

DATA INFORMATION AND VISUALIZATION-ITCS 6121

Exploring Workplace Dynamics: A Visual Analysis of Stress, Work-Life Balance, and Mental Health Resources

GROUP 5

Shikha Chandel (801365577)

Shailesh Kumar (801433241)

Satvik Nayak (801405756)

UNDER THE GUIDANCE OF

Dr. Kalpathi Subramanian

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ABSTRACT

In today's fast-paced and demanding workplace, employee well-being has come to the forefront. This has happened due to rise in challenges such as heightened stress levels, disrupted work-life balance, and limited access to mental health support impact both individuals and in turn the organizations. These issues not only affect employee satisfaction and productivity but also play a role in shaping overall workplace culture. Addressing these challenges has become essential to fostering supportive and inclusive work environments. This project explores the dynamics of workplace mental health, aiming to uncover insights into stressors, employee satisfaction, and accessibility to mental health resources, while identifying opportunities for improvement. The research involves meticulous data preparation and analysing visualizations created using D3.js to present findings in a compelling manner. Visualizations such as grouped bar charts, radial charts, and geo-maps are employed to highlight patterns, disparities, and actionable insights related to mental health perceptions and support structures across demographics and geographical regions. Key findings reveal that, while many organizations provide health benefits, awareness and utilization of mental health resources remain significantly low, underscoring the need for enhanced communication and inclusivity. Gender-based comparisons highlight differences in access, comfort levels, and perceptions of workplace mental health, with both men and women encountering distinct challenges in seeking and utilizing support. Furthermore, global analysis shows substantial disparities in mental health treatment accessibility, with underserved regions facing significant barriers. By analyzing workplace interactions and visualizing findings, this project underscores the importance of reducing stigma, fostering trust, and improving access to mental health resources. The report proposes actionable recommendations for organizations to enhance mental health awareness and support systems while offering global insights for bridging gaps in treatment accessibility. Through data-driven strategies, the project contributes to ongoing efforts to create healthier, more inclusive workplace environments and advance global mental health equity.

INTRODUCTION

In today's paced work environments, where demands are high and pressures abound, employees' well-being is coming under greater scrutiny than ever before. Workplaces nowadays often present individuals with challenges such as stress levels and obstacles to achieving work-life harmony, along with limited availability of mental health support services. These challenges impact the satisfaction and efficiency of employees. They also have far-reaching effects on an organization's performance and overall culture. Recognizing and addressing these complexities is essential for cultivating workplaces that are nurturing and supportive.

This project aims to reveal insights into elements of workplace interactions and environments. With a major focus on analyzing trends and connections in areas like sources of stressors and levels of employee contentment as well as the accessibility of mental health support services. This endeavor brings attention to potential areas for enhancement. The research merges a strategy for refining and organizing data with the implementation of visualization methods utilizing D3.js. This facilitates the creation of impactful visualizations of workplace issues, enabling decision-makers to rely on data-driven perspectives.

This report explains how we studied the interactions in the workplace by collecting and preparing data for analysis before showcasing discoveries through visual representations that shed light on improving employee wellbeing at workspaces. Moreover, the report pinpoints areas that need scrutiny and proposes suggestions for upcoming tasks. By doing this, the project endeavors to add input to ongoing conversations about mental health amongst employees by providing practical ideas to foster better and more diverse workplace atmospheres.

DATASETS

The dataset originates from Open Sourcing Mental Illness (OSMI Health) and focuses on workplace mental health. Covering the timeframe from 2017 to 2022, it provides insights into employees' perspectives on mental health and related organizational practices. Its primary goal is to facilitate sentiment analysis to better understand attitudes and experiences related to mental health in professional settings.

The dataset includes various attributes spanning demographic, professional, and mental health-related domains. Demographic information comprises fields such as Age, Gender, Country, and State, enabling the exploration of geographical and social trends. Professional characteristics include variables like self_employed, no_employees (organization size), and tech_company (whether the respondent works in the tech sector), shedding light on workplace structures and their impact on mental health.

The dataset extensively captures mental health dimensions, such as family_history (presence of mental illness in the family), treatment (seeking mental health treatment), and work_interfere (impact of mental health issues on work performance). Furthermore, organizational support mechanisms are represented by attributes like benefits, wellness_program, and seek_help, which provide insights into the resources and initiatives available to employees. Cultural attitudes toward mental health are reflected through variables like anonymity (protection of privacy in seeking help) and coworkers (comfort in discussing mental health with colleagues).

This dataset is a valuable resource for analyzing the interplay between workplace environments and mental health. It supports a broad range of analyses, from demographic trends and workplace characteristics to treatment-seeking behaviors and shifting cultural attitudes over time.

VISUALIZATION DESIGN

Visualization 1 (Grouped Bar Chart):

The grouped bar chart is particularly useful here because it effectively handles the complexity of comparing multiple response categories across several workplace topics. In this scenario, where the data involves diverse response options (e.g., levels of agreement, difficulty, or access) across multiple factors, the grouped format ensures that each response is distinctly represented without overcrowding the visualization. By placing related responses side by side within each category, the chart allows us to quickly compare the distribution of responses across different dimensions in a straightforward and visually intuitive way. This design is also beneficial because it highlights variations and patterns across categories, helping to draw attention to key differences without requiring extensive interpretation. The grouped format ensures that our detailed dataset with nuanced response options remains clear and organized, preventing confusion that might arise from overlapping or aggregated designs like stacked bars. In conclusion, the grouped bar chart not only simplifies the representation of complex data but also enhances the ability to identify actionable insights at a glance, making it an ideal tool for exploring and presenting workplace dynamics.

Visualization 2 (Radial Chart):

The radial chart is a powerful tool for visualizing multivariate data, particularly when it involves multiple variables that need to be compared across a set of categories. In this case, the chart effectively maps out diverse response options, such as "Yes," "No," and "Maybe," across workplace-related dimensions like mental health consequences, coworker interactions, and supervisor support. By using a circular layout, the radial chart provides a comprehensive yet intuitive view of relationships and contrasts across these categories.

This format excels at highlighting areas of convergence and divergence, making it easier to identify patterns, such as where responses align closely or vary significantly. The overlapping areas in the chart visually emphasize shared trends, while distinct shapes underline discrepancies, drawing attention to notable insights.

Unlike other types of charts, the radial format ensures a balanced and uncluttered display, even when representing complex datasets with multiple dimensions. In conclusion, the radial chart simplifies the interpretation of intricate relationships, fosters quick comparisons across variables, and supports informed decision-making. Its structured yet flexible design makes it an excellent choice for exploring nuanced workplace dynamics and uncovering actionable insights with clarity.

Visualization 3(Geo-Map):

The geo-map is an effective visualization tool for representing data distribution and trends across different geographical regions. In this case we can use color-coded markers (e.g., green for "More Treated," red for "More Untreated," and gray for "No Data") to indicate treatment disparities around the world. The size of the markers further enhances the visualization by proportionally representing the magnitude of the data points, allowing for an immediate grasp of regional differences.

This design excels at drawing attention to significant patterns, such as clusters of untreated populations in certain areas or regions with high treatment rates. By overlaying data on a familiar geographic context, the map provides a clear and intuitive framework for interpreting the global distribution of treatment accessibility. Additionally, the absence of data in some regions, indicated by gray areas, highlights gaps that can be looked at later down the line. In conclusion, the geo-map effectively balances clarity and detail, making it easy to identify both global and regional trends at a glance. It is particularly useful for exploring disparities, allocating resources, and prioritizing interventions in a visually compelling and actionable manner.

DATA PROCESSING, IMPLEMENTATION

DETAILS

During the data preprocessing phase, several challenges were encountered and addressed to ensure the dataset was clear, consistent, and ready for analysis. A significant issue arose from differences in column naming conventions across the five merged datasets. To address this, each column was reviewed and standardized to ensure clarity and uniformity. For instance, "What is your age?" was simplified to "Age," and "What is your gender?" was renamed to "Gender." Additionally, questions repeated for sentiment analysis were carefully combined by aligning similar values across columns. This ensured that the merged dataset retained its integrity and accuracy.

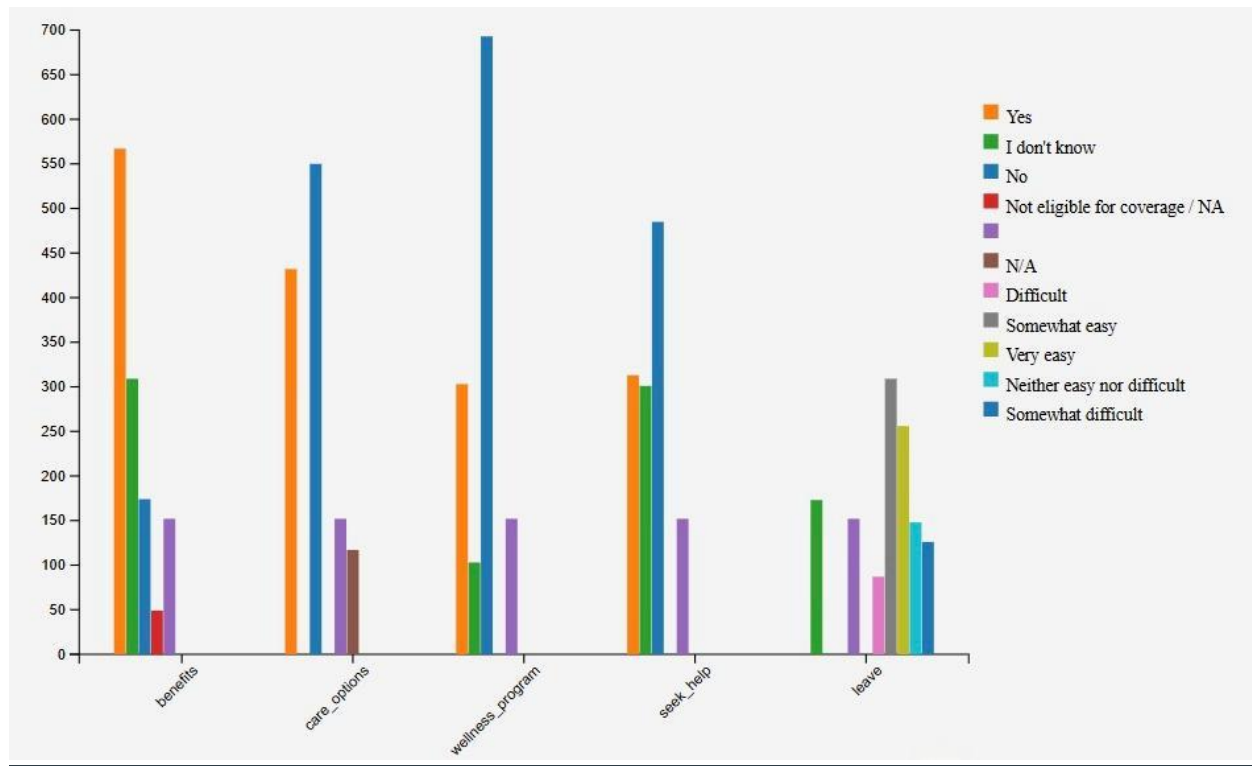
Cleaning and harmonizing the data required meticulous attention to detail. For example, manual entries for gender had to be standardized to eliminate variations such as "M," "Male," and "male," which were unified as "Male." Similarly, ambiguous responses like "I don't know" were reclassified as "Maybe" to improve the accuracy and clarity of visualizations. These adjustments were critical for ensuring the dataset's usability and reducing noise in the analysis.

Geospatial data posed another challenge. The dataset lacked coordinate information, so country names were utilized for mapping purposes. To align with standard naming conventions in geospatial tools, country names were harmonized. For example, "United States of America" was shortened to "USA," "United Kingdom" to "England," and "Serbia" to "Republic of Serbia." These adjustments allowed the data to integrate seamlessly with JSON files used for geospatial visualization.

The refined dataset encompasses a wide range of variables, providing insights into demographic trends, workplace characteristics, and mental health dimensions. It includes variables like "Age," "Gender," and "Country" for demographic analysis, as well as professional attributes such as organization size and self-employment status. Mental health-related dimensions, including "treatment" and "work_interfere," shed light on personal experiences and workplace dynamics. Through these preprocessing efforts, the dataset has been transformed into a

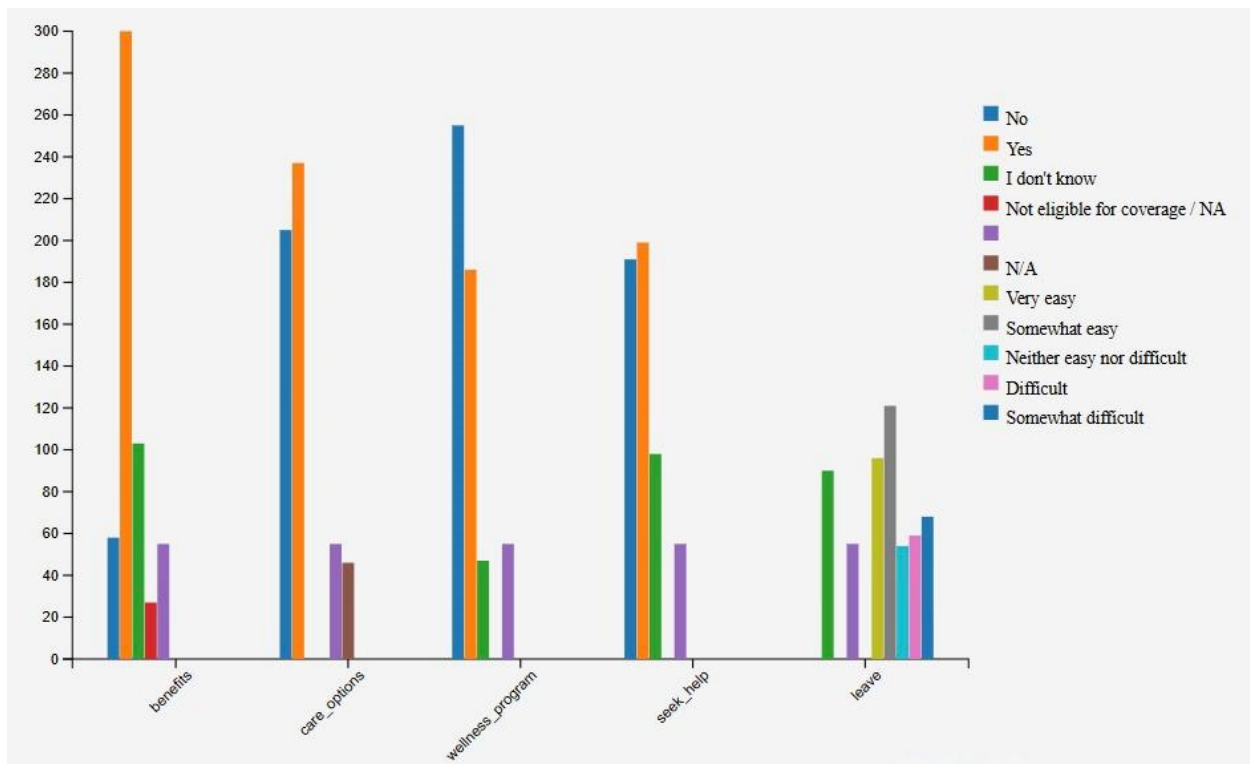
structured and versatile resource. It facilitates comprehensive analyses of workplace dynamics and mental health, enabling researchers to uncover meaningful insights and support data-driven decision-making.

RESULTS



Grouped Bar Chart Filtered by Male

The above chart specifically represents data for the male gender. A significant portion of male employees lack access to benefits, care options, and wellness programs, as reflected by "No" and "Not Eligible" responses, indicating the need for better communication and inclusivity regarding these resources. While some men find it easy to ask for leave, many report it as "Difficult," suggesting workplace policies or cultural norms may discourage them. Similarly, hesitation to seek professional help is evident, potentially due to societal stigma or workplace judgment, emphasizing the need to normalize conversations about mental health among men. Wellness programs indicate a high rejection or inaccessibility rate, pointing to the need for re-evaluation and better alignment with the needs of male employees'. Overall, addressing these gaps through improved awareness, inclusivity, and cultural shifts can foster a more supportive environment for male employees, enhancing their overall well-being and engagement.

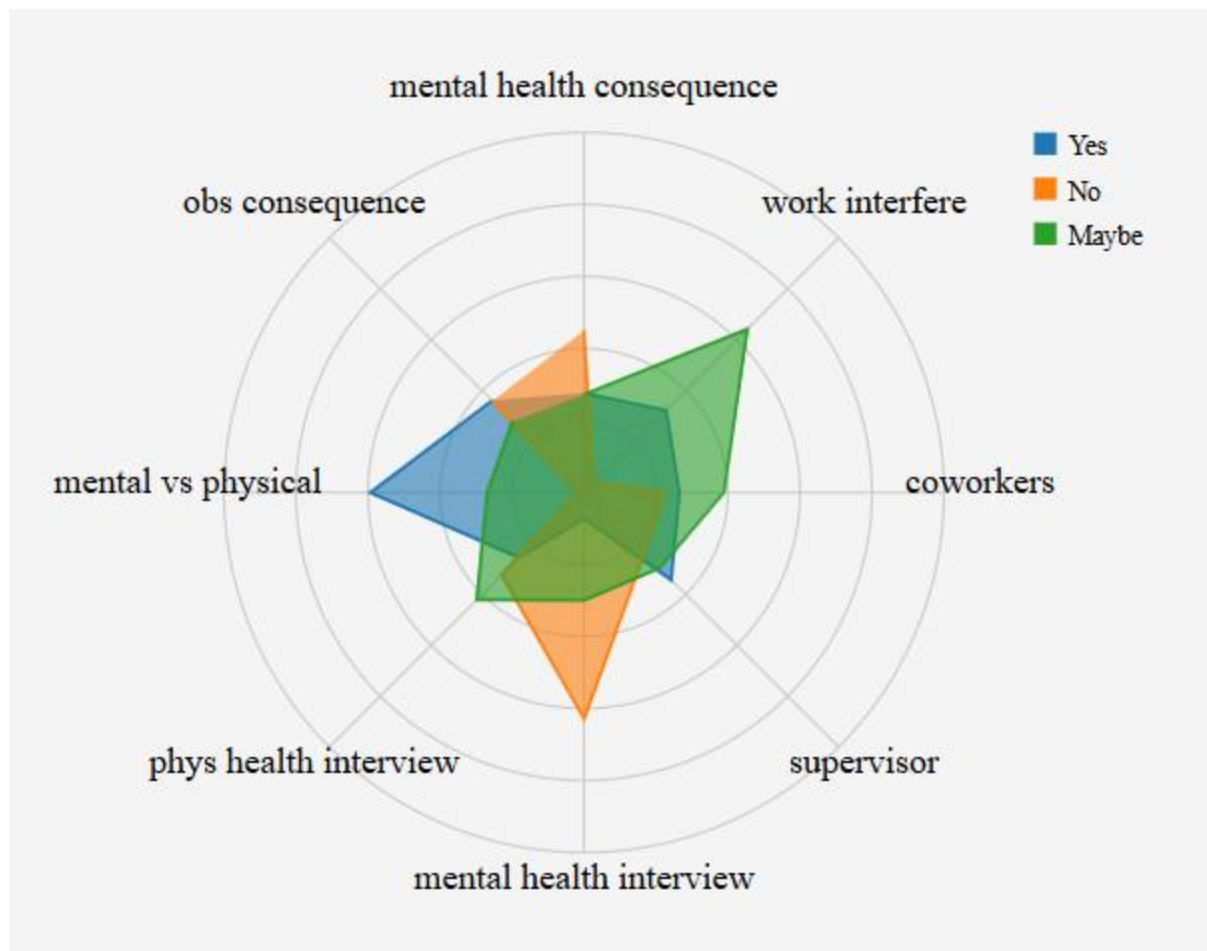


Grouped Bar Chart Filtered By Gender Female

The chart specifically represents data for the female gender. A significant number of female employees report limited access to benefits, care options, and wellness programs, as reflected in the high number of "No" and "Not Eligible" responses. This indicates a need for better inclusivity and communication regarding available resources for women in the workplace. When it comes to taking leave for health-related reasons, many women report it as "Somewhat Difficult" or "Difficult," although a fair portion finds it "Somewhat Easy." This split suggests that workplace policies or cultural norms may still create barriers for women in comfortably seeking health-related leave. In the "seek help" category, hesitation to utilize professional resources is evident, with a notable number of "No" and "I Don't Know" responses. This could stem from societal stigma or workplace cultures that discourage seeking mental health support, even when resources exist. Wellness programs also see a high rejection or lack of engagement rate, with significant "Not Eligible" and "No" responses. This highlights a potential disconnect between program design and the specific needs of female employees.

The comparison between male and female data highlights some similarities and differences in workplace mental health support. Both genders face significant barriers to accessing benefits, care options, and wellness programs, with high "No" and "Not Eligible" responses. However, females report slightly more difficulty in seeking leave for health reasons compared to males, indicating potential gender-based challenges in workplace policies or cultural attitudes.

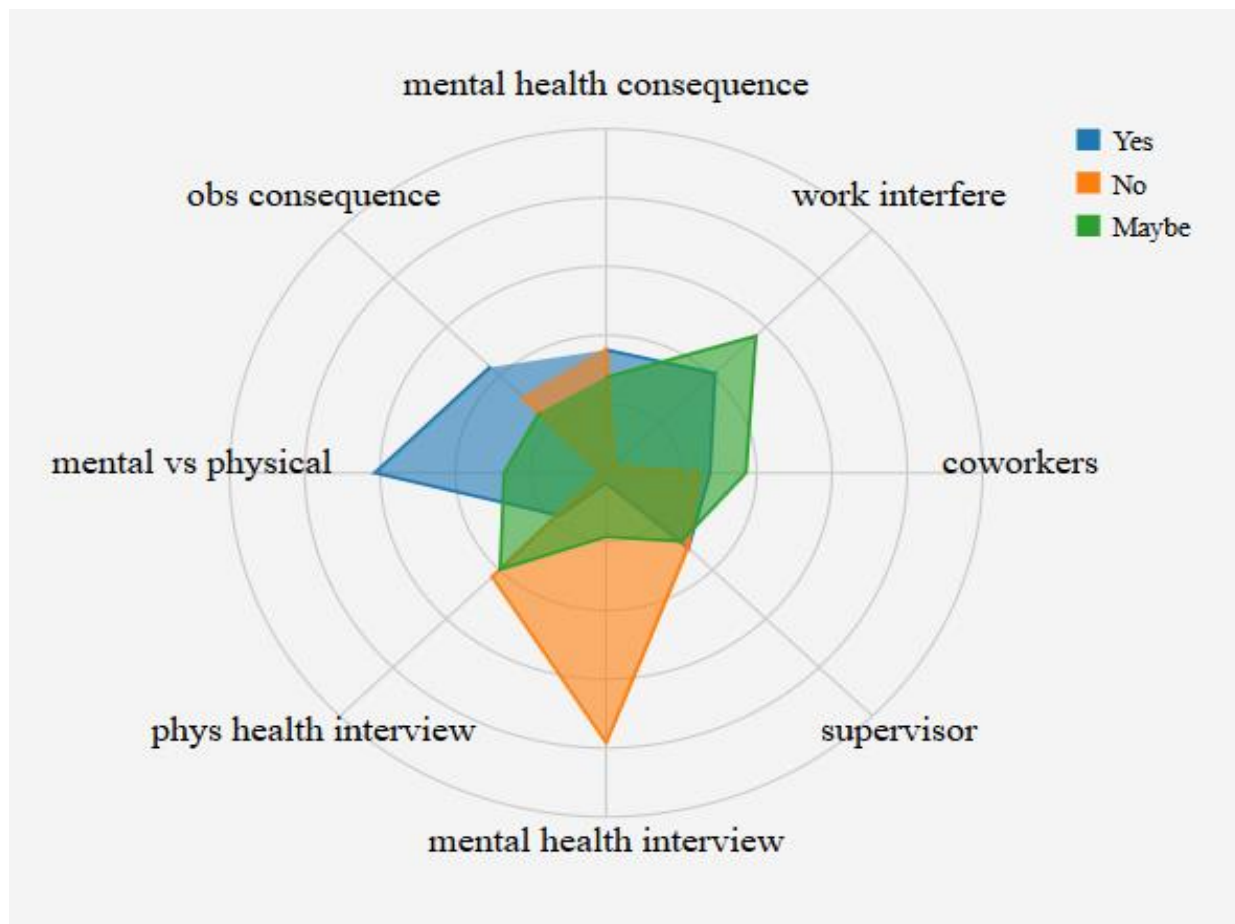
Both groups show hesitation to seek professional help, likely influenced by societal stigma, though this appears slightly more pronounced in males. Overall, while both genders face considerable challenges, females seem to experience slightly more barriers in accessibility and comfort when utilizing workplace mental health resources.



Radial Chart Filtered by Gender Male

The radial chart is filtered by male participants. When examining the "mental vs physical" category, it becomes evident that male participants find it easier to acknowledge physical health concerns compared to mental health. This pattern is reflected in the stronger "Yes" responses for physical health, indicating that societal or cultural stigma around mental health may still persist, making individuals less open about mental health challenges. In terms of comfort with supervisors and coworkers, the chart suggests that male participants feel at large equally comfortable discussing health matters with coworkers and supervisors. This trend shows that male employees are not affected much by workplace hierarchies and are able to approach supervisors about personal health concerns. When it comes to the consequences of revealing health problems, the categories "mental health consequence" and "obs consequence" demonstrate mixed responses. While a

majority of participants do not perceive direct negative outcomes, as indicated by "No" responses, the significant share of "Maybe" responses suggests lingering uncertainty. This uncertainty may stem from a lack of clear workplace policies or communication about how health disclosures are handled. In conclusion, male participants generally feel more comfortable addressing physical health issues and prefer discussing concerns with coworkers over supervisors. While the fear of consequences for disclosing health problems is not overwhelmingly high, uncertainty remains. Workplace interventions that prioritize reducing mental health stigma and building trust between employees and supervisors could encourage a more supportive environment for addressing health issues openly.



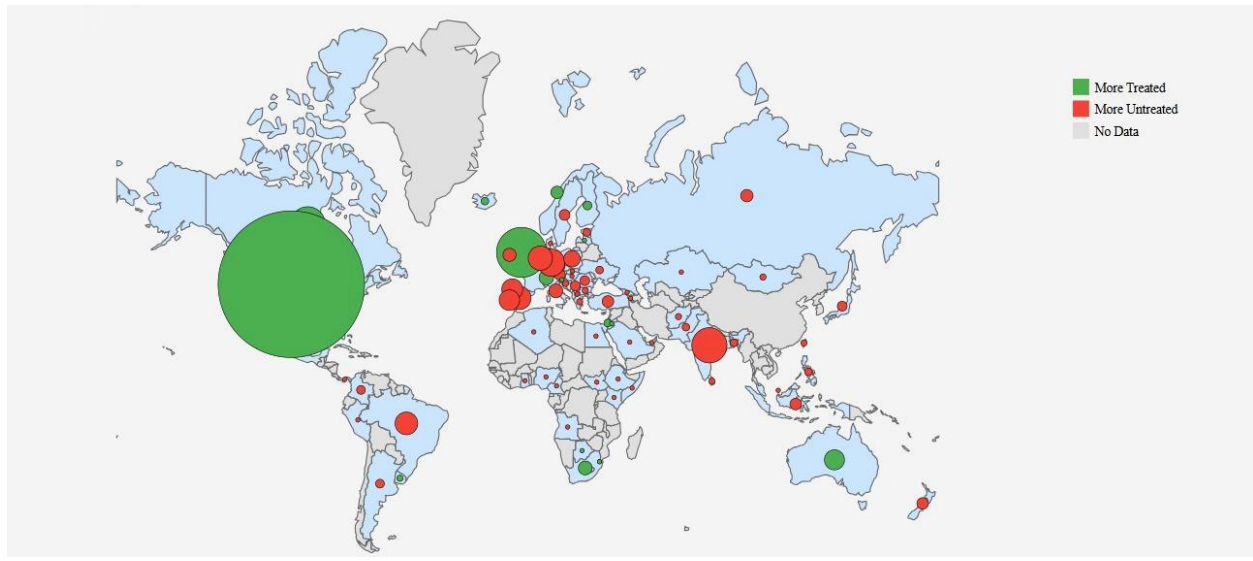
Radial Chart Filtered by Gender Female

The radial chart filtered by female participants highlights several key insights regarding workplace health concerns. Female participants show a relatively balanced acknowledgment of both mental and physical health, suggesting some progress in reducing stigma around mental health, though hesitations remain as indicated by "Maybe" responses in the "mental vs physical" category. They feel more comfortable discussing health concerns with coworkers than supervisors, as reflected in higher "Yes" and "Maybe" responses for coworkers, likely due to the perceived authority of supervisors, which can hinder open communication. Regarding the consequences of revealing health problems, categories like "mental health consequence" and "obs consequence" show a mix of "Yes," "No," and "Maybe" responses, with uncertainty likely stemming from unclear workplace policies or inconsistent support. Overall, female participants demonstrate greater openness towards health acknowledgment and comfort with peers but may benefit

from enhanced workplace trust and clearer communication to address lingering uncertainties about health disclosures.

When comparing the male and female radial charts, notable differences and similarities emerge in workplace health perceptions. Both males and females find it easier to acknowledge physical health over mental health, though females show a more balanced acknowledgment of both types, indicating slightly less stigma around mental health among women. In terms of comfort levels, males are slightly more comfortable discussing their health issues with supervisors while females seem to be much more comfortable discussing it with their co-workers. This could mean that the hierarchy barrier affects females more than males. Regarding the consequences of revealing health issues, both males and females display mixed responses, with a significant proportion of "Maybe," highlighting uncertainty about workplace policies or support. However, females show a slightly greater tendency toward openness in acknowledging health issues overall.

These comparisons suggest that while both groups face barriers in addressing mental health and hierarchical challenges in communication, females exhibit slightly greater progress in reducing stigma and fostering openness.



Geo Map by Countries

The geo map visualizes the global distribution of mental health treatment across countries, distinguishing between areas with "More Treated" (green) and "More Untreated" (red), while some regions lack data (gray). North America, particularly the United States, stands out with a significant focus on mental health treatment, as indicated by the large green circle. Europe exhibits a mix of treated and untreated cases, with several countries, such as the UK and Germany, showing substantial treatment coverage, but others, such as Eastern Europe, leaning more toward untreated cases. In contrast, regions in South America, Africa, and parts of Asia are predominantly red, suggesting limited mental health treatment access. Australia, like North America, has a notable emphasis on treatment, represented by a large green circle. The map highlights disparities in mental health treatment availability worldwide, emphasizing the need for increased resources and awareness, particularly in underserved regions.

CONCLUSION

The analysis underscores significant gender-based and global disparities in mental health acknowledgment, treatment, and workplace support, highlighting critical areas for intervention. For both male and female employees, access to benefits, care options, and wellness programs remains a challenge, as evidenced by the high proportion of "No" and "Not Eligible" responses, signaling limited inclusivity and inadequate communication. Male employees demonstrate greater hesitation in acknowledging mental health concerns, often finding it easier to discuss physical health issues, likely due to societal stigma and cultural norms. In contrast, females exhibit a more balanced acknowledgment of both physical and mental health concerns, indicating slightly lower stigma levels but still facing notable challenges. Both genders report greater comfort discussing health matters with coworkers than with supervisors, reflecting hierarchical barriers in workplace communication. However, this trend is more pronounced among males, who show a higher reluctance to approach supervisors. The consequences of disclosing health concerns also show mixed responses for both groups, with many employees expressing uncertainty, likely due to unclear workplace policies and inconsistent support systems.

On a global scale, the geomap reveals stark disparities in mental health treatment availability. Regions like North America and Australia demonstrate significant access to mental health care, as indicated by large green circles, suggesting better-developed infrastructure and awareness. In contrast, South America, Africa, and parts of Asia predominantly show red markers, indicating limited access to treatment and support resources. Europe presents a mixed picture, with Western European countries like the UK and Germany showing better treatment rates, while Eastern Europe struggles with higher levels of untreated cases. This global variability emphasizes the requirement for targeted efforts to increase resources, awareness, and equitable access.

These challenges call for a multifaceted approach. In workplaces, fostering inclusivity, improving communication about available resources, and reducing stigma through education and awareness campaigns are crucial. Policies that make it easier to seek leave, access care, and engage with wellness programs without fear

of judgment or exclusion are necessary for both genders. Globally, investments in mental health infrastructure, awareness campaigns, and culturally sensitive interventions can bridge the gaps in treatment access. By prioritizing mental health as a core element of workplace and societal well-being, a more supportive, inclusive, and equitable environment can be created for individuals all around the world.

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