

# HR Analytics Case Study

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# Problem Statement

A large company named XYZ, employs, at any given point of time, around 4000 employees. However, every year, around 15% of its employees leave the company and need to be replaced with the talent pool available in the job market. The management believes that this level of attrition (employees leaving, either on their own or because they got fired) is bad for the company

In order to find ways to decrease the attrition rate of the company we have performed logistic regression and have come up with few suggestions which are presented in this presentation.

# Approach for analysis

# Data understanding and Cleansing

- ▶ We started with acquiring the data set from XYZ and loading into our R environment.
- ▶ We have tried to understand the different attributes of the dataset and their purpose from the data dictionary provided by the company.
- ▶ We have removed the duplicate rows in the dataset
- ▶ Replaced NA values with appropriate values for categorical and continuous variables.
- ▶ Removed some attributes which are full of NAs

# Data Preparation

- ▶ Converted the required categorical attributes to factor type attributes
- ▶ Converted the numerical levels of attributes to readable levels from the data dictionary.
- ▶ Derived dummy attributes for multilevel attributes
- ▶ The cleansing and data preparation task has been performed for the 5 data sets general, employee survey, manager survey, in time and out time.
- ▶ Treated outliers
- ▶ Brought all data values to same case level

## Data Preparation Continued...

- ▶ All the data of the 5 data sets have been merged based on the employee ID.
- ▶ The data values of all the numeric variables have been standardized by scaling.
- ▶ The scaled data has been divided into training and testing data with training data sharing 70% of the master data set.

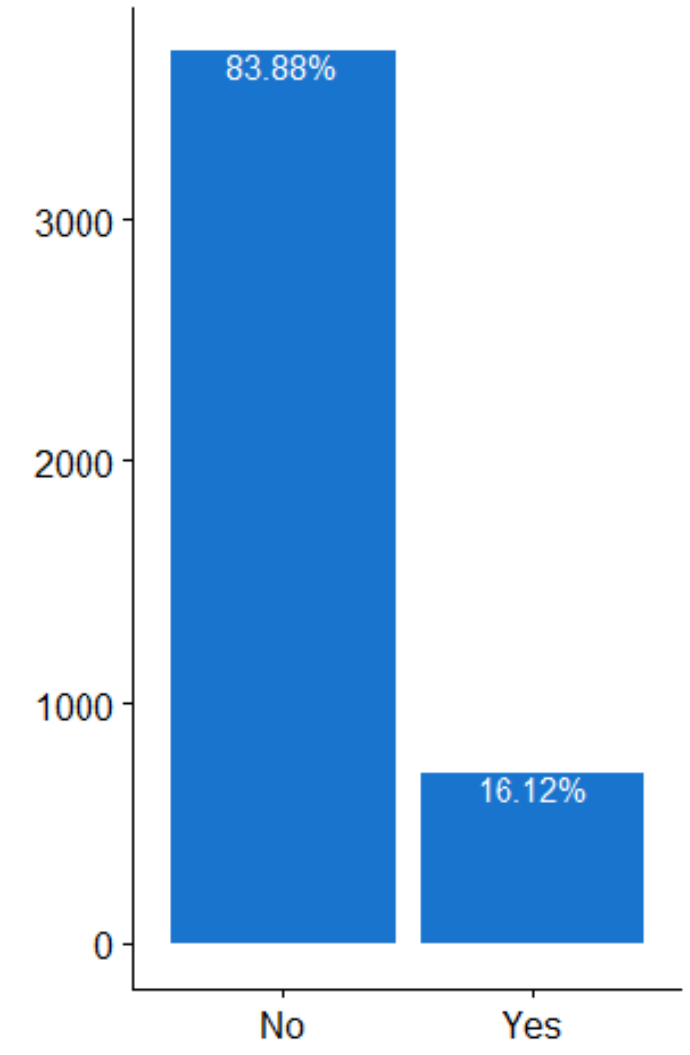
# Data Visualization

# Histograms and Bar plots



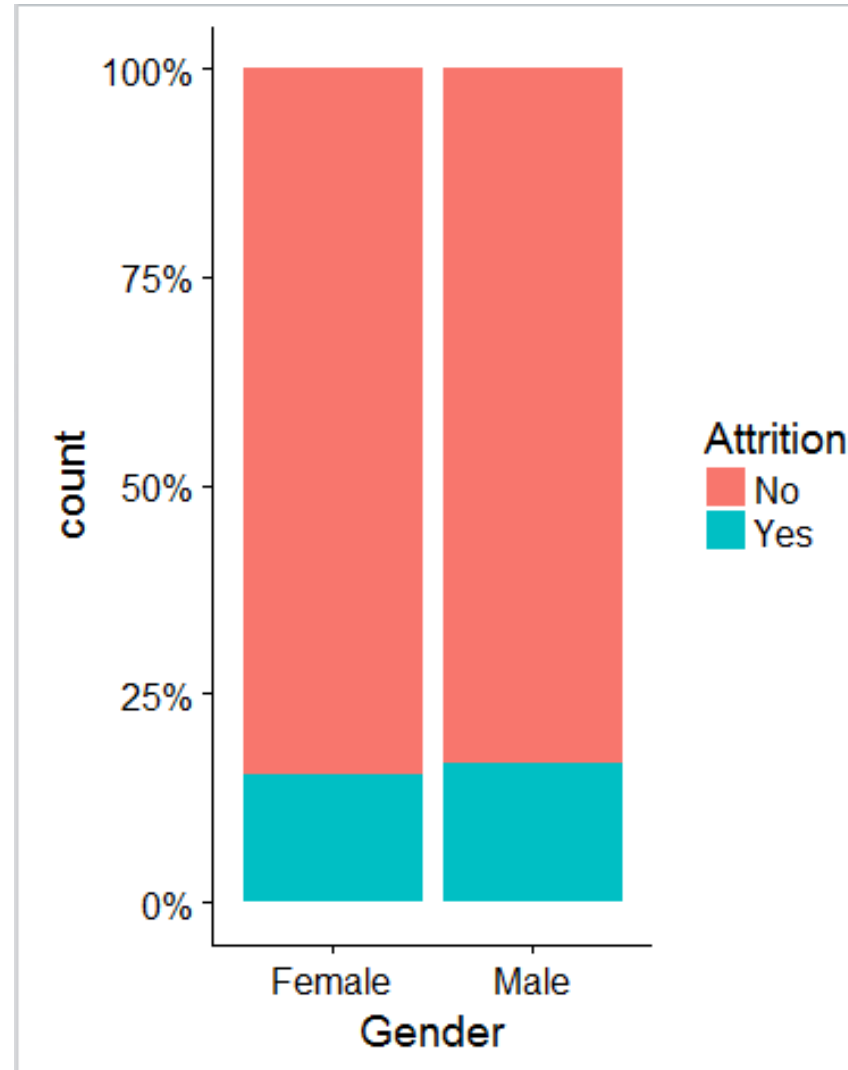
# Attrition Rate

The existing average attrition rate in the company is 16.2%



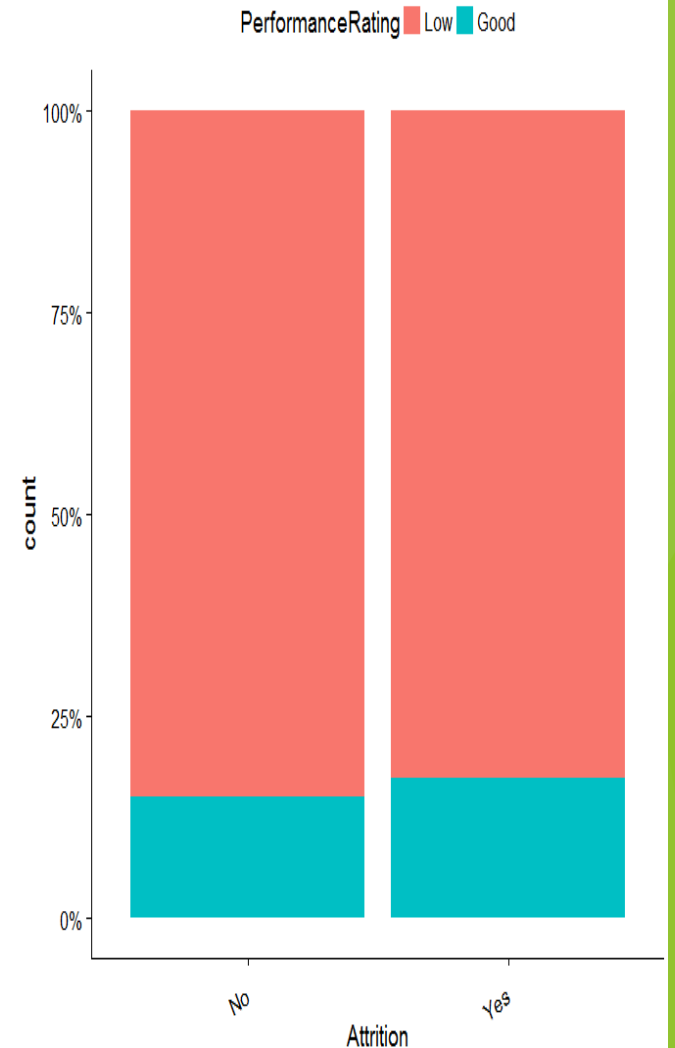
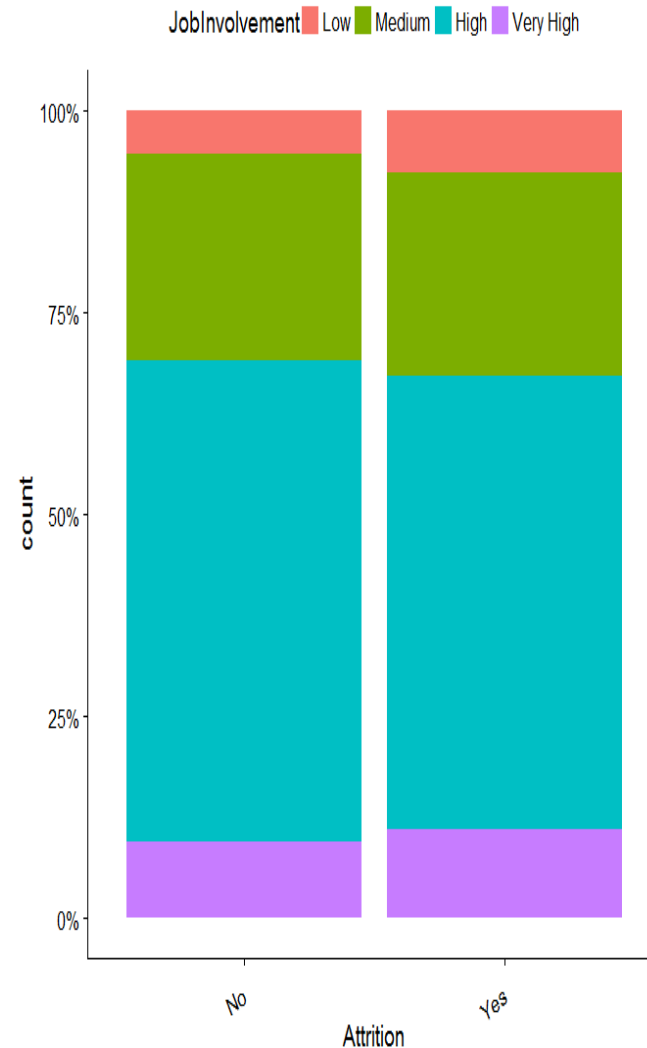
# Attrition by Gender

- The attrition rate is more or less same in both males and females



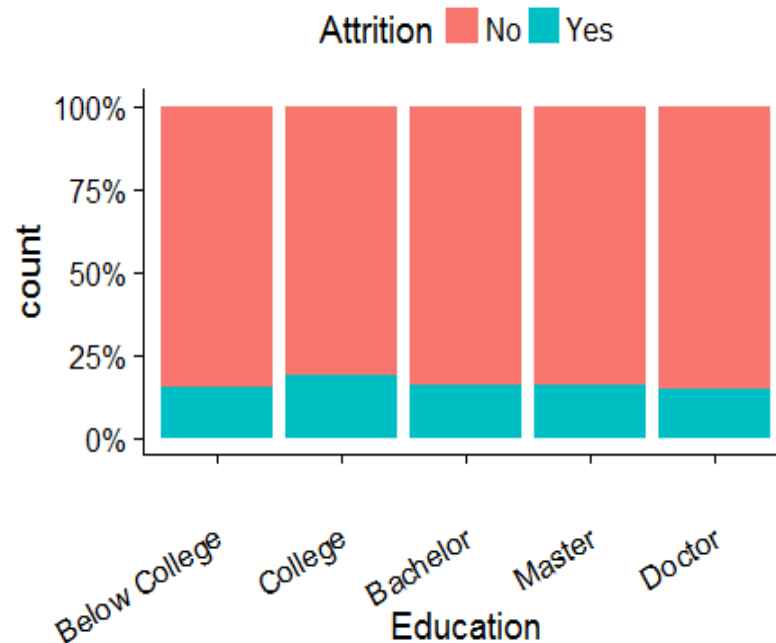
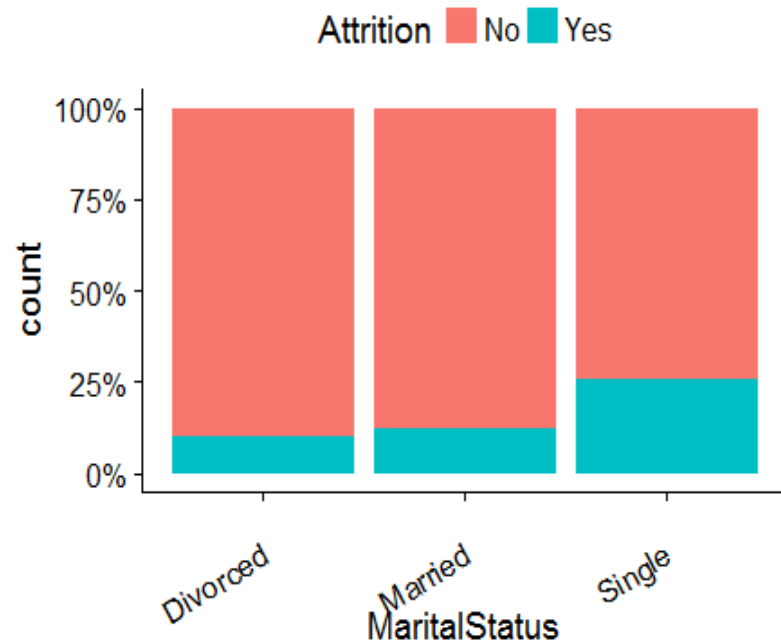
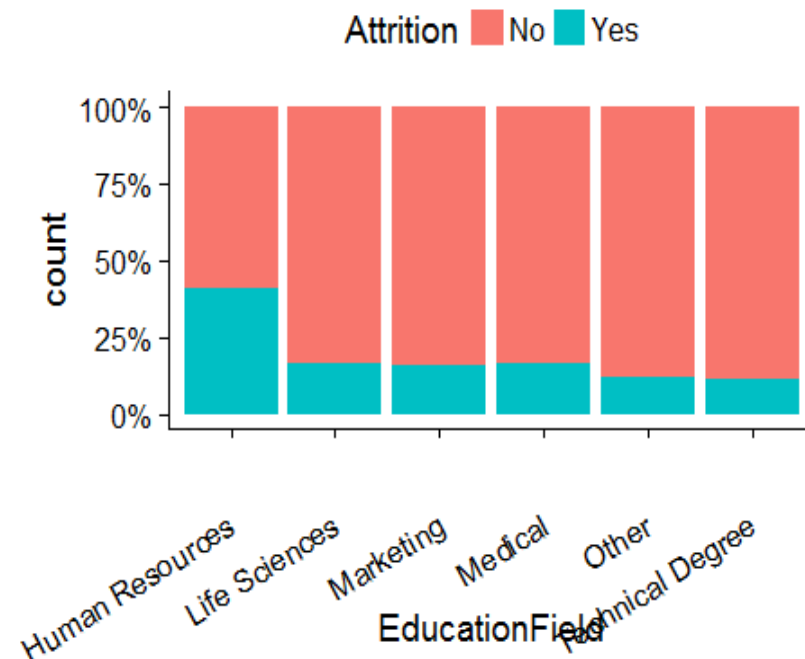
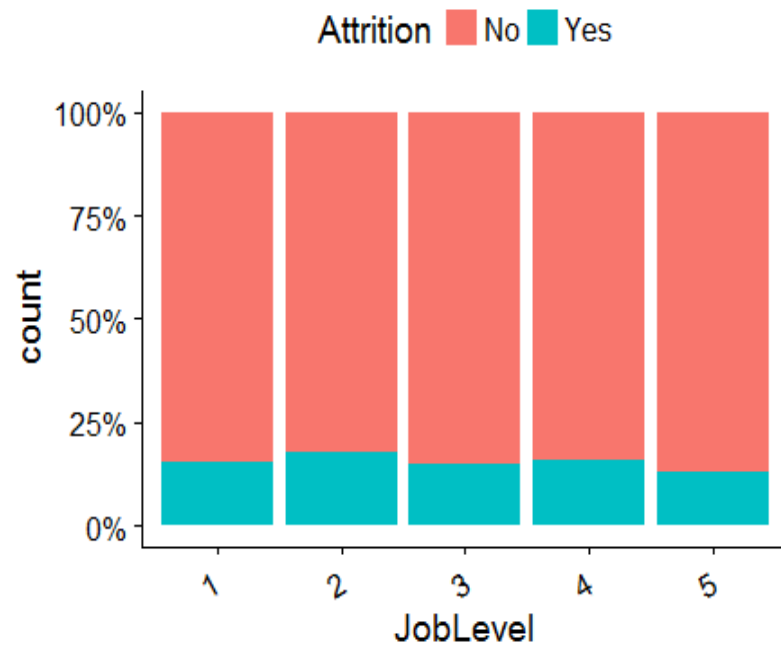
# Attrition by Job Involvement and Performance rating

- ▶ The plot shows that the attrition rate is slightly higher in employees who were awarded good performance rating compared to those who were given low rating. This tells us that there is something else more seriously employees are concerned about than the performance rating.
- ▶ The other plot depicts that the employees with high and medium level of job involvement contribute to major share of attrition whereas those with very high job involvement and low job involvement contribute to smaller share of attrition.
- ▶ It can be understood that those with less job involvement stick to the company may be they are not finding a better job outside. And that those with very high involvement are interested with the work they are doing than any other factors.



The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern, layered effect on the right side of the slide.

Attrition by -  
Job level  
Department  
Education field  
Education level  
Marital status



## Attrition by Job level

From the previous slide we can see that employees with job levels 1,2,3,and 4 contribute to around 12.5% of attrition, where as that in level five contribute to around 10%.So this tells us that there are always around 10% of the employees who are not happy with the company.

## Attrition by Department

Around 25% of employees from HR department alone are contributing to the existing attrition rate. This is a very huge number compared to other departments in the company. The company should seriously consider this department while adopting new and corrective policies.

## Attrition by Education Field

Around 40% of employees who from from HR faculty alone are contributing to the existing attrition rate. This is a very huge number compared to employees from other faculties in the . The company should seriously look into the areas which the HR department is desperately looking for improvements.

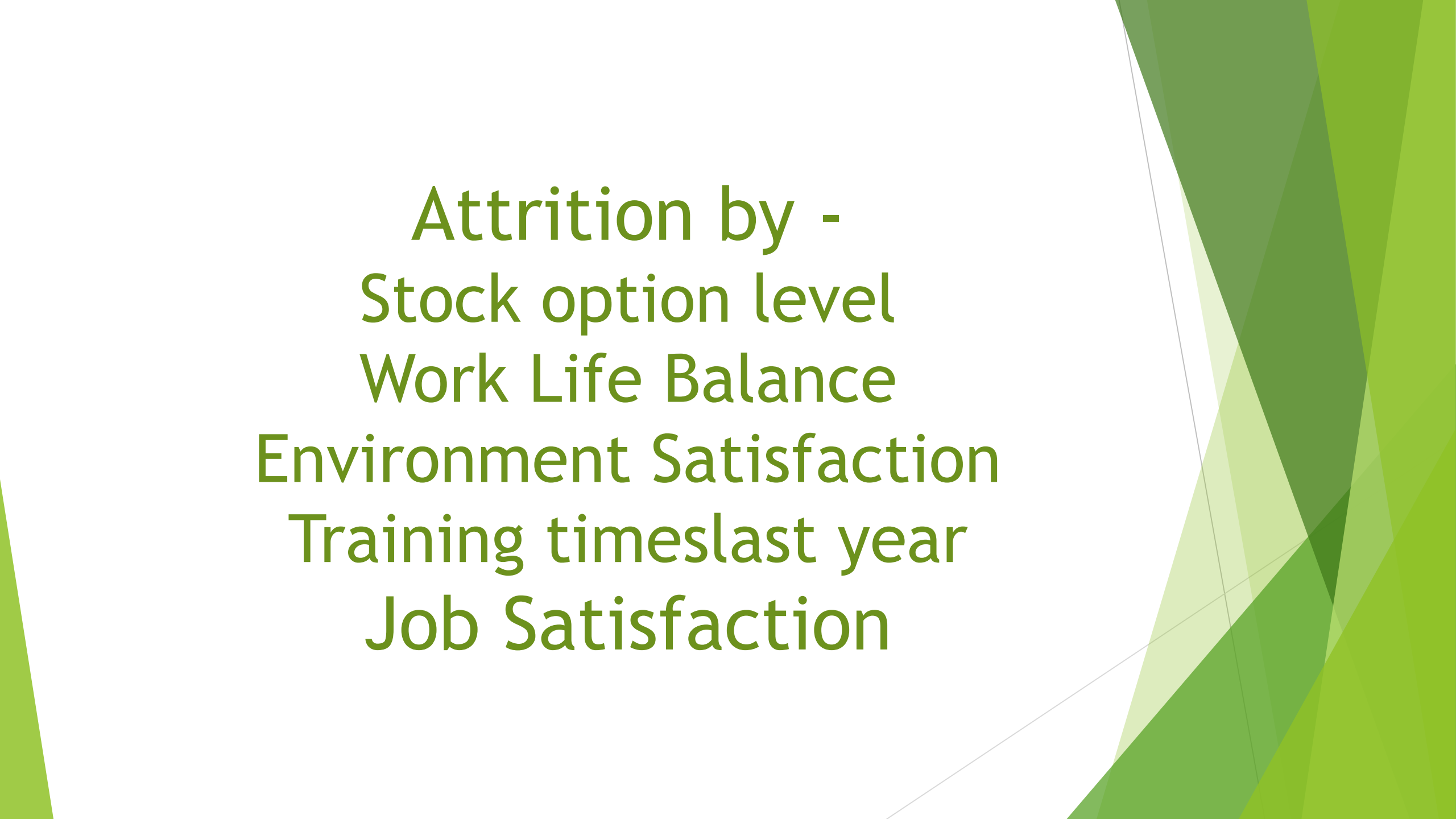


## Attrition by Marital Status

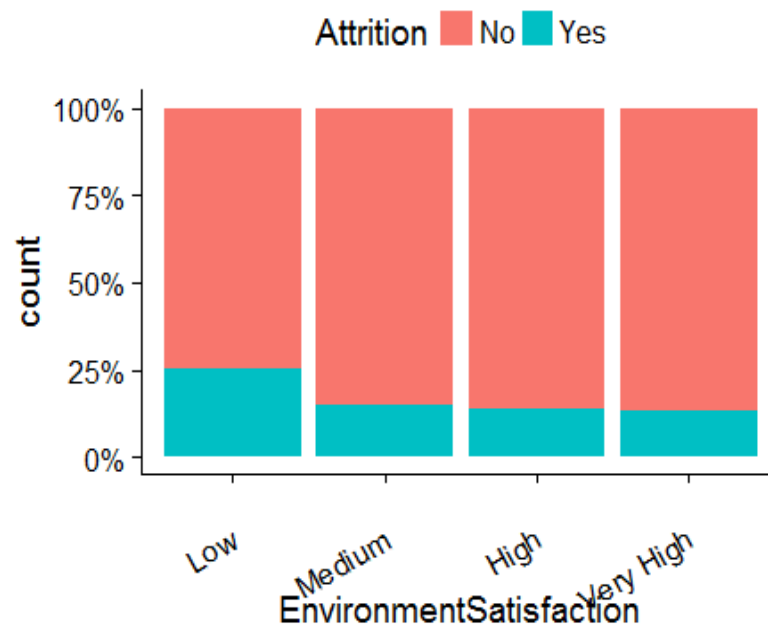
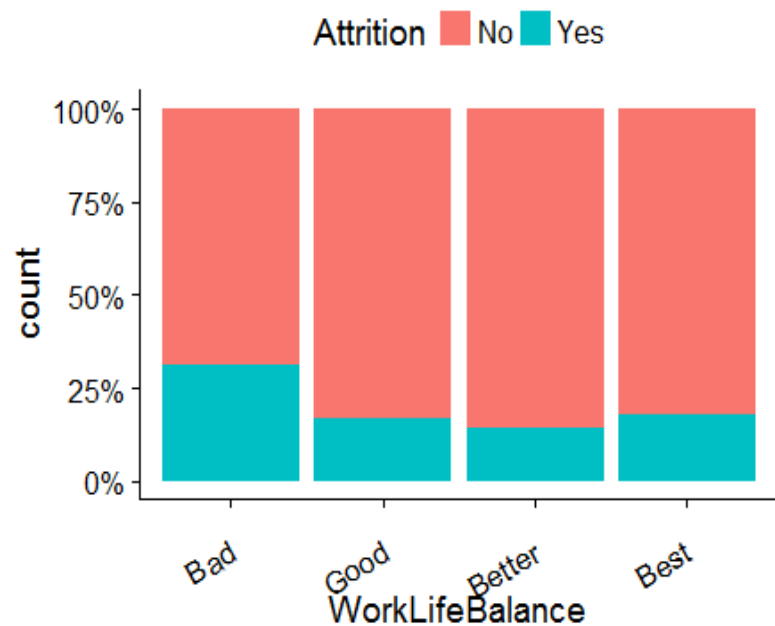
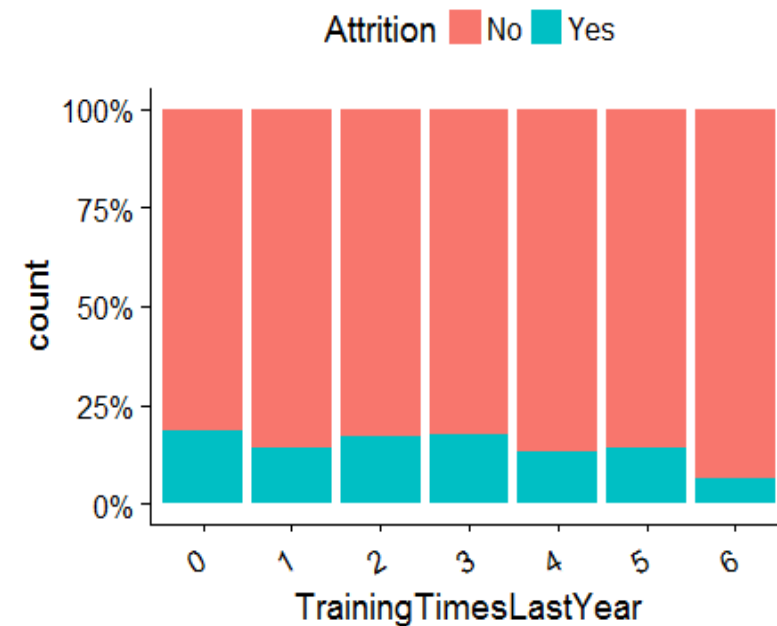
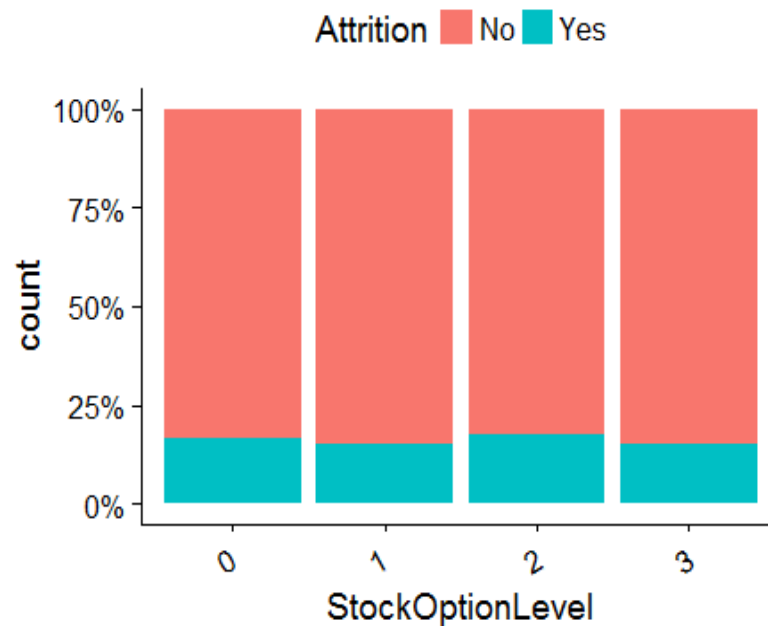
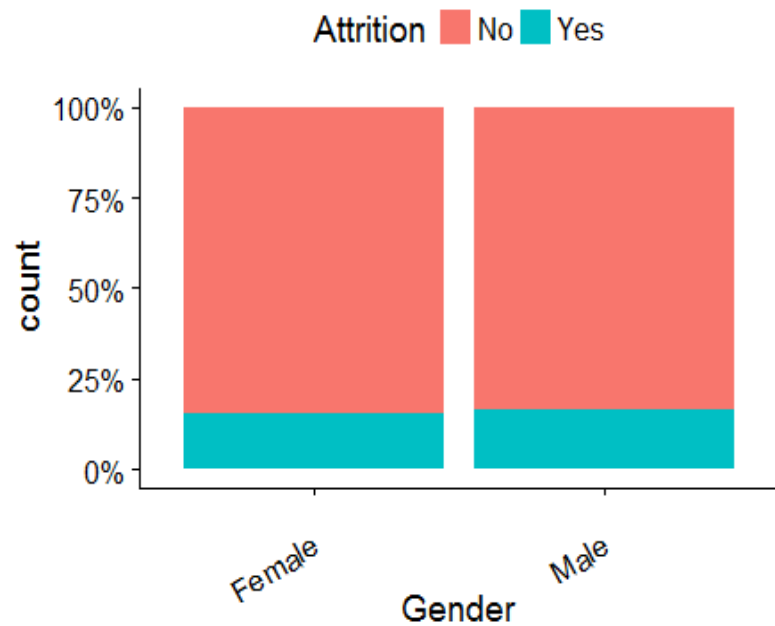
Around 25% of employees who are singles are looking for a job change. As the married and divorced feel more responsible in their duties and in personal life, the company should either do something to retain singles by offering attractive packages or should recruit more employees who are married or divorced.

## Attrition by Education level

Employees who carry degree of +2 , are more who are leaving the company. Employees below +2 hold low level jobs in the company and so do not look out for jobs as they do not have much competency. On the whole 10% of employees from all the education levels are looking out for new jobs. The company needs to perform a employee satisfaction survey and should try to find out the inherent issues in the company.

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Attrition by -  
Stock option level  
Work Life Balance  
Environment Satisfaction  
Training timeslast year  
Job Satisfaction



## Attrition by Stock Option level

Though stock options are provided still around 18% of the employees who are awarded stock options are still leaving the company. This indicates that the company should come up with new reforms or policies after conducting employee satisfaction survey at organization level.

## Attrition by Trainings conducted

The plot depicts that around 15 - 18% of employees who have received trainings are leaving the company. The company should concentrate on conducting more number of trainings which would enhance the skill set of the employees and also which would be useful in performing their jobs efficiently.

## Attrition by Work Life Balance

The plot depicts that around 30% of employees who are undergoing a bad work life are leaving the company. And also from people who are enjoying best work life balance nearly 20% are contributing to the attrition.

The company should come up with new programs which could improve the work life balance of the employees by doing load balancing , conducting timely entertainment programs , team outings etc.

## Attrition by Environment satisfaction

Out of the employees who are not at all happy with the working environment of the company 25% of them leaving the company. Do bring down the attrition rate for this group, the company should conduct skip level meetings and find out the problems facing by them and invest in enhancing the over all work environment.



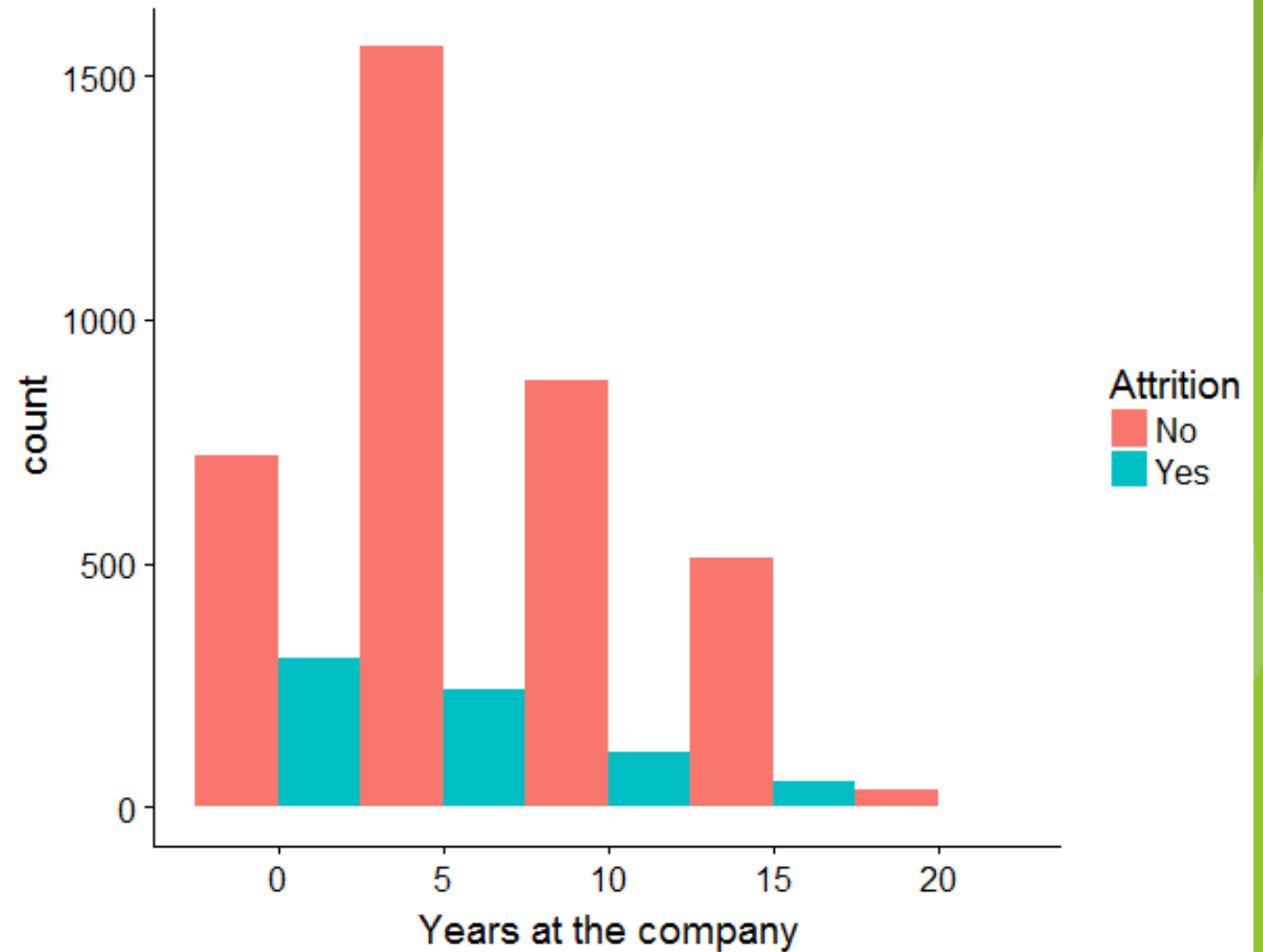
## Attrition by Jo Satisfaction

Out of the employees who are not at all happy with their job 25% are leaving the company. In order to bring down this figure the managers along with the concerned HR manager in all the departments should conduct a one - one survey to find out the requirement of the employees with concerns and try to shuffle their jobs award better assignments which can help them grow vertically or offer better packages to desirable candidates.

# Attrition by Years at company

The plot depicts that most of the employees leaving the company are those who have been with the company for less than 10 years.

The company can look into increasing the packages for desired candidates , bring in new business and expand into other verticals possible. This will help the company to retain its position in the competent market along with generating opportunities for the aspiring candidates.



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# Attrition by - Total Experience Years with current Manager

## Attrition by Years of Experience

From the plot we can see that employees with 0-7 years of overall experience contribute major share of the attrition. Employees with less than 2 years of experience has the maximum share of attrition.

This may mostly happen if the candidates are not finding new things to learn which would help the candidates grow technically.

## Attrition by Years with Manager

Candidates contributing to attrition are the most who have worked with the same manager for less than 5 years. This can be for a wide variety of reasons.

To know the rationale behind this, the HR should plan for regular skip meetings. This will help the HR understand the issues faced by the employees or any other reasons.

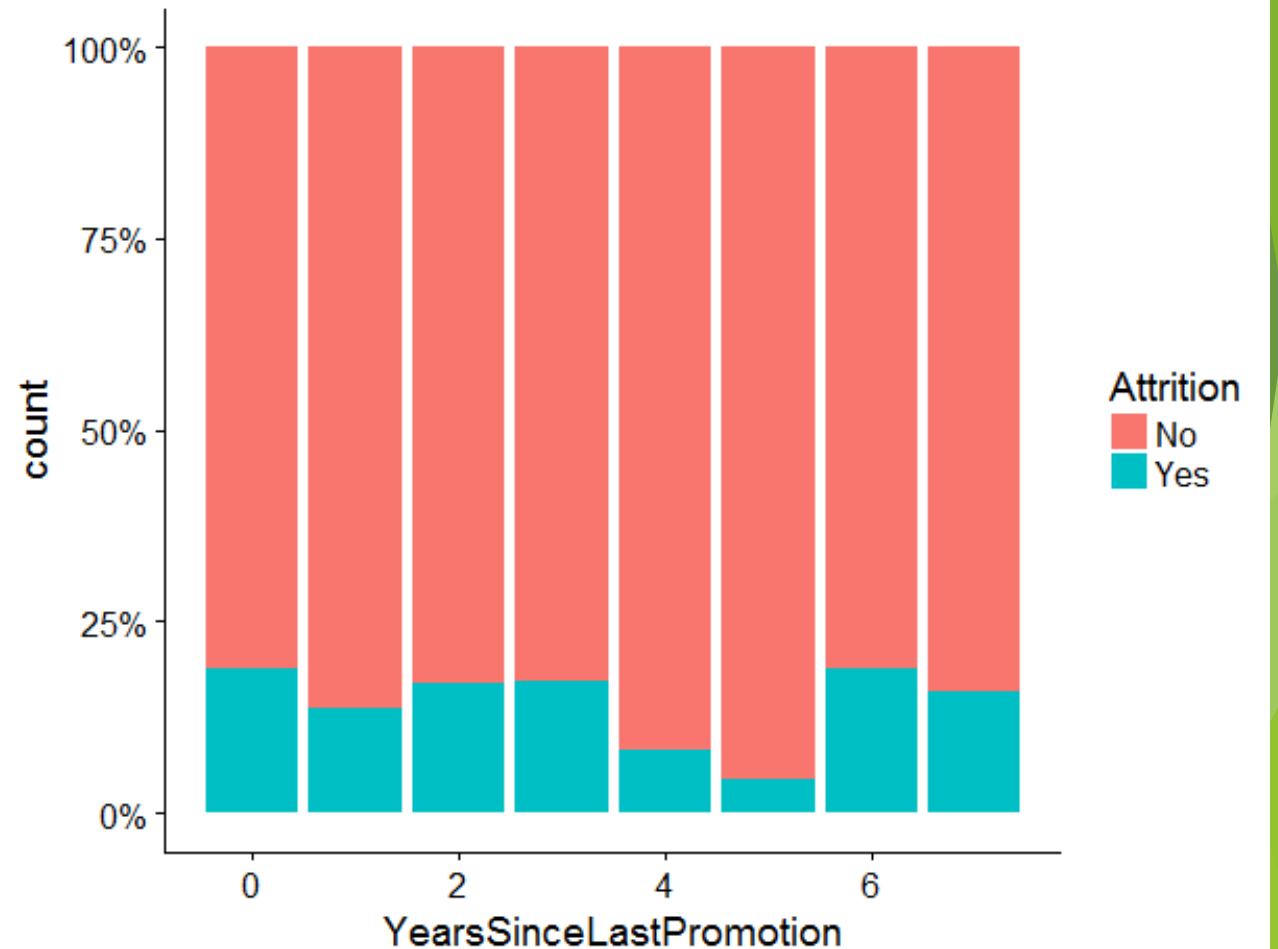
# Attrition by Salary Hike

- The plot shows that employees receiving very high salary hike are those who are contributing for major portion of the attrition.
- This tells us a different story altogether. Even a best hike could not help the company to retain the candidate.
- This implies that the employees are looking at something else any be quality of work , work environment etc.
- The company should request the candidates to mention the actual reasons for their exit during the exit interviews. The company should start conducting these interview's , if they are not currently doing.



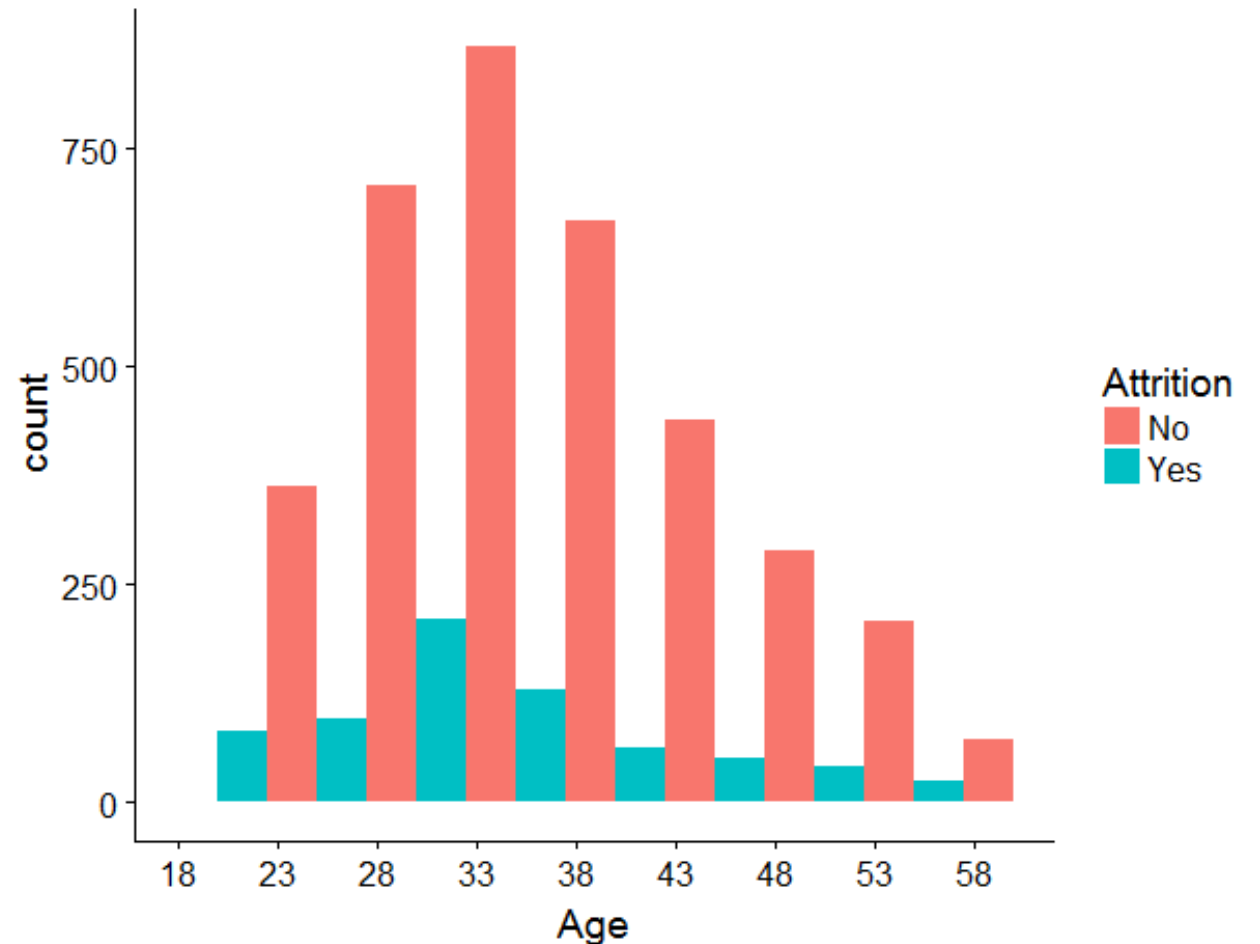
# Attrition By Last Promotion

- ▶ Other than employees who were not promoted for the last 4 and 5 years rest all have a major share in the attrition.
- ▶ As seen earlier freshers are always holding a major share in the attrition.
- ▶ The company should conduct organization level surveys in order to understand the rationale for the dissatisfaction of the employees.



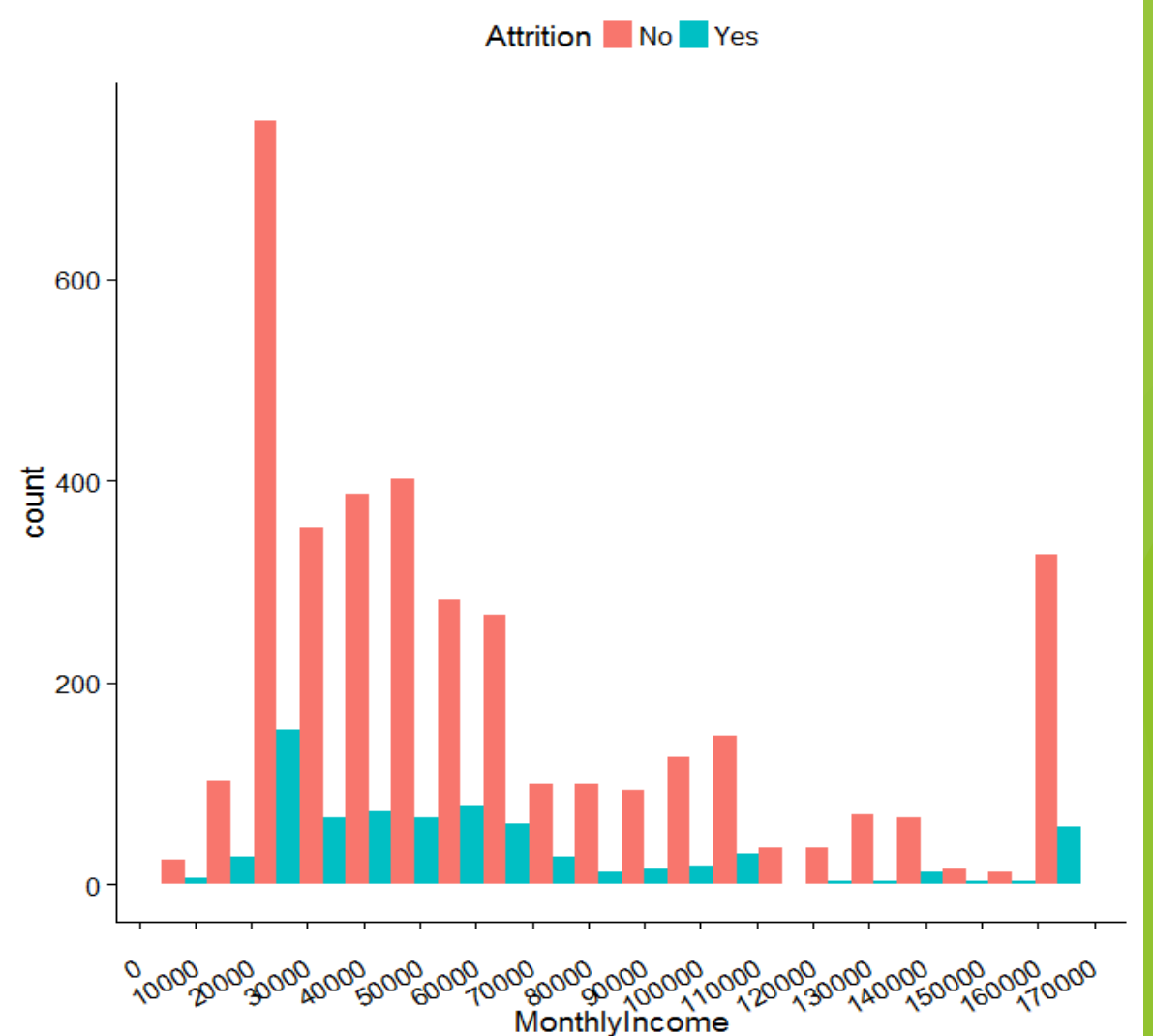
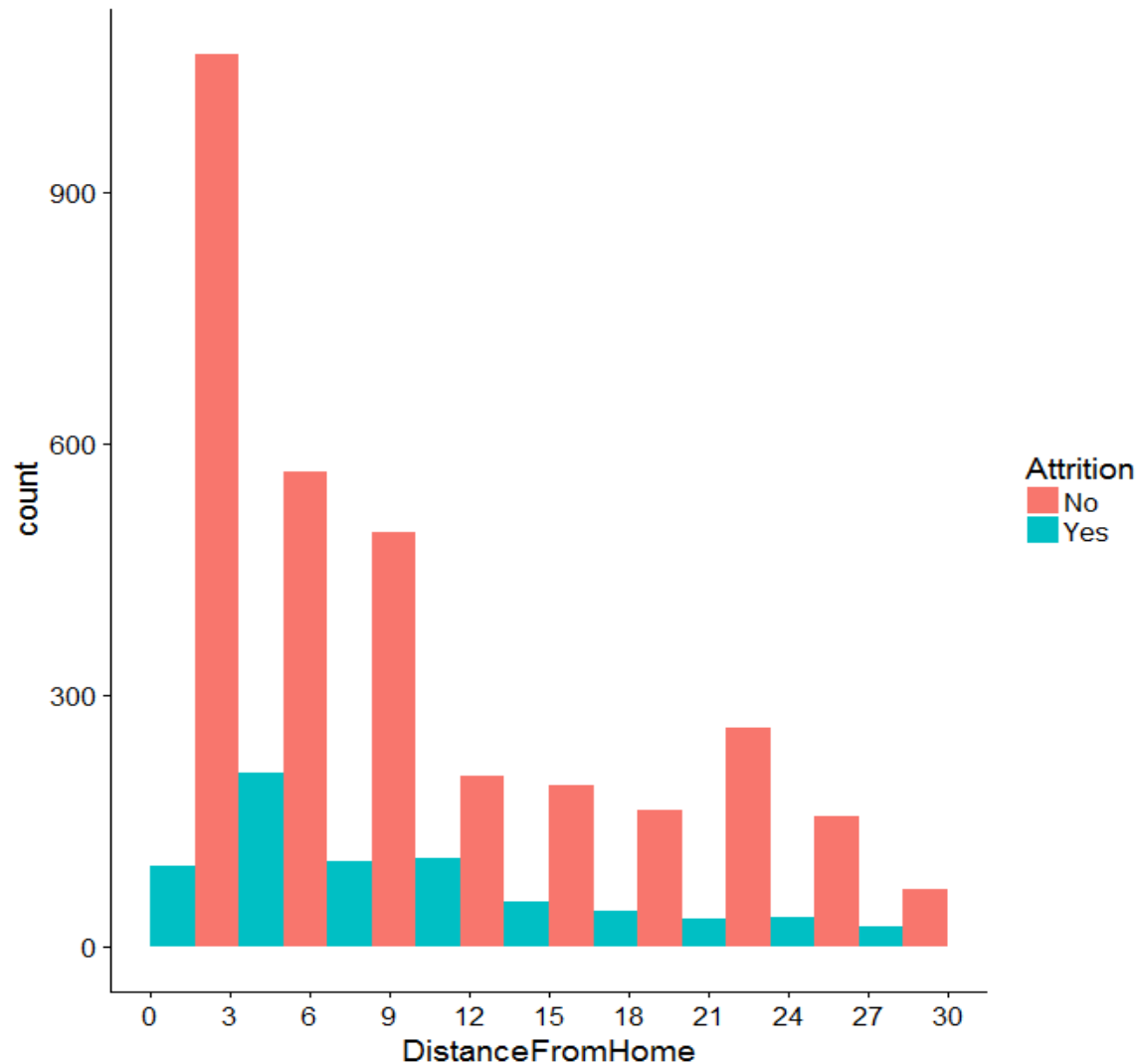
# Attrition By Age

- Employees in the age group of 28 - 33 have major share in the attrition.
- Usually employees with experience between 5 - 9 years fall in this age group.
- As discussed in the earlier slides the company should take appropriate measures in order to bring down the attrition of employees who fall in this group.





# Attrition By monthly income and distance from home



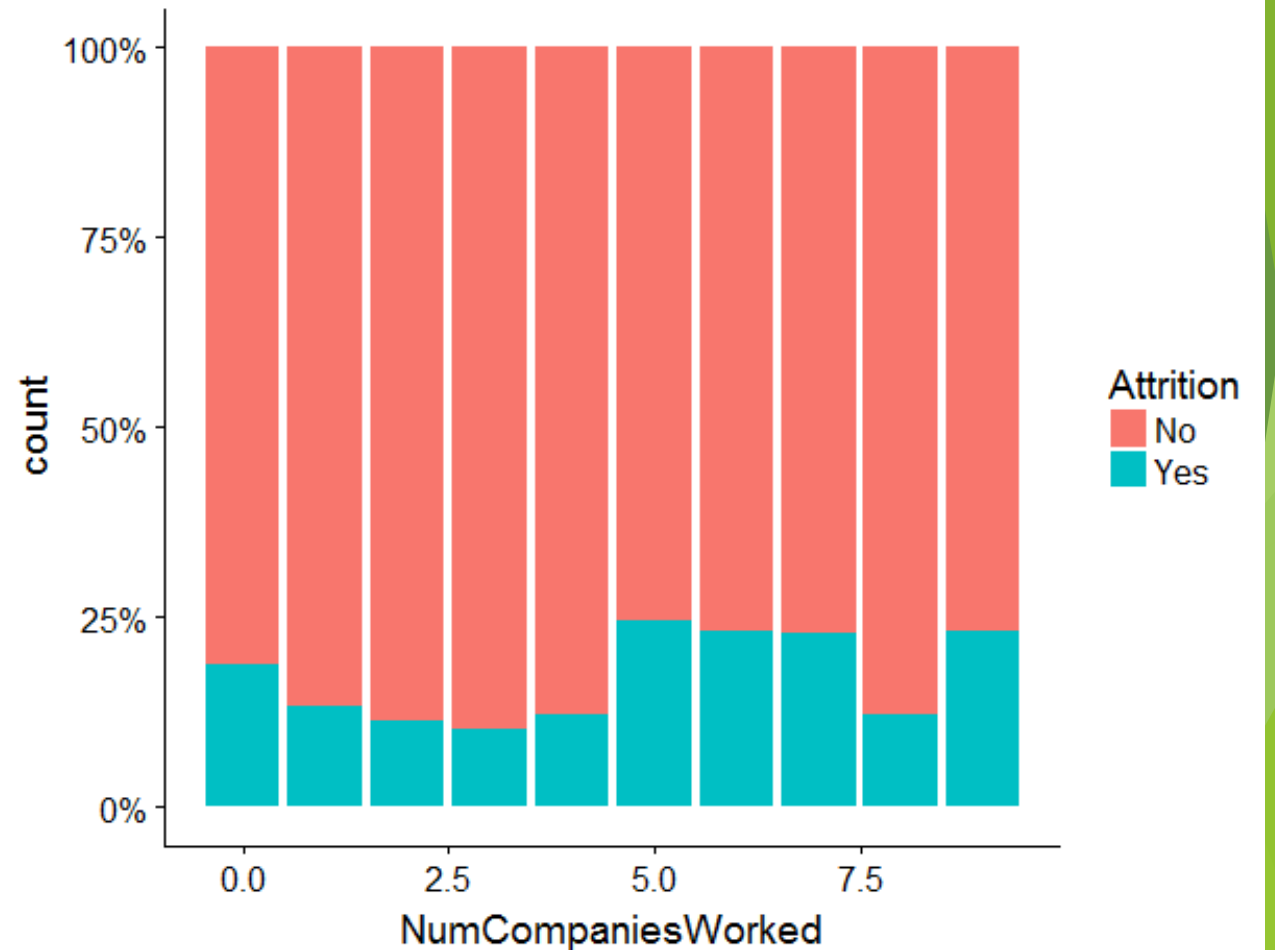
Previous slides depicts that employees with monthly salary between 20K to 30K contribute to major share in the attrition. These employees will fall under low job levels which have high attrition rate.

The slide also has the plot which depicts employees coming from 3 - 6 kms to the office have major share in the attrition. This trend is not common. The company should conduct a survey in order to find the rationale.

Is there no cab service for employees with this range of distance? Need more information to analyze like the location of the company the surrounding developments etc.

# Attrition By No. Of Companies Worked

- ▶ Employees who have worked earlier with 5 - 7 companies have major share in the attrition.
- ▶ Usually such kind of candidates have tendency to change companies very often mostly to get good hike in the package during the jump.
- ▶ The company should exercise caution while recruiting such candidates.
- ▶ Either avoid such candidates or demand bond at the time of joining.
- ▶ So that people who are really looking for a long relationship with the company only would join.



# Model Building and Evaluation

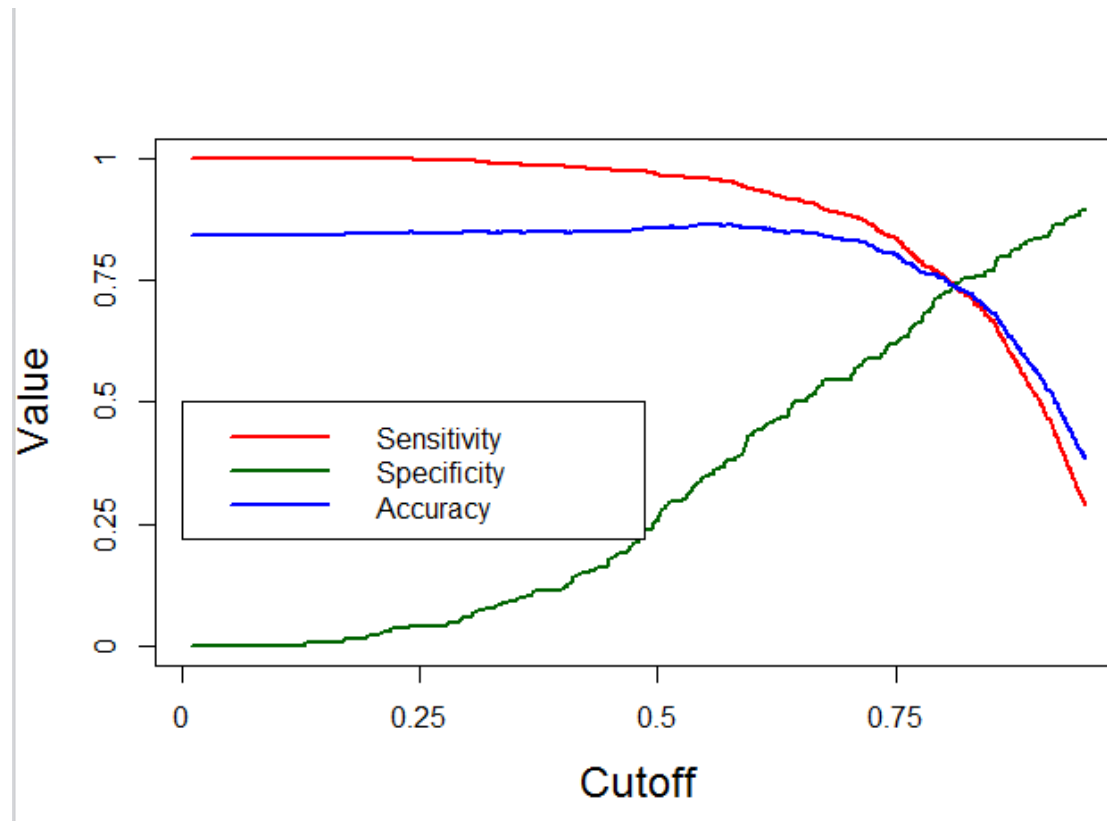
# Model Building

- ▶ Started building the model by running the `glm()` function on the training data set.
- ▶ We followed the backward step building using `stepAIC()` function.
- ▶ In each step we have removed one insignificant variable depending on the p value and vif value of each attribute.
- ▶ It has taken 28 steps to arrive at the final model with 12 most significant variables.
- ▶ The AIC value of the model is 2246.9

# Model Evaluation

- ▶ The model has been evaluated using Confusion-matrix, Gain and lift chart method and KS-Statistic method.
- ▶ The accuracy value attained is 0.7399849.
- ▶ Sensitivity is arrived at 0.7392473
- ▶ Specificity value is 0.7439614
- ▶ In Gain chart method the cumulative attrition is arrived at 44% in the 4<sup>th</sup> decile.
- ▶ The model is lifted by 1.12 times.
- ▶ The KS - Statistic is arrived at 48.3% which is greater than 40% and proves to be a good model.

# Accuracy, Sensitivity and Specificity graph



The cut off value is 0.81

# Summary

- ▶ The logistic model and the plots depict that on the whole all category of employees are not happy with the way company is running.
- ▶ The attrition is observed to be highest in the HR department and from the employees with HR as the education background. The company has to bring up considerable changes in these departments. Should try to considering increase in the package or similar kind of things.
- ▶ The company should conduct organization level survey and find out the rational behind the dissatisfaction of the employees and invest time and money in bringing up new policies , developing infrastructure. Provide transportation facility and other perks to the employees.