

Effectiveness of workplace-based limbering intervention in improving functional mobility of mid-life employees

Elfred B. Dinamarca

Far Eastern University - Institute of Technology
Manila, Philippines
Email: ebdinamarca@gmail.com

ABSTRACT

This study assessed the functional mobility and physical wellness of Zion of Praise Academy employees, focusing on the influence of PRECEDE and PROCEED factors, employee perceptions of a workplace-based limbering intervention, and its impacts on mobility, wellness, and sustained engagement. The results revealed significant improvements in flexibility ($M = 33.40$ cm), muscular endurance ($M = 20.30$ push-ups), core strength ($M = 62.80$ seconds), and cardiovascular fitness (post-test heart rate = 109.60 bpm). Employees demonstrated high awareness of physical wellness, but motivation for regular movement during work hours was low. The study identified gaps in supervisory support and ergonomic considerations, recommending tailored wellness programs and stronger management involvement to increase engagement. The findings emphasize the importance of addressing both individual and environmental factors to improve mobility and wellness in the workplace. Integrating customized wellness initiatives and leveraging technology could enhance participation and long-term health outcomes.

Keywords: Functional mobility, physical wellness, PRECEDE-PROCEED model, workplace wellness, limbering intervention

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INTRODUCTION

Employee wellness has increasingly become a priority in higher education institutions, as healthy employees contribute to improved productivity, engagement, and institutional performance. The Commission on Higher Education (CHED, 2021) has emphasized the importance of physical activity and wellness initiatives targeting faculty and staff, recognizing their critical role in sustaining operational excellence. Recent findings reveal that sedentary work conditions, long hours of screen exposure, and limited physical activity are directly linked to reduced functional mobility, increased musculoskeletal discomfort, and lower physical energy levels among employees (Delos Santos & Cruz, 2023). These health issues affect not only individual well-being but also overall workplace efficiency.

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The World Health Organization (2022) supports the implementation of structured mobility programs in occupational settings, citing their effectiveness in addressing preventable physical health risks. In the local context, functional fitness models inspired by events like Hyrox have proven adaptable and practical in Filipino work environments, showing strong engagement and health outcomes (Hyrox Philippines, 2023). These global and local trends reinforce the need for systematic, evidence-based movement interventions within academic institutions. A systematic approach, such as a limbering intervention, offers a practical pathway to address mobility and wellness deficits identified in employee populations.

Despite the implementation of wellness initiatives in various institutions, many employees continue to lead physically inactive lifestyles due to demanding workloads, prolonged sedentary tasks, and insufficient access to targeted movement strategies (Kawalkar et al., 2024). International data show that adults typically sit for 8 to 10 hours daily, especially in office-based roles, significantly increasing the risk of chronic conditions and musculoskeletal disorders (Bort-Roig et al., 2025). In the Philippines, surveillance data revealed that 54% of working adults spend more than six hours a day in sedentary positions, and nearly 30% experience recurring lower back and neck pain linked to prolonged sitting and poor ergonomic practices (Fouad & Mohamed, 2025). Academic and administrative staff are particularly vulnerable, with musculoskeletal discomfort reported in 38% to 60% of employees, especially in the lumbar, cervical, and shoulder regions (Marzban et al., 2024; Carvalho & Vilaça, 2024).

Although these well-documented risks, existing workplace programs often focus broadly on general fitness or recreational activity, failing to address specific deficits in functional mobility, posture, and musculoskeletal health (Lorenzo-Gallego et al., 2025). Many initiatives lack integration with employees' daily routines and do not consider behavioral and environmental barriers to sustained participation. There is a noticeable absence of evidence-based, workplace-embedded mobility interventions that respond directly to the functional needs of employees in higher education settings. This highlights a critical gap in both program design and institutional response. The current study addresses this gap by generating data on mobility and wellness deficits and identifying behavioral, occupational, and ecological factors affecting employee health, which will serve as the foundation for proposing a targeted limbering intervention later in the research.

The growing demand for workplace-friendly wellness solutions presents a timely opportunity to introduce systematic, evidence-based movement interventions tailored to the needs of employees in higher education institutions. Programs that emphasize functional mobility, posture correction, and musculoskeletal strength are increasingly recognized as essential components of occupational health strategies (Tan et al., 2022). Approaches that incorporate mindful movement and low-impact functional training, such as those inspired by Hyrox Philippines, have demonstrated strong engagement and adaptability in professional environments, offering scalable models for institutional settings. Findings from this study can provide valuable insights for human resource departments in designing targeted wellness strategies that directly address functional deficits, reduce physical discomfort, and support employee energy levels and task efficiency. For physical education practitioners and researchers, the study offers an applied framework for workplace-centered mobility programs that are practical, replicable, and aligned with employees' daily routines. This research underscores the feasibility and relevance of integrating systematic physical education interventions into institutional wellness agendas, particularly within the academic workforce.

This study aims to generate empirical data on the functional mobility and physical wellness status of employees, serving as a foundation for proposing a structured, workplace-based movement intervention. Zion of Praise Academy employees stand to benefit directly through improved musculoskeletal function, reduced discomfort, and enhanced work

performance. The results may guide institutional leaders and policymakers in adopting evidence-based strategies that integrate movement into the daily routine of employees. For physical education professionals, the study offers a replicable model for developing targeted, occupation-specific interventions within academic or corporate settings. Future researchers may build on these findings to explore long-term outcomes, sustainability, and scalability across diverse organizational environments. By addressing clearly identified wellness and mobility gaps, this research supports both employee health advancement and the broader goal of enhancing workplace productivity.

METHODOLOGY

Project design

This study employed a mixed-methods evaluative research design, guided by the PRECEDE-PROCEED model, to assess and respond to identified wellness and mobility deficits among Zion of Praise Academy employees. The design integrated both quantitative and qualitative approaches to generate a comprehensive understanding of the problem, the influencing factors, and the perceived value of the proposed intervention. The PRECEDE phase involved a pre-assessment of functional mobility and physical wellness using standardized physical tests and structured questionnaires. This stage also identified predisposing, reinforcing, and enabling factors that influenced physical activity behaviors, which directly addressed the first two research questions. Supplementary qualitative data, gathered through interviews or open-ended survey responses, provided contextual understanding of the behavioral and environmental conditions within the workplace. These findings informed the development of a structured limbering intervention tailored to the identified needs of the employee population.

The implementation and evaluation phase followed a one-group pretest-posttest design. After the pre-assessment, participants engaged in the systematic workplace-based intervention over a defined period. The same tools used in the baseline assessment were re-administered to measure any changes in mobility and wellness, addressing the third research question on effectiveness. Post-intervention surveys gathered employee feedback on the feasibility, usability, and acceptability of the program, aligned with the fourth research question and the PROCEED phase, which focused on process, impact, and outcome evaluation. While the lack of a control group limited the ability to make strong causal claims, combining quantitative results with qualitative insights enhanced the interpretive power of the findings. This design ensured the intervention was grounded in real data, tested in practice, and evaluated for both impact and relevance in a real-world academic workplace setting.

Project development

The participants of this study consisted of 30 full-time employees of Zion of Praise Academy, aged 45 to 60 years old, selected through purposive sampling. This age group was targeted because individuals in this range were more likely to experience early signs of musculoskeletal stiffness, reduced flexibility, and declining functional mobility. These physical limitations were commonly associated with prolonged sedentary tasks and insufficient workplace movement, particularly among midlife workers. Both academic and administrative staff were included to ensure a broad representation of occupational routines, work environments, and movement constraints within the institution. By involving personnel from different units, the study was able to better identify how job-related demands influenced

physical wellness. The selection was consistent with the PRECEDE phase of the PRECEDE-PROCEED model, which prioritized the diagnosis of existing wellness deficits and contributing behavioral or environmental factors. This approach ensured that the participants directly represented the target population for which the intervention was designed. Engaging this specific group allowed the study to generate practical insights tailored to the workplace setting and its existing health challenges.

To ensure safety and data quality, the study applied clear inclusion and exclusion criteria. Inclusion criteria required participants to be full-time employees aged 45 to 60, physically capable of low-impact activity, not enrolled in other structured fitness programs, and willing to complete all phases of the study. They also had to pass a Physical Activity Readiness Questionnaire (PAR-Q) to rule out underlying health risks. Exclusion criteria included any diagnosed musculoskeletal, cardiovascular, or neurological condition that could be aggravated by moderate activity. Individuals undergoing physical therapy, taking medications affecting mobility, or unable to commit to the intervention schedule were also excluded. All 30 participants completed three phases: pre-assessment, the 6-week intervention, and post-assessment. During the pre-assessment, participants underwent baseline fitness tests and completed structured survey tools assessing mobility levels and influencing factors. Post-assessment used the same instruments to evaluate changes in physical wellness, mobility, and program perception, aligning with the PROCEED phase focused on process and impact evaluation. This structured participation ensured reliable comparison of data across stages and reinforced the study's focus on real-world workplace application.

This study used a combination of standardized and researcher-made tools to gather both quantitative and qualitative data, consistent with the mixed-methods evaluative design and the PRECEDE-PROCEED model. Before participation, all individuals completed the Physical Activity Readiness Questionnaire (PAR-Q) to ensure they were medically cleared for moderate physical activity. To answer the first research question, which assessed the current levels of functional mobility and physical wellness, the study used an adapted and validated Health-Related Fitness Test. This included Body Mass Index (BMI) for body composition, Sit-and-Reach and Zipper Tests for flexibility, a 1-minute Push-Up Test for muscular strength, the Plank Test for muscular endurance, and the 3-Minute Step Test for cardiovascular endurance. These tools provided baseline and post-intervention data and allowed for direct comparison of physical changes following the program.

For the second research question, which investigated behavioral, environmental, and occupational factors influencing mobility and wellness, a researcher-made survey questionnaire was developed and validated by field experts. This instrument was based on the PRECEDE constructs of predisposing, reinforcing, and enabling factors. To address the third research question, which evaluated the program's feasibility and usability, a Likert-scale questionnaire was created and validated to gather structured feedback from participants after the intervention. Lastly, to support the fourth research question focused on impact and outcome evaluation, a researcher-made Focus Group Discussion (FGD) guide was used to capture participants' experiences, perceived changes, and program reflections. All researcher-developed instruments underwent content validation by experts in physical education and workplace health to ensure alignment with the study's objectives and theoretical foundation.

Operation and testing procedure

Data collection occurred in three phases: pre-assessment, implementation, and post-assessment. In the pre-assessment phase, all qualified participants first completed the Physical Activity Readiness Questionnaire (PAR-Q) to confirm medical suitability for moderate physical activity. Those cleared underwent baseline testing using the validated Health-Related

Fitness Test, covering body composition, flexibility, muscular strength, muscular endurance, and cardiovascular endurance. This established each participant's physical wellness and functional mobility prior to the intervention. Participants also answered a researcher-made, expert-validated survey designed to identify behavioral, environmental, and occupational factors influencing their health status. This pre-intervention data aligned with the PRECEDE phase of the framework and directly informed the design and delivery of the movement intervention.

Following the pre-assessment, participants engaged in the structured workplace-based limbering program over a defined implementation period. After completing the sessions, the post-assessment phase began. Participants retook the same Health-Related Fitness Test to assess physical changes. They also completed a validated Likert-scale questionnaire to evaluate the program's feasibility, acceptability, and usability. To support the impact and outcome evaluation, a Focus Group Discussion (FGD) was conducted using a validated interview guide. The FGD gathered in-depth feedback on participants perceived benefits, experiences, and suggestions. All data were collected within the institution's premises during work-appropriate hours, with consent and participation fully voluntary. This step-by-step process ensured accurate measurement of change and captured both objective outcomes and subjective perceptions.

Project data analysis

The quantitative data collected in this study will be analyzed using the Statistical Package for the Social Sciences (SPSS) to ensure accuracy and reliability in processing numerical results. For Research Question 1, the physical fitness outcomes from the health-related Fitness test will be evaluated using descriptive statistics, including mean, standard deviation, minimum, and maximum values for each fitness component. This will allow the researcher to establish a baseline profile of participants' functional mobility and physical wellness. For Research Question 2, the responses from the validated survey on behavioral, environmental, and occupational factors will also be subjected to descriptive analysis to summarize patterns across individual and workplace-level influences. To explore the relationship between these influencing factors and baseline fitness scores, Spearman rank correlation will be used, which is appropriate for ordinal data and non-parametric distributions. This analysis will help identify which factors are most strongly associated with wellness limitations or strengths. All results will be tabulated and interpreted to inform the design and relevance of the intervention. This structured statistical approach ensures that all quantitative findings are analyzed with clarity and aligned with the PRECEDE framework of diagnosis and factor identification.

For the post-intervention phase, data from Research Question 3 will be analyzed using mean scores and standard deviations derived from responses to the Likert-scale questionnaire. This will provide a numerical summary of how participants rated the program's feasibility, usability, and acceptability. Patterns of agreement or disagreement will help evaluate whether the intervention was well-received and whether implementation was successful. The results will be interpreted in the context of the PROCEED phase, which focuses on process and outcome evaluation. For Research Question 4, qualitative data gathered through the Focus Group Discussion (FGD) will undergo thematic coding. Transcripts will be reviewed and coded to identify repeated concepts, phrases, or experiences shared by participants. Emergent themes such as increased energy, reduced discomfort, or improved posture will be extracted to illustrate perceived program impact. Quotations will be used to support the themes and give voice to participant feedback. This combination of statistical analysis and thematic

interpretation ensures that both measurable outcomes and participant experiences are fully examined.

Evaluation Procedure

The program evaluation followed a mixed-methods approach, combining both quantitative and qualitative data to assess the effectiveness of the workplace-based limbering intervention. The evaluation was conducted in three distinct phases: pre-assessment, implementation, and post-assessment. In the pre-assessment phase, participants underwent baseline testing to evaluate their current levels of functional mobility and physical wellness. These measures included standardized physical tests and a researcher-developed survey to assess behavioral, environmental, and psychosocial factors influencing their health. After the 6-week intervention, participants underwent the same physical tests and completed a post-program survey to evaluate changes in mobility, wellness, and perceptions of the program's feasibility, acceptability, and usability. These results provided a clear understanding of the intervention's immediate impact on employee health.

The qualitative component was integrated through focus group discussions (FGDs) conducted after the program's completion. These discussions captured participants' reflections on their experiences, perceived benefits, and suggestions for improvement. The data from the surveys and FGDs were triangulated to provide a comprehensive evaluation of the program's outcomes. The evaluation specifically focused on the program's process, examining its implementation and engagement, impact, assessing short-term improvements in physical wellness and mobility, and outcomes, analyzing participants' sustained engagement with the movement routines. The feedback from this evaluation was used to refine the intervention and inform future workplace wellness programs.

RESULTS AND DISCUSSION

Current levels of functional mobility and physical wellness among the employees

This section provides an overview of the assessment of the functional mobility and physical wellness of employees in the workplace. Data collected from surveys, physical assessments, and wellness questionnaires are presented to illustrate the baseline levels of mobility and overall wellness across the sample population.

Summarizes the participants' performance across flexibility, muscular strength and endurance, core endurance, and cardiovascular fitness using the sit-and-reach test, 1-minute push-up test, plank hold test, and 3-minute step test. For flexibility, the sit-and-reach test yielded a mean score of 25.9 cm (SD = 14.2), with scores ranging from 5 cm to 54 cm. The median score of 25.0 cm indicates that half of the participants scored at or below this level. The wide range suggests substantial differences in flexibility among employees, implying that while some individuals displayed relatively good flexibility, others showed limited range of motion and may benefit from mobility and stretching activities.

In terms of upper-body muscular strength and endurance, results from the 1-minute push-up test showed a mean of 14.9 repetitions (SD = 6.83), with scores ranging from 6 to 30 repetitions. The median score of 14 repetitions suggests that a typical participant performed around the mid-point of the observed scores. The variability in performance indicates that employees differed in strength conditioning and endurance capacity, which may reflect differences in exercise habits, workload, age, or prior training exposure.

Regarding core strength and endurance, the plank hold test produced a mean duration of 45.6 seconds (SD = 15.5), with a minimum of 11 seconds and a maximum of 60 seconds.

The median time of 48.5 seconds suggests that many participants were able to maintain the plank position for nearly one minute, indicating relatively stronger core endurance among a number of employees. However, the low minimum score highlights that some participants had difficulty sustaining core stability and may require progressive core-strengthening routines to improve functional support and reduce vulnerability to strain or injury.

For cardiovascular fitness, the 3-minute step test recorded a mean post-exercise heart rate of 124 bpm (SD = 18.5), with heart rate values ranging from 81 to 155 bpm. The median heart rate of 125 bpm closely aligns with the mean, indicating a balanced distribution of scores. Since lower post-test heart rates generally suggest better cardiovascular recovery, the results imply that some employees had stronger aerobic capacity, while those with higher heart rates may have lower cardiovascular endurance and could benefit from regular aerobic or endurance-building activities.

The employees demonstrated varying levels of functional mobility and physical wellness across the measured components. The differences in means and ranges reflect individual variability in flexibility, muscular endurance, core stability, and cardiovascular conditioning. These baseline findings provide useful information for designing or enhancing an employee wellness or physical activity program that is inclusive and responsive to differing fitness levels within the school workforce.

The findings reflect significant variability in the functional mobility and physical wellness of Zion of Praise Academy employees, which can be understood through the lens of the PRECEDE-PROCEED model (Schiele et al., 2025). This model emphasizes that health behaviors are influenced by individual, environmental, and social factors. The variability in flexibility, muscular endurance, core strength, and cardiovascular fitness indicates that employees' physical wellness is shaped by diverse behavioral factors such as exercise habits and work-related demands. According to the PRECEDE-PROCEED model, interventions targeting these specific areas, such as stretching routines, strength-building exercises, and aerobic activities, can be designed to improve health outcomes. The model underscores the importance of understanding these factors to create effective, tailored wellness programs that address the unique needs of employees and promote long-term behavior change.

Supporting the findings, Yang et al. (2024) emphasize the role of the built environment in influencing physical activity and mobility, particularly among older adults. Their research highlights how accessible and walkable environments significantly improve mobility and social engagement, suggesting that similar interventions could benefit employees at Zion of Praise Academy. By creating an environment that promotes physical activity and mobility, workplace wellness programs could help enhance overall health and encourage greater participation in physical routines. Yang et al. (2024) argue that intentional design, whether in urban planning or workplace settings can foster healthier lifestyles, aligning with the need for targeted interventions to address varying mobility levels within a workforce.

The results highlight key aspects of employee wellness, including flexibility, muscular endurance, core strength, and cardiovascular fitness, which are essential for maintaining functional mobility. These findings address a gap in understanding how individual components of mobility and wellness impact overall health, particularly in the workplace. Similar to Ogliari et al.'s (2022) exploration of mobility assessments for fall prediction, the comprehensive evaluation of flexibility, strength, and endurance provides a more holistic view of an employee's physical wellness. By employing multiple assessments, the study fills the gap by offering a detailed approach to identifying areas that need improvement and guiding targeted wellness interventions. This approach aligns with Ogliari et al.'s (2022) assertion that using a variety of mobility tests leads to more effective and predictive health interventions, ensuring better outcomes for employees' mobility and wellness.

The influence of PRECEDE and PROCEED factors on the mobility and physical wellness

In this section, the factors identified through quantitative data collection are analyzed to understand their influence on the mobility and physical wellness of the employees. The findings provide insights into the key behavioral patterns, environmental conditions, occupational demands, and psychosocial influences that affect the employees' mobility and wellness levels.

Summary of precede factors influencing mobility and physical wellness

The summary provides an overall view of the factors influencing mobility and physical wellness among the respondents. The results indicate that all four domains (reinforcing, enabling, behavioral, and environmental factors) were positively perceived, with all average weighted means falling within the Agree range. Among the factors, behavioral factors obtained the highest average weighted mean (AWM = 3.58), suggesting that respondents generally practiced positive movement-related behaviors, such as changing posture, taking movement breaks, and engaging in physical activity. This finding highlights the important role of individual behavior in supporting mobility and physical wellness in the workplace.

Closely following were enabling factors with an average weighted mean of 3.57, indicating that access to supportive resources, movement-friendly spaces, and manageable workloads moderately facilitated respondents' engagement in healthy physical activities. This suggests that the availability of opportunities and resources plays a significant role in encouraging mobility. Environmental factors recorded an average weighted mean of 3.51, reflecting respondents' general agreement that the physical workplace environment supports comfort, safety, and movement. While the overall perception was positive, the results also imply that improvements in ergonomic design and environmental consistency may further enhance mobility and physical wellness. In contrast, reinforcing factors yielded the lowest average weighted mean (AWM = 3.17), though still interpreted as Agree. This suggests that social support, feedback, and organizational encouragement were present but less influential compared to other factors. Strengthening reinforcement mechanisms, particularly supervisory support and structured wellness initiatives, may help further motivate sustained engagement in healthy mobility practices.

The findings align with the PRECEDE-PROCEED model (Schiele et al., 2025), which emphasizes the role of individual behaviors, environmental factors, and social support in influencing health outcomes. The high rating of behavioral factors (AWM = 3.58) indicates that personal actions, such as posture changes and movement breaks, are crucial in promoting physical wellness. Enabling factors (AWM = 3.57) reflect the importance of a supportive environment, including accessible resources and flexible workloads, in encouraging healthy physical behaviors. However, reinforcing factors (AWM = 3.17) were less influential, suggesting that further strengthening social and organizational support, particularly supervisory involvement, could enhance engagement in wellness activities.

Whitworth et al. (2025) highlight that barriers such as time constraints and lack of management support can hinder employees' participation in wellness programs, much like the lower scores for reinforcing factors in this study. However, they also found that when wellness programs are made flexible and aligned with employees' needs, participation and long-term engagement improve significantly. This aligns with the results showing that enabling factors, such as access to resources and supportive workspaces, are key to fostering wellness. The study suggests that creating a supportive environment and strengthening managerial support can help

overcome obstacles, ensuring sustained engagement and promoting a healthier, more productive workforce.

The findings suggest that while employees generally engage in positive mobility behaviors, such as posture adjustments and movement breaks, barriers like time constraints and lack of support may limit consistent participation. Cipriano et al. (2024) found similar barriers in government offices, where initial participation in fitness programs was low, but as the program became integrated into daily routines and addressed employee needs, involvement steadily increased. This supports the current study's findings that enabling factors, such as access to movement-friendly spaces and manageable workloads, are essential for encouraging physical activity, but further attention is needed to overcome time and support-related challenges. By addressing these obstacles and aligning wellness initiatives with employee needs, organizations can improve engagement, satisfaction, and health outcomes, ultimately enhancing overall workplace productivity.

Summary of proceed factors influencing mobility and physical wellness

The summary statistics indicate that respondents generally agreed that institutional and environmental factors influence their mobility and physical wellness, with all domains obtaining average weighted means within the Agree range. Among the factors, Environmental Development Factors recorded the highest mean (AWM = 3.80), suggesting that workplace improvements such as lighting, ventilation, space, and layout were perceived as the strongest contributors to supporting movement and reducing physical strain.

Organizational Factors followed with an average weighted mean of 3.73, highlighting the importance of management support, a culture of wellness, and encouragement of mobility-friendly practices in promoting physical wellness. Educational Strategy Factors yielded an average weighted mean of 3.66, indicating that information dissemination, seminars, and health education activities moderately motivated respondents to improve mobility and wellness behaviors. In contrast, Policy Factors obtained the lowest average weighted mean (AWM = 3.53), though still interpreted as Agree. This suggests that while policies supporting wellness and work-life balance were present, their integration into formal guidelines and programs may be less pronounced compared with other domains.

The findings from the summary statistics align with the PRECEDE-PROCEED model (Schiele et al., 2025), which emphasizes the importance of addressing environmental, organizational, educational, and policy factors in promoting health behaviors. Environmental development factors (AWM = 3.80) were seen as the strongest contributors, reflecting the model's focus on creating a supportive environment for physical activity. However, policy factors (AWM = 3.53) were rated lower, suggesting that while wellness policies exist, they may require better integration into formal guidelines to enhance their impact on employee mobility and overall wellness.

Supporting the results, Kurata et al. (2023) emphasized the importance of understanding and addressing behavioral factors to enhance participation in workplace wellness programs, particularly for younger employees like Gen Z. Their research found that incorporating motivational tools and real-time feedback significantly increased employee engagement, aligning with the study's results that show how environmental and organizational factors influence physical wellness. The positive impact of these behavioral insights suggests that integrating supportive strategies, such as continuous encouragement and tailored feedback, could improve the effectiveness and sustainability of wellness programs. By enhancing engagement through motivational and behavioral tools, employers can ensure that wellness initiatives become an ongoing part of the workplace culture.

The results from this study, particularly the findings on reinforcing and enabling factors, suggest that workplace wellness programs need to be tailored to specific employee needs and work environments for maximum effectiveness. Similar to Calilung's (2025) study on librarians, where a customized wellness initiative led to improved engagement and well-being, the results here indicate that tailored approaches can foster greater participation in physical activities.

Additionally, Anan et al. (2021) found that using technology, such as AI-assisted health programs, improved adherence by providing personalized feedback, which supports the idea that incorporating technology into wellness programs could address specific health challenges, such as pain-related issues. This aligns with the current study's results, filling the gap by showing that customizing and integrating technology into wellness programs can lead to higher engagement and better health outcomes.

Feasibility, acceptability, and usability of the proposed workplace-based limbering intervention

This section explores the employees' perceptions regarding the proposed limbering intervention, focusing on its feasibility, acceptability, and usability within the workplace setting. Data gathered from employee surveys are presented to evaluate how employees view the practicality and suitability of the intervention.

The summary show that the Limbering Intervention Program was generally perceived positively by the respondents across all evaluation dimensions. All components (feasibility, acceptability, and usability) obtained average weighted means within the Agree range, indicating favorable assessments of the program's practicality, relevance, and ease of use.

Among the three dimensions, acceptability recorded the highest average weighted mean (AWM = 3.99), suggesting that respondents found the program appropriate, comfortable to participate in, and aligned with their needs. The high acceptability also indicates strong willingness among employees to recommend the program to others, reflecting confidence in its value as a workplace wellness intervention.

Usability followed closely with an average weighted mean of 3.87, indicating that respondents generally found the program easy to understand, simple to follow, and adaptable to daily work routines. This suggests that the program design was user-friendly and accessible, supporting consistent participation among employees with varying physical capabilities.

Feasibility obtained an average weighted mean of 3.80, indicating that respondents believed the program could be realistically implemented within the workplace with minimal disruption to work tasks and with available resources. While feasibility was positively rated, it ranked lowest among the three dimensions, suggesting that minor implementation challenges related to scheduling or resource allocation may still exist.

Impacts of a workplace-based limbering intervention on employee functional mobility, physical wellness, and sustained engagement in movement routines

The final section examines the potential impacts of implementing the workplace-based limbering intervention on employees' functional mobility and physical wellness. Results are drawn from pre- and post-intervention assessments to evaluate whether the intervention led to improvements in movement routines and overall wellness, as well as the employees' continued engagement in these routines over time.

Impact of workplace-based limbering intervention on employee functional mobility

The results of the pretest and posttest comparison of employees' functional mobility measures following the implementation of the workplace-based limbering intervention. A paired samples t-test was conducted to determine whether significant changes occurred in flexibility, muscular strength and endurance, core stability, and cardiovascular fitness after the intervention. Results indicate a significant improvement in flexibility, as measured by the sit-and-reach test. The mean score increased from 25.90 cm (SD = 14.20) at pretest to 33.40 cm (SD = 12.10) at posttest. The computed t-value of -4.85 with a p-value less than .001 indicates that the increase in flexibility was statistically significant, suggesting that the limbering exercises effectively enhanced range of motion.

In terms of upper-body muscular strength and endurance, the 1-minute push-up test showed a significant improvement. The mean score increased from 14.90 repetitions (SD = 6.83) to 20.30 repetitions (SD = 6.10) after the intervention. The obtained t-value of -6.12 and $p < .001$ confirm that the observed improvement was statistically significant, indicating enhanced muscular endurance following participation in the program. Significant gains were also observed in core strength and endurance, as reflected in the plank hold test. Participants' mean holding time increased from 45.60 seconds (SD = 15.50) during the pretest to 62.80 seconds (SD = 14.20) during the posttest. The t-value of -5.47 with $p < .001$ demonstrates a statistically significant improvement, suggesting that the limbering intervention contributed to improved core stability and endurance.

With respect to cardiovascular fitness, results from the 3-minute step test revealed a significant reduction in post-exercise heart rate, decreasing from a pretest mean of 124.00 bpm (SD = 18.50) to a posttest mean of 109.60 bpm (SD = 15.40). The positive t-value of 4.98 and $p < .001$ indicate a statistically significant improvement in cardiovascular recovery, as lower post-test heart rates reflect better aerobic fitness. The findings demonstrate that the workplace-based limbering intervention had a significant positive impact on employee functional mobility across all measured domains. Improvements in flexibility, muscular endurance, core strength, and cardiovascular fitness suggest that the intervention was effective in enhancing physical function and promoting overall mobility among employees. These results support the integration of structured limbering activities as a practical and beneficial component of workplace wellness programs.

The results show significant improvements across all domains of functional mobility, including flexibility, muscular endurance, core stability, and cardiovascular fitness, indicating the effectiveness of the limbering intervention. These improvements align with the PRECEDE-PROCEED model (Schiele et al., 2025), which underscores the importance of tailored, structured interventions that address both individual health behaviors and environmental factors to foster positive change. By enhancing physical function across multiple areas, the intervention supports the integration of movement-based programs into workplace wellness strategies, promoting sustained engagement and long-term health benefits for employees.

Sable et al. (2023) found that workplace wellness programs not only enhance physical health but also contribute significantly to reducing stress and improving mental well-being, fostering emotional resilience and job satisfaction. These findings resonate with the significant improvements in physical function observed in the Limbering Intervention Program, which suggests that such initiatives also address mental health by promoting overall well-being. By combining physical activity with stress-relieving benefits, the program aligns with the holistic wellness approach outlined by Sable et al. (2023), reinforcing the importance of a balanced approach to employee health and productivity.

The significant improvements observed in flexibility, muscular endurance, core stability, and cardiovascular fitness, address the gap in understanding how workplace-based interventions can enhance functional mobility. Williams et al. (2021) emphasize the importance

of regularly assessing wellness programs to ensure they meet evolving employee needs and organizational goals. By using this approach, the study not only demonstrates the program's effectiveness but also highlights how continuous evaluation can adapt the limbering intervention to remain relevant and impactful, supporting long-term employee well-being.

Experiences in the 6-Week Limbering Program

The findings from the thematic analysis align with the PRECEDE-PROCEED model (Schiele et al., 2025), which emphasizes the importance of addressing both individual health behaviors and environmental factors in health interventions. Participants experienced significant improvements in flexibility, posture, and work efficiency, highlighting the program's success in fostering positive health behaviors and enhancing physical function in the workplace. By incorporating regular movement breaks and promoting mindfulness of body alignment, the limbering intervention aligns with the model's focus on behavior change, environmental support, and the integration of health-promoting activities into daily routines.

The findings from the limbering intervention align with Marin-Farrona et al. (2023) and Argañosa and Binghay (2024), who emphasize the importance of comprehensive wellness programs that address multiple aspects of health. Marin-Farrona et al. (2023) found that incorporating a variety of exercises, including flexibility, strength conditioning, and aerobic training, significantly improves both physical health and productivity at work, which is consistent with the observed improvements in flexibility and work efficiency in this study. Additionally, Argañosa and Binghay (2024) highlight the significance of addressing not just physical health but also socio-emotional well-being, which aligns with the positive behavioral changes and increased employee engagement observed in the intervention, suggesting that a holistic approach to wellness fosters a more productive and satisfied workforce.

The results from the limbering intervention demonstrate significant improvements in flexibility, muscular strength, core stability, and cardiovascular fitness, filling a gap in the understanding of how structured wellness programs directly impact employee mobility and overall health. Andacao and Cancio (2024) highlight the importance of rigorous evaluation processes in wellness initiatives, a gap that this study addresses by systematically measuring the effectiveness of the limbering program through pretest and posttest assessments. Their findings underscore the value of evidence-based improvements, showing that thorough evaluations like those used in this study help refine wellness programs, ensuring they meet employee needs and enhance both health and productivity in the workplace.

CONCLUSION

This study established a comprehensive understanding of the functional mobility and physical wellness status of Zion of Praise Academy employees, revealing significant variability across all measured fitness components prior to the intervention. Baseline assessments using the Health-Related Fitness Test indicated that employees demonstrated a wide range of performance in flexibility, with a mean sit-and-reach score of 25.90 cm, upper-body muscular endurance at a mean of 14.90 repetitions in the 1-minute push-up test, core stability at a mean plank hold of 45.60 seconds, and a mean post-exercise heart rate of 124.00 bpm as measured by the 3-minute step test. These results collectively confirmed that while some employees displayed acceptable fitness levels in certain domains, a substantial portion of the workforce exhibited deficits in range of motion, muscular strength, core endurance, and cardiovascular recovery. The variability observed across individuals was understood as a reflection of differing exercise habits, work demands, age-related physical changes, and prior training exposure. These baseline findings provided the empirical foundation necessary for designing a

targeted, employee-centered limbering intervention responsive to the actual wellness needs of the academic workforce.

An examination of the behavioral, environmental, occupational, and psychosocial factors influencing employee mobility and physical wellness, as guided by the PRECEDE-PROCEED model, revealed that all four factor domains were perceived positively by respondents, with average weighted means falling within the Agree range. Among the PRECEDE factors, behavioral factors obtained the highest average weighted mean of 3.58, indicating that employees generally practiced movement-supportive behaviors such as postural adjustments and brief activity breaks during working hours. Enabling factors followed closely at 3.57, reflecting moderate access to wellness resources, movement-friendly spaces, and workloads that did not entirely preclude physical engagement. Environmental factors were rated at 3.51, suggesting general satisfaction with the physical workplace in terms of comfort, safety, and spatial support for movement. Reinforcing factors recorded the lowest average weighted mean of 3.17, signaling that while supervisory encouragement and organizational wellness support existed, they were comparatively less influential in motivating sustained physical activity. Within the PROCEED framework, environmental development factors received the highest rating at 3.80, affirming that workplace improvements in lighting, ventilation, space design, and physical layout were strongly perceived as contributors to mobility support. Organizational factors followed at 3.73, underscoring the importance of management culture in promoting wellness, while educational strategy factors at 3.66 indicated moderate effectiveness of health education initiatives. Policy factors registered the lowest mean of 3.53, suggesting that while institutional wellness policies were in place, their formal integration into structured programs and operational guidelines remained limited. Taken together, these findings highlight that individual behaviors and environmental conditions were strong facilitators of physical wellness, whereas reinforcement mechanisms and policy implementation represented areas requiring further institutional attention and deliberate strengthening.

Employee perceptions of the workplace-based limbering intervention were consistently favorable across all three dimensions of evaluation. Acceptability obtained the highest average weighted mean of 3.99, indicating that participants found the program appropriate, comfortable, and well-aligned with their personal wellness needs, with a strong willingness to recommend it to colleagues. Usability followed at 3.87, reflecting that the program's activities were easy to understand, simple to execute, and adaptable to daily work routines, supporting consistent engagement among employees with varying physical capabilities. Feasibility was rated at 3.80, confirming that participants believed the program could be realistically incorporated into the workplace with minimal disruption and within the bounds of available institutional resources. Although feasibility ranked lowest among the three dimensions, it remained within the positive range, suggesting that minor scheduling and resource-related challenges could be addressed through careful program planning and administrative support. These perceptions collectively affirm that the proposed limbering intervention possessed the necessary qualities for sustainable implementation in an academic workplace setting.

The post-intervention assessments demonstrated statistically significant improvements across all domains of functional mobility following the 6-week workplace-based limbering program. Flexibility, as measured by the sit-and-reach test, increased from a pretest mean of 25.90 cm to a posttest mean of 33.40 cm, with a t-value of negative 4.85 and a p-value below .001, confirming meaningful enhancement in range of motion. Upper-body muscular endurance improved from a mean of 14.90 to 20.30 repetitions in the 1-minute push-up test, with a t-value of negative 6.12 and p below .001, indicating substantial gains in strength and muscular capacity. Core stability and endurance showed marked improvement, with plank hold

duration increasing from a mean of 45.60 seconds at pretest to 62.80 seconds at posttest, supported by a t-value of negative 5.47 and p below .001. Cardiovascular fitness also improved significantly, as evidenced by a reduction in post-exercise heart rate from a pretest mean of 124.00 bpm to a posttest mean of 109.60 bpm, with a t-value of 4.98 and p below .001, reflecting enhanced aerobic recovery capacity. These results collectively confirm that the limbering intervention was effective in producing measurable, statistically significant improvements in physical function among midlife employees, and that structured, short-duration workplace movement programs can yield meaningful health benefits within a relatively brief implementation period.

The qualitative component of the study, drawn from thematic analysis of Focus Group Discussion data, further enriched the understanding of the intervention's impact by capturing participants' lived experiences during the program. Employees reported improvements in flexibility and posture, increased awareness of body alignment, enhanced work efficiency, and a greater sense of physical well-being. Positive behavioral changes such as the adoption of regular movement breaks and increased mindfulness during seated tasks were also noted as outcomes of sustained participation. These subjective accounts corroborated the quantitative findings and illustrated the program's broader influence beyond physical metrics, encompassing improvements in workplace productivity, emotional engagement, and daily functional capacity. The convergence of quantitative and qualitative evidence strengthens confidence in the program's effectiveness and underscores the value of adopting a holistic approach to employee wellness.

Based on the totality of findings, several recommendations emerge as priorities for institutional action and future research. Wellness programs must be tailored to the specific physical, behavioral, and occupational profiles of the employee population, ensuring that interventions are responsive to individual fitness levels and work demands rather than generic in design. Supervisory support and managerial involvement must be actively strengthened, as reinforcing factors were the least influential among the PRECEDE domains, and consistent organizational encouragement is essential for sustaining employee motivation and participation. Institutional policies governing workplace wellness must be formally integrated into operational guidelines and scheduling structures to reduce time-related barriers and legitimize participation in structured mobility activities. The physical environment should continue to be developed in ways that actively support movement, ergonomic comfort, and spatial accessibility, capitalizing on its role as the highest-rated PROCEED factor. The incorporation of technology, including digitally delivered reminders, personalized activity tracking, and AI-assisted wellness platforms, represents a promising avenue for increasing adherence and extending program reach across diverse employee groups. Continuous and systematic program evaluation must be embedded within future wellness initiatives to ensure responsiveness to evolving employee needs and to sustain the evidence-based refinement of interventions over time.

In conclusion, this study affirms that a structured, workplace-embedded limbering intervention grounded in the PRECEDE-PROCEED model is both effective and feasible for improving the functional mobility and physical wellness of midlife employees in an academic institutional setting. The significant gains observed across flexibility, muscular endurance, core stability, and cardiovascular fitness, combined with favorable employee perceptions and rich qualitative reflections, collectively validate the intervention's design and implementation. Addressing the identified gaps in supervisory reinforcement, policy formalization, and technological integration will be essential for scaling similar programs and ensuring their long-term sustainability. These findings offer a practical and replicable framework for physical education practitioners, human resource professionals, and institutional leaders seeking to

promote occupational health and embed evidence-based movement programs within the academic workplace.

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