Treatment Outcomes of Patients With Colorectal Cancer Enrolled in a Comprehensive Benefits Program of the National Insurance System in the Philippines: Data From the Pilot Site

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abstract

PURPOSE Cancer treatment causes significant financial burden, especially in developing countries such as the Philippines. This led the Philippine Department of Health to create the Z-Package colorectal cancer benefit program, an insurance system specifically designed to treat Filipinos with colorectal cancers with early to locally advanced-stage disease. The main goal of this program is to optimize treatment outcomes for this curable disease without causing financial toxicity.

MATERIALS AND METHODS Three-year data on patients enrolled in the Z-Package colorectal cancer benefit program from 2016 to 2018 were reviewed by the University of the Philippines, Philippine General Hospital Colorectal Polyp and Cancer Study Group.

RESULTS A total of 251 patients were enrolled in the Z-package colorectal cancer benefit program from 2016 to 2018. Mean age was 57 years old and a majority of patients (66%) were male. A majority of patients had rectal cancer (78%) and were diagnosed with stage III disease (82%). A majority (75%) were compliant to their treatment plans and clinic follow-up. Specifically, compliance to the prescribed surgery, chemotherapy, and/or radiation treatment were 90%, 77%, and 96%, respectively. Recurrence, morbidity, and mortality rates of enrolled patients in the Z-Package program from 2016 to 2018 were 17%, 22%, and 19%, respectively. Morbidities were mostly chemotherapy related (8%). Finally, patients in this program had a 2- and 3-year survival probability of 74% and 70%, respectively, which are comparable with data from more developed nations.

CONCLUSION Results of this study include real-world data that show that when the highest standards of patient care are provided through a multidisciplinary team, patients' overall survival is also maximized.

INTRODUCTION

Tied with the challenge of improving survival in cancer care would be the problem of managing treatment costs. The Association of Southeast Asian Nations Costs in Oncology (ACTION) study assessed the incidence of financial catastrophe—defined as out-of-pocket costs of at least 30% of household income spent on treatment within the year of any cancer diagnosis—among patients within the Association of Southeast Asian Nations region. This region consists primarily of low- and middle-income countries, including the Philippines. ACTION reported in 2015 that 48% of households with a member newly diagnosed with cancer faced financial catastrophe within the first year of treatment.[1] Significant contributors to the risk of catastrophe for patients were belonging to the low-income bracket of their respective country and lack of health insurance.

The Philippine Costs in Oncology (PESO) study was subsequently conducted using the Philippine data set from the ACTION study to investigate the risk for financial catastrophe among Filipinos in the setting of a newly diagnosed cancer. PESO reported that 40.6% of households faced financial catastrophe after a cancer diagnosis. Of note, unlike the ACTION study that associated having health insurance with a reduced risk of experiencing financial catastrophe, the PESO study did not establish a significant impact of having health insurance on avoiding financial catastrophe among Filipinos.[2] The authors attributed this observation to an inadequate benefit package given by the insurance scheme, specifically the government health insurance

CONTEXT

Key Objective

What are the treatment outcomes of Filipino patients with colon and rectal cancer enrolled in the comprehensive benefits program (PhilHealth Z-Package) of the national insurance system at the program pilot site?

Knowledge Generated

Patients in this program had 2- and 3-year survival probability of 74% and 70%, respectively. Recurrence, morbidity, and mortality rates of these patients were 17%, 22%, and 19%, respectively.

Relevance

Our study includes real-world data that show that, despite the treatment challenges identified, sustaining a national insurance program that bridges the patient to the highest standards of care is an essential endeavor.

system, the Philippine Health Insurance Company (PhilHealth), which was the most accessible program available to Filipinos. PhilHealth used the case rate system and covered only admissions, surgeries, and radiation therapy sessions. This system proved inadequate to cover the costs necessary for the care of patients with cancer. In response to this problem, PhilHealth under the direction of the Philippine Department of Health created the Z-Package benefit program.[3]

Colorectal cancers (CRCs) are currently the third leading site of malignancy in the Philippines. The incidence of CRC cases has escalated from 5,787 in 2010 to 9,625 in 2015. Historical data estimate 3- and 5-year survival for colon cancer to be 38.1% and 33.9% and that of rectal cancer 31.3% and 20.0%, respectively.[4-6]

Established in 2015, the Z-Package program for patients with CRC was designed to finance the treatment of Filipino patients with early-stage or locally invasive colon or rectal cancer (stages I to III).[3] Patients enrolled in this program receive care through a multidisciplinary specialist team composed of medical oncologists, colorectal surgeons, radiation oncologists, and diagnostic radiologists. This team holds weekly conferences to plan patient treatment and assess outcomes of ongoing therapy. Ultimately, the goal of this program is to provide standardized care for potentially curable colon and rectum cancer for Filipinos, particularly those who cannot afford to pay for their treatment out of pocket.

The University of the Philippines, Philippine General Hospital (UP-PGH) has been the pilot site to implement this program since 2016.[7] Under this program, patients enrolled would receive fully subsidized treatment. This study establishes the 3-year data that document the treatment outcomes of Filipino patients with CRC enrolled in the PhilHealth Z-Package benefit program.

General Objectives

This study aims to document the treatment outcomes of Filipino patients with colon and rectal cancer enrolled in the PhilHealth Z-Package benefit program at UP-PGH.

Specific Objectives

Specifically, this study aims to:

- Describe the clinicodemographic data of patients enrolled in the PhilHealth Z-Package benefit program at UP-PGH;
- Identify follow-up and compliance to treatment rates of these patients;
- Report the recurrence, morbidity, and mortality rates of these patients;
- Identify clinicopathologic factors that would significantly predict recurrence and mortality among these patients;
- Determine the 2- and 3-year survival rates of these patients; and
- Evaluate the target outcomes of the program as mandated by PhilHealth.

MATERIALS AND METHODS

Study Design and Setting

This was a longitudinal study involving a single cohort of patients seen by the colorectal multidisciplinary team and enrolled in the Z-Package benefit program at UP-PGH. Records of these patients entered into the program from 2016 to 2018 were reviewed.

Population Selection

All patients with colon and rectal cancer enrolled in the Z-Package benefit program at UP-PGH from 2016 to 2018 were included in the study. There were no exclusion criteria.

Clinical and Demographic Characteristics

Clinical data analyzed included age, sex, service, cancer type (colon or rectal), cancer stage, and the presence of associated high-risk features, namely poorly differentiated adenocarcinoma, fewer than 12 lymph nodes harvested during resection, the presence of perforation, positive margins, the presence of lymphovascular invasion, or the presence of perineural invasion.

Outcome Measures

The primary end point analyzed was the 2- and 3-year survival rates of Filipino patients with colon and rectal

cancer enrolled in the PhilHealth Z-Package benefit program at UP-PGH. Also of interest are the compliance rates of patients to treatment plans and follow-up. Compliance to follow-up was defined as a clinic visit to one of the comanaging specialties—medical oncology, radiation oncology, or colorectal surgery—after the prescribed follow-up date according to practice guidelines. For this study, a clinic visit within a period of ± 4 weeks from expected follow-up constituted compliance. Furthermore, we also reviewed the recurrence, morbidity, and mortality rates of patients in the program. Recurrences were further subdivided into local or distant metastatic sites. Morbidities were classified as treatment related, a result of medical comorbidities, or a result of cancer progression. Short-term surgical outcomes were investigated in terms of mean postoperative length of stay, 30-day morbidity, and 30-day mortality. Furthermore, we analyzed factors that significantly predict time to recurrence and mortality among these patients. Lastly, we examined how the outcomes of this program in our institution faired with the target rates as mandated by PhilHealth.

Statistical Analysis

We used descriptive statistics for the profiling of study participants. Specifically, quantitative variables—for example, age—were summarized using mean and standard deviation. Meanwhile, qualitative variables—for example, sex, cancer type, etc—were described using frequencies and percentages. Point estimates and 95% CIs of the proportion of patients who were compliant to follow-up and treatment were computed. Similarly, point estimates and 95% CI of recurrence, morbidity, and mortality rates of patients enrolled in the Z-Package program were also ascertained. Kaplan-Meier survival curves of patients enrolled in the PhilHealth Z-Package benefit program were also determined. Lastly, we used Cox proportional hazards regression analysis to determine the statistically significant predictors of time to mortality among patients enrolled in the PhilHealth Z-Package benefit program. We used the backward elimination method as the variable selection procedure in this analysis. A probability to remove 5% was used as the cutoff in determining variables to be retained in the final model. The Cox proportional hazards assumption was checked using the χ^2 goodness-of-fit test. Both descriptive and inferential statistics were produced using Stata 14 special edition.

RESULTS

Clinicodemographic Profile

A total of 251 patients were enrolled in the PhilHealth Z-Package benefit program from 2016 to 2018. All were included in this study (Table 1). Mean age of patients was 57 years with a standard deviation of 12 years. The youngest and oldest patients were age 24 and 81 years, respectively. Sixty-six percent of patients were male. Rectal cancer was the diagnosis in 78% of patients. Eighty-two percent of

TABLE 1. Characteristics of Patients Enrolled in the Philhealth Z-Package Benefit Program at the UP-PGH, 2016-2018 (N = 251)

Characteristic	No.	(%)
Total	251	100
Sex		
Female	85	34
Male	166	66
Service		
Charity	182	73
Pay	69	27
Cancer type		
Colon	56	22
Rectal	195	78
Cancer stage		
1	5	2
2	40	16
3	206	82
Presence of high-risk features		
None	125	50
At least one	126	50
High-risk features		
Poorly differentiated	85	34
< 12 lymph nodes	1	0.40
Lymphovascular invasion	53	21
Perineural invasion	71	28
Mean age, years (SD)	56.68 (12.12)	12.12

Abbreviations: SD, standard deviation; UP-PGH, The University of the Philippines, Philippine General Hospital.

patients were diagnosed with stage III disease upon presentation. One half of patients had at least one high-risk feature, the most common of which were having poorly differentiated histology (34%) and perineural invasion (28%).

Mean length of hospital admission for patients with colon cancer and rectal cancer was 11 and 15.8 days, respectively (Appendix Table A1). Furthermore, these patients were noted to have stayed for an average of 6 and 8 days postsurgery, respectively.

Survival Rates

Two-year survival of patients with CRC enrolled in the Z-Package benefit program at UP-PGH is estimated at 73.92% (95% CI, 66.33% to 80.05%), whereas the 3-year survival is estimated at 69.7% (95% CI, 60.14% to 77.39%; Appendix Table A2). Taken separately, patients with colon cancer demonstrate a higher 2-year survival rate at 81.76% (95% CI, 64.48% to 91.17%) compared with patients with rectal cancer with a 2-year survival rate of 71.97% (95% CI, 63.15% to 79.03%). Figures 1 and 2 show the respective Kaplan-Meier curves for these outcomes.
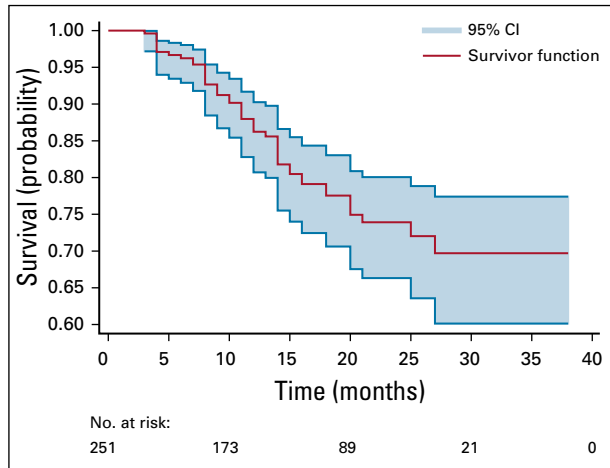
FIG 1. Kaplan-Meier survival curve of patients enrolled in the Phil-Health Z-Package benefit program at the University of the Philippines, Philippine General Hospital.

Recurrence, Morbidity, and Mortality

Among patients enrolled in the program, 17% were noted to have a recurrence, 22% experienced morbidities throughout the treatment period, and 19% were noted to have demised (Appendix Table A3).

Specifically, the recurrence rate was 12% and 19%, the morbidity rate was 21% and 22%, and the mortality rate was 13% and 21% for patients with colon and rectal cancer, respectively (Table 2).

The majority of patients (n = 35) had distant or metastatic recurrence, whereas 3 patients with rectal cancer were noted to have evidence of localized disease recurrence (Table 3).

For patients who were documented to have morbidities, most were chemotherapy related (8%), followed by morbidities
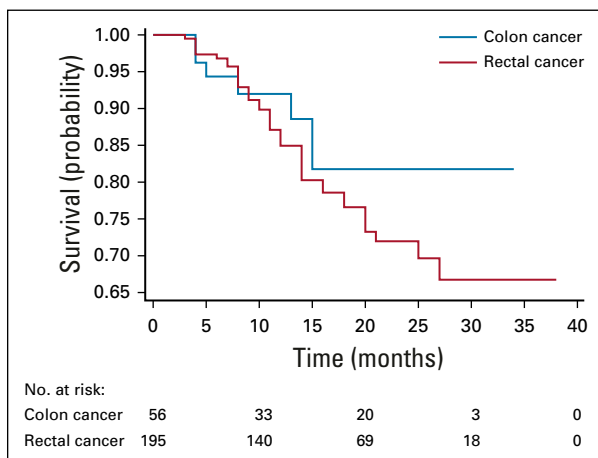

FIG 2. Kaplan-Meier survival curve of patients enrolled in the PhilHealth Z-Package benefit program at the University of the Philippines, Philippine General Hospital according to cancer type.

related to surgery (5%), cancer progression (5%), worsening of medical comorbidities (3%), and radiation therapy related (1%; Table 4).

For surgical morbidities, 3 patients with colon cancer were noted to have electrolyte imbalances (Appendix Table A4). For patients with rectal cancer, 9 were noted to have experienced surgical morbidities, most of which were due to anastomotic leaks and wound infections (Appendix Table A5). Moreover, this study also noted no surgical mortalities.

Factors Affecting Cancer Recurrence and Mortality

Using Cox proportional hazards regression analysis, we were able to identify factors that predict time to cancer recurrence and time to mortality. For cancer recurrence, statistically significant predictors for these patients were the presence of poorly differentiated histology and perineural invasion ($P <$ .05). In particular, the hazard of cancer recurrence is 2.98 times higher among patients with poorly differentiated adenocarcinoma compared with those with other histologic types. Furthermore, recurrence is 2.77 times higher among patients with perineural invasion compared with those without perineural invasion (Table 5).

In terms of survival, the statistically significant predictors of poorer survival were cancer stage, the presence of poorly differentiated adenocarcinoma, and fewer than 12 lymph nodes (LNs) harvested at the time of resection ($P <$ .05). In particular, the risk of mortality is 4.73 times higher among patients with stage III cancer compared with patients with either stage I or II cancer. Furthermore, mortality is 1.78 times higher among patients with poorly differentiated adenocarcinoma compared with patients with other histologic type, and 24.38 times higher among patients with fewer than 12 LNs harvested at the time of resection compared with patients with adequate LNs (Table 6).

Compliance With Follow-Up and Treatment

Seventy-five percent of patients were compliant with the prescribed follow-up clinic visits (Table 7). In terms of treatment, 90% of patients complied with planned surgery, 96% with prescribed radiation therapy, and 77% with the prescribed chemotherapeutic regimen.

Program Target Outcomes

Other program outcomes and target rates required by PhilHealth to be reported that were not previously described are listed in (Appendix Table A6). The pilot site was fully compliant with recommendations to have preoperative radiation therapy before resection for stage II and III rectal cancer, pretreatment multidisciplinary meetings for patients with colon and rectal cancer, and documentation of all treatment-related measures.

Lastly, the quality of total mesorectal excision required in this program is at least more than 60% with complete or partially complete circumferential resection margins (CRMs) on pathology reports. Our study showed that in the specimens evaluated, 71.1% and 22.3% had complete

TABLE 2. Recurrence, Morbidity and Mortality Rates of Colon and Rectal Cancer Patients Enrolled in the Z Package

	Colon Cancer			Rectal Cancer		
	No.	(%)	95% CI	No.	(%)	95% CI
Recurrence	50	12	4.97 to 25	173	18.50	13.17 to 25.26
Morbidity	56	21.43	12.02 to 34.80	195	21.54	16.12 to 28.11
Mortality	56	12.5	5.59 to 24.69	195	21.03	15.67 to 27.56

and partially complete CRM, respectively. This yields a total of 93.4% for both parameters combined (Table 8).

DISCUSSION

Survival Rates

This study reported 2- and 3-year outcomes of patients with CRC enrolled in the PhilHealth comprehensive benefits program (Z-Package) of the national insurance system in the Philippines.

Our study demonstrated a 2-year survival rate of 74%. These rates are far behind the 2-year survival rate in the United Kingdom (82.6%)[8] and Taiwan (88%),[9] but were on par with that of Turkey (75%).[10] In contrast, survival rates of patients with rectal cancer at 3 years were noted to be 70% in this study, which trails behind those of the United States (79%)[11] and Taiwan (79.4%),[9] but was better than the results of a study in Malaysia (59%; Fig 3).[12]

Taken separately, this study showed a better 2-year survival rate for colon cancer compared with rectal cancer site (82% v 72%). This was similar to another study in Taiwan that revealed that patients with colon cancer had a 2-year survival of 72% versus patients with rectal cancer (62%).[13] Studies from Thailand, China, the United States, Switzerland, and parts of Europe also showed a slightly higher survival rate for colon cancer versus rectal cancer.[14-16] This trend may be explained by differences in tumor biology and the more technically challenging operations for rectal tumors. Proximal colon cancers are more likely to have microsatellite instability, a CpG island methylator phenotype, and KRAS mutations, whereas distal colon and rectal tumors are more likely to have a p53 mutation compared with proximal colon cancers.[17,18] Aside from studies that show that high levels of microsatellite instability in colon cancer are associated with improved prognosis compared with rectal cancer, human colon cancer tissues were also

found to be more sensitive than rectal cancer tissues to cytotoxic drugs in vitro.[19,20] In contrast, studies performed in Turkey and the Netherlands showed a slightly better survival for patients with rectal cancer versus those with colon cancer: a 1-year survival rate of 80% versus 75%; 2-year survival rate of 78% versus 75%; and 5-year survival rate of 67% versus 64%.[10,21]

Mortality Rates

This study demonstrated an all-cause mortality rate of 19%, the majority (89%) of which was directly related to cancer burden or its treatment. No surgical mortalities were noted. Of the 48 deaths, 23 patients died as a result of complications during chemotherapy (mostly febrile neutropenia), 15 patients because of metastatic progression of the cancer, 9 patients due to worsening of medical comorbidities (chronic obstructive pulmonary disease, myocardial infarction, and pulmonary embolism), and 1 patient succumbed during long-course concurrent chemoradiation (infection). Taken separately, patients with rectal cancer had more mortalities compared with patients with colon cancer (21% v 13%), which is consistent with studies mentioned above in which survival of patients with rectal cancer is slightly lower than that for patients with colon cancer.

Recurrence

The 17% cancer recurrence rate in this cohort is similar to the results of a study in Korea (18.3% recurrence rate) and in the Netherlands (17% recurrence rate)[22,23]; however, this is significantly higher than the 5.7% 5-year recurrence rate reported in a study in Iran.[24]

The majority (92%) of recurrences noted in this study was in the form of distant metastases. This trend is noted to be similar to that in studies performed in Japan, the United States, and Germany. The majority of recurrences were noted to be in the liver.[11,25,26] Taken separately, patients with rectal cancer again fared worse, with a recurrence rate of 19% versus 12% for patients with colon cancer. These rates are similar to those from a study performed with 902 patients in Italy where 14% and 6% of patients with rectal and colon cancer, respectively, were noted to have experienced recurrence.[27] Moreover, it was noted that there were no data in 28 patients either because of incomplete chart records, lost to follow-up, or outdated contact details.

One possible reason for these relatively early recurrences may be inaccurate staging upon diagnosis. Diagnostic imaging facilities that were used to determine the stage of patients upon diagnosis were not standardized. According to one systematic review of the added value of double reading in diagnostic radiology, discrepancy in radiologists' readings varied from 0.4% to 22% depending on the study setting.[17] Furthermore, this cohort of patients was diagnosed in a more advanced stage—82% were stage III—compared with the profile of patients from other countries who were caught at an earlier stage. Moreover,

TABLE 3. Type of Cancer Recurrence Experienced by Patients

	All (N = 251)		Colon Cancer (n = 56)		Rectal Cancer (n = 195)	
Recurrence	No.	(%)	No.	(%)	No.	(%)
None	185	73.7	44	78.6	141	72.3
Local	3	1.2	0	0	3	1.5
Metastatic	35	13.9	6	10.7	29	14.9
No Information	28	11.2	6	10.7	22	11.3

TABLE 4. Morbidities Experienced by the Patients

Morbidity	All (N = 251)		Colon Cancer (n = 56)		Rectal Cancer (n = 195)	
	No.	(%)	No.	(%)	No.	(%)
None	197	78.5	44	78.5	153	78.5
Surgery related	12	4.8	3	5.4	9	4.6
Chemotherapy related	19	7.6	5	8.9	14	7.2
Radiation therapy related	2	0.8	N/A	N/A	2	1.0
Worsening of medical comorbidities	8	3.2	2	3.6	6	3.1
Cancer progression	13	5.2	2	3.6	11	5.6

Abbreviation: N/A, not applicable.

possible reasons can also be treatment delays, treatment complications, and incomplete treatments as shown by compliance rates discussed in the next sections.

Morbidity

Fifty-four patients (22%) were noted to have treatment-related morbidities. Eight percent were related to chemotherapy, mostly because of febrile neutropenia. In this study, the authors defined chemotherapy-related morbidity as any pathology that was noted to have occurred during the chemotherapy phase of the patient's treatment protocol that may have caused delay or stoppage of the chemotherapy treatment plan. This rate is relatively low compared with data from a prospective cohort done in Australia (27%) and the Netherlands (52% complication rate).[11,28]

Conversely, surgery-related morbidity was defined as any pathologic event observed in the patient during surgery or within 30 days since surgery. In our study, it was noted to be low (5%) compared with studies performed in Germany, Sweden, and France where surgical morbidity rates were reported to be 18%, 24%, and 35%, respectively.[29-33] In our study, 3 events were noted in patients with colon cancer and 9 in patients with rectal cancer. No deaths related to surgical treatment were noted. Surgical morbidity and mortality rates in our study are low compared with those reported in the literature.[34] A possible explanation for this is

TABLE 5. Significant Predictors of Time to Recurrence Among Patients Enrolled in the Philhealth Z-Package Benefit Program at the UP-PGH (N = 251)

Factor	Hazard Ratio	95% CI	P
Poorly differentiated			
No	1.00	—	—
Yes	2.98	1.46 to 6.07	.00
PNI			
No	1.00	—	—
Yes	2.77	1.39 to 5.49	.00

Abbreviations: PNI, perineural invasion; UP-PGH, The University of the Philippines, Philippine General Hospital.

that being a tertiary referral hospital, UP-PGH has high-volume surgeons, which is directly associated with lower surgical complication rates.[35] Furthermore, this may also be a result of the clinical systems—medical, nursing, and other paramedical teams—in place which may facilitate the prompt recognition and treatment of complications, thereby decreasing postoperative mortality.

The mean length of hospital stay for surgical management was 11 days (± 0.85) and 16 days (± 0.85) for patients with colon and rectal cancer, respectively. Our data show slightly longer hospital stays compared with a study performed in the United Kingdom that showed an average of 10 days (range, 7 to 14 days),[36] but are somehow similar to data from a study done in Taiwan in which the average length of stay was 15 days (± 8.12).[37] Most patients needed preoperative nutritional optimization, which may have prolonged their hospital stay.

Radiation therapy (RT)–related morbidity was defined as any event that was noted to have occurred during RT days or within 14 days after its completion that caused delay or stoppage of the treatment protocol. This cohort had a low RT-related complication rate (1%) compared with results from a study completed by the Dutch Colorectal Cancer Group where they noted a 7% grade 2 to 3 complication rate.[38]

Factors Affecting Cancer Recurrence and Mortality

The most common high-risk features observed were poorly differentiated adenocarcinoma and perineural invasion, observed in 34% and 28% of patients, respectively. The 34% incidence of poorly differentiated cancers noted in this study is slightly higher than the 20% incidence noted in a study in the United States.[39] Furthermore, perineural invasion noted at 28% is almost similar to the 22% detected from pathology samples in the United States.[40]

Significant predictors of time to recurrence in this study were noted to be the presence of a poorly differentiated tumor histology and perineural invasion, with a hazard ratio of 2.98 and 2.77 respectively ($P < .05$). This is in agreement with previous studies done abroad.[40-42] In contrast, cancer stage, poorly differentiated histology, and

TABLE 6. Significant Predictors of Time to Mortality Among Patients Enrolled in the Philhealth Z-Package Benefit Program at the UP-PGH (N = 251)

Factor	Hazard Ratio	95% CI	P
Stage			
1-2	1.00	—	—
3	4.73	1.15 to 19.50	.032
Poorly differentiated			
No	1.00	—	—
Yes	1.78	1.00 to 3.16	.049
< 12 lymph nodes harvested			
No	1.00	—	—
Yes	24.38	2.87 to 206.83	.003

Abbreviation: UP-PGH, The University of the Philippines, Philippine General Hospital.

fewer than 12 lymph nodes harvested at the time of resection were factors noted to be associated with mortality in this study, with hazard ratios of 4.73, 1.78, and 24.38, respectively ($P < .05$). Similar results were also noted in studies done in the Netherlands, Australia, Germany, and the United States.[43-48] Of note, the high hazard ratio for fewer than 12 LNs harvested in this study is most likely attributable to the fact that of the 226 surgeries done in this patient cohort, only 1 patient histopathology report was noted to have fewer than 12 LNs harvested. Furthermore, the hazard ratio for this factor should be interpreted with caution because of the wide CI. While perineural invasion has been identified as a significant independent prognostic factor of disease-free survival in one study,[49] poorly differentiated histology has also been characterized by local recurrences and/or distant metastases, despite curative surgery and chemotherapy, giving a poorer overall prognosis compared with well- or moderately differentiated colorectal adenocarcinomas.[50] The International Union Against Cancer, the American Joint Committee on Cancer, and a National Cancer Institute consensus panel have all recommended evaluation of at least 12 LNs to ensure adequate sampling.[51-53] In line with this, several studies found decreased recurrence and improved survival rates with increasing number of LNs removed.[48,49,54,55]

TABLE 7. Follow-Up and Compliance to Treatment Rates of Patients Enrolled in the PhilHealth Z-Package Benefit Program at the UP-PGH

	No.	(%)	95% CI
Compliance to follow-up	251	75.30	69.96 to 80.63
Compliance to surgery	251	90.04	86.34 to 93.74
Compliance to chemotherapy	225	77.33	71.86 to 82.80
Compliance to radiation therapy	186	95.70	92.78 to 98.61

Abbreviation: UP-PGH, The University of the Philippines, Philippine General Hospital.

TABLE 8. Quality of TME for Rectal Cancer (N = 131)

Quality of TME (by circumferential resection margins)	No. (%)
Complete[a]	93 (71.1)
Partially complete[a]	29 (22.3)
Incomplete	9 (6.6)

Abbreviation: TME, total mesorectal excision.

[a]93.4% with complete or partially complete circumferential resection margins on pathology reports.

Compliance Rates

In this study, the authors defined compliance with follow-up as the ability of patients to have clinic visits with members of the CRC group on the prescribed follow-up date according to practice standards ± 4 weeks. Compliance with follow-up in this study was noted to be 75%, which is comparable with international standards as evidenced by follow-up rates of patients with CRC in the United States and the Netherlands, which was noted to be 72% and 76%, respectively.[56,57] This is in contrast to one study in Japan that showed a 94% compliance rate with follow-up.[25]

Specifically, compliance of patients with the prescribed surgery, chemotherapy, and RT was noted to be 90%, 77%, and 96% in this study, respectively, which is comparable to treatment compliance of patients with CRC in studies done in Spain (86% to 92%) and the Netherlands (75% to 98%).[58,59]

Compliance to Z-Package Outcome Indicators

In terms of compliance with the outcome indicators of the Z-Package Program by PhilHealth, the 90% compliance rate with treatment plans was achieved by the surgery and RT treatment arms; however, delivery of and adherence to chemotherapy would need improvement, as evidenced by a 77% compliance rate. All patients with CRC were discussed in a pretreatment multidisciplinary meeting that surpassed the 75% and 90% requirement of PhilHealth for patients with colon and rectal cancer, respectively. All multidisciplinary meetings, treatment plans, compliance, and follow-ups were properly documented. The 75% follow-up rate at the clinic would need to be improved as PhilHelath required a 95% follow-up rate. A previous study performed by the authors have identified trust in their physicians, the presence of family support, and affordability of treatment as factors that would highly influence follow-up.[60]

The number of complete and partially complete CRMs in specimens that were properly evaluated were 71% and 22%, respectively, giving a total of 93%, surpassing the more than 60% requirement of the program. Of note, of the 173 rectal cancer specimens submitted to pathology, 42 had unspecified CRM readings, which may limit derived conclusions. Lastly, our study shows incomplete total mesorectal excision in 7% of evaluated specimens, which
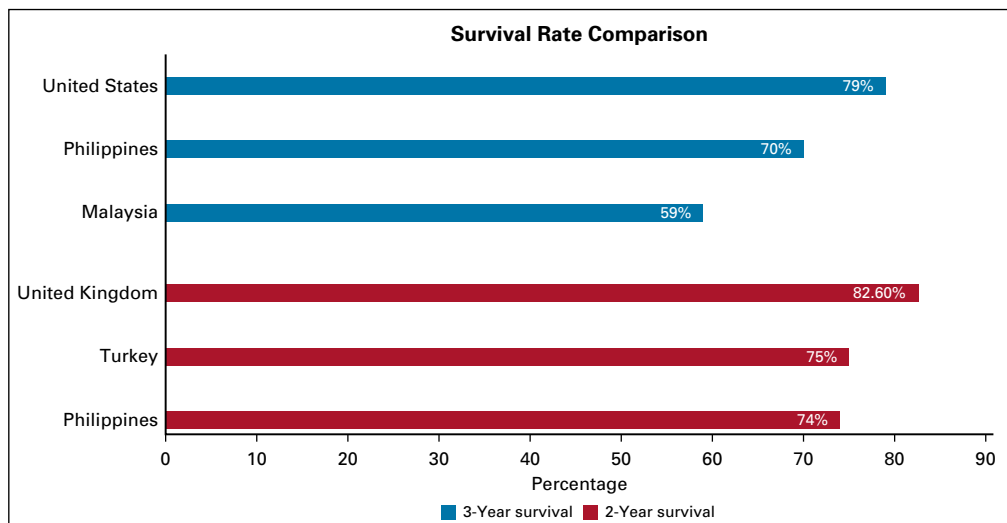
FIG 3. Graph showing the survival rates of patients with colorectal cancer enrolled in the Z-Package benefit program compared with statistics of other countries.

is lower than rates from a large series that reported 13% to 27% circumferential margin involvement.[61-65]

In conclusion, the results of this study include real-world data that show that when the highest standards of patient care are provided through a multidisciplinary team, patients' overall survival is also maximized.Results of this study can provide future researchers with an overview of the early statistics—compliance with follow-up and treatment, recurrence, morbidity, and mortality rates—of Filipino patients with CRC enrolled in the Z-Package benefit program of the Philippine Health Insurance Company where the highest standards of care are being delivered through a multidisciplinary approach. In line with this, a similar but larger scale with a longer time span is suggested so that we can observe these patients and determine their 5- and 10-year survival rates.

A study on the factors affecting compliance to follow-up in patients with CRC has already been done in this institution by the authors. That study revealed that trust in their physicians, the presence of family support, and affordability of treatment were factors that would highly influence follow-up.[8] A similar study exploring factors that influence compliance with surgery, chemotherapy, and RT would enable physicians to improve or modify their treatment approach to increase patient compliance and as a result improve patient treatment outcomes.

A study on the factors that influence treatment morbidity in these patients would also be beneficial so that physicians would know how to better improve the clinics' services, especially as chemotherapy was the most common reason for morbidity or treatment complication.

This study found that the adoption and institutionalization of quality-of-life measures was not done in clinical practice, contrary to the suggestion of PhilHealth in this program.[3] It is therefore imperative that quality-of-life measures be implemented.

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APPENDIX

TABLE A1. Mean Duration of Hospital Admissions

Period	Colon Cancer, Mean Days (SD)	Rectal Cancer, Mean Days, (SD)
Perioperative	11.0 (± 0.85)	15.8 (± 0.85)
Postoperative	6.2 (± 1.05)	8.2 (± 0.95)

Abbreviation: SD, standard deviation.

TABLE A2. Two- and Three-Year Survival Rates of Patients Enrolled in the Z Package According to Cancer Type

	Survival (%)	95% CI
Two-year survival (both sites)	73.92	66.33 to 80.05
Colon cancer[a]		
Two-year survival	81.76	64.48 to 91.17
Rectal cancer		
Two-year survival	71.97	63.15 to 79.03
Three-year survival	66.75	55.47 to 75.78

[a]No colon cancer patients were enrolled during the first year of implementation of the Z-Package benefit program. Hence only 2-year survival data for colon cancer can be presented.

TABLE A3. Recurrence, Morbidity and Mortality Rates of Patients Enrolled in the Z Package

	No.	(%)	95% CI
Recurrence	223	17.04	12.11 to 21.98
Morbidity	251	21.51	16.43 to 26.60
Mortality	251	19.12	14.26 to 23.99

TABLE A4. Thirty-Day Surgical Morbidities Experienced by the Colon Cancer Patients

Year	Morbidity Rate, No. (%)	Cause
2016 (n = 9)	0 (0)	
2017 (n = 23)	3 (13)	Electrolyte imbalance
2018 (n = 24)	0 (0)	

TABLE A5. Thirty-day Surgical Morbidities Experienced by the Rectal Cancer Patients

Year	Morbidity Rate, No. (%)	Cause
2016 (n = 28)	2 (7.1)	Fascial dehiscence
		Intra-abdominal abscess
2017 (n = 72)	3 (4.2)	Surgical-site infection
		Anastomotic dehiscence
		Infected vontact dermatitis (parastomal area)
2018 (n = 73)	4 (5.5)	Pelvic abscess
		Coloanal dehiscence
		Partial gut obstruction 2' to postoperative adhesions

TABLE A6. Other Program Target Outcomes Set by Philhealth

Outcome	Target Rate, Philhealth (%)	Actual Rate, UP-PGH (%)
Preoperative radiotherapy for patients with stage II and stage III rectal cancer who had resections	95	100
Pretreatment multidisciplinary meeting for colon cancers	75	100
Pretreatment multidisciplinary meeting for rectal cancers	90	100
Documentation of multidisciplinary meetings, treatment plans, compliance, treatment, and follow-up	100	100

Abbreviation: UP-PGH, The University of the Philippines, Philippine General Hospital.