

# Determinant of readiness for adopting healthy lifestyle behavior among university employee: structural equation modeling

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## ABSTRACT

Identifying the factors influencing healthy lifestyle behaviors among university faculty and staff is crucial for designing interventions to enhance health outcomes and reduce healthcare expenses. This study aimed to explore the determinants of readiness for adopting healthy lifestyle behaviors among university employees, with a focus on aspects such as diet, physical activity, and stress management in Indonesia. Using a cross-sectional survey approach, respondents participated in guided interviews utilizing the G-form. Through Partial Least Square Structural Equation Modelling (PLS SEM) analysis, it was found that while lifestyle choices did not significantly impact readiness to change lifestyles (p-value>0.05); factors such as health status, use of preventive services, mental health, and perception of occupational health significantly influenced readiness (p-value<0.05). The study underscores the importance of considering various factors, including mental health, health status, and work-related perceptions, to encourage readiness for lifestyle changes among university employees. An incorporating comprehensive wellness programs with mental health resources, regular health screenings, and workplace health initiatives should be considered in implementation of healthy lifestyle program in the universities.

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## 1. INTRODUCTION

Chronic diseases pose a substantial risk to working-age adults worldwide, significantly contributing to high rates of mortality and illness [1]. Research shows that noncommunicable diseases (NCDs) are the leading causes of death, with risk factors such as tobacco use, unhealthy diets, lack of physical activity, and alcohol consumption being common among the working population. Additionally, studies point to a rising incidence of obesity, diabetes, and asthma among adults, underlining the burden of chronic diseases [2]. The Global Burden of Disease study highlights the severe impact of NCDs, indicating that cardiovascular diseases, cancer, diabetes, and respiratory problems account for millions of deaths globally, with behavioral risk factors like smoking and high body mass index (BMI) playing key roles [3].

One specific workplace to consider is academic institutions. These institutions are crucial for improving the health of faculty and staff who work and reside in higher education environments. They play

an essential role in supporting the mental health and well-being of their employees. Research indicates that faculty members frequently experience stress, burnout, anxiety, and depression due to the challenging work environment and the demands of balancing multiple responsibilities [4]–[7].

Determining the readiness for adopting healthy lifestyle behaviors among university employees is crucial for promoting overall well-being and preventing diseases. Several factors influence the adoption of healthy behaviors in university settings. Research has shown that unhealthy dietary habits, such as snacking and poor eating choices, can have adverse effects on weight status in young adults [8]. Gender differences and the specific needs of students play a role in shaping health-promoting behaviors, indicating the importance of tailored interventions for different groups within the university community [9]. Identifying key factors that influence healthy lifestyle behaviors among university faculty and staff is essential for designing effective interventions to improve health outcomes and reduce healthcare costs [10].

Studies have highlighted the significance of promoting healthy lifestyle behaviors among university employees. Adopting healthy lifestyle behaviors, such as physical activity and proper nutrition, is crucial for preventing diseases and improving overall well-being [11]. Workplace wellness programs have been recognized as important strategies for preventing cardiovascular diseases and addressing shared risk factors such as obesity, physical inactivity, and diabetes [12]. Moreover, the social environment, including educational settings like universities, plays a critical role in establishing health behaviors among students [13].

Effective interventions tailored to the motivational readiness of employees can enhance the adoption of healthy lifestyles in university settings [14]. Positive attitudes towards healthy behaviors are correlated with perceived support from colleagues and management, emphasizing the role of organizational culture in promoting health and well-being [15]. Implementing continuous healthy lifestyle behaviors can reduce the likelihood of occupational stress among healthcare staff, highlighting the importance of sustained efforts in promoting health in the workplace.

Previously, a health intervention called Collective Action for Wellness in the Workplace (CAWW) was developed. The CAWW intervention was designed during 2021–2022 and initially piloted at DuoPharma Pharmaceutical company in Malaysia [16]. The next phase involves piloting this research in Indonesia, specifically in West Sumatra. However, before implementing the pilot project, an exploration of the readiness of university employees is needed. Thus, the problem statement of this study is: How ready are university employees to adopt healthy lifestyle behaviors? Therefore, this study aimed to investigate the determinants of readiness for adopting healthy lifestyle behaviors among university employees, focusing on aspects such as diet, physical activity, and stress management in Indonesia.

## **2. METHOD**

### **2.1. Research design**

In addressing the research problem in this study, a quantitative design conducted through a cross-sectional study approach. The research is conducted at Universitas Andalas, with a duration of eight months from April to December 2023. The data collection process utilizes open-ended questions covering respondents' characteristics, health status, lifestyle, physical activity, and stress management.

### **2.2. Population and sampling**

Over 700 employees, including academic and administrative staff, work at the university. A sample calculation was conducted using G\*Power, resulting in 286 respondents. Recruitment was then carried out using the simple random sampling method. Data collection was conducted by the researchers and enumerators over a five-week period, employing guided interviews through Google Forms.

### **2.3. Instruments**

The questionnaire distributed to respondents is an adapted version of CDC Worksite Health ScoreCard Manual tools developed by the Centers for Disease Control and Prevention [17]. The instruments were tested for validity and reliability before being delivered to the respondents. The results showed that the instruments are valid (0.378–0.656) and reliable (0.716). It encompasses sociodemographic data and respondent characteristics, including age, gender, profession, health status, description of preventive service utilization, lifestyle details, mental health status, readiness to change lifestyle, health information requirements, perceptions related to occupational health, and interest in CAWW activity plans.

### **2.4. Data analysis**

This study employed the PLS-SEM approach to test the proposed hypotheses. Specifically, we investigated the associations between various factors, including lifestyle habits, mental health status, utilization of preventive health services, perceptions of workplace-related health conditions, self-assessed current health status, and readiness to change lifestyles. The PLS-SEM method was chosen due to its robustness in handling

complex models and its suitability for exploratory research. These factors were analyzed in the context of their interaction with Collective Action for Wellness in the Workplace (CAWW) interventions.

### 2.5. Ethical clearance

This research has referred to the Helsinki Declaration for research conducted on humans, meets ethical standards, and has passed the ethical test of the Ethics Committee of the Faculty of Nursing, Andalas University, with number 086. laiketik/KEPKFKEPUNAND. All respondents were informed about the purpose of the study, procedures, and the rights of respondents.

## 3. RESULTS AND DISCUSSION

This study aims to explore university employees' readiness to adopt healthy workplace behavior and its related factors. To address this, a PLS-SEM approach was used to measure the dominant determinants related to the readiness for a healthy lifestyle. This approach comprehensively explains the factors for adopting a healthy workplace program.

### 3.1. Sample profiles and groups

The characteristics of respondents in this study revealed that almost half of them divided into the age category of 31-40 years old, comprising 106 individuals (37.1%). The respondents reported being in good health, with 117 (61.9%) stating so, while 75 (26.2%) described their health as relatively healthy. Regarding health conditions or diseases, respondents have been diagnosed with hypertension (16.4%), high cholesterol (15%), diabetes mellitus (10.1%), and arthritis (7.7%). A total of 57 respondents (19.9%) had a history of medication consumption, including for hypertension (7.0%), asthma (1.0%), diabetes mellitus (3.8%), and other medications (8.0%). Additionally, 168 respondents (58.7%) reported experiencing pain in the neck and shoulder area, lower back, elbows, or knees. The frequency of pain varied from day to week. Among those experiencing pain, only 3.8% took pain medication.

### 3.2. Measurement model (outer model)

#### 3.2.1. Convergent validity testing

Validity testing or convergent validity using outer loading values. The results of processing using SmartPLS are presented in Table 1. The outer loading values, indicating the correlation between the constructs and the variables, reveal that overall, there are loading factor values smaller than 0.5. Consequently, the constructs for all model variables are deemed invalid, necessitating attention to the invalid indicators. Meanwhile, Table 2 showed the results of processing the outer values of the model, or the correlation between the constructs and the variables after removing an invalid indicator, indicate that the overall loading factor values are all significant ( $p > 0.5$ ). Thus, the constructs for all variables are considered valid within the model.

#### 3.2.2. Discriminating validity testing

After testing the validity using the outer loading values, the discriminant validity was assessed using the average variance extracted (AVE) values. Table 3 shows the results of the discriminant test. This test was done to see how big the difference between variables is. The values seen in this test are values of AVE. All variables have an AVE value of  $> 0.5$ , so they are declared valid.

Furthermore, measurement results from the Fornell Larcker criterion and cross-loading were presented in Table 4. The results of the Fornell Larcker criterion among all latent variables with indicator variables have been shown in Table 4, showing that the value of one indicator is more excellent in calculating the variable than the other construct. Based on these results, each indicator already has discriminant validity, suitable for forming variables.

### 3.3. Reliability testing

Reliability testing was carried out to determine whether the variables used in this study are reliable. Reliability testing using Cronbach's Alpha value and composite reliability. Based on Table 5, the construct for the management variable of all variables meets the reliable criteria. This is indicated by Cronbach's Alpha value and composite reliability obtained from SmartPLS estimation. The resulting value is  $> 0.60$  as recommended criteria. Figure 1 shows the validity test (1) finding 18 invalid and excluded indicators from the model that will be described in Figure 2. Figure 2 shows the validity testing (2) as a final SEM model of factor related to readiness to change.

Table 1. Validity testing (1)

| Variable                      | Indicators | Outer loading | Information |
|-------------------------------|------------|---------------|-------------|
| Readiness to change lifestyle | GBK32      | 0.793         | Valid       |
|                               | GBK33      | 0.801         | Valid       |
|                               | GBK34      | 0.826         | Valid       |
|                               | GBK37      | 0.821         | Valid       |
|                               | GBK38      | 0.860         | Valid       |
|                               | GBK39      | 0.876         | Valid       |
| Lifestyle                     | GBK40      | 0.800         | Valid       |
|                               | GH12       | 0.959         | Valid       |
|                               | GH13       | 0.870         | Valid       |
|                               | GH14       | 0.919         | Valid       |
|                               | GH15       | 0.769         | Valid       |
|                               | GH16       | 0.910         | Valid       |
| Mental health                 | GH17       | -0.820        | Invalid     |
|                               | GH18       | -0.122        | Invalid     |
|                               | KMB19      | 0.036         | Invalid     |
|                               | KMB20      | 0.083         | Invalid     |
|                               | KMB21      | -0.004        | Invalid     |
|                               | KMB22      | 0.747         | Valid       |
|                               | KMB23      | 0.652         | Valid       |
|                               | KMB24      | 0.043         | Invalid     |
|                               | KMB25      | 0.281         | Invalid     |
|                               | KMB26      | -0.482        | Invalid     |
|                               | KMB27      | 0.260         | Invalid     |
|                               | KMB28      | -0.326        | Invalid     |
|                               | KMB29      | 0.288         | Invalid     |
|                               | KMB30      | -0.438        | Invalid     |
| Use of preventive services    | KMB31      | -0.476        | Invalid     |
|                               | KMB32      | -0.317        | Invalid     |
|                               | LP8        | -0.054        | Invalid     |
|                               | LP9        | 0.678         | Valid       |
|                               | LP10       | 0.081         | Invalid     |
|                               | LP11       | 0.909         | Valid       |
| Health status                 | SK1        | 0.795         | Valid       |
|                               | SK3        | -0.383        | Invalid     |
|                               | SK4        | 0.815         | Valid       |
|                               | SK6        | 0.864         | Valid       |
|                               | SK7        | -0.083        | Invalid     |

Table 2. Validity testing (2)

| Variable                        | Indicators | Outer loading | Information |
|---------------------------------|------------|---------------|-------------|
| Readiness to change lifestyle   | GBK32      | 0.791         | Valid       |
|                                 | GBK33      | 0.801         | Valid       |
|                                 | GBK34      | 0.824         | Valid       |
|                                 | GBK37      | 0.823         | Valid       |
|                                 | GBK38      | 0.862         | Valid       |
|                                 | GBK39      | 0.874         | Valid       |
| Lifestyle                       | GBK40      | 0.801         | Valid       |
|                                 | GH12       | 0.968         | Valid       |
|                                 | GH13       | 0.893         | Valid       |
|                                 | GH14       | 0.928         | Valid       |
|                                 | GH15       | 0.770         | Valid       |
|                                 | GH16       | 0.929         | Valid       |
| Mental health                   | KMB22      | 0.897         | Valid       |
|                                 | KMB23      | 0.851         | Valid       |
| Use of preventive services      | LP9        | 0.785         | Valid       |
|                                 | LP11       | 0.928         | Valid       |
| Health status                   | SK1        | 0.814         | Valid       |
|                                 | SK4        | 0.844         | Valid       |
|                                 | SK6        | 0.893         | Valid       |
| Work-related health perceptions | TKP64      | 0.853         | Valid       |
|                                 | TKP65      | 0.848         | Valid       |
|                                 | TKP66      | 0.824         | Valid       |

Table 3. Discriminant validity testing

| Variable                      | Average variance extracted (AVE) | Variable                        | Average variance extracted (AVE) |
|-------------------------------|----------------------------------|---------------------------------|----------------------------------|
| Lifestyle                     | 0.811                            | Use of preventive services      | 0.739                            |
| Mental health                 | 0.764                            | Work-related health perceptions | 0.708                            |
| Readiness to change lifestyle | 0.682                            | Health status                   | 0.725                            |

*Determinant of readiness for adopting healthy lifestyle behavior among ... (Hema Malini)*

Table 4. Fornell-Larcker criterion between variables

| Variable                        | Lifestyle | Mental health | Readiness to change lifestyle | Use of preventive services | Work-related health perceptions | Health status |
|---------------------------------|-----------|---------------|-------------------------------|----------------------------|---------------------------------|---------------|
| Lifestyle                       | 0.900     |               |                               |                            |                                 |               |
| Mental health                   | 0.143     | 0.874         |                               |                            |                                 |               |
| Readiness to change lifestyle   | -0.085    | 0.142         | 0.826                         |                            |                                 |               |
| Use of preventive services      | 0.066     | 0.003         | 0.118                         | 0.860                      |                                 |               |
| Work-related health perceptions | 0.062     | 0.312         | 0.218                         | 0.011                      | 0.842                           |               |
| Health status                   | -0.024    | -0.250        | 0.122                         | 0.066                      | -0.105                          | 0.851         |

Table 5. Reliability testing

| Variable                        | Cronbach's Alpha | Composite reliability | Rule of thumb | Model evaluation |
|---------------------------------|------------------|-----------------------|---------------|------------------|
| Lifestyle                       | 0.956            | 0.955                 |               | Reliable         |
| Mental health                   | 0.693            | 0.866                 |               | Reliable         |
| Readiness to change lifestyle   | 0.922            | 0.938                 |               | Reliable         |
| Use of preventive services      | 0.666            | 0.849                 | >0.60         | Reliable         |
| Work-related health perceptions | 0.808            | 0.879                 |               | Reliable         |
| Health status                   | 0.811            | 0.887                 |               | Reliable         |

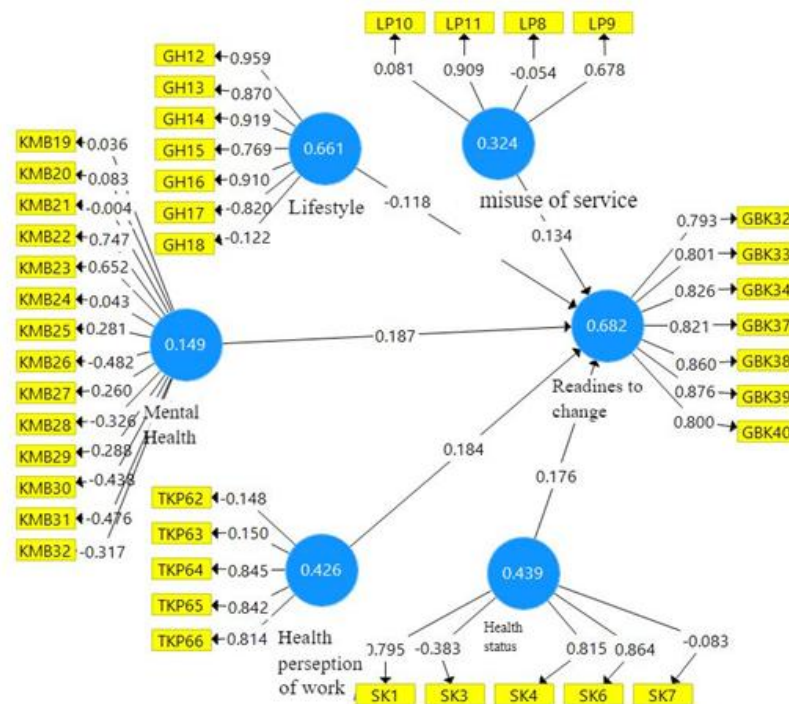


Figure 1. Structural model outer model

### 3.4. Structural model (inner model)

The inner or structural model is tested to see the relationship between the construct, significance value, and R-square of the research model as shown in Figure 3. The structural model was evaluated using R-square for the dependent construct of the t-test and the significance of the parameter coefficients of the structural path. In principle, this study examines one variable influenced by several other variables using SmartPLS. The R-square value of the readiness to change lifestyle variable, which is 0.107 or 10.7%, suggests that the variables lifestyle, mental health, use of preventive services, health status, and health perceptions related to work collectively explain the variable readiness to change lifestyle to a significant extent, accounting for 10.7% of its variance. The remaining variance is likely influenced by factors not included in this research. Additionally, the Q-square value of the readiness to change lifestyle variable is 0.069, indicating that both variables have Q-square values greater than 0.1. this suggests that the model possesses predictive relevance.

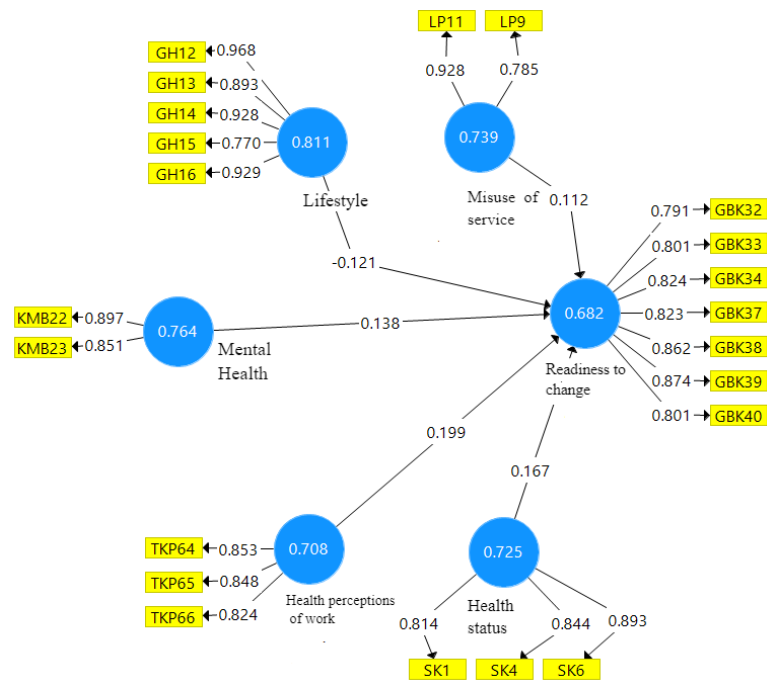


Figure 2. Structural model outer model (2)

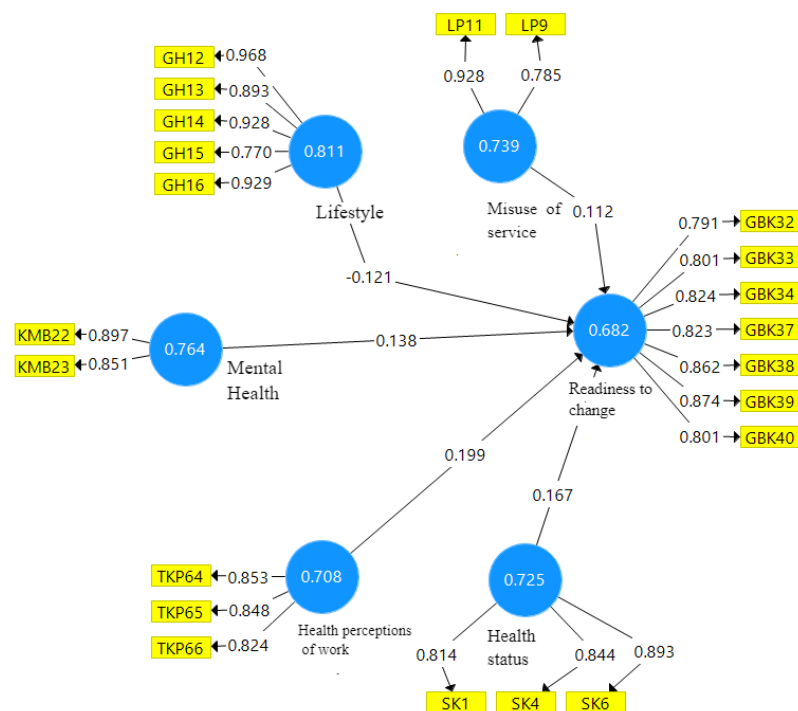


Figure 3. Structural model inner model

Moreover, Table 6 shows the hypothesis testing result. Hypothesis testing evaluates the significance of estimated parameters, offering valuable insights into the relationships between research variables. The output path coefficient serves as the basis for testing hypotheses. The components of the variables in the study include various aspects of lifestyle change readiness, lifestyle habits, mental health, use of preventive services, health status, and work-related health perceptions. Lifestyle change readiness encompasses factors such as healthy eating, weight loss, physical activity, tobacco use, stress reduction, sleep, and alcohol use. Lifestyle habits are measured by smoking history, frequency of smoking within a year attempts to quit

smoking, and use of other types of tobacco. Mental health is evaluated based on the experience of work-related and home-related stress exceeding coping abilities. The use of preventive services is assessed through blood pressure and blood sugar checks. Health status is gauged by overall health status, medications consumed, history of pain medication use, and frequency of back pain. Work-related health perceptions involve feelings of emotional drain at work, difficulty working due to health problems, and health-related difficulty concentrating on work.

Based on hypothesis testing, the direct influence of these variables can be summarized as follows: the relationship between lifestyle and readiness to change lifestyle is not significant ( $p\text{-value}=0.128>0.05$ ), indicating that lifestyle does not significantly affect readiness to change lifestyle. In contrast, mental health has a significant effect on readiness to change lifestyle ( $p\text{-value}=0.011<0.05$ ), suggesting that better mental health significantly influences readiness to change lifestyle. The use of preventive services also shows a significant relationship with readiness to change lifestyle ( $p\text{-value}=0.038<0.05$ ), indicating that utilizing preventive services significantly impacts readiness to change lifestyle. Additionally, work-related health perceptions have a significant effect on readiness to change lifestyle ( $p\text{-value}=0.000<0.05$ ), showing that how health is perceived in the work context significantly influences readiness to change lifestyle. Finally, health status is significantly related to readiness to change lifestyle ( $p\text{-value}=0.010<0.05$ ), suggesting that overall health status significantly affects readiness to change lifestyle.

Table 6. Direct influence analysis

|   | Original sample<br>(O) | Sample mean<br>(M) | Standard deviation<br>(STDEV) | T statistics<br>( O/STDEV ) | p-<br>values |
|---|------------------------|--------------------|-------------------------------|-----------------------------|--------------|
| Lifestyle -> Readiness to change lifestyle                              | -0.121                 | -0.103             | 0.106                         | 1.138                       | 0.128        |
| Mental health -> Readiness to change lifestyle                          | 0.138                  | 0.142              | 0.060                         | 2.288                       | 0.011        |
| Use of prevention services -> Readiness to change<br>lifestyles         | 0.112                  | 0.110              | 0.063                         | 1.772                       | 0.038        |
| Health perceptions related to work -> Readiness to<br>change lifestyles | 0.199                  | 0.209              | 0.052                         | 3.861                       | 0.000        |
| Health status -> Readiness to change lifestyle                          | 0.167                  | 0.174              | 0.071                         | 2.340                       | 0.010        |

### 3.5. Discussion

This study aimed to explore the factors influencing the readiness of university employees at Andalas University to adopt healthy lifestyle behaviors, specifically focusing on diet, physical activity, and stress management in Indonesia, prior to implementing the pilot project of the CAWW intervention. The study found that lifestyle factors such as smoking history, frequency, attempts to quit, and the use of other types of tobacco do not significantly impact employees' readiness to change their lifestyle. However, mental health factors, health status, and work-related health perceptions do have a significant impact. These findings underscore the importance of addressing mental health, overall health status, and work-related health perceptions in supporting employee health and preventing chronic diseases. This study also found that lifestyle factors do not significantly influence workers' readiness to change their lifestyle. While unhealthy lifestyle habits are known to contribute to chronic diseases and reduced workplace productivity [18]–[20], however, simply addressing these habits may not be sufficient to enhance workers' readiness to change their lifestyle. This study suggests that a more holistic approach, addressing both mental and physical health, as well as workplace environment and perceptions, is necessary to effectively support employees in adopting healthier behaviors.

Additionally, this study highlights the significance of mental health as a crucial factor influencing the readiness to change lifestyles. Specifically, sleep difficulties and stress management stand out as significant aspects, given their potential to lead to chronic health issues and decreased workplace efficiency. Consistent with prior research, mental health factors such as sleep problems and stress management significantly impact readiness for lifestyle changes, as noted in various studies. Insufficient sleep and heightened stress levels not only affect overall health but also contribute to inefficiencies in the workplace [21], [22]. Furthermore, previous study stresses the importance of addressing mental health concerns, particularly in young individuals with chronic conditions, to improve readiness for transitioning to adult care [23]–[25]. The commitment to a healthy lifestyle is closely linked to factors like awareness, motivation, and the ability to implement health-promoting practices, highlighting the crucial role of mental well-being in driving behavioral changes towards healthier lifestyles. These findings underscore the pivotal role of mental health in shaping individuals' readiness to embrace healthier lifestyles and perform effectively in diverse environments [25].

This study also emphasizes that work-related health perceptions significantly influence the readiness to change lifestyle. Perceptions such as feeling emotionally drained at work, facing challenges in performing tasks due to health issues, and perceiving health as affecting work concentration play a significant role in the relationship between occupational health perceptions and readiness to adopt lifestyle changes. Consistent

with prior research, it has been shown that workers' readiness to change behaviors related to pain, such as engaging in exercise, is positively associated with their perceived ability to work effectively [26], [27]. Furthermore, the perception of occupational safety and health risks is pivotal in the success of initiatives aimed at preventing work-related accidents, highlighting the crucial role of workers' perceptions in occupational health contexts. These findings underscore the interconnected nature of occupational health perceptions, readiness to change behaviors, and their impact on work-related outcomes, emphasizing the importance of addressing these perceptions to promote healthier lifestyles and work environments [28], [29].

This study also indicates that health status significantly impacts readiness to adopt lifestyle changes. It was found that factors such as overall health perception, past occurrences of back pain, and the frequency of experiencing back pain showed a notable association with the inclination to change lifestyle habits. Given the common occurrence of lower back pain among workers, strategies aimed at improving workplace productivity, such as regular stretching routines, ergonomic adjustments, and addressing psychological stressors, should be prioritized. Consistent with previous research demonstrating that individuals with a history of back pain may display varying levels of readiness to alter their behaviors, it underscores the importance of considering past pain experiences when promoting lifestyle adjustments [27], [30]. Moreover, the transtheoretical model has been applied to comprehend the readiness to change activity levels among individuals recovering from stroke, highlighting the importance of addressing both physical health and depressive symptoms to facilitate behavior change. These findings collectively emphasize the necessity of adopting a comprehensive approach that takes into account factors such as health perception, pain history, and the frequency of pain in evaluating and improving readiness to embrace lifestyle modifications [31]–[33].

The study underscores the importance of comprehensive workplace health promotion strategies for university employees, targeting mental health, health status, and work-related perceptions to encourage lifestyle changes. Organizations must create supportive environments and tailor interventions considering contextual factors to enhance well-being, engagement, and performance. However, limitations such as reliance on data from a single university, potential biases in self-reported data, and the cross-sectional design's inability to establish causality call for caution in interpreting findings. Further research is needed to evaluate intervention effectiveness and explore additional influential variables, indicating avenues for future investigation.

#### 4. CONCLUSION

The study underscores the importance of considering multiple factors like mental health, health status, and work-related perceptions to encourage readiness for lifestyle changes among university employees. While lifestyle factors alone might not heavily impact employees' readiness for behavior change, adopting a holistic approach that accounts for both physical and mental well-being, as well as workplace environment and perceptions, is crucial. Organizations should prioritize establishing supportive environments and customized interventions to encourage healthier behaviors, thus enhancing employee well-being, engagement, and organizational performance. Consequently, implementing the Collective Action for Wellness in the Workplace (CAWW) intervention at Andalas University shows promise in this regard.

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