

Cerebromicrovascular disease in elderly patients with Diabetes

Introduction

Patient Medical History

Glucose and Lipid Profile

Inflammation and Immune Biomarkers

Blood and Clotting biomarkers

Blood Brain Barrier Biomarkers

Hormone and Repair Biomarkers

Medications category

Patient Medication info for BP and Diabetic patients

Blood Pressure Monitoring

Ophthalmological Testing

Advanced Diabetic Retinopathy Grading

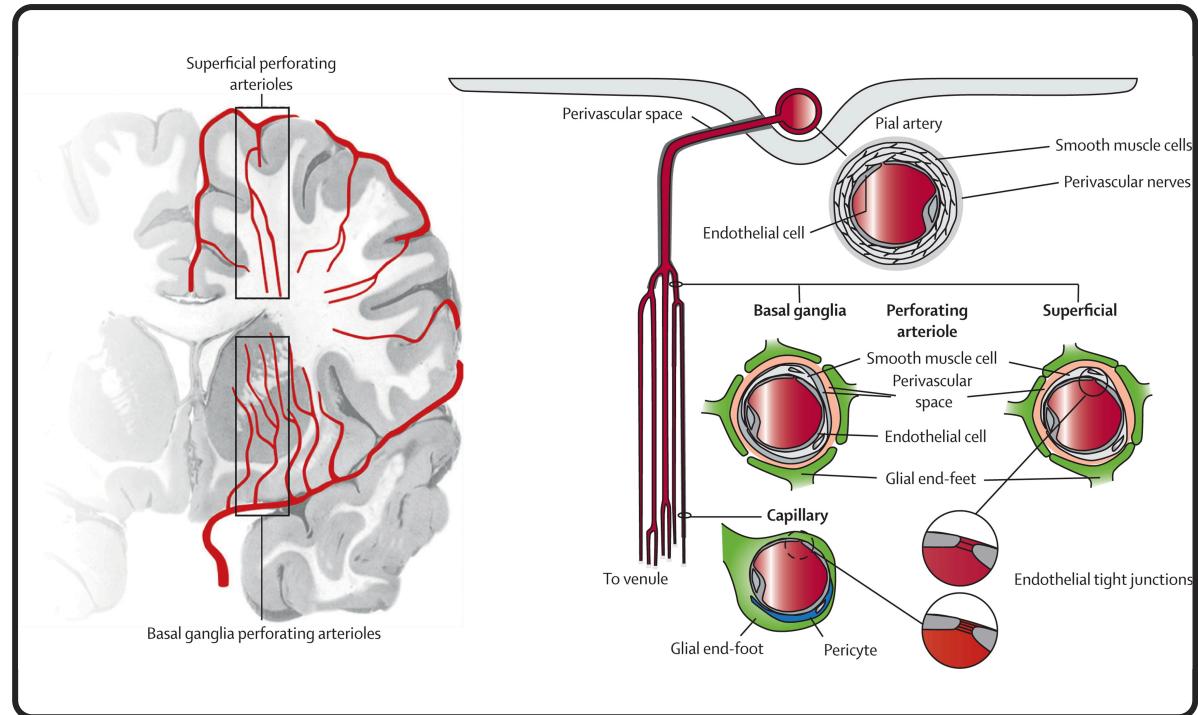
Walking Tests

Cognitive Testing

Cognitive Interpretation

Cognitive Trend Analysis

Conclusion



Cerebromicrovascular disease (cMVD) is a major contributor to cognitive decline, gait impairment, and stroke risk in elderly individuals, and its burden is substantially amplified in patients with diabetes mellitus. With advancing age, the cerebral microvasculature undergoes structural and functional changes, including endothelial dysfunction, arterial stiffening, and impaired autoregulation of cerebral blood flow. Diabetes accelerates these age-related processes through chronic hyperglycemia, insulin resistance, and metabolic inflammation, making elderly diabetic patients particularly vulnerable to microvascular brain injury.

Elderly patients with diabetes often exhibit a higher severity and faster progression of cMVD compared with non-diabetic peers. This enhanced vulnerability is compounded by common comorbidities such as hypertension, dyslipidemia, and obesity, which synergistically worsen microvascular damage. Importantly, cMVD in this population is closely linked to cognitive impairment, particularly in executive function and processing speed, and increases the risk of vascular dementia and mixed Alzheimer's disease pathology. Understanding the interplay between aging, diabetes, and cerebral microvascular dysfunction is therefore critical for early identification, risk stratification, and development of targeted preventive and therapeutic strategies in elderly diabetic patients.

Patient Summary Dashboard

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune Biomarkers	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medications category	Patient Medication info for BP and Diabetes	Blood Pressure Monitoring	Ophthalmological Testing	Advanced Diabetic Retinopathy Grading	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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Average Age
63.78

Count of patients by Gender
Male
37

Female
40

Hypertension Patient %
50.65

Diabetic Patient%
57.14

HTN & Diabetic
41.56

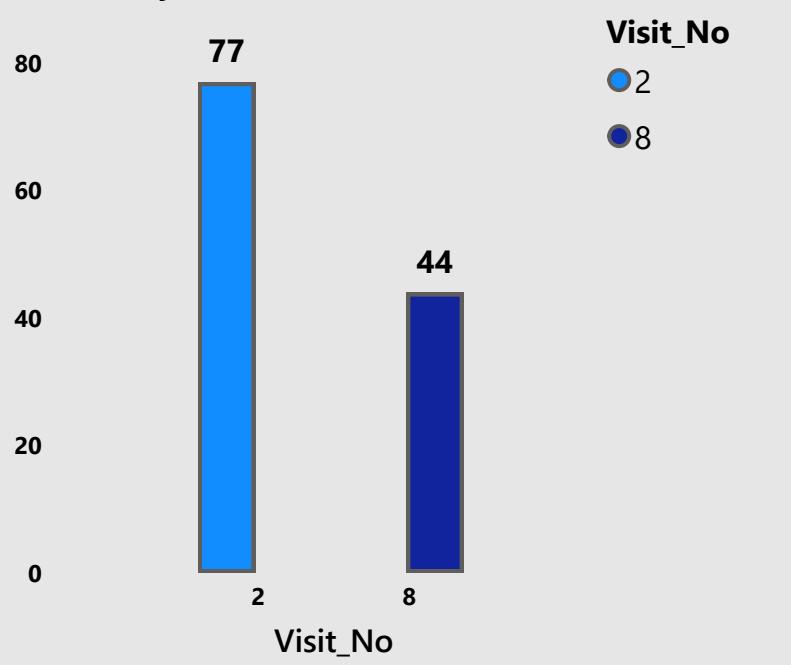
Patient Count
77

HTN or Diabetic
66.23

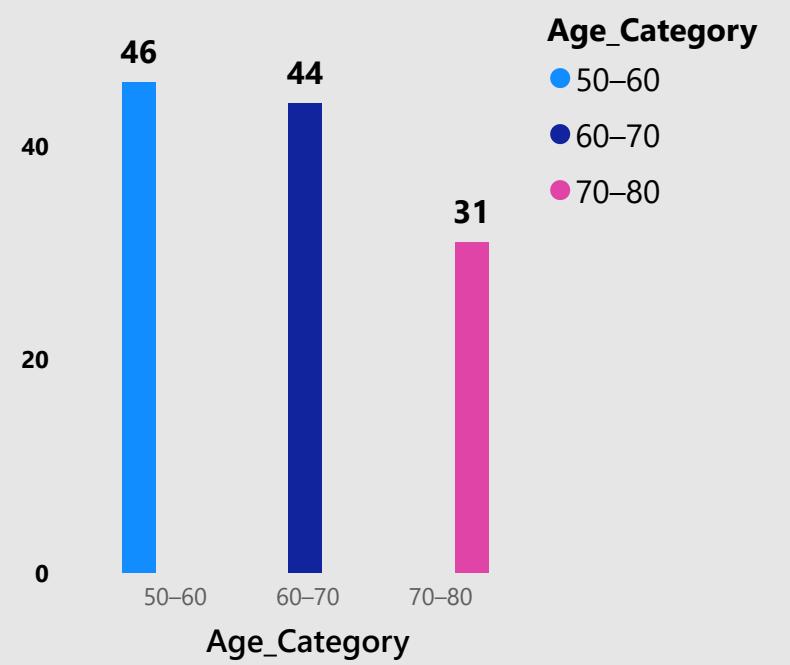
Tobacco Patient %
14.29

Alcohol Patient %
48.05

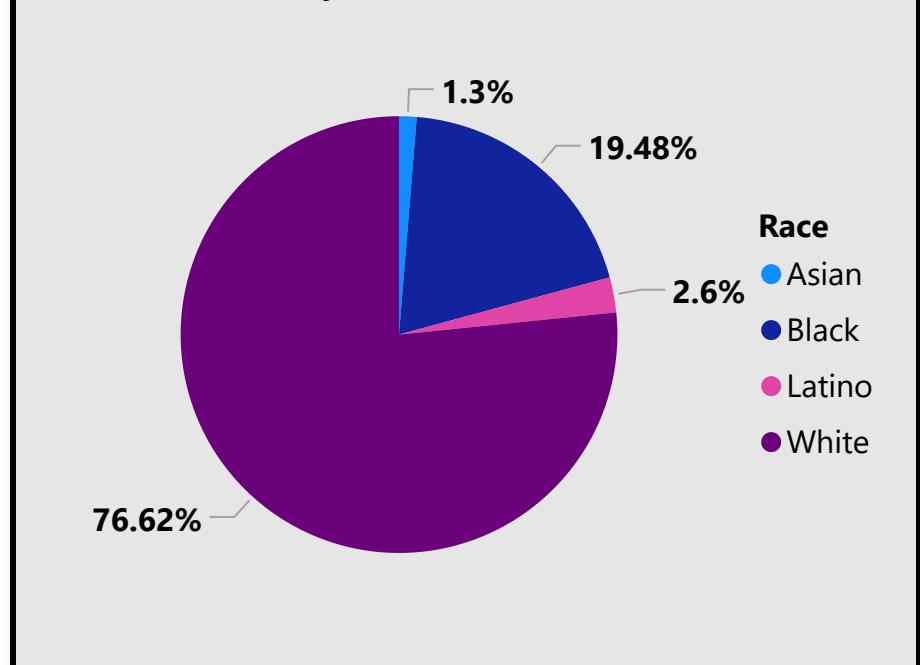
Count by Visit No.



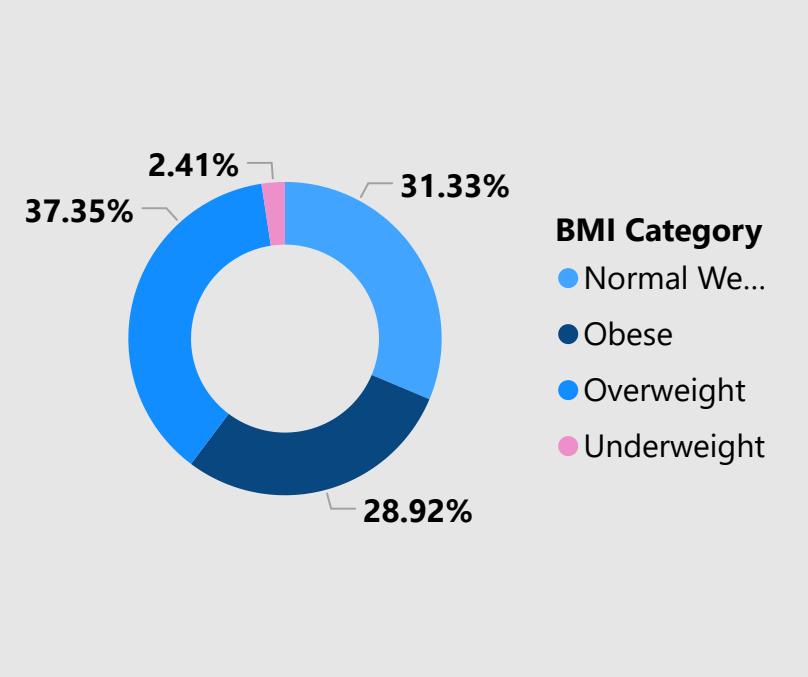
Patient Count by Age



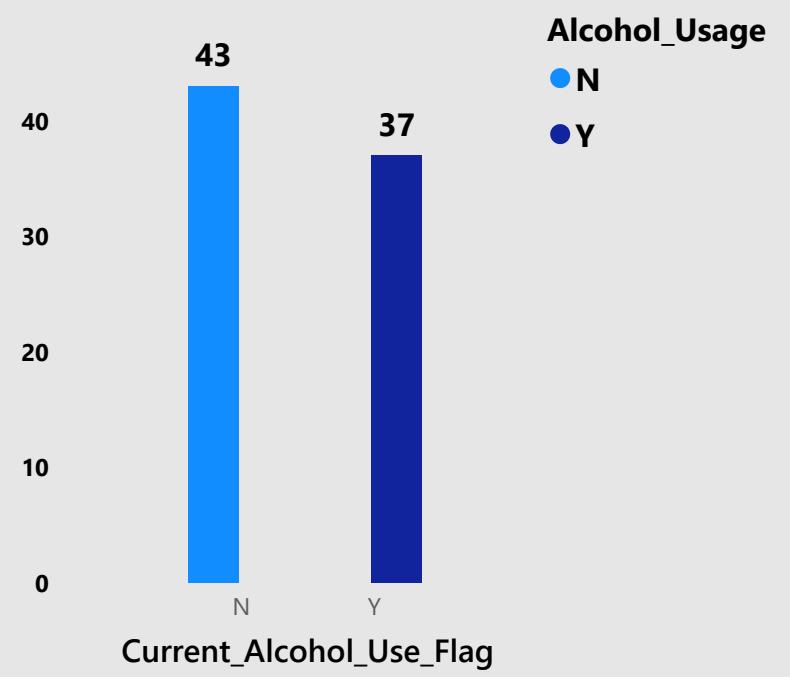
Patient Count by Race



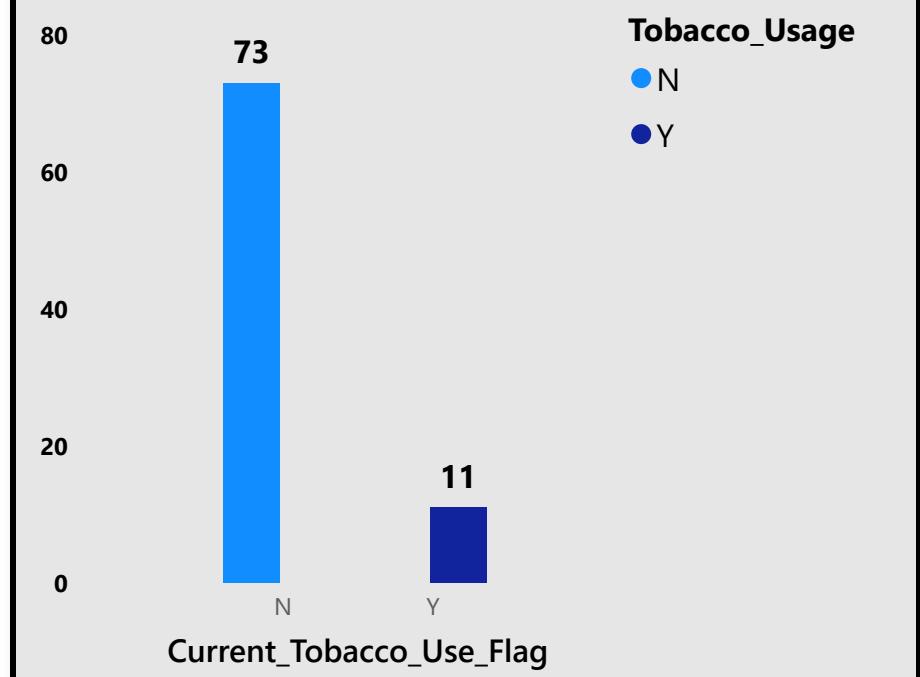
Patient Count by BMI category



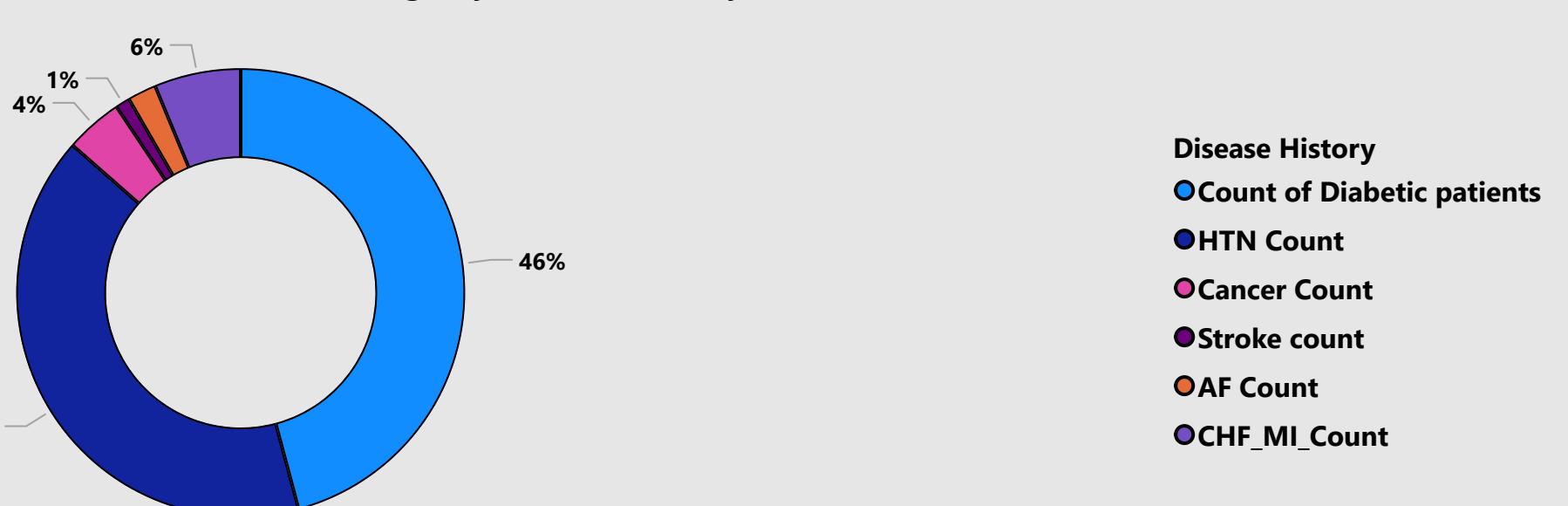
Patient Count - Alcohol Usage



Patient Count - Tobacco Usage

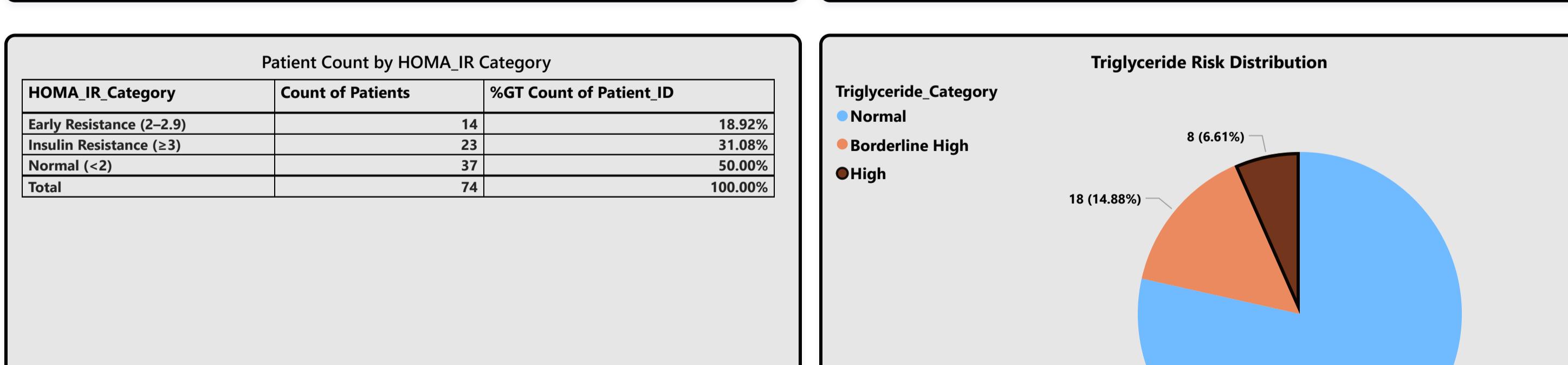
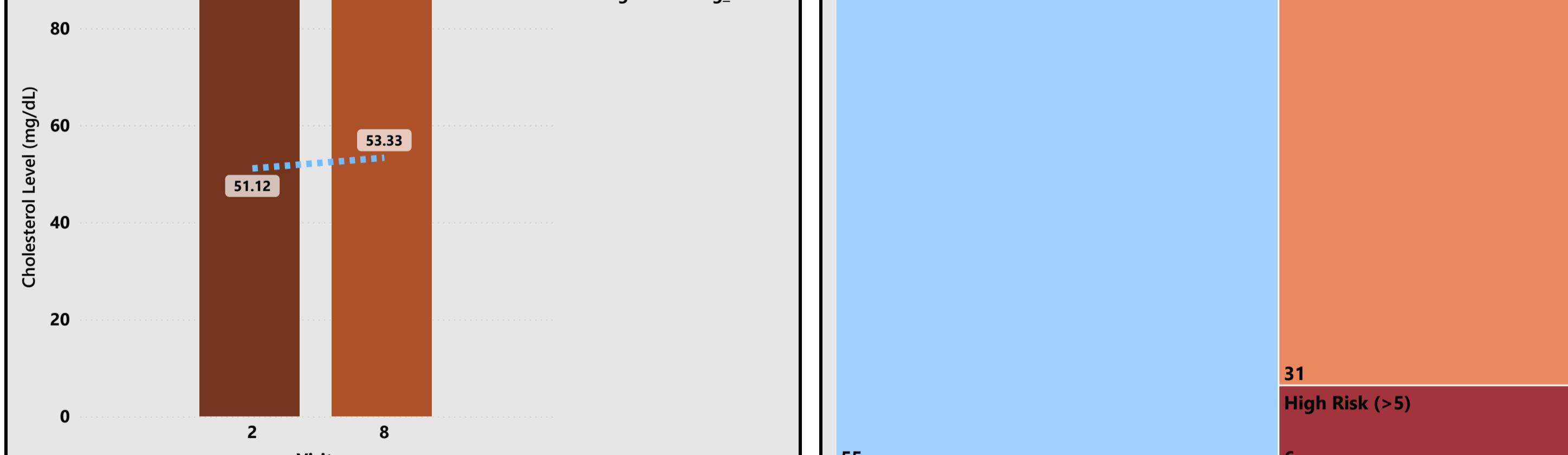
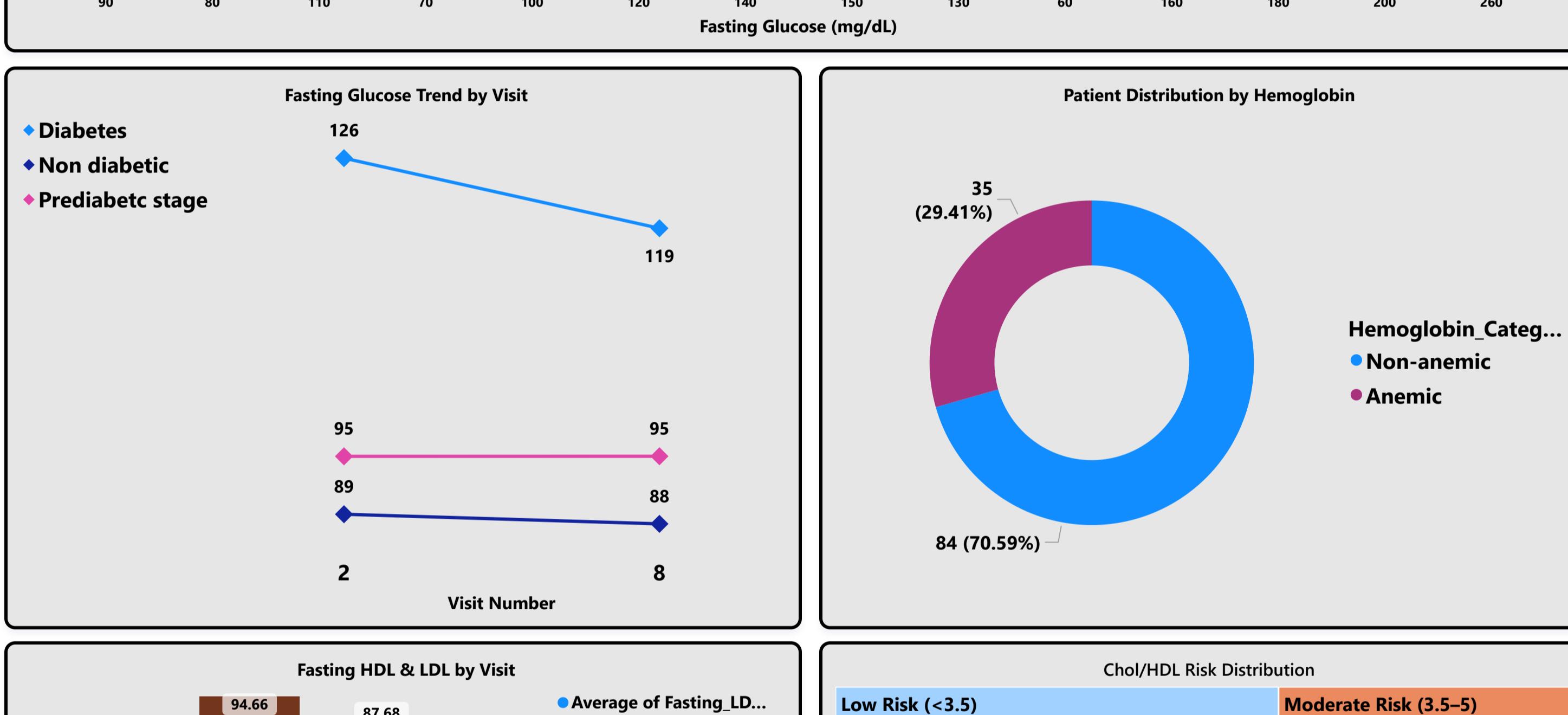
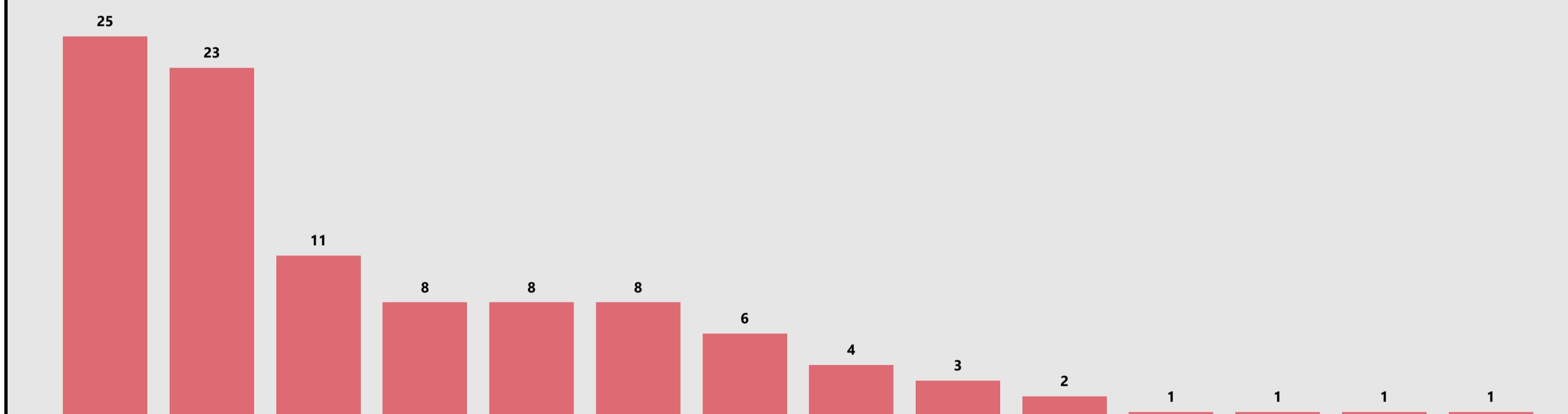
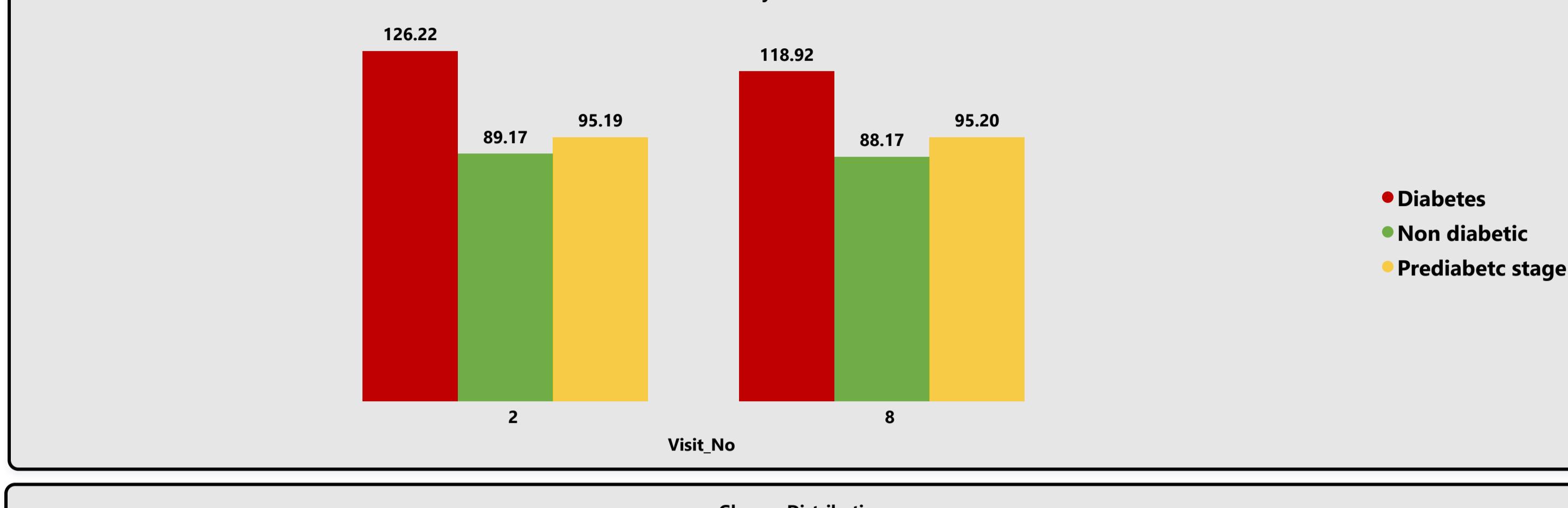
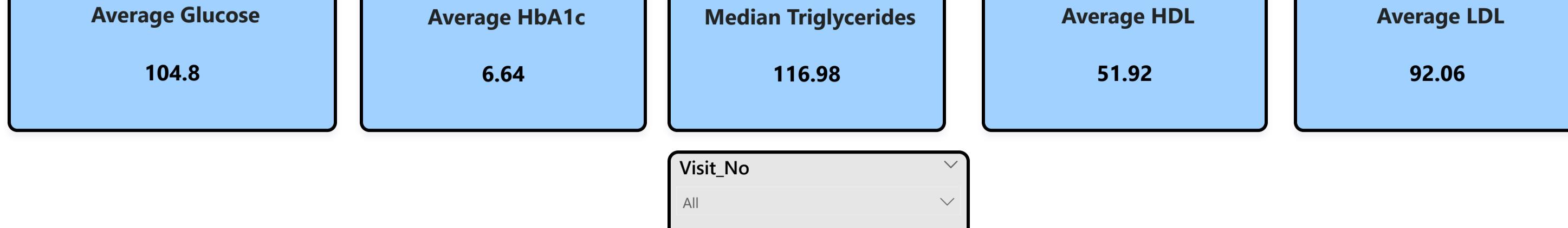


Patients Percentage by Disease History



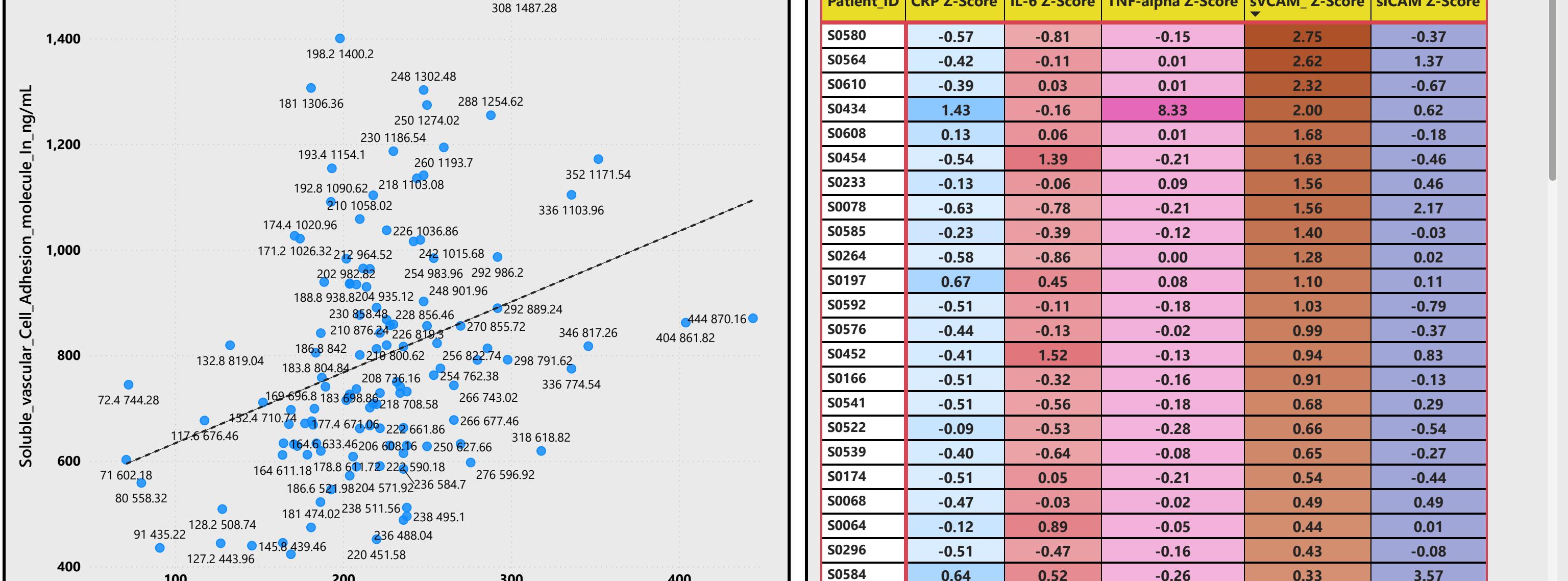
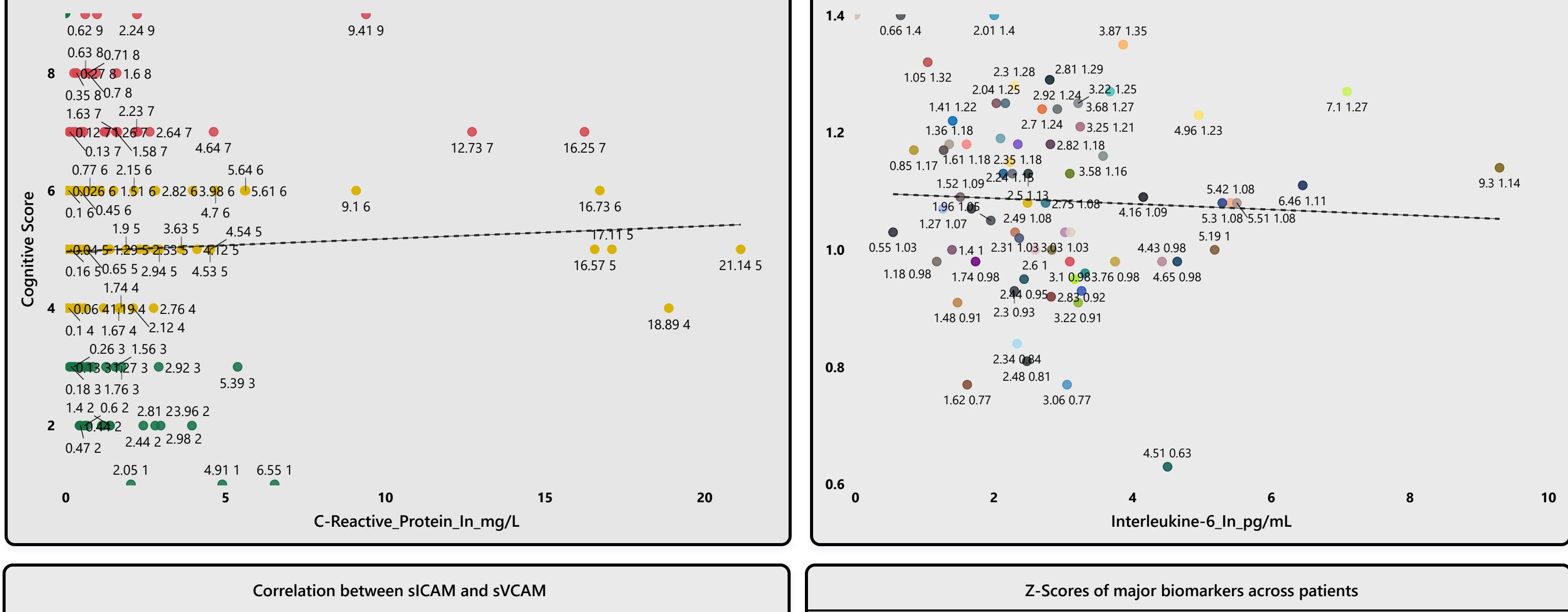
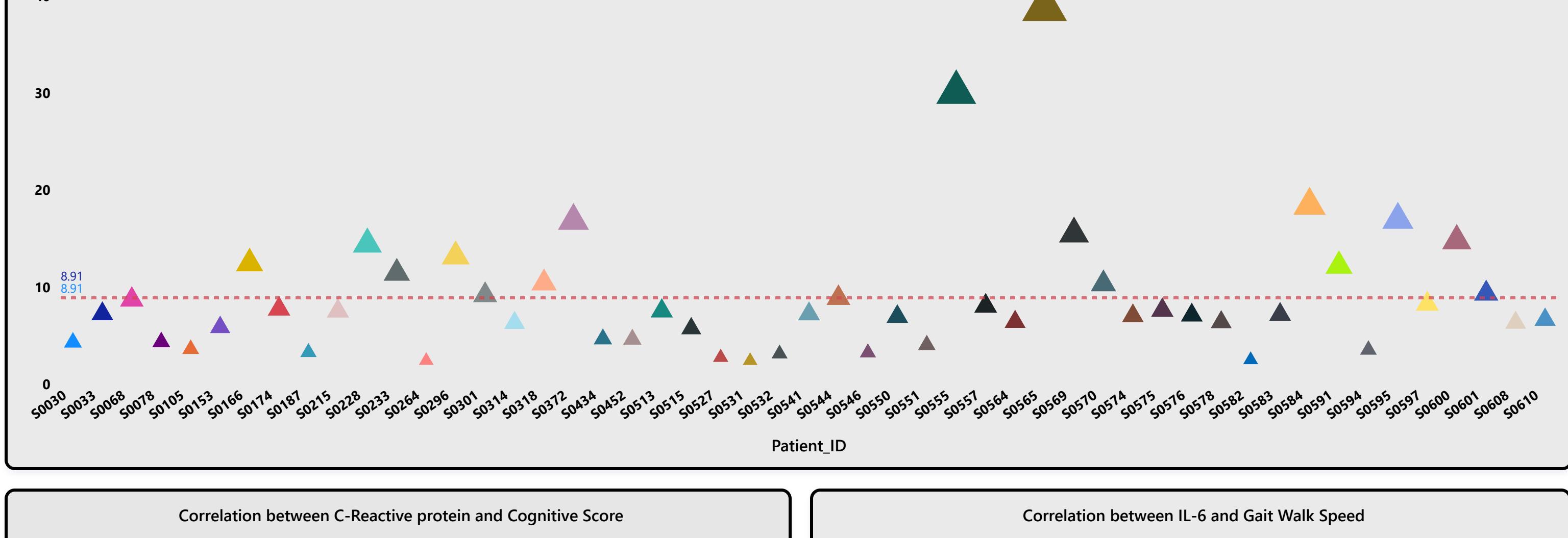
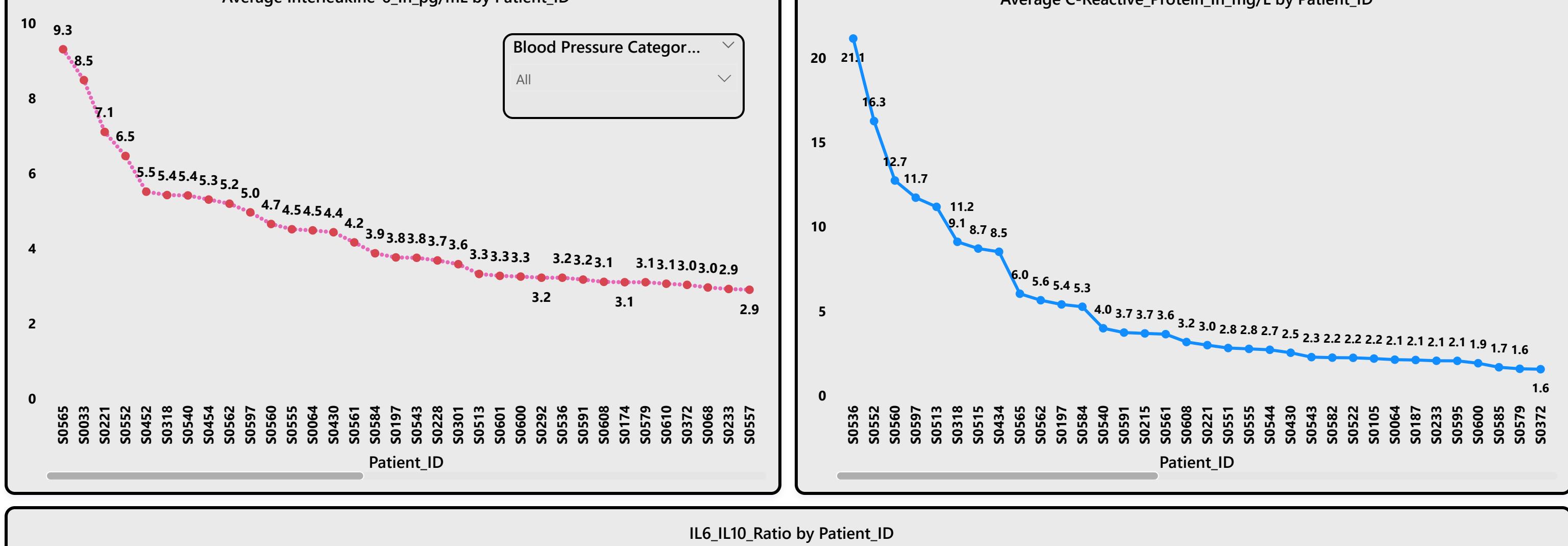
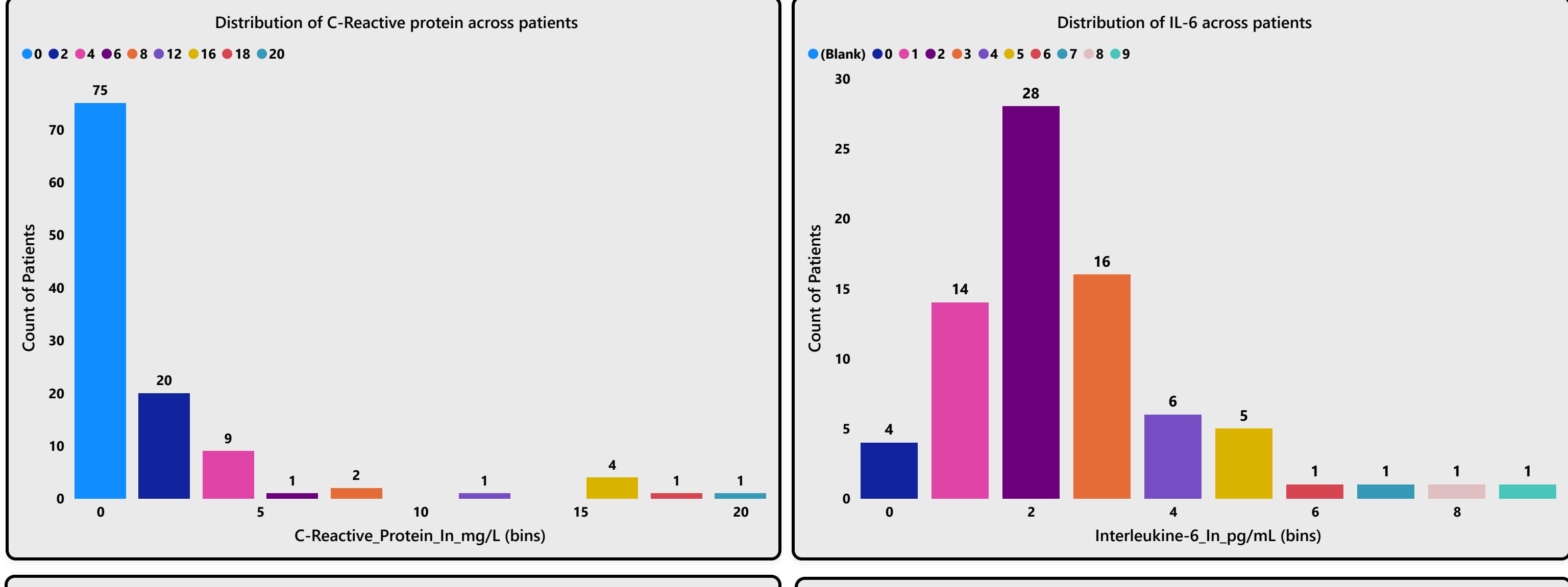
Glucose and Lipid profile of Patients

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune Biomarker...	Blood and Clotting biomarkers	Blood Brain Barrier Biomarker...	Hormone and Repair Biomarker...	Medications category	Patient Medication info for BP and...	Blood Pressure Monitoring	Ophthalmological Testing	Advanced Diabetic Retinopathy...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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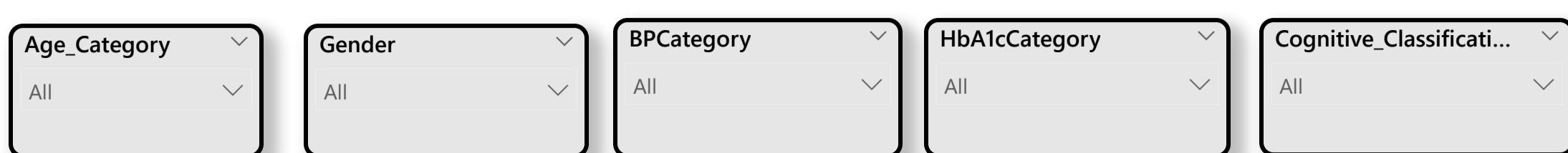
Inflammation and Immune Biomarkers Analysis Dashboard

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune Biomarkers	Blood and Clotting biomarkers	Blood Brain Barrier... Repair...	Hormone and Repair...	Medications category	Patient Medication info fo...	Blood Pressure Monitor...	Ophthalmological Testing	Advanced Diabetic Retinop...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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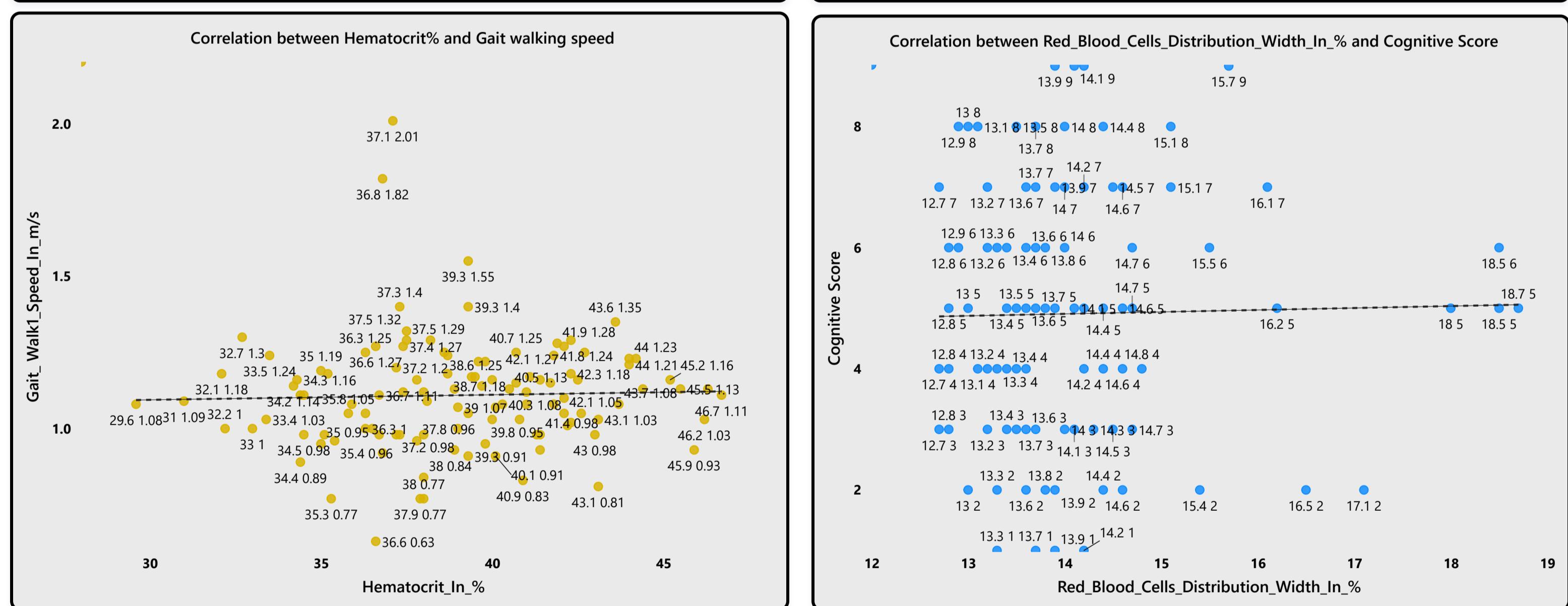
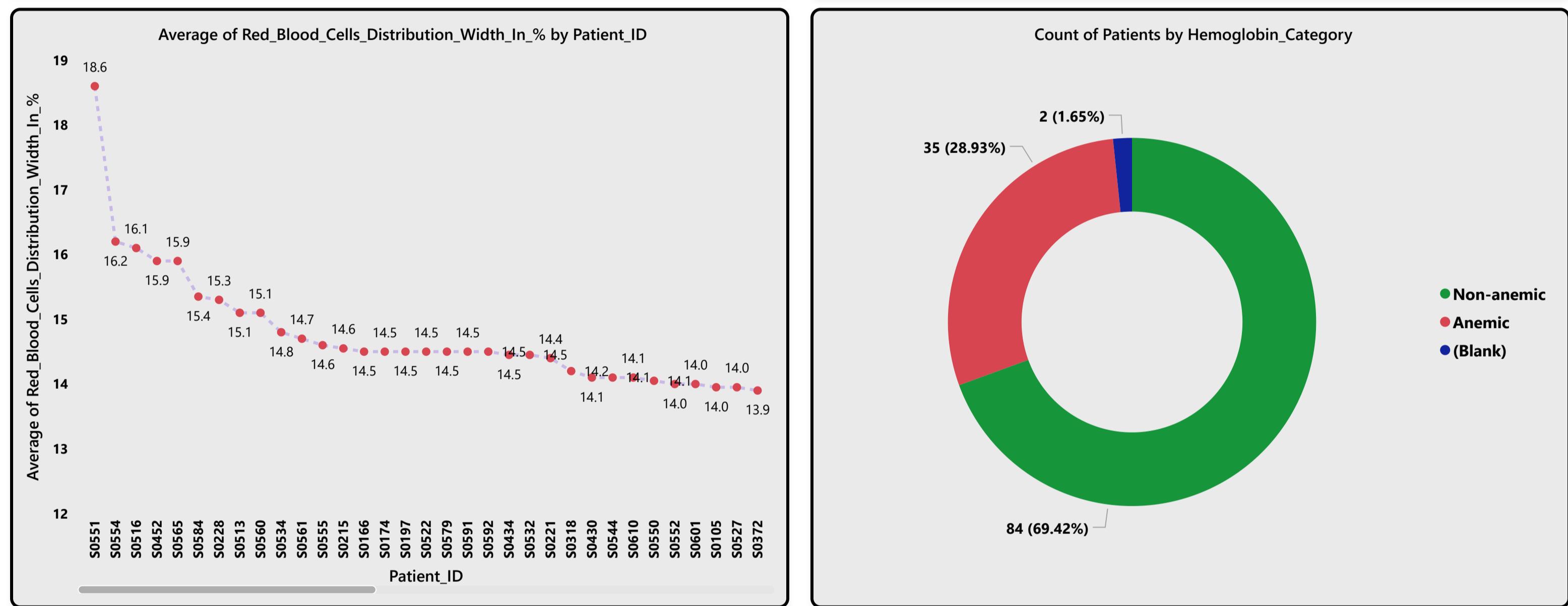
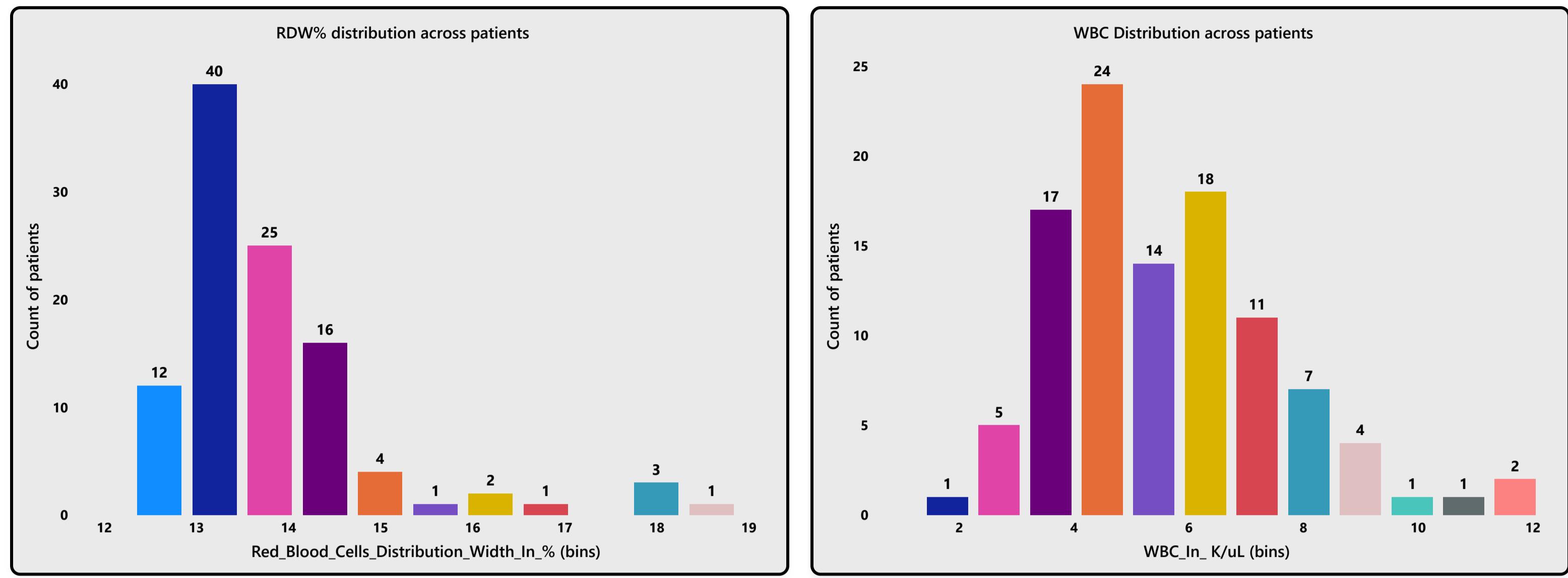


Blood and Clotting Biomarkers Analysis Dashboard

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune...	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medications category	Patient Medication info for B...	Blood Pressure Monitoring	Advanced Diabetic Retinopat...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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Mean Platelet Count	Mean WBC	Mean Hemoglobin	Mean Hemtocrin%	Mean RDW	% of Patients with High RDW	% Anemic patients
224.78	5.92	13.16	39.01	14.02	14.29	31.17



Hematologic Inflammatory Risk profiling of Patients						
Patient_ID	RDW Z-Score	WBC Z-Score	Platelets Z-Score	CRP Z-Score	Hemoglobin Z-Score Inverted	Hematologic_Inflammatory_Risk_Score
S0030	-0.68	-1.03	-0.60	-0.51	-0.51	-3.32
S0033	-0.72	-0.16	-1.38	-0.27	-1.14	-3.68
S0064	-0.81	-0.36	-1.37	-0.12	-0.35	-3.01
S0068	-0.55	0.60	1.19	-0.47	0.84	1.61
S0078	-0.55	-0.97	-1.66	-0.63	-0.86	-4.68
S0105	-0.06	0.22	0.83	-0.10	0.25	1.13
S0153	-0.37	-1.03	-0.77	-0.32	0.41	-2.08
S0166	0.42	0.70	0.03	-0.51	-0.70	-0.06
S0174	0.42	0.50	-0.22	-0.51	-0.27	-0.07
S0187	-1.03	0.45	-0.25	-0.12	0.01	-0.95
S0197	0.42	-0.31	-0.25	0.67	0.53	1.06
S0215	0.47	-1.08	0.68	0.26	1.56	1.89
S0221	0.33	-0.11	0.05	0.09	0.61	0.97
S0228	1.13	-0.75	-0.72	-0.36	0.05	-0.65
S0233	-0.19	-0.80	-1.31	-0.13	-0.86	-3.30
S0264	-0.33	1.06	-1.06	-0.58	1.32	0.41
S0292	-1.16	0.35	-0.10	-0.47	0.05	-1.33
S0296	-0.86	-0.03	0.61	-0.51	-0.19	-0.98
S0301	-0.15	0.60	0.30	-0.28	1.48	1.95
S0308	-0.99	0.04	-0.20	-0.38	0.05	-1.47
S0314	-0.46	0.40	0.56	-0.57	0.25	0.18
S0318	0.16	1.72	2.18	1.57	0.01	5.63
S0372	-0.11	-0.11	-0.32	-0.26	-2.05	-2.85
S0411	-0.55	0.09	-0.10	-0.57	-0.74	-1.87
S0430	0.07	0.55	0.41	-0.02	-1.06	-0.05
S0434	0.38	-1.69	-2.35	1.43	1.36	-0.86
S0452	1.66	0.75	1.66	-0.41	2.12	5.77

Blood Brain Barrier Biomarkers Analysis Dashboard

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune..	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medication's category	Patient Medication info for ...	Blood Pressure Monitori...	Ophthalmological Testing	Advanced Diabetic Retinopa...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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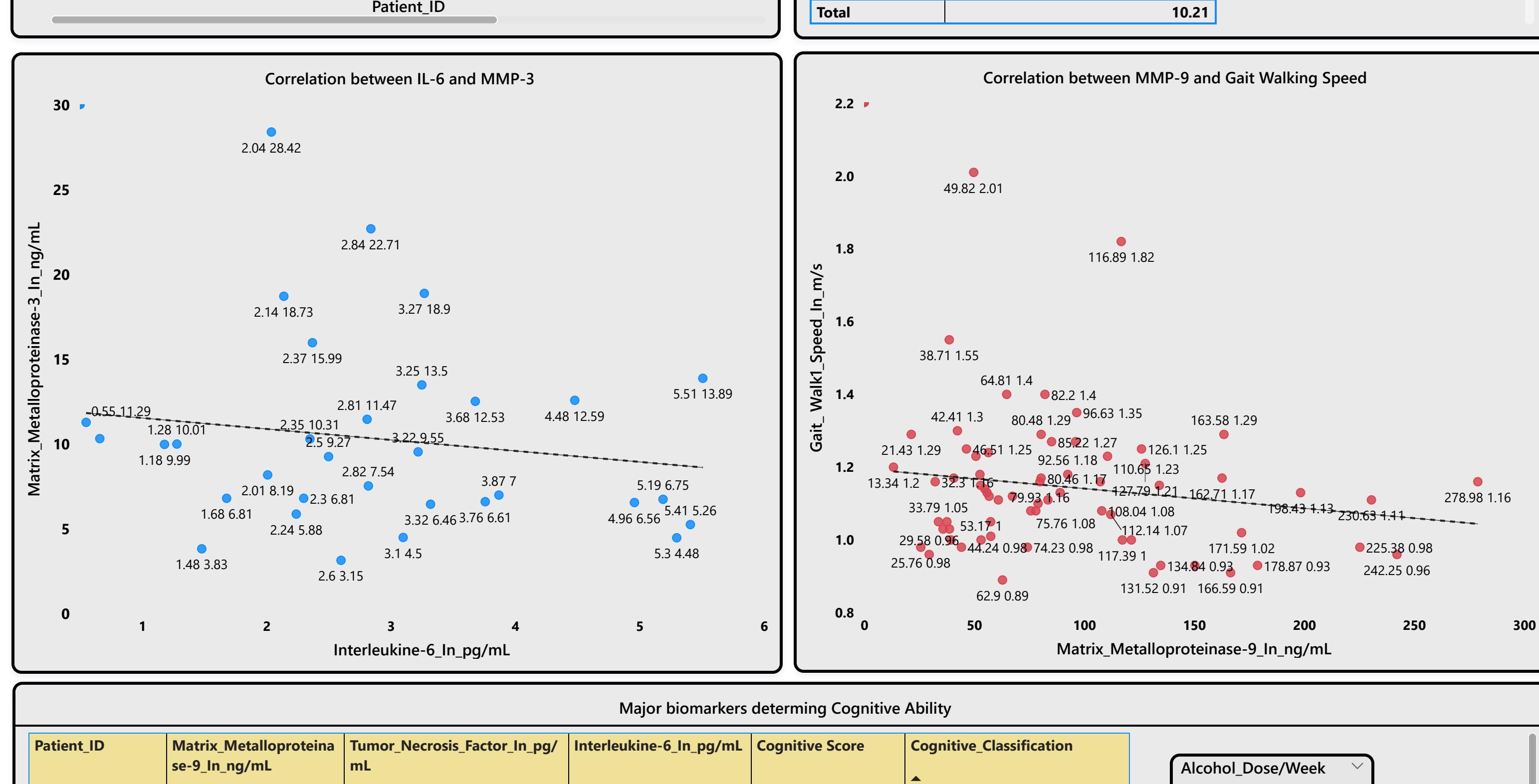
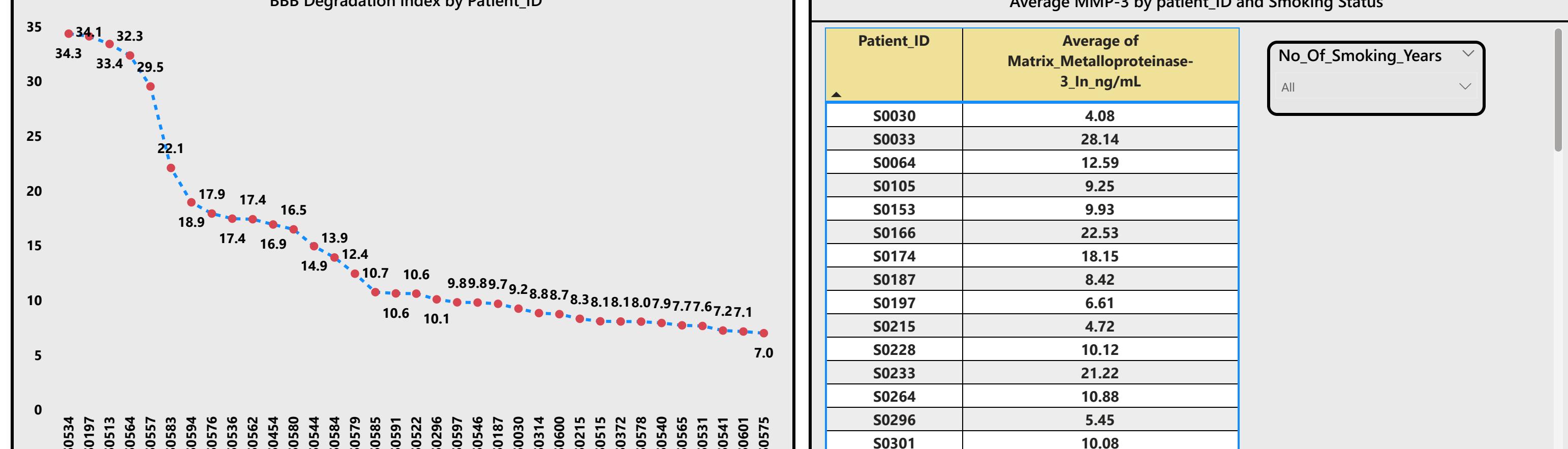
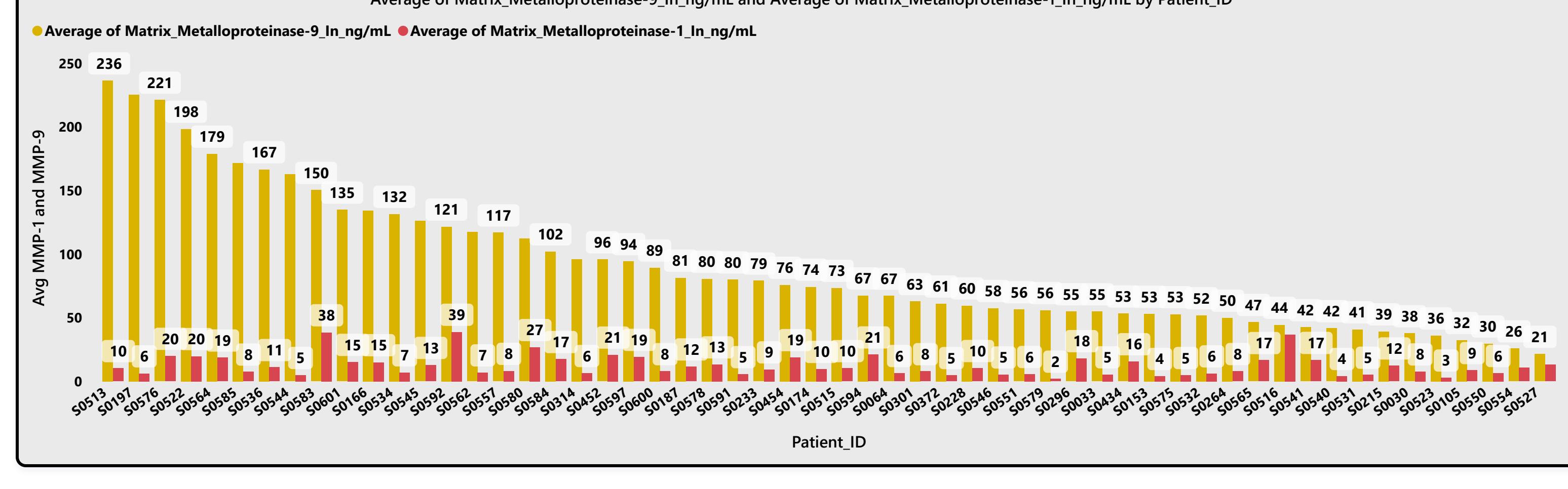
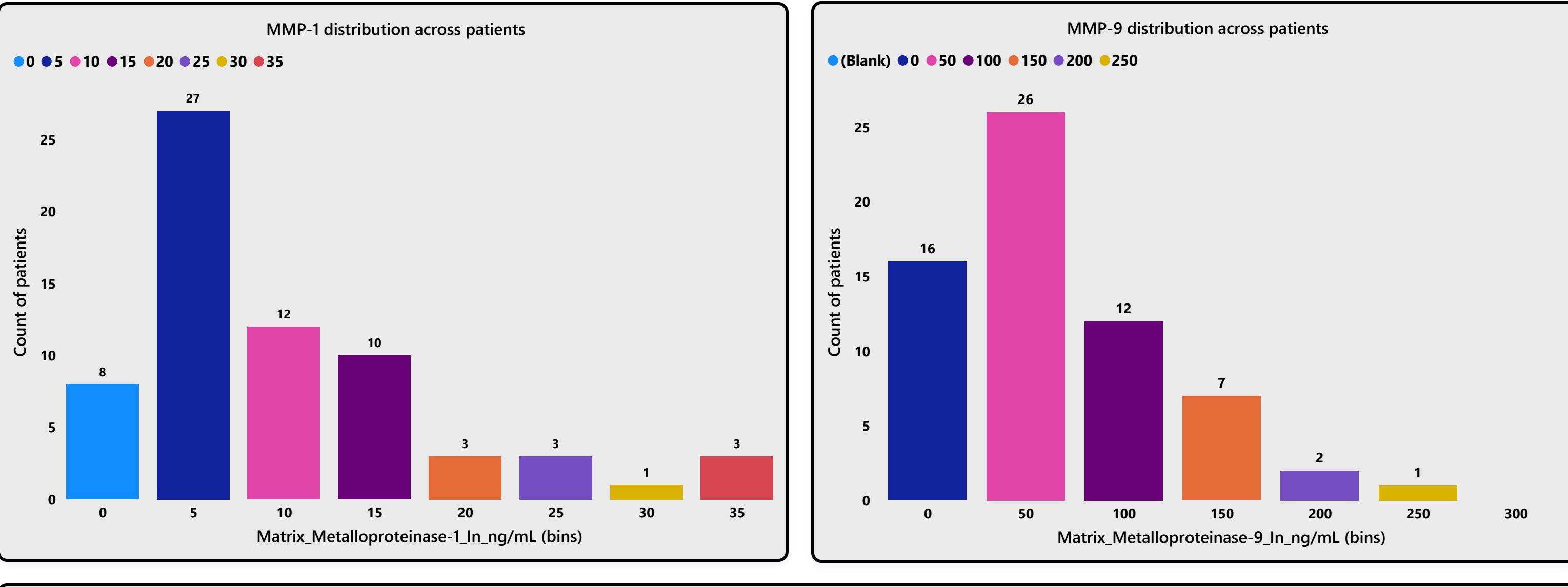
Age_Catagory: All | Gender: All | BP_Catagory: All | HbA1c_Catagory: All | Cognitive_Classification: All

% of Patients with High MMP-1
72.73

% of Patients with High MMP-3
71.43

% of Patients with High MMP-9
27.27

BBB Degradation Index
8.91



Major biomarkers determining Cognitive Ability

Patient_ID	Matrix_Metalloproteinase-9_In_ng/mL	Tumor_Necrosis_Factor_In_pg/mL	Interleukine-6_In_pg/mL	Cognitive Score	Cognitive_Classification
S0030		2.40	0.95	6	Mild Cognitive Decline
S0033		1.90	8.48	5	Mild Cognitive Decline
S0064	67.11	1.70	4.48	4	Mild Cognitive Decline
S0068		1.80	2.96	5	Mild Cognitive Decline
S0078		1.00	1.74	5	Mild Cognitive Decline
S0078		1.40		4	Mild Cognitive Decline
S0153	92.56	1.20	2.35	6	Mild Cognitive Decline
S0166		1.30	2.49	5	Mild Cognitive Decline
S0166	134.21	1.40		4	Mild Cognitive Decline
S0187	80.48	2.00		5	Mild Cognitive Decline
S0301	62.90	2.00	3.58	6	Mild Cognitive Decline
S0308		0.80	1.27	6	Mild Cognitive Decline
S0314		1.20	2.34	4	Mild Cognitive Decline
S0314	96.13	2.00		4	Mild Cognitive Decline
S0318		22.80	5.42	6	Mild Cognitive Decline
S0372	61.02	1.30		6	Mild Cognitive Decline
S0411		1.10	2.30	6	Mild Cognitive Decline
S0430		1.60	4.43	5	Mild Cognitive Decline
S0434	53.17	27.60	2.75	6	Mild Cognitive Decline
S0452	83.56	1.50		5	Mild Cognitive Decline

Hormone Repair Biomarkers analysis Dashboard

Introduction	Patient Medical History	Glucose and Lipid...	Inflammation and...	Blood and Clotting...	Blood Brain Barrier.	Hormone and Repair Biomar...	Medications category	Patient Medication inf...	Blood Pressure Monit...	Ophthalmological Testing	Advanced Diabetes Management	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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Inflammation, Hormone & Repair Biomarkers (Patient-Level)

Patient Medications Dashboard

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune.	Blood and Clotting biomark...	Blood Brain Barrier...	Hormone and Repair...	Medications category	Patient Medication info f...	Blood Pressure Monitor...	Advanced Diabetic Retinop...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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Count of patients with their Medication Category

Medication Category	Count of patients
+	20
⊕ Ace Inhibitors	1
⊕ Ace Inhibitors, Beta Blockers, CA ++ Blockers, Oral Hypoglycemic	1
⊕ Ace Inhibitors, Oral Hypoglycemic	2
⊕ Anticoagulants, Antihyperlipidemic, Statins, Arbs, Beta Blockers, CA ++ Blockers, Oral Hypoglycemic	1
⊕ Anticoagulants, Antihyperlipidemic, Statins, Arbs, Beta Blockers, Diuretics	1
⊕ Antihyperlipidemic, Ace Inhibitors, Beta Blockers, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Ace Inhibitors, Diuretics, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Arbs, Diuretics, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, CA ++ Blockers	1
⊕ Antihyperlipidemic, Statins	7
⊕ Antihyperlipidemic, Statins, Ace Inhibitors	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Beta Blockers, CA ++ Blockers, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Beta Blockers, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Beta Blockers, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Diuretics, CA ++ Blockers, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Diuretics, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Diuretics, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Ace Inhibitors, Oral Hypoglycemic	3
⊕ Antihyperlipidemic, Statins, Arbs, Diuretics, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Beta Blockers	1
⊕ Antihyperlipidemic, Statins, Beta Blockers, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, CA ++ Blockers	1
⊕ Antihyperlipidemic, Statins, Diuretics, CA ++ Blockers, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Diuretics, CA ++ Blockers, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Insulin, Oral Hypoglycemic	1
⊕ Antihyperlipidemic, Statins, Oral Hypoglycemic	2
⊕ Antiplatelets	3
⊕ Antiplatelets, Ace Inhibitors	1
⊕ Antiplatelets, Ace Inhibitors, Beta Blockers	1
⊕ Antiplatelets, Ace Inhibitors, Insulin	1
⊕ Antiplatelets, Ace Inhibitors, Insulin, Oral Hypoglycemic	1
⊕ Antiplatelets, Anticoagulants, Antihyperlipidemic, Ace Inhibitors, Beta Blockers, Diuretics, Insulin, Oral Hypoglycemic	1
Total	77

Visit_No



Medications for Diabetic and Hypertension Patients

Introduction	Patient Medical History	Glucose and Lipid..	Inflammation and...	Blood and Clotti...	Blood Brain Barrie..	Hormone and Repai..	Medications categ...	Patient Medication...	Blood Pressur e...	Advanced Diabe...	Walking Tests	Cognitive Testing	Cognitive Inter...	Cognitive Trend..	Conclusion
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Visit_No	Patient_ID	HbA1cCategory	BPCategory
All	All	All	All

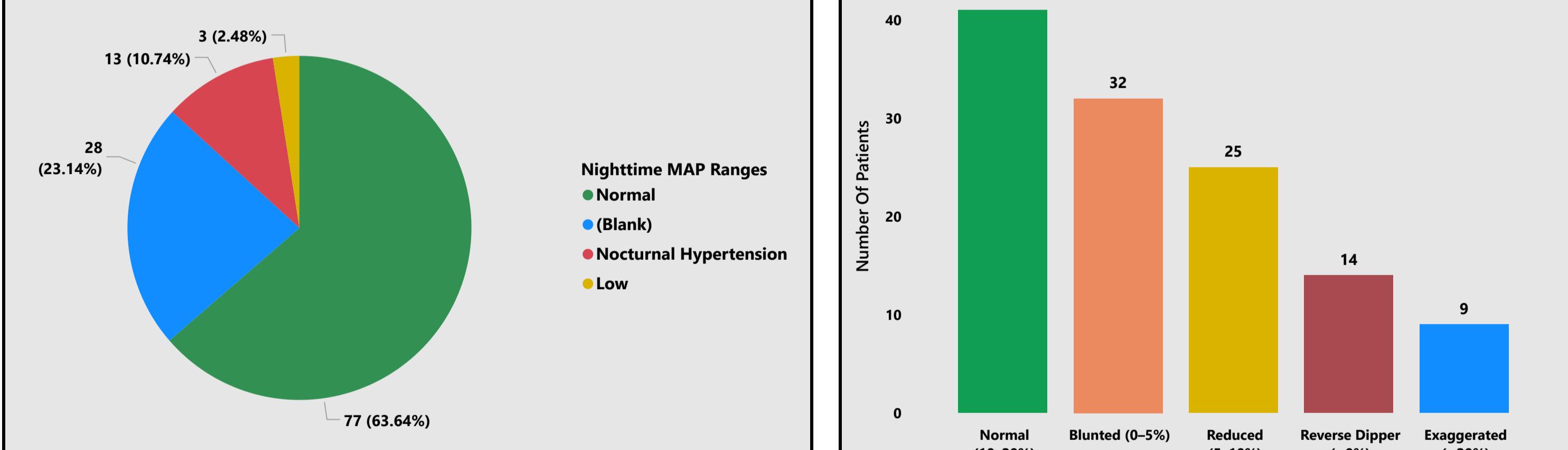
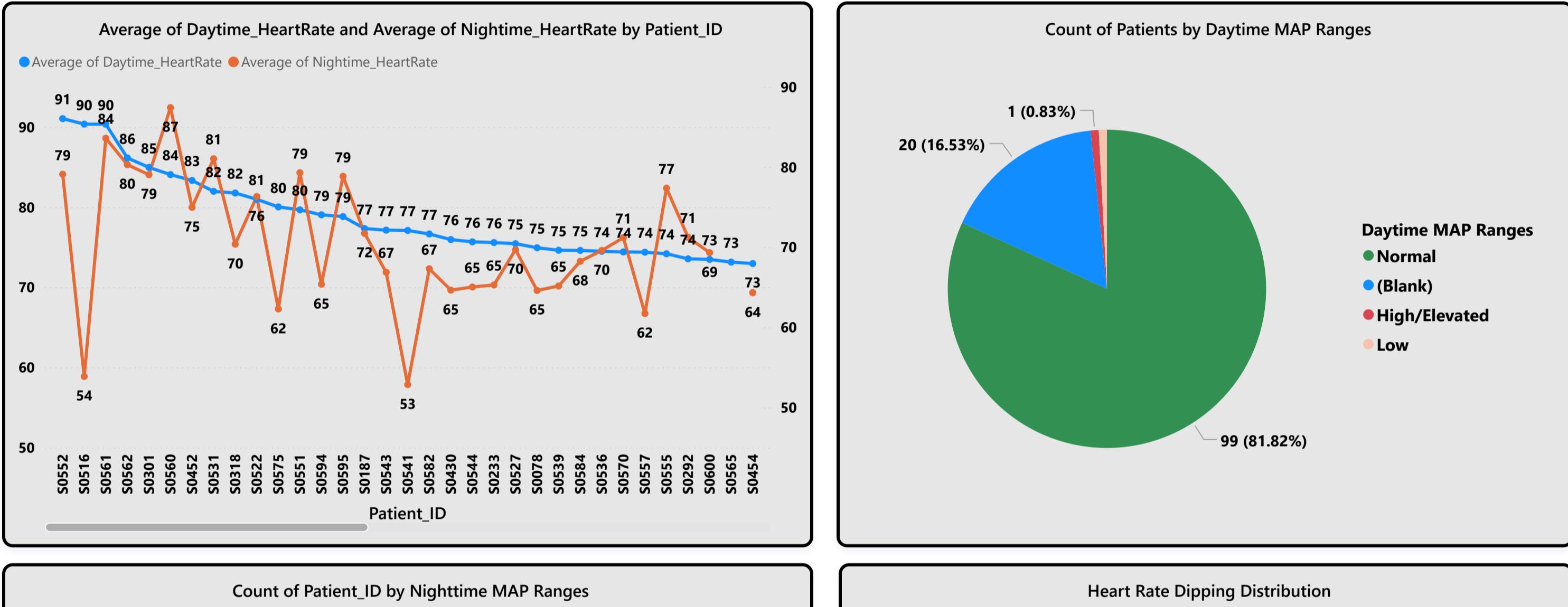
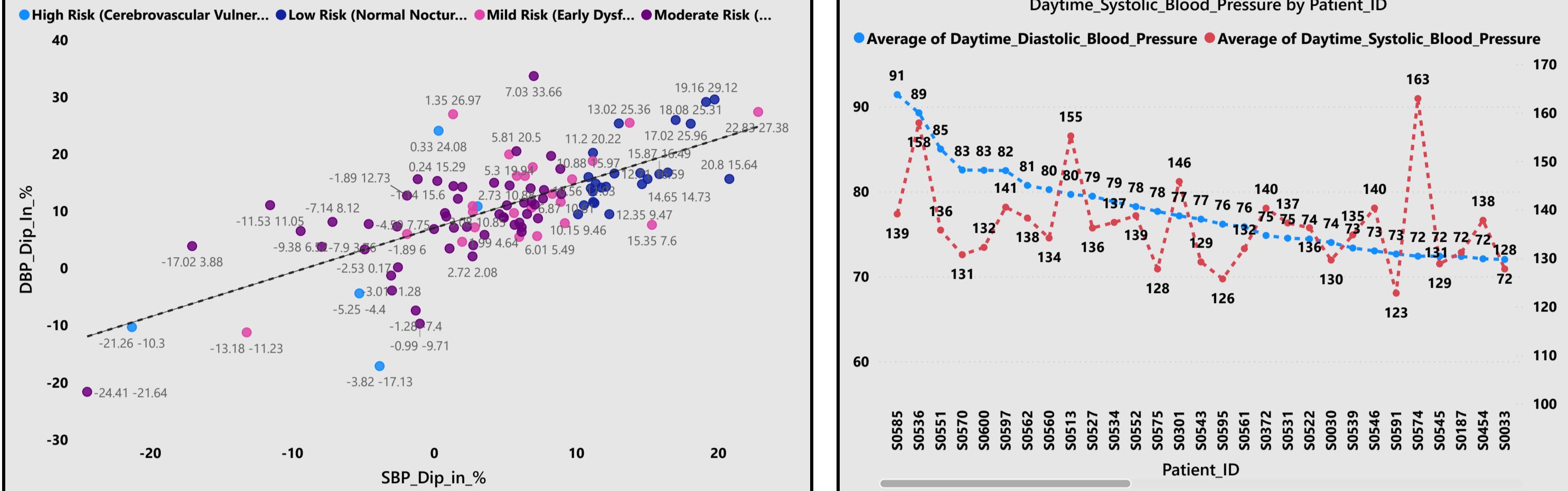
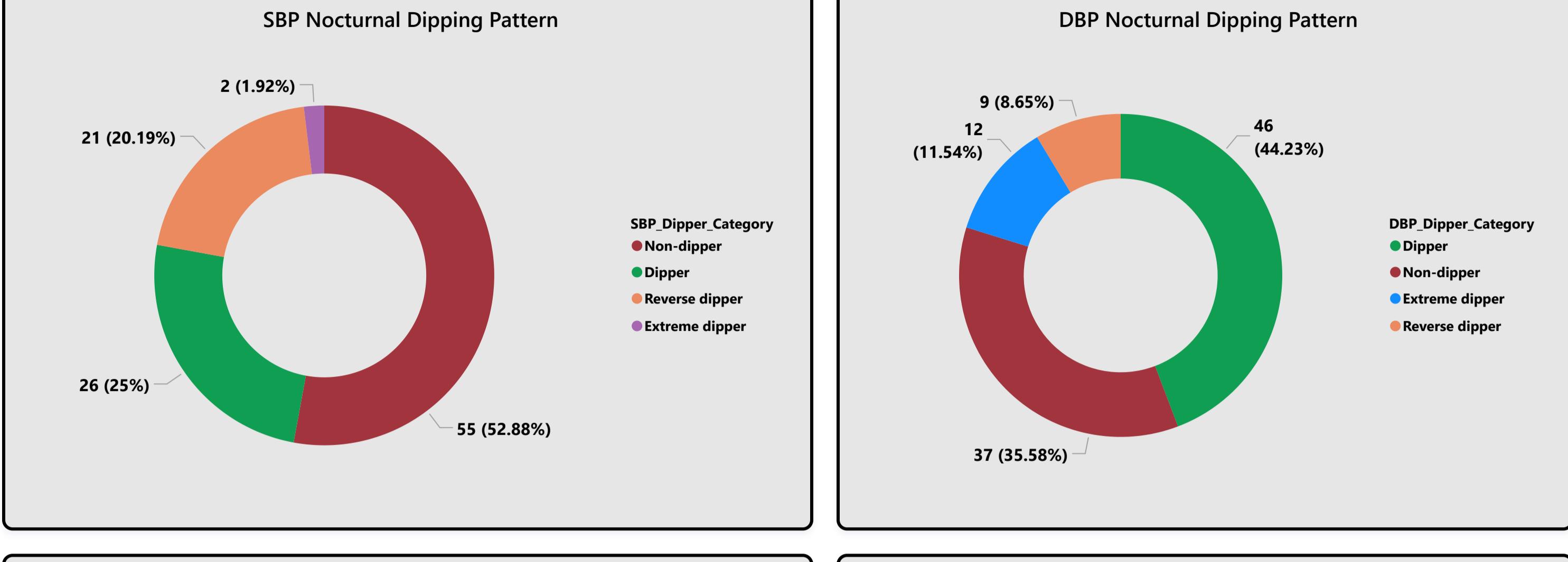
Patient Medication Count for Diabetes and Hypertension Patients

Patient_ID	Visit_No	HbA1cCategory	BPCategory	Medication_Count
S0030	8	Prediabetic stage	Elevated BP	1
S0030	2	Prediabetic stage	Hypertension Stage 1	
S0033	8	Non diabetic	Elevated BP	6
S0033	2	Non diabetic	Hypertension Stage 1	3
S0064	2	Non diabetic	Hypertension Stage 1	1
S0068	2	Prediabetic stage	Normal BP	1
S0078	2	Non diabetic	Hypertension Stage 1	1
S0078	8	Non diabetic	Hypertension Stage 1	1
S0105	2	Prediabetic stage	Hypertension Stage 1	22
S0105	8	Prediabetic stage	Hypertension Stage 2	21
S0153	2	Prediabetic stage	Elevated BP	6
S0153	8	Non diabetic	Hypertension Stage 2	4
S0166	2	Non diabetic	No Data	0
S0166	8	Non diabetic	Normal BP	1
S0174	2	Non diabetic	No Data	2
S0174	8	Non diabetic	No Data	4
S0187	8	Non diabetic	Elevated BP	5
S0187	2	Non diabetic	Hypertension Stage 1	1
S0197	2	Prediabetic stage	Normal BP	3
S0215	2	Non diabetic	Hypertension Stage 1	1
S0215	8	Non diabetic	Hypertension Stage 1	0
S0221	2	Prediabetic stage	Elevated BP	4
S0228	2	Non diabetic	Hypertension Stage 1	2
S0228	8	Prediabetic stage	Hypertension Stage 1	5
S0233	2	Non diabetic	Elevated BP	1
S0233	8	Non diabetic	Hypertension Stage 2	8
S0264	8	Diabetes	Hypertension Stage 2	20
S0264	2	Prediabetic stage	No Data	9
S0292	2	Diabetes	Hypertension Stage 1	6
S0296	2	Diabetes	Elevated BP	5
S0296	8	Diabetes	No Data	6
S0301	2	Diabetes	Hypertension Stage 1	9
S0301	8	Diabetes	Hypertension Stage 2	22
S0302	2	Diabetes	Hypertension Stage 1	11

Blood Pressure Monitoring of Patients

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune Biomarkers	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medications category	Patient Medication info for BP and...	Blood Pressure Monitoring	Ophthalmological Testing	Advanced Diabetic Retinopathy Grading	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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Avg Daytime SBP (mmHg) 131.7	Avg Nighttime SBP (mmHg) 125.1	Avg Daytime DBP (mmHg) 69.8	Avg Daytime DBP (mmHg) 62.2	Mean SBP Dipping (%) 5.0	SBP Non-Dippers (%) 62.3%	Nighttime Hypertension (%) 47.9%
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High-Risk Patients List					
Patient_ID	SBP_Dipper_Category	HR_Dip_Category	Nighttime_Systolic_Blood_Pressure	Combined_Risk_Category	
S0030	Dipper	Normal (10-20%)	118.31	Low Risk (Normal Nocturnal Pattern)	
S0030	Reverse dipper	Reduced (5-10%)	129.43	Moderate Risk (Multiple Abnormalities)	
S0033	Reverse dipper	Normal (10-20%)	137.92	Moderate Risk (Multiple Abnormalities)	
S0033	Reverse dipper	Reduced (5-10%)	125.48	Moderate Risk (Multiple Abnormalities)	
S0064	Dipper	Normal (10-20%)	116.56	Low Risk (Normal Nocturnal Pattern)	
S0068	Non-dipper	Normal (10-20%)	109.24	Mild Risk (Early Dysfunction)	
S0078	Dipper	Reduced (5-10%)	116.65	Low Risk (Normal Nocturnal Pattern)	
S0078	Non-dipper	Normal (10-20%)	131.41	Moderate Risk (Multiple Abnormalities)	
S0105	Non-dipper	Reverse Dipper (<0%)	133.38	Moderate Risk (Multiple Abnormalities)	
S0105	Reverse dipper	Normal (10-20%)	139.08	Moderate Risk (Multiple Abnormalities)	
S0153	Non-dipper	Exaggerated (>20%)	128.78	Moderate Risk (Multiple Abnormalities)	
S0153	Non-dipper	Exaggerated (>20%)	140.00	Moderate Risk (Multiple Abnormalities)	
S0166		Blunted (0-5%)		Mild Risk (Early Dysfunction)	
S0166	Non-dipper	Reduced (5-10%)	107.44	Mild Risk (Early Dysfunction)	
S0174		Blunted (0-5%)		Mild Risk (Early Dysfunction)	
S0187	Dipper	Reduced (5-10%)	102.14	Low Risk (Normal Nocturnal Pattern)	
S0187	Dipper	Reduced (5-10%)	117.92	Low Risk (Normal Nocturnal Pattern)	
S0197	Non-dipper	Normal (10-20%)	114.46	Mild Risk (Early Dysfunction)	
S0215	Non-dipper	Normal (10-20%)	135.92	Moderate Risk (Multiple Abnormalities)	
S0215	Reverse dipper	Reduced (5-10%)	164.08	High Risk (Cerebrovascular Vulnerability)	
S0221	Non-dipper	Normal (10-20%)	119.04	Mild Risk (Early Dysfunction)	
S0228	Dipper	Normal (10-20%)	117.33	Low Risk (Normal Nocturnal Pattern)	
S0228	Non-dipper	Blunted (0-5%)	123.73	Moderate Risk (Multiple Abnormalities)	
S0233	Non-dipper	Normal (10-20%)	121.89	Moderate Risk (Multiple Abnormalities)	
S0233	Non-dipper	Normal (10-20%)	132.84	Moderate Risk (Multiple Abnormalities)	
S0264		Blunted (0-5%)		Mild Risk (Early Dysfunction)	
S0264	Non-dipper	Normal (10-20%)	140.05	High Risk (Cerebrovascular Vulnerability)	
S0292	Non-dipper	Blunted (0-5%)	133.24	Moderate Risk (Multiple Abnormalities)	
S0296		Blunted (0-5%)		Mild Risk (Early Dysfunction)	
S0296	Non-dipper	Normal (10-20%)	119.56	Mild Risk (Early Dysfunction)	
S0301	Non-dipper	Reduced (5-10%)	144.62	Moderate Risk (Multiple Abnormalities)	
S0301	Reverse dipper	Blunted (0-5%)	141.78	Moderate Risk (Multiple Abnormalities)	
S0308	Reverse dipper	Reduced (5-10%)	140.50	Moderate Risk (Multiple Abnormalities)	
S0314	Non-dipper	Blunted (0-5%)	124.30	Moderate Risk (Multiple Abnormalities)	
S0314	Non-dipper	Reverse Dipper (<0%)	132.62	Moderate Risk (Multiple Abnormalities)	

Ophthalmological Analysis of Patients

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune Biomarkers	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medication's category	Patient Medication info for BP and...	Blood Pressure Monitoring	Ophthalmological Testing	Advanced Diabetic Retinopathy Grading	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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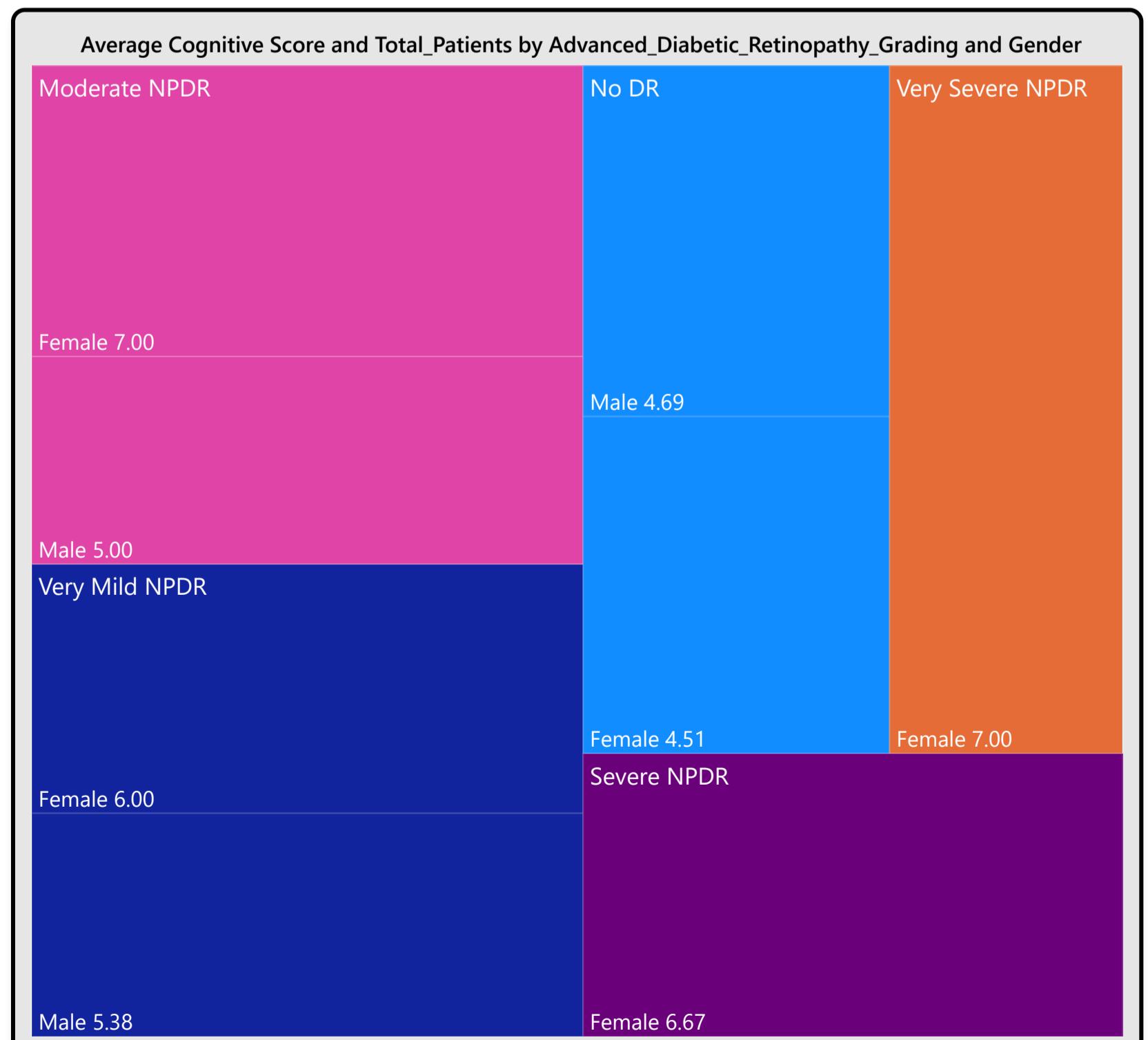
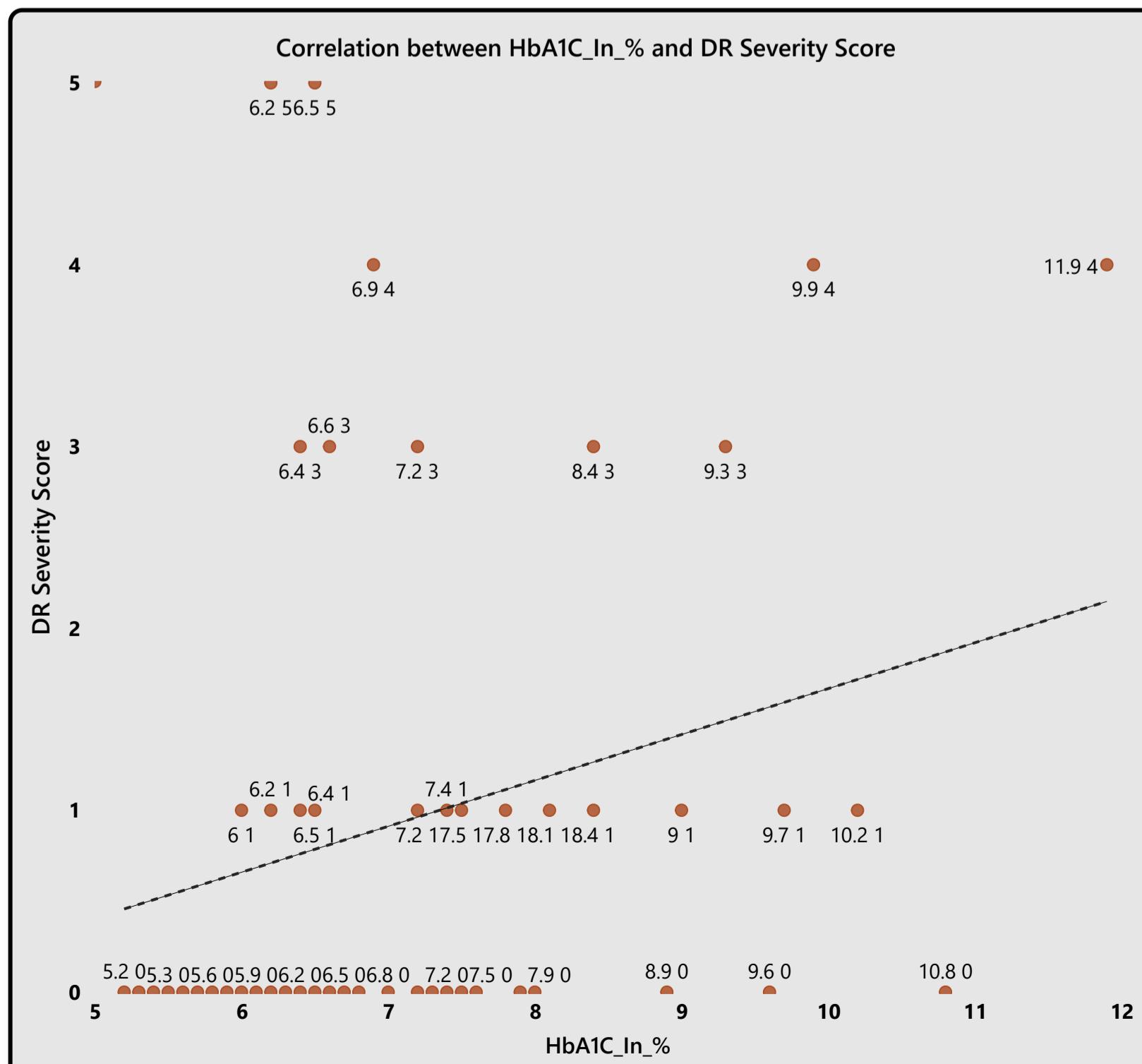
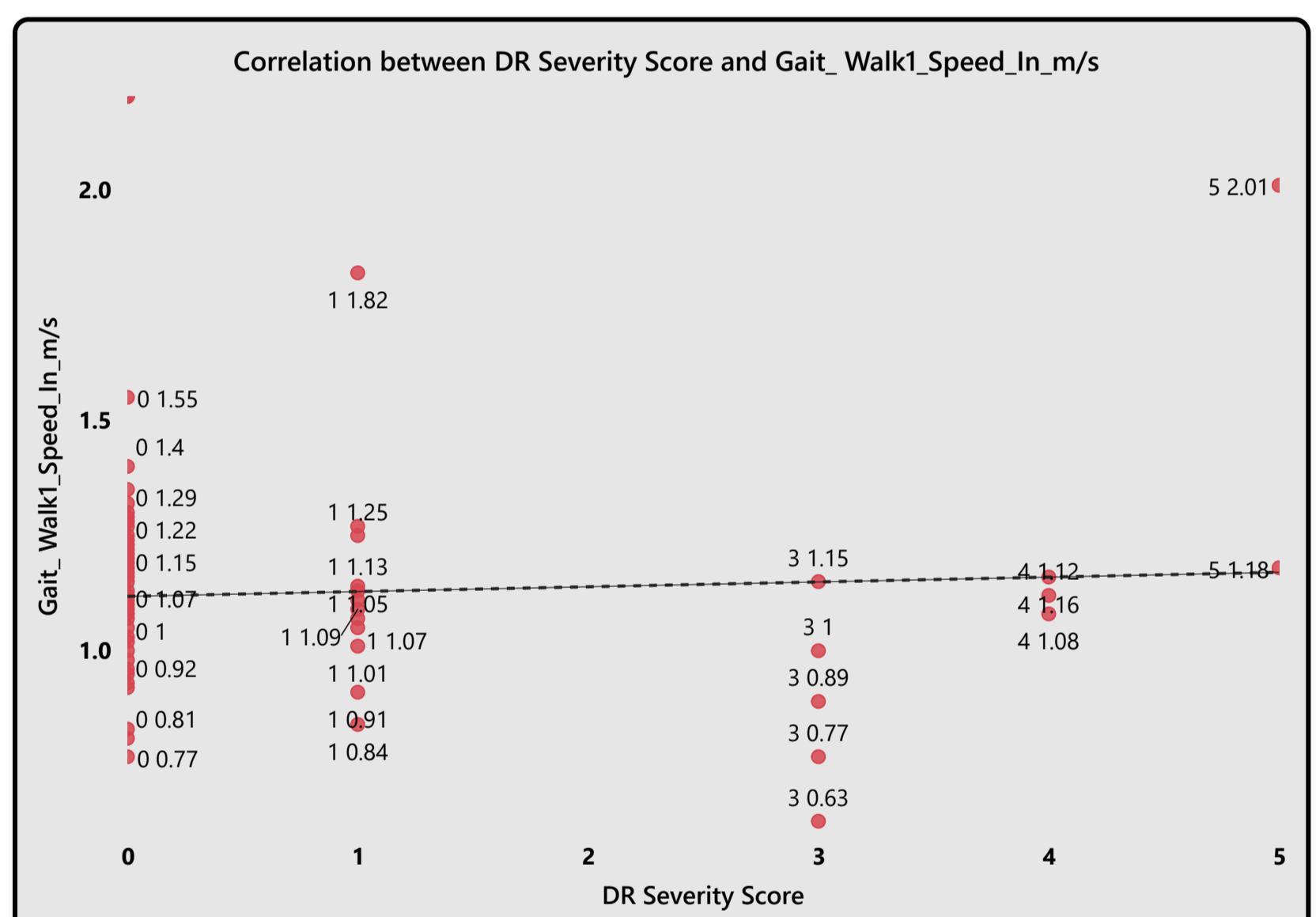
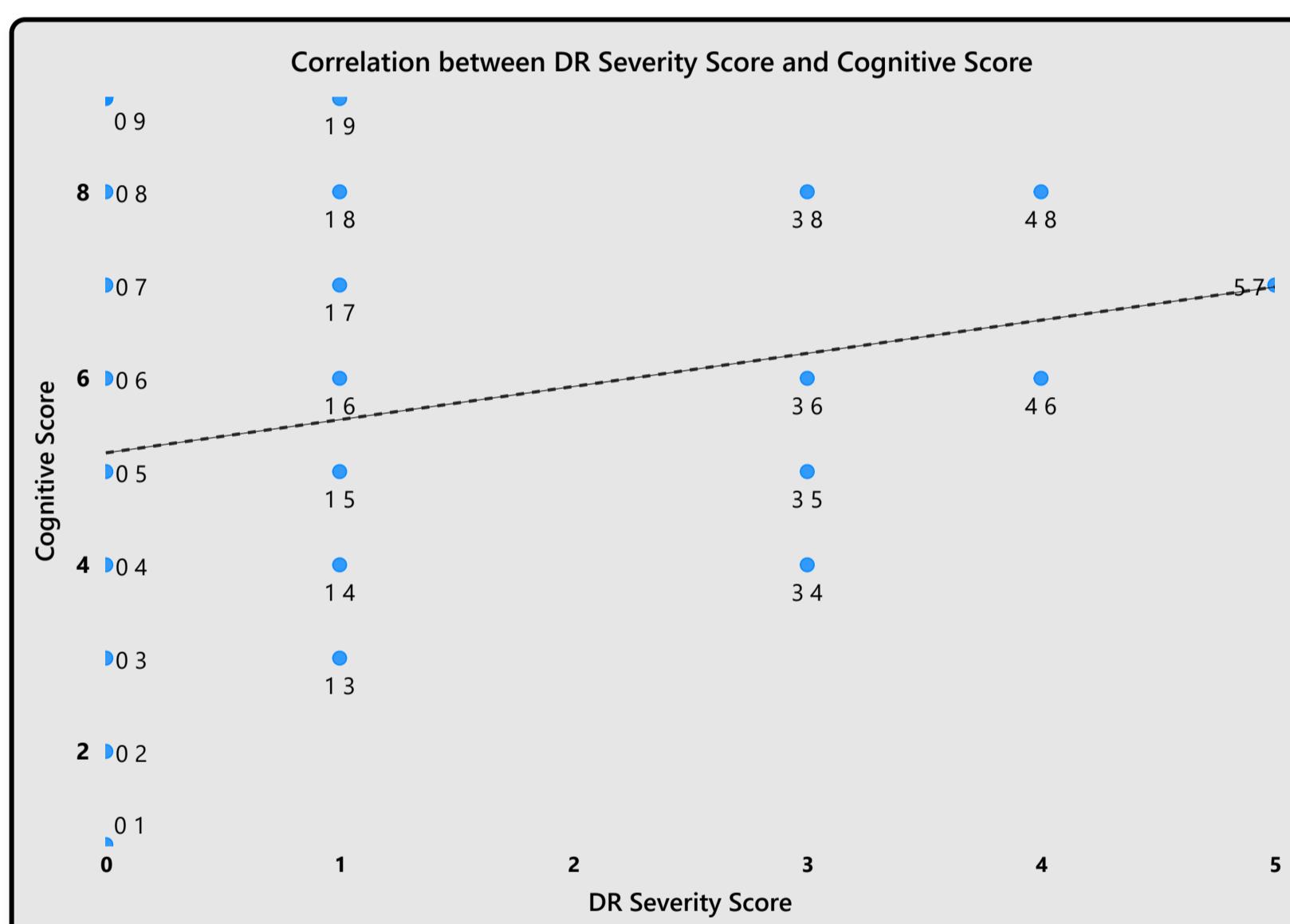
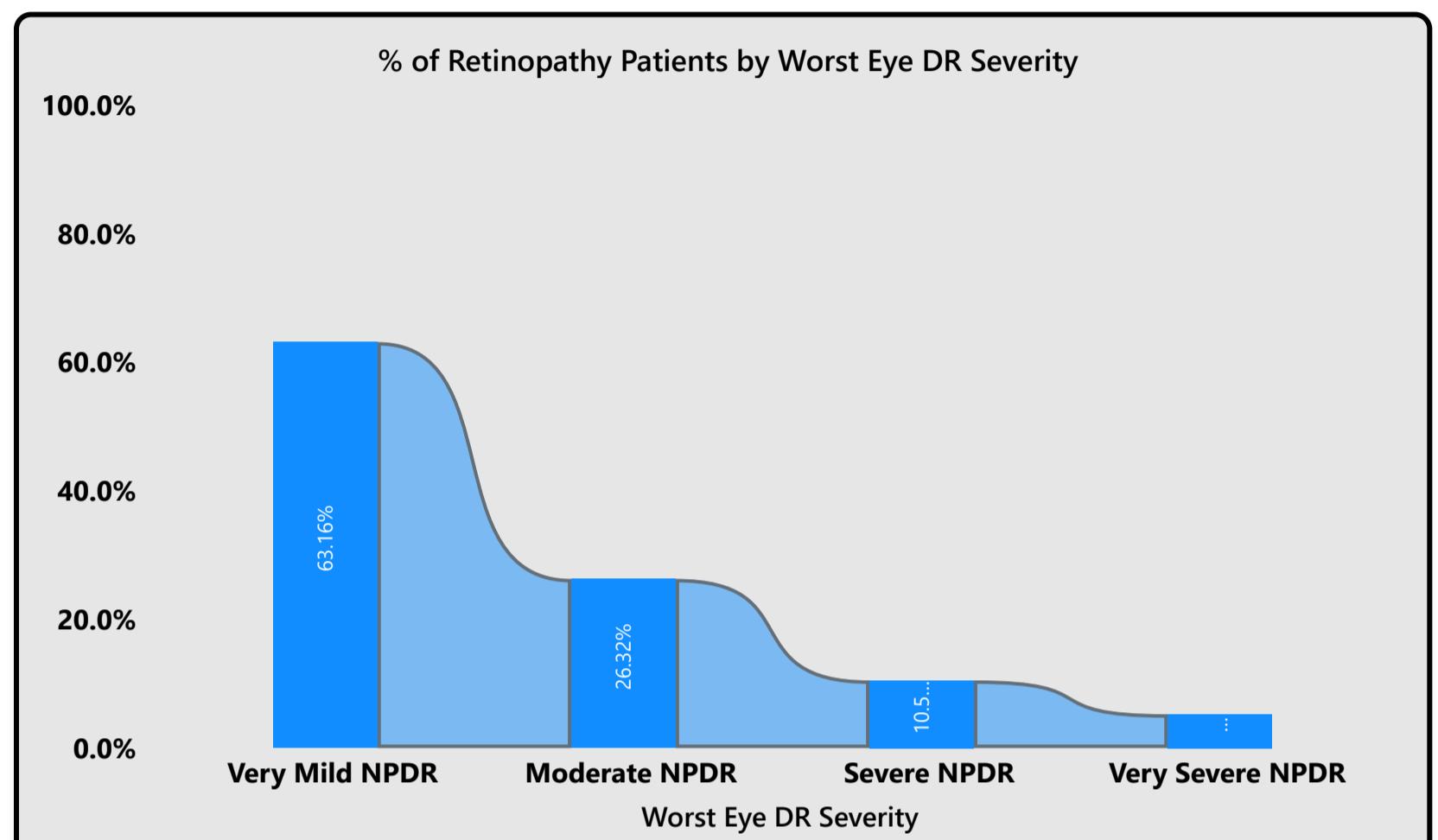
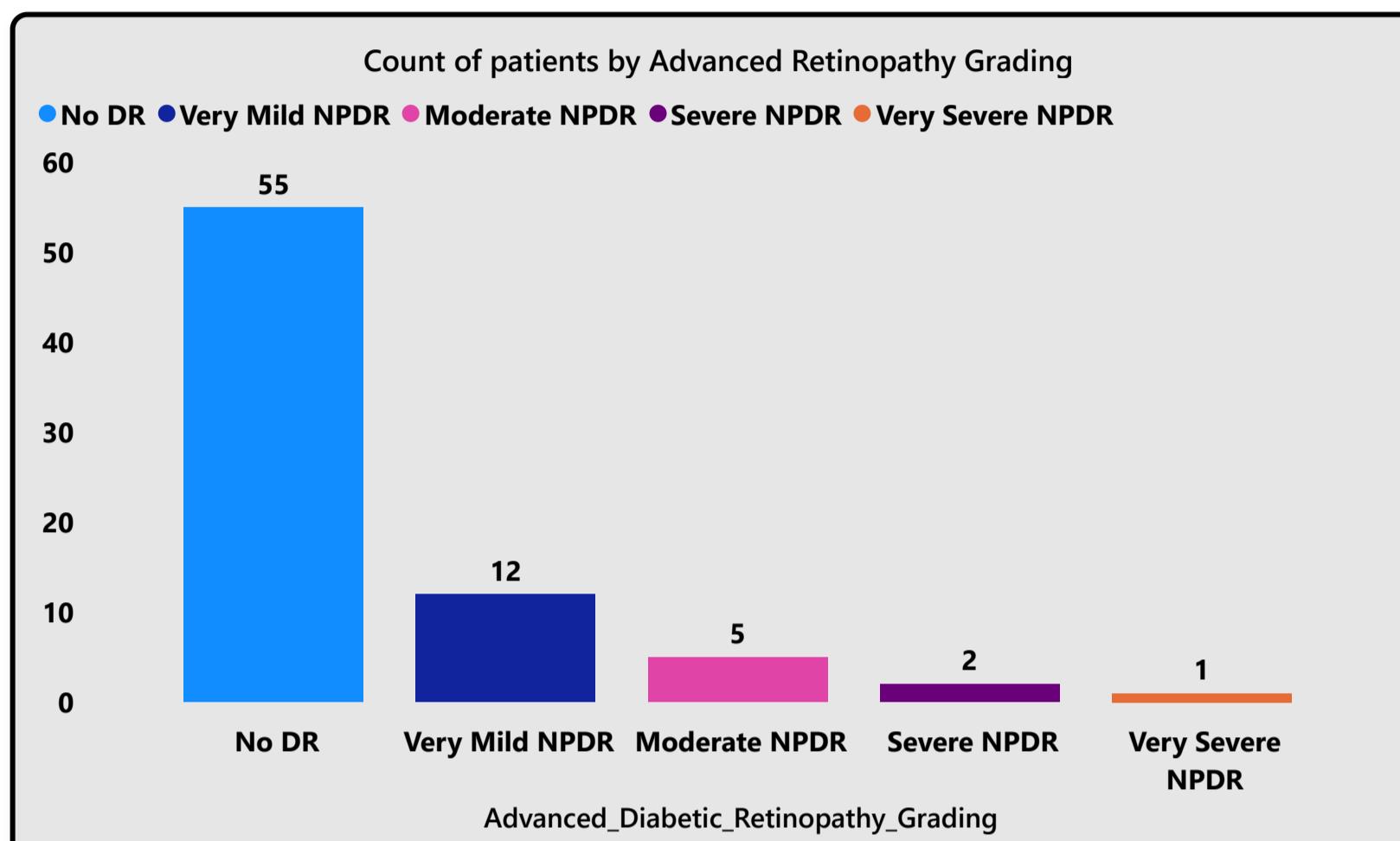
hba1c Category Age_Category

All All

Total Gradable Patients
74

% of patients with Retinopathy
0.26

Patient Count by Advanced DR
3



Advanced Retinopathy Grading

Introduction	Patient Medical History	Glucose and Lipid...	Inflammation and...	Blood and Clotti...	Blood Brain Barrie...	Hormone and Repair.	Medications categ...	Patient Medication in...	Drill Through...	Blood Pressure...	Ophthalmologic al...	Advanced Diabetic Retino...	Walking Tests	Cognitive Testing	Cognitive Interp...	Cognitive Trend..	Conclusion
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Left_Eye_Diabetic... ▾
All ▾

Right_Eye_Diabet... ▾
All ▾

Advanced_Diabeti... ▾
All ▾

Worst Eye DR Seve... ▾
All ▾

Patient_ID	Left_Eye_Diabetic_Retinopathy_Grading	Right_Eye_Diabetic_Retinopathy_Grading	Advanced_Diabetic_Retinopathy_Grading	Worst Eye DR Severity	DR Severity Score
S0030	No DR	No DR	No DR	No DR	0
S0033	No DR	No DR	No DR	No DR	0
S0064	No DR	No DR	No DR	No DR	0
S0068	No DR	No DR	No DR	No DR	0
S0078	No DR	No DR	No DR	No DR	0
S0105	No DR	No DR	No DR	No DR	0
S0153	No DR	No DR	No DR	No DR	0
S0166	No DR	No DR	No DR	No DR	0
S0174	No DR	No DR	No DR	No DR	0
S0187	No DR	No DR	No DR	No DR	0
S0197	No DR	No DR	No DR	No DR	0
S0215	No DR	No DR	No DR	No DR	0
S0221	No DR	No DR	No DR	No DR	0
S0228	No DR	No DR	No DR	No DR	0
S0233	No DR	No DR	No DR	No DR	0
S0372	No DR	No DR	No DR	No DR	0
S0411	No DR	No DR	No DR	No DR	0
S0430	No DR	No DR	No DR	No DR	0
S0434	No DR	No DR	No DR	No DR	0

Walking Tests analysis of Patients

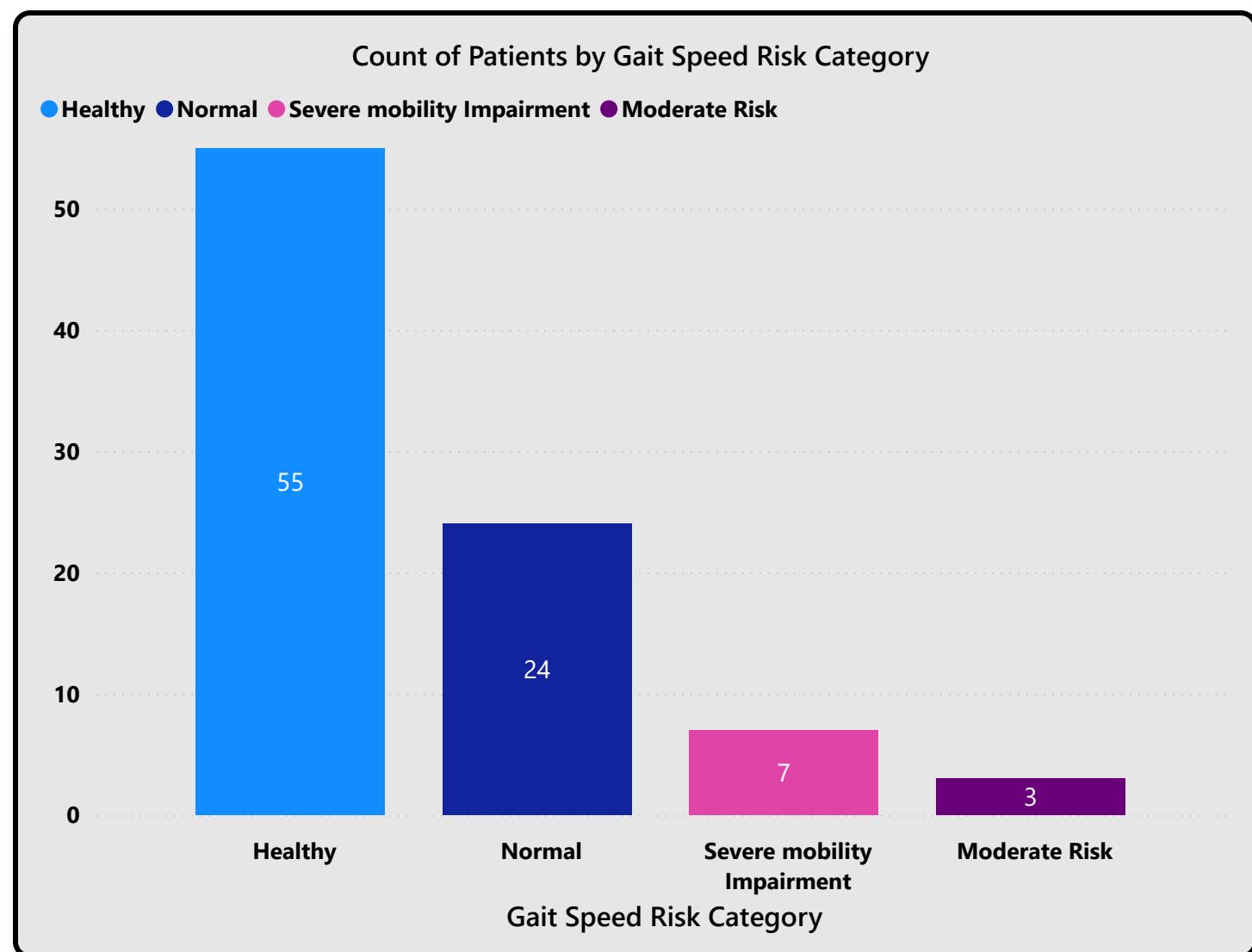
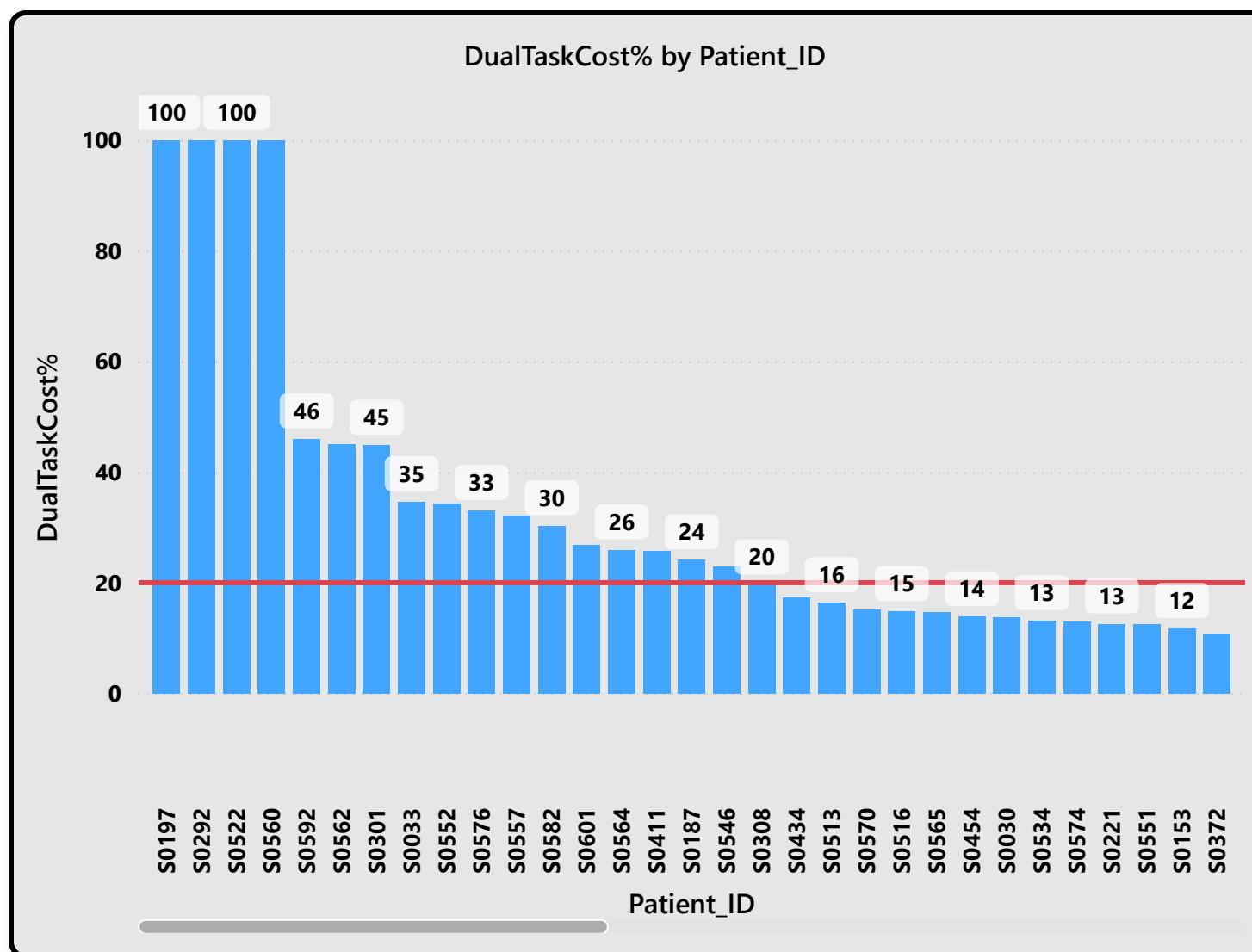
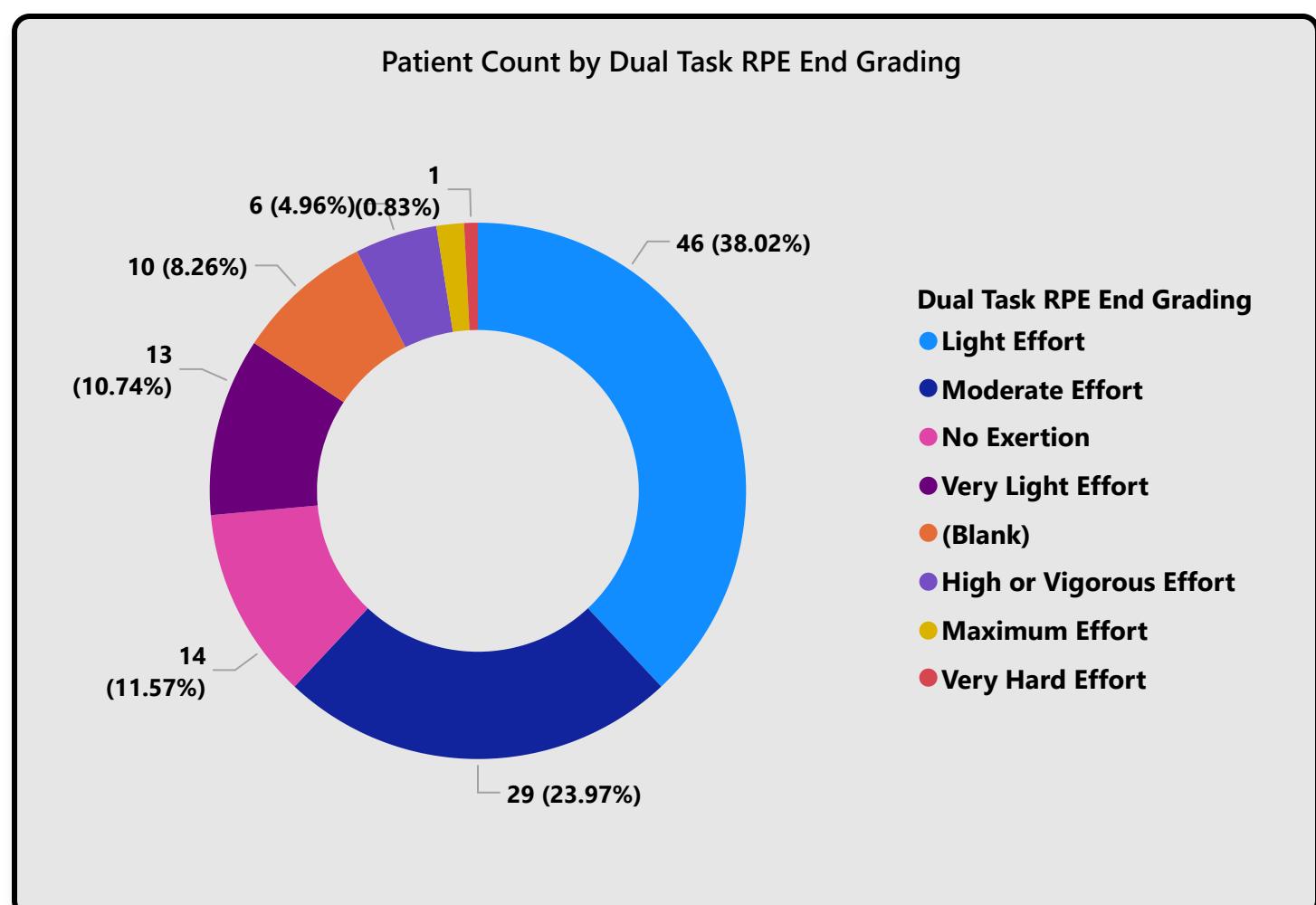
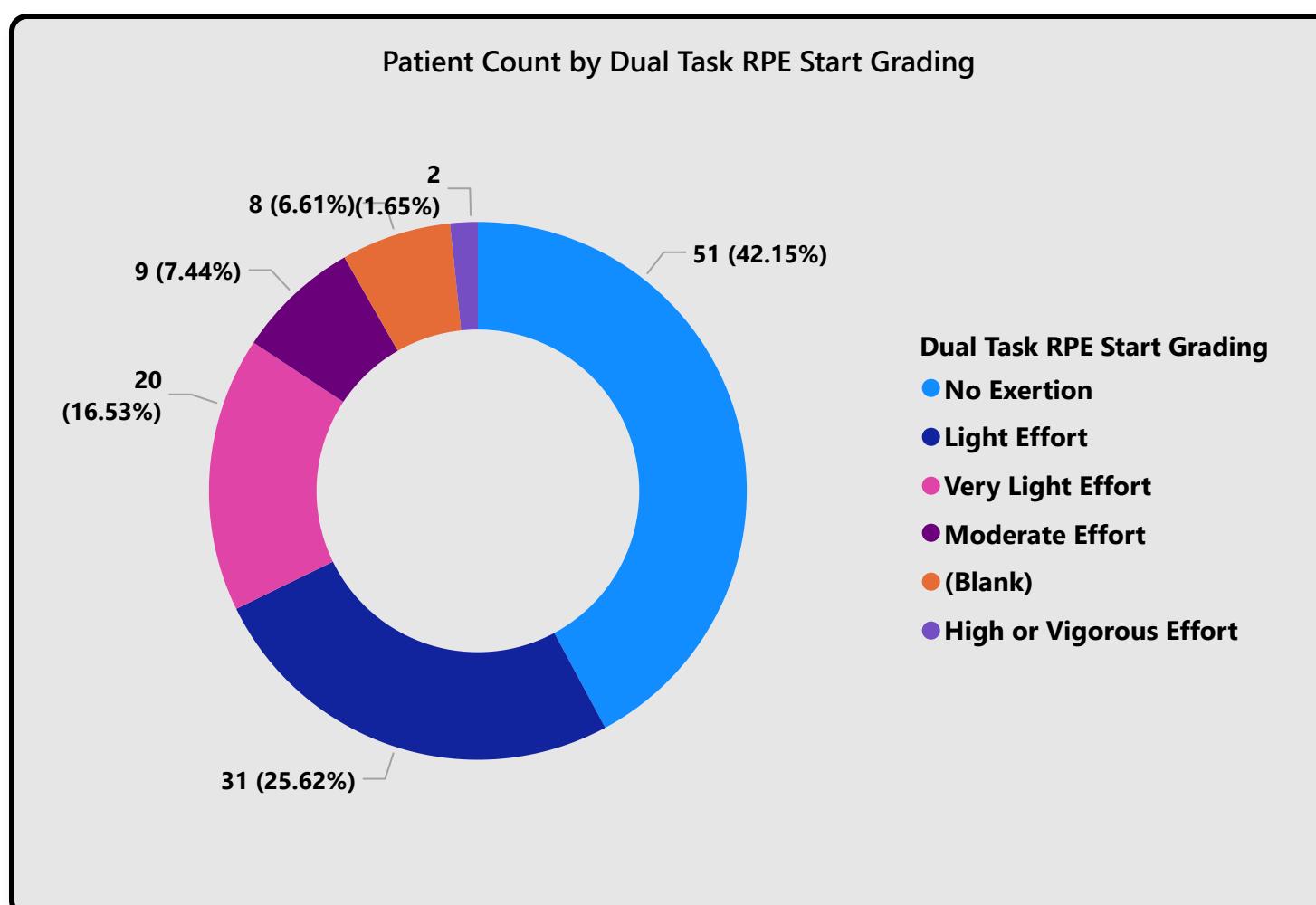
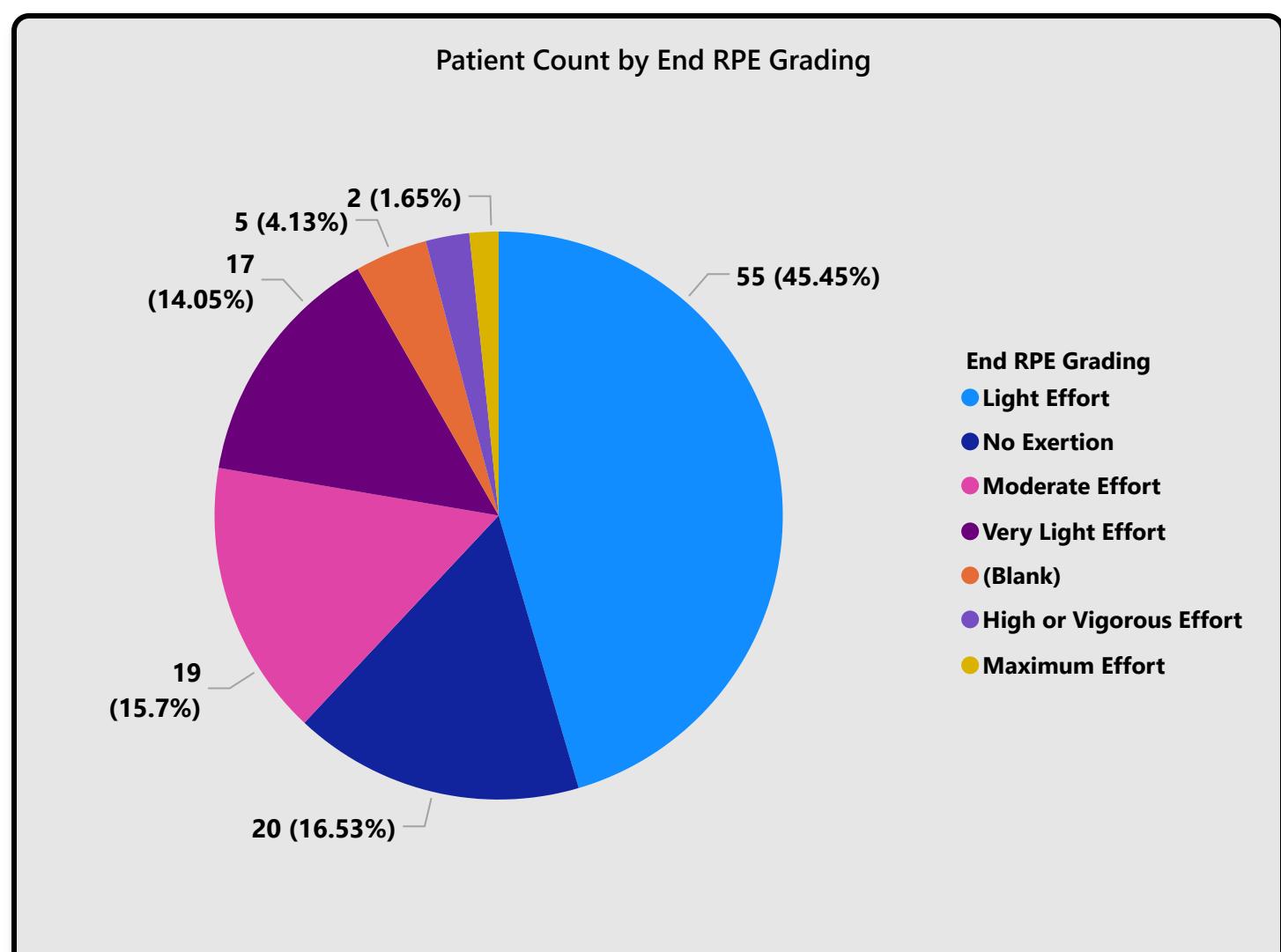
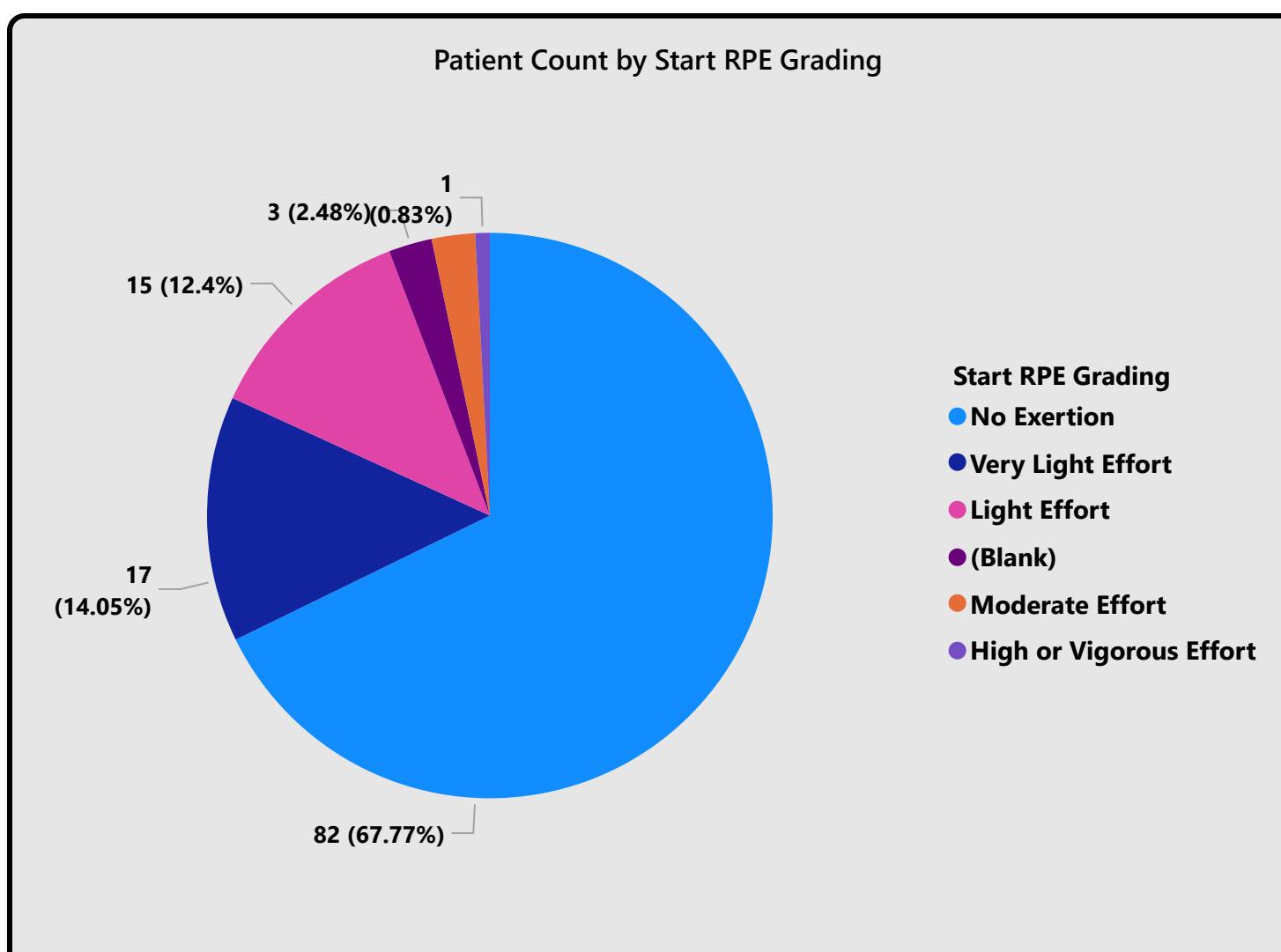
Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune...	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medication's category	Patient Medication info for B...	Drill Through Medication	Blood Pressure Monitoring	Advanced Diabetic Retinopat...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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1.11
Average Walk1 Speed

0.99
Average DualTask Walk Speed

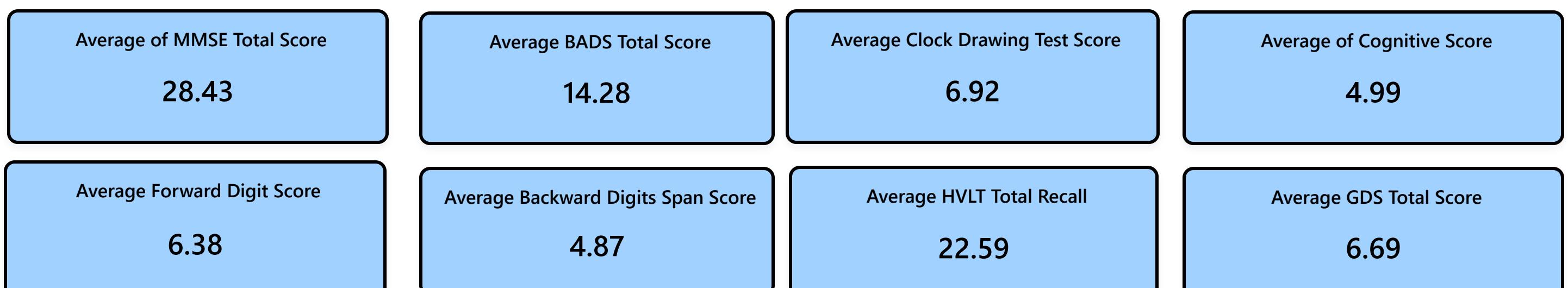
20
Patients with DualTaskCost% > 20

Visit_No

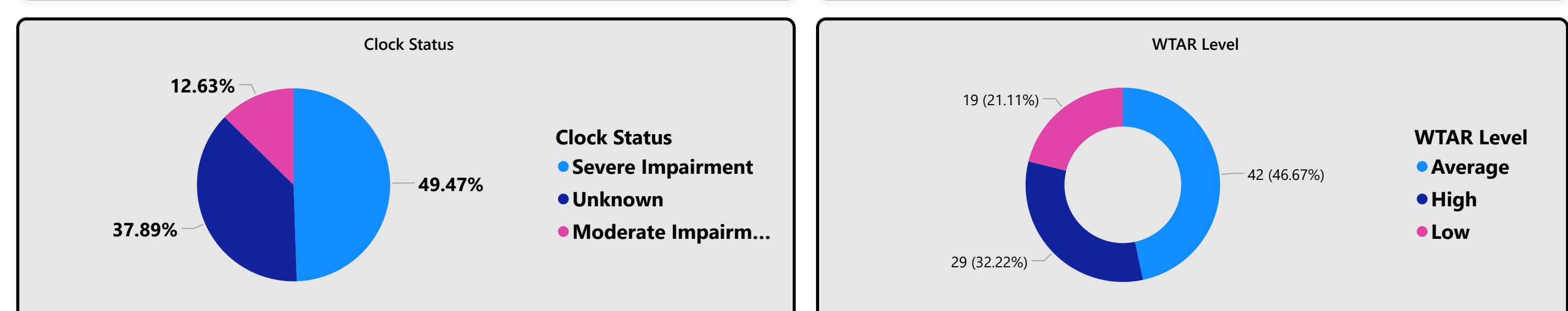
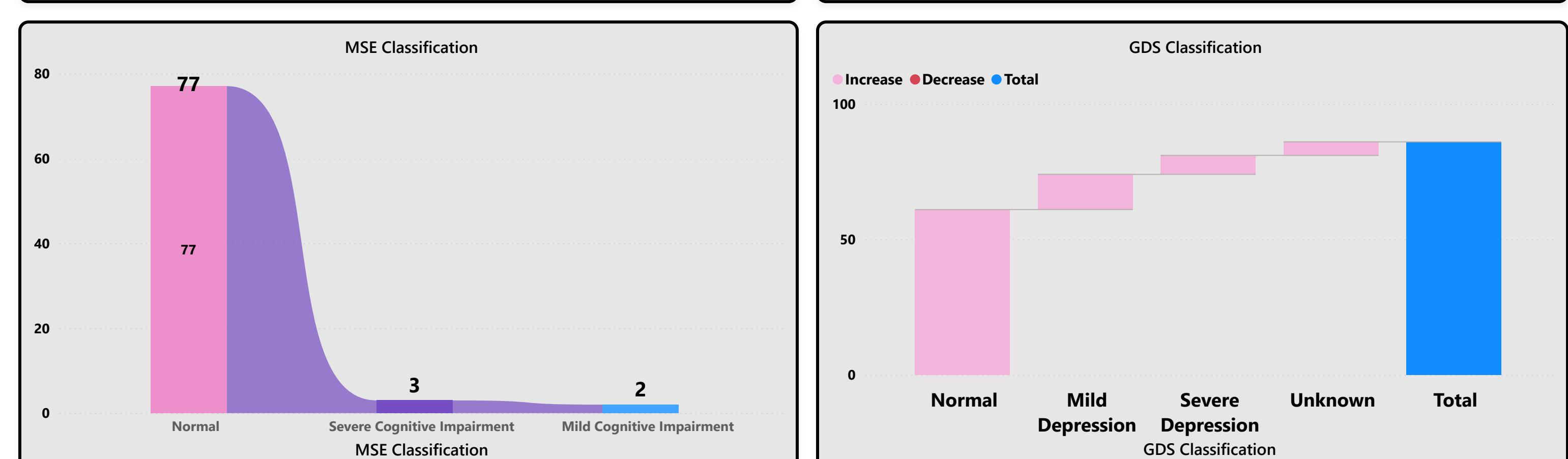
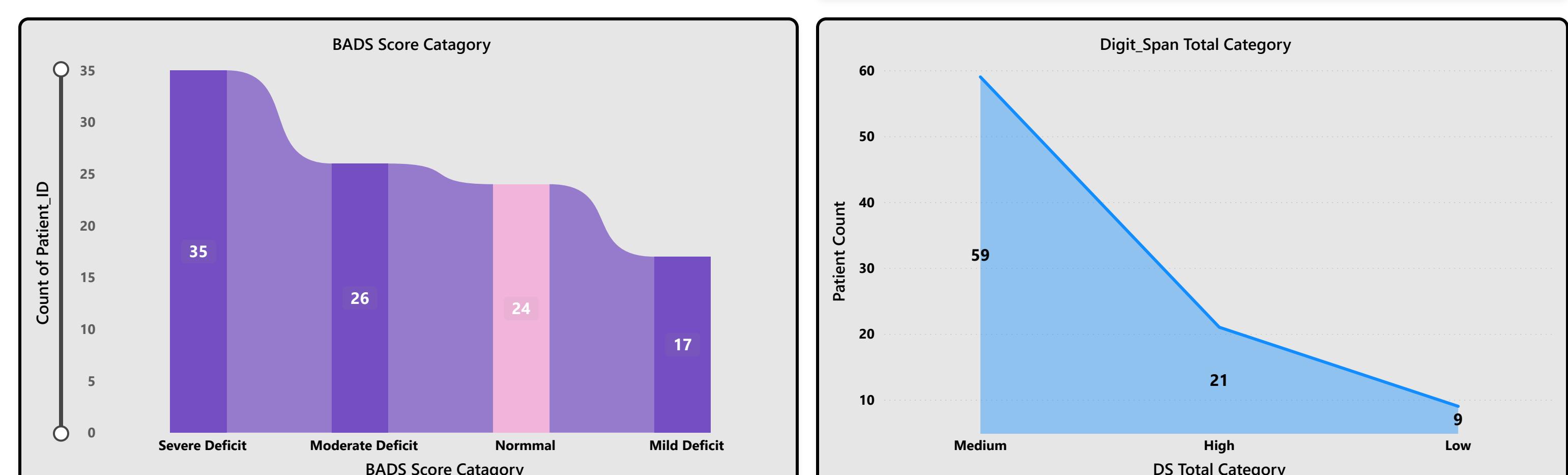
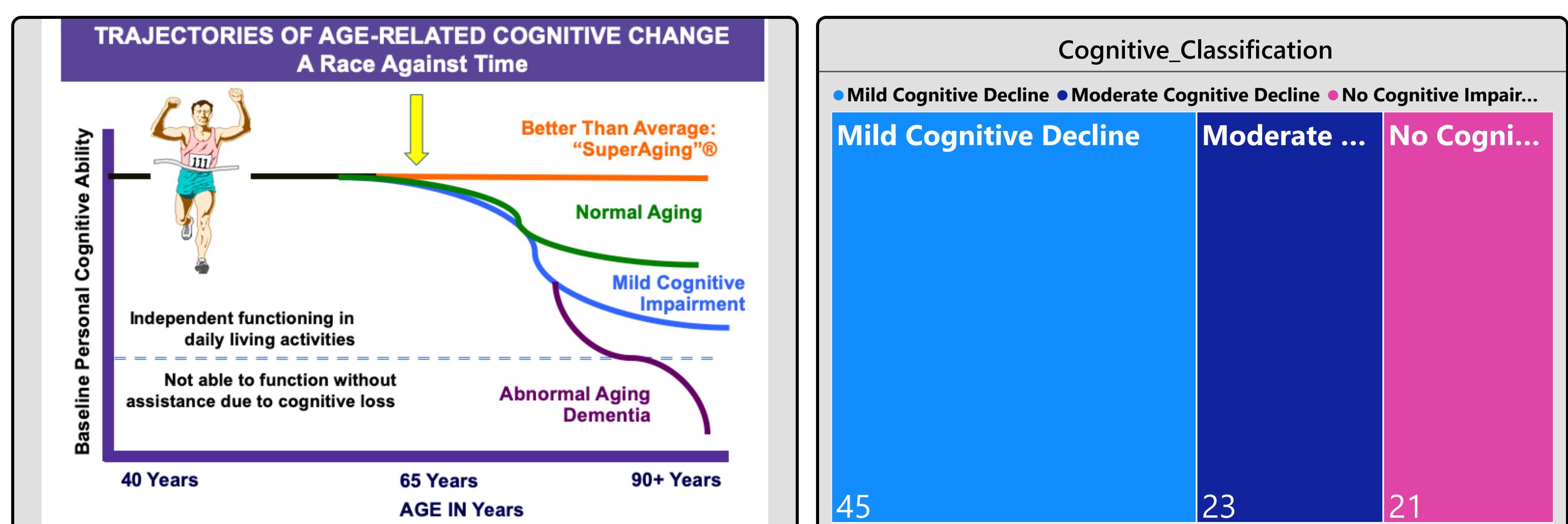


Cognitive Testing analysis of Patients

Introduction	Patient Medical History	Glucose and Lipid Profile	Inflammation and Immune...	Blood and Clotting biomarkers	Blood Brain Barrier Biomarkers	Hormone and Repair Biomarkers	Medications category	Patient Medication info for B...	Blood Pressure Monitoring	Advanced Diabetic Retinopat...	Walking Tests	Cognitive Testing	Cognitive Interpretation	Cognitive Trend Analysis	Conclusion
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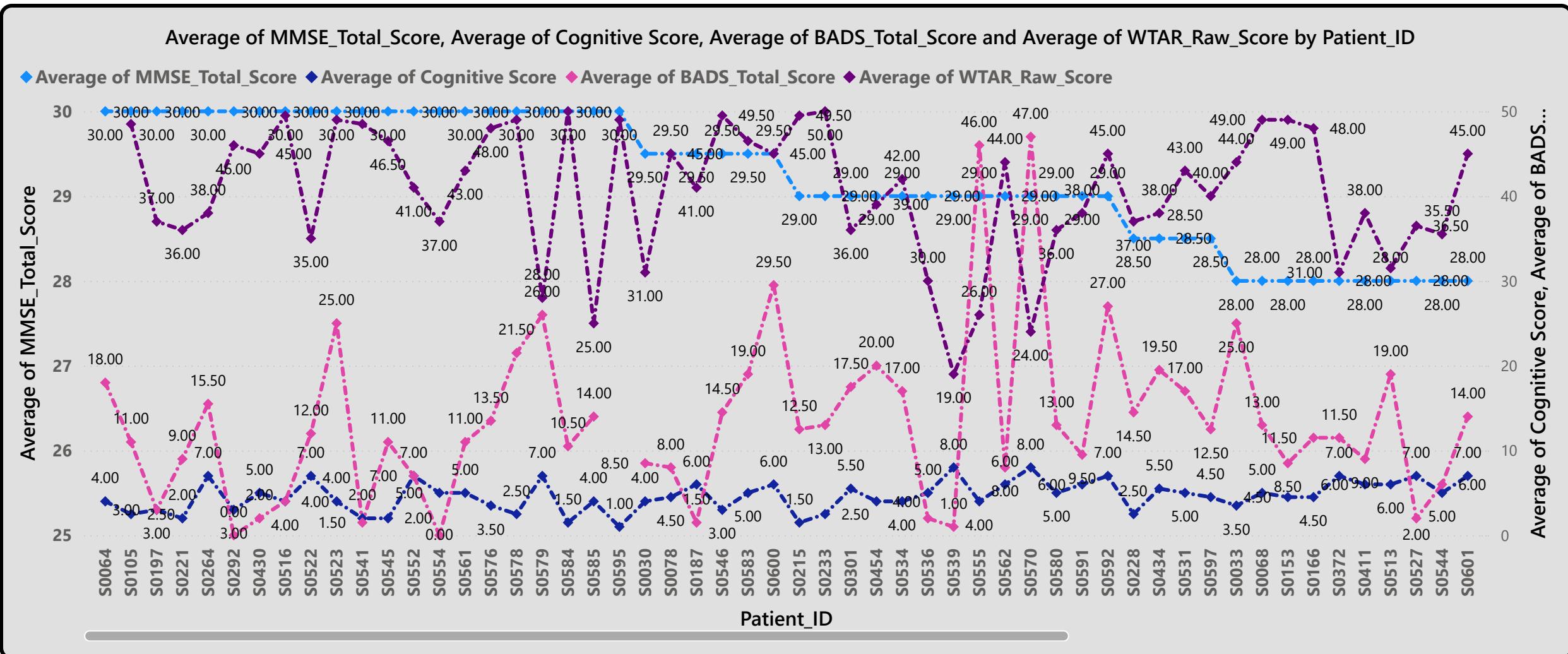


Gender All	Age_Category All	BMI Category All	Hba1c Category All	Hemoglobin_Category All	Visit_No All
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Cognitive Testing- Interpretation

Patient_ID	BADS Score Catagory	Clock Status	DS Total Category	GDS Classification	MMSE_Total_Score	WTAR Level
S0064	Mild Deficit	Severe Impairment	Medium	Normal	30	Low
S0105	Mild Deficit	Severe Impairment	High	Mild Depression	30	High
S0228	Mild Deficit	Severe Impairment	Medium	Normal	30	Average
S0264	Mild Deficit	Unknown	Medium	Normal	30	Average
S0264	Mild Deficit	Unknown	Medium	Normal	30	Low
S0301	Mild Deficit	Severe Impairment	Medium	Normal	28	Average
S0301	Mild Deficit	Unknown	High	Normal	30	Average
S0308	Mild Deficit	Unknown	Medium	Unknown	27	High
S0434	Mild Deficit	Severe Impairment	Medium	Normal	28	Average
S0452	Mild Deficit	Moderate Impairment	Medium	Normal	25	Average
S0452	Mild Deficit	Severe Impairment	Medium	Unknown	30	Average
S0513	Mild Deficit	Unknown	Medium	Mild Depression	30	Average
S0515	Mild Deficit	Severe Impairment	Medium	Mild Depression	28	Average
S0531	Mild Deficit	Severe Impairment	Medium	Normal	27	High
S0531	Mild Deficit	Unknown	Medium	Severe Depression	30	Average
S0532	Mild Deficit	Severe Impairment	Medium	Normal		High
S0534	Mild Deficit	Severe Impairment	Medium	Normal	29	Average
S0546	Mild Deficit	Severe Impairment	Medium	Mild Depression	29	High



Conclusion

Cognitive decline is a common complication of aging, and growing evidence shows that **diabetes significantly accelerates cognitive impairment** in older adults. Chronic hyperglycemia, insulin resistance, vascular damage, and inflammation associated with diabetes adversely affect brain structure and function, particularly in regions responsible for memory and executive control.

The primary biomarkers used to assess the impact of diabetes on cognition include:

- **HbA1c** – reflects long-term glycemic control
- **Fasting Blood Glucose** – indicates short-term glucose dysregulation
- **Insulin / Insulin Resistance (HOMA-IR)** – reflects metabolic dysfunction

Secondary biomarkers such as blood pressure, lipid profile (HDL, LDL, triglycerides), BMI, and inflammatory markers (e.g., CRP) provide insight into vascular and inflammatory mechanisms that mediate cognitive decline.

Elderly individuals with diabetes perform **worse across multiple cognitive domains** compared to non-diabetic peers.

Higher HbA1c levels are consistently associated with lower memory scores and slower executive performance, suggesting a dose-response relationship.

Executive dysfunction often appears **earlier than memory impairment**, making it a potential early indicator of diabetes-related cognitive decline.

Elderly individuals with diabetes perform **worse across multiple cognitive domains** compared to non-diabetic peers.

Higher HbA1c levels are consistently associated with lower memory scores and slower executive performance, suggesting a dose-response relationship.

Executive dysfunction often appears **earlier than memory impairment**, making it a potential early indicator of diabetes-related cognitive decline.

These findings highlight diabetes as a **modifiable risk factor for cognitive decline** in older adults. Improved glycemic control and early identification of executive dysfunction may help delay or prevent cognitive deterioration. Integrating biomarker and cognitive data into interactive dashboards can support clinical decision-making, research analysis, and population-level monitoring.