Building an infrastructure to improve cardiac rehabilitation: from guidelines to audit and feedback
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REVISION OF THE DUTCH CLINICAL ALGORITHM FOR ASSESSING PATIENT NEEDS IN CARDIAC REHABILITATION BASED ON IDENTIFIED IMPLEMENTATION PROBLEMS

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Background: Despite all available evidence of its effectiveness, cardiac rehabilitation and secondary prevention (CRSP) is still insufficiently implemented in current clinical practice. Based on an analysis of implementation problems, recently the Dutch clinical algorithm for the assessment of patient’s CRSP needs was revised. The purpose of this paper is to describe the revision process and its results to improve CRSP guideline implementation.

Methods: The NICE Guidelines manual for conducting guideline revisions was followed. Information on the use of the algorithm in practice was collected from electronic medical records and by conducting semi-structured interviews. Next, an expert advisory group identified the problems for use in daily practice and defined the scope for the revision. A multidisciplinary guideline development group subsequently wrote the revised algorithm.

Results: A large variation in assessed patient needs was observed between CRSP clinics. Assessment based on clinical judgment was found to be a source of practice variation and is therefore avoided in the revised algorithm. It was decided to add assessment instruments for anxiety and depression, cardiovascular risk factors, stress, attitude of partner, and lifestyle parameters.

Conclusion: The Dutch clinical algorithm for assessing patient needs for CRSP was revised using a combination of patient data from routine practice, knowledge from academic experts, and experience from field experts. The revised algorithm is a practical tool consisting of assessment instruments to improve CRSP guideline adherence in the Netherlands. This algorithm may be also useful for other Western countries to organize their CRSP needs assessment procedure.

Key words: Practice Guidelines; Cardiac Rehabilitation; Health Care Quality, Access, and Evaluation; Information systems
INTRODUCTION

Cardiac rehabilitation and secondary prevention (CRSP) programs have been shown to reduce morbidity and mortality in cardiac patients and are therefore recommended by the European Society of Cardiology (ESC) (1), the American Heart Association (AHA) and the American College of Cardiology (ACC) (2). Nonetheless, in most European countries fewer than half of eligible patients participate in a CRSP program (3). Also the CRSP practice is poorly standardised and does not follow the available scientific evidence (4;5). Causes include absent or inadequate legislation, funding, professional guidelines and information systems in many countries (3). Guidelines can improve CRSP practice by founding and supporting clinical decisions related to organizing and executing the CRSP program (6). However, professional adherence to guidelines may be hindered by a variety of barriers related to professional knowledge and attitude, task delegation and collaboration in teams, and impracticabilities of the guidelines themselves (7). The overcome the last barrier, the European Association of Cardiovascular Prevention and Rehabilitation (EACPR) has released a position statement containing practical recommendations on the core components and goals of CRSP (1).

Based on this guideline and other international guidelines (1;8;9), national guidelines on the core components and goals of CRSP were published in the Netherlands in 2004 (10). They state that after hospitalization for cardiac incidents and interventions patients should be offered an individualized rehabilitation program based on their medical, physical, and psychosocial needs. To this end, the guidelines included a clinical algorithm that describes an extensive needs assessments procedure which can be used for all patients entering the CRSP program. In general, clinical algorithms are designed by expert physicians for use by paramedical personnel who have been assigned certain routine care tasks (11). The Dutch algorithm for CRSP describes a branching logic to assess data concerning patient health status in order to identify rehabilitation and secondary prevention goals for a patient-tailored rehabilitation program. This program can contain four possible group-based therapies (exercise training, education, lifestyle change counselling, and relaxation therapy) and several forms of individual therapy.

Concurrently with the algorithm, a patient information system with computerized decision support (CDS) functionalities was developed to collect patient data and to guide users through the needs assessment procedure (12). A recent trial in 21 clinics showed that the system increases the adherence with the guideline-recommended therapeutic decisions (13). The trial data offered a unique opportunity to analyze the use of different parts of the algorithm of which participants during the study period mentioned that they were impracticable. The purpose of the current study was to revise the Dutch algorithm for CRSP based on implementation problems in daily clinical practice. As the algorithm is consistent with international guidelines for CRSP, the results of this study can support other Western countries in organizing the needs assessment procedure for their CRSP program.
METHODS

Dutch clinical algorithm for CRSP (2004 guidelines)

The clinical algorithm for CRSP is a flowchart to which professionals can refer during the needs assessment prior to starting the actual rehabilitation program. This procedure is usually carried out by a nurse practitioner, and covers objective and subjective exercise capacity, psychological and social functioning and risk behaviour. Within each of these domains the patient’s health status is assessed by questionnaires, biometric screening, and clinical interviewing. A maximum of 40 data items is assessed to obtain a patient-tailored rehabilitation program. Figure 1 depicts a schematic representation of the needs assessment procedure.

The algorithm describes assessment instruments and threshold values to select patient-specific goals from a list of fifteen potential CRSP goals. Important assessment instruments in the 2004 algorithm are the symptom-limited exercise test on a bicycle ergometer (14) and the MacNew health-related quality of life questionnaire (15). Although the 2004 algorithm advises to employ these and other instruments, assessment of patient needs based on clinical judgement was also allowed. After establishing of the relevant rehabilitation goals, decisions are made with respect to treatment, resulting in the final CRSP program. When a patient is unusually complex there are built-in safeguards in the algorithm, leading to referrals to specialized professionals (e.g. a cardiologist or clinical psychologist) for advanced assessment. They further define specific parts of the CRSP program, which may then consist of individual therapy.

Figure 1 – Schematic representation of the needs assessment procedure, as prescribed by the Dutch Guidelines. For each domain the algorithm describes assessment instruments that allow CRSP professionals to decide on patient specific rehabilitation goals and to make therapeutic decisions.
NICE Three Steps Model
We revised the algorithm for CRSP using a modified version of the Three Steps Model as described in the Guidelines manual for conducting guideline revisions from the National Institute for health and Clinical Excellence (NICE) (16). This qualitative model describes the process, frequency and methods for partial updating clinical practice guidelines. Figure 2 gives an overview of the modified NICE Three Steps Model. Each step will be discussed in more detail below. A description of our methods in more detail can be found in Appendix I.

Figure 2 – Overview of the modified Three Steps Model that was used to revise the clinical algorithm for CRSP, based on (16).

Step 1a: Collecting information – Reliability of assessed CRSP needs: In order to analyze the reliability of the assessed patients’ CRSP needs, patient data recorded with the CDS system were used to study inter-practice variation. The recorded data items included patient demographics, reason for referral to CRSP, objective exercise capacity, subjective (i.e., self-perceived) exercise capacity, psychological and social status, marital status, employment status and lifestyle parameters (smoking status, dietary habits, physical activity). Intra-cluster correlation coefficients (ICCs) (17) adjusted for variations in case mix were computed as reliability measure to quantify inter-practice variation.
Step 1b: Collecting information – Interviews with CRSP professionals: Data of a qualitative study was used to assess experiences of professionals in applying the algorithm (18). Semi-structured interviews were conducted with 29 professionals who worked with the CDS system to address adherence to different guideline recommendations for the needs assessment procedure. All remarks from the interviews regarding problems with the use of the algorithm during the needs assessment, were analyzed and classified by two researchers (MvE and RG) using the conceptual framework of Cabana et al (7). This framework distinguishes barriers to guideline adherence, such as knowledge and attitude of professionals, and patient, guideline, and environmental factors.

Step 2: Expert advisory group – Scope definition and proposals for revision: A multidisciplinary, academic expert advisory group was asked to use their domain expertise and knowledge of the literature to define the scope of the revision and to propose evidence based revisions. Inputs were the results of Step 1a (a list of inter-practice variation of the assessed patient needs) and Step 1b (a list of guideline-related barriers for use of the algorithm in daily practice) and key areas from the CRSP literature, identified by the experts. When revisions concerned the selection of clinical assessment instruments, the experts used the criteria for reviewing health status measurement instruments developed by the Scientific Advisory Committee (SAC) of the Medical Outcomes Trust (19).

Step 3: Guideline development group – Selection and elaboration of the final revisions: The guideline development group was formed including members of Dutch professional associations of all disciplines involved in CRSP, together with two researchers (MvE and NP) having technical expertise with guideline revisions. During three meetings we asked the group to discuss the result of Step 2 (the scope for the revision including the revisions suggested by the expert advisory group) using their expertise of practical use and feasibility of the algorithm in daily practice. The meetings took place in a meeting centre of the Dutch Society of Cardiology. This centre is centrally situated in the Netherlands and within easy reach of the participants. During the discussion the group focused mainly on the burden and interpretability for the professionals (SAC criteria 5 and 6). Based on their clinical expertise, the revisions of the experts were either adapted, complemented or rejected. After this procedure, a final revision of the algorithm was composed.

RESULTS

Step 1a: Collecting information – Reliability of assessed CRSP needs: Data from 4157 patients were recorded in the CDS system in sixteen rehabilitation clinics. The median number of patients per clinic was 221. The mean age of the study population was 61.3 years (SD 11.4) and 74.4% was male. Of the patients referred to cardiac rehabilitation 42.4% was diagnosed with a myocardial infarction, 28.7% underwent a CABG procedure and 13.7% were diagnosed with
angina pectoris. We found high intra-cluster correlation coefficients (ICC) values for seven out of nine variables representing assessed CRSP needs. Hence the reliability of CRSP needs assessed with the 2004 algorithm was poor. Appendix II mentions the ICC value per variable representing assessed CRSP needs, both described at study population level and at clinic level.

Step 1b: Collecting information – Interviews with CRSP professionals: From the interviews we identified a variety of barriers to perform the cardiac rehabilitation needs assessment according to the way it was described in the algorithm. Several barriers related to attitude, (e.g., lack of agreement), but also a number of external barriers (e.g. guideline complexity) were mentioned. Examples of the remarks and identified barriers are listed in Table 1.

A number of professionals reported that one recommendation in the 2004 algorithm, the use of the MacNew questionnaire to determine emotional and social functioning of the patient, was not followed in their clinic. For convenience's sakes they preferred to use their clinical judgment. Furthermore, professionals often reported that they disagreed with the recommended assessment method of lifestyle parameters, e.g. asking the patient whether he or she adhered to the Dutch dietary norms. Instead they preferred for example the patient's BMI to determine dietary habits.

Table 1 – Samples of the remarks and the identified barriers for implementation of the algorithm as extracted from the interviews with the cardiac rehabilitation professionals.

<table>
<thead>
<tr>
<th>Item</th>
<th>Comment</th>
<th>Identified barrier*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective exercise capacity</td>
<td>“In our organisation it isn’t achievable to have the results of the symptom-limited exercise test during the intake.”</td>
<td>Organisational constraints</td>
</tr>
<tr>
<td></td>
<td>“In our clinic we perform a symptom-limited exercise test after a patient has started an exercise program, not before the intake in the program, during the intake clinical expertise is also allowed.”</td>
<td>Guideline related factors</td>
</tr>
<tr>
<td>MacNew questionnaire (emotional and social functioning)</td>
<td>“If we don’t agree with the result of the MacNew, we use our clinical expertise to assess the emotional and social functioning.”</td>
<td>Lack of agreement</td>
</tr>
<tr>
<td></td>
<td>“We only use the MacNew if we think a patient is able to fill it in. But in most cases we use our clinical expertise.”</td>
<td>Lack of outcome expectancy</td>
</tr>
<tr>
<td>Anxiety and depression</td>
<td>“The psychologist sees all patients. He uses several questionnaires on depression. The algorithm doesn’t advice a list for this item.”</td>
<td>Guideline related factors</td>
</tr>
<tr>
<td>Cardiovascular risk profile</td>
<td>“We use the blood pressure and lipid profile to specify secondary prevention goals for the patient but this is absent in the algorithm”.</td>
<td>Guideline related factors</td>
</tr>
<tr>
<td>Dietary habits</td>
<td>“The algorithm doesn’t mention an instrument for dietary habits, so we use the BMI to determine this. Most patients say they do eat healthy but we don’t think they really follow the norms.”</td>
<td>Guideline related factors</td>
</tr>
<tr>
<td>Physical activity</td>
<td>“Determining the physical activity is hard. In most cases I use the BMI to decide if a patient needs an exercise program.”</td>
<td>Guideline related factors</td>
</tr>
</tbody>
</table>

* Based on the framework of Cabana et al concerning barriers to guideline adherence (7).
Step 2: Expert advisory group – Scope definition and proposals for revision: For the expert advisory group we approached nine different academic experts from various disciplines. They decided that all items concerning outcomes of the needs assessment with high interpractice variation (see Appendix II) and all guideline related barriers identified from the interviews (see Table 1) needed revision. In addition, the experts identified four new key areas for inclusion in the algorithm: anxiety and depression, stress, cardiovascular risk profile, and alcohol consumption. Finally they proposed revisions for all identified problems. Table 2 gives an overview of the recommendations from the 2004 algorithm and a summary of the problems for use in daily practice as identified by the experts, including the proposed revisions to solve these problems.

Most deficiencies in the algorithm were related to the type of prescribed assessment instrument, especially when clinical judgment was allowed in the needs assessment procedure. In these cases, the experts determined univocal assessment instruments and stated that using these instruments should be obligatory. For example the MacNew questionnaire was selected because this instrument is translated and validated for a Dutch population (20) (SAC criterion 3, Validity).

Step 3: Guideline development group – Selection and elaboration of the final revisions: Table 2 gives an overview of the final revisions of the algorithm composed by the guideline development group based on the scope of the expert advisory group. Several types of revision are described. The first revision type is advice against using a clinical interview alone to assess the rehabilitation needs. In the revision instruments like the symptom-limited exercise test and the MacNew questionnaire are recommended. The second type of revision concerns the adding of the four new key areas as proposed by the experts. The third type of revision concerns adding assessment instruments for items which were unstructured assessed during the clinical interview in the 2004 algorithm (instruments to measure attitude of partner, resumption of work, smoking status, physical activity and dietary habits). The entire revised algorithm is in English available on http://kik.amc.uva.nl/KIK/reports/TR2011-03.pdf.

One of the new key areas, the cardiovascular risk profile, has resulted in new rehabilitation goals. The risk profile provides an overview of risk factors for cardiovascular diseases and can be used in clinics to specify four secondary prevention goals with accompanying interventions: optimize weight, optimize blood pressure, optimize diabetic therapy, and optimize cholesterol levels. Interventions to work on these goals are multidisciplinary and contain both exercise training and lifestyle change therapy as well as individual treatment by a cardiologist to optimize medication use.
Table 2 – Recommended assessment instruments in the Clinical Algorithm 2004, identified problems for use in daily practice, proposed revisions by expert advisory group, and revised recommendations in the Clinical Algorithm Cardiac Rehabilitation 2010.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>Instruments Clinical Algorithm 2004</th>
<th>Identified problems for use of the algorithm in daily practice (expert advisory group)</th>
<th>Proposed revisions (expert advisory group)</th>
<th>Final revisions: Instruments Clinical Algorithm 2010 (guideline development group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical functioning</td>
<td>Objective exercise capacity</td>
<td>Symptom-limited exercise test (14) or clinical judgment</td>
<td>Variation data: Large variation in clinic means.&lt;br&gt;Interviews: Professionals mostly use clinical judgment. No consensus about safety of exercise test for complex patients.</td>
<td>Always perform a symptom-limited exercise test. Alternative is a shuttle interval test. For complex patients (e.g. with heart failure) perform test under special supervision.</td>
<td>Symptom-limited exercise test for all patients (14). Alternative is a shuttle interval test. Complex patients receive an exercise test under special supervision (29).</td>
</tr>
<tr>
<td></td>
<td>Subjective exercise capacity</td>
<td>MacNew QoL questionnaire (15) or clinical judgment</td>
<td>Variation data: Large variation.&lt;br&gt;Interviews: Professionals mostly use clinical judgment.</td>
<td>Always use the MacNew QoL questionnaire.</td>
<td>MacNew QoL questionnaire (15)</td>
</tr>
<tr>
<td>2. Psychological functioning</td>
<td>Emotional functioning</td>
<td>MacNew QoL questionnaire (15) or clinical judgment</td>
<td>Variation data: Moderate variation.&lt;br&gt;Interviews: Professionals mostly use clinical judgment.</td>
<td>Always use the MacNew QoL questionnaire.</td>
<td>MacNew QoL questionnaire (15)</td>
</tr>
<tr>
<td></td>
<td>Anxiety and Depression</td>
<td>Absent</td>
<td>Interviews: CRSP guidelines describe need to measure anxiety and depression.&lt;br&gt;New key area: Literature describes need to take presence of anxiety and depression into account in CRSP.</td>
<td>Measure presence of anxiety and depression with a questionnaire suitable for heart patients. HADS and PHQ are recommended.</td>
<td>Hospital Anxiety and Depression Scale (HADS) (30), Patient Health Questionnaire (PHQ) (31) (recommended)</td>
</tr>
<tr>
<td>Stress</td>
<td>Absent</td>
<td>Interviews: CRSP guidelines describe need to measure stress.&lt;br&gt;New key area: Literature describes the importance of taking presence of stress into account in CRSP.</td>
<td>Measure presence of stress.</td>
<td>Clinical interview, 5 questions from the INTERHEART study (32)</td>
<td></td>
</tr>
<tr>
<td>3. Disruption or treat to social functioning</td>
<td>Social functioning</td>
<td>MacNew QoL questionnaire (15) or clinical judgment</td>
<td>Variation data: Large variation. Interviews: Professionals mostly use clinical judgment.</td>
<td>Always use the MacNew QoL questionnaire.</td>
<td>MacNew QoL questionnaire (15)</td>
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<tr>
<td>Attitude of partner</td>
<td>Clinical interview, unstructured</td>
<td>Interviews: CRSP guidelines describe need to involve the patient's partner, it should be clarified how.</td>
<td>Perform a structured assessment of the attitude of the patient's partner.</td>
<td>Clinical interview, 3 questions</td>
<td></td>
</tr>
<tr>
<td>Resumption of work</td>
<td>Clinical interview, unstructured</td>
<td>Interviews: CRSP guidelines describe need to give attention to resumption of work, it should be clarified how.</td>
<td>Perform a structured assessment of the patient's professional situation and current resumption status. Possibly the company doctor should be contacted.</td>
<td>Clinical interview, 2 to 7 questions (two stage screening)</td>
<td></td>
</tr>
<tr>
<td>Cardio-vascular risk profile</td>
<td>Absent</td>
<td>Interviews: CRSP guidelines describe need to assess the patient's cardiovascular risk profile. New key area: International guidelines underline need to take cardiovascular risk profile into account in CRSP.</td>
<td>Perform assessment of modifiable cardiovascular parameters.</td>
<td>Physical examination (body weight, waist circumference, blood pressure) and laboratory evaluation (cholesterol, HbA1c)</td>
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<td>Smoking status</td>
<td>Clinical interview (3 to 4 questions)</td>
<td>Interviews: Algorithm is not in line with guidelines concerning tobacco cessation therapy.</td>
<td>Assess smoking habits; when necessary, treat according to tobacco addiction guidelines.</td>
<td>Clinical interview, 1 to 4 questions (two stage screening) and specific treatment advice</td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td>Clinical interview, unstructured</td>
<td>Variation data: Moderate variation Interviews: Current activity norm is too strict. It is also unclear how to assess physical activity without getting socially desirable answers.</td>
<td>Perform a structured assessment of the patient's physical activity with the Monitor 'Physical activity and Health' or the SQUASH questionnaire.</td>
<td>Monitor 'Physical activity and Health' (33)</td>
<td></td>
</tr>
<tr>
<td>Dietary habits</td>
<td>Clinical interview, unstructured</td>
<td>Variation data: Moderate variation Interviews: Current norm is too strict. It is unclear how to avoid socially desirable answers. Full assessment takes to much time.</td>
<td>Perform individual assessment by a dietician in case of hypertension, hypercholesterolemia, obesity or diabetes.</td>
<td>Individual assessment by dietician in case of hypertension, hypercholesterolemia, obesity, or diabetes</td>
<td></td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Absent</td>
<td>New key area: CRSP guidelines describe risks of alcohol consumption. Alcohol addiction is undesirable in group-based rehabilitation.</td>
<td>Assess alcohol consumption and addiction with the Five Shot questionnaire.</td>
<td>Five Shot questionnaire (34)</td>
<td></td>
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</tbody>
</table>
DISCUSSION

Summary of results
Despite all available evidence on its effectiveness, CRSP is still insufficiently implemented in current clinical practice. Based on an analysis of implementation problems a thorough revision was conducted of the Dutch clinical algorithm for the assessment of patient's CRSP needs. The algorithm was extended with assessment instruments for anxiety and depression, cardiovascular risk factors, stress, absence of partner, and lifestyle parameters (smoking, physical activity, and alcohol consumption), and excludes the option of using only clinical judgment to assess CRSP needs (Table 2). The revised algorithm may also be used to support implementation of CRSP in other Western countries.

Strengths of the study
Clinical practice guidelines serve to foster evidence-based medical practice, reduce practice variation, and manage the delegation of tasks between clinical professionals (21). However, implementation may be difficult and requires separate attention (7). Revisions of practice guidelines are often based on systematic reviews of the literature and consensus among clinical experts (22) but tend to neglect implementation issues. Our revision of the Dutch clinical algorithm for CRSP screening is, in contrast, largely based on observed implementation problems. These problems were identified by analyzing data that were recorded in daily care practice and by interviewing practitioners that had frequently used the algorithm. By using this methodological triangulation, qualitative input may help to explain quantitative information about the success or failure of an intervention (23). In our study the data showed which parts of the algorithm had implementation problems and the interviews showed why professionals experienced problems with these specific parts. Taking into account these local circumstances during guideline development and implementation can change clinical practice (24).

For revision of the algorithm we used a structured, formal consensus procedure from the NICE Institute. During the procedure both the expert advisory group and the guideline development group used the predefined SAC criteria (19) to judge assessment instruments that were included in the algorithm. By adding instruments to determine patients’ needs, the revised algorithm provides a practical elaboration of the guidelines which could be the missing link for a successful implementation. In fact, the Cardiac Rehabilitation Section of the EACPR has provided recommendations for the assessment of patient needs and goals of CRSP interventions, stressing the fact that integration of these assessments into daily practice is still inadequate (1).

Meaning of study
There are several reasons why medical professionals do not adhere to clinical guidelines and protocols (7). Broadly speaking, these reasons may be classified as internal (i.e. relating to the professional’s own knowledge or attitude) or external (i.e. relating to the guideline or protocol, to organizational factors, or to patient cooperation). In our study, we found that professionals
faced external barriers related to shortcomings of the clinical algorithm itself and invented their own solutions to remediate them. For instance, the 2004 algorithm recommended that patients be asked whether they adhered to the Dutch dietary and physical activity norms (10). Most people have however difficulties in assessing their own lifestyle habits and tend to give socially desirable responses to such questions (25;26). Many CRSP professionals had invented their own solutions to deal with this problem, for instance by posing additional questions. The resulting assessments were subject to high inter-practice variation because there was no standardized assessment method.

The revised algorithm recommends using assessment instruments to determine patients’ rehabilitation needs, reasonably resulting in a needs assessment procedure less sensitive to local interpretations and inter-practice variation. As the Dutch guidelines for cardiac rehabilitation are consistent with national guidelines in other countries (1;8;9), we expect the results of our study to be generalizable. In other countries the revised algorithm can be used as starting point for setting up clinical algorithms for CRSP screening as well to refine and clarify the steps of the needs assessment procedure. Furthermore, the clinical algorithm can be used in addition to the recommendations from the EACPR on the core components and goals of the content of a CRSP program (1).

Limitations of the study
This study has several limitations. We did not conduct a systematic literature search to identify new scientific evidence. Furthermore, asking the professional CRSP associations to send an official representative for the guideline development group resulted in a group with mostly practice experts and no academic experts. The risk in this was that only revisions would be made which were practical but not supported with evidence in literature. Although not the entire cardiac rehabilitation guidelines were rewritten but just the algorithm, we tried to minimize this risk. We asked the academic expert advisory group to focus on the scientific evidence for the revisions the proposed. By involving them in the revision process we believe the revisions are evidence based.

Although we tried to solve as many barriers we found in the interviews with the CRSP professional as possible, the revised algorithm may not solve barriers classified as patient related barriers (e.g. specific comorbidity or logistic problems), barriers related to the attitude of professional (e.g. lack of outcome expectancy or motivation) or external barriers (e.g. lack of resources). To solve these barriers alternative solutions at the organisational level of CRSP clinics might be needed to optimize the implementation of the algorithm.

Unanswered questions and future research
Although we tried to make the algorithm a representation of the latest practical and scientific insights, not all proposed revisions could be carried through because in some cases there was no consensus among the clinical experts and there existed no conclusive scientific evidence either. Especially in the physical and psychosocial domains there was a lack of consensus at several
points. Therefore, there is still a need in these domains for an overview of available assessment instruments and their applicability for cardiac patients.

In addition we suggest that more research is carried out concerning the validity and reliability of assessment of patient needs by clinical judgment. During our study it was assumed that clinics using clinical judgement (instead of a predefined assessment instrument) underestimated the rehabilitation needs and caused high inter-practice variation. However, to date little is known about the consistency and evaluation of needs assessment procedures (27). We found one study in which assessment instruments identified almost twice the amount of patients as having multiple unexplained physical symptoms in comparison with identification of these problems by their GP (28). More research can show what is in general the difference between results from clinical judgment compared to assessment instruments.

CONCLUSION

The revised clinical algorithm describes a practical procedure for assessing patient needs in cardiac rehabilitation. We used a structured consensus procedure to revise the algorithm in which both academic experts and CRSP professionals were involved. The revised algorithm advises to use assessment instruments, where possible, to determine patient needs. It was decided to add instruments to assess anxiety and depression, cardiovascular risk factors, stress, attitude of partner and risk behavior (smoking, physical activity, and alcohol consumption). The algorithm will be used by all Dutch cardiac rehabilitation professionals but can also support other Western countries in organizing the needs assessment procedure and in setting up a clinical algorithm for their CRSP program.
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NVVC – Netherlands Society for Cardiology (‘Nederlandse Vereniging voor Cardiologie’)
VRA – Society of Rehabilitation Physicians (‘Vereniging van Revalidatieartsen’)
VSG – Society for Sport Medicine (‘Vereniging voor Sportgeneeskunde’)
NVAB – Netherlands Society for Labour and Company Medicine (‘Nederlandse Vereniging voor Arbeids- en Bedrijfsgeneeskunde’)
NVHV – Netherlands Society for Cardiac Nurses (‘Nederlandse Vereniging voor Hart- en Vaat Verpleegkundigen’)
VHVL – Society for Cardiac and Lung Physiotherapy (‘Vereniging voor Hart-, Vaat- en Longfysiotherapie’)
NIP – Netherlands Institute of Psychologists (‘Nederlands Instituut van Psychologen’)
LOMH – National Session Social Workers Cardiac Rehabilitation (‘Landelijk Overleg Maatschappelijk werkers Hartrevalidatie’)
NVD – Netherlands Society of Dieticians (‘Nederlandse Vereniging van Diëtisten’)
HVG – Cardiovascular patients Organization (‘De Hart&Vaatgroep’)

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