

The Utrecht questionnaire (U-CEP) measuring knowledge on clinical epidemiology proved to be valid

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Abstract

Objectives: Knowledge on clinical epidemiology is crucial to practice evidence-based medicine. We describe the development and validation of the Utrecht questionnaire on knowledge on Clinical epidemiology for Evidence-based Practice (U-CEP); an assessment tool to be used in the training of clinicians.

Study Design and Setting: The U-CEP was developed in two formats: two sets of 25 questions and a combined set of 50. The validation was performed among postgraduate general practice (GP) trainees, hospital trainees, GP supervisors, and experts. Internal consistency, internal reliability (item-total correlation), item discrimination index, item difficulty, content validity, construct validity, responsiveness, test–retest reliability, and feasibility were assessed. The questionnaire was externally validated.

Results: Internal consistency was good with a Cronbach alpha of 0.8. The median item-total correlation and mean item discrimination index were satisfactory. Both sets were perceived as relevant to clinical practice. Construct validity was good. Both sets were responsive but failed on test–retest reliability. One set took 24 minutes and the other 33 minutes to complete, on average. External GP trainees had comparable results.

Conclusion: The U-CEP is a valid questionnaire to assess knowledge on clinical epidemiology, which is a prerequisite for practicing evidence-based medicine in daily clinical practice. © 2016 Elsevier Inc. All rights reserved.

Keywords: Validation; Evidence-based medicine; Knowledge; Questionnaire; Clinical epidemiology; Assessment

1. Introduction

Knowledge of clinical epidemiology is crucial to be able to practice evidence-based medicine (EBM) in daily clinical practice [1]. Practicing EBM implies the ability to combine the best available evidence with the clinician's expertise and the patient's preferences [2]. Clinical epidemiology focuses on four important challenges clinicians are faced with. First, how to accurately diagnose a patient's illness (diagnosis, D), second to determine what causes the disease (etiology, E), third how to predict the natural history of the disease in an individual patient (prognosis, P), and fourth to estimate effect of interventions on a patient's prognosis (therapy, Th). In routine clinical practice, these

four domains are incorporated in medical decision making, following the so-called DEPTH model [1]. Clinical epidemiology provides the framework and knowledge and skills for practitioners to critically appraise research evidence and translate outcomes of research into use in daily clinical practice. Given its importance for adequate evidence-based practicing in the future, monitoring theoretical knowledge on clinical epidemiology is important in the training of clinicians.

Testing knowledge needed to practice EBM is essential in clinicians [3] and should focus on those aspects useful in clinical practice. The second Sicily Statement pointed out that for a useful evaluation of EBM training it should be clear which aspect(s) such an assessment instrument intends to measure [4]. A number of questionnaires developed for testing knowledge needed to practice EBM exist already [5–7], but in our view, these do not prioritize clinical relevance, are time consuming to score, or assess therapeutic issues only. Importantly, developers of those questionnaires often provide only minimal data on validation [5–7].

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What is new?

Key findings

- The Utrecht questionnaire on knowledge on Clinical epidemiology for Evidence-based Practice (U-CEP) is a questionnaire that assesses knowledge on clinical epidemiology covering three different aspects of evidence-based medicine (EBM; ask, appraise, and apply) and different aspects relevant to daily clinical practice (diagnosis, etiology, prognosis, therapy [DEPTh]).
- The U-CEP was shown to be valid among different clinicians, such as general practice trainees, hospital trainees, and general practice supervisors.
- The U-CEP is responsive to change and is therefore valid to monitor change in knowledge of clinicians on clinical epidemiology after EBM training.
- The U-CEP performs moderately on the test–retest reliability.

What this adds to what was known?

- The U-CEP is the *first* questionnaire assessing knowledge on clinical epidemiology on all four clinically important challenges clinicians are faced with in daily clinical practice (DEPTh), addressing different aspects of EBM.

What is the implication and what should change now?

- Clinical epidemiology provides the framework, knowledge, and skills for practitioners to critically appraise research evidence and translate outcomes of research into use in daily clinical practice. Clinical epidemiology focuses on the four key questions in clinical practice (diagnosis, etiology, prognosis, and therapy; DEPTh). Given its importance for adequate evidence-based practicing in the future, monitoring theoretical knowledge on *all* aspects of clinical epidemiology is important in the training of clinicians.

We previously developed an EBM training program for the vocational training of general practitioners. Focus of the program is the decision process in primary care, and we aim to integrate the training as much as possible into daily clinical practice [8]. The EBM training is strongly based on dilemmas derived from clinical practice and focuses on relevant outcomes for patients. It covers all clinical domains because many clinical queries pertain not only to therapeutic but also to diagnostic or prognostic topics as well [8].

We report on the development and validation of the Utrecht questionnaire on knowledge on Clinical epidemiology for Evidence-based Practice (U-CEP), a questionnaire suitable for the evaluation of EBM training, with a focus on those aspects relevant to clinical practice.

2. Methods

2.1. Development of the U-CEP

We postulated that an optimal questionnaire should address the content of EBM training, cover as many different aspects of EBM (ask, acquire, appraise, apply, and assess) as possible, contain questions on clinically relevant aspects with an equal distribution across the different types of clinically relevant research (DEPTh), and test the minimal required methodological knowledge to be able to translate research results to clinical practice. At first, we used our experiences as teachers of EBM to include questions on difficulties clinicians frequently encounter in the interpretation of research findings and their use in daily clinical practice. We devised an initial set of 95 items based on the most relevant themes in clinical epidemiology [1]. Experts in the development of summative assessment helped to devise instructions, response options (e.g., not including the do not know option), and rules for scoring [9]. We exchanged opinions about the first drafts between four experienced teachers in EBM (M.E.L.B., G.v.d.H., M.F.K., and N.J.d.W.) and adapted elements of the questionnaire accordingly. Finally, the list of 95 items was judged and adapted by two senior clinical epidemiologists (A.W.H. and D.E.G.). Although there seems to be no agreement on the optimum length of a questionnaire, we aimed to develop a questionnaire that was both as long as needed and as short as possible. We reduced the number of items in the questionnaire on the basis of an item analysis using the scores of respondents. For this, we used the data from those who had followed EBM training or were expert on EBM (Table 1).

2.2. Validation

2.2.1. Population and setting

The validation was performed among 219 postgraduate general practice (GP) trainees (180 first-year and 39 last [i.e., third]-year), 20 hospital trainees, 20 GP supervisors, and 8 expert academic GPs or clinical epidemiologists from the University Medical Center Utrecht (UMCU). Characteristics of participants, such as age, gender, time since graduation, PhD degree, and self-perceived knowledge on EBM, were collected through an online survey. The EBM training that the first-year GP trainees and hospital trainees received was a 2-day course in which essential skills, such as searching for evidence, critical appraisal of the literature for different research designs, and basic analytic skills were taught in accordance with the five steps of EBM training

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