

HR Analytics

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Role: Junior Data Analyst

Overview and Objective:

Overview:

This project analyzes employee attrition and workforce dynamics using SQL for data exploration and Power BI for dashboarding. It uses the **IBM HR Analytics Attrition & Performance** dataset.

Project Objective:

The primary goal is to identify key factors contributing to employee attrition and offer data-driven insights to improve retention and employee satisfaction.

Dataset Overview:

The dataset contains 1,470 rows and 35+ columns about employee attributes like:

- Demographics: Age, Gender, Marital Status
- Work: Job Role, Department, Years At Company
- Compensation: Monthly Income, Monthly Rate
- Satisfaction: Environment Satisfaction, Job Satisfaction, Relationship Satisfaction
- Attrition status: Yes/No

➤ **Note:** No date fields (like joining/resignation dates) are available, so this is a static cross-sectional analysis.

Tools Used:

Data Processing - **MySQL**

Visualization - **Power BI**

Dataset - **IBM HR Analytics (Kaggle)**

Process overview:

- **Data Cleaning:**

- Dropped redundant columns: “EmployeeCount”, “Over18”, “Standard Hours”.

- **Feature Engineering:**

- Added “AttritionFlag”: 1 if Attrition = 'Yes', else 0.
- Created “Age_group” based on age bins.
- Mapped encoded values (e.g., “Education”, “JobSatisfaction”) to readable labels.

- **Exploratory Data Analysis:**

- Uncovered patterns using visualizations.

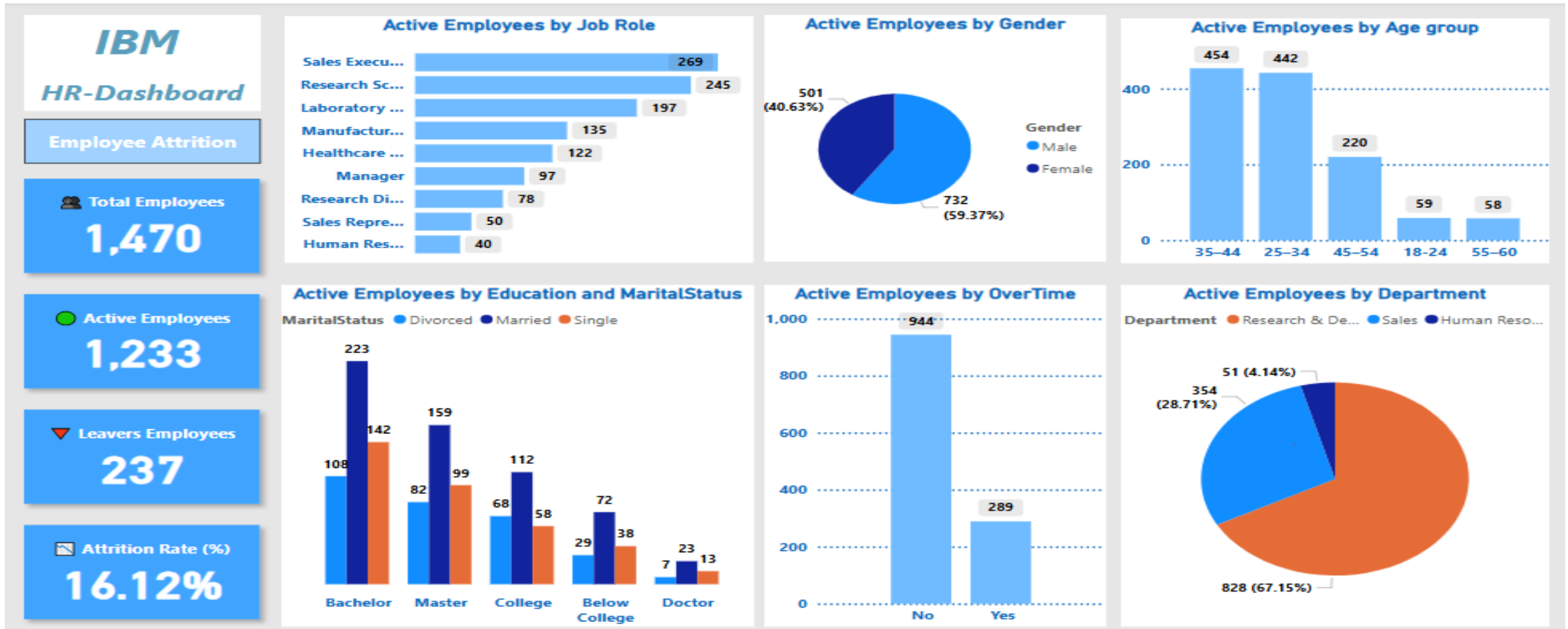
- **Suggestions & Recommendations:**

- Based on insights.

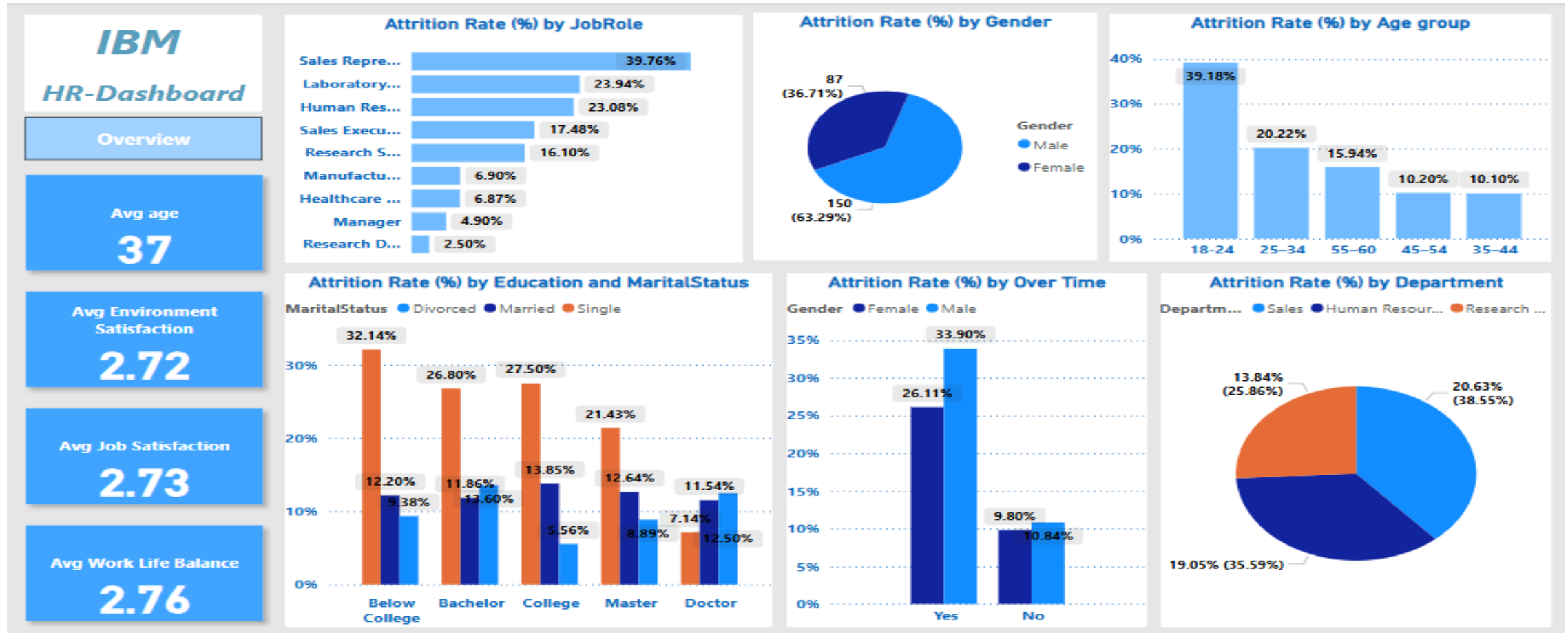
Key Business Questions:

1. How many active employees are there?
2. How Does Attrition Differ by Gender?
3. Department-wise Attrition Comparison
4. Attrition Risk Across Employee Age Bands
5. Attrition Hotspots by Role
6. Attrition Trends by Employee Education
7. How Does Overtime Impact Attrition?
8. Is Marital Status Linked to Attrition?

Power BI Dashboard Overview:



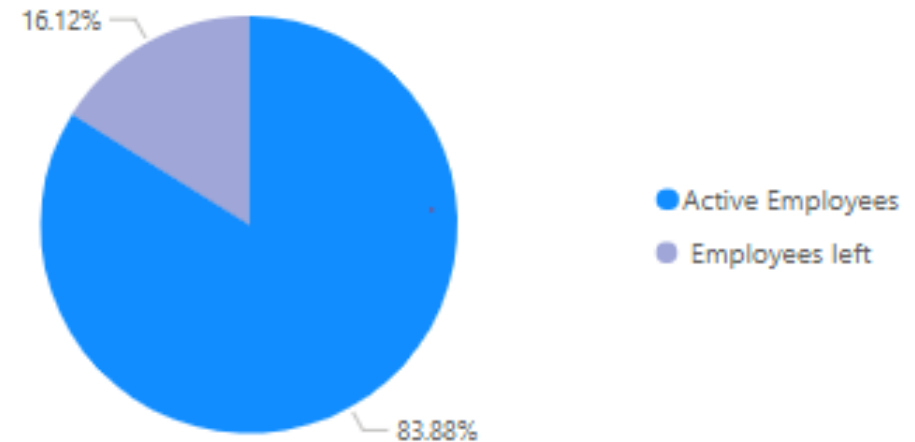
Power BI Dashboard Overview:



How many active employees are there?

	Total_employees	Active_employees	Employees_left	Attrition_rate_percentage
▶	1470	1233	237	16.12

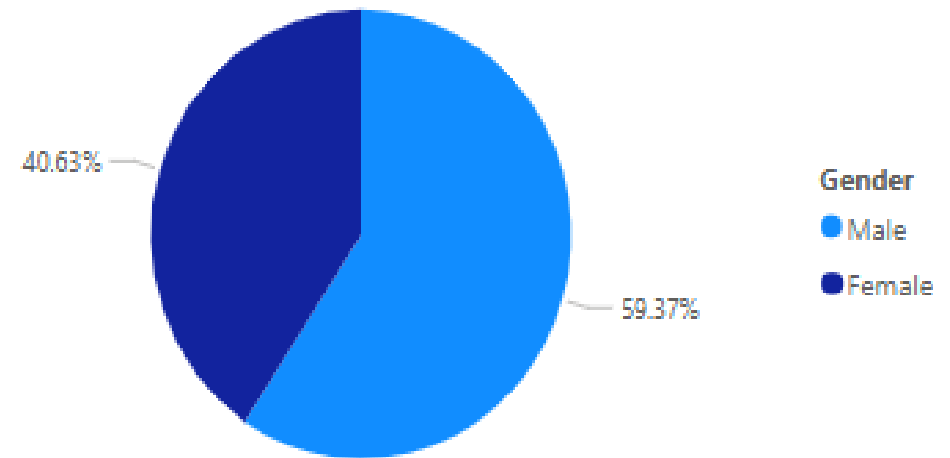
The company has total **1470 employees**, out of which **1233 employees (83.88%)** are still working with the company (**active**) while **237 employees (16.12%)** are those who **resigned** the company or **terminated** by the HR .



How does attrition differ by gender?

	Gender	total
▶	Male	150
	Female	87

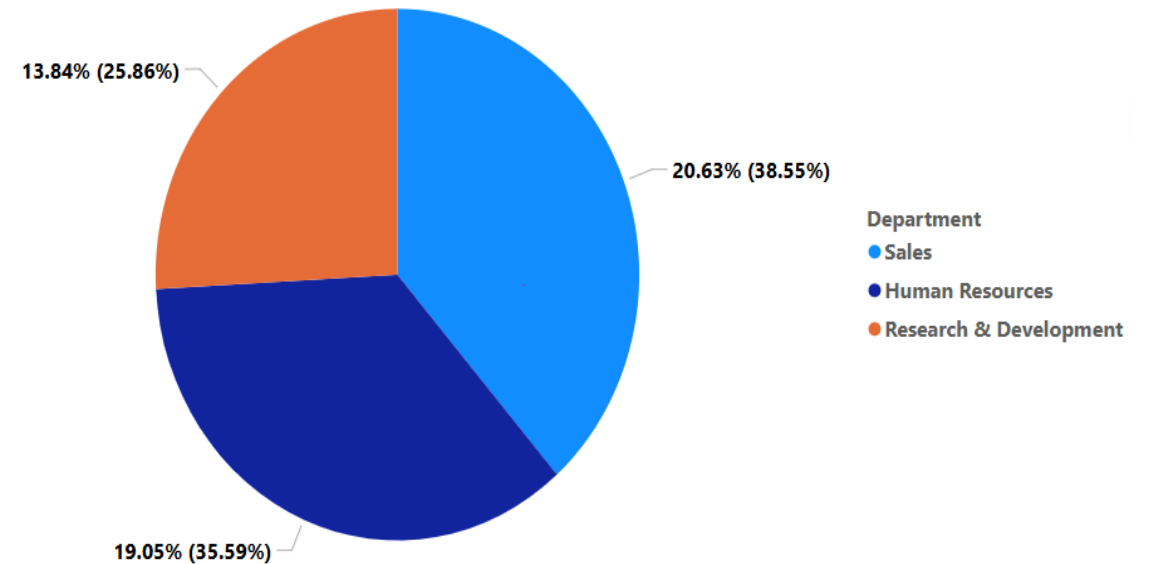
Gender wise attrition ratio of employees left the company **male to female** are **150:87**.



Department-wise Attrition Comparison

	Department	total_in_dept	attrition_count	attrition_rate
►	Sales	446	92	20.63
	Human Resources	63	12	19.05
	Research & Development	961	133	13.84

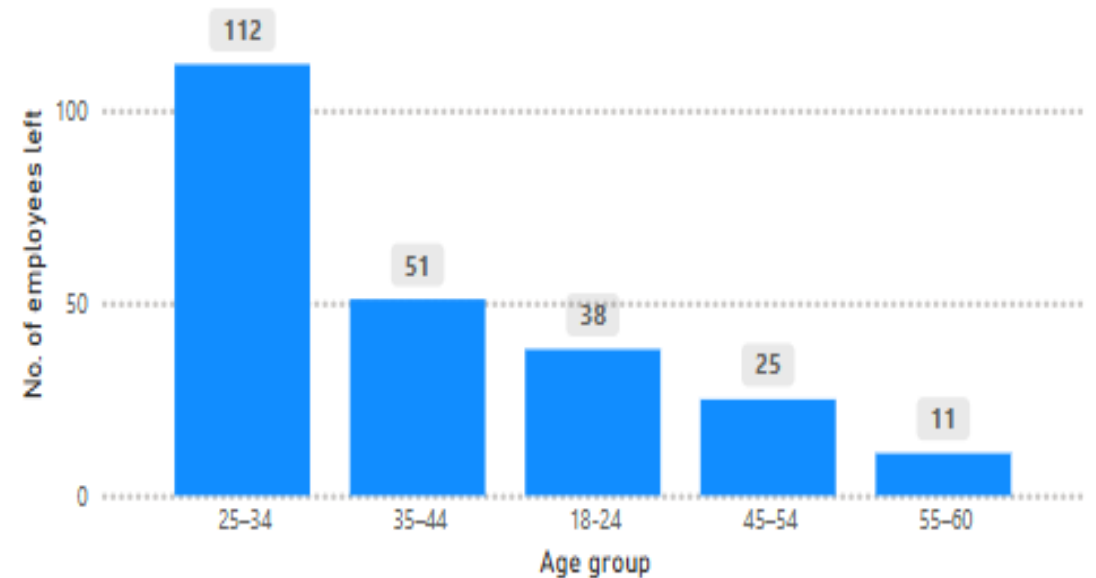
Sales department has maximum attrition rate (20.63%) and Research & Development department has minimum attrition rate (13.84%).



Attrition Risk Across Employee Age Bands

	Age_group	total_employees	employees_left	attrition_rate
▶	18-24	97	38	39.18
	25-34	554	112	20.22
	55-60	69	11	15.94
	45-54	245	25	10.20
	35-44	505	51	10.10

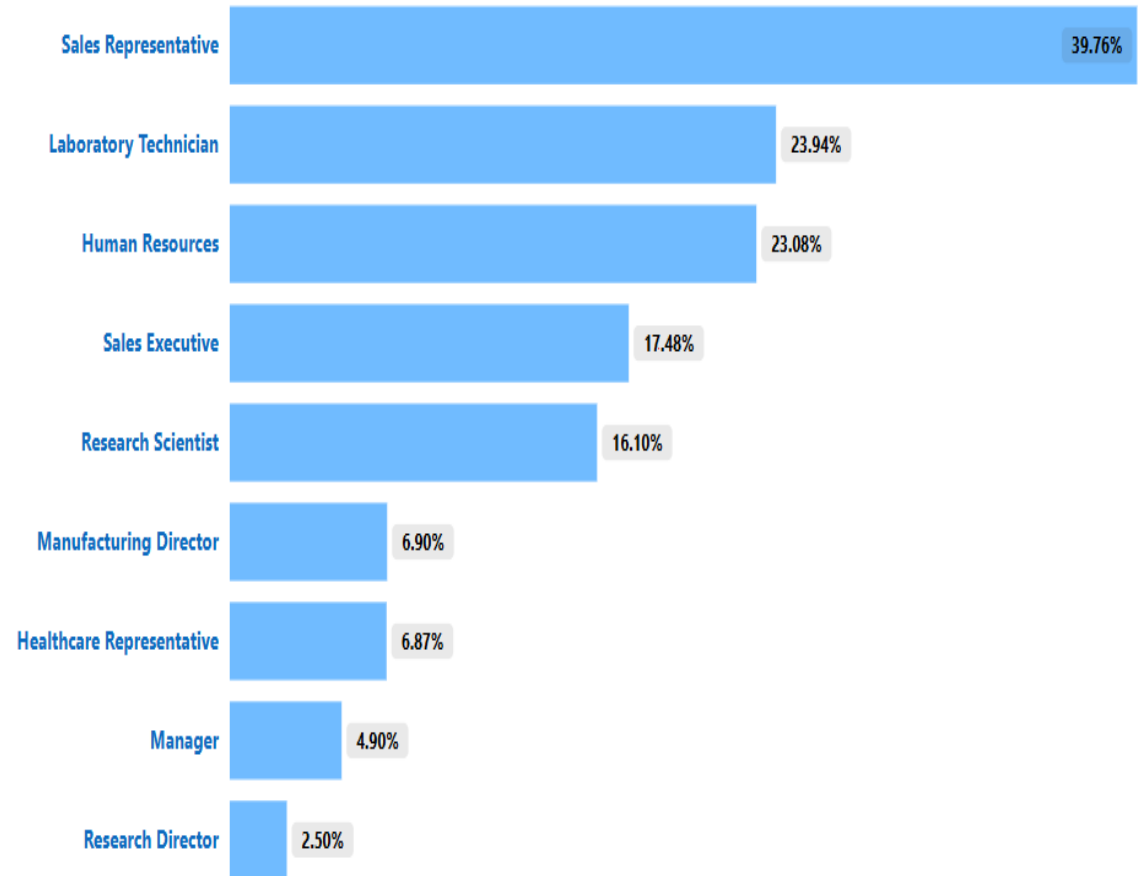
While the **25-34** age group had the **highest number of leavers**, , accounting for nearly half of all leavers. Age **18-24** had the **highest attrition rate**, making them the **most at-risk group** for turnover.



Attrition Hotspots by Job Role

	JobRole	total_employees	employees_left	attrition_rate
►	Sales Representative	83	33	39.76
	Laboratory Technician	259	62	23.94
	Human Resources	52	12	23.08
	Sales Executive	326	57	17.48
	Research Scientist	292	47	16.10

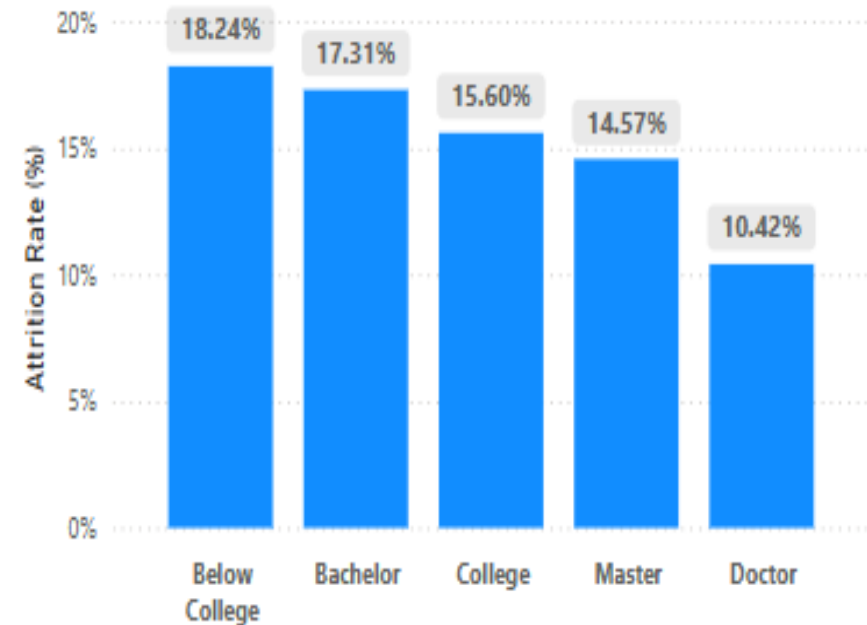
Sales Representatives have the highest attrition rate at **nearly 40%**, significantly above all other roles. **Laboratory Technicians** and **HR professionals** also show elevated attrition rates **above 23%**. Leadership and technical roles, such as **Managers** and **Research Directors**, experience the **lowest attrition**, suggesting greater role stability.



Attrition Trends by Employee Education

	EducationLevel	total_employee	employee_left	attrition_rate
▶	Below College	170	31	18.24
	College	282	44	15.60
	Bachelor	572	99	17.31
	Master	398	58	14.57
	Doctor	48	5	10.42

Employees with **Below College** and **Bachelor** degrees show the highest attrition rates at **18.24%** and **17.31%**, respectively. Attrition gradually decreases with higher education levels, reaching the lowest among **Doctorate holders (10.42%)**.



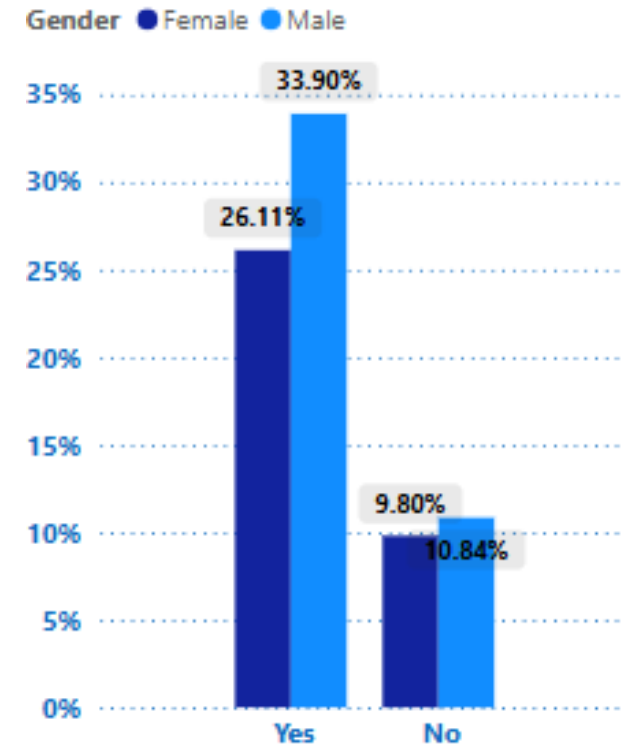
How Does Overtime Impact Attrition?

	gender	overtime	total_employees	employees_left	attrition_rate
▶	Male	Yes	236	80	33.90
	Female	Yes	180	47	26.11
	Male	No	646	70	10.84
	Female	No	408	40	9.80

Employees who work overtime have a significantly higher attrition rate.

Male employees with overtime show the highest attrition at **33.9%**, followed by females at **26.1%**.

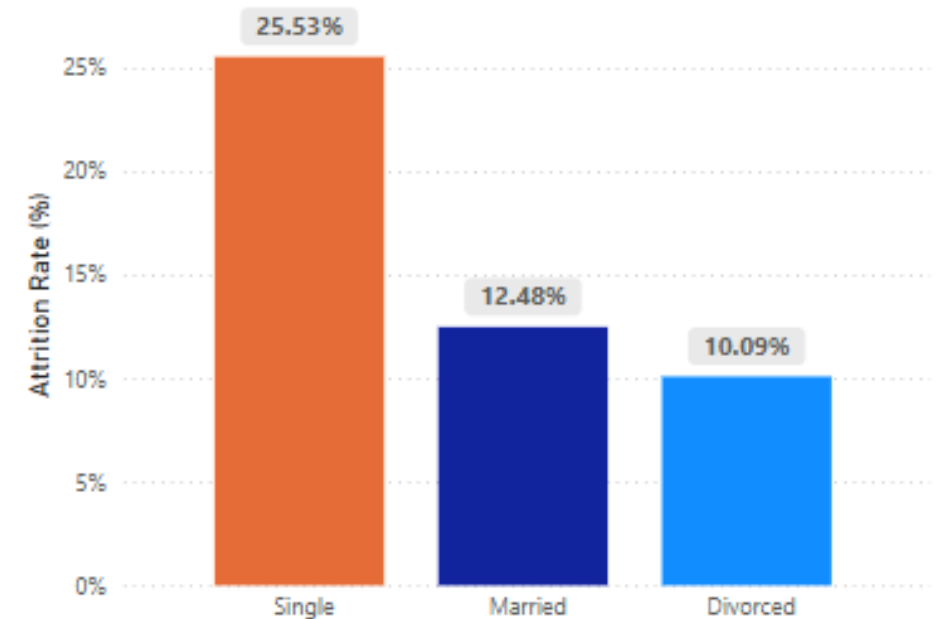
In contrast, those **not working overtime** have much lower attrition (around **10%**).



Is Marital Status Linked to Attrition?

	MaritalStatus	total_employees	employees_left	attrition_rate
▶	Single	470	120	25.53
	Married	673	84	12.48
	Divorced	327	33	10.09

Single employees have the highest attrition rate at 25.53%, nearly double that of married and divorced employees. Married employees show a moderate attrition rate (12.48%), while divorced employees have the lowest at 10.09%.



Suggestions & Recommendations:

1. By Age Group

- Focus retention efforts on the **25–34** age group, which has the highest number of leavers.
- Implement mentorship and career development programs for younger employees (especially 18–24) to reduce early-stage attrition.

2. By Job Role

- Target **Sales Representatives** for retention efforts — they show the highest attrition rate (40%).
- Conduct stay interviews or offer incentives for high-risk roles like Laboratory Technicians and HR professionals.
- Monitor leadership and specialist roles less aggressively, as they show high stability.

Suggestions & Recommendations:

3. By Education Level

- Attrition is highest among employees with **mid-level education** (Below College and Bachelor degrees).
- Provide career path clarity, certification support, or role enrichment to these groups to increase retention.

4. By Overtime

- Overtime is strongly linked to high attrition, especially among male employees (up to 33.9%).
- Re-evaluate overtime policies, redistribute workload, and promote work-life balance, especially in operations-heavy roles.

Suggestions & Recommendations:

5. By Marital Status

- **Single employees** have the highest attrition rate (25.53%), possibly due to mobility or lack of stability.
- Offer tailored engagement strategies, flexible career planning, or work-from-anywhere benefits for younger/single professionals.

6. By Department

- The **Sales department** has the highest attrition; review leadership, targets, and compensation benchmarks in this area.
 - Continue monitoring **Research & Development**, which has the lowest attrition, as a potential benchmark for other teams.
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