

HR Analytics – Employee Attrition Analysis

Documentation Report

This document details the design and execution of an HR Attrition Analysis system, using SQL queries and Power BI dashboards. The dataset was sourced from GitHub and online repositories, preprocessed and cleaned using SQL Server Management Studio, then visualized using Power BI. The analysis aims to identify workforce trends, attrition drivers, and derive insights that support strategic HR decision-making. This report provides end-to-end documentation of the workflow, findings, and visual interpretations.

1. Introduction to HR Analytics

HR Analytics refers to the use of data analysis techniques to drive strategic decisions in human resources. This approach enables organizations to identify patterns, improve employee engagement, and reduce attrition by aligning HR strategies with business goals.

2. Problem Statement

The organization is currently experiencing a 16% attrition rate, with 237 out of 1,470 employees exiting. High turnover is affecting team stability, increasing recruitment/training costs, and disrupting business continuity. Identifying the root causes of attrition is critical for developing effective retention strategies.

3. Project Objectives & KPIs

Objectives

- Analyze workforce demographics and attrition patterns
- Identify key factors influencing employee turnover
- Provide data-driven recommendations to reduce attrition

Key Performance Indicators

- Total Employees: 1,470
- Attrition Rate: 16%
- Active Employees: 1,233
- Gender Distribution: 60% Male, 40% Female
- Average Income: \$6.5K

- Average Age: 37
- Job Satisfaction Levels
- Attrition segmented by: role, education, gender, salary, and distance

4. Data Analysis Process

Step	Description
1. Data Collection	Data sourced from HRIS and validated with public datasets
2. Business Understanding	Collaborated with HR teams to align on goals
3. Data Preparation	Cleaned, standardized, and deduplicated datasets
4. Data Analysis	Used SQL and Power BI for statistical analysis
5. Visualization & Insights	Developed dashboards and extracted actionable recommendations

5. Data Overview

Employee Demographics

- Total: 1,470
- Male: 882 (60%), Female: 588 (40%)
- Average Age Group: 35–44 years
- Average Monthly Income: \$6.5K

Education Background

- Life Sciences: 606
- Medical: 464
- Marketing: 159
- Technical: 132
- Human Resources: 27
- Other: 82

Service Years

- Most common: 1 year (1,272)
- Also significant: 5 years (1,966), 10 years (1,477)

Job Roles & Income

- Manager: \$17K
- Research Scientist: \$16K
- Sales Executive: \$7K
- HR: \$3K

Satisfaction Levels

- Poor: 407
- Medium: 369
- Good: 234
- Excellent: 223

6. Attrition Analysis

Metric	Value
Attrition Count	237
Attrition Rate	16%
Active Employees	1,233
Average Age of Attrited Employees	37

By Education

- Bachelor's Degree holders: 99 exits from 473 total
- Master's Degree holders: 58 exits from 340 total

By Role

- Laboratory Technicians: 23.94%
- Sales Executives: 17.48%
- Research Scientists: 16.10%

By Income & Gender

- Most exits occurred in the 0–5K salary range
- Male: 102
- Female: 61

By Distance to Work

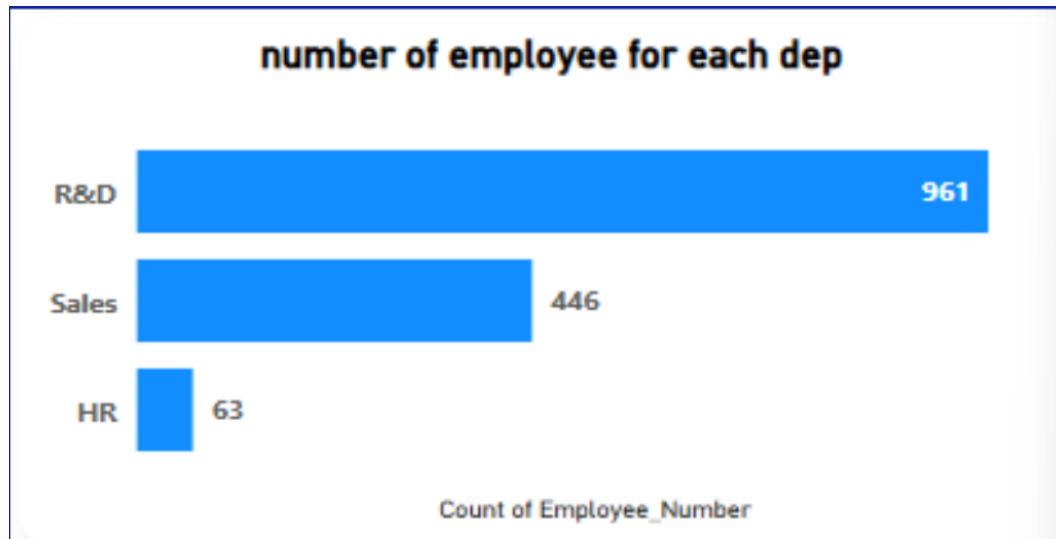
- 0–5 KM: 87 exits
- 5–10 KM: 57 exits

powerbi – Dashboard Visualizations

Employee Overview Dashboard

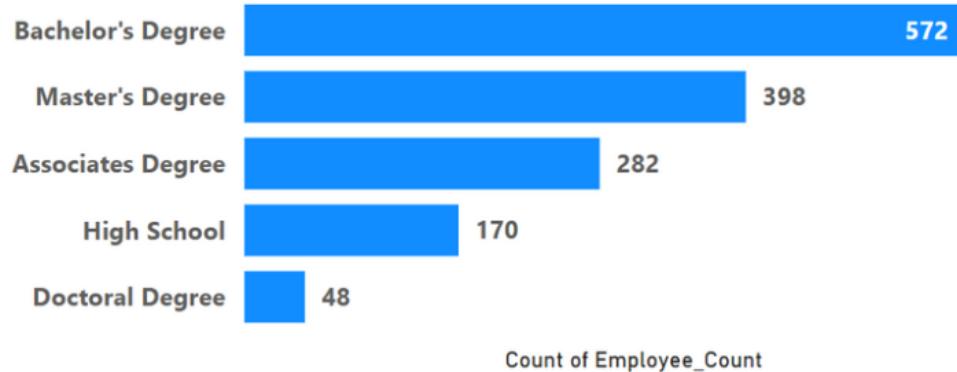


Employee Count by Department

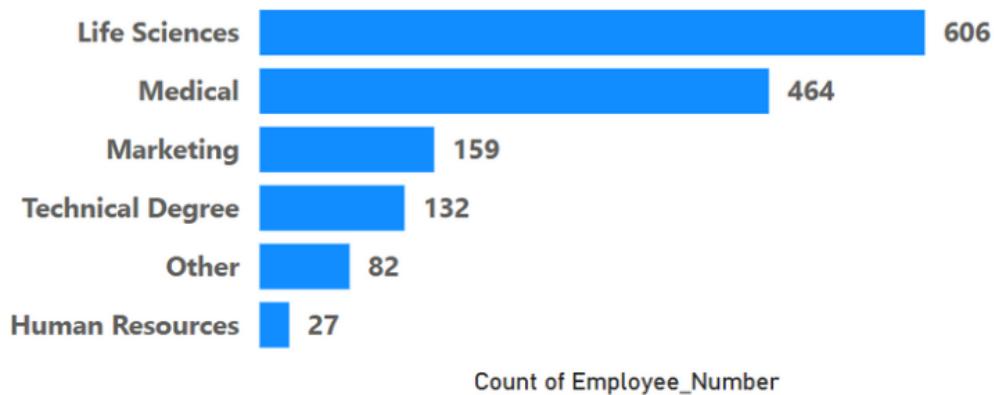


Education Level Summary

education

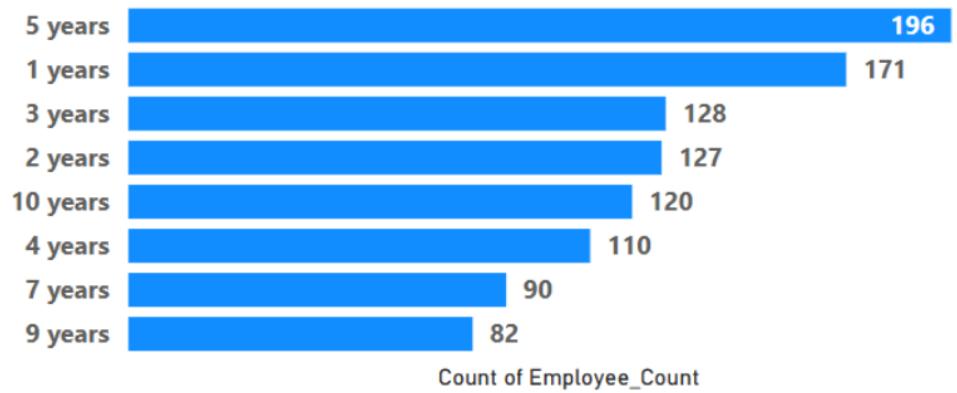


Education Level Distribution

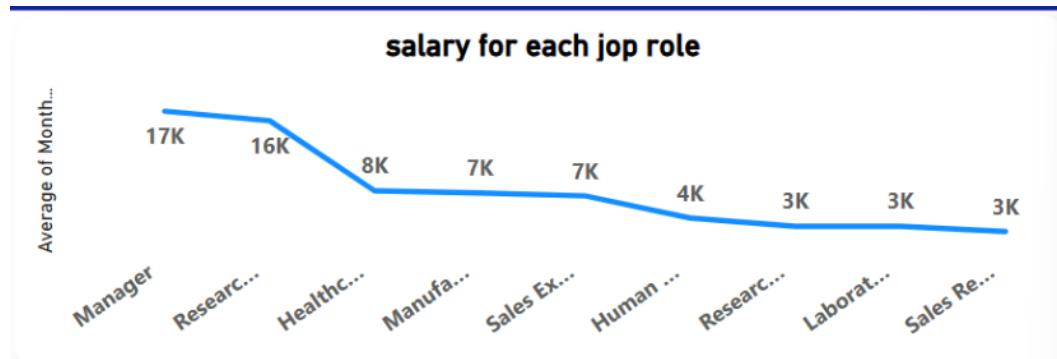


Service Year Distribution

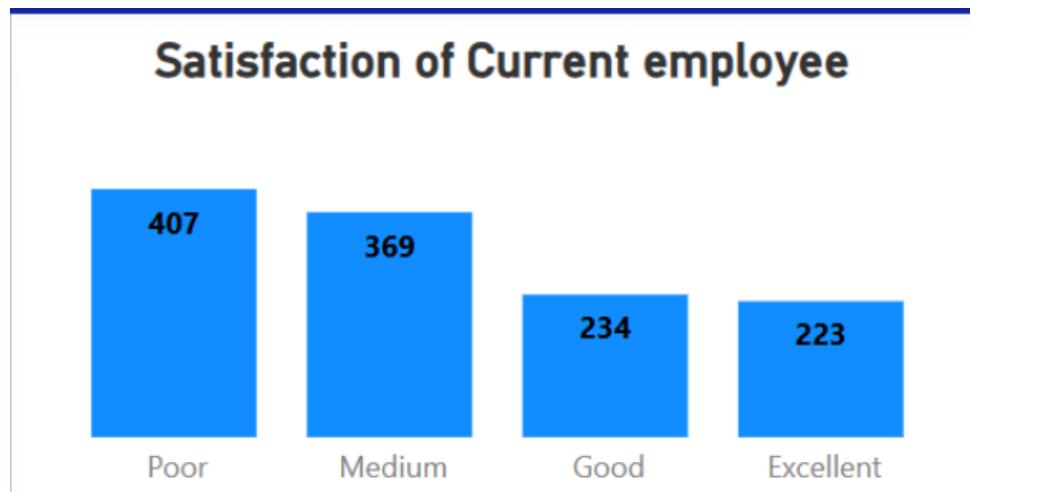
Service Year



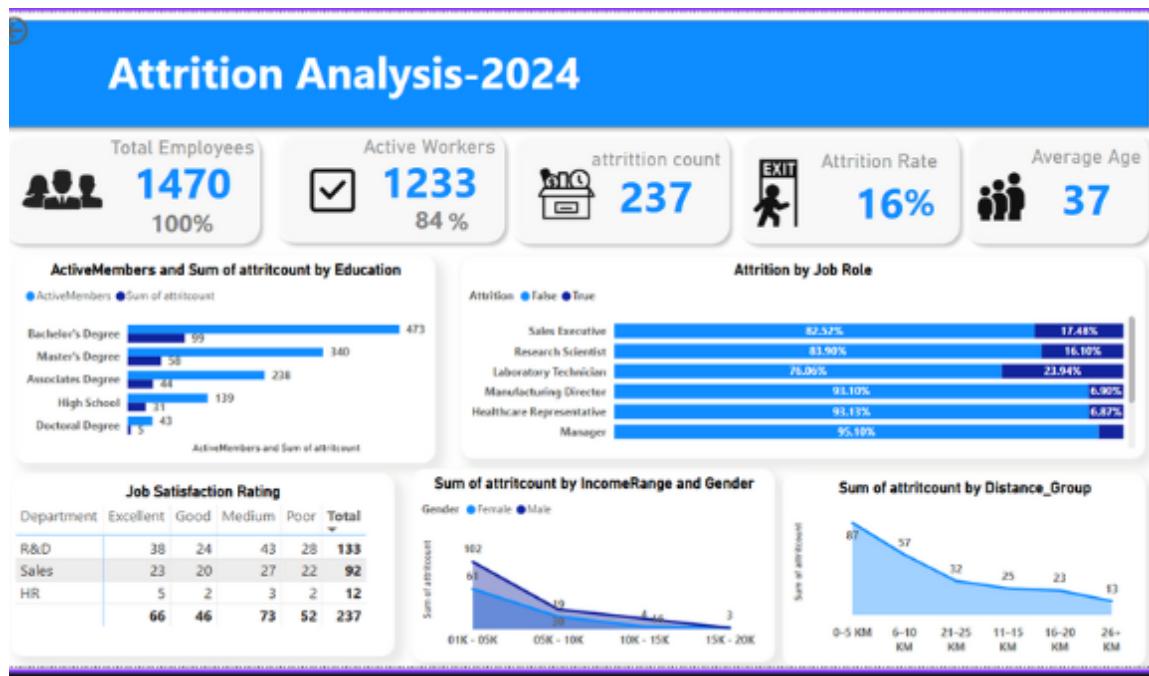
Job Role Salary Chart



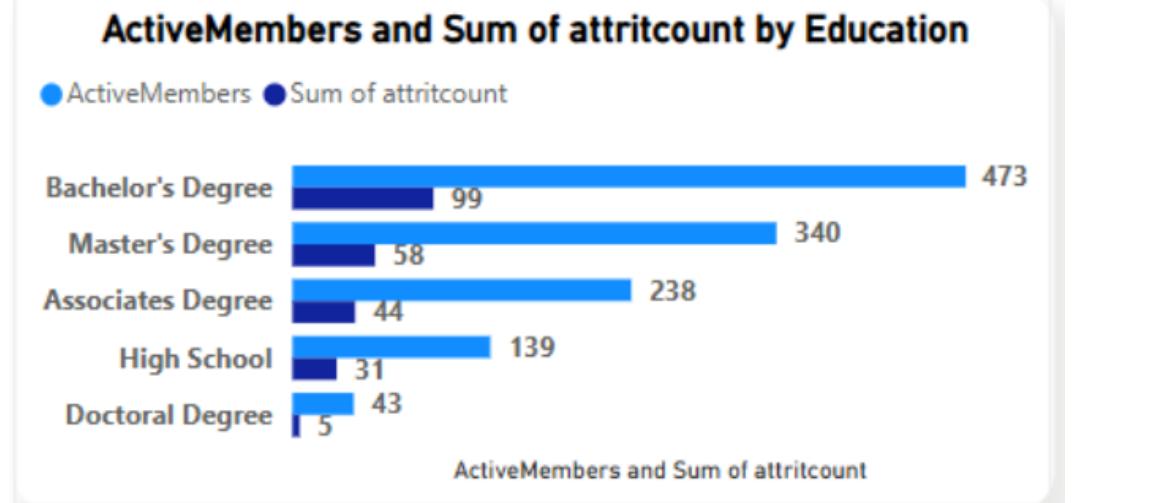
Job Satisfaction Ratings



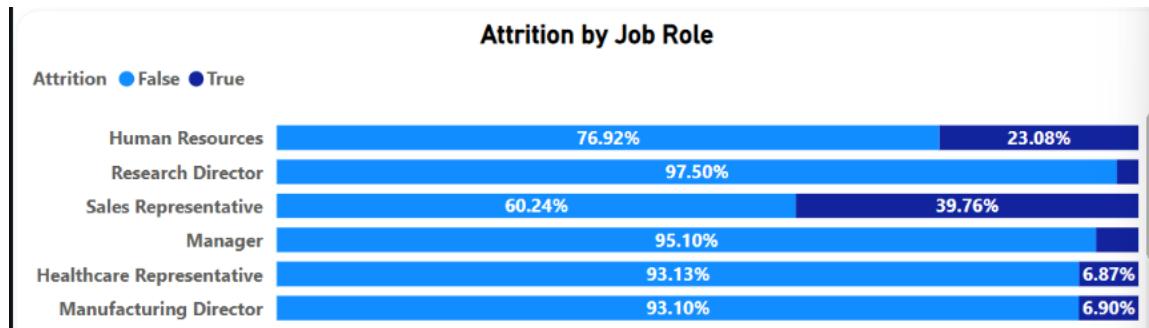
Attrition Overview Dashboard



Attrition by Education Level



Attrition by Job Role

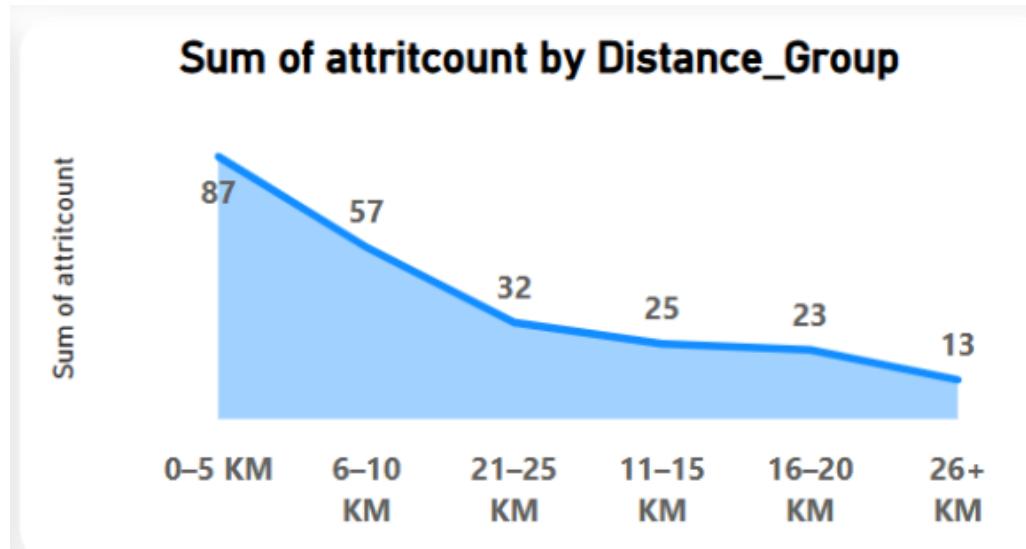


Additional Visual Insights

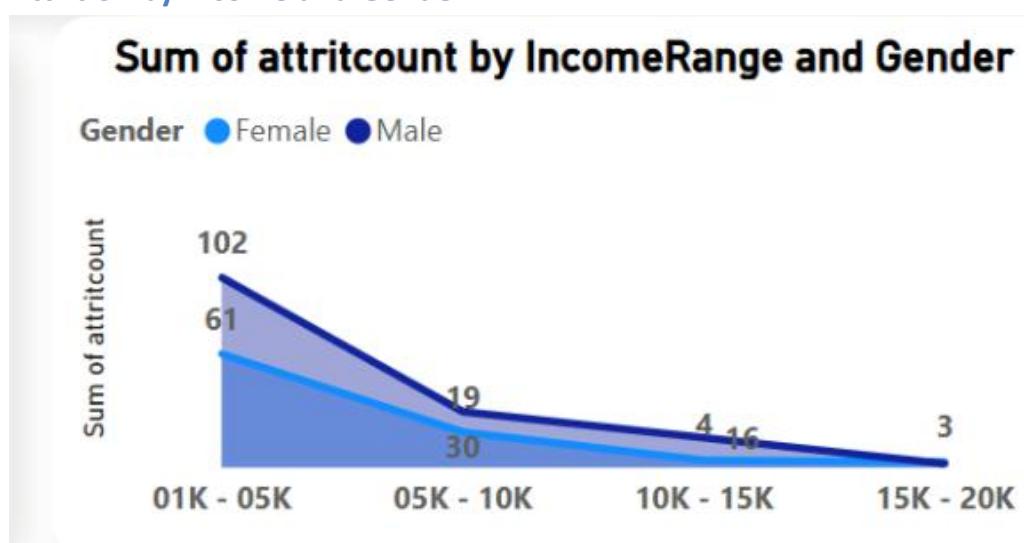
Job Satisfaction by Department

Department	Excellent	Good	Medium	Poor	Total
R&D	38	24	43	28	133
Sales	23	20	27	22	92
HR	5	2	3	2	12
	66	46	73	52	237

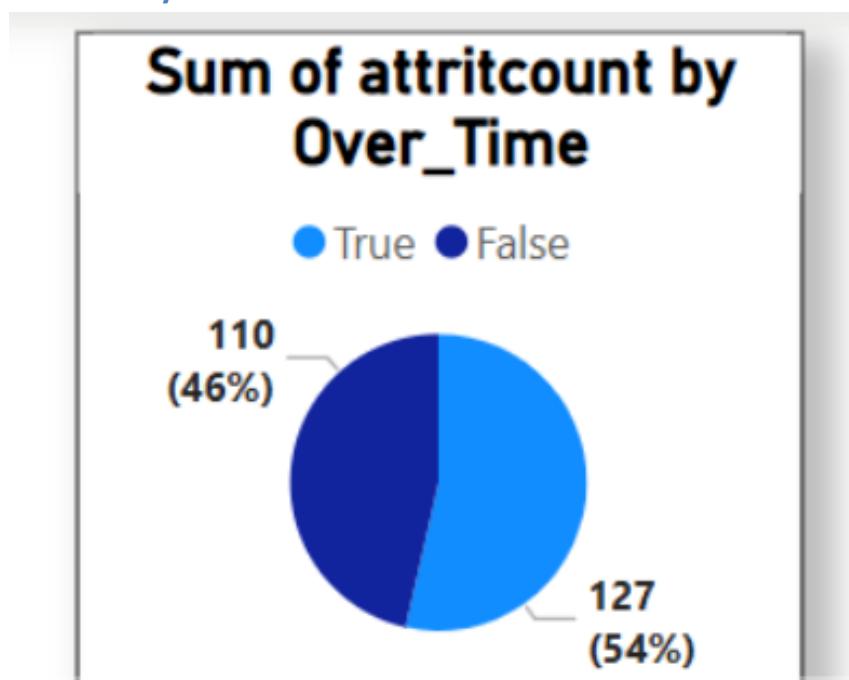
Attrition by Distance from Home



Attrition by Income and Gender



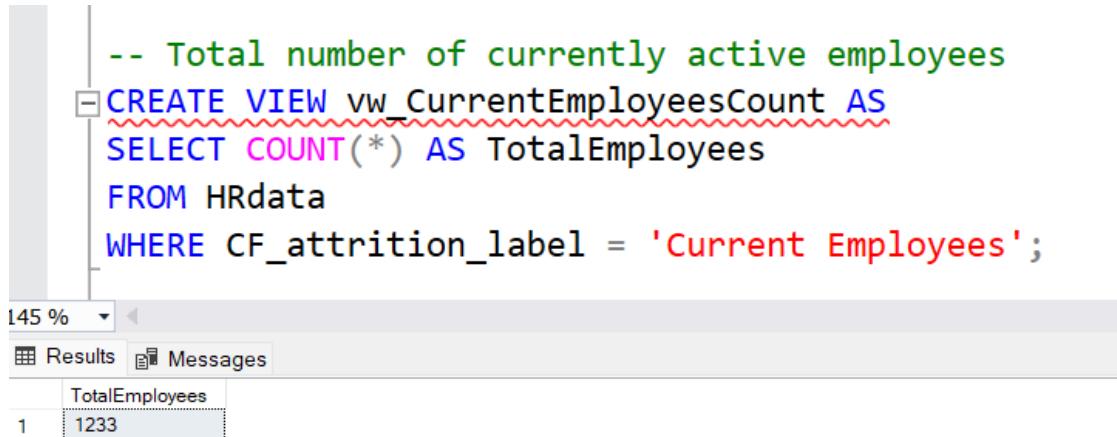
Attrition by Overtime Work



4.5 SQL-Based Data Analysis

Before conducting visual exploration using Power BI, preliminary data analysis was done using SQL Server. This helped validate, filter, and summarize data directly from the HR database. Below are examples of SQL queries and their outputs used to support the visualization.

Query: Count of Current Employees

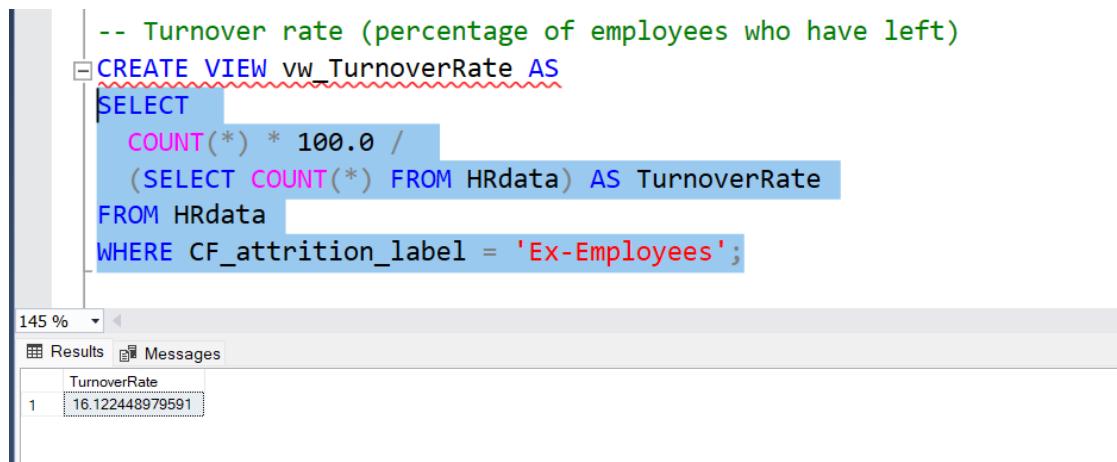


```
-- Total number of currently active employees
CREATE VIEW vw_CurrentEmployeesCount AS
SELECT COUNT(*) AS TotalEmployees
FROM HRdata
WHERE CF_attrition_label = 'Current Employees';
```

The screenshot shows the SQL query above in a query editor window. Below the query, the results pane displays a single row with the value 1233 under the column 'TotalEmployees'.

TotalEmployees
1233

Query: Turnover Rate Calculation



```
-- Turnover rate (percentage of employees who have left)
CREATE VIEW vw_TurnoverRate AS
SELECT
    COUNT(*) * 100.0 /
    (SELECT COUNT(*) FROM HRdata) AS TurnoverRate
FROM HRdata
WHERE CF_attrition_label = 'Ex-Employees';
```

The screenshot shows the SQL query above in a query editor window. Below the query, the results pane displays a single row with the value 16.122448979591 under the column 'TurnoverRate'.

TurnoverRate
16.122448979591

Query: Average Monthly Income by Job Role

```
-- Average monthly income by job role
CREATE VIEW vw_AvgIncomeByJobRole AS
SELECT Job_Role, AVG(Monthly_Income) AS AvgMonthlyIncome
FROM HRdata
GROUP BY Job_Role
```

145 %

Results Messages

	Job_Role	AvgMonthlyIncome
1	Sales Representative	2626
2	Manager	17181
3	Healthcare Representative	7528
4	Laboratory Technician	3237
5	Sales Executive	6924
6	Manufacturing Director	7295
7	Human Resources	4235
8	Research Director	16033
9	Research Scientist	3239

Query: Number of Employees by Marital Status

```
-- Number of employees by marital status
CREATE VIEW vw_EmployeeCountByMaritalStatus AS
SELECT Marital_Status, COUNT(*) AS EmployeeCount
FROM HRdata
GROUP BY Marital_Status;
```

!5 %

Results Messages

	Marital_Status	EmployeeCount
1	Single	470
2	Divorced	327
3	Married	673

Query: Exits by Department

```
-- Number of exited employees by department
CREATE VIEW vw_ExitsByDepartment AS
SELECT Department, COUNT(*) AS ExitCount
FROM HRdata
WHERE CF_attrition_label = 'Ex-Employees'
GROUP BY Department
```

Results	
Department	ExitCount
HR	12
R&D	133
Sales	92

Query: Average Job Satisfaction by Department

```
-- Average job satisfaction by department
CREATE VIEW vw_SatisfactionByDept AS
SELECT Department, AVG(Job_Satisfaction) AS AvgJobSatisfaction
FROM HRdata
GROUP BY Department
```

Results	
Department	AvgJobSatisfaction
Sales	2
R&D	2
HR	2

Query: Job Satisfaction Categorization Using CASE

```
/ NEW CODE /  
CREATE VIEW Satisfaction AS  
SELECT  
  
CASE  
    WHEN Job_Satisfaction = 1 THEN 'Poor'  
    WHEN Job_Satisfaction = 2 THEN 'Medium'  
    WHEN Job_Satisfaction = 3 THEN 'Good'  
    WHEN Job_Satisfaction = 4 THEN 'Excellent'  
    ELSE 'Unknown'  
END AS Satisfaction_Label  
FROM HRdata  
WHERE CF_attrition_label = 'Current Employees';
```

109 %

Results Messages

	Satisfaction_Label
1	Medium
2	Good
3	Medium
4	Excellent
5	Poor
6	Good
7	Good
8	Good
9	Medium
10	Good