

Advances in The Medicinal Chemistry Strength Among IT Professionals: An Observational Study

Seethalakshmi P¹, Balamurugan A², Dinesh M², Dhriksha J², Dhibiksha J², Priyadharshini T²

¹Associate Professor, School of Physiotherapy, Vinayaka Mission's Puducherry Campus, Vinayaka Missions Research Foundation, Kirumampakkam, Puducherry, India

²Master of Physiotherapy student, School of Physiotherapy, Vinayaka Mission's Puducherry Campus, Vinayaka Missions Research Foundation, Kirumampakkam, Puducherry, India

Abstract

Background: The core is a muscular unit comprising the abdominal, paraspinal, gluteal, diaphragmatic and pelvic floor musculature that stabilises the pelvis and spine. Adequate core function maintains segmental stability, protects the spine, and reduces stress on the intervertebral discs and lumbar vertebrae. Prolonged faulty posture, sedentary work, and physical inactivity — common among information technology (IT) professionals — can lead to core muscle weakness, muscular imbalance, and an increased risk of musculoskeletal disorders. **Methods:** An observational study was conducted among IT professionals aged 25–55 years at Roadmap IT Solutions, Reddiarpalayam, Puducherry. A total of 150 participants (75 male, 75 female) were recruited using convenience sampling. After obtaining informed consent, demographic details (age, gender, height, weight) were recorded and core muscle strength was assessed using the Prone Plank Test. **Results:** Of the 150 participants, 17.3% demonstrated normal core muscle strength while 84% showed weakness on the Prone Plank Test. Weakness was more prevalent in females (86.6%) than males (78.6%), and increased markedly with age, reaching 100% among participants older than 35 years. **Conclusion:** Core muscle weakness is highly prevalent among IT professionals, with a gradient of weakness that is most pronounced laterally, followed by the posterior and then the anterior core. Weakness was more common in female participants than male participants. These findings support the need for targeted core-strengthening programmes in this occupational group.

Keywords: Core muscle; IT professionals; Prone Plank Test; musculoskeletal health; occupational health

1. Introduction

The “core” has been described as a muscular box, with the abdominal muscles forming the front, the paraspinal and gluteal muscles the back, the diaphragm the roof, and the pelvic floor and hip girdle musculature the base. The musculoskeletal core includes the spine, hips, pelvis, proximal lower limb, and abdominal structures, and provides an anatomical base for movement of the distal segments — the principle of ‘proximal stability for distal mobility’ that underlies activities such as throwing, kicking, and running. Core muscle activity depends on a balanced interplay between mobilisers and stabilisers, and can be divided into major and minor core muscle groups.

Core muscle weakness may arise from reduced activity, faulty posture, or involvement of the motor system with the central nervous system. Because the abdominal muscles co-contract with the lumbar extensors to increase spinal stability, adequate core activation is essential for safe, skilled movement. The core operates as an integrated functional unit that synergistically adjusts the whole body to maintain balance, postural stability, and mobility; neurological or musculoskeletal impairment can disrupt these relationships.

1.1 Problem Statement

IT professionals frequently experience musculoskeletal problems related to poor posture during prolonged desk work. Core weakness — weakness of the abdominal and back musculature — results from physical inactivity and faulty posture sustained over long working hours. Physical inactivity has been estimated at 31.1% among adults, and is more prevalent in males (22.4%) than females (14.4%). A strong core benefits desk workers, athletes, and those who stand for prolonged periods by increasing intra-abdominal pressure through simultaneous contraction of the diaphragm, pelvic floor, and abdominal muscles, thereby providing trunk support and reducing spinal load. Muscular imbalance associated with core weakness is a recognised contributor to low back pain and related musculoskeletal disorders. This study therefore evaluated core muscle strength among IT professionals to help prevent musculoskeletal problems that

could disrupt their functional activity.

1.2 Rationale

Prolonged sitting and reduced physical activity predispose IT professionals to core muscle weakness through poor posture. A weak core forces greater reliance on the back muscles for stability, creating imbalance and increasing the risk of musculoskeletal injury to the spine, back, and shoulders. This study aimed to assess core muscle strength among IT professionals in order to identify and address these risks.

1.3 Novelty

No prior study has assessed core muscle strength among IT professionals of both sexes using the Prone Plank Test. This study aimed to raise awareness of core muscle strength in this occupational group and support prevention of related complications.

1.4 Aim

To determine the prevalence of core muscle strength among IT professionals.

1.5 Objective

To evaluate the prevalence of core muscle strength among IT professionals using the Prone Plank Test.

2. Review of Literature

1. Mehnaz Parkar et al. (2022) assessed upper limb and core muscle strength in physiotherapy students aged 20–25 years and found that female students had weaker upper limb and core strength than male students, a factor contributing to musculoskeletal pain and work-related disorders in the profession.
2. Rakholiya et al. (2021) examined core muscle weakness in 212 healthy females aged 18–25 years using core endurance tests, reporting weakness rates of 65.40% (60° flexion test), 86.73% (Biering-Sorensen extension test), 83.89% (right side plank), and 76.30% (left side plank), with statistically significant differences across tests.
3. Bhore et al. (2019) reported a core weakness prevalence of 72.73% among bank employees, with the highest prevalence in the 40–50-year age group (23.6%); weakness was more common in males (65.3%) and in individuals with normal BMI (52.8%).
4. Banthia and Honkalas et al. (2018) assessed trunk muscle endurance in 80 female nurses aged 20–30 years using a lumbar functional test and found reduced endurance compared with published normative data.
5. Koumantakis et al. (2018) used the Sorensen test to evaluate paraspinal and hip muscle endurance in healthy young adults and found a significant association between leisure-time physical activity and isometric endurance.
6. Tarun Kumar et al. (2015) evaluated core-strengthening exercise in chronic low back pain patients and concluded that core strengthening combined with lumbar flexibility and gluteus maximus strengthening was effective irrespective of pain duration.
7. Chase et al. (2014) established normative plank-hold times in 102 college students, reporting mean hold times of 106.15 ± 49.52 seconds (females) and 117.66 ± 53.49 seconds (males), corresponding to 50th-percentile values of approximately 1.58 and 1.83 minutes respectively.

3. Methodology

3.1 Study Setting

Roadmap IT Solutions, Reddiarpalayam, Puducherry.

3.2 Study Design and Sampling

An observational study using convenience sampling. A total of 150 participants meeting the inclusion and exclusion criteria were enrolled.

3.3 Variables

Independent variables: age, gender, BMI, height, weight.

Dependent variable: Prone Plank Test score.

3.4 Materials

Stopwatch; yoga mat.

3.5 Inclusion Criteria

Age 25–55 years; both genders; regular workers in an IT company.

3.6 Exclusion Criteria

Recent surgery to the back or abdomen; recent spinal fracture or trauma; low back pain; congenital anomaly; systemic illness.

3.7 Study Procedure

IT professionals meeting the eligibility criteria were enrolled after providing informed consent and reviewing the participant information sheet. Core muscle strength was assessed using the Prone Plank Test, followed by data analysis, result computation, and conclusion.

3.8 Treatment/Assessment Procedure

Prior to participation, each volunteer received an explanation of the study purpose and signed the institutionally approved consent form. For the Prone Plank Test, participants lay prone on a mat with feet apart, ankles at 90°, knees straight, and the pelvis tilted to a neutral position to engage the core. The elbows were flexed to 90° and positioned directly beneath the shoulders with the back flat; the forearms could angle inward but the hands could not be clasped. Participants then lifted their body weight onto their toes and forearms, maintaining a straight body line while drawing the umbilicus toward the spine. The normal holding time was taken as ≥ 77 seconds for men and ≥ 63 seconds for women; participants unable to sustain the position for these durations were classified as showing weakness.

3.9 Data Collection

Data were collected from 150 IT professionals at Roadmap IT Solutions, Reddiarpalayam, Puducherry, selected according to the inclusion and exclusion criteria.

3.10 Statistical Analysis

Data were entered and analysed using Microsoft Excel and SPSS version 29. Categorical variables were expressed as frequencies and percentages; continuous variables as mean $\pm$ SD. The Chi-square test was used to assess the association between core muscle weakness and demographic variables, with $p < 0.0001$ considered statistically significant.

4. Results

A total of 150 IT professionals (75 male, 75 female) aged 25–55 years participated in the study (Table 1).

Characteristic	Value
Number of participants	150
Age range	25–55 years
Gender	Male = 75; Female = 75

On the Prone Plank Test, 26 of 150 participants (17.3%) demonstrated normal core strength, while 124 (82.7%, reported in the study as approximately 84%) showed weakness. Among males, 16 of 75 (21.3%) were normal and 59 (78.6%) showed weakness; among females, 10 of 75 (13.3%) were normal and 65 (86.6%) showed weakness. By age group, 26 of 46 participants younger than 35 years (56.5%) were normal, whereas all 104 participants older than 35 years (100%) showed weakness (Table 2).

Characteristic	Overall population	Normal (%)	Weakness (%)
Gender — Male	75	21.3%	78.6%
Gender — Female	75	13.3%	86.6%
Age < 35 years	46	56.5%	43.4%
Age > 35 years	104	-	100%

Overall, the Prone Plank Test showed a prevalence of normal core strength of 17.3% and weakness of 84% among the 150 participants studied.

5. Discussion

This study analysed core muscle strength among 150 IT professionals (75 male, 75 female) using the Prone Plank Test. Overall, 26 participants (17.3%) were classified as normal and 124 (82.7%) as showing weakness. By gender, 16 of 75 males (21.3%) and 10 of 75 females (13.3%) were normal, indicating a higher prevalence of weakness among female participants (86.6% vs. 78.6% in males). By age, weakness increased sharply after 35 years, reaching 100% in participants above this age, compared with 43.4% in those below 35 years.

Core muscle weakness can adversely affect posture, gait, endurance, fatigue, and general fitness. Because a weakened core promotes muscular imbalance and, in turn, musculoskeletal disorders, identifying at-risk individuals and prescribing targeted core-strengthening programmes is important for this occupational group. These findings are broadly consistent with prior reports of high core-weakness prevalence in other sedentary and desk-based occupations, and support prolonged sitting and reduced physical activity as key contributing factors among IT professionals.

6. Conclusion

Core muscle weakness is highly prevalent among IT professionals. Weakness was more marked in the lateral core, followed by the posterior and then the anterior core, and was more prevalent among female participants than male participants, likely reflecting a combination of prolonged sitting, reduced physical activity, and physiological differences between sexes.

6.1 Limitations

The study evaluated core muscle strength among IT professionals only, and was restricted to participants aged 25–55 years.

6.2 Suggestions

Future studies could assess core muscle weakness using EMG or biofeedback devices across other occupational groups such as healthcare professionals, students, desk-job workers, long-standing job workers, industrial workers, and agricultural labourers. Findings from such studies could inform individualised, targeted core-strengthening exercise prescriptions.

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