

Integrating Perceived Stress Scale, Principal Component Analysis, and Fuzzy Logic to Classify Stress Level

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Abstract. Modern life is filled with stress, adversely affecting both physical and mental health, as well as performance and organizational success. This study examines work stress and how gender, age, job tenure, marital status, and education level influence stress levels. Using a modified Perceived Stress Scale (PSS), Principal Component Analysis (PCA), and fuzzy logic, the study aims for precise stress measurement while addressing uncertainty. Linear regression assesses the effects of work experience and age, while parametric methods like the t-test and ANOVA analyze gender, marital status, and education level impacts. Results show no significant effect of work experience or age on stress, but substantial gender differences and considerable stress related to educational level, with those holding a 3-year degree experiencing more stress. The study recommends that companies offer training, adequate rest, and counseling to help manage stress and enhance productivity.

Keywords: fuzzy logic; perceived stress scale; principal component analysis; stress mitigation.

I. INTRODUCTION

Modern life is full of stress, which hurts both physical and mental health. This study focuses on work-related stress, characterized as a mismatch between an individual's resources and abilities and the demands of their job. Both physiologically and psychologically, stress can cause symptoms including headaches, elevated heart rate, impatience, and burnout, especially in jobs that involve high pressure or danger (Sahoo, 2016). It hurts employees' safety, motivation, productivity, and health, eventually affecting organizational success (Sahoo, 2016).

Workplace stress is frequently caused by excessive demands, a lack of support, and little control over one's job. Job stress is largely caused by the constant pressure to perform and improve, as well as the growing demands from management and consumers (Lie, 2015). Continuous exposure to stress has been shown to

cause burnout and hurt social and academic activities, especially in educational contexts (Soomro et al., 2020). Stress affects the mind, body, and performance negatively; it has been shown to moderately lower performance and organizational success (Prasad, 2015). Inadequate resources, strict schedules, and a hostile work environment are some of the causes of high occupational stress, which has a significant financial impact on individuals and companies (Prasad, 2015).

Due to increased rivalry and quick technical breakthroughs, stress is becoming commonplace in modern work contexts (Timotius and Octavius, 2022). Employers sometimes assert that their most precious asset is their workforce. Still, there is a gap between this ideal and the reality of workplace stress due to intense competition, unmet promotions, and a need for acknowledgment (Leca and Tigu, 2015). This paradox exacerbates preexisting stress levels, affecting interpersonal connections and job satisfaction in general. Furthermore, a combination of stressors at work, such as unmet expectations, conflicting personalities, and heavy workloads, leads to a state of stress that management frequently overlooks (Leca and Tigu, 2015). To succeed in the uncertain conditions of the future, executives must efficiently manage stress and optimize staff potential (Leca and Tigu, 2015). Stress equally impacts people; stress affects health, performance, and general well-

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being (Izzati et al., 2020). It has been demonstrated that job stress has a detrimental impact on mental health and raises intentions to leave the company, but that stress can be lessened by perceived organizational support (Lee et al., 2022).

Studies demonstrate that stress results from pressures that are greater than a person's capacity for coping, which can cause a range of physical and mental health problems (Lee et al., 2022). Contemporary issues, such as growing employment expectations and technology breakthroughs, intensify stress levels, which lower productivity and worsen health issues (Panigrahi, 2018) (Nagaraju and Nandini, 2012). Unrealistic goals and lengthy hours cause significant stress for workers in industries like insurance, as they also interfere with personal and family life (Nagaraju and Nandini, 2012). Referred to as the "illness of the century," stress has been demonstrated to have a detrimental effect on professionals' performance (Panigrahi, 2018).

Stress hurts health and is linked to several diseases and mental health issues (Dorsey et al., 2022) (Shojaeian et al., 2020). Workplace stress has significant effects on people and companies since it has been connected to heart disease, higher absenteeism, and higher healthcare costs (Lestari and Rizkiyah, 2021). Workplace connections, professional advancement, and duration of employment impact work-related stress (Lestari and Rizkiyah, 2021). Anxiety, persistent mental exhaustion, and a host of physical symptoms, such as headaches, sleep difficulties, and poor concentration, can all be brought on by high levels of stress (Musradinur, 2016) (Khan et al., 2014).

Employee performance and organizational outcomes are impacted by long-term workplace stress, which is caused by unfavorable working circumstances and unreasonable demands (Kushwaha, 2014) (Tran et al., 2020). Further emphasizing the necessity for efficient stress management, stress also impacts interpersonal interactions and can result in poor decision-making and a rise in workplace accidents (Ismail et al., 2015). Stress at work is mainly caused by role conflict, task overload, and unfavorable

working environment (Nekoranec and Kmosena, 2015).

Stress can negatively impact an organization's overall performance, lower work quality, and increase absenteeism (Kim, 2021). These pressures can also affect family life, public activities, and health (Sajid et al., 2021) (Bhui et al., 2016). Unrealistic demands, a lack of support, and inadequate communication are management techniques that lead to stress (Bhui et al., 2016). The success of the business and the well-being of its employees ultimately depend on the knowledge and management of work-related stress. Effective stress management techniques and supporting practices are crucial for reducing the detrimental effects of stress on workers and organizations as the workplace changes (Kapoor and Chhabra, 2022).

This study aims to measure stress levels, to test whether respondent backgrounds significantly affect stress levels, and to provide stress mitigation recommendations. This study measured stress levels in employees working at a technology company. Psychological techniques that involve questionnaires can be used to measure stress (Panigrahi, 2018). Everyone is unique in their psychology and response to stress (Panigrahi, 2018). Therefore, several questionnaires measuring the stress response were created to collect such responses (Panigrahi, 2018). The questionnaire used to measure stress level is the perceived stress scale questionnaire. However, this questionnaire instrument, widely used in previous studies, has yet to be able to answer the problem of uncertainty in measuring stress levels. When grouping stress levels, the measurement of scores needs to consider the spectrum value of the function and the logic rules where fuzzy logic can overcome this problem. Based on the literature review conducted in this study, as far as the researcher knows, more research needs to apply fuzzy logic to the perceived stress scale questionnaire. Therefore, this study tries to answer the problem of uncertainty by modifying the perceived stress scale questionnaire and integrating it with the principal component analysis (PCA) method so

that the results can be inputted into the fuzzy logic method.

The stages carried out are determining the input membership function derived from the results of the PCA method, creating fuzzy rules, and determining the output membership function. The existence of the fuzzy method can overcome the problem of measuring stress levels to more precise because it has accommodated the uncertainty factor in classifying stress levels, which, as far as the researcher's understanding is concerned, there have been no or very few who have applied this method to measure stress. Based on this research gap, this study tries to use a new method resulting from modifications and integration of several approaches to be applied in measuring stress levels and providing recommendations for stress management.

II. RESEARCH METHOD

The following are the stages in this study:

1. Literature review

In this study, the first stage is to conduct a literature review to find current problems related to relevant research and to identify research gaps that have not been widely discussed in previous studies. Stress measurements were carried out on 30 employees at a technology company in Indonesia.

2. Preparing the Perceived Stress Scale Questionnaire

This stage is an important stage for compiling the questionnaire and checking each instruction and question in the questionnaire before distributing it to respondents.

3. Validity and Reliability Test

The validity test is carried out to test whether the questionnaire has measured the stress level correctly according to the purpose of the survey with the questionnaire. The reliability test is carried out to test whether the questionnaire is consistent and produces similar results if the stress level measurement is carried out again.

4. Normality Test and Linear Regression Assumption

The normality test and linear regression assumption test are needed to determine

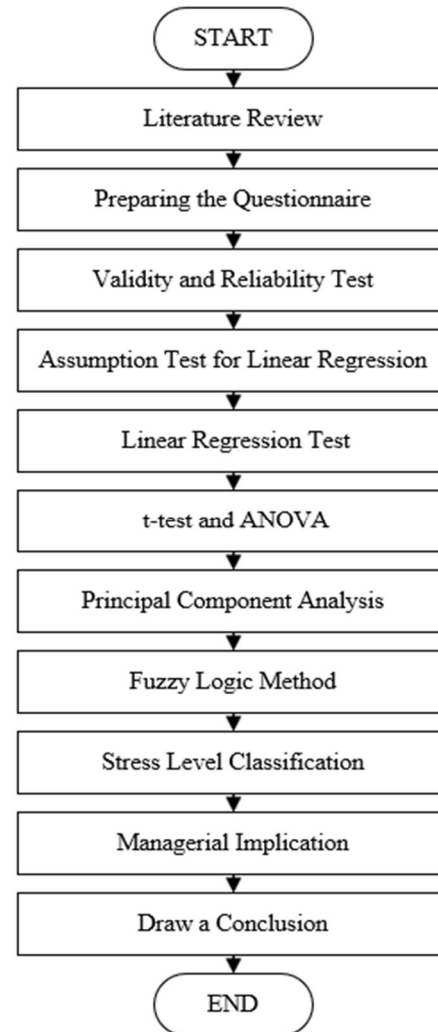


Figure 1. Research Stages

whether the linear regression method can be carried out. In addition to the normality test, the assumption tests carried out are linearity, multicollinearity, and heteroscedasticity tests.

5. Linear Regression Test

After fulfilling the assumption tests, the linear regression method can be carried out to see whether work experience has a significant effect on stress levels and whether age has a significant effect on stress levels.

6. t-test and ANOVA

After ensuring that the data is normally distributed, testing with parametric statistical methods can be carried out. The t-test is carried out to see whether there is a significant difference in stress levels between genders and to find out whether there is a significant difference in stress

levels between the single respondent group and the married respondent group. The ANOVA test is carried out to test whether there is a significant difference in stress levels at different levels of education.

7. Reducing Factors with Principal Component Analysis (PCA)

Principal Component Analysis (PCA) is a method used to group question items on the perceived stress scale questionnaire. The grouping results will be used as input to the fuzzy logic method which will determine the output stress level.

8. Applying the Fuzzy Logic Method

The fuzzy logic method is used to accommodate uncertainty factors in measuring stress levels. The stages carried out are determining the input membership function derived from the results of the PCA method, creating fuzzy rules, and determining the output membership function. The existence of the fuzzy method can overcome the problem of measuring stress levels to be more precise because it has accommodated the uncertainty factor in classifying stress levels which as far as the researcher's understanding has not been or very few have applied this method to measure stress.

9. Stress Level Classification

The classification produced by fuzzy logic is one of the stress-level groups, whether low stress, moderate stress, or high stress. Classification is carried out to measure the overall stress level and group the scores across all employees and compare them with the respondent's background such as gender, education level, and marital status.

10. Managerial Implication

After getting the results, researchers need to compare them with previous studies and provide recommendations on the research results so that respondents can apply this strategy in dealing with stress experienced by workers in their jobs.

11. Draw a Conclusion

This stage is drawing conclusions based on the findings obtained in this study and also answering the problems in the research questions.

III. RESULT AND DISCUSSION

Results

Table 1 shows the descriptive statistics of the respondents' profiles in this study. The number of respondents involved in this study was 30 people. The questionnaire collected respondents' backgrounds related to gender, education level, marital status, age, and job tenure. The average age of respondents was 28.13 years (standard deviation 2.79) with an average work experience of 4.38 years (standard deviation 2.70).

Table 1. Profile of Respondents

	Frequency
Female	20
Male	10
3-year College Degree	3
Bachelor Degree	24
Master's Degree	3
Married	10
Single	20
All Respondents	30

The questionnaire used to collect data was the Perceived Stress Scale Questionnaire which is shown in Table 2.

The 10-item Perceived Stress Scale (PSS) is the most widely used tool for evaluating feelings of overall stress. The extent to which an individual perceives their life as chaotic, erratic, and excessive within the last 30 days is measured by this questionnaire. Higher overall scores indicate a higher level of perceived stress [11]. Scores are determined using a five-point scale (0 = never, 1 = practically never, 2 = once in a while, 3 = often, and 4 = very often).

Higher scores on the PSS indicate higher perceived stress. Individual scores on the PSS can vary from 0 to 40. A score between 0 and 13 is regarded as low stress. A score between 14 and 26 is regarded as somewhat stressful. A score between 27 and 40 is regarded as high for perceived stress.

To find out whether the questions in the questionnaire are accurate and consistent in measuring stress levels, validity and reliability

Table 2. Perceived Stress Scale Question Items (Cohen et al., 2012)

No.	Question Items
X ₁	How many times in the past month have you been irritated by an unforeseen event? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₂	How frequently during the past month have you felt like you had no control over the significant aspects of your life? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₃	How often have you felt stressed and nervous in the past month? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₄	How often in the past month have you felt assured that you can manage your personal issues? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₅	How often did you feel like things were going in your direction in the past month? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₆	How many times in the past month have you felt like you couldn't handle everything that you needed to get done? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₇	How often have you been able to manage your aggravation in the past month? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₈	During the past month, how often did you feel in control of your situation? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₉	How often in the past month have events that happened to you that were beyond your control made you furious? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often
X ₁₀	How many times in the past month have you felt like you were facing too many obstacles to overcome? ① Never ① Almost Never ② Sometimes ③ Fairly Often ④ Very Often

tests need to be conducted. In determining the appropriate validity test, a normality test is needed. Based on the normality test with Shapiro-Wilk, a significance value of less than 0.05 was obtained, so the data was not normally distributed. The results of the validity test are shown in Table 3. The validity test based on the total correlation test using the Spearman

correlation obtained all valid question items at a significance level of 0.01.

The results of the reliability test showed a Cronbach's Alpha value of 0.887, indicating that the questions in the questionnaire were reliable. The regression test was used to determine whether there was an influence between work experience and worker stress levels and whether there was an influence between age and worker stress levels.

The first linear regression assumption test is that the data must be normally distributed. The significance value in the normality test with Shapiro Wilk is 0.666, thus the data is normally distributed. Second, the linearity test shows a Fobtained value of 1.596 with a significance greater than 0.05 so that the data meets the linearity assumption. Third, based on the multicollinearity test, the VIF value is smaller than 10 and the tolerance value is greater than 0.10, indicating that there are no symptoms of multicollinearity. Then the results of the Glejser heteroscedasticity

Table 3. Validity Test

	Correlations
X ₁	0.558**
X ₂	0.866**
X ₃	0.858**
X ₄	0.517**
X ₅	0.513**
X ₆	0.779**
X ₇	0.769**
X ₈	0.680**
X ₉	0.708**
X ₁₀	0.738**

** Correlation is significant at the 0.01 level

test obtained a significance value above 0.05 so that there are no symptoms of heteroscedasticity. Thus, the linear regression test can be carried out because it has met all the assumption tests. The regression results show a significance value above 0.05, which means there is no significant effect between work experience and stress level, and there is no effect of age on stress level.

To determine the right method to find out whether there is a significant difference in stress levels between gender groups, it is necessary to conduct a normality test first.

Based on the normality test with Shapiro-Wilk, a significant value above 0.05 is obtained, which means the data is normally distributed. Therefore, a t-test can be performed. The results of the t-test show that the Levene for Equality of Variances significance value is 0.333. Because the Levene significance value is above 0.05, the data is assumed to be homogeneous. The results of the significance value on the assumption of homogeneous variance are 0.031, which indicates that there is a significant difference between gender and stress level. The results of this study indicate that stress levels in women are higher than stress levels in men.

To determine the right method to find out whether there is a significant difference in stress

levels between single and married groups, it is necessary to conduct a normality test first.

The normality test shows a significance result above 0.05 so that the data is normally distributed. Therefore, the t-test can be performed. The t-test results show that the Levene for Equality of Variances significance value is 0.396. Because the Levene significance value is above 0.05, the data is assumed to be homogeneous. The significance value result on the assumption of homogeneous variance is 0.368, which indicates that there is no significant difference in stress levels between single and married workers. To determine the right method to determine whether there is a significant difference in stress levels between different education level groups, it is necessary to conduct a normality test first. Table 4 shows the average stress levels in different education level groups.

The results of the normality test with Shapiro-Wilk showed that the data was normally distributed because it had a significance value above 0.05. Therefore, the ANOVA test can be performed.

The ANOVA test was performed to determine whether there was a significant difference in stress levels in the three education level groups. The p-value obtained in the ANOVA test was 0.019, indicating that there was a difference in stress levels between the education level groups. The results of the follow-up test with Bonferroni obtained a significance value of 0.05 between 3-year degree workers and bachelor degree workers, where 3-year degree workers had higher and more significant stress values compared to the bachelor degree worker group.

Principal Component Analysis is needed to reduce the questionnaire items to only a few Factors. These factors will be used as input membership in fuzzy logic in determining stress levels and their classification. Before conducting the Principal Component Analysis (PCA) test, it is necessary to see the Kaiser Meyer Olkin value and the significance value in Bartlett's test.

The Kaiser Meyer Olkin value obtained is 0.849, and the significance value in Bartlett's test is 0.0001. The value in the diagonal anti-image correlation matrix shows a value greater than 0.5.

Table 4. Mean of Stress Level by Education Level

No.	Education Level	Mean
1.	3-Year Degree	2.53
2.	Bachelor Degree	1.72
3.	Master's Degree	2.33

Table 5. Principal Component Analysis Results

	Component 1: Situation	Component 2: Internal Conflict
X ₉	0.872	0.081
X ₃	0.811	0.245
X ₂	0.800	0.373
X ₁	0.764	-0.073
X ₇	0.640	0.434
X ₁₀	0.635	0.440
X ₈	0.630	0.327
X ₆	0.584	0.546
X ₄	0.031	0.866
X ₅	0.187	0.674

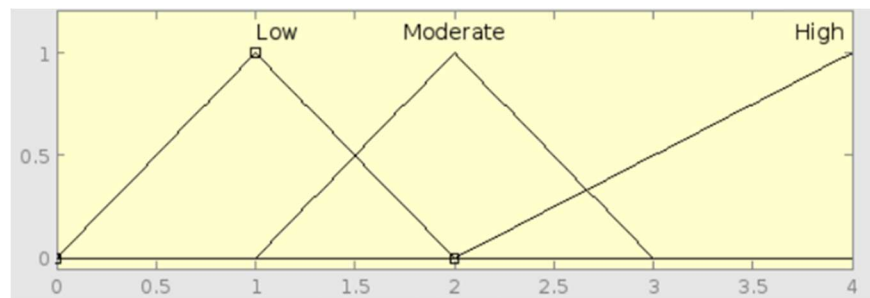


Figure 2. Membership function for Situation and Internal Conflict

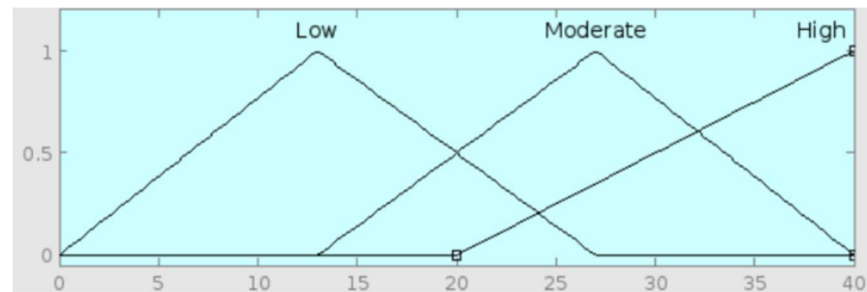


Figure 3. Membership function for Stress Scale

Table 6. Fuzzy Rules

No.	Fuzzy Rules
1.	If (Internal Conflict is Low) and (Situation is Low) then (Stress Scale is Low)
2.	If (Internal Conflict is Low) and (Situation is Moderate) then (Stress Scale is Low)
3.	If (Internal Conflict is Low) and (Situation is High) then (Stress Scale is Moderate)
4.	If (Internal Conflict is Moderate) and (Situation is Low) then (Stress Scale is Moderate)
5.	If (Internal Conflict is Moderate) and (Situation is Moderate) then (Stress Scale is Moderate)
6.	If (Internal Conflict is Moderate) and (Situation is High) then (Stress Scale is High)
7.	If (Internal Conflict is High) and (Situation is Low) then (Stress Scale is Moderate)
8.	If (Internal Conflict is High) and (Situation is Moderate) then (Stress Scale is High)
9.	If (Internal Conflict is High) and (Situation is High) then (Stress Scale is High)

All of these test results indicate that factor grouping with PCA can be done. Because 2 components have a total eigenvalue above 1, the number of components used is 2 components. Table 5 shows the results of the PCA component matrix after rotation.

After getting the PCA results, the values of items X4 and X5 become the formers for the input score of the internal conflict factor. While the other questionnaire items become the formers for the situation factor score. After that, fuzzy logic is used to measure stress levels and group stress levels.

In fuzzy logic, the first step is to define the membership function obtained by considering the range score from 0 to 44 based on reference

(Cohen et al., 2012). The formulation of the membership function is shown in Figure 2 and Figure 3.

After determining the membership function, it is necessary to determine fuzzy rules. Fuzzy rules are rules that are used as a reference in determining the classification of stress levels based on input groups in situations and internal conflicts. Table 6 shows the fuzzy rules in this study.

Based on the results of the input score on the situation and internal conflict, the overall stress level of employees is moderate. The results of stress level measurements in this study are shown in Table 7. Based on the results of this study, almost all respondent characteristics

Table 7. Stress Level Summary Based on Fuzzy Logic Outputs

No.	Profile Characteristics	Stress Scale	Stress Category
1.	Overall respondents	21.7	Moderate Stress
2.	Male	20	Moderate Stress
3.	Female	22.7	Moderate Stress
4.	3-year degree	27.6	High Stress
5.	Bachelor degree	20.9	Moderate Stress
6.	Master degree	21.8	Moderate Stress
7.	Single	23.5	Moderate Stress
8.	Married	18.3	Moderate Stress

indicate a moderate stress level, except for the group of employees who have a 3-year degree educational background. This could be because employees who have a 3-year degree educational background tend to get technical jobs that require high skills. As a result, the stress level will increase.

Although most employees are at moderate stress levels, stress management in the company is still needed so that stress levels do not become high stress and employee performance in the company is maintained.

The discussion section will discuss the comparison of the results of this study with previous studies and recommendations for stress-coping strategies needed as managerial implications based on the results of this study.

Discussion

Women are more stressed than men, according to this study's findings and those of earlier studies. The role conflict that results from women's dual obligations of working and caring for their families at home has also been reported to contribute to higher levels of stress in women (Prasad, 2015). When it came to how they reacted to stress, more women than men reported feeling depressed, frustrated, and anxious (Calvarese, 2015).

The study found that women feel stress more acutely and are more susceptible to it than men. This may be the result of the simultaneous stress that women experience in their home and work lives (Leca and Tigu, 2015). It has been shown that women face serious challenges related to their physical well-being, encounter prejudice and sexual harassment, and have to

deal with men's authority and control over them in positions of hierarchy (Bhui et al., 2016). They have less access to consultation, preventive, representation services, and decision-making bodies (Bhui et al., 2016).

Prior studies have shown that educational background and length of employment can have a big impact on stress levels. Work experience and educational background have a major impact on the stress levels of employees as well (Leca and Tigu, 2015). People with longer tenure also have greater workloads because, based on their employment experience, they are presumed to be capable of accomplishing the work (Lestari and Rizkiyah, 2021). According to the data, respondents who have worked for nine years or more rank [4.3529] stress as being more common than respondents with fewer years of experience (Owusu et al, 2021).

The study's findings, however, indicated that while work tenure had no discernible impact on stress levels, education level was the only one that did. This demonstrates that the research backs up the conclusion that stress levels are independent of work tenure (Aydin, 2018).

According to the study's findings, staff stress levels are generally moderate. Previous research showing that 72.4% of respondents reported having a moderate degree of stress due to their jobs (Lestari and Rizkiyah, 2021) further supports this [13]. The factors that affected workplace stress were the length of work ($p = 0.002$), roles played by individuals within the organization ($p = 0.026$), career advancement ($p = 0.027$), and relationships within the company ($p = 0.03$) (Lestari and Rizkiyah, 2021).

Age and marital status had no discernible impact on stress levels. This differs from earlier studies that found higher levels of stress at particular ages. The findings show that respondents in the 50–59 age range (4.3333) believe stress to be more common than in other age groups (Owusu et al., 2021). Additionally, this study defies other findings that suggest lone workers typically experience higher levels of stress (Aydin, 2018). Fuzzy logic was used to test employee stress levels, and the results showed that all employees had moderate levels of stress, except those who had a diploma background. These individuals had high levels of tension, according to the measurement results. This may be the case because workers with a three-year degree typically work in technical positions requiring a high level of ability, which raises stress levels. This goes against other studies' findings that stress is more common among respondents with a master's degree in education (4.0870) than among respondents with lower educational levels (Owusu et al., 2021).

Stress can be caused by a variety of factors, such as one's position within the company, career progression, interpersonal relationships at work, and essential features of the job itself. Stress at work might result from role conflicts that develop when workers are unable to fulfill their tasks (Lestari and Rizkiyah, 2021).

The work period affects how much work is received. Typical sources of stress include problems at work, test anxiety, domestic problems, illness, lack of sleep, and many other variables (Musradinur, 2016). Four factors were considered: social, financial, emotional, and familial stress (Khan et al., 2014). This study emphasizes the need to manage workplace stress to safeguard employee wellness and improve organizational performance. This theory states that combining individual and organizational strategies is the best way to manage stress connected to work (Sahoo, 2016). Management shouldn't ignore employee stress levels because doing so can help the business succeed going forward (Lie, 2015). Better interpersonal relationships, flexible work schedules, and active employee participation in stress management are

a few examples of stressor mitigation strategies (Prasad, 2015).

Stress management is a highly individualistic process that requires personal control over one's beliefs, emotions, and lifestyle (Sahoo, 2016). Employees should recognize the sources of their stress and learn calming strategies like time management and socializing. Other important things to keep in mind are to get enough sleep, manage your time well, and accept that some things cannot be altered (Prasad, 2015). Businesses must accept responsibility by providing flexible work arrangements, promoting effective supervision, and implementing stress-reduction programs. Practical strategies include teaching work-life balance, encouraging open communication, reducing long work hours, and using technology for training (Prasad, 2015) (Panigrahi, 2018).

Participating in activities like yoga, meditation, and counseling from a professional can also help reduce stress (Panigrahi, 2018). Effective stress management requires keeping an eye on stress levels, refining job designs, and boosting employee involvement. Creating a welcoming environment at work and giving regular feedback is essential (Lestari and Rizkiyah, 2021) (Nekoranec and Kmosena, 2015). In general, both organizational and individual initiatives are needed to establish a favorable work environment that boosts worker productivity and efficiency (Kim, 2021) (Kapoor and Chhabra, 2022).

In light of the variables that may impact stress levels, the following managerial suggestions may be made:

1. The organization should make career growth transparent and easy for every worker.
2. To help new hires avoid role conflict, the organization should offer training or probationary periods.
3. To prevent tension among employees, the management should allow enough time for rest.
4. For each worker to be productive and to avoid stress easily, they need to get enough sleep and good quality sleep.

5. Employee bonding must be strengthened through joint events, which also serve as entertainment during hectic work hours.
6. Counseling services must be available so that workers can resolve issues at work and avoid going through too much stress.

It is intended that by implementing these mitigating measures, employee stress levels can be kept at a manageable level, allowing them to function more effectively.

IV. CONCLUSION

The fuzzy logic method was adopted in this study to modify the stress measurement instrument on the perceived stress scale to accommodate the uncertainty factor in measuring stress levels. Based on the results of this study, it was found that there was no significant effect between work experience and stress levels and there was no significant effect between age and stress levels. There was a significant difference between gender and stress levels and there was no significant difference between marital status and stress levels. There was a significant difference in stress levels between levels of education. Based on the results of measuring stress levels using fuzzy logic, it was found that all employees were at a moderate stress level, except for employees with a 3-year degree education background, where based on the results of the measurement, employees with a 3-year degree education background had a high stress level. Based on the factors that can affect stress, the stress mitigation that can be given is: the company should provide support in the form of training, sufficient time to rest, and counseling facilities. By taking these mitigation actions, it is hoped that employee stress levels can be maintained so that they do not become high and can work more productively.

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