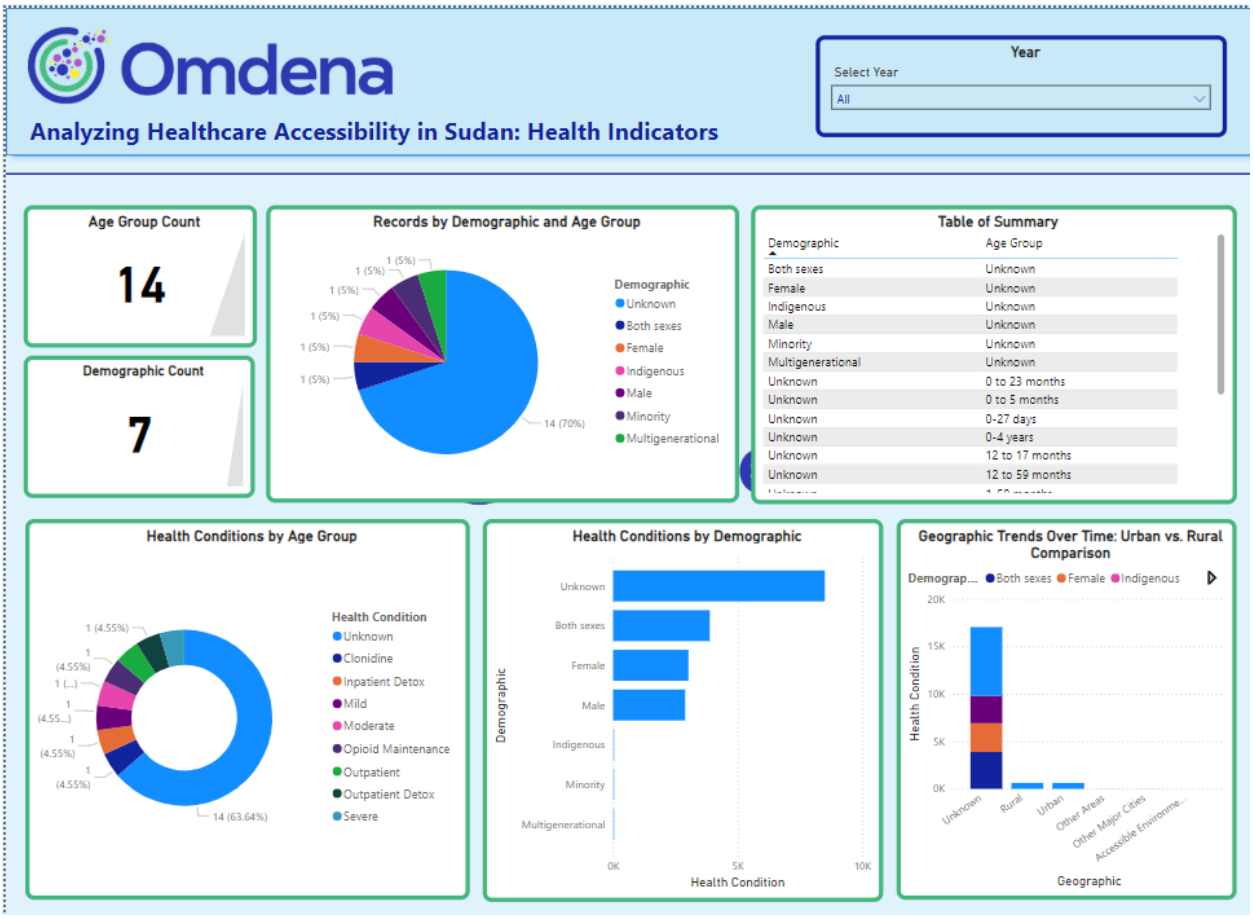
Analyzing Healthcare Accessibility in Sudan

Healthcare Systems EDA: Health Indicator Dashboard

Introduction

This Power BI dashboard provides a comprehensive and interactive analysis of healthcare accessibility in Sudan. By focusing on key health indicators, this dashboard presents critical insights to guide decision-making, policy formulation, and resource allocation. The integration of visualizations such as pie charts, bar graphs, and geographic trends offers a dynamic platform to assess the state of healthcare services across different demographics and age group.



Objectives of the Dashboard

This dashboard aims to analyze and highlight healthcare accessibility in Sudan from multiple perspectives:

- Evaluating the distribution of healthcare across demographics and age groups.
- Identifying disparities in urban and rural healthcare access.

Key Features

The dashboard combines data visualizations and interactive tools to present a detailed overview of healthcare accessibility:

- **Demographic Representation:** Pie charts reveal records from diverse groups such as males, females, indigenous populations, and multigenerational households.
- **Age Group Analysis:** Fourteen categories offer a granular perspective on healthcare needs.
- **Health Conditions:** Data is categorized to focus on areas that demand urgent attention, such as severe or outpatient cases.

Geographic disparities are addressed through comparisons between urban and rural healthcare access, with bar charts highlighting significant gaps. Trends over time reveal clustering of healthcare resources in specific regions, further emphasizing the need for equitable distribution.

Progress and Methodology

To update on the progress of the dashboard development, the focus has been on organizing key aspects such as health conditions, age groups, demographics (gender, groups, etc.), and geographic data.

To achieve this, DAX (DAX code in page 7) was utilized to extract subgroups from the Dimension column, creating a new table where each subgroup (e.g., health conditions, demographic categories) is represented as a column. This approach effectively organized the data, but a challenge arose due to the significant amount of "Unknown" data caused by blank rows in the Dimension column. While removing these rows could have led to missing data in other columns, DAX was used to handle the blanks appropriately during subgroup extraction.

Columns like disease indicator code and descriptions have not yet been addressed due to their complexity for Power BI. These may require exploratory data analysis in Python while using NLP techniques also is confirmed that the presence of "Unknown" data is an expected behavior given the nature of the dataset.

Layout and Design Choices

The dashboard’s layout is designed to ensure clarity. The report provides key performance metrics, including demographic and age group counts, offering a quick snapshot of the data. Detailed visualizations, such as health condition trends and geographic comparisons, are placed centrally for in-depth analysis.

The design theme is inspired by the color palette of the Omdena logo, creating a simple and visually appealing color. The use of consistent color schemes enhances visual clarity by associating specific colors with demographic groups, health conditions, and geographic regions. Interactive elements like filters and hover effects make the dashboard engaging and user-friendly.

Key Insights

The analysis reveals several critical findings:

- **Demographics:** The "unknown" and "both sexes" categories dominate the records, while age group trends highlight uneven distribution, signaling areas that require targeted investigation.
- **Health Condition Trends:** Significant gaps in data are evident, "unknown," underscoring the need for advance approaches for other columns.
- **Geographic Disparities:** Urban regions demonstrate significantly higher healthcare accessibility compared to rural areas. Clustering patterns highlight underserved regions, reinforcing the necessity of equitable resource allocation.

DAX Code

```
orig_dimension_subgroup_dimension =
ADDCOLUMNS(
    FILTER(
        'health_indicators_sdn',
        NOT(ISBLANK('health_indicators_sdn'[DIMENSION (NAME)]))
    ),
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Male", "Male",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Both sexes", "Both sexes",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Indigenous people", "Indigenous",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Minority groups", "Minority",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Multigenerational households",
"Multigenerational",
        "Unknown"
    ),
    "Geographic", SWITCH(
        TRUE(),
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Rural", "Rural",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "In other areas", "Other Areas",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "In other major cities", "Other
Major Cities",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Barrier-free/accessible
environments", "Accessible Environments",
        "Unknown"
    ),
    "AgeGroup", SWITCH(
        TRUE(),
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "0-4 years", "0-4 years",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "1-59 months", "1-59 months",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "0 to 5 months", "0 to 5 months",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "12 to 59 months", "12 to 59
months",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "0 to 23 months", "0 to 23 months",
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "24 to 59 months", "24 to 59
months",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "30 to 35 months", "30 to 35
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```

```
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months",
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Q2", "Q2",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Q3", "Q3",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Q4", "Q4",
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    "HealthCondition", SWITCH(
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Moderate", "Moderate",
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therapy", "Opioid Maintenance",
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "In-patient detoxification",
"Inpatient Detox",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Outpatient", "Outpatient",
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Spirits", "Spirits",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Wine", "Wine",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Other alcoholic beverages", "Other
Alcoholic Beverages",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Drugs", "Drugs",
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    "Professions", SWITCH(
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industry", "Alcohol Industry Representatives",
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organizations", "NGO Representatives",
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organizations", "Youth Organization Representatives",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Representative of the tobacco
industry", "Tobacco Industry Representative",
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"Community Health Workers",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Social workers", "Social Workers",
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        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "International organizations",
"International Organizations",
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"Drivers",
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"Communication Training",
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"School Programmes",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Legislation on education (or
similar)", "Education Legislation",
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users", "Injecting Drug Users",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Work/sports", "Work/Sports",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "Labour (or similar)", "Labour",
        TRIM('health_indicators_sdn'[DIMENSION (NAME)]) = "In addition to criminal sanction",
"Criminal Sanction",
        "Unknown"
    )
)
```