

ORIGINAL ARTICLE

Prevalence of Anemia among Patients with Solid Cancer at the Time of Diagnosis in Saudi Arabia

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ABSTRACT

Background: Cancer represents a significant global health challenge, with elevated incidence and mortality rates, particularly in Saudi Arabia. Anemia frequently manifests as a common complication in patients diagnosed with solid tumors, often remaining undiagnosed. This study aims to evaluate the prevalence of anemia in individuals recently diagnosed with solid tumors, addressing the lack of comprehensive data on this issue.

Methods: A cross-sectional study was conducted using the records of 508 newly diagnosed cancer patients at King Abdulaziz Medical City (2014 - 2024). Eligible patients had confirmed histological diagnoses and no prior cancer treatment. Data included demographics, tumor types, and blood parameters (RBC, hemoglobin, hematocrit, MCV, MCH). Anemia was defined as hemoglobin < 11.5 g/dL in females and < 13.0 g/dL in males.

Results: Among the 508 patients analyzed, 47.9% were classified as anemic. Microcytic hypochromic anemia (MCHC) was the most prevalent subtype, observed in 25.2% of patients. Colorectal-related malignancies – including colon, rectal, and sigmoid cancers – showed the highest prevalence of MCHC anemia, suggesting chronic gastrointestinal blood loss and iron deficiency as major contributors. In contrast, breast, endometrial, and skin cancers exhibited predominantly non-anemic profiles.

Conclusions: Anemia was prevalent in 47.9% of newly diagnosed solid tumor patients, most commonly in colorectal cancers (colon 61%, sigmoid 58%, rectal 52%), with microcytic hypochromic anemia (25.2%) as the leading type. Excluding patients with chronic illnesses and prior treatments allowed a clearer estimate of the true burden. Early screening and management are essential to reduce treatment-induced anemia and improve patient outcomes.

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Supplementary Data

Table S1. The values of hemoglobin (HB), hematocrit (Hct), red blood cells (RBC), mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH) for each type of cancer in our population. The mean, range, and standard deviation are shown.

Cancer Type	Parameter	Mean	SD	Min	Max
Colon	HB	11.7	2.1	8.0	17.8
	Hct	36.7	6.2	24.7	51.1
	RBC	4.5	0.7	2.8	6.8
	MCV	81.1	8.4	56.4	99.5
	MCH	26.0	3.1	17.2	32.5
Rectal	HB	12.1	2.2	5.7	16.1
	Hct	37.7	6.6	18	50.2
	RBC	4.6	0.6	3	6
	MCV	82.7	9.7	59.6	97.4
	MCH	26.6	3.5	17.5	34.2
Breast	HB	11.7	2.1	8.0	17.8
	Hct	36.7	6.2	24.7	51.1
	RBC	4.5	0.7	2.8	6.8
	MCV	81.1	8.4	56.4	99.5
	MCH	26.0	3.1	17.2	32.5
Endometrial	HB	13.1	1.4	9.6	15.3
	Hct	40.7	3.2	33.0	45.2
	RBC	5.0	0.5	3.9	5.9
	MCV	82.8	9.0	61.5	104.1
	MCH	26.7	3.1	16.4	30.9
Colorectal	HB	11.3	1.9	7.7	14.3
	Hct	35.4	6.1	24.4	46.5
	RBC	4.5	0.6	3.7	5.7
	MCV	78.9	9.9	63.0	95.9
	MCH	25.2	3.2	19.9	30.4
Thyroid	HB	12.12	1.70	9.4	15.0
	Hct	37.27	4.03	30.5	46.2
	RBC	4.49	0.49	3.7	5.3
	MCV	83.54	7.85	64.9	93.0
	MCH	27.14	3.45	19.3	30.3
Sigmoid	HB	11.38	2.09	8.2	14.6
	Hct	35.31	6.17	25.0	44.7
	RBC	4.18	0.62	3.0	5.0
	MCV	84.64	10.09	69.4	99.7
	MCH	27.28	3.69	21.8	32.8
Lung	HB	13.6	3.0	8.4	18.8
	Hct	42.4	9.3	30.0	62.0
	RBC	5.1	1.2	4.2	7.8
	MCV	83.3	9.0	65.8	96.5

Table S2. The values of hemoglobin (HB), hematocrit (Hct), red blood cells (RBC), mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH) for each type of cancer in our population. The mean, range, and standard deviation are shown.

Cancer Type	Parameter	Mean	SD	Min	Max
Bladder	HB	11.1	1.8	9.1	13.9
	Hct	33.9	4.6	27.3	40.4
	RBC	4.0	0.5	3.1	4.8
	MCV	84.9	8.0	64.6	91.8
	MCH	27.7	3.6	19.1	31.5
Cervical	HB	10.94	2.66	8.7	15.1
	Hct	34.43	8.17	26.1	48.2
	RBC	4.44	1.03	3.0	6.2
	MCV	77.88	6.03	70.2	85.9
	MCH	24.85	3.37	21.0	30.6
Uterus	HB	11.3	1.9	9.0	14.4
	Hct	35.2	6.0	28.8	45.1
	RBC	4.3	0.8	3.4	5.5
	MCV	82.4	5.7	71.9	90.0
	MCH	26.6	1.9	24.1	28.7
Brain	HB	12.1	0.9	11.0	13.2
	Hct	36.8	3.3	33.2	40.7
	RBC	4.8	0.4	4.2	5.4
	MCV	76.6	7.9	70.1	86.7
	MCH	25.3	2.5	23.2	28.2
Skin	HB	13.2	2.2	9.5	15.5
	Hct	39.7	6.9	28.1	48.0
	RBC	4.7	0.8	3.3	5.9
	MCV	84.8	5.0	77.8	90.5
	MCH	28.2	2.1	24.9	30.3
Ovarian	HB	10.3	2.3	8.1	14.8
	Hct	32.6	7.4	28.1	47.7
	RBC	4.4	0.6	3.6	5.4
	MCV	75.0	9.1	65.0	89.0
	MCH	23.7	2.8	20.8	27.6
Caecum	HB	12.5	4.5	7.8	17.7
	Hct	38.6	12.2	25.1	53.3
	RBC	4.8	1.3	3.3	6.2
	MCV	79.5	5.1	74.7	87.5
	MCH	25.5	2.7	22.7	28.8
Gastric	HB	9.4	3.0	6.6	14.3
	Hct	30.0	8.2	22.7	43.3
	RBC	4.2	0.9	3.4	5.6
	MCV	70.5	7.0	60.9	78.0
	MCH	21.9	3.3	17.7	25.8

Table S3. The values of hemoglobin (HB), hematocrit (Hct), red blood cells (RBC), mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH) for each type of cancer in our population. The mean, range, and standard deviation are shown.

Cancer Type	Parameter	Mean	SD	Min	Max
Appendicular	HB	12.3	1.9	10.7	14.0
	Hct	38.1	4.8	33.9	42.3
	RBC	4.6	0.9	3.8	5.3
	MCV	85.3	5.4	80.6	90.0
	MCH	27.5	1.0	26.7	28.4
Bone	HB	11.1	2.8	8.7	13.5
	Hct	34.8	7.3	28.4	41.1
	RBC	4.5	0.7	3.9	5.1
	MCV	77.0	3.8	73.7	80.3
	MCH	24.4	2.3	22.4	26.4
Kidney	HB	12.5	1.2	11.8	14.3
	Hct	36.6	4.2	32.8	42.4
	RBC	4.5	0.5	4.2	5.2
	MCV	81.8	2.2	78.8	83.4
	MCH	28.0	0.6	27.4	28.6
Nose	HB	15.1	1.8	12.5	16.3
	Hct	45.6	5.7	37.5	50.6
	RBC	5.4	0.7	4.3	6.0
	MCV	85.1	5.8	79.8	92.7
	MCH	28.2	1.5	26.4	29.9
Head & Neck	HB	13.0	1.6	10.2	15.1
	Hct	39.0	4.5	32.8	45.3
	RBC	4.6	0.7	3.7	5.4
	MCV	84.2	5.0	78.4	90.1
	MCH	27.6	2.2	24.3	30.4
Intestine	HB	10.1	2.1	8.0	12.1
	Hct	31.0	7.3	24.1	38.7
	RBC	3.9	1.2	2.9	5.3
	MCV	80.5	6.6	72.9	84.8
	MCH	26.5	3.3	22.8	28.9
Liver	HB	13.8	0.7	13.3	14.6
	Hct	42.1	4.6	38.2	47.1
	RBC	5.4	0.4	5.2	5.9
	MCV	77.7	3.8	73.3	80.4
	MCH	25.6	0.5	25.0	25.9
Nasopharyngeal	HB	15.9	2.1	13.5	17.3
	Hct	44.9	5.0	39.2	48.6
	RBC	5.4	0.8	4.8	6.3
	MCV	82.8	7.0	76.7	90.4
	MCH	29.2	2.8	27.3	32.4