78.5%, $n_{alive\ with\ data}$ = 456) compared to baseline (60.3%, n = 909); there was a decrease in those who did paid work (40.0% to 20.8%) as well. There was an increase in those who received government pension (i.e. disability; social welfare), from 7% to 38%.

Respondents were asked regarding conditions that could be considered as a form of economic hardship. These were grouped into two sets: an event (e.g. not being able to buy food) or a strategy (e.g. selling assets). At baseline, 77% of 909 patients reported any event or using any strategy which slightly decreased at Month 12 to 71% (n = 462). At baseline (n = 909), any poor event had occurred to 56% of patients and had increased slightly to 59% at Month 12 (n = 462). According to use of the listed strategies, at baseline (n = 909), 71% utilized at least one strategy which decreased slightly to 70% at Month 12 (n = 462).

In terms of events, the events that increased from baseline to Month 12 were mostly health-related while those that decreased were related to daily needs. Individuals reporting not attending medical appointments and not buying medications increased noticeably from 8.8% to 42.9% and 4.4% to 45.7%, respectively. Other events that increased in occurrence were the following: could not pay for gas (42.4% to 45.0%), could not pay for drugs (21.5% to 22.7%), and could not pay for medical consults or tests (18.2% to 20.8%). The following events occurred less often at Month 12 compared to baseline: could not pay for rent (15.4% to 4.8%), could not pay for health insurance (5.5% to 1.1%), could not pay for school (8.5% to 1.7%), could not pay for transport (13.1% to 8.9%) and could not pay for meals (8.4% to 2.6%).

For strategies, even though this was a decrease overall, there were certain strategies which occurred more often. Individuals who obtained loans (43.83% to 57.05%) or sought financial assistance from government (15.06% to 51.84%) also increased from baseline. Three other strategies were used more often: using their savings (31.9% to 45.6%), resorting to assistance from family/friends (49.3 to 64.4%), and selling assets (9.4% to 25.4%). Moving occurred less often from 2.8% to 2.0% as well as use of other strategies (4.3% to 2.2%).

The proportion of patients needing assistance for daily activities increased across time. At baseline (n = 909), 25% needed assistance in at least one activity, which increased to 34% at Month 12 (n = 462). The need for support in activities at Month 12 ranged from 7% (working on land)

and 25% (medical care). There was an increase in levels of support needed from 4% to 29% depending on the activity. At baseline, a person needed an average 5 hours of support which increased to 8 hours on Month 3 and 10 hours on Month 12.

Spouses (53%) were the most common caregivers followed by children (29%). There was a slight increase in utilization of paid caregivers at Month 3 (5%) from baseline (3%). About 41% of respondents perceived that the illness had an unfavorable effect on caregivers at baseline, which increased to 49% at Month 3 and 79% at Month 12. Patients felt that there was an unfavorable impact on the employment, social, and school activities of the caregivers from baseline to Month 12 (from 32% to 72%, 13% to 56%, and 1% to 7%, respectively) ($n_{baseline}$ = 909, $n_{month\ 12}$ = 462).

Cancer status, treatment, and outcomes

The most common type of cancer in the cohort was breast cancer (33.3%) followed by gastrointestinal cancer (22.6%). The hematological cancers in the cohort were mostly lymphoma cases. Overall, 240 (26.4%) of the cohort were dead at the end of the study. However, cancer status at the end of study varied among cancer types. Almost half of the female breast cancer cohort had complete remission in contrast to almost half of those with respiratory cancers who were dead by the end of follow-up (Figure 2).

Although, almost all (99.8%) had some planned treatment at recruitment, only 79.0% received some form of definitive treatment, particularly those with breast and gastrointestinal cancers and those with Stages I-III disease. The most common types of treatment received were chemotherapy (65.1%) and surgery (52.9%). These two modalities also had the highest rate of pushing through if planned at baseline with 76.1% of the 402 with surgical
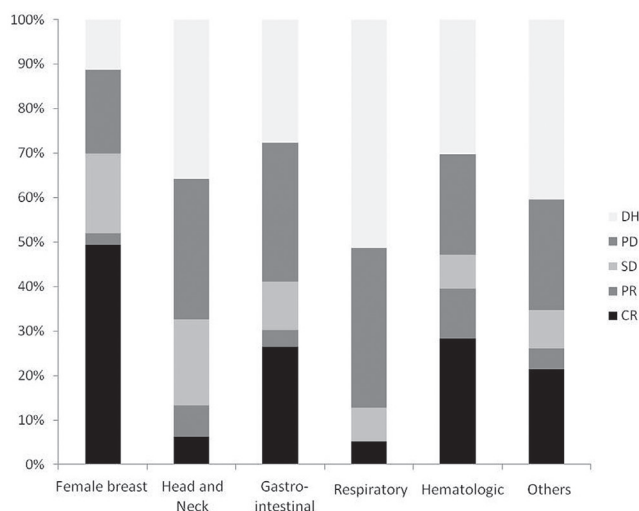

Figure 2. Cancer status at end of the study according to cancer type.
Note: DH – death, PD – progressive disease, SD – stable disease, PR – partial remission, CR – complete remission.

plans and 67.9% of the 850 with chemotherapy plans pushing through. Only 10.2% of the 88 with plans of using biopharmaceuticals received this modality (Table 2).

Table 2. Distribution of respondents according to cancer type, stage, and treatment received

		Percent (%)
A. Cancer type (n = 909)		
Gastrointestinal		23.8
Female breast		33.3
Head and neck		11.0
Hematologic		5.9
Respiratory		9.4
Others		16.6
B. Cancer stage (n = 909)		
I		4.2
II		23.1
III		29.3
IV		20.7
Unstaged/no stage data		22.8
C. Treatment received	**With plan**	**% pushed through**
Any plan	907 (99.78)	79.05
Surgery	528 (58.09)	76.14
Radiotherapy	405 (44.55)	31.85
Chemotherapy	850 (93.51)	67.88
Hormone	114 (12.54)	47.37
Biopharmaceutical	88 (9.68)	10.23

Death and catastrophic spending

There were two follow-up points: Month 3 and Month 12; vital and financial data were available for 740 and 755 respondents, respectively. By Month 3 (n = 909), 79 or 9% had died. Among the 661 known to be alive, 157 or 23.8% were assessed to have experienced financial catastrophe (FC). By Month 12, 40.6% of the cohort (n = 909) had experienced financial catastrophe and 26.4% had died. (Figure 3).

There were nine (9) individuals who were alive with FC in Month 3 and lost to follow-up in Month 12. For the purpose of this analysis, they were assumed to survive up to Month 12 and their final outcome classified as alive with FC. There were also 95 individuals who were known to be alive in Month 12 but did not have information on financial status.

If disaggregated according to cancer type, the FC by Month 12 occurred most among patients with breast
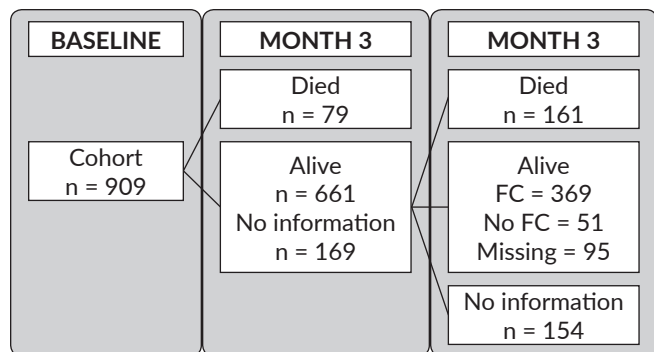

Figure 3. Vital and financial status of cohort at baseline, Month 3 and Month 12.

cancer while it occurred the least in those with respiratory cancer. Meanwhile, the highest death rate occurred among the respiratory group and the least among those with breast cancer (Figure 4).
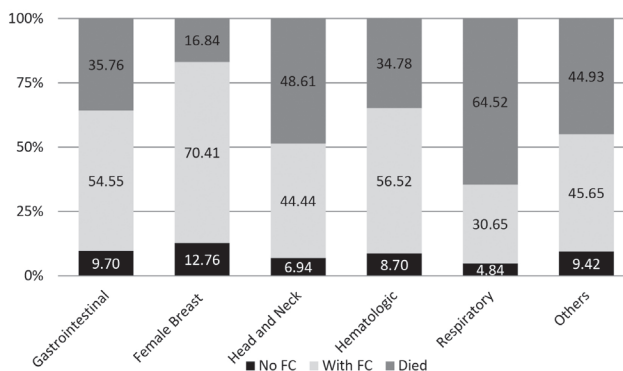

Figure 4. Households with financial catastrophe (FC) by cancer site, Month 12 (n=909).

Health care expenditure

Mean combined Month 3 and Month 12 out-of-pocket expenditures (n = 458) was PhP181,789.00 (sd = 348,717.47). Among those with breakdown of Month 12 expenditures (n = 454), the highest mean expenditure was extra cost (non-medical including fare to and from the hospital, food while in hospital, outside caregiver salaries) at PhP70,510.20 (SD: 81,354.75). This was followed by expenses for medication at PhP51,138.42 (SD: 170,000.00). The mean expenses for hospitalization was at PhP9,885.57 (SD: 49,339.43) with some reporting no expenses for hospitalization. The mean cost of hospitalization among those hospitalized between Month 3 and Month 12 (PhP47,569.96, SD: 99,660.10, n = 95) was lower compared to the mean cost among hospitalized between baseline and Month 3 (PhP53,774.42, SD: 95,339.26, n = 375). (1USD = PhP41.1)

Predictors of death and financial catastrophe

Multinomial regression models were tested to identify predictors of two competing outcomes: death and alive with financial catastrophe. This was started with the framework and predictors of the ACTION study, and predictors presented were those identified by the model with the best fit.

Belonging to upper income groups (vs. belonging to the lowest two brackets) was a statistically significant factor associated with lower risk of financial catastrophe at Month 12 (RRR of highest income group = 0.050, p <0.05) and death (RRR of highest income group = 0.093, p <0.05) (Table 3). Meanwhile, having Stage IV cancer at baseline (vs. Stage I) (RR = 14.822, p = 0.029) was significantly associated with higher risk of death. Risk of death decreased as baseline EQ5D weighted score increased (RR = 0.063, p = 0.019) and if the patient had breast cancer (compared to gastrointestinal) (RR = 0.309, p =0.044). Receiving treatment was noted to have a non-significant lower risk of death.

Table 3. Predictors of occurrence of financial catastrophe and death among cohort at Month 12

	Alive with FC		Dead	
	RRR	p-value	RRR	p-value
1. Sex (vs. Female)	1.033	0.939	1.064	0.887
2. Age group (vs. <45 y.o.)				
45 to <55 y.o.	1.574	0.323	0.945	0.910
55 to <65 y.o.	0.568	0.197	0.599	0.280
≥ 65 y.o.	0.633	0.418	0.531	0.298
3. Cancer site (vs. Gastrointestinal)				
Female breast	0.793	0.653	0.309	0.044
Head and neck	0.715	0.640	0.450	0.279
Hematologic	0.476	0.458	2.564	0.456
Respiratory	1.58×10^6	0.979	3.11×10^6	0.978
Others	0.948	0.914	0.936	0.901
4. Cancer stage (vs. Stage I)				
II	0.430	0.328	1.154	0.902
III	0.437	0.331	2.670	0.388
IV	0.597	0.603	14.822	0.029
Unstaged/No stage data	0.509	0.470	6.099	0.130
5. Number of chronic conditions (vs. none)				
1	2.392	0.091	2.356	0.122
2 or more	1.099	0.878	0.617	0.492
6. Educational attainment (vs. none or Primary)				
Secondary	1.074	0.875	1.127	0.807
Technical or higher	2.156	0.103	1.856	0.229
7. Income group (vs. ≤ 103,000)				
103,001 – 206,000	0.234	0.001	0.141	0.000
206,001 – 309,000	0.185	0.004	0.243	0.025
≥ 309,001	0.050	0.000	0.093	0.000
8. EQ5D score at baseline	0.830	0.863	0.063	0.019
9. Any form of cancer treatment	2.368	0.120	0.384	0.077
10. Experienced economic hardship	1.530	0.282	1.282	0.576
11. Health insurance (vs no insurance)	0.744	0.274	0.504	0.197

Notes: RRR – relative risk ratio; unstaged patients were those who were unable to complete their staging procedures and who were usually moribund. (n = 614, pseudo R^2 = 0.2544).

Receiving any form of cancer treatment was not significantly associated with increased risk of FC (RR = 2.368, p = 0.120) or death (RR = 0.384, p = 0.077). One should note that in this study treatment did not mean receiving the full regimen but rather receiving at least one episode of treatment such as one surgery or one session of chemotherapy. Sex, age group, chronic conditions, educational attainment, and having health insurance did not come out to be significantly associated with any outcome.

DISCUSSION

This PESO study described the economic impact of cancer on Filipino patients. It was found that at the end of the 12 month follow-up period, 26.4% of the cohort had died while 40.6% had experienced financial catastrophe. The illness posed a significant economic burden leading to decrease in household income and, in some cases, impoverishment. Individuals with cancer also become less economically productive members with decrease in income, dependence on pension and passive income sources (e.g. gifts and remittances), and taking up simpler and likely lower earning occupations.

The Philippine cohort had the same mean age with less females compared to the entire ACTION cohort.[8] The proportion of deaths and financial catastrophe were slightly lower than the values for the region as a whole. Analysis in this study also differed in that very few clinical variables (e.g. stage or type) were found to be significantly associated with death or FC. Notably, it was found that insurance did not have a protective effect against FC and death.

The study has some limitations. The sample size was lower than the initial target of at least 1,000 patients from the Philippines in order to estimate the prevalence of financial catastrophe with a maximum error of 3%.[9] Majority of the patients were from government hospitals JRRMMC, PGH, VMMC, and NKTI, with patients predominantly in middle-low to low income groups (of the 909 cases, PGH contributed 60%, JRRMMC 25%, NKTI 7%, VMMC 6%, SLMC 6%,). Medical oncologists were the principal investigators hence patients were taken from medical oncology clinics leaving out gynecology, liver, and lung cancers that were usually

seen in gynecology oncology clinics, gastrointestinal clinics, and pulmonary clinics, respectively. Oftentimes in the government hospitals, if definitive treatment (radiotherapy and/or chemotherapy) was given, this was not completed mainly due to lack of funds.

Insurance has been documented to provide protection against catastrophic illness in other studies. Heeley et al. concluded that health insurance protects against catastrophic expenditure among acute stroke patients in China.[10] Cook et al. found that among the elderly in the US who experienced major illnesses including cancer and stroke, there was a median asset decrease of around 50% among newly ill uninsured compared to matched newly ill insured elderly.[11] Minh and Tran found that in rural Viet Nam, having one household member with an insurance card was significantly protective against catastrophic health expenditure and impoverishment.[12] Lastly in Korea, Kim and Kwon observed that financial catastrophe among cancer patients decreased when cancer was included in the coverage plan.[13]

Unlike these studies, including the ACTION analysis, this sub-analysis for the Filipino patients did not show any statistically significant impact of having insurance on financial catastrophe. The likely culprit for this would be inadequate benefit package or support value given by the insurance scheme at the time. At the time, the insurance was under the case rate system and covered only admissions, surgeries, and radiotherapy sessions. This is contributory evidence that insurance, particularly the government insurance, was not achieving its goal of offering financial protection. This study's finding paralleled the observation by Bredenkamp and Buisman, that there had not been much progress on financial protection goals in the Philippines over the last 17 years, at least in terms of catastrophic and impoverishing health expenditures.[14]

The national insurance program, however, had undergone many changes and expansion in its benefit packages since the conduct of the study. A main step relevant to cancer care was the creation of the Z-benefit package.[15] This package was specifically created for patients who have illnesses that are likely to lead to financial catastrophe such as cancer, open heart surgery, and severe trauma. At the time of data collection, the Z-benefit package covered only a limited number of cancers and the impact of the program would be a good topic to study in the future. If the program existed at the time of the study and covered all direct medical expenses (e.g. hospitalization, medications, and health services), it is estimated that the number of individuals who experienced catastrophic spending would decrease by 22% or from 369 to 286 individuals.

In relation to impact of more government support and better survival, female breast cancer was found to be associated with lower risk of death at 12 months compared to other cancers. Though the study controlled for stage of disease and receiving treatment, it is likely that compared to other cancers, the treatments breast cancer patients received are more comprehensive and complete compared to other cancer types. Many patients recruited in this study were qualified for the Breast Cancer Medicines Access Program. Patients enrolled in this program receive free chemotherapy and hormone medicines as long as they are stage III or lower.[16] The presence of this program has allowed for better access to treatment and thus survival. Filipino female patients enrolled in this program with non-metastatic breast cancer after surgery and mainly on adjuvant chemotherapy has been found to have a high relapse-free rate in the first two years of follow-up.[17] There was also improvement in 12 of 18 quality care indicators in the program with the greatest differences in the initiation of treatment and appropriate neo-adjuvant chemotherapy administration.[18]

Notably and overall, after controlling for other factors, treatment did not provide protection against death and even increased the risk for financial catastrophe. It could be that the patients who died did not receive adequate treatment (did not spend much on treatment) or limited the treatment they received due to financial constraints. The treatment variable in this study considered a person to be treated even if just one course or session of treatment was received and thus some individuals who received inadequate treatment were included in this group. Inadequate treatment could have led to more cancer complications and more healthcare-related costs. The increase in FC could possibly result from increase in non-definitive health care services that address only symptoms or problems related to cancer but not the cancer itself.

The findings also hinted that despite high FC occurrence, the survival of cancer patients seemed to have improved compared to 20 years ago. Ngelangel and Wang cited one year observed survival rates of 82.0% for breast cancer, 25.8% for lung cancer and 25.9 to 58.1% for GI tract cancers.[19] These were much lower to the survival rates at Month 12 in this study suggesting that cancer treatment in the country had improved over the time. Breast cancer patients incurred the highest proportion of financial catastrophe (70%) and the respiratory cancer patients the lowest (31%); breast cancer patients had less number of deaths (11%) than the respiratory cancer cohort (51%) at the end of study. If the hypothesis is that death can put a family in FC (particularly since many of the patients were either heads of family or spouses, and caregivers were mostly spouses and children who may have productivity loss caring for their sick instead), then both the respiratory cancer and breast cancer cohorts experienced similarly about 80% FC.

This study did have some limitations. The main one is that the findings may not be readily generalizable to the entire Philippine population. The cohort was recruited from medical oncology units in the National Capital Region such that patients from the other regions were not represented. The mix of cancer types in the cohort was also notably lacking in gynecologic (e.g. cervical) and liver cancers (mainly seen in gynecology-oncology and hepatology units, respectively)

despite these cancers being in the top common cancers in the Philippines.[19,20] A similar study on patients in other areas in the Philippines and including other cancers may be warranted to assess the robustness of the study findings.

Despite these limitations, the findings have implications on cancer care and financing in the Philippines. It is clear that cancer remains an illness that leads to death and catastrophic spending. There is a need to improve the benefit package of insurance in order to ensure that it leads to protection against catastrophic health expenditures. The case rate scheme needs to be revised for cancer patients. Alternatively, the Z-benefit package and Medical Access programs should be expanded to cover additional cancers. These packages should be comprehensive to cover all the necessary treatments to ensure compliance to the treatment regimen and maximize survival. This study's dataset, however, cannot be used to determine which cancers should be prioritized for inclusion.

The lack of protective effect of treatment stresses not just the need to step up compliance and quality of treatment but also the need for early detection and prevention of cancers. At this rate, Filipino patients are at high risk of dying or experiencing catastrophic expenditure if they get cancer even if they get treatment. Cancer prevention is thus very important. There is a need to investigate ways to ensure that preventive programs are implemented, such as tobacco control plus early cancer screening, and that patients receive complete cancer treatment. Scaling up and rolling out prevention programs of the common cancers such as those included in this study will likely yield benefits to society.

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Statement of Authorship

The authors had full access to all the data included in the study and had final responsibility for the decision to submit the manuscript for publication.

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