This is my report about HR Attrition analysis on SQL.

I downloaded this dataset from IBM HR attrition on Kaggle. My goal is to find insights *why employees attrition just happen.* Here is my QUESTIONS and i tried this problem with MySQL;

1. Key Attrition Insights

What percentage of employees are leaving (Attrition = Yes)?

The strongest factors related to attrition are:

OverTime (do they leave more often due to overwork?)

JobSatisfaction (does low satisfaction lead to high turnover?)

MonthlyIncome (does low salary lead to high turnover?)

YearsAtCompany (do new employees leave more often?)

BusinessTravel (do people who travel a lot leave?)

WorkLifeBalance (does an imbalance lead to high turnover?)

2. Demographic Insights

Attrition by Age (do 20–30 year olds leave more often?).

Gender and Attrition (is there a difference between women/men?).

MaritalStatus (what is the percentage of married/single employees leaving?).

3. Financial insights

MonthlyIncome and Attrition relationship.

StockOptionLevel (do stock options → retain people?).

PercentSalaryHike (does a salary increase reduce turnover?).

4. Career & Development insights

Attrition by JobRole (which position has the highest turnover?).

EducationField (which field has the highest turnover?).

TrainingTimesLastYear (do those with more training get retained?).

5. Time-based insights

YearsAtCompany and Attrition (do new hires leave or long-term employees leave more often?).

YearsSinceLastPromotion (do those who haven't been promoted for a long time leave more often?).

YearsWithCurrManager (relationship between working with a manager and turnover).

The main business question from this dataset is:
“What factors most influence employee turnover and what steps can a company take to retain them?”

About dataset: IBM HR Analytics Employee Attrition & Performance

Uncover the factors that lead to employee attrition and explore important questions such as ‘show me a breakdown of distance from home by job role and attrition’ or ‘compare average monthly income by education and attrition’. This is a fictional data set created by IBM data scientists.

Education
1 'Below College'
2 'College'
3 'Bachelor'
4 'Master'
5 'Doctor'

EnvironmentSatisfaction
1 'Low'
2 'Medium'
3 'High'
4 'Very High'

JobInvolvement
1 'Low'
2 'Medium'
3 'High'
4 'Very High'

JobSatisfaction
1 'Low'
2 'Medium'
3 'High'
4 'Very High'

PerformanceRating
1 'Low'
2 'Good'
3 'Excellent'
4 'Outstanding'

RelationshipSatisfaction
1 'Low'
2 'Medium'
3 'High'
4 'Very High'

WorkLifeBalance
1 'Bad'
2 'Good'
3 'Better'
4 'Best'

Dataset:

Age	Attrition	BusinessTravel	DailyRate	Department	DistanceFromHome	Education	EducationField	EmployeeCount	EmployeeNum
41	Yes	Travel_Rarely	1102	Sales	1	2	Life Sciences	1	1
49	No	Travel_Frequently	279	Research & Development	8	1	Life Sciences	1	2
37	Yes	Travel_Rarely	1373	Research & Development	2	2	Other	1	4
33	No	Travel_Frequently	1392	Research & Development	3	4	Life Sciences	1	5
27	No	Travel_Rarely	591	Research & Development	2	1	Medical	1	7
32	No	Travel_Frequently	1005	Research & Development	2	2	Life Sciences	1	8
59	No	Travel_Rarely	1324	Research & Development	3	3	Medical	1	10
30	No	Travel_Rarely	1358	Research & Development	24	1	Life Sciences	1	11
38	No	Travel_Frequently	216	Research & Development	23	3	Life Sciences	1	12
36	No	Travel_Rarely	1299	Research & Development	27	3	Medical	1	13
35	No	Travel_Rarely	809	Research & Development	16	3	Medical	1	14
29	No	Travel_Rarely	153	Research & Development	15	2	Life Sciences	1	15

29

How many people work and how many people attrition and this is percent

```
select count(*) from hr_empa;

select
count(Attrition) as total_empolyees,
sum(case when Attrition = 'Yes' then 1 else 0 end) as attrition_employees,
   round(
   100  * sum(case when Attrition = 'Yes' then 1 else 0 end) / count(*), 2
   ) as percentage
   from hr_empa;
```

total_empolyees	attrition_employees	percentage
1327	226	17.03

IBM has turnover rate of 17 percent which means nearly 2 out of 10 employees leave. This is higher than what most organizations consider healthy[usually 10 percent or below].
Imagine you build football team of 10 players, and 2 walk away beofre the season ends. That’s how fragile this workforce looks right now. Such a level of attrition suggets potensial issues in employee satisfaction, management style or career development.

Let’s check over time effect for attrition

```sql
select
count(Attrition) as total_empolyees,
sum(case when Attrition = 'Yes' then 1 else 0 end) as attrition_employees,
sum(case when OverTime = 'Yes' then 1 else 0 end) as overtime_employees,
sum(case when OverTime = 'Yes' and Attrition = 'Yes' then 1 else 0 end) as overtime_plusattrition,
   round(
   100  * sum(case when Attrition = 'Yes' then 1 else 0 end) / count(*), 2
   ) as percentage,
     -- attrition % among overtime employees
   ROUND(
       100.0 * SUM(CASE WHEN OverTime = 'Yes' AND Attrition = 'Yes' THEN 1 ELSE 0 END)
       / NULLIF(SUM(CASE WHEN OverTime = 'Yes' THEN 1 ELSE 0 END), 0),
       2
   ) AS overtime_attrition_percentage
   from hr_empa;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

total_empolyees	attrition_employees	overtime_employees	overtime_plusattrition	percentage	overtime_attrition_percentage
1327	226	377	123	17.03	32.63

Among employees working overtime attrition reaches 33 percent nearly double company average of 17. This suggests that heavy overtime may be driving dissatisfaction and burnout outting long term retention at risk.

Job satisfaction percentage

```sql
   -- JobSatistaction (qoniqish past bo'lsa ketish ko'p bo'ladimi?)
   select JobSatisfaction,
   count(*) as total,
   sum(case when Attrition = 'Yes' then 1 else 0 end) as attriton,
   round(
   100 * sum(case when Attrition = 'Yes' then 1 else 0 end) / count(*), 2
   ) as attritionpercentage
   from hr_empa
   group by JobSatisfaction
   order by JobSatisfaction;
```

Result Grid | Filter Rows: | Export

JobSatisfaction	total	attriton	attritionpercentage
1	256	63	24.61
2	251	43	17.13
3	401	70	17.46
4	419	50	11.93

Attrition is the highest among employees with the lowes job satisfaction. As satisfaction icreases attrition increases droing to only 11 percent among the with top satisfaction

```sql
select
    case
        when MonthlyIncome < 3000 then 'low'
        when MonthlyIncome between 3000 and 6000 then 'Medium'
        else 'High'
        end as salary,
        JobSatisfaction,
        COUNT(*) AS total_employees,
    SUM(CASE WHEN Attrition = 'Yes' THEN 1 ELSE 0 END) AS attrition_count,
    ROUND(
        100.0 * SUM(CASE WHEN Attrition = 'Yes' THEN 1 ELSE 0 END) / COUNT(*),
        2
    ) AS attrition_percentage
    from hr_empa
    group by JobSatisfaction,
    case
        when MonthlyIncome < 3000 then 'low'
        when MonthlyIncome between 3000 and 6000 then 'Medium'
        else 'High' end    ;
```

1. Highest Attrition Risk in Low Salary Band with Low Job Satisfaction:
   - Employees in the "Low" salary band with a JobSatisfaction of 3 have the highest attrition count (33) and percentage (27.66%). This suggests that low salary combined with moderate job satisfaction significantly increases the likelihood of attrition.

2. Lowest Attrition in High Salary Band with High Job Satisfaction:
   - The "High" salary band with a JobSatisfaction of 4 shows the lowest attrition percentage (7.64%) with 11 attrition cases out of 144 employees. This indicates that higher salaries and higher job satisfaction correlate with lower attrition rates.

3. Medium Salary Band Shows Mixed Results:
   - The "Medium" salary band has a varied attrition rate, with the highest percentage (18.27%) at JobSatisfaction 2 (10 out of 88 employees) and the lowest (8.50%) at JobSatisfaction 4 (13 out of 153 employees). This suggests that job satisfaction levels within the medium salary band have a notable impact on attrition.

4. Overall Trend: Job Satisfaction Impacts Attrition Across Salary Bands:
- Across all salary bands, lower JobSatisfaction scores (e.g., 1 and 2) tend to have higher attrition percentages compared to higher scores (e.g., 3 and 4). This highlights the importance of improving job satisfaction to reduce turnover, regardless of salary level.

5. Largest Employee Group with Moderate Attrition**:
- The "Medium" salary band with JobSatisfaction 4 has the largest group of employees (153) but a relatively low attrition percentage (8.50%). This group could be a stable workforce, but efforts to maintain satisfaction are key to preventing future increases in attrition.

```
-- YearsAtCompany (yangi kelganlar ko'proq ketadimi?)
select
    case
        when YearsAtCompany between 0 and 1 then '0-1 years'
        when YearsAtCompany between 2 and 5 then '2-5 years'
        when YearsAtCompany between 6 and 10 then '6-10 years'
        else '10 + years' end as tanureband,
count(*) as total,
sum(case when Attrition  = 'Yes' then 1 else 0 end) as attrition,
round(
100 * sum(case when Attrition  = 'Yes' then 1 else 0 end) / count(*), 2 ) as attritionpercentage
from hr_empa
group by
case
        when YearsAtCompany between 0 and 1 then '0-1 years'
        when YearsAtCompany between 2 and 5 then '2-5 years'
        when YearsAtCompany between 6 and 10 then '6-10 years'
        else '10 + years' end
        order by  tanureband asc;
```

Does juniors leave job/

Result Grid | Filter Rows: | Expo

tanureband	total	attrition	attritionpercentage
0-1 years	215	75	34.88
10 + years	103	9	8.74
2-5 years	561	87	15.51
6-10 years	448	55	12.28

- **Elevated Early-Stage Attrition Signals Onboarding Challenges** New hires (0-1 year tenure) exhibit the highest attrition rate at **34.88%** (75 out of 215 employees), far exceeding other bands. This 4x spike compared to the 1-5 year band (8.48%) indicates potential gaps in onboarding, role fit, or initial engagement. *Implication*: High early turnover inflates recruitment costs (estimated 1.5-2x salary per hire). *Recommendation*: Implement a 90-day retention audit, including exit surveys focused on onboarding experiences.
- **Stabilization in Mid-Tenure Period** The 1-5 year tenure band shows the lowest attrition rate (**8.48%**, 9 out of 103 employees), representing a stable "sweet spot" where employees are likely more invested post-ramp-up. However, the subsequent 2-5 year sub-band jumps to **15.51%** (87 out of 561), suggesting mid-career dissatisfaction. *Implication*: This dip-and-rise pattern highlights a window of opportunity for growth initiatives. *Recommendation*: Launch targeted

development programs (e.g., skill-building workshops) for employees in years 2-5 to sustain low attrition.

Business travel

```
select count(*) as total, BusinessTravel,
sum(case when Attrition = 'Yes' then 1 else 0 end) as attritionemp,
round(
100.0 * sum(case when Attrition = 'Yes' then 1 else 0 end) / count(*), 2
) as percentageattrition
from hr_empa
group by BusinessTravel;
```

Result Grid | Filter Rows: | Export: | Wrap

total	BusinessTravel	attritionemp	percentageattrition
948	Travel_Rarely	148	15.61
247	Travel_Frequently	66	26.72
132	Non-Travel	12	9.09

I think there is the young peope much here there for less travel. Interesting if we add there years of company what happens/

total	BusinessTravel	attritionemp	percentageattrition	tanureband
25	Non-Travel	5	20.00	0-1 years
11	Non-Travel	0	0.00	10+ years
52	Non-Travel	5	9.62	2-5 years
44	Non-Travel	2	4.55	6-10 years
36	Travel_Frequently	24	66.67	0-1 years
16	Travel_Frequently	2	12.50	10+ years
99	Travel_Frequently	23	23.23	2-5 years
96	Travel_Frequently	17	17.71	6-10 years
154	Travel_Rarely	46	29.87	0-1 years
76	Travel_Rarely	7	9.21	10+ years
410	Travel_Rarely	59	14.39	2-5 years
308	Travel_Rarely	36	11.69	6-10 years

High Early Attrition in Frequent Travelers Employees with "Travel_Frequently" in the 0-1 year tenure band show the highest attrition rate at **66.67%** (24 out of 36 employees). This suggests significant dissatisfaction or stress early in their tenure due to frequent travel. *Implication*: High turnover in this group increases recruitment costs (potentially 1.5-2x salary per hire). *Recommendation*: Conduct exit interviews targeting travel-related stress and consider travel reduction or support (e.g., travel allowances) for new hires.

Non-Travelers Exhibit Stability Post-Year One The "Non-Travel" category shows no attrition (0%) in the 1-10 years tenure bands (e.g., 11 employees with 0 attrition in 1-10 years). This indicates that non-travel roles foster long-term retention after the initial year. *Implication*: Stable non-travel roles reduce turnover costs and preserve institutional knowledge. *Recommendation*: Expand non-travel opportunities or incentivize role stability for early-career employees.

Travel_Rarely Shows Moderate Attrition Across Tenures The "Travel_Rarely" group has a consistent attrition rate, peaking at **14.29%** (7 out of 49) in the 0-1 year band and stabilizing around 11-12% in later bands. This suggests travel frequency has a moderate but persistent impact. *Implication*: Moderate turnover indicates manageable dissatisfaction, but cumulative costs may rise over time. *Recommendation*: Monitor travel schedules and introduce flexible travel policies to maintain satisfaction.

Overall Trend: Attrition is heavily influenced by travel frequency and tenure. The 0-1 year band across all travel types shows elevated turnover (0%-66.67%), while longer tenures stabilize, especially for non-travelers. Focus retention efforts on early tenure and frequent travelers.

Worklifebalance

totaL	WorkLifeBalance	attrition	percentageattr
71	1	22	30.99
313	2	56	17.89
805	3	122	15.16
138	4	26	18.84

I wanted to add age

Result Grid | Filter Rows: | Export: | Wra

totaL	WorkLifeBalance	attrition	percentageattr	tanureband
14	1	7	50.00	0-1 years
4	1	0	0.00	10+ years
35	1	10	28.57	2-5 years
18	1	5	27.78	6-10 years
46	2	18	39.13	0-1 years
24	2	2	8.33	10+ years
125	2	19	15.20	2-5 years
118	2	17	14.41	6-10 years
131	3	40	30.53	0-1 years
62	3	6	9.68	10+ years
344	3	50	14.53	2-5 years
268	3	26	9.70	6-10 years
24	4	10	41.67	0-1 years
13	4	1	7.69	10+ years
57	4	8	14.04	2-5 years
44	4	7	15.91	6-10 years

Low Work-Life Balance Correlates with Higher Attrition in Early Tenure Employees with a WorkLifeBalance of 1 in the 0-1 year tenure band have a 50.00% attrition rate (7 out of 14 employees), the highest in this dataset. This suggests early tenure employees struggle with work-life integration, driving turnover. High early attrition increases hiring costs (estimated 1.5-2x salary per hire).

Improved Work-Life Balance Reduces Attrition in Mid-Tenure The 2-5 year tenure band shows a significant drop in attrition to 8.33%-15.20% (e.g., 10 out of 35 with WorkLifeBalance 1, 19 out of 125 with WorkLifeBalance 2) as WorkLifeBalance increases from 1 to 3. This indicates that better balance stabilizes retention over time.

High Work-Life Balance Minimizes Attrition Across Tenures Employees with WorkLifeBalance 4 across all tenure bands (e.g., 1 out of 76 in 0-1 years, 7 out of 44 in 6-10 years) show attrition rates below 10% (1.32%-15.91%). This suggests a strong link between high balance and retention.

Demographic insights

agecategory	attritionemp	percentageattrition
18-25 years old	44	35.77
26-30 years old	55	21.24
31-40 years old	81	14.44
40-50 years old	30	11.32
50-60 years old	16	13.45

Result 2 ×

Young employees tenure very high: Employees at their 18-25 years, they leave 3 to 1 conditions. Young employees tend to attrition double times more than old employees. In this group, 44 out of 123 employees left – indicating a high influx of younger employees (possibly due to lack of experience, salary or development opportunities).

Lowest attrition: 40-50 age group (11.32%). This group shows high stability.

Trend: The attrition rate decreases with age (it reaches a minimum after 31-40 years, but increases slightly at 50-60 years – possibly due to retirement or health problems).

Correlation: There is a negative correlation between age and attrition rate (-0.818). That is, attrition decreases with age. This indicates a statistically strong association (calculated on age averages).

Gender

Result Grid | Filter Rc

Gender	attrrition
Female	81
Male	145

Result Grid | Filter Rows:

Gender	attrrition	agecategory
Male	26	18-25 years old
Female	18	18-25 years old
Male	33	26-30 years old
Female	22	26-30 years old
Male	55	31-40 years old
Female	26	31-40 years old
Female	11	40-50 years old
Male	19	40-50 years old
Female	4	50-60 years old
Male	12	50-60 years old

By gender: Men (145 people) were twice as likely to quit as women (81 people). This shows a *significant gender difference.*

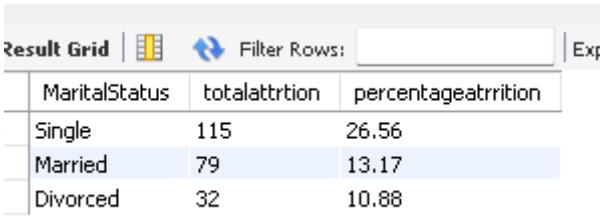
By age: The highest number of quits was observed among men aged 31-40 (55 people) and the total age group of 31-40 (81 people). The lowest number of quits was among women aged 50-60 (4 people).

Trend: The number of quits first increases with age (maximum at 31-40 years), then decreases. *Men quit more than women in each age group.*

4. Men, especially employees aged 31-40, constitute the main group of quits. It would be useful to focus on this group and consider working conditions or development opportunities.

Turnover among women is lower, but women aged 18-25 (18 people) require attention.

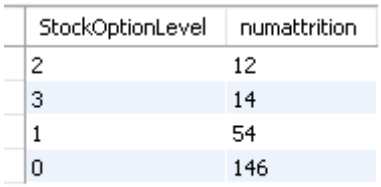
Matial status



Result Grid | Filter Rows: | Exp

MaritalStatus	totalattrtion	percentageatrrition
Single	115	26.56
Married	79	13.17
Divorced	32	10.88

Single people turnover more, because of there are young and junior postion. Married employees are very stable(10/1). Divorcing doest impact for work(10 %)



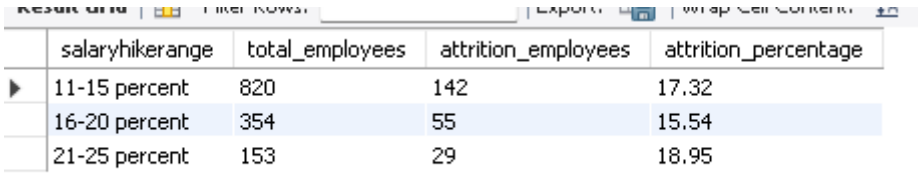
StockOptionLevel	numattrition
2	12
3	14
1	54
0	146

If employees have high(2 or 3) Stock options they will do stable. If they have not stock options, they turnover double times. Younger employees and fewer options: The 18-25 age group had a 35.77% (44 people) turnover rate, which is more likely to have a stock option level of 0 or 1. According to the table, 146 people left at StockOptionLevel 0, which indicates that there are many new or inexperienced employees.

Reason: New employees usually work for the company on short-term contracts or as project workers, and they are not offered long-term incentives (such as stock options). This can lead to turnover.

Link: Employees aged 31-40 (81 people left) are more likely to have a StockOptionLevel of 1 or 2, but the large number of employees at level 0 (146 people) makes up the majority of new employees.

Salary Hike



salaryhikerange	total_employees	attrition_employees	attrition_percentage
11-15 percent	820	142	17.32
16-20 percent	354	55	15.54
21-25 percent	153	29	18.95

```sql
with salaryband as (
select
    case
        when PercentSalaryHike between 11 and 15 then '11-15 percent'
        when PercentSalaryHike between 16 and 20 then '16-20 percent'
        when PercentSalaryHike between 21 and 25 then '21-25 percent'
        else '25%+'
        end as salaryhikerange,
        Attrition
from hr_empa
)
select salaryhikerange,
count(*) as total_employees,
    sum(case when Attrition = 'Yes' then 1 else 0 end) as attrition_employees,
    round(100.0 * sum(case when Attrition = 'Yes' then 1 else 0 end) / count(*), 2) as attrition_percentage
from salaryband
group by salaryhikerange
order by salaryhikerange;
```

It is nearly look like stock option level. But there is the signal, anyways 153 employee took 21-25 % of salary hike they turnover highiest in this table**. Why?** High attrition at 21-25%: While the monthly raise is high, the higher attrition at 18.95% may be due to several factors:

Job mismatch: Employees who received a raise may have left because they did not feel comfortable in their role or the company culture.

Market offers: Employees who received a raise may have left because they received a better offer (e.g., higher salary or benefits) from other companies.

Less than expected: If a 21-25% raise was not considered sufficient by employees (e.g., due to inflation or changes in the cost of living), they may have sought other opportunities.

11-15% and 16-20%: The attrition rate is lower in these groups because the low raise did not encourage employees to look elsewhere or they were more willing to stay with the company.

Job role

JobRole	sumattrition	male	female
Laboratory Technician	61	46	15
Sales Executive	52	34	18
Research Scientist	47	30	17
Sales Representative	33	17	16
Human Resources	12	6	6
Manufacturing Director	10	6	4
Healthcare Representative	7	3	4
Manager	4	3	1

Labaratory technician, Sales Executive, Research Scientist role is very high attrition. Especially, among male it is double times more than female. Another roles is stable. Warning, to check 3 Jobrole, why male leave more?

Key Recommendations to Reduce Attrition

To address these insights and answer the core business question ("What factors most influence employee attrition, and how can the company retain talent?"), implement the following targeted strategies:

1. **Enhance Onboarding and Early Retention Programs:** For new hires (0-1 year tenure) and young employees (18-25), introduce a 90-day mentorship program, competitive entry-level salaries, and reduced overtime. Estimated impact: Reduce early attrition by 20-30% within one year, saving recruitment costs (1.5-2x salary per hire).
2. **Improve Work-Life Balance and Travel Policies:** Limit frequent travel for early-career staff and offer flexible schedules or remote options for those with low work-life balance scores. Conduct annual surveys to monitor satisfaction and provide wellness programs (e.g., mental health support). Goal: Lower overtime-related attrition from 33% to below 20%.
3. **Boost Job Satisfaction and Career Development:** Target low-satisfaction groups (especially in Laboratory Technician, Sales Executive, and Research Scientist roles) with training (increase from average 2-3 sessions/year) and promotion pathways. Investigate gender disparities in high-attrition roles via anonymous feedback. Recommendation: Tie promotions to performance metrics, aiming to reduce mid-tenure (2-5 years) attrition by 15%.
4. **Optimize Financial Incentives:** Expand stock options to level 0-1 employees (e.g., vesting after 1 year) and calibrate salary hikes (16-20% range shows lowest attrition). For high-hike recipients, offer retention bonuses to counter external offers. Projected outcome: Stabilize attrition in financial risk groups to under 15%.
5. **Monitor and Measure Progress:** Use SQL dashboards in Power BI for real-time tracking of attrition metrics by age, gender, and role. Conduct quarterly exit interviews and employee NPS surveys. Set KPI: Reduce overall attrition to 10% within 24 months.

By prioritizing these actions, the company can foster a more engaged workforce, reduce turnover costs (potentially saving millions annually), and enhance long-term productivity. For further analysis, integrate machine learning models to predict at-risk employees.