

Reducing Workplace Pain Through AI

An Eight Week Evaluation of Qawam Posture App

Table Of Contents

- 1** Executive Summary
- 2** Introduction and Background
- 3** The Problem
- 4** The Solution
- 5** Discussion
- 6** Conclusion
- 7** References

Executive Summary

Qawam is an AI-powered posture correction solution designed to help office workers reduce musculoskeletal pain and build healthier sitting habits. Using motion sensors in everyday devices like smartphones and AirPods, it detects poor posture in real time and provides instant feedback; All without cameras or extra hardware leading to fewer sick days, lower insurance claims, and higher productivity.

Musculoskeletal pain, especially in the neck and lower back, affects more than 70% of office workers globally each year. This leads to reduced productivity, higher absenteeism, and rising healthcare costs for employers. Traditional ergonomic interventions often fail to scale, especially for remote or distributed teams.

To evaluate Qawam's effectiveness, a licensed Saudi research ethics board approved an expedited study (IRB #24-0954), conducted an eight-week randomized controlled trial to evaluate the effectiveness of the Qawam AI-assisted posture correction app. A total of 135 participants were enrolled, and 34 completed the protocol at the time of this interim analysis.

Participants in the intervention group, who used the Qawam app in addition to a posture education program, demonstrated significant improvement. Scores on the Numeric Pain Rating Scale (NPRS) dropped from 4.38 to 2.18, a statistically significant reduction ($p = .015$), with a very large effect size (Cohen's $d = 2.78$) (Hawker et al., 2011). Additionally, improvements were observed in the Neck Disability Index (NDI) and the Oswestry Disability Index (ODI), with moderate to large effect sizes (Vernon & Mior, 1991; Fairbank & Pynsent, 2000). Quality of life, as measured by the SF-36 Health Survey, also showed a small positive change (Ware & Sherbourne, 1992).

This study received expedited ethical approval from a licensed Saudi research ethics board. To protect institutional and participant confidentiality, no organizational names or identifiers have been disclosed publicly. Full data collection is expected to conclude this year, with plans for a peer-reviewed publication.

These preliminary findings suggest that Qawam is a scalable, privacy-conscious digital intervention capable of reducing workplace pain by approximately 50% within just two months without the need for additional hardware.

Introduction and Background

Qawam Technologies Ltd., a research-based spin-off founded in 2021, develops AI-powered solutions to address the growing problem of workplace musculoskeletal disorders. The company originated from the Information Science Lab (ISL) at King Abdullah University of Science and Technology (KAUST) and focuses on applying advanced motion-sensing and machine learning technologies to improve workplace health. Posture monitoring is also the entry point to our broader 'Saleem' wellbeing platform, which covers mental health, activity levels, and overall wellness

Musculoskeletal (MSK) pain, particularly in the neck and lower back, is a common occupational hazard among individuals who spend prolonged periods sitting. Global studies have indicated that more than 70% of office workers experience at least one episode of significant MSK pain annually, contributing to substantial personal and organizational burdens.

Traditional ergonomic strategies, such as static training sessions or physical aids can be helpful but often lack scalability and sustained impact. In contrast, digital health technologies offer continuous, personalized, and responsive interventions. Qawam posture correction app utilizes motion sensors from smartphones and wearables to detect poor posture and provides real-time feedback to guide users toward healthier positioning.

The Problem

1 High prevalence of pain

Neck pain affects 42% to 69% of office workers annually, and low back pain affects 31% to 51%, with some studies reporting up to 63% annual neck pain and 62% lifetime prevalence (Hakala et al., 2002; Janwantanakul et al., 2008; Sadeghian et al., 2013).

2 Hidden productivity loss

Neck pain results in an average of 11.4 missed workdays per year, while back pain accounts for 264 million lost workdays annually, about two days per employee (Stewart et al., 2003; Hoy et al., 2010).

3 Rising health costs

Ongoing treatment, physiotherapy sessions, and diagnostic imaging increase the financial burden on employer-sponsored health plans.

4 Limited scalability of traditional approaches

On-site ergonomic assessments are effective but resource-intensive and impractical for large or remote teams.

The Solution

Qawam's AI-powered posture correction application transforms consumer electronics, specifically AirPods and smart phones motion sensors, into precise posture monitoring instruments. The solution employs advanced machine learning algorithms to analyze real-time motion data, detecting four distinct sitting postures and providing immediate feedback to prevent musculoskeletal disorders.

Technical Capabilities

The system achieves 91% detection accuracy across four distinct posture types: Normal, Tech-Neck, Hunch, and Slouch. Using motion sensor analysis, the application provides real-time intervention when poor posture is detected, helping users develop healthier positioning habits and reduce workplace pain.

User and Enterprise Benefits



Real-time pain reduction through posture feedback and corrective exercises



Weekly progress reports for users and aggregated analytics for enterprises



Works with existing smartphones and AirPods, no extra hardware



Privacy-first posture monitoring using anonymized motion data

Implementation Process

Qawam follows a streamlined three-step approach:



This simplified workflow integrates seamlessly into existing work routines while providing enterprise-grade posture analytics for corporate wellness programs and healthcare provider integration.

Study Design

- **Type:** Randomized controlled trial with pre test and post test measurement
- **Participants:** 135 screened, 66 assigned to the intervention group, 69 to the control group. Seventeen from each group completed eight weeks at this interim point.
- **Intervention:** Qawam posture application delivered through iOS and Android plus a brief education chatbot session
- **Control:** Education chatbot only
- **Duration:** Eight weeks
- **Outcome tools**
 - Numeric Pain Rating Scale (NPRS) (Hawker et al., 2011)
 - Neck Disability Index (NDI) (Vernon & Mior, 1991)
 - Oswestry Disability Index (ODI) (Fairbank & Pynsent, 2000)
 - SF-36 Health Survey (Ware & Sherbourne, 1992)

Interim Results

Clinical Outcome Measures

Outcome measure	Baseline mean	Week 8 mean	p value	Cohen d (effect size)	Interpretation
NPRS (Pain Intensity)	4.38	2.18	0.015	2.78	Very large pain reduction
NDI (Neck Disability)	0.98	0.66	0.114	0.69	Moderate to large functional gain
ODI (Lower Back Disability)	0.76	0.46	0.090	0.64	Moderate functional gain
SF-36 (Quality of Life)	2.65	2.72	+0.435	0.34	Small positive change

Behavioral Change Metrics

Beyond clinical outcomes, Qawam application tracked real-time behavioral changes through its integrated Posture Score system. This proprietary metric provides users with a score out of 100, evaluating sitting quality based on posture type classification (Normal vs. Tech-Neck, Hunch, or Slouch) and active sitting behavior (avoiding prolonged static positioning).

Participants demonstrated progressive improvement in their Posture Scores throughout the eight-week intervention period. Average scores increased from 76% in Week 1 to 99% by Week 8, representing a 23-percentage-point improvement in healthy sitting behaviors. The trajectory showed consistent upward progress with notable acceleration after Week 4, suggesting that behavioral adaptation occurs within the first month of intervention.

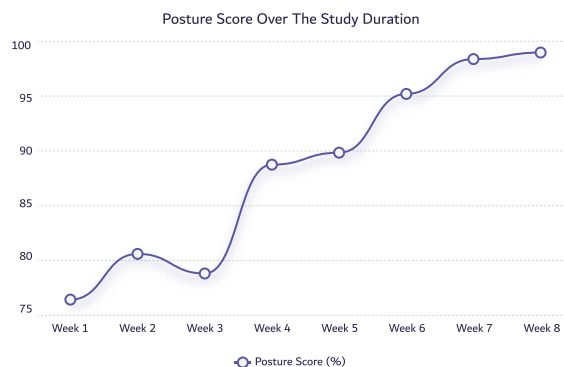
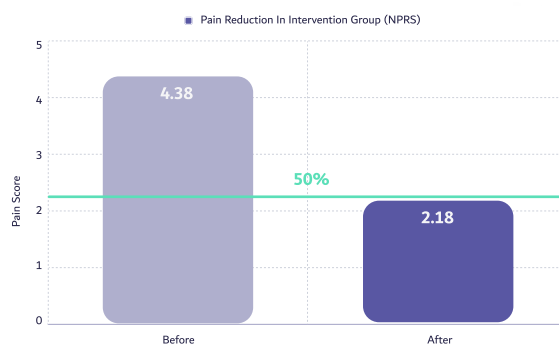


Figure 1 Average Posture Score Over The Study Period

This behavioral data provides objective evidence of habit formation, complementing clinical pain reduction measurements. The Posture Score improvements indicate that participants not only experienced less pain but actively developed healthier sitting patterns, supporting the intervention's long-term sustainability.

Discussion

The integration of clinical outcomes with real-time behavioral metrics demonstrates Qawam's dual impact on both immediate symptom relief and sustainable habit modification. The 50% reduction in pain intensity (NPRS) corresponds directly with the 23-percentage-point improvement in daily sitting behaviors, suggesting a clear relationship between posture correction and pain reduction.



The progressive nature of Posture Score improvements indicates that users require approximately one month to establish new behavioral patterns. This timeline aligns with established behavior modification research and provides practical guidance for implementation protocols in workplace wellness programs.

Most significantly, the behavioral tracking capability distinguishes Qawam from traditional ergonomic interventions by providing continuous, objective measurement of postural habits rather than relying solely on subjective pain reporting or periodic clinical assessments.

Practical Implications



Rapid remote onboarding for in-office, hybrid, or remote teams



Objective data to track program impact and ROI



Evidence-based improvements within two months



Potential to lower healthcare costs by preventing chronic MSK issues

Limitations

These results represent an interim analysis with 34 completers out of the planned 135. Full results will provide greater statistical power and allow subgroup analyses. Nevertheless, the early findings are consistent with expected outcomes based on existing posture and pain research.

Conclusion

Early evidence confirms that the Qawam AI posture application offers a powerful new tool for reducing musculoskeletal pain among office workers. The intervention delivered significant clinical benefits with minimal effort from users and no capital expense for employers. As full data become available Qawam expects to refine its algorithms and expand corporate partnerships. Qawam does not use cameras or record identifiable personal data, ensuring complete user privacy while delivering actionable insights. Organizations searching for cost effective ways to promote employee wellbeing should consider piloting Qawam as part of a comprehensive health strategy.

For partnership inquiries or to request the full technical dossier please contact info@qawam.ai.

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