disorder) AND (causality OR cohort study OR cross-sectional study OR epidemiology OR epidemiologic factor* OR follow-up study OR incidence OR incidence study OR prevalence OR prevalence study OR prospective study OR risk OR risk factor* OR survey) NOT (arthritis OR fractures OR scoliosis OR rheumatic disorders).

Inclusion criteria included articles published in peer-reviewed journals, in English language, between January 2005 and March 2012 as well as their reference lists. Titles and abstracts of eligible articles were independently screened by two reviewers (LR; MJ) using the following inclusion criteria:

1. e study design had to be a cohort, case-control, or cross-sectional.
2. Study samples should be aged 6 to 18 years, withdrawn from the general population, with NSBP. Samples from speci c populations (e.g., practicing a speci c sport, obese population or others) were excluded.
3. Non-speci c thoracic, dorsal, upper back, mid-back or low back pain had to be assessed in the study. Studies that comprised only individuals with cervical and shoulder pain were excluded. Studies reporting back pain characteristics among a cohort of individuals with known pathologies (e.g. osteoporosis, fractures) or diagnosed structural deformities (e.g. scoliosis) were also excluded.
4. Studies had to report data at least one of the following parameters: prevalence, incidence, predisposing factors for back pain. Studies reporting lifetime prevalence were excluded because children easily forget the episodes of back pain and therefore it is considered unreliable [17,18].
5. e outcome of the studies should include the examination of associations between predisposing factors and the presence of back pain. Outcomes could be self-reported or clinically evaluated.

Disagreements between reviewers were resolved by consensus. When disagreement persisted, a third independent reviewer (EC) was consulted and a nal decision was made. e full text of potentially relevant papers was then assessed against the same criteria. A owchart of the selection process is shown in Figure 1.

Study quality assessment

Selected articles were evaluated for methodological quality, by two independent reviewers (LR; EC), using the Critical Review Form – Quantitative Studies [19]. Based on 15 dichotomous quality appraisal criteria (yes - 1/no - 0), there were assessed methodological bias (including, selection, measurement and confounding bias), clinical importance of the results, conclusions and implications for clinical practice.

A quantitative score was obtained by summing the total of 15 criteria. Disagreements between the reviewers on individual items were identi ed and discussed and a third reviewer (CN) was consulted if necessary.

Data extraction and analysis

Two independent reviewers (LR; CN) extracted the data using a

Figure 1: Flowchart of the s α

customized form. e extracted data consisted of: authors, study design, study population, participation rate, sample characteristics (size, age, nationality), outcomes, data collection tools, and study's results (prevalence rate, correlations values between predisposing factors and back pain; and risk estimations). Data extraction was separately conducted for incidence and prevalence rates and for predisposing factors for back pain.

To conduct the meta-analysis, studies were grouped according to time prevalence in 1-month, 3-months, 6-months and 1-year prevalence, respectively. In what regards to pain location, the prevalence was estimated on the basis of the prevalence values related to pain in the back or any pain in the spine/back.

For each period of prevalence (one, three or six months, and one year) the di erences in the duration of pain, or age intervals were not considered. When the prevalence was presented by gender or age, a global weighting prevalence was computed. Since episodes of back pain are easily forgotten by the children [17,18], statistical analyses of the association between back pain and risk factors were limited to 1 month prevalence of pain.

Statistical analysis

Extracted data was analysed for prevalence, incidence and predisposing factors, grouped by di erent time periods (1-month, 3 and 6 month and 1-year). When possible, study results were pooled in statistical meta-analysis using the Comprehensive Meta Analysis so ware 2.0 [20]. Heterogeneity was assessed through the Q statistics and the I2 index, with the I2 representing the percentage of degree of variation among studies (0 means that heterogeneity was absent, and larger I2 indicates a higher probability of heterogeneity).

Fixed e ects models were used to compute mean prevalence rates and 95% con dence intervals (95%CI). When heterogeneity was present random e ects models were used. Publication biases were tested by the Funnel Plot and Begg's and Egger's tests.

When Meta-Analysis was not possible, because of the absence of information or due to heterogeneity between studies, a narrative synthesis of the ndings was carried out.

Results

sectional surveys and 6 (7%) were prospective cohort studies. e major limitations in the quality of the studies were related to response rates below 80%, inadequate sample size justi cation, lack of information regarding informed consent or concerning with reliability and validity of the outcome measures used, poor description of the clinical implications of the results and misreport of the study's limitations. Strengths of the studies were related to appropriate report of the study design, statistical signi cance of the results and implications for clinical practice.

1-month back pain prevalence: Twenty-two studies reported 1-month prevalence. Assuming a xed-e ects model the NSBP prevalence estimated was 16, 07% (95%CI: 15, 81%; 16, 33%; p<0,001). Using a random-e ects model the prevalence estimated was 24, 33% (95%CI: 18, 22%; 31, 7%; p<0,001). Homogeneity was not satis ed (Q=5796, 038; p<0,001; I2 = 99, 67%). Forest Plot (with Random E ect model) is shown in Figure 2. Begg's and Egger's tests failed to identify publication bias (Begg's test, p=0, 67; Egger's test, p=0,1). To measure the stability of the results, sensitivity analysis was used and the stability con rmed (Figure 2).

3-month, 6-month and 1-year back pain prevalence: From the 35 studies selected, 4 studies reported a 3-month prevalence, 7 a 6-month prevalence, and 4, one-year prevalence. NSBP prevalence for each period was estimated by a xed– e ects model with the following results: 3-months: 33, 74% (95%CI: 32, 18%; 35, 33%; p<0,001); 6 months: 42, 32 (95%CI: 41, 78%; 42, 86%; p<0,001); 1-year: 21,93% (95%CI: 21, 24%; 22, 64%; p<0,001) and with a random-e ects model (3-months: 37,97% (95%CI: 27,81%; 49,31%; p<0,001); 6 months: 38, 55 (95%CI: 27, 14%; 51, 37%; p<0,001); 1-year: 25, 76% (95%CI: 16, 67%; 37, 56%; p<0,001). Based on Q statistics and I2, homogeneity cannot be assumed (3-months: Q=104, 2425; p<0,001; I2 = 97, 12%; 6- months: Q=3090, 801; p<0, 001; I2 = 99, 8%; 1 year: Q=435, 7774; p<0, 001; I2 = 99, 31). Stability problems were identi ed in all the analysed periods and they have remained with the removal of any of the included studies. Based on these results it has been decided to carry out a narrative synthesis of the prevalence estimates rather than the meta-analysis.

Narrative synthesis

In the 3-months period, the NSBP prevalence ranged from 17, 4% [51] to 51, 3% [49]. In the past 6 month the NSBP prevalence ranged from 15, 6% [34] to 61, 1% [44] and in the last year NSBP prevalence ranged from 17, 4% [34] to 54, 1% [31]. Table 2 shows the 3, 6 months and 1-year prevalence for NSBP according to the self-report period of back pain of NSBP assessed in each study and age.

Back pain incidence

Of the 35 studies analyzed only two studies reported incidence [15, 29]. Grimmer et al. followed a sample of 434 children during a period of 5 years (1999-2003), and found a percentage of new cases of 7,2% for

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Finally, this review's findings founded that several different mechanic factors have showed statistically significant associations with NSBP, namely the school bag carrying time [21], carrying the bag on one shoulder [40], twisting the back for more than 10 min during the lesson/class [8] and the position and time spent watching television, or doing the homework [34]. However, these findings were based on one or two studies and no definitive conclusion can be draw.

In summary, the findings of this review emphasize a lack of evidence to support or refute the association between back pain and the different predisposing factors reported in the literature.

Citation: