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Original Article

# Effectiveness of the back school program for the performance of activities of daily living in users of a basic health unit in Porto Alegre, Brazil

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**Abstract.** [Purpose] Primary care is considered the gateway to the Brazilian public health system and is responsible for managing the most prevalent problems in the population. In this study, the effects of Back School on pain, functionality, and the performance of activities of daily living (ADL) in users with chronic musculoskeletal pain were evaluated. [Subjects and Methods] Forty-four users (33 females and 11 males) participated in Back School, with five two-hour theoretical and practical meetings held once a week. The assessment instruments used were as follows: (a) a circuit evaluation of posture dynamics recorded on video, (b) an observational instrument of ADL using video, (c) anamnesis, (d) the visual analogue scale, and (e) the Oswestry Disability Index. [Results] The results showed decreased pain intensity, improved functionality, and the recovery of ADL. [Conclusion] The Back School program is an effective health education strategy for users with chronic musculoskeletal pain.
**Key words:** Health evaluation, Primary health care, Chronic pain

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## INTRODUCTION

The managers of the Brazilian public health system have implemented measures to strengthen primary health care in all regions of the country, because primary care is considered the "gateway" for Brazilian users[1, 2)]. The Primary Care Policy mandates that health services expand their activities and improve the quality of life for individuals[1)]. To achieve this goal, primary care networks should promote health, prevent disease and injury, minimize the burdens of disease, and reduce the demands on secondary and tertiary care services[1, 3)].

Back pain, and especially lower back pain, has high global prevalence, and some cases may become chronic if not treated[4)]. This type of chronic pain can lead to work absenteeism, reduced productivity, and diminished quality of life and functionality, among other consequences[5–8)]. Thus, chronic pain has become a costly public health problem with a negative impact on life, and it is important for the Brazilian public health system to include in its Primary Care Policy the means for preventing and treating chronic pain.

Back School is a program of health education that aims to reduce injury and improve the functionality and quality of life for individuals with chronic musculoskeletal pain, especially pain in the spine, through proper implementation of activities of daily living (ADL)[9–11)]. This program is compatible with the principles of the Brazilian public health system. However, there are few reports that address Back School in this system[12)], and research has predominantly focused on secondary and tertiary care services from a biomedical perspective[5–8)]. Moreover, current literature[13)] indicates that most research involving

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**Table 1.** Pretreatment demographics

| | | Percentage |
|---|---|---|
| Age categories | <50 years (n=10) | 22.7% |
| | 50–60 years (n=13) | 29.5% |
| | 60–70 years (n=17) | 38.6% |
| | >70 years (n=4) | 9.2% |
| Schooling | Basic education (n=21) | 50% |
| | Middle education (n=13) | 29.5% |
| | Higher education (n=9) | 20.5% |
| Occupation | Standing activities (n=6) | 13.6% |
| | Sitting activities (n=7) | 15.9% |
| | Household or custodial services (n=13) | 29.5% |
| | Retirees (n=10) | 22.7% |
| | Housewife (n=8) | 18.3% |

Back School methodology used evaluation questionnaires for pain intensity, quality of life, and functionality to determine the impact of the program[14]. Few reports have considered the effects of Back School on the performance of ADL.

Therefore, this study investigated the effects of Back School on the performance of ADL, pain, and related aspects, as well as functionality in users with chronic musculoskeletal pain in a basic health unit (BHU) in Porto Alegre. With this information, a Back School program, as proposed by Forssell[9], was implemented in a BHU in Porto Alegre.

## SUBJECTS AND METHODS

This study was approved by the research ethics committee of the Hospital de Clinicas de Porto Alegre (Nº. 100354) and complied with Resolution 196/96 of the National Health Council.

To set the sample size, a calculation was performed based on the estimated population mean[15]. The calculation used a confidence level of 95%, a maximum average estimated error of 5% (6.47), and a standard deviation (1.06) of the primary variable (evaluation of dynamic posture in ADL) obtained from the literature[16]. Thus, it was determined that a minimum of 41 subjects were required to fulfill the purposes of the present study. In anticipation of losses and refusals, eight groups, each with five to seven members, were defined.

The inclusion criteria were the presence of chronic musculoskeletal pain and a referral from a doctor in the BHU. The exclusion criterion was attendance at less than three Back School meetings. The sample was composed of 44 members: 33 females and 11 males. The ages ranged from 35 to 75 years, and the mean age was 57.04 ± 10.38. Most participants (38.6%) were 60–70 years old and had less education; 50% had completed basic education, and 29.5% listed household or custodial services as their occupation. Table 1 lists the characteristics of the subjects.

To evaluate dynamic posture, two instruments were used: the Layout for Assessing Dynamic Posture (LADy)[17] and the observational instrument for ADL (OI-ADL) through video[18]. The LADy was used to assess posture when the participants were lifting objects from the ground, sitting down to write, or sitting on a bench. The OI-ADL was used to assess seated posture. The evaluation used a script that required the user to move around the room while performing the ADL requested in their usual manner. The activity was recorded on a video camera (Sony DCR-DVD201 model) and subsequently recorded on CDs for analysis.

Each instrument used four to nine predefined criteria for evaluation of each ADL, with a score of 0 if the task was performed or 1 if it was not. The final score for each ADL was used for the analysis.

Pre- and posttest assessments were conducted by a researcher in a healthcare field who was familiar with the instruments, and blinded as to whether the evaluation was performed before or after testing. The evaluation results were compared with the final score for each ADL.

Anamnesis was used to collect personal data and other relevant information, including the duration of pain, the number of pain-related symptoms, and the main source of pain, which was defined in this study as the most intense and frequent pain. The anamnesis also included a body chart to assist users in correctly identifying the site of pain.

Pain intensity was measured using the visual analogue scale (VAS), which was presented as a straight, horizontal, 10-cm non-numeric line. The left end indicated “no pain,” and the right end indicated “unbearable pain.” Users were asked to score the intensity of pain within the last week.

Functionality was evaluated with the Oswestry Disability Index (ODI), a questionnaire validated for Portuguese by Vigatto et al[19]. This questionnaire consists of 10 questions designed to identify the extent to which pain interferes with the performance of certain activities, such as walking and lifting, without focusing on the psychological consequences of pain.

**Table 2.** Median and 25th and 75th percentiles of pre- and posttest ADL scores

| ADL (points) | Pretest | Posttest |
|---|---|---|
| | median (25th and 75th) | median (25th and 75th) |
| Lifting objects from the ground (0–4) | 2 (1.25–3) | 3 (2.25–4) * |
| Sitting to write (0–8) | 2.5 (1–5) | 4 (2.25–5) * |
| Sitting posture (0–4) | 3 (3–4) | 3 (3–4) |
| Sitting on a bench (0–6) | 3 (3–5) | 4 (4–6) * |
| Total score (0–22) | 12 (9–14.75) | 15 (12–17) * |

*p<0.05

**Table 3.** Mean and standard deviation, median, and 25th and 75th percentiles for pain intensity pre- and posttest

| Body region | Pretest | | Posttest | |
|---|---|---|---|---|
| | Mean ± SD | Median (25th and 75th) | Mean ± SD | Median (25th and 75th) |
| Cervical[+] (n=20) | 5.86 ± 3.01 | 5.4 (4.05–8.5) | 3.15 ± 2.42* | 3.55 (0.55–4.7) |
| Dorsal[+] (n=10) | 7.19 ± 2.56 | 7.45 (4.97–10) | 1.21 ± 1.69* | 0.25 (0–2.7) |
| Lumbar[+] (n=33) | 5.37 ± 3.05 | 5.1 (3.4–7.85) | 3.06 ± 2.67* | 2.9 (0.55–4.85) |
| Upper limbs[+] (n=14) | 6.4 ± 2.5 | 6.8 (4.42–8) | 2.81 ± 3.75* | 0.55 (0–8) |
| Lower limbs[#] (n=21) | 6.3 ± 2.93 | 7 (3.1–9.05) | 2.29 ± 2.96* | 0.55 (0–8) |

[+] parametric variables: paired t-test.
[#] nonparametric variables: Wilcoxon test.
*p<0.05

The questionnaire scores range from 0, for no pain or disability, to 100, for the worst possible pain and disability. The ODI divides disability into five categories with a score ranging from 20–100 points: minimal (1–20), moderate (21–40), severe (41–60), crippling (61–80), and bed-bound (81–100).

The evaluations were performed in a BHU in Porto Alegre. In each Back School group, the following experimental design was developed for an eight-week program: in the first week prior to starting Back School, users registered on the waiting list were called for initial assessment (pretest). Users who agreed to participate signed a consent form and were evaluated by anamnesis, ODI, and ADL filming. From the second to the seventh weeks, the Back School intervention was conducted. Finally, in the eighth week, after the conclusion of Back School, all users were reassessed (posttest) using the same tools as in the pretest.

Back School consisted of five two-hour theoretical and practical meetings held once a week in groups of five to seven members. During the first hour, the mostly theoretical aspects related to posture were presented; during each class, theoretical and experiential themes that addressed specific aspects related to posture and postural care were defined, and proper ways of performing the most common ADL were presented. During the second hour, body awareness exercises were performed, including stretching, muscle strengthening, and relaxation, as well as massage activities and self-massage[14].

Statistical software package SPSS (20.0) for Windows was used for statistical analysis. Data normality was verified with the Shapiro-Wilk test. Descriptive statistics were provided for absolute and relative frequencies, means, standard deviations, medians, and 25th and 75th percentiles; inferential statistics used the paired t-test for parametric data and the Wilcoxon test for non-parametric data. These analyses were done to compare the pre- and posttests for performance of ADL, pain intensity, and functionality. The level of significance was $p<0.05$.

## RESULTS

With respect to duration, 76.7% had pain for a year or more, and the remainder (23.3%) had pain for three months to a year, indicating that the entire sample had chronic musculoskeletal pain. Most users had two (38.6%) to three pain-related symptoms (36.4%). Lumbar region pain was reported most often (75%) by the study participants, but 90% of those users also complained of pain in another region of the body. The main pain, defined as the most frequent and intense, was also mostly located in the lumbar spine (50%), followed by the cervical spine (27.3%).

Table 2 shows the medians and 25th and 75th percentile values of the pre- and posttest ADL scores. A significant difference was observed for the performance of lifting objects from the ground, sitting down to write, and sitting on a bench. Based on a total of 22 points, the user percentile score was 54.5 on the pretest and 68.1 on the posttest, which was obtained by summing the scores of the four ADL tasks. The ADL task of sitting down to write showed the lowest scores (Table 2).

**Table 4.** Mean and standard deviation, median, and 25th and 75th percentiles for the ODI pre- and posttest

| Variable | Pretest | | Posttest | |
|---|---|---|---|---|
| | Mean ± SD | Median (25th and 75th) | Mean ± SD | Median (25th and 75th) |
| ODI[+] | 26.14 ± 11.37 | 28 (20–32) | 18.19 ± 9.95* | 18 (10–26) |

[+] parametric variables: paired t-test.
*$p<0.05$

There was also a significant decrease in the intensity of pain in the five body regions evaluated (Table 3). Furthermore, 30.6% of the sample reported no pain at the posttest.

Table 4 presents the results of the ODI at the pre- and posttest assessments. There was less functional disability reported on the ODI questionnaire, and the average disability of the group improved from moderate to minimal.

## DISCUSSION

The results of this study indicate that the Back School program was effective in teaching the proper performance of ADL tasks of lifting objects from the ground, sitting down to write, and sitting on a bench. As described in the program, Back School was only ineffective in teaching proper sitting posture. Few studies have used instruments that analyzed ADL performance to examine the impact of the Back School program, and none was conducted in individuals with chronic musculoskeletal pain, making it difficult to compare studies. Two studies used the OI-ADL through video[18] to verify the effect of Back School in a population of schoolchildren. Candotti et al.[20] used the OI-ADL through video to determine the influence of the Back School program on adolescents, and found significant differences in all ADL analyzed, including sitting posture. Ritter et al.[21] conducted a similar study with elementary school students and also found a significant difference in sitting posture. However, Back School programs in these studies provided 12 and 20 lessons, respectively, and included healthy individuals, or patients with no chronic pain.

The use of videos to assess dynamic posture is an appropriate strategy for determining whether there is improvement in the performance of ADL in an intervention that aims to achieve healthy postural habits. The use of a questionnaire for the assessment of ADL, despite being an important method due to its ability to systematically record subjective perceptions, its ease of use, and its low cost[22], may cause bias in the results because the responses are highly dependent on participant perceptions and cognitive levels. Moreover, these questionnaires are not able to verify the incorporation of theoretical knowledge by the individual and how this knowledge is transferred to movement[23], which is possible by filming the dynamic posture[24, 25].

The posture adopted in the ADL determines the amount and distribution of stress on the bone structure, muscles, tendons, ligaments, and joints, and can potentiate or ameliorate the burdens imposed on the vertebral column[26]. For example, Straker[27] stated that use of improper posture to lift an object from the ground leads to increased shear forces on the spine, and ligament stress is 50% to 75% greater than with proper posture with knees and hips flexed. Improper posture, with flexion of the trunk, tends to accentuate the harm resulting from prolonged and continuous sitting, resulting in pain, fatigue, and even degenerative processes, such as spinal disc herniation[28, 29]. Thus, the findings of this study are relevant because of the numerous negative effects caused by incorrect ADL postures.

Good postural habits are important for proper functioning of the musculoskeletal system[30], and poor postural behaviors may be a risk factor for nonspecific chronic back pain[16] and postural changes[28]. The proper use of body mechanics, simulated in the Back School classes, allows for better adjustments of the musculoskeletal system through better balance and distribution of effort required to perform ADL, and can mitigate pain and degenerative processes[31]; however, this mitigation depends on complex interactions between biomechanical and neuromuscular functions[30]. Changing habits is not easy. Postural habits are deeply embedded in the organization of movements and in the mind, and interventions that seek to change poor postural habits must create situations that allow reflection, as well as understanding of the postures and movements[32]. It is also necessary to consider the psychological and cultural implications involved in acquiring a postural habit.

For a habit to change, individuals must develop the ability to observe the sensations generated by their movements and to interpret them, which is the intent of Back School intervention. This type of methodology allows for greater user autonomy in solving problems related to posture in daily life.

Essential educational activities, such as those in this study, aim to promote proper postures through habit change. These activities are an important means of promoting health, and should be offered in the form of programs that address lifestyles and behaviors that perpetuate or worsen health problems and can be modified by individuals[32].

The findings of this study corroborate those of others that demonstrate the positive influence of Back School interventions on pain intensity[5, 7, 8]. However, these studies only assessed pain in the lumbar spine, probably because this methodology was created as a postural training method used in the treatment of lumbar pain patients[9]. However, this limitation makes it difficult to compare the results with those for other body regions[33].

Chronic low back pain is a frequent complaint, and is the second most frequently reported chronic disease in Brazil, ac-

cording to the National Household Survey[3]. In the present study, the lumbar region was the most frequently reported region of pain; however, 90% of users also had pain in other regions of the body. Thus, it is important to examine other types of pain, because the Back School methodology also proved to be effective for reducing pain in regions other than the lumbar spine.

The results also indicate that Back School was effective for improving functionality, which corroborates the findings of other literature[7, 8]. According to Morone et al.[7], participants in an educational program such as Back School can learn to manage different daily tasks without developing pain, which can reduce the severity and recurrence of new episodes.

The National Primary Care Policy in Brazil promotes program development and implementation of activities that focus on the most common health problems, as well as educational interventions for various diseases. These activities should focus on groups and behavioral risk factors, both dietary and environmental, to prevent disease and injury[1]. Thus, group programs such as Back School, which can reduce public spending for individual treatment, and are geared toward problems prevalent in the population, should be encouraged in primary care. Studies evaluating these programs are essential to verify their legitimacy in improving the health of users and to identify strategies that can be effective for chronic problems such as musculoskeletal pain.

Comparing results with a control group is important because it helps to eliminate bias in the results (i.e., the effectiveness of the program may be related to spontaneous improvement in the users), which is a limitation of the present study. Another limitation was the lack of medium- and long-term follow-up. However, we chose to conduct the study without a control group because Back School is held in a primary care setting; the staff of the unit decided that it was not appropriate to deny the service to a user who was not a subject in the study. Moreover, the entire sample was composed of users with chronic musculoskeletal pain; the majority of users (76.7%) had experienced pain for a year or more and had previously sought other treatment. Further research is required to assess the effects of Back School, both in comparison with usual care, and to assess the medium- and long-term results.

The Back School program is an effective health education strategy for pain relief. The program improved the performance of ADL and functionality in users with chronic musculoskeletal pain in a BHU in Porto Alegre. Back School was only ineffective in reeducation for proper sitting posture, and new strategies are needed for this variable.

Programs such as Back School should be developed in primary care, with a focus on solving problems prevalent in the population. Group health education using easily applicable assessment instruments is important in reducing public spending on health, and can improve the health and well-being of the population.

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## REFERENCES

1) Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Política nacional de atenção básica. Vol. 4. Brasília: Ministério da Saúde, 2006.
2) Brasil. Ministério da Saúde. Entendendo o SUS. Brasília: editora do Ministério da Saúde, 2006.
3) Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Política nacional de promoção da saúde. Brasília: Ministério da Saúde, 2006.
4) Henschke N, Maher CG, Refshauge KM, et al.: Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. BMJ, 2008, 337: a171. [Medline] [CrossRef]
5) Andrade SC, Araújo AG, Vilar MJ: Back school for patients with non-specific chronic low-back pain: benefits from the association of an exercise program with patient's education. Acta Reumatol Port, 2008, 33: 443–450. [Medline]
6) Garcia AN, Gondo FL, Costa RA, et al.: Effects of two physical therapy interventions in patients with chronic non-specific low back pain: feasibility of a randomized controlled trial. Rev Bras Fisioter, 2011, 15: 420–427. [Medline] [CrossRef]
7) Morone G, Paolucci T, Alcuri MR, et al.: Quality of life improved by multidisciplinary back school program in patients with chronic non-specific low back pain: a single blind randomized controlled trial. Eur J Phys Rehabil Med, 2011, 47: 533–541. [Medline]
8) Sahin N, Albayrak I, Durmus B, et al.: Effectiveness of back school for treatment of pain and functional disability in patients with chronic low back pain: a randomized controlled trial. J Rehabil Med, 2011, 43: 224–229. [Medline] [CrossRef]
9) Forssell MZ: The back school. Spine, 1981, 6: 104–106. [Medline] [CrossRef]
10) Hodselmans AP, Jaegers SM, Göeken LN: Short-term outcomes of a back school program for chronic low back pain. Arch Phys Med Rehabil, 2001, 82: 1099–1105. [Medline] [CrossRef]
11) Ladeira CE: Evidence based practice guidelines for management of low back pain: physical therapy implications. Rev Bras Fisioter, 2011, 15: 190–199. [Medline] [CrossRef]
12) Ferreira MS, Navega MT: Efeitos de um programa de orientação para adultos com lombalgia. Acta Ortop Bras. 2010, 18: 127–131. [CrossRef]
13) Chapman JR, Norvell DC, Hermsmeyer JT, et al.: Evaluating common outcomes for measuring treatment success for chronic low back pain. Spine, 2011, 36: S54–S68. [Medline] [CrossRef]
14) Borges RG, Vieira A, Noll M, et al.: Effects of participation in a Back School on musculoskeletal pain, quality of life and functionality of users of a Unidade Básica de Saúde from Porto Alegre- Brazil. Motriz, 2011, 17: 719–727.

15) Santos GR, Abbud EL, Abreu AJ: Determination of the size of samples: an introduction for new researchers. Rev Cient Symposium, 2007, 5: 59–65.
16) Furtado R, Jones A, Furtado RN, et al.: Validation of the Brazilian-Portuguese version of the Gesture Behavior Test for patients with non-specific chronic low back pain. Clinics (Sao Paulo), 2009, 64: 83–90. [Medline] [CrossRef]
17) Noll M, Candotti CT, Rosa BN, et al.: Vieira Adriane, Loss JF. Lay-out for Assessing Dynamic Posture (LADy): Development, Validation, and Reproducibility. Pediatr Phys Ther, 2016, DOI: 10-1097/PEP.0000000000000292.
18) Rocha A, Souza JL: Observação das atividades de vida diária através de vídeo. Rev Movimento. 1999, 11: 16–22.
19) Vigatto R, Alexandre NM, Correa Filho HR: Development of a Brazilian Portuguese version of the Oswestry Disability Index: cross-cultural adaptation, reliability, and validity. Spine, 2007, 32: 481–486. [Medline] [CrossRef]
20) Candotti CT, Macedo CH, Noll M, et al.: Escola de postura: uma metodologia adaptada aos pubescentes. Rev Mackenzie Educ Fis Esporte, 2010, 9: 91–100.
21) Ritter AL: Postura corporal ao sentar e transportar material escolar. Tese de Doutorado do Programa de Pós Graduação de Ciências do Movimento Humano da Universidade Federal do Rio Grande do Sul; 2009.
22) Schlademann S, Meyer T, Raspe H: The test-retest reliability of a questionnaire on the occurrence and severity of back pain in a German population sample. Int J Public Health, 2008, 53: 96–103. [Medline] [CrossRef]
23) Andreotti RA, Okuma SS: Validação de uma bateria de testes de atividades da vida diária para idosos fisicamente independentes. Rev Paul Educ Fis. 1999, 13: 46–66.
24) Spence SM, Jensen GM, Shepard KF: Comparison of methods of teaching children proper lifting techniques. Phys Ther, 1984, 64: 1055–1061. [Medline]
25) Noll M, Candotti CT, Vieira A: Tools for evaluation the dynamic posture: applicability to the school environment. Fisioter Mov, 2013, 26: 203–217 [CrossRef].
26) Karahan A, Bayraktar N: Determination of the usage of body mechanics in clinical settings and the occurrence of low back pain in nurses. Int J Nurs Stud, 2004, 41: 67–75. [Medline] [CrossRef]
27) Straker L: Evidence to support using squat, semi-squat and stoop techniques to lift low-lying objects. Int J Ind Ergon, 2003, 31: 149–160. [CrossRef]
28) Womersley L, May S: Sitting posture of subjects with postural backache. J Manipulative Physiol Ther, 2006, 29: 213–218. [Medline] [CrossRef]
29) Noh KH, Oh JS, Yoo WG: Comparison of lumbar repositioning error according to different lumbar angles in a flexion pattern (FP) subgroup of patients with non-specific chronic low back pain. J Phys Ther Sci, 2015, 27: 293–294. [Medline] [CrossRef]
30) Vieira A, Souza JL: Concepções de boa postura dos participantes da Escola Postural da ESEF/UFRGS. Movimento, 2002, 8: 9–20 (in Portuguese).
31) Yu JS, An DH: Differences in lumbar and pelvic angles and gluteal pressure in different sitting postures. J Phys Ther Sci, 2015, 27: 1333–1335. [Medline] [CrossRef]
32) Buss PM: Health promotion and quality of life. Cien Saude Colet, 2000, 5: 163–177. [CrossRef]
33) Lee SW, Kim SY: Effects of hip exercises for chronic low-back pain patients with lumbar instability. J Phys Ther Sci, 2015, 27: 345–348. [Medline] [CrossRef]