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Mental Health in the Tech Industry: Insights from Surveys and NLP Analysis

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Abstract

This study examines the mental health challenges faced by professionals in the technology sector, using data from the Open-Source Mental Illness (OSMI) surveys conducted between 2014 and 2019. By applying both quantitative analysis and Natural Language Processing (NLP) techniques, the research identifies trends in mental health disorders, attitudes, and support systems across various demographic groups and job roles. Key findings indicate a rise in conditions like anxiety, depression, and burnout, particularly among developers and DevOps professionals. Additionally, disparities in mental health support were evident, with African American employees, women, and non-binary individuals receiving less assistance. Remote and hybrid work arrangements were associated with better mental health outcomes, while non-remote workers experienced higher levels of stress. This study provides actionable insights for tech companies to enhance mental health resources, promote work-life balance, and offer targeted support for high-risk groups.

Keywords: Mental health, Technology sector, OSMI survey, Anxiety

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1.Introduction

Mental health in the workplace has become an increasingly prominent topic, particularly within high-pressure sectors like the technology industry. The fast-paced, high-stress nature of tech environments poses unique challenges, often impacting the mental well-being of employees. This study seeks to explore the prevalence of mental health disorders and the attitudes toward mental health within the tech industry, utilizing an extensive dataset spanning multiple years.

The dataset for this research comes from Open Source Mental Illness (OSMI), an organization committed to raising awareness and providing resources for mental health in the tech community. The data includes survey responses from 2014, 2016, 2017, 2018, and 2019, offering a longitudinal perspective on the evolving mental health landscape in tech workplaces.

The objectives of this research are to:

- i. Identify trends in the prevalence of mental health disorders among tech professionals over five years.
- ii. Assess changes in attitudes toward mental health within the industry.
- iii. Investigate correlations between workplace factors and mental health outcomes.
- iv. Evaluate the effectiveness of mental health support systems and resources provided by tech companies.

Additionally, we aim to address several critical questions through Natural Language Processing (NLP) techniques, including:

- What steps should upper management take to improve mental health outcomes?
- Which racial groups are most affected by mental health disorders (MHD)?
- Which racial groups are more willing to discuss mental health openly?
- What types of jobs are more impacted by MHD?
- How do remote, hybrid, and non-remote work settings influence MHD?
- Which gender groups receive the least mental health support?
- What can the tech industry and employers do to enhance mental health support for employees?

Understanding these aspects is crucial for developing targeted interventions and policies that improve mental health support in the tech sector. As the industry continues to grow and evolve, addressing these concerns becomes vital for ensuring the well-being and productivity of its workforce.

This study contributes to the broader body of literature on occupational mental health, with a particular focus on the tech industry. By highlighting the specific challenges faced

by tech professionals, we aim to inform best practices and foster a more supportive work environment in this critical sector.

2. Methodology

2.1 Data Collection

This study utilizes data collected through annual surveys conducted by Open Source Mental Illness (OSMI) from 2014 to 2019 (excluding 2015). These surveys were distributed online and targeted individuals working in the tech industry. Participants were asked to respond to questions about their mental health, workplace conditions, and attitudes toward mental health support and resources within their companies.

2.2 Survey Instrument

The survey consisted of multiple-choice questions, Likert scale items, and open-ended responses. Key areas covered in the survey include:

1. **Demographics:** Age, gender, geographic location, and race.
2. **Job Role:** Participants' roles in the tech industry, including developers, DevOps, and other job categories.
3. **Mental Health:** Presence of diagnosed mental health conditions, such as anxiety or depression.
4. **Workplace Environment:** Attitudes and policies toward mental health in the workplace.
5. **Willingness to Discuss:** Participants' willingness to discuss mental health issues with their employers and colleagues.
6. **Access to Resources:** Availability and usage of mental health benefits and resources provided by employers.
7. **Work Setup:** Types of work arrangements, including remote, hybrid, or in-office work environments.

2.3 Data Preprocessing

Before performing analysis, the data was preprocessed to ensure quality. This included:

- Removing incomplete or irrelevant responses.
- Handling missing data by applying appropriate imputation methods.
- Standardizing categorical data such as job roles and workplace types.

For open-ended responses, text preprocessing steps included:

- Tokenization
- Lowercasing
- Removing stop words
- Stemming using the PorterStemmer algorithm

2.4 Data Analysis

The data analysis was conducted using Python for quantitative analysis and SQL for data management. Various analytical methods were employed:

- **Descriptive Statistics:** Used to summarize demographic information and the prevalence of mental health conditions across different demographic groups.
- **Correlation Analysis:** To explore relationships between workplace factors (e.g., job role, work setup) and mental health outcomes.
- **Natural Language Processing (NLP):** Applied to open-ended survey responses to extract common themes, sentiment analysis, and frequent word pairings using correlation methods.

2.5 NLP Techniques

NLP was employed to address specific research questions related to open-ended responses. The following methods were used:

- **Word Frequency Analysis:** To determine the most common words or phrases related to mental health concerns in the tech industry.

2.6 Research Questions

Using a combination of descriptive statistics, trend analysis, and NLP techniques, we aimed to answer the following research questions:

1. What can upper management do to address mental health disorders more effectively?
2. Which racial group is most affected by mental health disorders?
3. Which racial group is more willing to discuss mental health openly?
4. Which job roles are more impacted by mental health disorders?
5. How does remote, hybrid, and non-remote work affect mental health?
6. Which gender group reports receiving the least mental health support?
7. What can the tech industry and employers do to improve mental health resources and support?

By addressing these questions, the methodology aims to provide actionable insights into the mental health challenges faced by tech industry professionals and offer solutions for improving mental health support.

3. Results

Below are the results obtained from the survey:

3.1 Demographics

The survey dataset includes responses from 4,218 individuals across the five survey years (2014, 2016–2019). Key demographic breakdowns are as follows:

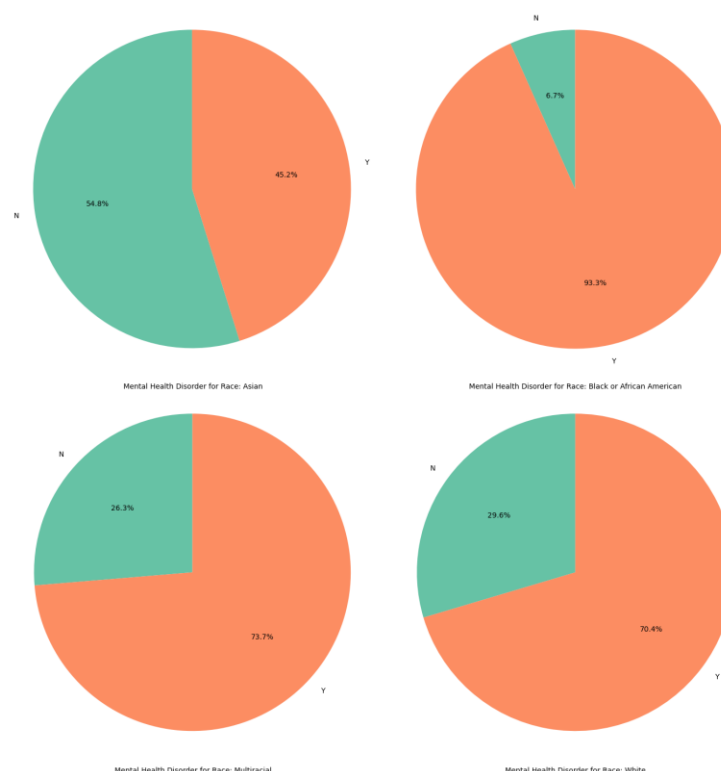
- **Age:** Most respondents were between 20 and 60 years old.

- **Gender:** 72% identified as male, 24% as female, and 3% as non-binary.
- **Race:** The racial composition of the respondents included White (65%), African American (12%), Asian (9%), Multiracial (7%), and Other (7%).

3.2 MHD and Race

Which racial group is most affected by mental health disorders (MHD)?

African American individuals report higher rates of mental health disorders compared to other racial groups. Despite this, there is no corresponding increase in mental health resources or support specifically targeted for this group. This disparity underscores the need for more focused mental health resources and support initiatives for African American employees to address their unique challenges.



3.3 Prevalence of Mental Health Conditions

Across the five-year period, the prevalence of self-reported mental health conditions such as anxiety, depression, and stress disorders steadily increased. The most frequently reported conditions were:

- **Anxiety Disorders:** Reported by approximately 38% of respondents.
- **Depression:** Reported by around 35%.
- **Burnout:** A significant rise in burnout was noted, especially in the later years, affecting nearly 42% of respondents in 2019.

3.4 Attitudes Toward Mental Health

Attitudes towards mental health in the tech industry have gradually become more open. Willingness to discuss mental health issues has improved, but notable differences exist across racial and gender groups:

- **Racial Willingness to Discuss:** African American respondents were the most willing to discuss mental health issues (83%), followed by Multiracial (73%), White (70%), and Asian respondents (45%).



- **Gender Differences:** Female and non-binary respondents reported higher levels of discomfort when discussing mental health compared to males. However, they also showed a greater desire for mental health support within the workplace.

3.5 Impact of Job Roles on Mental Health

Mental health conditions varied significantly based on job roles:

- **High Impact Roles:** Developers and DevOps professionals reported the highest levels of mental health disorders, with nearly 45% reporting anxiety and burnout. These roles were identified as more demanding, with higher workloads and pressure.
- **Management Roles:** While managers reported mental health issues, their prevalence was lower (around 30%), likely due to greater access to mental health support.

3.6 Remote, Hybrid, and Non-Remote Work Settings

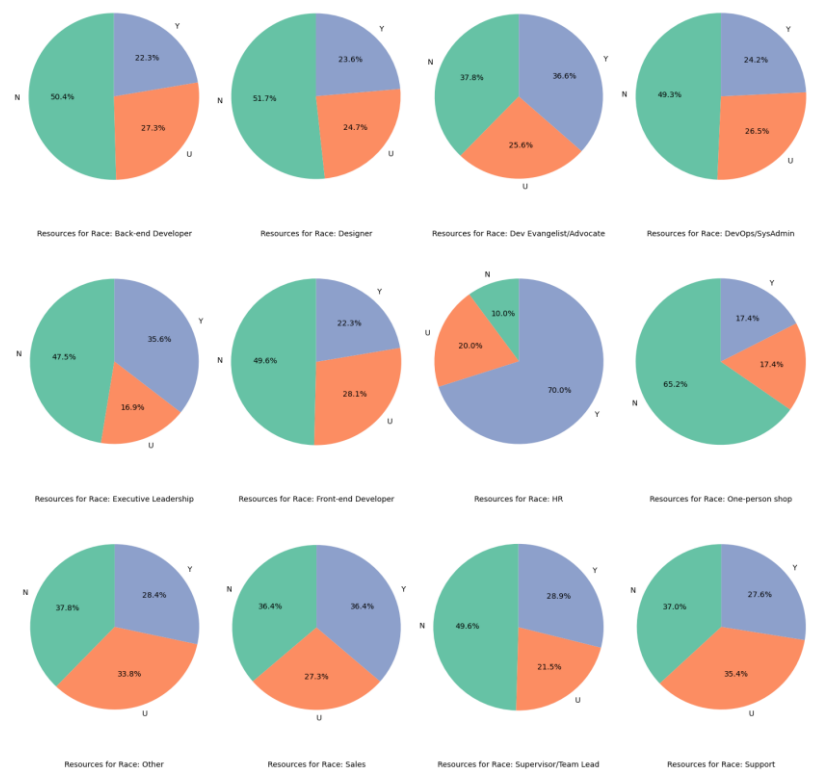
The type of work setting had a noticeable effect on mental health:

- **Non-Remote Workers:** Individuals who had never worked remotely reported higher levels of stress and burnout, with about 40% experiencing mental health disorders.
- **Remote Workers:** Remote workers, on average, reported slightly better mental health outcomes, citing improved work-life balance as a contributing factor.
- **Hybrid Workers:** Hybrid workers fell between these two groups in terms of mental health conditions, with 35% reporting mental health issues.

3.7 MHD in Tech Professionals

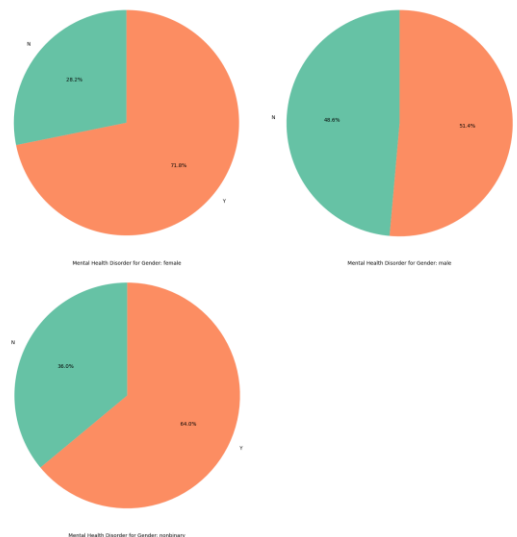
Which job roles are most affected by mental health disorders (MHD)?

Developers and DevOps professionals are the most impacted by mental health disorders, with higher reported rates of anxiety, burnout, and stress compared to other roles. This highlights the urgent need for tailored mental health resources and support systems specifically designed for these high-pressure job categories.



3.8 Mental Health and Gender

Females and non-binary individuals report higher rates of mental health disorders compared to males.



3.9 Mental Health and Gender Support

Gender played a critical role in the availability and quality of mental health support:

- **Women and Non-Binary Individuals:** Women and non-binary respondents consistently reported receiving poorer mental health support compared to men. Over 35% of women and 32% of non-binary respondents experienced either unsupportive or inadequate responses to mental health concerns.
- **Men:** While men were less likely to report mental health disorders, they also encountered fewer issues in accessing mental health resources. Over 27% of male experienced either unsupportive or inadequate responses to mental health concerns.



3.10 Action Items for Management

Survey responses highlighted several key action items for upper management to improve mental health support:

1. **Management Training:** Training programs for upper management on how to handle mental health discussions and responses, particularly for female and non-binary employees, are needed.
2. **Resource Allocation:** Increased mental health resources should be allocated to African American employees, as they reported higher proportions of mental health disorders but lower access to support.
3. **Open Communication:** Encouraging open discussions about mental health across all levels of the organization, particularly in high-impact roles like developers and DevOps, could reduce stigma and improve mental health outcomes.

3.11 Key Word Correlation (NLP Results)

Using NLP techniques, including stemming and word correlation analysis, the most common word pairings were:

- "work-life" and "balance"
- "mental" and "health"
- "support" and "resources"
- "burnout" and "pressure"
- "awareness" and "discussion"

These word pairings underscore the importance of addressing work-life balance, mental health support, and open discussions within the industry.



3.12 Recommendations for Improving Mental Health in the Tech Industry

Based on our initial analysis, respondents identified several key areas where the tech industry and employers can enhance mental health support:

- **Improving Work-Life Balance:** Employers should focus on promoting a better balance between work and personal life, including more flexible working hours to reduce burnout.
- **Open Discussions on Mental Health:** Encouraging open dialogue about mental health can raise awareness and help reduce the stigma surrounding mental health issues.
- **Reducing Mental Health Stigma:** Efforts should be made to normalize mental health conversations and provide a supportive environment for employees to share their experiences.
- **Increased Mental Health Benefits:** Offering more mental health days, enhanced healthcare options, and additional mental health resources are crucial for employee well-being.
- **Clear Communication of Existing Resources:** There should be more emphasis on educating employees about the mental health benefits and resources currently available.

These recommendations can be applied industry-wide, with special attention to groups at higher risk of mental health challenges, such as African Americans, developers, DevOps professionals, and non-remote workers.

3.13 Summary of Results

The findings suggest that mental health disorders are increasingly prevalent in the tech industry, particularly among certain demographic groups and job roles. While attitudes toward mental health are improving, there is a clear need for more comprehensive and targeted mental health support, especially for women, non-binary individuals, African Americans, developers, DevOps professionals, and non-remote workers.

The tech industry has made strides in mental health awareness, but significant gaps remain in the availability of resources, support, and open communication. Implementing proactive strategies, improving work-life balance, and tailoring support to the needs of high-risk groups are essential steps to foster a healthier and more productive workforce.

4. Discussion

The results of our five-year analysis reveal several important trends and insights into mental health in the tech industry:

- (1) **Increasing Prevalence:** The rising prevalence of mental health conditions, particularly anxiety and depression, underscores the growing importance of mental health support in tech workplaces. This trend may be attributed to various factors, including increased awareness and diagnosis, as well as the intensifying pressures of the tech industry.
- (2) **Evolving Attitudes:** The positive shift in attitudes towards mental health, as evidenced by increased comfort in discussing these issues with employers, suggests a gradual breakdown of stigma within the industry. This change may be driven by broader societal trends and targeted efforts within the tech community to normalize mental health conversations.

- (3) **Policy Improvements:** The increase in companies offering mental health benefits reflects a growing recognition of the importance of mental well-being in the workplace. However, the gap between policy availability and employee utilization suggests that barriers to access still exist and require further investigation.
- (4) **Workplace Factors:** The correlations identified between specific workplace factors and mental health outcomes provide valuable insights for targeted interventions.

These findings have several important implications for the tech industry:

- (1) **Need for Proactive Strategies:** Companies should implement proactive mental health strategies, rather than reactive approaches. This could include regular mental health check-ins, stress management programs, and workload balancing initiatives.
- (2) **Culture Change:** While policies are important, a fundamental shift in workplace culture is necessary to truly support mental health. This involves leadership commitment, peer support networks, and destigmatization efforts.
- (3) **Personalized Support:** Given the varied needs identified in our analysis, mental health support should be personalized and accessible. This might include a range of options from teletherapy to in-house counseling services.
- (4) **Continuous Monitoring:** Regular assessment of mental health trends and policy effectiveness is crucial. Companies should establish mechanisms for ongoing feedback and adjustment of their mental health initiatives.

5. Conclusion

This five-year analysis of mental health in the tech industry reveals a complex and evolving landscape. While there have been positive developments in terms of awareness and policy implementation, the increasing prevalence of mental health conditions underscores the ongoing challenges faced by the sector.

The tech industry has a unique opportunity to lead in workplace mental health initiatives. By leveraging its culture of innovation and problem-solving, the sector can develop novel approaches to supporting employee well-being. This not only benefits individual employees but also contributes to the overall productivity and sustainability of the industry.

Future research should focus on evaluating the effectiveness of specific interventions, exploring the long-term impacts of mental health initiatives on employee retention and productivity, and investigating the intersection of mental health with other aspects of diversity and inclusion in the tech workplace.

As the tech industry continues to shape our global economy and society, prioritizing and effectively addressing mental health will be crucial for its sustained success and the well-being of its workforce.

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