Exploratory Data Analysis: Orthopedics Department (2023)

This document outlines the step-by-step process of exploratory data analysis (EDA) conducted on the patient data from the Orthopedics department. The analysis includes data transformation, the generation of pivot tables, and the final dashboard visualization.

Step 1: Initial Dataset (Raw Data)

The raw dataset contains various details such as patient ID, gender, age, satisfaction score, race, wait time, and department referral. This data serves as the foundation for the EDA process.

date	patient_id	patient_gender	patient_age	patient_sat_score	patient_last_name	patient_race	patient_admin_flag	patient_waittime	department_referral
01-01-2023 00:10	237-42-9499	M	70		Broadbury	African American	TRUE	21	None
01-01-2023 04:59	641-52-3173	F	37	5	Harford	White	FALSE	10	None
01-01-2023 08:57	320-82-5563	F	5	5	Rubel	Declined to Identify	TRUE	14	None
01-01-2023 09:08	130-03-6486	F	17	7	Carwithan	White	TRUE	56	None
01-01-2023 10:03	761-66-7563	M	6		Colvin	Asian	TRUE	52	General Practice
20-04-2022 00:13	255-51-2877	M	58		Buff	Asian	FALSE	59	None
23-08-2022 08:26	465-97-0990	F	68		Perrat	White	TRUE	43	None
29-07-2022 16:57	157-31-7520	F	47		Gwillim	Two or More Races	TRUE	23	None
01-01-2023 11:11	868-41-2022	M	55	10	Baulcombe	Native American/Alaska Native	TRUE	59	None
01-01-2023 11:25	452-18-8105	M	53		Pattini	Pacific Islander	TRUE	22	Neurology
01-01-2023 11:42	716-90-5923	F	8		Seadon	African American	TRUE	21	None
01-01-2023 12:55	533-87-1299	F	28		Brownlee	White	FALSE	57	None
12-11-2022 16:00	288-05-6370	F	16		Brixey	Native American/Alaska Native	TRUE	53	General Practice
25-06-2022 09:40	784-54-9931	M	46		Goudie	Pacific Islander	FALSE	45	None
04-05-2022 13:16	662-21-6522	M	69		Stanlack	White	TRUE	49	None
19-09-2022 01:53	628-73-1801	M	37		McMurty	Declined to Identify	TRUE	57	None
01-01-2023 13:00	730-54-8361	M	59		O'Lennachain	White	TRUE	45	Orthopedics
25-06-2022 18:59	458-98-8860	M	37		Helgass	Declined to Identify	FALSE	55	None
04-09-2022 16:15	728-31-2493	F	70		Chittock	Asian	TRUE	50	Physiotherapy
16-11-2022 23:46	823-34-5523	M	55	2	Prendergast	Asian	TRUE	40	None
30-06-2022 05:22	621-70-7472	F	63		Bissiker	Native American/Alaska Native	TRUE	25	None
22-05-2022 16:48	344-36-7156	F	44	2	Mandell	Asian	FALSE	51	None
17-11-2022 07:24	455-21-3671	F	11	4	Coste	Declined to Identify	FALSE	30	None
01-01-2023 15:19	392-57-1593	M	8		Mantz	African American	FALSE	23	None
24-05-2022 14:42	720-54-2625	F	4		Pavie	Native American/Alaska Native	TRUE	23	None
12-04-2022 21:02	661-92-7059	M	42	0	Sleightholm	African American	FALSE	51	None
01-01-2023 17:25	608-47-0337	F	22		Boyle	White	TRUE	45	Orthopedics
16-12-2022 13:02	715-74-5338	M	22		Filkin	Pacific Islander	FALSE	25	General Practice
01-01-2023 17:33	390-79-5650	M	59		Skerritt	Asian	FALSE	47	None
01-01-2023 19:37	566-17-1941	M	37		Hatz	Asian	TRUE	55	None
01-01-2023 21:00	175-49-8550	F	63		Nisot	Pacific Islander	TRUE	36	Cardiology
30-06-2022 22:38	334-76-4005	M	35		Sibbit	White	TRUE	40	Orthopedics
01-01-2023 21:13	687-65-8903	M	51	10	Lovstrom	African American	TRUE	60	None
01-01-2023 23:01	353-25-3957	M	19		Levermore	White	FALSE	34	Cardiology
01-01-2023 23:48	338-57-1208	F	5	3	Samwayes	Asian	TRUE	47	None
01-01-2023 23:57	860-05-8907	M	37		St Clair	White	TRUE	14	None
14-12-2022 21:22	384-70-5840	M	25		Drinkeld	African American	FALSE	10	None
02-01-2023 02:33	328-14-5591	M	59	5	Shambrooke	African American	FALSE	49	None
02-01-2023 03:05	487-70-4415	M	2		Stenbridge	White	TRUE	58	None
06-07-2022 19:47	878-55-0051	F	22		Harrington	African American	FALSE	16	General Practice
02-01-2023 03:22	269-62-2200	M	17	5	Barzen	White	TRUE	51	None
12-10-2022 15:03	472-28-5842	F	41		Gulliman	Pacific Islander	FALSE	16	None
27-05-2022 06:13	553-27-8559	F	8		Garnsworthy	African American	FALSE	59	General Practice

Step 2: Data Transformation (Filtered Orthopedic Data)

The data was filtered to include only the patients referred to the Orthopedics department. This transformed data provides a more focused view for the subsequent analysis.

01-01-2023 13:00 January	Sunday	1.00.00 PM 730-54-8361	M	59		O'Lennachain	White	TRUE	45 Orthopedics
01-01-2023 17:25 January	Sunday	5.00.00 PM 608-47-0337	F	22		Boyle	White	TRUE	45 Orthopedics
02-01-2023 14:06 January	Monday	2.00.00 PM 409-55-2108	M	6		Buller	African American	TRUE	19 Orthopedics
02-01-2023 21:16 January	Monday	9.00.00 PM 771-94-6870	M	18		Muccino	African American	FALSE	55 Orthopedics
03-01-2023 04:38 January	Tuesday	4.00.00 AM 299-16-0016	M	16		Boulder	Native American/Alaska Nativ	FALSE	20 Orthopedics
03-01-2023 05:57 January	Tuesday	5.00.00 AM 357-69-5446	M	41		Huetson	Two or More Races	TRUE	57 Orthopedics
04-01-2023 03:07 January	Wednesday	3.00.00 AM 323-73-5214	M	27		Andrelli	Native American/Alaska Nativ	FALSE	53 Orthopedics
04-01-2023 03:29 January	Wednesday	3.00.00 AM 426-07-4984	F	11	4 Deluca	White	FALSE	42 Orthopedics
04-01-2023 14:54 January	Wednesday	2.00.00 PM 323-99-0794	F	6	6 Ruselin	African American	TRUE	42 Orthopedics
04-01-2023 16:54 January	Wednesday	4.00.00 PM 705-51-2537	F	20		Olyet	Declined to Identify	TRUE	43 Orthopedics
05-01-2023 20:36 January	Thursday	8.00.00 PM 374-08-6811	M	9	8 Broadis	Declined to Identify	FALSE	30 Orthopedics
05-01-2023 22:58 January	Thursday	10.00.00 AM 634-94-1438	M	27		Baudichon	Two or More Races	TRUE	49 Orthopedics
07-01-2023 10:32 January	Saturday	10.00.00 AM 421-15-9145	M	77	3 Brunsen	Asian	TRUE	28 Orthopedics
07-01-2023 11:35 January	Saturday	11.00.00 PM 672-75-7086	M	55		McCaughan	Two or More Races	FALSE	56 Orthopedics
07-01-2023 15:22 January	Saturday	3.00.00 PM 767-96-0026	M	13		Frammingham	Asian	FALSE	49 Orthopedics
07-01-2023 22:32 January	Saturday	10.00.00 PM 804-80-4289	M	63		Lomax	Pacific Islander	FALSE	41 Orthopedics
08-01-2023 14:12 January	Sunday	2.00.00 PM 488-61-3428	M	73		Yegorchenkov	Two or More Races	FALSE	38 Orthopedics
08-01-2023 18:39 January	Sunday	6.00.00 PM 344-30-6145	M	64	10 Hardaker	Two or More Races	TRUE	21 Orthopedics
09-01-2023 09:31 January	Monday	9.00.00 PM 828-19-1085	M	32		Gilfoy	African American	TRUE	26 Orthopedics
09-01-2023 22:32 January	Monday	10.00.00 PM 812-01-8966	M	24		Bremond	African American	FALSE	60 Orthopedics
10-01-2023 13:57 January	Tuesday	1.00.00 PM 260-70-4444	M	46		Temprell	White	TRUE	47 Orthopedics

Step 3: Exploratory Data Analysis (EDA)

Various pivot tables were generated to gain insights from the data. These tables help in understanding patient distribution, satisfaction scores, and wait times overall KPIs: Number of patients, average satisfaction score, and average wait time.

Row Labels	Wait Time	Patients
12:00 AM	31	21
01:00 AM	33	18
02:00 AM	37	27
03:00 AM	37	21
04:00 AM	39	14
05:00 AM	41	13
06:00 AM	34	14
07:00 AM	38	16
08:00 AM	39	16
09:00 AM	38	30
10:00 AM	31	15
11:00 AM	34	12
12:00 PM	36	16
01:00 PM	39	17
02:00 PM	39	17
03:00 PM	37	20
04:00 PM	33	28
05:00 PM	36	20
06:00 PM	30	25
07:00 PM	29	19
08:00 PM	32	12
09:00 PM	34	17
10:00 PM	37	21
11:00 PM	43	24
Grand Total	**36**	**453**

Monthly Average Satisfaction Score: Analyzing patient satisfaction scores across different months.

Row Labels	Count of patient_id
1-10	60
11-20	54
21-30	56
31-40	61
41-50	51
51-60	62
61-70	60
71-80	49
Grand Total	453

Age Distribution: Distribution of patients across different age brackets.

Row Labels	Average of patient_sat_score	Count of patient_id
January	6.4	55
February	4.7	41
March	4.9	50
April	5.5	39
May	5.1	39
June	3.9	43
July	4.7	55
August	6.1	43
September	4.3	39
October	5.8	49
Grand Total	5.2	453

Wait Time Analysis: Average wait time by time of day and number of patients.

Month	(All)	
day-Of-week	(Multiple Items)	

Count of patient_id	Average of patient_sat_score	Average of patient_waittime
453	5.2	36

Step 4: Final Dashboard

The final dashboard visualizes the key insights derived from the EDA. It provides an interactive way to explore patient satisfaction scores, age distribution, and correlation between wait times and the number of patients.