Mental Health in Tech Industry - 2016

A Data Analysis Study

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Contents

1. Purpose

As a part of the Google Data Analytics Certificate, I was asked to complete a case study by analyzing a dataset. A case study is a common way for employers to assess our skills and observe how we would approach a data-related project. For my case study, I chose to focus on a public dataset of interest to me – Mental Health of employees working in the Tech industry.

Mental health refers to a person's emotional, psychological, and social well-being. It encompasses one's cognitive and emotional functioning, their ability to handle stress, maintain fulfilling relationships, and make sound decisions. Good mental health involves coping effectively with life's challenges, having a positive self-perception, and seeking help when needed to address issues like anxiety, depression, or stress.

Mental health is crucial in the tech industry as high-pressure environments, demanding workloads, and isolation can lead to burnout and anxiety. Prioritizing mental well-being through support systems and work-life balance not only fosters healthier professionals but also enhances creativity and productivity, contributing to sustainable innovation.

2. About the Data Set

Open Sourcing Mental Health Illness (OSMI) is a non-profit, 501(c)(3) corporation dedicated to raising awareness, educating, and providing resources to support mental wellness in Tech and open-source communities. The OSMI team bring their time and expertise to bear on this critical issue by speaking at conferences and companies, conducting research, and creating documentation to assist companies in making supportive environments for those impacted by mental health disorders.

Every year from 2014, this organization has conducted a survey to measure attitudes towards mental health in the tech workplace and examine the frequency of mental health disorders among tech workers.

3. Ask Phase – The Problem

The largest survey ever conducted by OSMI on mental health in the Tech industry was conducted in 2016. The survey received an overwhelming number of 1400+ from more than 20 different countries.

I wanted to achieve the following objectives by analyzing the survey responses:

- Identify the frequency of mental health disorders across various demographic parameters.
- Observe the state of mental health resources and support offered by employers in the Tech industry.
- Identify attitudes towards mental health in the workplace.

Based on the above analysis, I generated big-picture conclusions and insights which can be used and implemented by the project stakeholders. While this project has no formal stakeholders, following categories of people may be interested in the results of this case study:

- The OSMI team of volunteers can use this data to drive their work in raising awareness and improving conditions for those with mental health disorders in the IT workplace.
- Employers in the Tech industry can use this data analysis to better understand how to support their employees who have mental health issues.

4. Prepare Phase – Download and Prepare Data

The OSMI Mental Health in Tech Survey 2016 data set is available on Kaggle under the Creative Commons Attribution-ShareAlike 4.0 International license.

The survey consisted of 63 questions stored as a .csv file. The data set was organized such that each question constitutes one column, and each survey response appears as a record. The .csv file of survey responses was opened in Microsoft Excel and saved as a .xlsx file for easier data manipulation and analysis. The analysis of this survey data set has been completely exclusively in Microsoft Excel.

This case study was focused on the mental health of workers employed in the Tech industry, i.e., workers employed by a Tech/IT employer. Consequently, records which met the following criteria were removed as they were irrelevant:

- Participants who were self-employed, as indicated by the question, "*Are you self-employed?*"
- Participants who did not work for a Tech/IT employer, as indicated by the question, "*Is your employer primarily a tech company/organization?*"

5. Process Phase – Clean Data

The process phase involved numerous data cleaning steps which have been summarized in the next few subsections.

5.1 Fixing Incorrect Data Types

Inconsistent data type was observed for the column relating to the question, "*How many employees does your company or organization have?*". For some records, the data type was auto-detected as Date while for others, the data type was auto-detected as Text. To resolve this issue and ensure data consistency, I modified each record to a Text data type as shown below:

- 1-5 → 1 to 5
- 6-25 → 6 to 25
- 26-100 → 26 to 100
- 100-500 → 100 to 500
- 500-1000 → 500 to 1000
- More than 1000 → More than 1000

5.2 Standardizing Survey Responses

One of the biggest challenges of the data set was that the survey responses were non-standard across different questions. For some questions, the participants indicated a 1 and 0 for "*Yes*" and "*No*" respectively while for other questions, the participants indicated "*Yes*" and "*No*" response itself. This inconsistency was resolved by modifying the records that indicated 1 for "*Yes*" and 0 for "*No*" to instead used the words, "*Yes*" and "*No*". This change was made for the following questions:

- *Is your employer primarily a tech company/organization?*
- *Is your primary role within your company related to tech/IT?*
- *Do you have medical coverage (private insurance or state-provided) which includes treatment of mental health issues?*
- *Do you have previous employers?*
- *Have you ever sought treatment for a mental health issue from a mental health professional?*

Another question for which non-standard responses were observed was, *"What is your gender?"*. Since the survey had specified this question as a text question instead of providing specific choices, a myriad of responses was given by the participants. To indicate gender as Male, some participants had responded with "*Male*" or "*M*" while other participants responded with "*Cis-Male*". A similar discrepancy was also observed for participants who indicated their gender as "*Female*". Participants from the LGBTQIA+ community also provided a variety of different responses as well. To have standardize the response for this question, I modified each record to specify one of the following genders:

- Male
- Female

- Other
- Prefer not to Answer

5.3 Adding Age Ranges

The survey had a question which asked the participant's age. A lot of surveys usually specify an age range for this question so that responses are easier to plot and visualize. In this survey, however, no such age ranges were specified, and participants had simply input in their age. To aid in upcoming analysis and visualization, I created the following age ranges:

- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 – 64
- 65+

Then, I used the following formula to assign the input age to one of the above age ranges:

```
IFS (AA2 < 25, "18 - 24", AA2 < 35, “25 - 34”, AA2 < 45, “35 - 44”, AA2 < 55, “45-54”, AA2 < 65, “55 – 64”, AA2 >= 65, “65+”)
```

5.4 Adding a New Column for Managerial Role

The survey had a question which asked the participants their work position. The participants were allowed to select multiple choices to represent their job functions. I wanted to observe if occupying a managerial role such as Supervisor, Team Lead or Executive Leadership in addition to any other work functions had an impact on mental health.

Consequently, I added a new column to the data set which represented the question, - "*Are you a supervisor, team lead or executive leader? "*. This column checked if the work function input by the participants included one or more of the following positions – Supervisor, Team Lead or Executive Leadership. If the work function included one or more of these roles, then the column value was input as "*Yes*". Else, the column value was input as "*No*".

5.5 Removing Irrelevant Columns

The last data cleaning step was to remove those questions which were not relevant to the case study. Some of these questions focused on more specific details that were out of scope for this analysis while other questions provided no useful information. As a result of removing these columns, the data set was reduced to 31 questions.

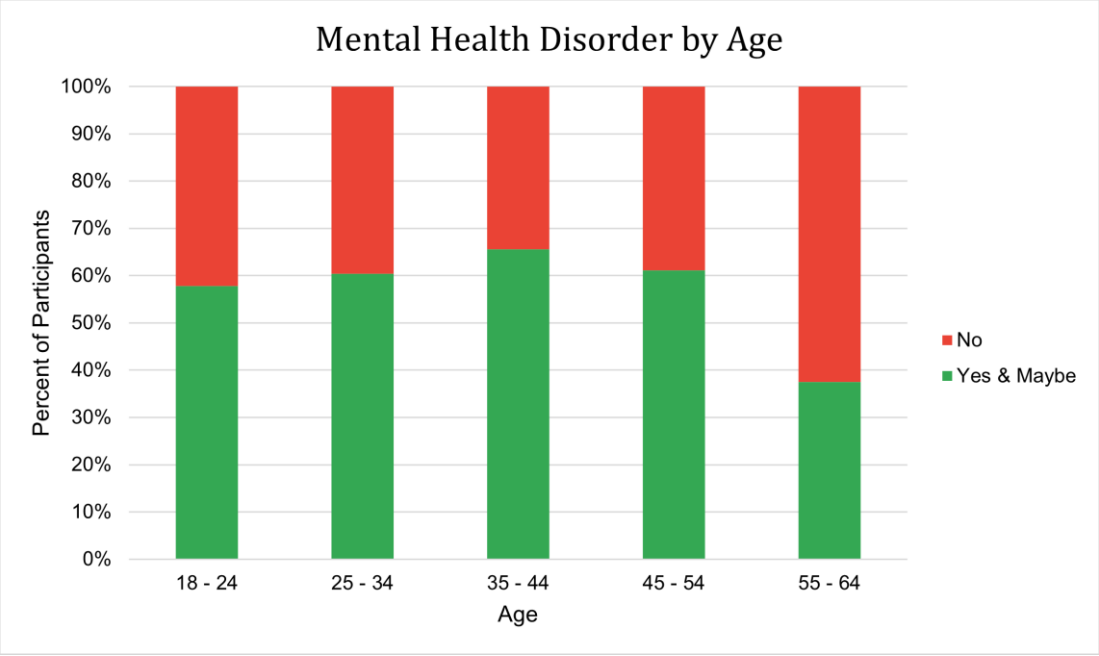
6. Analyze and Share Phase – Generating Insights

This phase has been divided into three sections to individually focus on the three objectives described in the Ask Phase. Most of the analysis completed in this section used the COUNTIF and COUNTIFS functions in Microsoft Excel to summarize the data.

6.1 Demographic Summary of the frequency of Mental Health Disorders

In this section, I looked at the frequency of mental health disorders across the following parameters – Age, Gender, Country, Company size, Remote working, and Managerial Role.

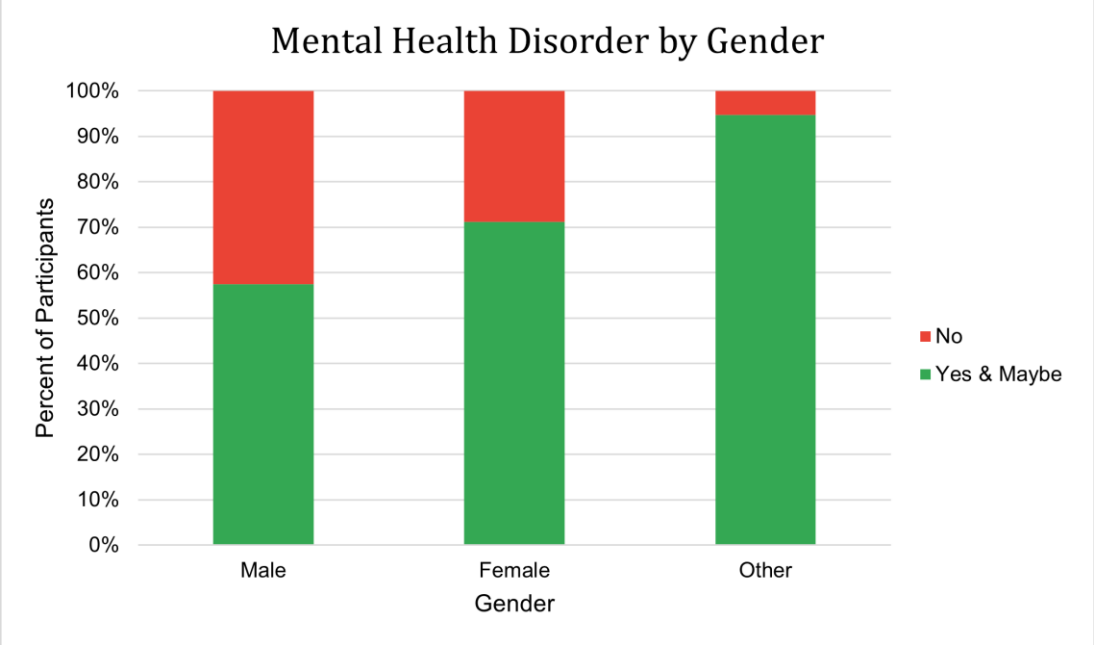
6.1.1 Mental Health Disorders by Age



From the above visualization, we can observe that for ages 18 to 54, more than 50% of participants have reported that they have a mental health disorder. We can also see that percentage of participants who have a mental health disorder also increases with age – 58% of participants in the age range of 18-24 have reported a mental health disorder and this percentage increases to 60% for participants in age range of 25-34 and 66% for participants in the age range of 35-44. Surprisingly, this percentage decreases slightly to 61% for participants in the age range of 45-54 and

very significantly for participants in the age range of 55-64. This anomaly may be attributed to the fact that much fewer participants are in these age groups – only 54 and 8 respectively – and thus this downward trend may not be accurately representative of those age groups.

6.1.2 Mental Health Disorders by Gender



From the above visualization we can observe that across all genders, more than 50% of participants have reported that they have a mental health disorder. There is also a significant disparity of mental health disorders across different genders. While only 57% of males have reported that they have a mental health disorder, this number sharply rises to 71% for females and 95% for others. It is crucial to note here that the number of other participants is significantly smaller than the number of male and female participants, who make up 97% of the survey participants. Consequently, the actual percentage of the other population who have a mental health disorder is likely to be lower than 95%.

6.1.3 Mental Health Disorders by Country

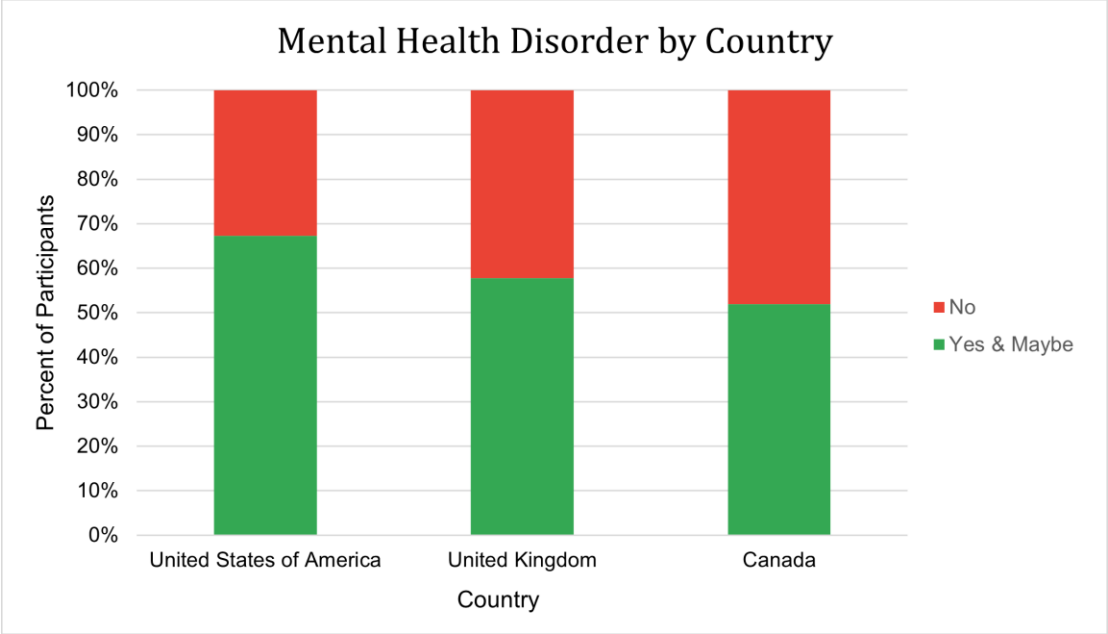
As we can observe in the table below, the survey received responses from participants in 21 different countries.

Country	Number of Participants
United States of America	547
United Kingdom	97
Canada	52
Germany	35
Netherlands	22

Australia	21
Sweden	12
France	10
Russia	9
Ireland	8
India	7
Bulgaria	6
New Zealand	6
Brazil	5
Denmark	4
Switzerland	4
Belgium	3
Finland	3
Chile	2
Estonia	2
Israel	2
Italy	2
Norway	2
Pakistan	2
South Africa	2
Spain	2
Afghanistan	1
Argentina	1
Austria	1
Bangladesh	1
Bosnia and Herzegovina	1
Colombia	1
Czech Republic	1
Ecuador	1
Hungary	1
Iran	1
Poland	1
Romania	1
Slovakia	1
United Arab Emirates	1
Vietnam	1

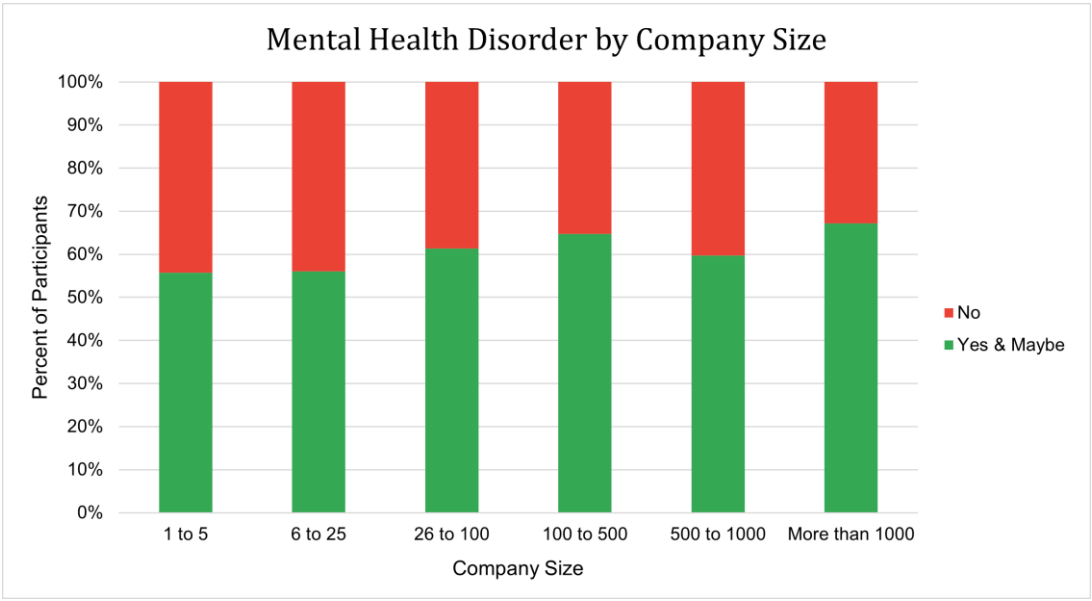
For this case study, I have chosen to focus only on the top three countries with the greatest number of participants as the number of responses were large enough to draw some meaningful conclusions. The top three countries with the greatest number of participants are United States of America, United Kingdom, and Canada. For other countries, the sampled population is not large enough to be accurately

representative of that country and thus, including these countries may lead to sampling bias and misleading insights.



From the visualization we can observe that for all observed countries, more than 50% of participants from that country have reported that they have a mental health disorder. The United States of America has the highest percentage of participants who have reported a mental health disorder, closely followed by the United Kingdom and Canada.

6.1.4 Mental Health Disorders by Company Size

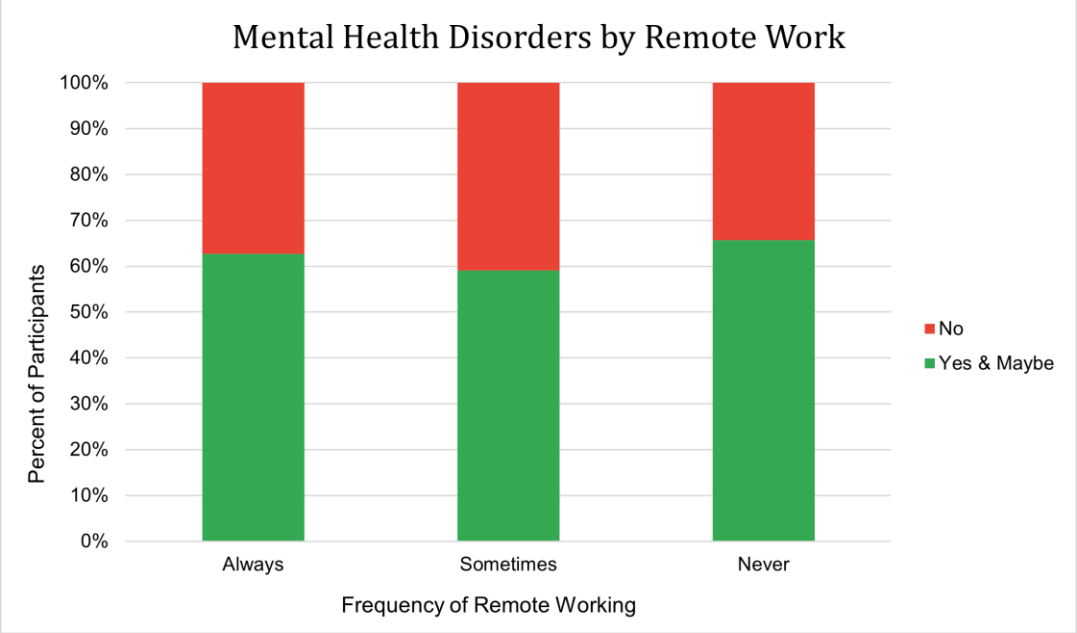


We can observe from the visualization that across all company sizes, more than 50% of participants have reported that they have a mental health disorder. We can also see that the percentage of employees who have a mental health disorder also

increases with the size of the company. For companies with less than 25 employees, approximately 56% of participants have a mental health disorder. This number increases to 61% for companies with 26-100 employees, 65% for companies with 100-500 employees and 67% for companies with more than 1000 employees. Based on this trend, it was expected that around 65-67% employees working at companies with 100-500 employees would have mental health disorder. However, the observed number was lower – only 60% of employees have a mental health disorder. This may be attributed to the fact that much fewer participants work in companies with 500-1000 employees – only 62 – as compared to the number of participants which work in other companies.

6.1.5 Mental Health Disorders by Remote Working

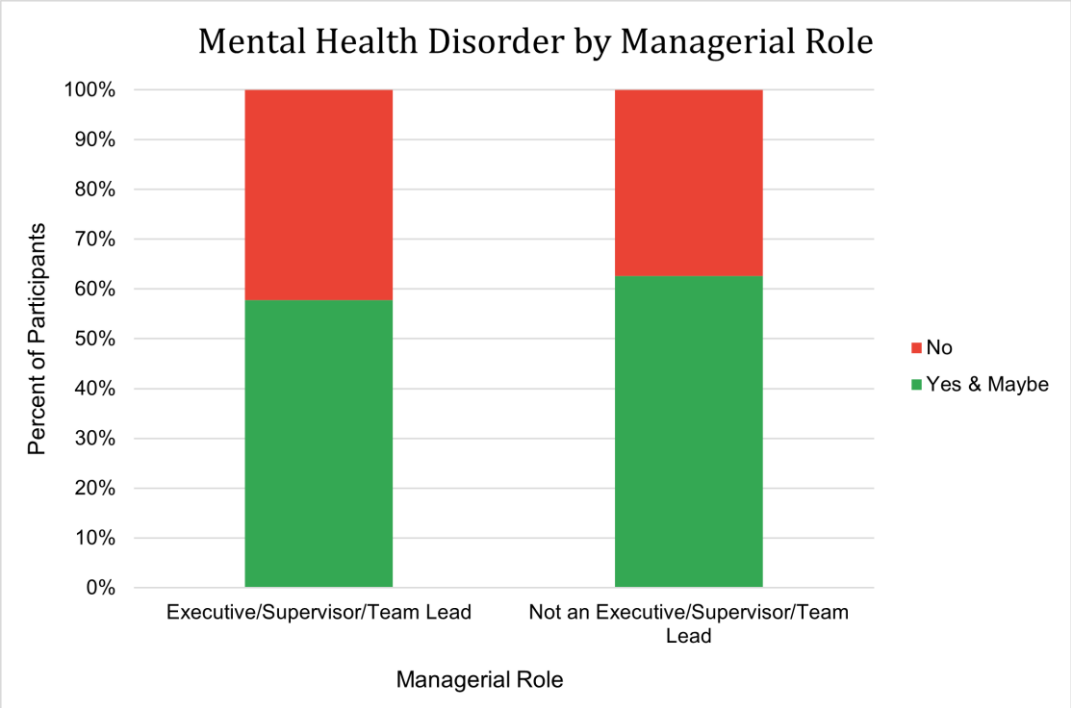
The survey had a question which asked participants if they worked remotely. While remote working offers greater flexibility to employees, remote workers can be at a higher risk of experiencing mental health issues due to factors like isolation, loneliness, blurred work-life boundaries, and lack of social interaction. Informed of these mental health risks for remote workers, I wanted to determine if participants who always worked remotely were more likely to have mental health disorders than participants who never worked remotely or only worked remotely sometimes.



We can observe from the visualization that participants who always work remotely are not more likely to have mental health disorders than participants who never work remotely. In fact, the percentage of participants who have mental health disorders and never work remotely is equal, or even slightly higher than percentage of participants who have mental health disorders and always work remotely.

6.1.6 Mental Health Disorders by Managerial Role

The survey had a question which asked participants to input their work function. The participants were allowed to select multiple choices to represent their job functions, including any managerial or supervisory roles they performed. Managers or supervisors can be susceptible to mental health issues due to the pressure of leadership responsibilities, high expectations, and the need to balance team dynamics. Informed of these mental health risks for managers, I wanted to observe if occupying a managerial role such as Supervisor, Team Lead or Executive Leadership had an impact on mental health. Specifically, I wanted to notice if participants who were supervisors were more likely to have mental health disorders than participants who were not supervisors.



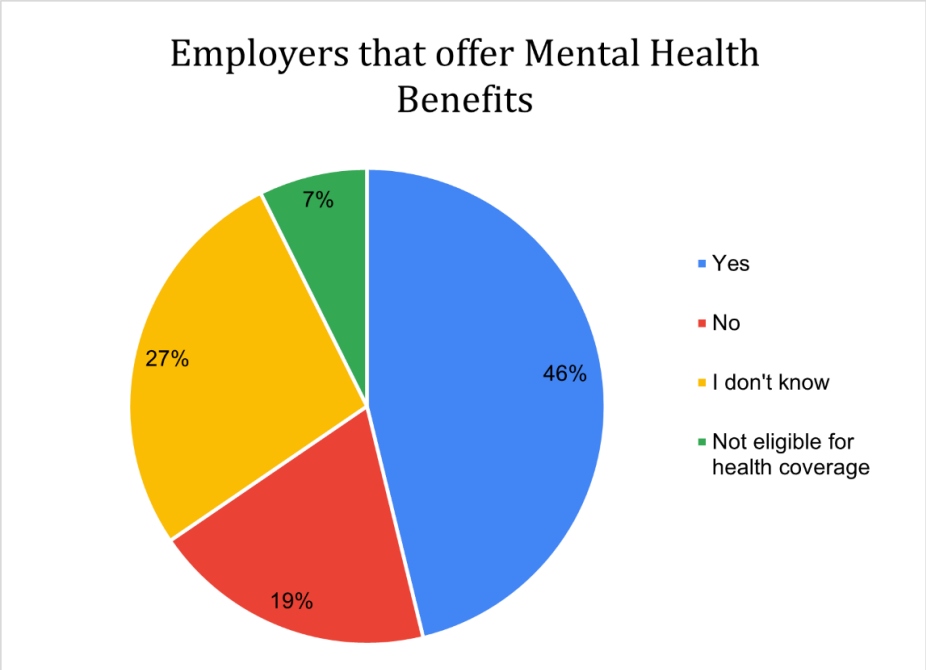
We can observe from the visualization that participants who occupy a managerial role are not more likely to have mental health disorders than participants who are not managers. In fact, the percentage of participants who are not supervisors and have mental health disorders is equal to, or even slightly higher than percentage of participants who are supervisors and have mental health disorders.

6.2 Mental Health Benefits offered by Tech/IT Employers

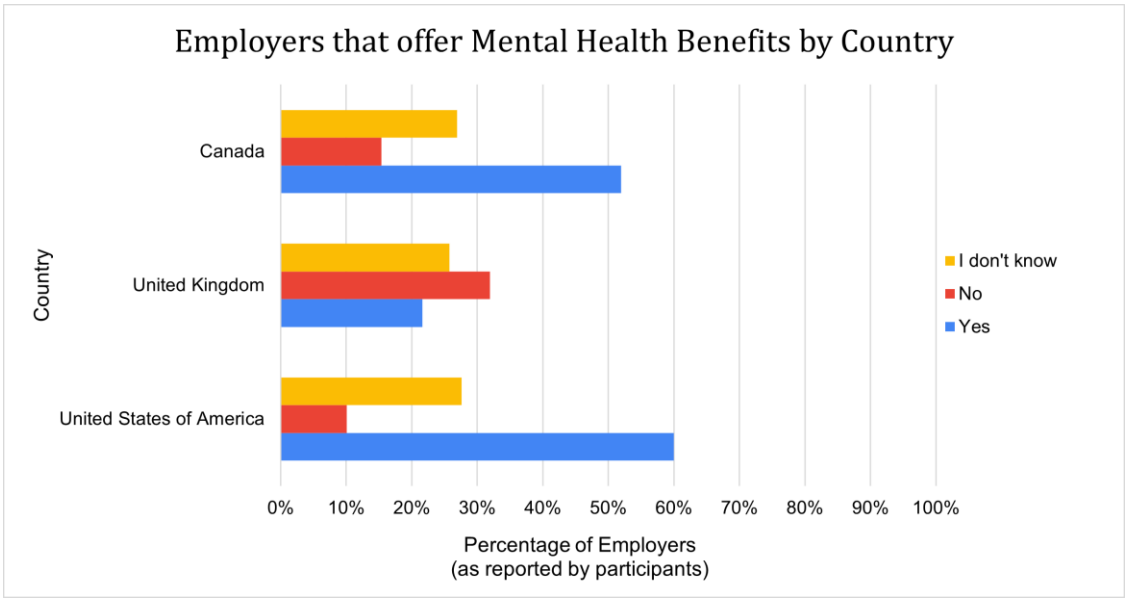
In this section, I observed the state of mental health benefits and resources that employers in the Tech industry provide to their employees. For all the subsections within this section, I will look at these benefits across two parameters – country and company size.

6.2.1 Mental Health Benefits

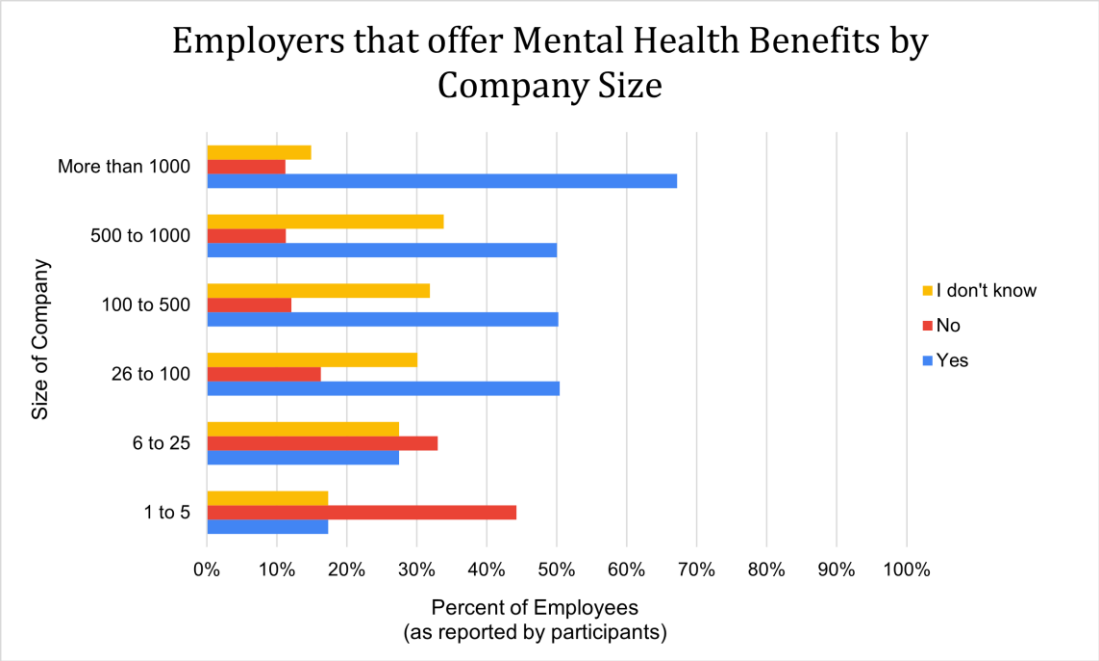
Employers may provide mental health benefits as a part of the employer-provided healthcare coverage.



We can see from the visualization that 46% of participants have reported that their employers offer mental health benefits as compared to almost 20% of participants who have reported that their employers do not provide mental health benefits. A considerable proportion of participants, nearly 30%, have also reported that they are not aware if their employers offer mental health benefits. This indicates that employers may need to further elucidate the healthcare coverage and benefits offered to employees.



If we observe how mental health benefits are distributed geographically, participants have reported that the United States of America has the highest percentage of employers, around 60%, who offer mental health benefits. In stark contrast, United Kingdom has the lowest percentage of employers, around 22%, who offer mental health benefits. In fact, only around 10% of employers in the United States of America do not offer healthcare coverage as compared to over 30% of employers in United Kingdom.

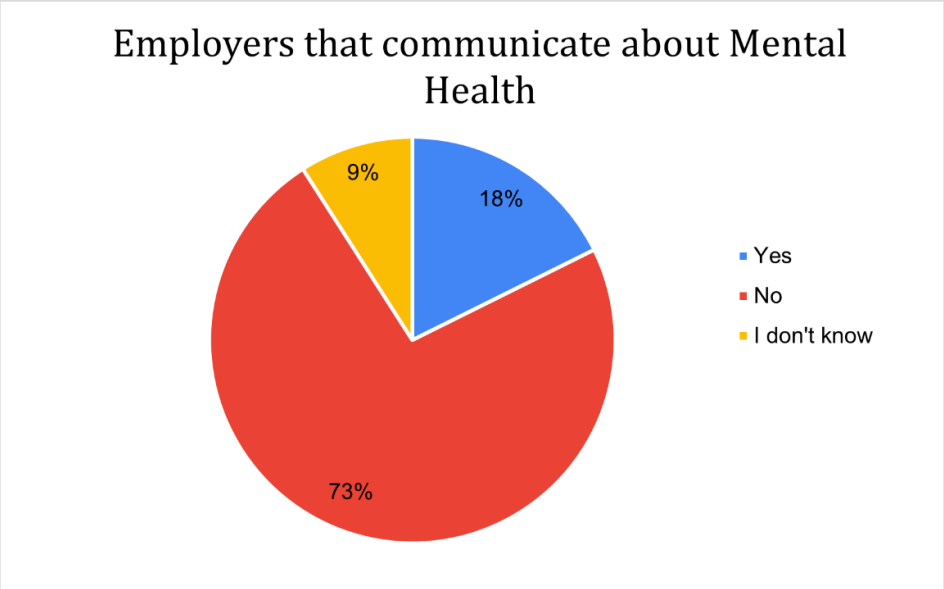


Looking at how mental health benefits are distributed by company size, we can see a trend – as the company size increases, a higher percentage of employers offer mental health benefits. Participants have reported that more than 60% of employers with more than 1000 employees offer mental health benefits, while only 18% of employers with 1-5 employees offer mental health benefits. This trend is consistent with the fact bigger companies have more funds and can offer more extensive healthcare coverage, which includes mental health benefits. Smaller companies have limited funds and are thus less likely able to include mental health benefits in their healthcare coverage.

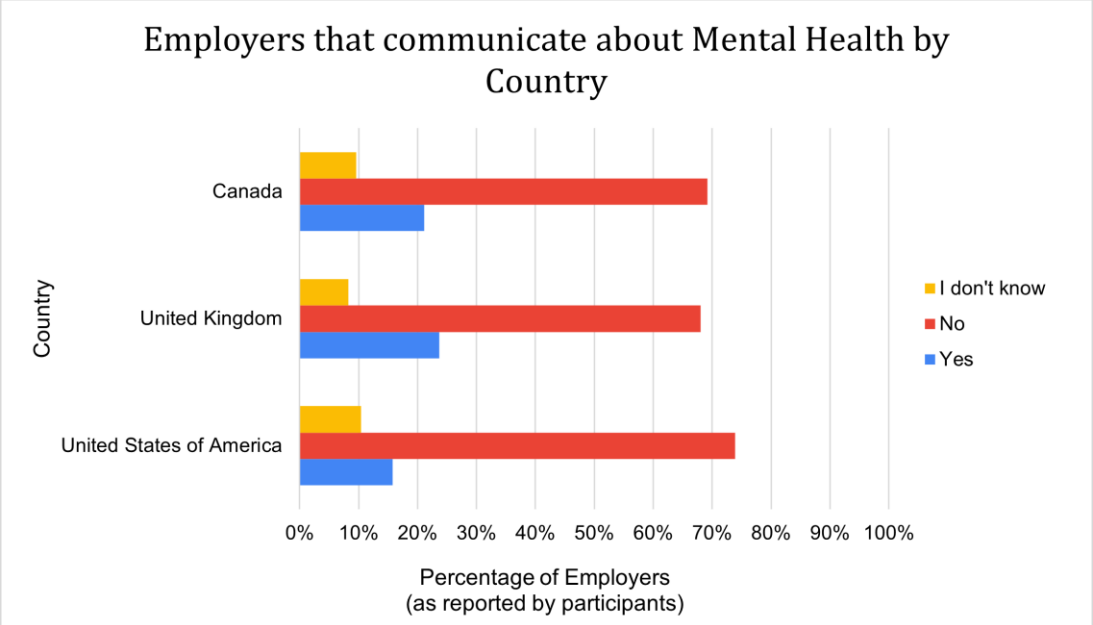
We can also observe another interesting trend in this visualization. When the company size is between 1-5 employees, only 18% of participants are not aware of their employer-provided mental health benefits. This percentage steadily rises as the company size increases and culminates to approximately 34% for companies with 500-1000 employees. However, we see an anomaly for this trend with employers having more than 1000 employees – only 15% of participants are not aware of their mental health benefits.

6.2.2 Official Communication about Mental Health

The survey had a question which asked participants if their employers had ever communicated with them about mental health – either official communication or through wellness programs at the company.

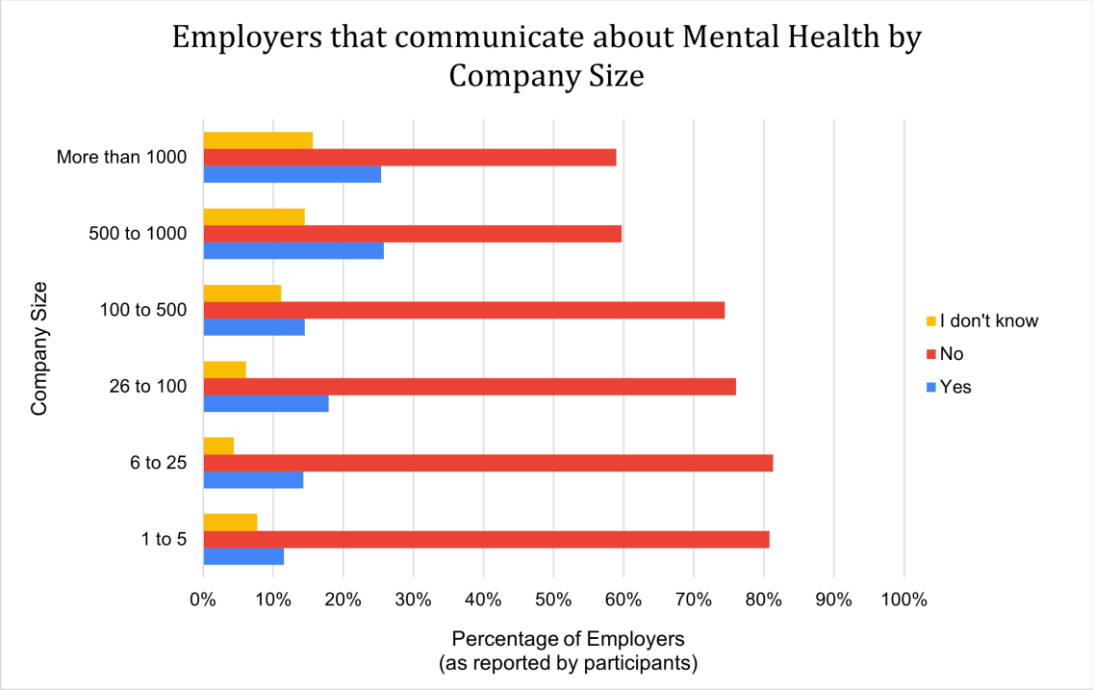


We can observe from the visualization that an overwhelming proportion of participants, nearly 73%, reported that their employers do not officially communicate about mental health. A much smaller proportion of participants, nearly 20%, reported that their employers have communicated about mental health.



Looking at how official communication about mental health is distributed geographically, across all countries, participants have reported that a considerable proportion of employers, nearly 70%, do not communicate about mental health to

their employees. Among the employers who do communicate about mental health, participants have reported that the United Kingdom has the highest the proportion of employers among the three countries while the United States of America has the lowest proportion of employers.

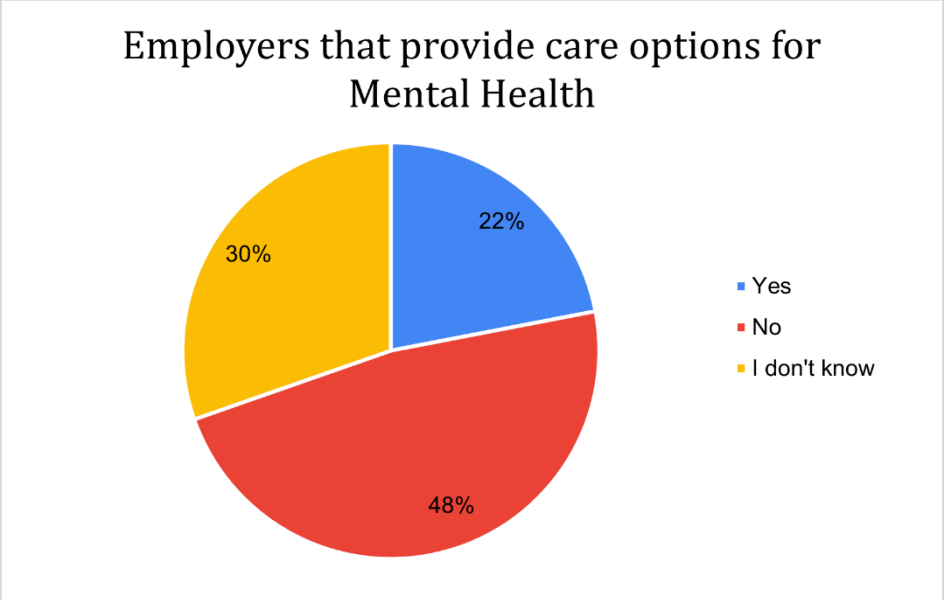


If we look at how official communication about mental health is distributed across company sizes, we can observe that smaller companies are less likely to officially communicate about mental health to their employees. Participants have reported that approximately 59% of employers with more than 1000 employees do not communicate about mental health. This number increases around 75% for companies with 25-500 employees and culminates to 81% for companies with less than 25 employees. This trend may be explained if we consider an earlier visualization that looked at how mental health benefits are distributed across company size. As compared to larger companies, a considerable proportion of smaller companies do not offer mental health benefits due to limited funds. Thus, communicating about mental health may seem irrelevant to these companies as they don't even offer mental health benefits.

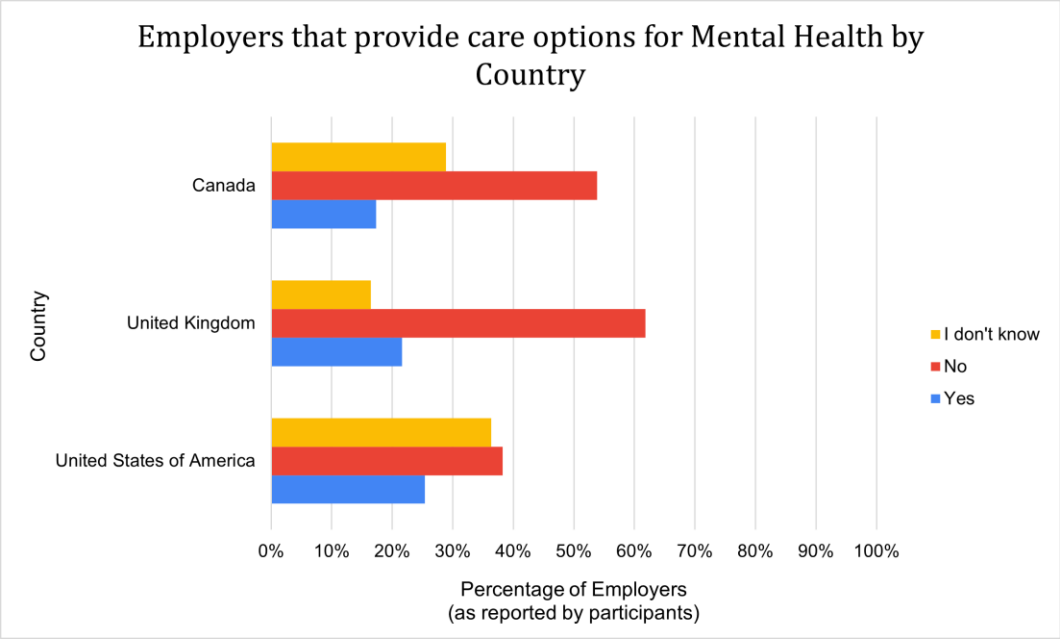
We can also observe another interesting trend in this visualization – the percentage of participants who are not aware of official communication about mental health from their employers also steadily increases as the size of company increases.

6.2.3 Care Options for Mental Health

The survey had a question which asked the participants if their employers offered resources to learn more about mental health and care options for seeking help.

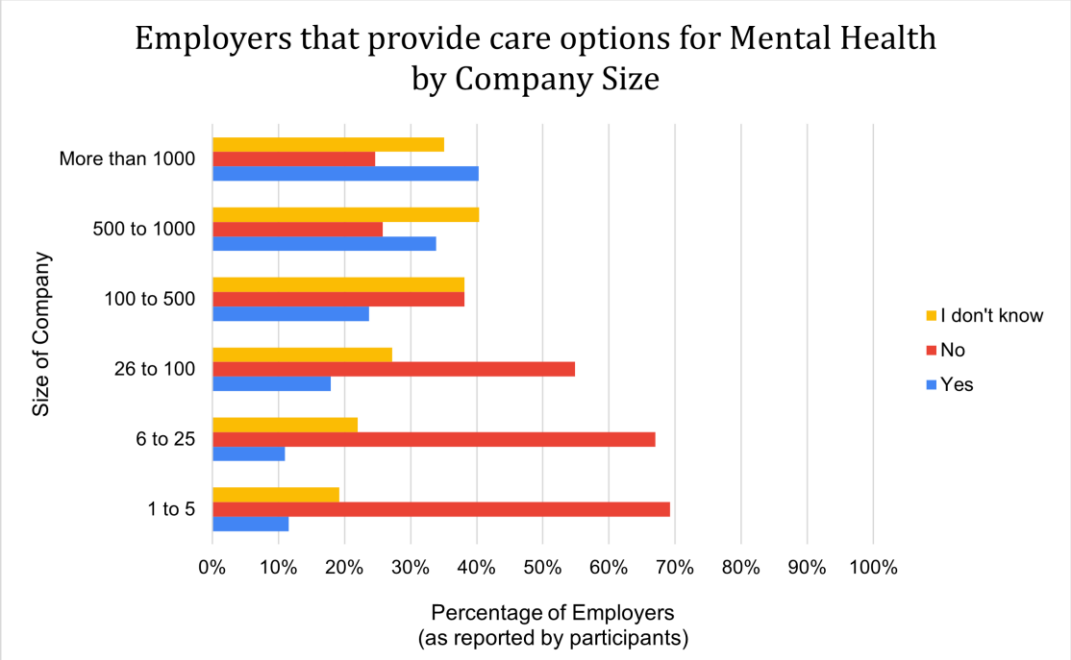


We can observe from the visualization that nearly 50% of participants have reported that their employers did not offer any resources or care options for mental health. Only about a quarter of participants, around 22% have reported that their employers provide care options for mental health. Additionally, a considerable proportion of participants, approximately 30%, were not aware of any care options for mental health offered by their employer.



Looking at how care options for mental health are distributed geographically, participants have reported that the United Kingdom has the highest percentage of employers, around 62%, who do not offer any resources or care options for options while the United States of America has reported the lowest percentage of employers, around 48%, who do not offer any resources or care options for mental health. Additionally, unlike other countries, the United States of America also has

the highest proportion of participants who do not know if their employers offer any care options for mental health. In fact, this percentage is comparable to the percentage of participants whose employers do not offer any care options for mental health.



If we look at how care options about mental health are distributed across company sizes, we can observe that smaller companies are less likely to provide care options for mental health. Participants have reported that for employers with more than 1000 employees, 25% of employers do not offer any care options for mental health to their employees and this number steadily rises as the number of employees in the companies increases, culminating to 68% for companies with less than 25 employees. This trend may be explained if we consider an earlier visualization on how mental health benefits are distributed across company size. Compared to larger companies, smaller companies are less likely able to offer mental health benefits due to limited funds. Consequently, it is also less likely that these smaller companies would be able to provide any other care options for mental health to their employees.

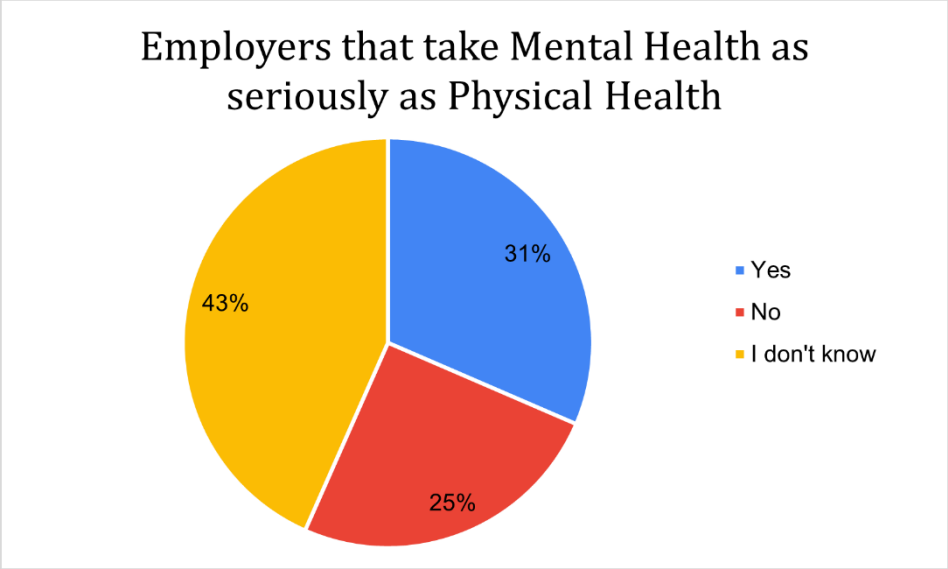
Additionally, we can also observe another interesting trend – as the company size increases, the percentage of participants who are not aware of employer-provided care options for mental health also steadily increases. However, a slight anomaly is observed for companies with more than 1000 employees where this percentage decreases slightly.

6.3 Attitudes towards Mental Health

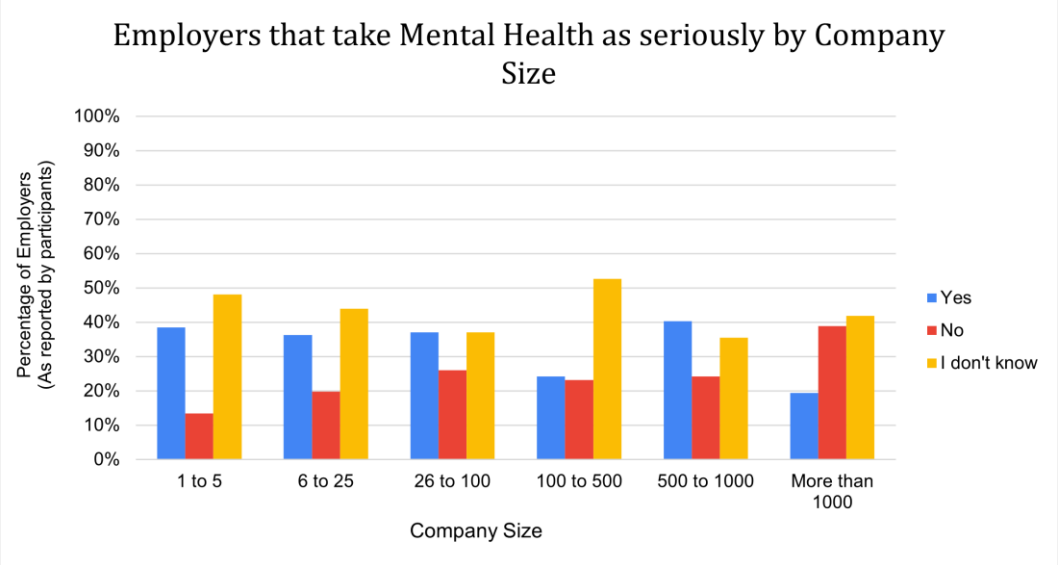
In this section, I observed attitudes towards mental health in the workplace.

6.3.1 Mental Health vs. Physical Health

The survey had a question which asked the participants if they felt that their employers take mental health as seriously as physical health.



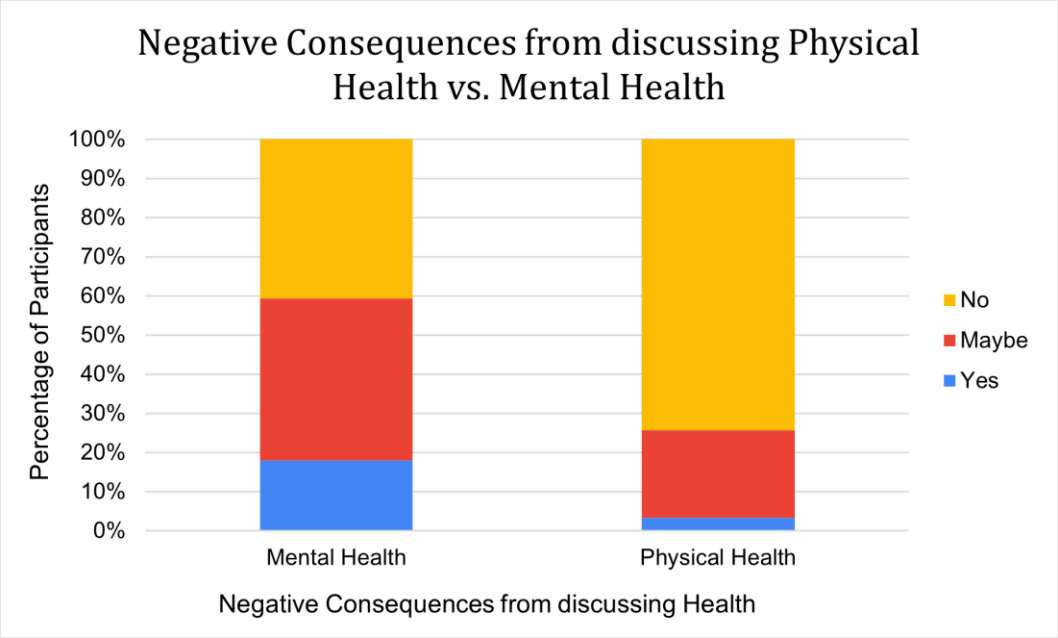
As we can observe from the visualization, only 30% of the participants feel that their employers consider mental health to be as important as physical health. A vast majority of participants, around 43%, don't know if their employers take mental health as seriously as physical health.



Looking at how this attitude towards physical vs. mental health varies by company size, participants have reported that smaller companies, as compared to larger companies, take mental health as seriously as physical health. Approximately 37% of companies with less than 100 employees take mental health as seriously as physical health. This number drops to 24% for companies with 100-500 employees and 19% for companies with more than 1000 employees. An anomaly is seen for companies with 500-1000 employees where this percentage suddenly rises to

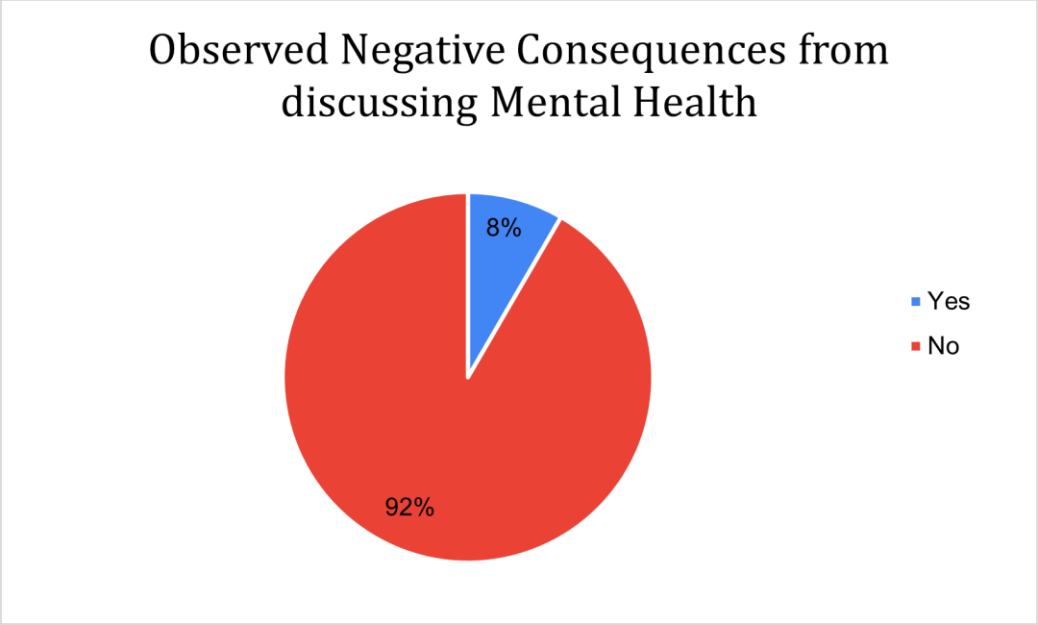
around 40%. This trend suggests that smaller companies with fewer employees tend to focus more on the overall employee well-being as compared to larger companies, even though smaller companies may not offer mental health benefits.

To look at this attitude in a different context, I also focused on employee perceptions about discussing physical and mental health with their employers. Often, employees feel that discussing any health-related issue, physical or mental, with their employers will have negative consequences.



It is evident from the above visualization that almost 30% of participants feel that discussing mental health with their employers will have negative consequences on their job and career. In stark contrast, only 3% of participants feel that discussing physical health with their employers will have negative consequences. Additionally, almost 75% of participants feel that they will not have negative consequences by discussing physical health as compared to 40% of participants who feel that they will not have negative consequences by discussing mental health.

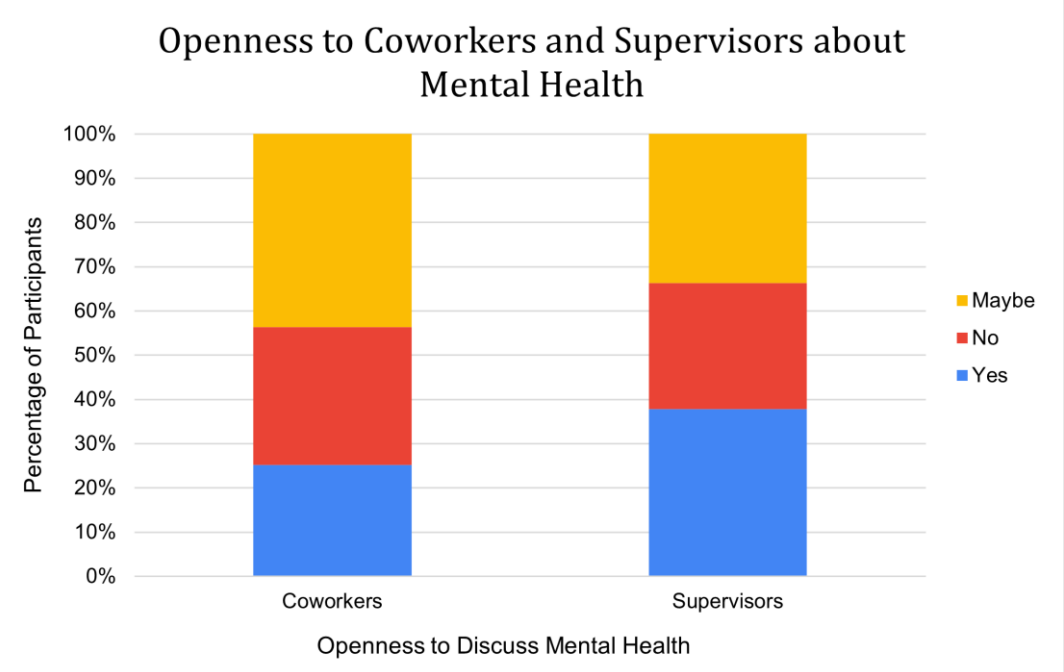
In relation to the above question, the survey also asked participants if they had heard of or observed negative consequences for co-workers who had discussed mental health issues in the workplace.



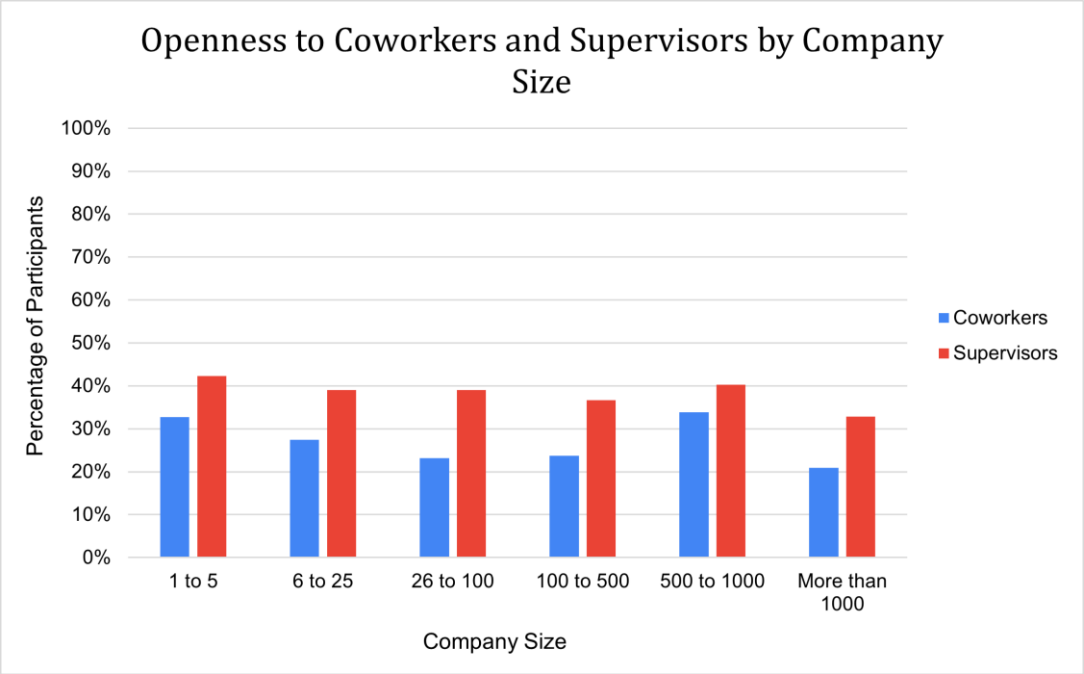
We can see from the visualization that an overwhelming percentage of participants have never actually heard of or observed negative consequences from discussing mental health issues in the workplace. The general stigma and taboo around mental health causes employees fear negative repercussions from discussing mental health issues in the workplace when, in reality, there may not be any negative consequences at all.

6.3.2 Openness to Coworkers and Supervisors

The survey had questions which asked the participants if they felt that they could be open to their coworkers and supervisors regarding mental health issues.



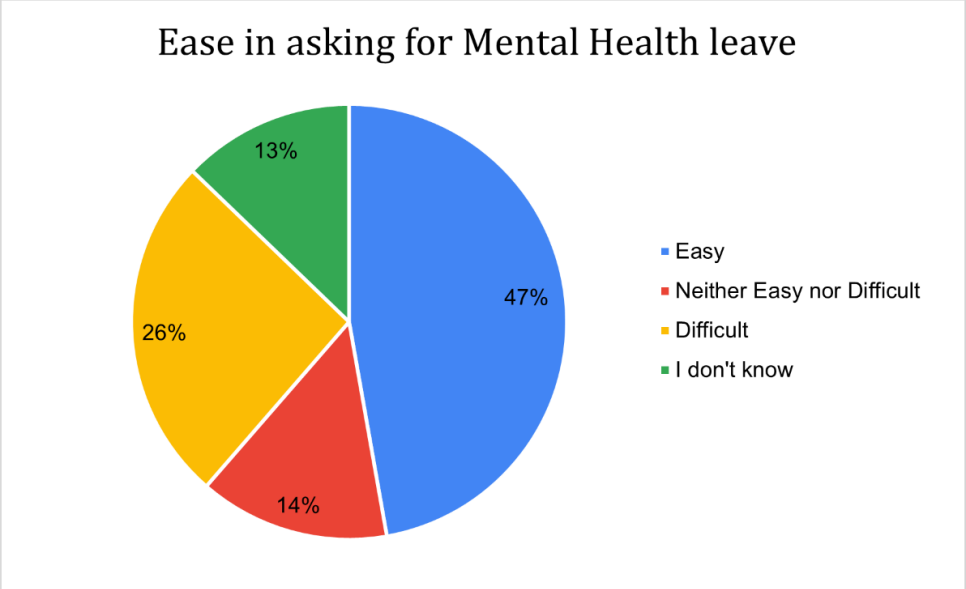
We can observe from the visualization that nearly 40% of participants have reported that they would be open to discussing mental health with their supervisors. In contrast, only 25% of participants have reported that they would be open to discussing mental health with their coworkers. This observation may be attributed to the fact that employees feel that their supervisors may be able to provide more support to them than their coworkers when it comes to mental health and thus prefer being more open with their supervisors about their mental health issues.



Looking at how openness to coworkers and supervisors varies according to company size, we can observe that as the company size increases, participants as less likely to openly discuss mental health issues with coworkers and supervisors alike. When the company size is 1-5 employees, then more than 30% of participants are open to discussing mental health issues with their coworkers and supervisors. These numbers steadily decrease as company size increases and reaches a minimum of 20% for companies with more than 1000 employees. An anomaly is seen for companies with 500-1000 employees where this range is higher than expected. This trend is reflective of the close-knit and collaborative company culture of smaller companies where employees may feel more open about sharing their mental health issues.

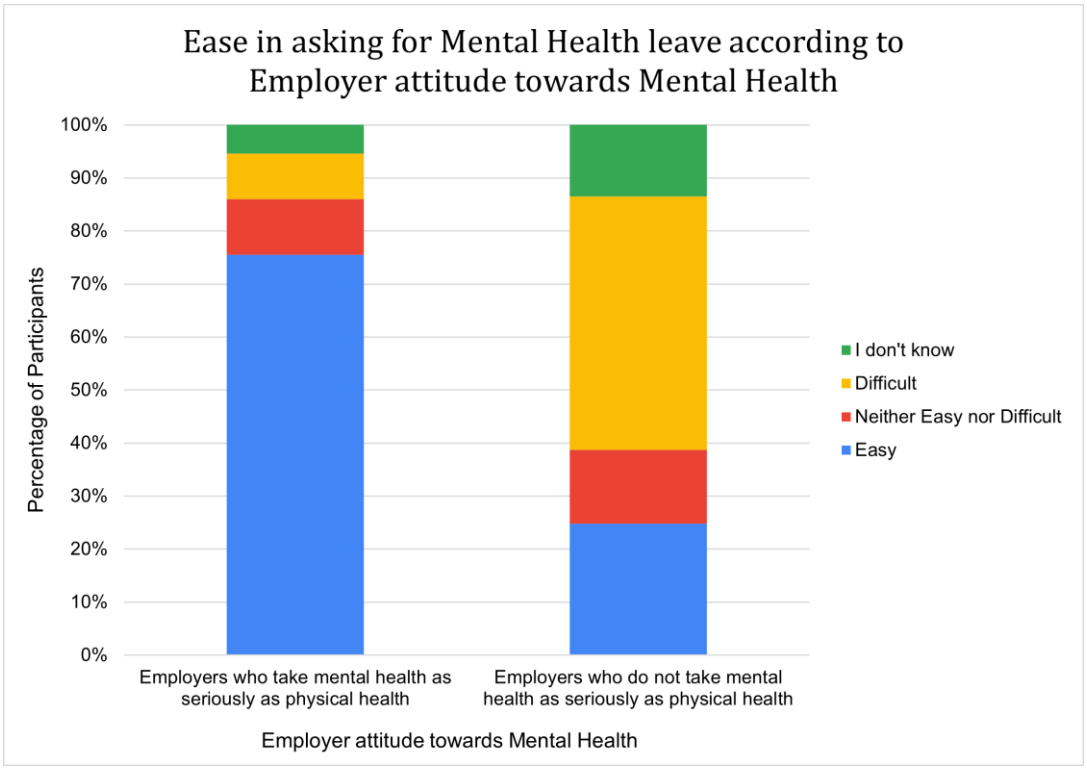
6.3.3 Ease in Asking for Mental Health Leave

The survey had a question which asked participants that if a mental health issue prompted them to request medical leave from work, then how easy or difficult would it be for them to ask for that leave.



We can see in the visualization, majority of participants, nearly 50%, have reported that they would find it easy to request such a leave while 26% of participants have reported that they will find it difficult to ask for that leave.

To further inspect this question, I conducted a bivariate analysis with employers' attitude towards mental health (as observed in section 6.3.1) and the ease employees feel in asking for mental health leave from employers.

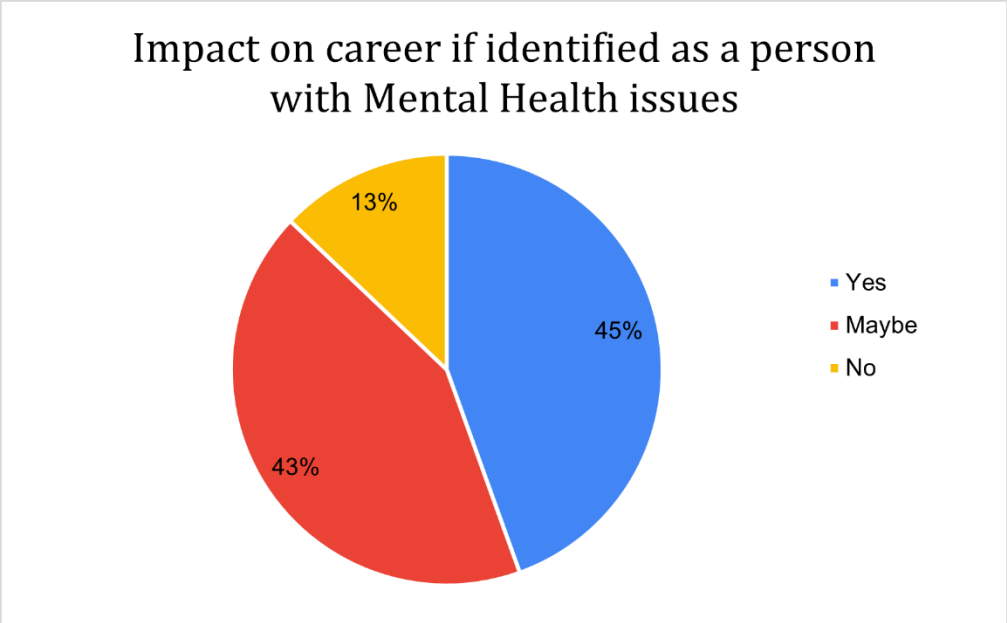


It is evident from the visualization that over 75% of employees find it easy to request a mental health leave when they feel their employers take mental health as seriously as physical health. In contrast, a vast majority of employees, nearly 50%, find it

difficult to request mental health leave from their employer when they feel that their employers do not take mental health as seriously as physical health. This suggests that employees find it easier to take mental health leave when they feel their employer has a positive attitude towards mental health. When employers project a negative attitude towards mental health, employees find it difficult to discuss mental health issues openly and ask for leave to deal with mental health issues.

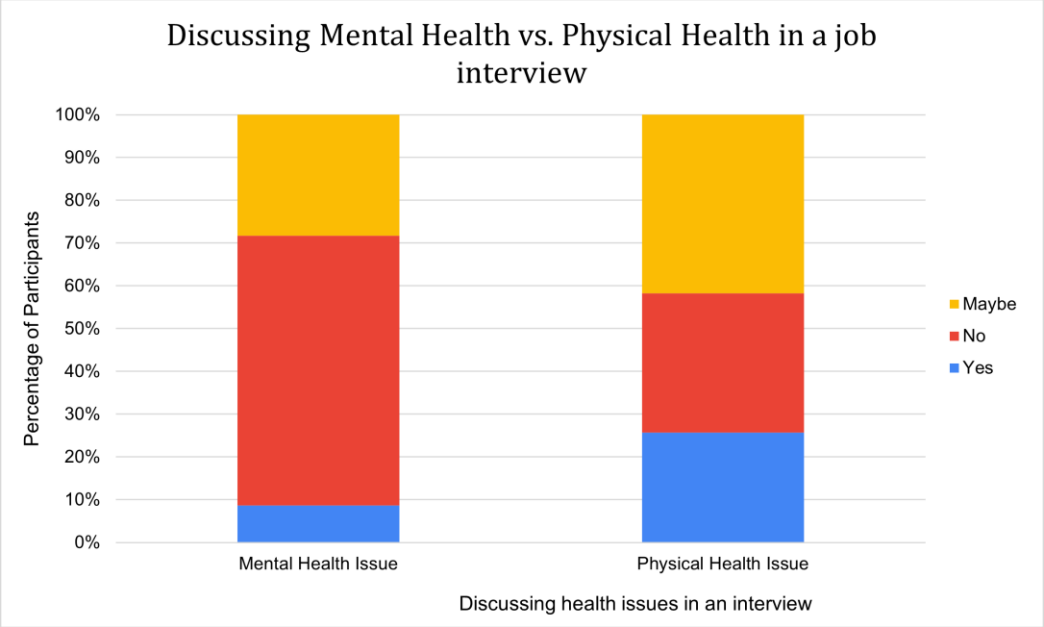
6.3.4 Career Impact

One of the survey questions asked participants if they felt that being identified as a person with mental health issues would hurt their career.



We can observe from the visualization that majority of participants, approximately 45% of participants strongly feel that being identified as a person with mental health issues would have an impact their career. A nearly equal proportion of participants, around 43%, feel that there may be a likelihood of some career impact but are uncertain about it. This visualization lends support to the common belief that having mental health issues projects misgivings about a person's capabilities and skills, especially to employers.

To look at career impact from a different viewpoint, I also looked at how many participants are likely to bring up a mental health issue or a physical health issue in a job interview.



We can see from visualization then only 10% of participants have reported that will bring up a mental health issue in an interview as opposed to 26% of participants who will bring up a physical health issue. Additionally, 63% of participants have reported that they will not bring up a mental health issue in their interview as compared to 33% of participants who will not bring up a physical health issue.

The survey had also asked participants the reason for their response to the above question. Most participants indicated stigma, taboo, and potential for discrimination as the primary reasons for not bringing up mental health issues in an interview. Several participants also felt that commonly held beliefs about mental health would cast doubt on their capabilities and skills and affect their prospects of getting a job. In addition, a small percentage of participants reported that discussion of health issues was irrelevant in a job interview.

7. Act Phase – Overall Conclusions & Insights

From the extensive analysis conducted in the earlier sections, we can derive a few big-picture conclusions and insights:

1. Mental health disorder is quite prevalent among workers in the Tech industry; one out of two survey participants have reported that they have a mental health disorder. This trend has remained consistent across all the demographic parameters considered – Age, Gender, Country, Company size, Remote working, and Managerial Role.
2. While mental health benefits, resources and care options varies across companies of different sizes, the employees' lack of awareness of these

benefits and resources stays relatively consistent. Employers should endeavor to communicate more about mental health to their employees. At the same time, employees themselves should also make efforts to remain informed of their employer-provided mental health benefits and care options.

3. The general attitude toward mental health in the Tech industry, as experienced by Tech workers, is pessimistic and even dismissive to an extent. Such an environment can have adverse effects not only on an employee's mental well-being but also on the overall company and industry, especially when a high proportion of employees have mental health disorders. While efforts from individual companies to change this attitude will help, a shift of in the mindset of the overall Tech industry is needed to create a real and lasting impact.
4. Larger companies with more than 1000 employees have the least supportive culture around mental health as compared to other company sizes. Two out of every three people working at these companies have a mental health disorder despite most of these companies offering mental health benefits. A high proportion of employees working at these companies have reported that their employers do not take mental health as seriously as physical health. Additionally, as compared to other company sizes, employees are also least likely to be open about their mental health in the workplace. Larger companies should consider investing in organizational culture change to reform the narrative around mental health and in turn provide better support for their employees' mental health.

While this project does not have any formal stakeholders, these conclusions may drive future work of the OSMI team as well as help employers in the Tech industry improve work conditions and devise strategies to better support their employees.