



IQTISODIYOT & TARAQQIYOT

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REMOTE PREVENTION AND CORRECTION OF SPINAL DISORDERS IN OFFICE WORKERS VIA TELEGRAM BOT: RESULTS OF A PILOT STUDY

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Abstract. Spinal diseases rank among the primary causes of temporary incapacity among office employees. Prolonged static posture leads to degenerative changes in the spinal column, chronic pain, and reduced cognitive productivity. Traditional rehabilitation formats require clinic visits, substantially reducing treatment adherence.

To evaluate the clinical effectiveness of a 30-day physical therapy programme delivered remotely via a Telegram bot in office workers with spinal disorders.

Prospective single-group pilot study. Participants (n=20, age 22–45 years) were office workers with spinal pain complaints. The intervention — Full Body Premium programme — comprised daily 15–25-minute exercise sessions delivered via a Telegram bot for 30 days. Outcomes were assessed using a standardised Likert-scale questionnaire (Google Forms) administered before and after the course.

Pain reduction was recorded in 95% of participants (19/20; $p < 0.001$), with clinically significant improvement (complete resolution or substantial reduction) in 75%. Work capacity improved in 70%, sleep quality in 70%, body flexibility in 95%, and concentration in 85%. The mean Cohen's d for pain was 2.91 (large effect). The programme was recommended by 95% of participants.

The remote physical therapy programme delivered via Telegram bot demonstrated high clinical and functional effectiveness comparable to in-person rehabilitation. The results support integration of telehealth physical therapy formats into corporate health promotion programmes.

Key words: physical therapy; spinal disorder prevention; remote rehabilitation; Telegram bot; telemedicine; office workers; pain syndrome; Cohen's d.

Annotatsiya. Orqa miya kasalliklari ofis xodimlari orasida vaqtinchalik mehnatga layoqatsizlikning asosiy sabablari qatoriga kiradi. Uzoq muddatli statik holat umurtqa pog'onasida degenerativ o'zgarishlarga, surunkali og'riqqa va kognitiv unumdorlikning pasayishiga olib keladi. An'anaviy reabilitatsiya formatlari klinikaga tashrif buyurishni talab qiladi, bu esa davolanishga rioya qilishni sezilarli darajada kamaytiradi.

Orqa miya kasalliklari bo'lgan ofis xodimlarida Telegram boti orqali masofadan turib amalga oshiriladigan 30 kunlik fizioterapiya dasturining klinik samaradorligini baholash uchun. Istiqbolli bitta guruhli pilot tadqiqot. Ishtirokchilar (n=20, 22–45 yosh) orqa miya og'rig'i shikoyatlari bo'lgan ofis xodimlari edi. Aralashuv — Full Body Premium dasturi — 30 kun davomida Telegram boti orqali amalga oshiriladigan har kuni 15–25 daqiqalik mashqlardan iborat edi. Natijalar kursdan oldin va keyin beriladigan standartlashtirilgan Likert shkala so'rovnomasi (Google Forms) yordamida baholandi. Og'riqning kamayishi ishtirokchilarning 95 foizida (19/20; $p < 0.001$) qayd etildi, klinik jihatdan sezilarli yaxshilanish (to'liq hal bo'lish yoki sezilarli darajada kamayish) 75 foizda qayd etildi. Ish qobiliyati 70 foizda, uyqu sifati 70 foizda, tana moslashuvchanligi 95 foizda va diqqatni jamlash 85 foizda yaxshilandi. Koenning og'riq uchun o'rtacha d koeffitsienti 2,91 ni tashkil etdi (katta effekt). Dastur ishtirokchilarning 95% tomonidan tavsiya etilgan.

Telegram bot orqali amalga oshirilgan masofaviy fizioterapiya dasturi shaxsan reabilitatsiya qilish bilan taqqoslanadigan yuqori klinik va funktsional samaradorlikni namoyish etdi. Natijalar teletibbiyot fizioterapiyasi formatlarini korporativ sog'liqni saqlashni rivojlantirish dasturlariga integratsiyalashni qo'llab-quvvatlaydi.

Kalit so'zlar: fizioterapiya; umurtqa pog'onasi kasalliklarining oldini olish; masofaviy reabilitatsiya; Telegram bot; teletibbiyot; ofis xodimlari; og'riq sindromi; Koenning d koeffitsienti.



Аннотация. Заболевания позвоночника входят в число основных причин временной нетрудоспособности офисных работников. Длительное нахождение в статическом положении приводит к дегенеративным изменениям позвоночника, хронической боли и снижению когнитивных функций. Традиционные методы реабилитации требуют посещения клиники, что существенно снижает приверженность лечению.

Цель исследования — оценить клиническую эффективность 30-дневной программы физиотерапии, проводимой дистанционно через Telegram-бота, у офисных работников с заболеваниями позвоночника. Проспективное пилотное исследование в одной группе. Участниками ($n=20$, возраст 22–45 лет) были офисные работники с жалобами на боли в позвоночнике. Программа — «Премиум-программа для всего тела» — включала ежедневные 15–25-минутные занятия упражнениями, проводимые через Telegram-бота в течение 30 дней. Результаты оценивались с помощью стандартизированного опросника по шкале Ликерта (Google Forms), заполняемого до и после курса.

Снижение боли было зафиксировано у 95% участников (19/20; $p<0,001$), при этом клинически значимое улучшение (полное исчезновение или существенное уменьшение) наблюдалось у 75%. Работоспособность улучшилась на 70%, качество сна — на 70%, гибкость тела — на 95%, а концентрация — на 85%. Средний коэффициент Коэна d для боли составил 2,91 (значительный эффект). Программа была рекомендована 95% участников.

Программа дистанционной физиотерапии, проводимая через Telegram-бота, продемонстрировала высокую клиническую и функциональную эффективность, сопоставимую с очной реабилитацией. Результаты подтверждают целесообразность интеграции форматов телемедицинской физиотерапии в корпоративные программы по укреплению здоровья.

Ключевые слова: физиотерапия; профилактика заболеваний позвоночника; дистанционная реабилитация; Telegram-бот; телемедицина; офисные работники; болевой синдром; коэффициент Коэна d .

INTRODUCTION

Musculoskeletal disorders, and spinal pathology in particular, rank among the leading chronic non-communicable diseases in the working-age population. The Global Burden of Disease Study (GBD 2019) identifies low back pain as the predominant cause of disability globally, impacting over 570 million individuals each year [1]. Spinal disorders account for 40–65% of all medical consultations among office workers [2]. The key pathogenetic factors driving vertebrogenic pathology in office workers include: prolonged static spinal loading in non-physiological positions, physical inactivity, muscle imbalance from asymmetric loads, and psycho-emotional stress that exacerbates myotonic syndrome [3]. Together, these factors accelerate the progression of osteochondrosis, intervertebral disc protrusions, and chronic pain syndrome, significantly reducing quality of life and professional productivity.

Traditional medical rehabilitation formats — physical therapy clinics, physiotherapy, and manual therapy — are poorly accessible for working individuals. The main barriers include: limited working hours, geographic distance from facilities, financial costs, and psychological reluctance to seek help for a chronic, “familiar” pain [4]. As a result, according to domestic studies, only 12–18% of patients with vertebrogenic pathology regularly perform prescribed exercises over the long term [5].

The rise of mobile technologies and instant messaging platforms opens fundamentally new opportunities for remote patient support. As of 2024, Telegram exceeds 900 million monthly active users, a considerable share of whom are within the working-age demographic [3]. The ability to create multifunctional bots enables automated delivery of therapeutic programmes, systematic reminders, and feedback without the additional costs of developing specialised applications [6].

Despite growing research interest in telehealth rehabilitation formats, data on the effectiveness of physical therapy programmes delivered specifically via messenger platforms remain scarce in the global literature. Most published studies focus on smartphone applications or video conferencing, while the potential of Telegram bots as a therapeutic delivery tool remains understudied.

1.1. Study Objectives and Hypotheses

Primary objective: To evaluate the clinical effectiveness of the 30-day remote physical therapy programme “Full Body Premium,” delivered via a Telegram bot, in office workers with spinal disorders.

Secondary objectives:

- To assess the programme’s effect on work capacity, sleep quality, body flexibility, and cognitive productivity
- To analyse participant adherence and its relationship with clinical outcomes
- To determine the effect size (Cohen’s d) for key outcomes
- To evaluate participant satisfaction and willingness to recommend the programme



Working hypothesis: A 30-day physical therapy programme delivered via a Telegram bot will achieve clinically significant pain reduction in at least 70% of participants.

LITERATURE REVIEW ON THE TOPIC

Anna Eisele-Metzger, Daniela S. Schoser, Michaela D. Klein, et al. Interventions for preventing back pain among office workers – a systematic review and network meta-analysis (2022). This comprehensive meta-analysis concludes that isolated ergonomic adjustments are often insufficient. The most effective strategy for preventing back pain is a combined approach involving regular physical exercise and ergonomic education. This supports the necessity of a multifaceted intervention via digital tools.

Aki Rintala, Riikka Rantalainen, Anne Kaksonen, et al. Health Apps for Low Back Pain Self-management: Scoping Review (2022). The research highlights that mobile health (mHealth) solutions, such as apps and automated bots, significantly improve patient adherence to exercise programs. By providing timely reminders and accessible guidance, these digital tools empower office workers to manage spinal health independently.

Pim P. Valentijn, Larysa Tymchenko, et al. Digital Health Interventions for Musculoskeletal Pain Conditions: Systematic Review and Meta-analysis (2022). This study demonstrates that digital health interventions are non-inferior to traditional face-to-face care. For office workers, remote platforms (like Telegram bots) provide a scalable and cost-effective method to deliver therapeutic exercises and postural monitoring.

Dhawal Kalal. The Impact of Postural Correction and Ergonomic Interventions on Neck and Upper Back Pain in Office Workers (2025). Kalal’s work emphasizes that targeted postural correction—delivered through remote monitoring—specifically reduces tension in the cervical and thoracic regions. This is particularly relevant for “text neck” and other modern office-related spinal issues.

Luis Alfonso Mendoza Álvarez. Ergonomic Interventions and Their Effects on Worker Performance (n.d.). This research links spinal health directly to workplace productivity. It argues that corrective interventions for office workers do not only serve a medical purpose but also act as an economic driver by reducing absenteeism and improving focus during work hours.

RESEARCH METHODOLOGY

A prospective single-arm pilot study design was employed, with outcome evaluation based on pre- and post-intervention questionnaires. The study took place from March to April 2026 [4] and adhered to the ethical standards of the World Medical Association Declaration of Helsinki.

The study included twenty office workers according to pre-specified eligibility criteria. Inclusion criteria were: office workers working at least 6 hours per day, reporting pain in the spine (cervical, thoracic, or lumbar regions), aged between 18 and 55 years, owning a smartphone with the Telegram application installed, and providing signed informed consent. Patients were excluded if they had an acute pain syndrome requiring pharmacologic treatment, had spinal surgery within the prior 12 months, had absolute contraindications to physical therapy (eg, spinal malignancy, unstable fracture), or were pregnant (Table 1).

Table 1. Participant Characteristics

Characteristic	n (%)	Note
Total	20 (100%)	
Age 22–35 лет	12 (60%)	
Age 36–45 лет	8 (40%)	
Lower back pain	14 (70%)	Leading localization
Neck pain	11 (55%)	Multiple localization
Pain in the thoracic region	6 (30%)	
Office work experience > 3 years	18 (90%)	
Previous experience in physical therapy	7 (35%)	Unregular exercises

Note: some participants had pain in multiple spinal regions.



The “Full Body Premium” programme is a structured 30-day physical therapy intervention designed with the underlying mechanisms of vertebrogenic disorders in office workers in mind. To facilitate consistent delivery and user engagement, the programme was implemented through a dedicated Telegram bot.

Each day, participants were provided with exercise sessions lasting approximately 15–25 minutes. These sessions were supported by video demonstrations to ensure proper execution of movements. In addition to the exercise component, participants received practical recommendations on workplace ergonomics and occupational hygiene.

To promote adherence, daily push notifications were sent via Telegram as reminders to complete the exercises. The platform also included a simple feedback feature, allowing participants to indicate whether they had completed each session, which enabled basic monitoring of engagement throughout the programme.

Therapeutic directions of the programme:

The therapeutic component of the programme was designed to address multiple aspects of spinal function. It included targeted mobilisation of the cervical, thoracic, and lumbar regions, along with exercises aimed at strengthening the spinal stabilising system, particularly the deep paraspinal and core muscles.

In parallel, the programme focused on improving postural alignment and reducing excessive muscle tension. Special attention was given to relieving myotonic stiffness and restoring a physiological range of motion within individual spinal segments, thereby supporting overall functional recovery.

Outcomes were evaluated using a standardised self-administered questionnaire (Google Forms), completed at two time points: prior to the start of the programme (Day 0) and immediately after its completion (Days 30–32).

The primary outcome was the change in pain intensity, assessed using a 5-point ordinal scale. Secondary outcomes included self-reported changes in work capacity and professional productivity, sleep quality, and overall flexibility with range of motion. In addition, participants were asked to evaluate changes in concentration and cognitive performance.

Adherence to the programme was measured by the number of completed sessions recorded through the platform. Participants also provided feedback on their overall satisfaction with the programme and indicated whether they would recommend it to others.

Statistical analysis was performed using the Wilcoxon signed-rank test for paired samples (given the ordinal measurement scale). Effect size was assessed using Cohen’s *d* coefficient. Confidence intervals for proportions were calculated using the Wilson method (95% CI). The significance threshold was set at $p < 0.05$. Analysis was performed in R 4.3.2.

ANALYSIS AND RESULTS

After completing the 30-day physical therapy program, nearly all participants experienced some degree of pain relief. Specifically, 19 out of 20 individuals (95%) reported a reduction in pain, a result that was highly statistically significant ($p < 0.001$) and supported by a 95% confidence interval of 75.1% to 99.9%.

A clinically meaningful improvement—defined as either complete pain resolution or a marked decrease in both frequency and intensity—was observed in 15 participants (75%; 95% CI: 50.9–91.3%). Among them, 7 individuals (35%) reported that their pain had completely resolved, while 8 (40%) experienced a substantial reduction. An additional 4 participants (20%) noted a moderate improvement. Only one participant (5%) reported no change in symptoms, and importantly, no cases of worsening were observed.

The magnitude of the treatment effect was considerable, with a Cohen’s *d* of 2.91, indicating a very large clinical impact (Table 2).

table 2.

Outcome	n	% improvement	95% ДИ	p	Effect size
Reduction of pain syndrome	19/20	95%	75.1–99.9%	<0.001	Large
Clinically significant improvement*	15/20	75%	50.9–91.3%	<0.001	Large
Improving performance	14/20	70%	45.7–88.1%	<0.001	Moderate
Improving sleep quality	14/20	70%	45.7–88.1%	0.003	Moderate
Improving body flexibility	19/20	95%	75.1–99.9%	<0.001	Large
Improving concentration	17/20	85%	62.1–96.8%	0.002	Large
They recommend the program	19/20	95%	75.1–99.9%	<0.001	—



Clinically significant improvement: complete resolution of pain or response “significantly less frequent and less intense.” 95% CI = Wilson confidence interval. d = Cohen’s d.

Work capacity and professional productivity improved in 14 participants (70%; d=1.32) of whom 7 (35%) reported substantial improvement in work efficiency and 7 (35%) moderate improvement. No change was reported by six participants (30%). Fourteen participants (70%) reported improvement in sleep quality (d=1.17): 9 (45%) reported noticeable improvement, 5 (25%) reported slight improvement; 6 participants (30%) reported no change.

The most consistent finding was an improvement in body flexibility, reported by 19 participants (95%; d=2.71): 12 (60%) described marked improvement and 7 (35%) slight improvement. Improvement in concentration and cognitive productivity was observed in 17 participants (85%; d=1.48): substantial in 7 (35%), noticeable in 4 (20%) and slight in 6 (30%). Three participants (15%) did not show any change (Table 3).

Table 3. Mean Pre- and Post-Course Values (n=20)

Indicator	Before the course M±SD	After the course M±SD	Δ (difference)	p	Cohen’s d
Pain syndrome (1–5)	4.2 ± 0.8	1.8 ± 0.9	–2.4	<0.001	d = 2.91
Efficiency (1–5)	3.1 ± 0.7	2.1 ± 0.8	–1.0	<0.001	d = 1.32
Sleep quality (1–5)	3.4 ± 0.9	2.4 ± 0.8	–1.0	0.003	d = 1.17
Body flexibility (1–5)	3.8 ± 0.7	1.9 ± 0.7	–1.9	<0.001	d = 2.71
Concentration (1–5)	3.3 ± 0.8	2.2 ± 0.7	–1.1	0.002	d = 1.48
General well-being (1–5)	3.5 ± 0.8	2.1 ± 0.7	–1.4	<0.001	d = 1.89

M±SD — mean ± standard deviation; Δ — mean difference; d — Cohen’s d. Scale: 1 = very good, 5 = very poor. Wilcoxon signed-rank test.

Table 4. Adherence Analysis (n=20)

The following limitations should be taken into account in interpreting the results:

The study was a pilot study with a relatively small sample size (n = 20), limiting the statistical power.

No randomised control group to rule out placebo effects and natural symptom regression

visual subjective outcome assessment with self-administered questionnaire without objective instrumental assessment

analogue scale dynamometer)

Possible selection bias Those who agreed were probably more motivated to start with

30 days short follow up period, No evaluation of long-term outcomes

There were no data on the pharmacological treatment of the participants at the same time.

CONCLUSION AND SUGGESTIONS

The 30-day remote physical therapy programme “Full Body Premium,” delivered via Telegram bot, demonstrated high clinical effectiveness in office workers with spinal disorders. Statistically and clinically significant pain reduction (95%; d=2.91), improvement in work capacity (70%), sleep quality (70%), body flexibility (95%), and concentration (85%), along with a 95% willingness to recommend the programme, indicate that messenger platforms can serve as effective delivery tools for therapeutic physical therapy programmes.

The programme’s high effectiveness even with incomplete adherence (in some participants, fewer than one-third of sessions completed) opens prospects for broader implementation of remote physical therapy formats in corporate medicine without requiring strict adherence to the full schedule.

These results justify conducting a randomised controlled trial with at least 120 patients, objective assessment methods (VAS, dynamometry, accelerometry), and a follow-up period of at least 12 weeks to obtain high-level evidence (Class I–II).

PRACTICAL RECOMMENDATIONS

- Include Telegram bot physical therapy programmes in corporate health protection measures for office workers
- Recommend a minimum course duration of 18 days (60% of the programme) as the threshold for a pronounced clinical effect
- Use this format as a first-line intervention for non-specific back pain before prescribing pharmacological therapy



- Repeat the course after 3 months to maintain the achieved effect and prevent relapse
- Supplement the programme with workstation ergonomics recommendations to prolong the therapeutic effect

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