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Research article

Patient-reported healthcare utilisation and economic burden among people with colorectal cancer in Kuwait: a cross-sectional study

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Abstract

Background: Patient-reported economic consequences of colorectal cancer (CRC), particularly productivity losses and caregiving costs, are insufficiently documented in Kuwait. This study described healthcare use and quantified direct expenditure, indirect economic costs and their combined burden among patients receiving tertiary oncology care.

Methods: A cross-sectional telephone survey of 100 patients with CRC was conducted at the Kuwait Cancer Control Center from 6 June through December 2022. The EQ-5D-5L and Health Care Utilisation questionnaires captured healthcare encounters, expenditure, productivity and caregiving. Direct costs comprised reported outpatient and inpatient expenditure; indirect costs included caregiver costs and time losses valued at KD 33.56 per day using a 2022 GDP-per-capita proxy. Skewed monetary outcomes were summarised for records with positive values using response-specific denominators.

Results: Outpatient care in the preceding six months was reported by 44/99 respondents (44.4%); government hospitals were named by 39/43 outpatient facility respondents (90.7%) and 24/32 admission facility respondents (75.0%). Among positive-value records, total direct expenditure averaged KD 266.28 (SD 393.42; n=48), with a median of KD 155.00 (IQR 47.50–310.00). Total indirect cost averaged KD 1,714.29 (SD 2,441.86; n=67), with a median of KD 1,074.97 (IQR 301.05–2,020.32). The combined patient-level cost averaged KD 1,636.40 (SD 2,475.83; n=78), with a median of KD 1,003.40 (IQR 253.75–2,062.50). Caregiver costs were positive in 39 records (median KD 900.00). Denominators differed across cost domains, and stored zero amounts could not reliably be distinguished from non-applicability or missing costs.

Conclusions: This single-centre, non-representative sample indicates reliance on public-sector services among patients reporting relevant encounters, alongside direct expenditures and substantial valued productivity and caregiving costs. The cost summaries are neither national burden estimates nor complete annual per-patient costs and do not establish that indirect costs exceed direct costs for individual patients. Better linked clinical, employment, healthcare-expenditure and caregiver data are needed to inform equitable CRC service planning.

Keywords: colorectal cancer; healthcare utilisation; health services research; patient-reported expenditure; caregiver burden; productivity loss; Kuwait

Background

Colorectal cancer (CRC) remains a major global public health concern because it contributes substantially to cancer incidence, mortality, disability, and health-system expenditure.[1,2] Global estimates identify CRC as one of the leading cancers worldwide, with burden shaped by population ageing, changing risk-factor profiles, screening coverage, treatment access, and health-system capacity.[3,4,5,6]

In Kuwait, CRC is a high-priority cancer-control issue. A Kuwait analysis reported that CRC ranked as the second most common cancer, with 2,710 registry-recorded cases between 2010 and 2019 and an age-standardised incidence rate of 13.2 per 100,000 people in 2019.[7] That analysis found fecal occult blood testing followed by colonoscopy or sigmoidoscopy to be a cost-effective screening strategy from the provider perspective.[7] International evidence supports stool-based testing, sigmoidoscopy and colonoscopy as screening modalities, while emphasising that implementation depends on local capacity, follow-up and adherence.[8]

Local screening context remains relevant but is not the primary outcome of the present study. Public-awareness research in Kuwait has identified knowledge gaps concerning CRC symptoms, risk factors and diagnostic procedures,[9] while primary-care physicians have reported generally favourable attitudes toward screening alongside patient- and health-system barriers.[10] International cost-effectiveness evidence likewise shows that the preferred screening modality depends on local costs, capacity, adherence and willingness-to-pay assumptions,[11] and claims-based research has documented screening-related healthcare use and productivity losses.[12]

Conceptual and economic-burden framework

CRC economic-burden research distinguishes healthcare expenditures, non-medical expenditures and indirect costs, including hospitalisation, treatment, transport, absenteeism, disability and premature mortality.[13,14] Costs also vary by phase of care, stage, treatment intensity, survivorship and end-of-life status.[15,16] From the household perspective, cancer can generate out-of-pocket payments, non-medical expenditure, income loss and reduced work productivity even in publicly financed systems.[17,18] Informal caregivers may absorb substantial time, employment and care-coordination burdens,[19] while financial strain can coincide with symptom burden and lower quality of life.[20]

Patient-reported observational and health-services data can complement administrative and provider-cost sources by describing utilisation, treatment pathways, costs and outcomes that are visible to patients and families.[21] Oncology studies show that healthcare resource utilisation and costs vary with cancer type, treatment line, comorbidity and disease phase,[22,23,24] while Gulf-region evidence highlights the value of local utilisation and cost information for payer and service-planning decisions.[25,26,27]

Evidence drawn from retinal disease, osteoarthritis, atypical haemolytic uraemic syndrome and other cancers is used here only for general insights into administrative-data methods, service planning and economic measurement; it is not direct evidence about colorectal cancer in Kuwait.

Patient-reported evidence on CRC service use and economic burden in Kuwait remains limited. This study therefore aimed to describe healthcare utilisation, recent illness and treatment seeking, caregiving, source of expenditure, and patient-reported direct and indirect economic burden among patients with CRC attending KCCC. The study's contribution is primarily geographic and perspectival: it combines local service-use, productivity and caregiving information and identifies economic-data domains that require more complete routine measurement. The conceptual framework linking patient characteristics and need factors with enabling factors, healthcare use and patient/family economic burden is presented in Figure 1.

Methods

Study design and setting

A cross-sectional patient-interview survey of people with colorectal cancer (CRC) was conducted at the Kuwait Cancer Control Center (KCCC), a tertiary oncology referral centre in Kuwait. Patient interviews were conducted by telephone from 6 June through December 2022. Telephone administration replaced the originally planned face-to-face interviews because of COVID-19-related constraints. Trained research staff conducted the telephone interviews and requested participant consent before initiating the questionnaire. Informed consent was obtained from all participants before the telephone interviews, and the consent process was documented in the study records. The analysis focused on patient-reported health status, healthcare utilisation, direct expenditures, time-related economic losses and caregiving. Cost-effectiveness modelling and provider-side costing from the broader research programme were not included.

The telephone interview procedure was pilot-tested with approximately 10–15 patients before the main fieldwork. The EQ-5D-5L and Health Care Utilisation questionnaires were reviewed by the project steering

committee, back-translated and edited for study use. The Health Care Utilisation questionnaire was based on the instrument developed within our earlier Kuwait colorectal cancer research programme, associated with the previously published cost-effectiveness study by Nur et al. (2025). The published article reports the related research programme but does not reproduce the Health Care Utilisation questionnaire or its individual items. For transparency, the full English-language questionnaire should therefore be provided as Supplementary File 1, with a citation to that file added upon upload. Data collection took place from 6 June through December 2022. Patients were recruited from 183 CRC cases identified during the medical-record review. The final fieldwork account documented 100 completed interviews (100/183, 54.6% of the medical-record recruitment pool). This proportion describes interview yield from selected records, not an established response rate: the number actually approached, eligible and refusing interview was not recorded as a complete recruitment flow.

The original protocol proposed enrolling 188 Kuwaiti patients aged 44–75 years, with recruitment targets distributed across four CRC stages. These planned restrictions cannot be attributed to the completed interview sample because the observed records include non-Kuwaiti patients and people outside the proposed age range. The final eligibility amendments, stage allocation and disposition of excluded or unreachable patients could not be verified; the present analysis therefore describes the realised clinic-based interview sample without asserting random or stage-stratified sampling.

Study participants

The six-page Health Care Utilisation questionnaire used in the study contains five domains: recent morbidity (two-week recall), outpatient encounters (six-month recall), inpatient admissions (one-year recall), caregiving, and sources of expenditure. Its expenditure questions concern the most recent encounter or admission, including transport, meals, consultation, diagnostic, procedure and medicine charges. Respondents could report multiple facility types and multiple payment sources; nominal coding of these responses has been retained in the analysis.

One hundred patient-interview records were available for analysis. The patient-level extract had two records without documented sex, one without nationality and one without age. These response-specific denominators differ from the original narrative summary, which reported complete demographics; the individual-level extract was used for analytic proportions, while discrepancies were not resolved by substituting assumed values.

The EQ-5D-5L instrument provided a utility index and a patient-reported health-state visual analogue scale (VAS). The Health Care Utilisation survey provided item-level indicators for recent illness, visits, admissions, travel and direct expenditure, work absence, caregiver activities and financing. The original protocol anticipated English and Arabic materials; the final language used for each respondent was not identifiable in the analytical extract.

Patient contact was restricted by willingness and ability to participate in a telephone interview. The fieldwork account described refusals associated with cancer-related stigma and confidentiality concerns, patients being too unwell to respond and difficulties recalling hospital admissions, clinic visits and costs. Because specific counts were not recorded for each reason, these are reported as documented recruitment barriers without assigning frequencies. The sample is not nationally representative.

Questionnaire routing is explicit: patients reporting no recent illness are not asked some related follow-up items; patients reporting no outpatient use skip its detailed module. Accordingly, nonresponses to conditional items are not equivalent to refusals or data loss. The economic calculation fields in the supplied workbook contain a mix of positive amounts and zero codes. Because these zero entries are not linked consistently to flags identifying genuine no-cost encounters, non-applicability or missing responses, they are tabulated as 'coded zero' rather than classified as zero economic burden.

The interview instrument covers recent illness over two weeks, outpatient visits over six months and hospital admissions over one year. Item-level outpatient charges are associated with the most recent reported visit, while inpatient charges refer to the most recent admission; these should not be interpreted automatically as complete expenditure over the respective look-back windows. Retrospective interview recall may affect completeness, particularly for care-intensive cases.

Study measures

A 2022 GDP-per-capita approach was specified for valuation of time losses. The supplied 2022 economic-input note states KD 33.56 per calendar day. Accordingly, patient-level estimates were calculated as hospitalisation-related time cost = reported length of stay (days) × KD 33.56 and work-absence cost = reported days absent × KD 33.56. For consistency with the existing analytical construction, outpatient facility time was valued using an eight-hour working day (KD 33.56/480 = KD 0.0699 per minute), conditional on time being recorded in minutes. These are imputed opportunity-cost proxies rather than verified individual earnings. The

documentation also quotes US$39,981.8 GDP per capita and an annual exchange rate of KD 1 = US$3.260, which imply approximately KD 33.60 per day.

Sociodemographic measures included gender, age group and nationality. Health-status measures included EQ-5D utility categories, current health-status score and self-reported health over the preceding two weeks. Healthcare-utilisation measures included recent illness and treatment seeking over two weeks; outpatient care over six months; facility type; number of treatment visits; time spent in facility; transport mode; hospital admissions over one year; admission facility type; reasons for admission; and length of stay. Economic measures included patient-reported direct outpatient and inpatient expenditure, productivity loss due to hospitalisation and work absenteeism, caregiver cost, total direct expenditure, total indirect cost and total reported cost. Cancer stage, treatment phase, time since diagnosis, treatment modality, metastasis status, employment status and detailed insurance eligibility were unavailable and were not analysed.

The wider research proposal envisaged double-entry checking, statistical software use and expert group meetings for provider-side costing. Completion of those procedures for this interview dataset could not be independently confirmed. No provider-side cost estimates, expert-derived costs or inferred inferential tests were imported into the present patient-interview analysis.

The patient-level extract contains 100 records. Several computed financial variables are zero-coded when no positive amount was entered, but zero cannot consistently be distinguished from non-use, questionnaire skipping or an unrecorded expenditure. Cost summaries therefore describe positive values with their denominators and present the count of zero-coded records separately. All positive derived values were retained without applying the undocumented exclusion of low positive amounts seen in some historical summary worksheets. No costs were extrapolated to all patients.

Patient-reported economic measures

Direct expenditure was computed as the sum of patient-reported outpatient and inpatient expenditures. Indirect cost was computed at patient level from imputed outpatient facility-time cost, imputed hospital-stay cost, imputed work-absence cost and recorded caregiver cost. The total combined cost equals direct plus indirect components for each record. To align the valuation year with the 2022 interviews, the imputed time components were reconstructed from reported times and durations using KD 33.56 per day; reported financial charges and caregiver amounts were unchanged. These constructed quantities do not represent complete

annual societal cost or full public-provider expenditure, because recall windows differ and zero-coded values have uncertain meaning.

Statistical analysis

The patient-level Excel file (100 records) was analysed descriptively using valid-response denominators for questionnaire outcomes. Frequencies and percentages, with Wilson 95% confidence intervals for selected proportions, were reported as descriptive summaries; non-probability recruitment precludes interpreting these as design-based national precision. Skewed positive economic outcomes were described using the median, interquartile range (IQR), mean, standard deviation and range; zero-coded records were enumerated separately. The 2022 productivity proxy was used to reconstruct hospital-stay, absenteeism and outpatient-time components and the derived totals. No hypothesis tests or regression models were introduced because employment, cost applicability and individual missingness mechanisms could not be validated. Arithmetic checks confirmed that the reported length of stay and days absent reproduce the earlier GDP-based loss variables, and that derived component totals are internally additive.

Patient and public involvement

The questionnaires were reviewed by a project steering committee. The available records do not establish the extent to which patients or members of the public took part in its deliberations. Survey respondents contributed patient-reported information; their additional involvement in study design, analysis and dissemination cannot be confirmed from the available documentation.

Reporting guideline

This cross-sectional observational study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Results

Patient profile, quality of life and perceived health

The analytical file contained 100 patient records. Sex was recorded for 98 respondents (52 female, 53.1%; 46 male, 46.9%), nationality for 99 (50 Kuwaiti, 50.5%; 49 non-Kuwaiti, 49.5%), and age for 99 (mean 59.0 years;

SD 11.2; range 34–85). The age categories were younger than 50 years (20/99), 50–59 (36/99), 60–69 (22/99), 70–79 (18/99) and 80 years or older (3/99). These values correct earlier tabulations that treated some unrecorded demographic values as observed. Table 1 summarises selected categorical outcomes.

The EQ-5D utility values were below 0.500 in 22 participants, 0.500–0.900 in 48 and greater than 0.900 in 30. The utility index ranged below zero for eight respondents, consistent with valid EQ-5D values that represent health states valued worse than dead under a given tariff; these values were retained. Median utility was 0.809 (mean 0.669; n=100). The health-state VAS exceeded 70 in 56 participants, was 50–70 in 31 and below 50 in 13. These are descriptive categories rather than validated thresholds of clinical severity.

Recent illness and healthcare-seeking behaviour

Twenty-six respondents reported illness in the previous two weeks (26/100, 26.0%). Of these 26, 23 reported that recent illness limited daily activities (88.5% of recently ill respondents). Treatment-seeking information was available for 25 of 26 ill respondents; 23 of those 25 reported receiving or seeking treatment (92.0%). Follow-up items were not applicable to most respondents without recent illness, rather than being missing through nonresponse. Reported symptoms and conditions were diverse and included gastrointestinal, respiratory, treatment-related and general complaints.

Outpatient utilisation and public-sector reliance

Outpatient care during the preceding six months was reported by 44 of 99 participants with a response (44.4%; Wilson 95% CI 35.0–54.3%). Among 44 outpatient users, the number of visits had a mean of 7.89 (SD 6.41) and median of 6.0 (IQR 3.75–9.25; range 1–26). One outpatient user did not report a facility; government hospitals were included among facility choices for 39 of 43 participants with a recorded facility (90.7%; Wilson 95% CI 78.4–96.3%). Respondents could select combinations of government and private facilities. Figure 2 presents selected proportions using response-specific denominators.

Reported reasons for outpatient care included follow-up, check-up visits, chemotherapy and cancer management, laboratory work, endoscopy, chest pain, fever, low magnesium, mental-health issues, metastatic colon cancer, poor general condition and medication-related needs.

Hospital admission, length of stay and facility type

Among 27 respondents with a positive government-hospital admission count during the preceding year, the mean number of admissions was 2.26 (SD 1.61; median 2; range 1–7). Of 32 respondents reporting a facility for their last admission, 24 indicated a government hospital (75.0%; Wilson 95% CI 57.9–86.7%). These conditional denominators must not be interpreted as population hospitalisation rates.

Hospital length of stay had 30 positive values (mean 22.07 days; SD 51.51; median 5 days; IQR 2.25–11 days; range 1–240). The much greater mean than median reflects a pronounced right tail, including an exceptionally long admission. Detailed admission reasons ranged from cancer-related treatment and surgery to supportive and symptom-directed care. Figure 3 depicts median and mean values alongside the full observed ranges.

Caregiving and source of expenditure

Forty-seven respondents were coded as caring for themselves, and caregiving relationship was not recorded for 13. The remaining responses identified spouses, daughters, sons and other family members or hired help, sometimes in combinations. Among 95 respondents with a recorded usual payment category, 47 reported government social health insurance (49.5%) and 16 reported self/family payment (16.8%). The questionnaire allows multiple funding sources, and a small number of multi-code entries in the dataset were not decomposed into separate categories.

Patient-reported expenditure and indirect costs

Recorded direct-cost variables were right-skewed, with many coded zeros (Table 2). Among patients with positive values, outpatient expenditure was recorded for 33 (median KD 20.00; IQR KD 10.00–75.00; mean KD 75.64) and inpatient expenditure for 32 (median KD 300.00; IQR KD 72.50–300.00; mean KD 321.43). Total direct expenditure was positive for 48 respondents (median KD 155.00; IQR KD 47.50–310.00; mean KD 266.28). The remaining 52 direct-total records were coded zero, without reliable information to separate genuine no-cost encounters from non-applicability or unavailable costs.

At the specified 2022 time valuation (KD 33.56/day), hospital-stay productivity costs were positive in 30 records (median KD 167.80; mean KD 740.56), and work-absence costs in 32 (median KD 1,006.80; mean KD 1,600.39). Caregiver costs were positive for 39 records (median KD 900.00; mean KD 1,060.54). Including

outpatient facility-time costs, derived indirect costs were positive in 67 respondents (median KD 1,074.97; IQR KD 301.05–2,020.32; mean KD 1,714.29). Derived total combined cost was positive in 78 (median KD 1,003.40; IQR KD 253.75–2,062.50; mean KD 1,636.40). These are positive-value summaries with differing denominators, not paired, representative annual means, nor evidence that one cost domain exceeds another for an individual. The distributions of positive-value direct expenditures, imputed time costs and caregiver costs, together with the number of positive records for each outcome, are presented in Fig. 4.

Discussion

This telephone interview study, conducted between 6 June and December 2022, demonstrates substantial use of government oncology services among patients who reported relevant encounters and records patient- and family-facing payments, caregiving and imputed time losses. The updated valuation uses the study's specified 2022 daily GDP-per-capita proxy applied to the 2022 interview cohort. The estimates remain restricted to records with positive calculated amounts; they cannot be interpreted as per-patient mean cost for all patients or as a national economic burden. The principal healthcare-utilisation indicators and the medians of positive direct, indirect and combined costs are summarised in Fig. 5.

The single-centre recruitment setting, uncertain number of patients actually contacted, stigma- and illness-related participation barriers and retrospective telephone recall may have biased the sample and expenditure completeness. Conditional skips explain some unused questionnaire items, but zero-coded cost records cannot be reliably separated into true zero, no encounter, or missing information. The time-loss calculation assumes GDP per capita is a proxy for time value rather than an observed salary and applies a calendar-day amount to reported hospital stay and work absence. These distinctions help explain differences between the present estimates and the wider literature. Administrative and electronic-record studies in metastatic CRC and other cancers demonstrate substantial utilisation and provider-paid medical costs that vary with treatment line, cancer type, comorbidity and disease phase.[22,23,24,28,29,30,31] CRC-specific studies from Saudi Arabia and Jordan quantify provider-side resource use and direct medical expenditure,[32,33] whereas patient-perspective research in Iran captures household and productivity costs.[34] Disease-state analyses in Finland and population-based European studies further show that total burden changes markedly across treatment, metastatic and palliative phases and can include sizeable informal-care and productivity components.[35,36,37] Phase-of-care work from Italy and studies of treatment adverse events and rectal-cancer pathways similarly

demonstrate that the timing and clinical context of care shape resource use and expenditure.[38,39,40] Against this background, relatively low patient-reported direct expenditure in a publicly financed setting cannot be taken to imply low health-system cost; instead, it reflects a different economic perspective.

The findings are also relevant to regional evidence development. Gulf health systems have identified gaps in routinely available utilisation, treatment-pattern, outcome and cost data needed for resource allocation,[25] while claims-based studies from Dubai illustrate how linked real-world data can support health-service planning.[26,27] Patient-reported information adds dimensions that administrative datasets may not capture, including perceived burden, productivity and caregiver involvement.[41] The large recorded values for some productivity and caregiving components are consistent with evidence that CRC can impose substantial productivity losses and financial burden on patients and families.[42,43,44,45,46] However, the present data do not establish that indirect costs are greater than direct costs at the individual level. The practical implication is narrower: supportive outpatient pathways, caregiver support and systematic collection of patient-reported economic information deserve evaluation alongside existing public-sector oncology services. Screening evidence remains relevant background for Kuwait,[7,8,11,12] but the current study did not evaluate screening pathways, endoscopy capacity or diagnostic-stage shifts and should not be used to infer those effects directly.

Future work should use multicentre, longitudinal individual-level data linking stage, treatment modality, treatment phase, employment, caregiver involvement, utilisation, patient-reported outcomes and expenditure. Clear questionnaire coding should distinguish zero cost, non-applicability, 'don't know' and item nonresponse. Public and private providers should be represented if national burden estimates are intended. Age at diagnosis and prediagnostic utilisation may also be incorporated because young-onset CRC can carry substantial direct medical costs and increased healthcare use before diagnosis.[47,48] Such data would permit appropriately paired economic comparisons, modelling of high-burden episodes and more precise assessment of equity across nationality, insurance and employment groups.

Conclusions

In this clinic-based sample of 100 people with colorectal cancer, healthcare utilisation was concentrated in government facilities among those providing relevant service details. The analysis also documents household-facing expenditure and model-imputed time costs, but multiple source-data limitations prevent credible population-level cost estimation or inference that indirect costs exceed direct expenditure. Routine collection

should distinguish true zero, no relevant service, missing response and unknown cost, and future studies should link interview records with contemporaneous clinical and administrative information.

Declarations

Ethics approval and consent to participate

The study was approved by the Kuwait Ministry of Health Standing Committee for the Coordination of Health and Medical Research (approval no. PN19113BH01). Informed consent was obtained from all participants before the telephone interviews and was documented in the study records. All research involving human participants was conducted in accordance with relevant institutional and national guidelines and regulations and the ethical principles of the Declaration of Helsinki.

Consent for publication

Not applicable. No identifiable individual-level information, photographs or case reports are included.

Availability of data and materials

The data that support the findings of this study are available from KCCC and the Kuwait Ministry of Health, but restrictions apply to the availability of these data and they are not publicly available. Data are available from the corresponding author upon reasonable request and with permission from the Kuwait Ministry of Health.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AMN: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. SMA: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. MA: substantial

contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. MHJ: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. AA: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. MFO: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. LN: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. SMHAJ: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability. SAZAR: substantial contribution to the work; participation in drafting, revising or critically reviewing the manuscript; final approval; and accountability.

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Tables

Table 1. Selected characteristics and service use with response-specific denominators and Wilson 95% confidence intervals

Domain	Indicator	n/N	%	95% CI
Sample profile	Female	52/98	53.1	43.3–62.6
Sample profile	Kuwaiti nationality	50/99	50.5	40.8–60.1
Sample profile	Age 50–59 years	36/99	36.4	27.6–46.2
Quality of life	EQ-5D utility ≥0.500	78/100	78.0	68.9–85.0
Quality of life	Health-state VAS >70	56/100	56.0	46.2–65.3
Recent illness	Any illness during past 2 weeks	26/100	26.0	18.4–35.4
Recent illness	Activity limited among recently ill	23/26	88.5	71.0–96.0
Recent illness	Treatment sought among responders to follow-up	23/25	92.0	75.0–97.8
Service utilisation	Outpatient care in past 6 months	44/99	44.4	35.0–54.3

Domain	Indicator	n/N	%	95% CI
Service utilisation	Government hospital among outpatient facility responders	39/43	90.7	78.4–96.3
Service utilisation	Government hospital among admission facility responders	24/32	75.0	57.9–86.7
Financing	Government insurance among payment-category responders	47/95	49.5	39.6–59.4
Financing	Self/family payment among payment-category responders	16/95	16.8	10.6–25.6

Notes: Proportions are based on the valid response denominator for each question, not automatically on all 100 interviewees. Outpatient government-hospital use includes multi-facility selections. CI = confidence interval. Convenience sampling limits population-level interpretation of intervals.

Table 2. Distribution of utilisation and economic outcomes among records with positive values

Outcome	N > 0	Coded zero	Mean (SD)	Median (IQR)	Range	Basis
Outpatient visits (6 months)	44	0	7.89 (6.41)	6.00 (3.75–9.25)	1.00–26.00	Count
Government-hospital admissions (12 months)	27	1	2.26 (1.61)	2.00 (1.00–3.00)	1.00–7.00	Count
Hospital length of stay (days)	30	1	22.07 (51.51)	5.00 (2.25–11.00)	1.00–240.00	Days
Outpatient time cost, imputed (KD)	44	56	1.53 (1.01)	1.05 (1.05–1.84)	0.35–4.20	Imputed

Outcome	N > 0	Coded zero	Mean (SD)	Median (IQR)	Range	Basis
Hospital-stay time cost, imputed (KD)	30	70	740.56 (1,728.62)	167.80 (75.51–369.16)	33.56–8,054.40	Imputed
Absenteeism time cost, imputed (KD)	32	68	1,600.39 (2,527.97)	1,006.80 (1,006.80–1,006.80)	234.92–12,249.40	Imputed
Caregiver cost (KD)	39	61	1,060.54 (898.42)	900.00 (500.00–1,200.00)	100.00–4,000.00	Reported
Outpatient direct expenditure (KD)	33	67	75.64 (137.77)	20.00 (10.00–75.00)	10.00–650.00	Reported
Inpatient direct expenditure (KD)	32	68	321.43 (447.56)	300.00 (72.50–300.00)	2.60–1,990.00	Reported
Total direct expenditure (KD)	48	52	266.28 (393.42)	155.00 (47.50–310.00)	2.60–1,990.00	Derived
Total indirect cost (KD)	67	33	1,714.29 (2,441.86)	1,074.97 (301.05–2,020.32)	0.35–12,316.52	Derived
Total combined cost (KD)	78	22	1,636.40 (2,475.83)	1,003.40 (253.75–2,062.50)	0.35–14,176.52	Derived

Notes: 'N > 0' is the number of positive-cost records, and 'coded zero' denotes a stored zero, not necessarily verified zero expenditure. Means (SD), medians (IQR) and ranges describe only records with positive values; no imputation was used for missing applicability. Values for outpatient time, hospital stay and work absence were recalculated at the specified 2022 rate of KD 33.56 per day (KD 0.0699 per minute assuming eight hours/day). Costs from distinct recall windows and subsets are not comparable as paired estimates.

Figures

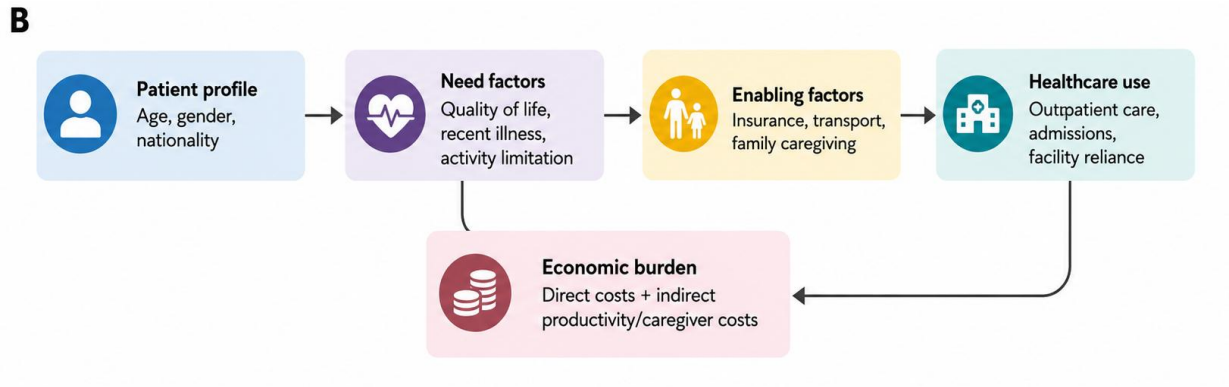


Figure 1. Conceptual framework for patient-reported CRC burden.

The framework links patient profile and need factors with enabling factors, healthcare use and patient/family economic burden.

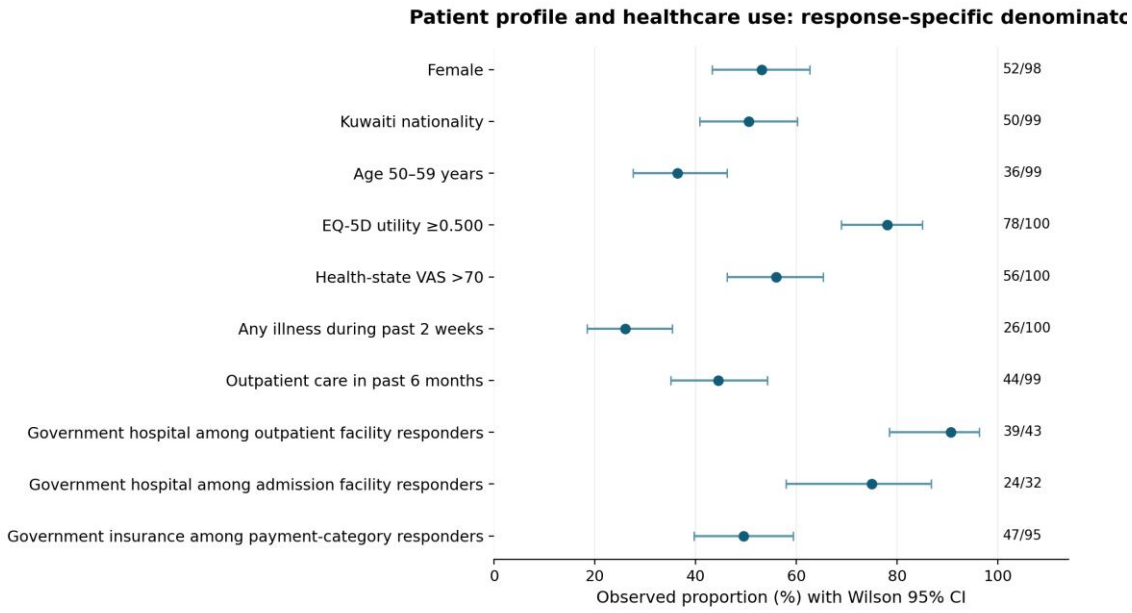


Figure 2. Response-specific proportions with Wilson 95% confidence intervals. Labels show numerators and valid denominators; intervals are descriptive only.

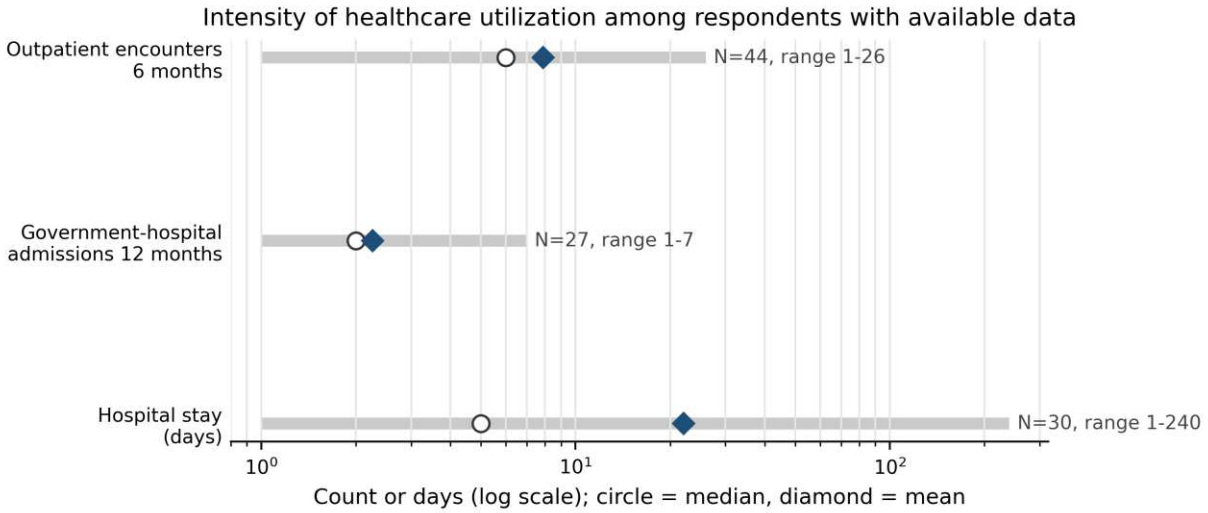


Figure 3. Intensity of healthcare utilisation among respondents with available data.

Grey lines show ranges; circles show medians; diamonds show means. The x-axis is log-scaled to show the skewed distribution of outpatient encounters, government-hospital admissions, and hospital stay.

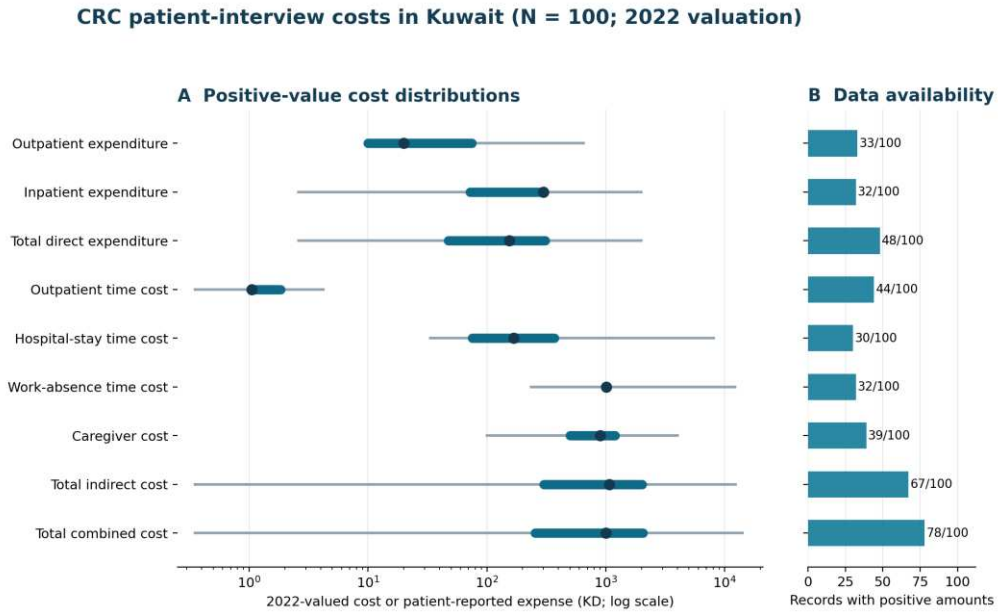


Figure 4. Patient-reported direct and caregiver costs and 2022-valued time costs among records with positive amounts. The left panel presents ranges and interquartile intervals with medians on a logarithmic KD scale; the right panel shows the positive-value numerator out of 100 interview records. Coded zero does not necessarily mean actual zero expenditure.

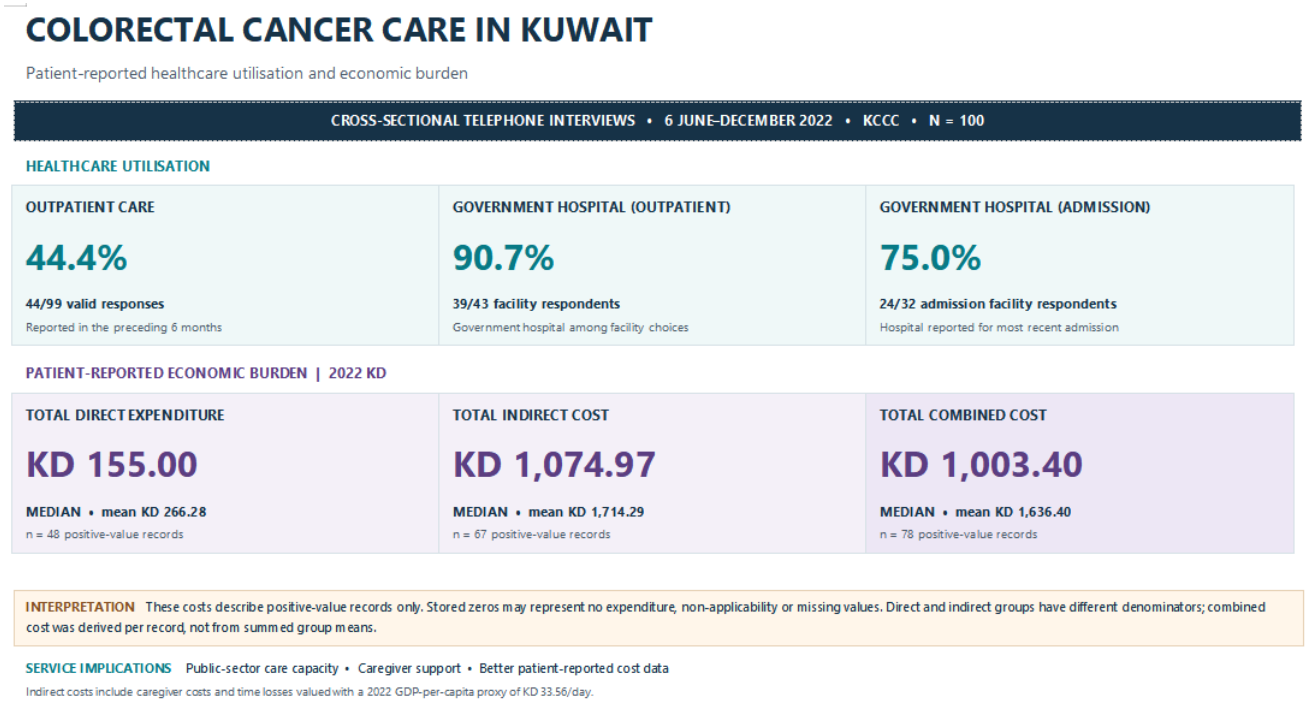


Figure 5. Graphical summary of patient-reported colorectal cancer service utilisation in Kuwait, telephone interviews conducted 6 June–December 2022. The monetary summaries refer to positive-value records; direct and indirect costs have different denominators and must not be interpreted as a paired comparison.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- 3.GraphicalAbstractPatientreportedhealthcareutilisationCRCKuwaitAMN.docx