

EVALUATION OF THE USEFULNESS OF 2 PREDICTION MODELS OF CLINICAL PREDICTION MODELS IN PHYSICAL THERAPY: A QUALITATIVE PROCESS EVALUATION

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ABSTRACT

Objective: The purposes of this study were to (1) evaluate the usefulness of 2 prediction models by assessing the actual use and advantages/disadvantages of application in daily clinical practice and (2) propose recommendations to enhance their implementation.

Methods: Physical therapists working in 283 practices in the area of Breda (the Netherlands) were invited to participate in this study. Two prediction models were presented: (1) to predict persistent shoulder pain and (2) to predict the preferable treatment in nonspecific neck pain. Participants were asked to apply both models in practice. After 2 months, their opinions about the usefulness of both models were gathered during a focus group meeting or by using an online questionnaire in order to identify the most important advantages/disadvantages of each prediction model.

Results: In total, 46 physical therapists (13.8%) of 39 practices participated. Evaluative data were available from 32 participants who used the shoulder model 102 times and the neck model 126 times. For the shoulder model, the most frequent advantage (mentioned 14 times) was that it enabled physical therapists to estimate a motivated prognosis, that is, a prognosis based on the score of the model. The most frequent mentioned disadvantage was that participants expressed their doubts about the validity of the model because the model initially was developed for usage in a general practice setting. For the neck model, the most frequently mentioned advantage (29 times) was that the model was easy to interpret. The most important disadvantage (mentioned 14 times) was that the model only takes a few treatment options into account.

Conclusions: The physical therapists participating in this study reported that both models evaluated in this study were not easy to use in daily practice. Based on the findings of this study, we recommend that these models are modified to meet the practical needs of the therapist, before assessing their impact on daily clinical care and patient outcomes. (*J Manipulative Physiol Ther* 2014;37:334-341)

Key Indexing Terms: *Prognosis; Musculoskeletal Diseases; Physical Therapy Specialty*

Clinical prediction models are decision making tools for clinicians in which several patient characteristics or test results from physical examination are used to pass a judgment about prognosis, diagnosis, or treatment selection.^{1,2} These models can help clinicians to increase the

efficiency and effectiveness of health care. There are different types of prediction models varying from purely mathematical models to algorithms, Web-based calculators, and score charts. Especially score charts are known to facilitate the use of prediction models by health care providers in daily practice.

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Duration of complaints			Total score	Risk
<6 weeks	0	...	≤1	10% - 20%
6-12 weeks	9	...	2 - 16	20% - 30%
>3 months	17	...	17 - 28	30% - 40%
Gradual onset	10	...	29 - 39	40% - 50%
Concomitant low back pain	13	...	40 - 49	50% - 60%
Shoulder pain (0-10)	score × 2	...	50 - 61	60% - 70%
Shoulder pain score at physical examination (0-18)	score	...	≥62	70% - 100%
		— +		
Total score		...		

Fig 1. Prediction model to predict the chance of persistent symptoms at 6 months in patients with shoulder pain.¹² Scores were given based on the patients' answers to the following questions: What is the duration of shoulder pain? Was it a gradual onset (yes/no)? Do you have low back pain (yes/no)? Please score your pain on a scale from 0 to 10. Please score shoulder pain from 0 to 4 during active rotation (hand to neck and hand to low back), passive exorotation, active and passive abduction, and Neers sign (sum 0-18).

Prediction models are developed by the use of multivariable regression analyses in prospective cohorts.^{1,2} After a prediction model is derived, it needs further evaluation before it can be applied in clinical practice. This evaluation consists of internal and external validation because initial development of a prediction model often leads to overrating the predictors that are part of the model. In other words, most derived prediction models are overoptimistic (internal validity) and usually perform worse when tested under different circumstances (external validity).³ Therefore, most experts in the field of prognostic research underline the importance of validation of prediction models and performing impact studies before applying those in practice.^{4,5}

However, it seems that this concept of experts on prognostic research is somehow in conflict with indications from implementation research. These indications show that changing clinicians' behavior, which is essential in successful implementation of health care innovations, depends on the extent to which the clinicians are involved in the development process of the innovation of interest.⁶⁻¹⁰ Successful implementation can be increased by giving clinicians room and time to share their thoughts and concerns about the innovation together with creating awareness about the need for the requested change and an explanation of its importance.⁶⁻¹⁰

From this point of view, incorporating clinicians into the development process could stimulate the implementation of prediction models. Therefore, we developed a study that would allow clinicians to use and evaluate 2 recently developed prediction models in daily practice. The aim of this study was to evaluate the usefulness of 2 prediction models in daily clinical practice. This study aimed to evaluate how frequently the models were used, whether the models were easy to use, whether the physiotherapists experienced difficulties in using these models, and whether the physiotherapist thought the models had an impact on their care for the patients. The purpose of this study is to

propose recommendations to enhance future use of prediction models. In case the models appear to be easy to use in clinical practice, this study would enable us to start impact studies (randomized clinical trials) to evaluate the impact of using prediction models on clinical care and patient outcome.

METHODS

Study Design

This study evaluated the use and perceptions of prediction models using quantitative and qualitative evaluation methods. We included physiotherapists as participants, and those physiotherapists were also asked to participate in the process evaluation discussion.

Participants

Avans University of Applied Sciences (Breda, the Netherlands) maintains a database of 283 primary care practices that provide traineeships for physical therapy students. All physical therapists working in these practices were invited to take part in this study by e-mail or postal letter. No further inclusion or exclusion criteria were formulated. They received information about the content and purposes of the study and were invited to attend the first meeting. Physical therapists, who were interested to participate, were asked to fill out an online registration form, including demographic information of the participants and some questions about the participants' knowledge of and experience with prediction models. Recruitment took place from January 2010 until March 2010. The study was approved by the ethics review board of the Saint Elisabeth Hospital in Tilburg, the Netherlands. All study participants gave written informed consent.

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