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LOW BACK PAIN—CORRESPONDENCE BETWEEN QUESTIONNAIRE, INTERVIEW AND CLINICAL EXAMINATION

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ABSTRACT. The aim of this study was to analyse the correspondence between answers to a questionnaire about trouble from the musculoskeletal system, answers in a personal interview and clinical findings indicating low back disorder. The questionnaire was answered by 1773 construction workers. Out of those, 206 workers underwent interview and clinical examination. Among those who reported no lifetime LBT in the questionnaire 63% gave the same report in the personal interview and those were all assessed negative at a blind clinical examination. Of those reporting current LBT in the interview 80% (47/59) were clinically positive. The clinical criteria used in the examination seemed to indicate lumbar painful structures. Answers to a question about functional impairment were in confirmity with clinical findings. As regards answers to a question about frequency of pain and a question, in the specific Nordic questionnaire for the low back, concerning inability to do normal work the correlation to clinical findings was less apparent. Reported inability to do normal work in the questionnaire corresponded only to 43% with reported sick-leave in the interview.

Key words: clinical classification, epidemiology, low back trouble, musculoskeletal disorders, reliability, sensitivity, specificity, validity.

The general Nordic questionnaire for the surveying of musculoskeletal symptoms has had widespread use in research and in routine occupational health care. More than 50000 persons have responded to the questionnaires (5). Studies of reliability, by re-testing, have shown that non-identical answers varied from 0 to 23%. A validity test of the questionnaire against clinical history showed a lack of correspondence between 0 and 20% (5). The specific Nordic questionnaire for neck and shoulder has also been tested for reliability and validity (4). The specific Nordic questionnaire for low back includes the same questions as the neck/shoulder questionnaire, apart from one. It has however not been separately tested for reliability and validity.

The questionnaires are meant to survey musculoskeletal symptoms (pain/ache/discomfort) and to be an epidemiological instrument. They are not meant to be a basis for clinical diagnosis. Concerning spinal disorders, clinicians mostly deal with symptom diagnosis, like lumbago, sciatica and insufficientia dorsi (7). It is reasonable to assume that low back pain and discomfort is caused, at least to some extent, by sensitive lumbar structures and mechanical dysfunction. This fact may explain why pain and discomfort often can be provoked at clinical examination.

Also from a clinical viewpoint it would be valuable to find out if some special combinations of answers in a questionnaire, indicate low back disorder better than others.

The specific Nordic questionnaire for the low back includes questions concerning duration and consequences of low back trouble (LBT), i.e. number of days of pain during the past year and number of days of inability to do normal work. In the study by Kemmlert & Kilbom (4) the question about days of pain, in the specific Nordic questionnaire for neck and shoulder, showed "low sensitivity" at a re-test. The subjects in that study considered especially that later question difficult to reply. Probably questions based on a five point scale ranging from "never" to "very often" could be easier to answer.

The purpose of this study was to analyse the correspondence between answers to a questionnaire, answers to a personal interview and clinical findings indicating low back disorder.

MATERIAL AND METHODS

Questionnaire

A questionnaire about trouble from the musculoskeletal system was mailed to the randomly selected construction work-

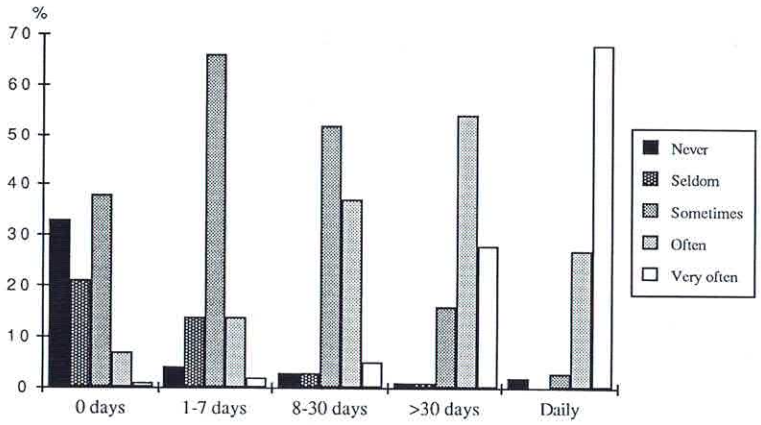

Fig. 1. Comparison between answers to questions concerning frequency of low back trouble during the past year; one question categorized from "0 day" to "daily" and the other from "never" to "very often". Gamma statistic $G=0.76$ ($p<0.001$), $N=1\,289$.

ers. The definition of 12 months' prevalence of trouble was the same as in the *general* Nordic questionnaire but instead of using dichotomised alternatives for the answers a five point scale ranging from "never" to "very often" was used. A question concerning degree of functional impairment (8) was added. "Slight" meant ability to do most things in spite of pain. "Moderate" meant ability to carry out activities at work and during leisure time in spite of pain. "Severe" meant necessity to take pauses because of pain and "very severe" meant periods of sick-leave. One part of the questionnaire consisted of the *specific* Nordic questionnaire for low back with questions concerning number of days of pain in the past year and consequences of the LBT at work and in leisure time.

Participants

The questionnaire, with the specific Nordic questionnaire for low back included, was sent to a randomly selected sample of active construction workers from the Swedish trade union for construction workers, and 75% (1772 men and one woman) answered. Out of those, 140 workers were randomly selected for interview and clinical examination from those reporting LBT more than 30 days during the past year in the questionnaire. Another 70 workers were randomly selected from those reporting no lifetime LBT. Four workers were excluded because they did not fulfil the criterion "active construction worker". Therefore data on 206 participants were analysed. The mean age of the group was 44 years (SD ±11).

Clinical examination

The clinical examination was performed by an experienced physiotherapist, not informed about the participants' answers to the questionnaire. No case history was taken during the examination.

Presence of pain during active spinal mobility tests in standing positions was noted. Results of the straight leg raising test (1, 3) were here regarded as positive if pain in the leg or the back was elicited below 70° of hip flexion with a straight knee and if radicular pain was provoked at any degree. Discomfort due to muscle tenseness was not regarded as a positive result. If sensory disturbances in the legs were found, examination of muscle strength and reflexes were added. The springing test (6), interspinal and paraspinal palpation (3), the combined lumbar extension and lateral flexion in standing and passive lumbar flexion and extension in sidewise lying position (6) were performed with the aim of provoking pain from structures in the low back. Examination of the thoracic spine, hip joints and iliosacral joints was carried out to exclude painful conditions from these joints. The criteria for classifying a person as "positive" or "negative" for LBT were based on clinical findings, indicating low back disorder. The criteria were formulated in a pilot study (2), designed like this study, where the combinations of clinical findings giving the best correspondence to current LBT were recorded. The criteria were as follows: Pain must be provoked in the lower back and/or in one or both legs by the active spinal mobility test and/or the springing test in the lumbar spine, and by one or more of the other pain-provoking tests.

Interview

Immediately after the clinical examination the participants were interviewed by a nurse, using a standardised, structured interview about LBT; localization, intensity, duration, periods of sick-leave and consequences at work and in leisure time. Interview and clinical examination were performed at an average interval of 1.5 months (range 1–3 months) after answering the questionnaire.

Statistical method

The gamma statistic G was used to measure relation between different scales. The gamma statistic G is equal to 1 if the frequencies in the contingency table are concentrated on the diagonal from the upper left to the lower right of the contingency table (10).

RESULTS

Comparison between questions concerning frequency and intensity of LBT expressed by different scales

Answers to the question in the specific Nordic questionnaire for the low back concerning periods of days of pain in the past year corresponded well to answers

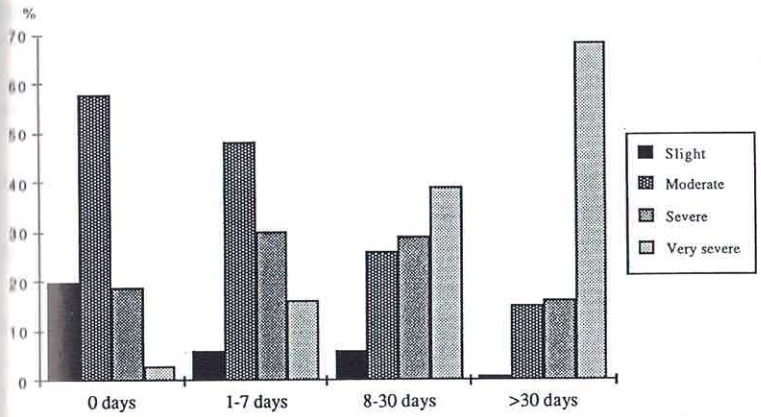

Fig. 2. Comparison between answers to a question concerning inability to do normal work, categorized from "0 day" to "> 30 days" and a question concerning functional impairment due to low back trouble, categorized from "slight" to "very severe". Gamma statistic $G=0.64$ ($p<0.001$). $N=966$.

given to a question concerning frequency of LBT expressed on a five point scale ranging from "never" to "very often" with a correlation coefficient $G=0.76$ ($p\leq 0.001$) (Fig. 1). Answers to the question in the specific Nordic questionnaire for the low back concerning inability to do normal work corresponded fairly well to a question concerning functional impairment with $G=0.64$ ($p<0.001$) (Fig. 2).

Correspondence between questionnaire and interview

Answers to the question in the questionnaire about lifetime LBT were compared to answers given in the interview (Table I): 87% (178/204, $N=206$) of the answers were identical. Three subjects with no reported lifetime LBT in the questionnaire reported current LBT in the interview. Only 64% of those who reported no lifetime LBT in the questionnaire gave the same answer in the interview. The answers to the question "What is the total length of time that low back trouble has prevented you from doing your normal work (at home or away from home) during the last 12 months?", were compared to an interview question about sick-leave during the past year (Table II). Due to the hierarchical construction of the questionnaire only 136 were meant to answer that question. Of those answers 69% (84/122, $N=136$, missing=14) corresponded. More than 8 days inability were reported by 33 participants in the questionnaire, but only 19 reported sick-leave during the past year.

The influence of the time interval (1–3 months) between the questionnaire and the interview with clinical examination was studied. In connection with the interview 127 workers answered the specific Nordic questionnaire for low back a second time; 74 within 1–2 months after the mailed questionnaire and 53 within 2–3 months. The frequency of identical answers to the question concerning periods of pain during the past year was about the same in both groups (60% and 66% respectively).

Comparison between LBT reported in a questionnaire, in an interview and clinical findings

Reported no lifetime LBT in the questionnaire was maintained by 63% in the interview and those were all negative at clinical examination, when using the criteria for classifying LBT. Daily LBT was reported by 51 workers in the questionnaire but only 45% (23/51) had current LBT in the interview and of those 21 were classified as positive at the clinical examination. Of those 2 classified as negative; one had only thoracic symptoms and the other one had no clinical

Table I. *Lifetime prevalence of LBT; correspondence between answers to a questionnaire and an interview at an interval of 1–3 months*

$N=206$. 1. Missing =2. Identical answers =87%. Three subjects, with reported no lifetime LBT in the questionnaire, reported current LBT in the interview

	Questionnaire		
Interview	No lifetime LBT	Lifetime LBT	Total
No lifetime LBT	44	1	45
Lifetime LBT	25 (22+3)	134	159
Total	69	135	204

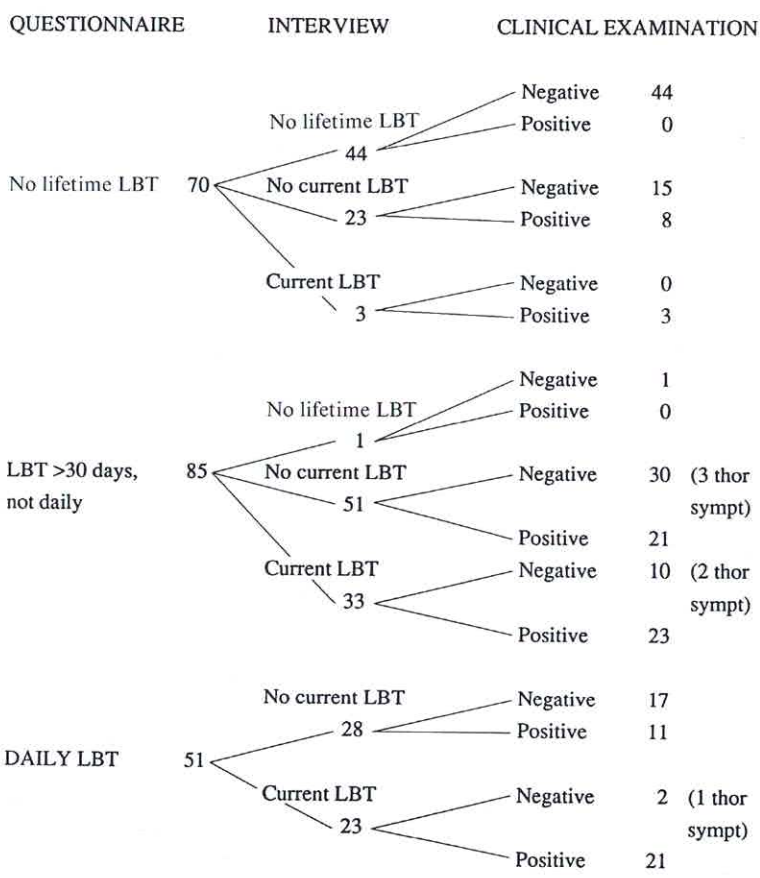

Fig. 3. Flow diagram over low back trouble reported in a questionnaire, and in an interview, and clinical findings at an interval of 1–3 months between questionnaire and interview + clinical examination. $N=206$.

findings. A flow diagram showing the correspondence between answers to the questionnaire, answers in the interview and clinical findings is shown in Fig. 3.

There was a correspondence of 75% (154/206) between reported LBT in the interview and the clinical classification, used in this study (Table III). Of those reporting "current" LBT in the interview 80% (47/59) were classified as clinically positive and of those reporting "no current" pain 39% (40/102) were clinically positive. None of those reporting "no lifetime LBT" was clinically positive.

The question about degree of functional impairment due to pain predicted clinical findings fairly well, irrespective of current symptoms at the clinical examination, for those with LBT on more than 30 days during the past year (Fig. 4). The prediction was not so good for the question about "inability to do normal work" (Fig. 5).

In the interview 35 workers reported lumbago/sciatica. In the questionnaire 6 of them reported trouble only from the low back which includes the gluteal regions. Twenty-one workers reported low back and hip trouble or low back, hip and knee trouble or low back, hip, knee and foot trouble in a way which could be interpreted as radiating pain or trouble from all

Table II. *Reported inability to do normal work and sick-leave due to LBT during the past year; comparison of answers to a questionnaire and an interview at an interval of 1–3 months*

$N=136$. Missing $=14$. Correspondence $=69\%$

	Questionnaire				
Interview	0 day	1–7 days	8–30 days	>30 days	Total
No	61	17	6	8	92
Yes	7[a]	4	7	12	30
Total	68	21	13	20	122

[a] Three subjects were on sick-leave at the interview.

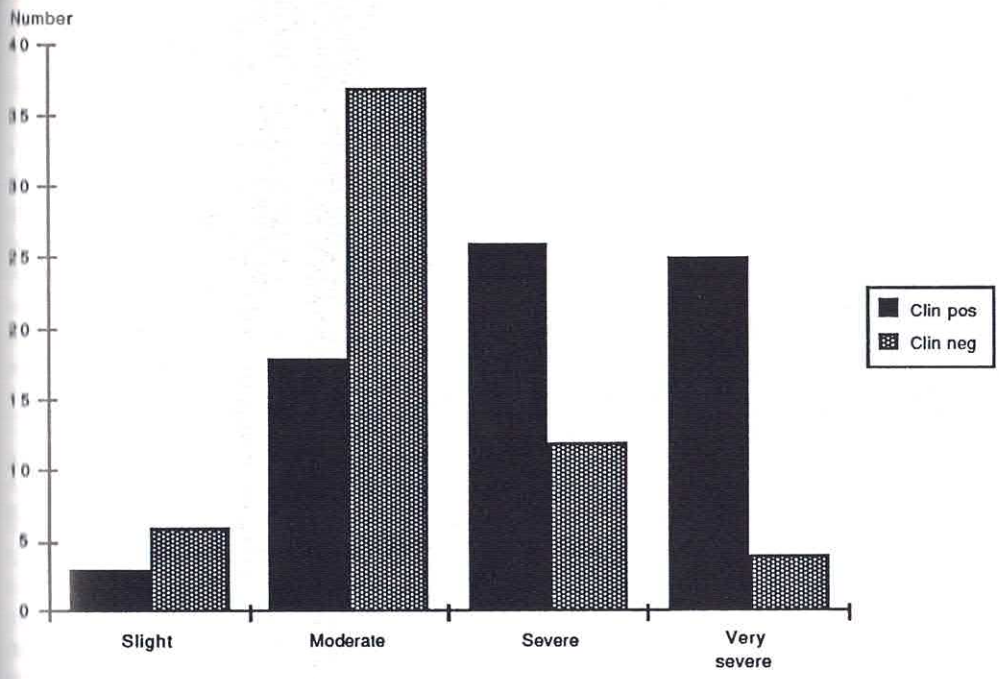

Fig. 4. Comparison between answers to a question about degree of functional impairment and clinical classification, irrespective of current symptoms, for persons reporting LBT >30 days or daily in the past year in the questionnaire. $N=136$. Missing $=6$.

these regions. The other 8 reported trouble from the low back and extremities not indicating radiating pain.

DISCUSSION

Answers to questions categorized from "never" to "very often" and from "slight" to "very severe" corresponded well to questions categorized in number of days with LBT and number of days with inability to do normal work. It should be observed, however, that nearly half of those reporting "severe" functional impairment reported "0 day" inability to do normal work. In epidemiological studies dealing with periods of at least one year it is maybe enough to categorize from "never" to "very often" and from low to high degree.

Even if there was a totally good rate of correspondence of 87% between the questionnaire and the interview concerning lifetime prevalence of LBT, there is a point to be noted. The rate of identical answers to the alternative "no lifetime LBT" was only 63%.

A rather poor rate of correspondence between the question concerning inability to do normal work due to LBT and the interview question about periods of sick-leave was to be expected. The question "What is the total length of time, that low back trouble has prevented you from doing normal work (at home or away from home) during the last 12 months?" may be interpreted as equivalent to sick-leave or may be understood as days you have adjusted the work to your condition. Less than half of those reporting inability

Table III. *Comparison between LBT, reported in an interview and clinical classification*

$N=206$. Correspondence $=75\%$ (154/206)

	Reported LBT			
Clinical classification	Current LBT	No LBT	No lifetime LBT	Total
Positive	47	40	0	87
Negative or uncertain	12[a]	62	45	119
Total	59	102	45	206

[a] Including 3 subjects with only thoracic clinical findings.

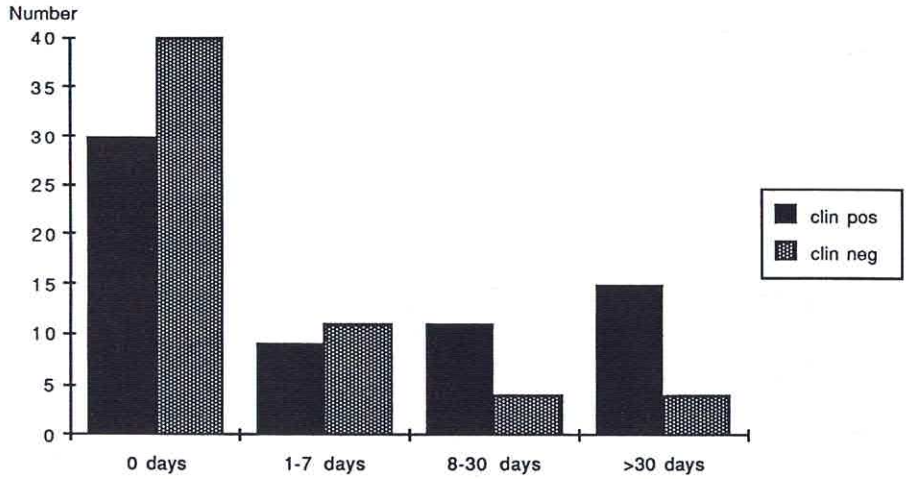

Fig. 5. Comparison between answers to a question about inability to do normal work and clinical classification, irrespective of current symptoms for persons reporting LBT >30 days or daily in the past year. $N=136$. Missing $=12$.

to do work in the questionnaire reported sick-leave in the interview. Obviously this question in the specific Nordic questionnaire for the low back is interpreted in different ways and can hardly be interpreted as sick-leave.

The difference in time between the questionnaire and the interview with examination did not seem to influence the reported 12 months' prevalence of LBT among the 127 subjects studied separately with a re-test of the questionnaire.

In this study 80% of those reporting current LBT had clinical findings indicating low back disorder. Waddell states that tenderness, related to physical disease, is usually localized to a particular skeletal or neuromuscular structure (12). Vällfors (11) found objective clinical findings in 30% of chronic back patients and in 60% of acute back patients. The subjects in the present study had nothing to gain from reporting sickness or pain. The patients in Vällfors' study were selected from those who had reported themselves sick at the regional Social Insurance Office. The clinical tests selected for indicating low back disorder were expected to reveal a painful lumbar structure and they did so to a greater extent than any separate test. They were sensitive enough because even 40% of subjects reporting LBT "more than 30 days" or "daily" in the questionnaire but without current LBT at the examination were classified as positive. The pain provoked by the examination may be due to sensitive tissue, which reacts to the provoking tests. Despite the careful examination and well-founded criteria 20% (12/59) of those reporting current LBT were classified as negative. Three of them had only thoracic clinical findings. One was without any clinical findings. The other 8 had positive clinical findings but did not fulfil the criteria. They may express the shortcomings of a clinical examiner in differentiating between pain, discomfort and tenseness. The 45 persons with no reported life-time LBT in the interview were all classified as negative and represented those with healthy lumbar structure. It is reasonable to expect to find painful lumbar structure in those reporting LBT in a questionnaire. Kemmlert & Kilbom (4) did not find any correspondence between neck- and shoulder trouble reported in a questionnaire and objective clinical findings. This may be explained by a very brief examination based only on posture deviation and restricted mobility. In this study those reporting LBT more than 30 days or daily and those without LBT were selected and that may have influenced the better correspondence to clinical findings.

Riihimäki (9) found a higher cumulative incidence rate of sciatic pain but not lumbago or non-specific low back pain among reinforcement workers compared to painters. It seems to be interesting to analyse sciatic pain separately in epidemiological studies. In this study the answers to the questionnaire for those reporting sciatic pain in the interview did not clearly indicate radiating pain. That was not expected because the definition of localisation of pain in the questionnaire was based on anatomical regions fol-

lowing the different joints. Neither the general Nordic questionnaire nor the specific Nordic low back questionnaire are suitable for surveying radiating pain.

In addition to being an epidemiological instrument a questionnaire can be used to discover those where clinical findings can be expected. Answers to the question about functional impairment seemed to be a better predictor for clinical findings than those concerning inability to do normal work. At least the construction workers studied seemed to have clinical findings without reporting inability to do normal work.

Conclusions

Answers to questions categorized from "never" to "very often", from "slight" to "very severe" corresponded well to answers to questions categorized in specified numbers of days. The question, in the specific Nordic questionnaire for the low back, about inability to do normal work can hardly be interpreted as referring to sick-leave. The proposed combination of clinical criteria was present in 80% of those with current LBT. Those 45 persisting in "no lifetime LBT" were all without clinical findings. The combination of answers to questions about localisation of pain, frequency of pain and functional impairment in a questionnaire offers criteria indicating lumbar painful structures and/or low tolerance to mechanical stress.

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