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Development of a longlist of healthcare quality indicators for physical activity of patients during hospital stay: a modified RAND Delphi study

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ABSTRACT

Objective To develop a longlist of healthcare quality indicators for the care of hospitalised adults of all ages with (or at risk of) low physical activity during the hospital stay.

Design A modified RAND/UCLA Appropriateness Method Delphi study.

Setting and participants Participants were physical therapists, nurses and managers working in Dutch university medical centres.

Methods The current study consisted of three phases. Phase I was a systematic literature search for quality indicators and relevant domains. Phase II was a survey among healthcare professionals to collect additional data. Phase III consisted of three consensus rounds. In round 1, experts rated the relevance of the potential indicators online (Delphi). The second round was a face-to-face expert panel meeting managed by an experienced moderator. Acceptability, feasibility and validity of the quality indicators were discussed by the panel members. In round 3, the panel members rated the relevance of the potential indicators that were still under discussion.

Results The search retrieved 1556 studies of which 53 studies were assessed full text. Data from 17 studies were included in a first draft longlist of indicators. Eighteen nurses and one physical therapist responded to the survey and added data for a second draft of the longlist. Experts constructed the final longlist of 23 indicators in three consensus rounds. Seven domains were identified: 'Policy', 'Attitude and education', 'Equipment and support', 'Evaluation', 'Information', 'Patient-tailored physical activity plan' and 'Outcome measure'.

Conclusion and implications The healthcare quality indicators developed in this study could help to grade, monitor and improve healthcare for hospitalised adults of all ages with (or at risk of) low physical activity during the hospital stay. Future research will focus on the psychometric quality of the indicators and selection of key performance indicators.

Strengths and limitations of this study

► The current study consists of a systematic review with duplicate study selection, an extra survey in healthcare professionals and three consensus rounds with a panel meeting.

► The panel meeting has been moderated by an internationally experienced moderator.

► The longlist of healthcare quality indicators was developed by a multidisciplinary group of healthcare professionals including nurses, physical therapists and managers.

► Only five panel members participated in the second and third consensus rounds.

► There were no patients and public involved in the coproduction of this study.

adverse effects such as decreased strength, functional decline, a prolonged hospital stay and institutionalisation.[6–9] Common barriers to physical activity during the hospital stay include symptoms (ie, fatigue and pain), lack of motivation, medical devices and the hospital environment.[10–13] Several quality improvement initiatives have been developed to improve physical activity of patients during the hospital stay.[14–18] Nevertheless, quality indicators to measure the results of such quality improvement strategies are scarce.[19–21]

Healthcare quality indicators, also known as performance indicators or quality measures, are used all over the world to quantify, grade, monitor and improve the quality of healthcare.[22–24] Recently, qualitative indicators have also been introduced to express matters that are hard to capture quantitatively such as having confidence in being safe in a community.[25] Quality indicators are used in hospital care to provide information for quality improvement initiatives to, for example, decrease hospital mortality and complications.[26 27] Regarding the management of

INTRODUCTION

Low physical activity of patients during the hospital stay has been extensively reported,[1 2] especially in older patients.[3–5] Low physical activity is a global healthcare issue with known

(low) physical activity of patients during the hospital stay, quality indicators could be helpful to capture persisting barriers in an attempt to improve the physical activity of all patients.[28] As a first step, a longlist of relevant quality indicators is needed to serve as a database for healthcare professionals, clinical teams and organisations to measure performance for quality improvement purposes.[21] Therefore, the aim of this study is to develop a longlist of quality indicators for the healthcare in hospitalised adults of all ages with (or at risk of) low physical activity during the hospital stay.

METHODS

Design and setting

A modified RAND/UCLA Appropriateness Method Delphi study[29] was used to develop a longlist of quality indicators which meets the requirements of the Appraisal of Guidelines for Research and Evaluation (AGREE) II Healthcare Quality Indicator tool.[30] The AGREE II tool was used as a guiding checklist for study development (online supplementary table A1). The reporting of this study followed guidelines of the Standards for QUality Improvement Reporting Excellence (SQUIRE 2.0).[31] The study was conducted as a quality improvement initiative of the Radboud University Medical Center and followed the principles of the Declaration of Helsinki[32] and Good Clinical Practice Guideline.[33] Full ethical consideration was waived by the Ethics Committee of the Radboud University Medical Center in accordance with the Dutch Medical Research with Human Subjects Law.

All phases from the RAND/UCLA method were followed (figure 1). Phase I was a systematic literature search to identify indicators and relevant topics for potential indicators. Phase II was an extra survey among healthcare professionals to provide additional relevant topics. This extra survey was a modification to the original RAND/UCLA method to obtain as many relevant indicators and topics as possible. Phase III consisted of three consensus rounds in which potential indicators were rated for their relevance by experts.

Literature search

The literature search was conducted to develop the first draft of a longlist of quality indicators for physical activity of hospitalised adults of all ages. CINAHL, MEDLINE and EMBASE were systematically searched for studies up to 24 January 2018 using a predefined search strategy (online supplementary table A2). The search strategy was compiled with the help of an experienced librarian (OYC). The study selection and data extraction were independently performed by two researchers (NK, SvdH).[34] An indicator was considered relevant if a definition, numerator and denominator were described in the literature and related to physical activity of patients during the hospital stay. A topic was considered relevant when information in the text of articles commented on the physical activity of patients during the hospital stay.
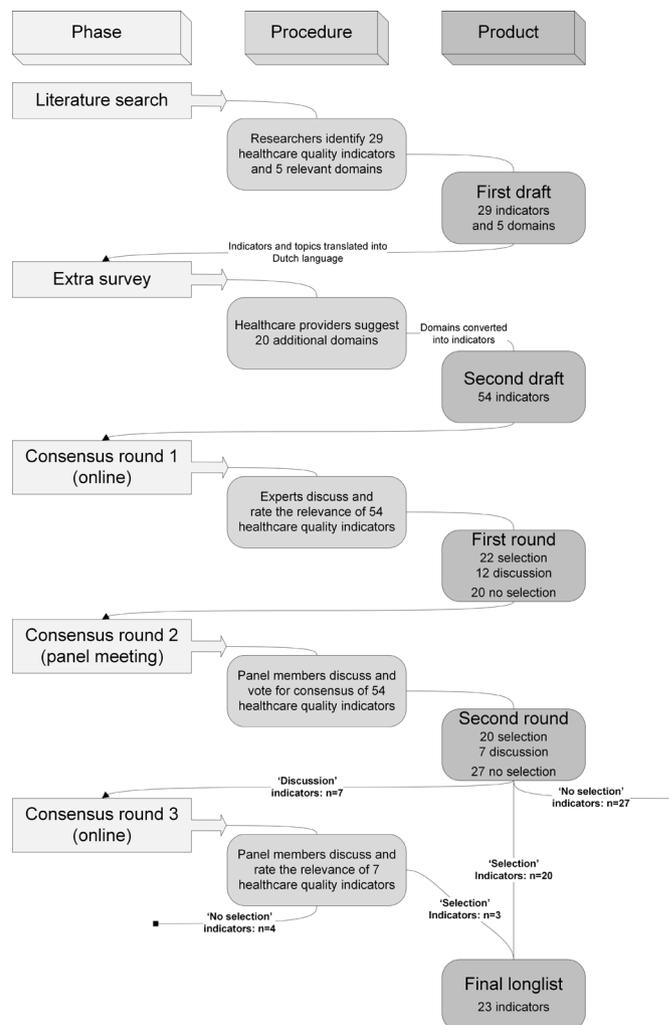

Figure 1 Flow diagram showing the selection of healthcare quality indicators in all phases of the study.

Extra survey

All indicators and topics were then translated into the Dutch language and presented to a convenience sample of healthcare professionals and managers of one Dutch academic hospital using an online questionnaire in Lime-Survey.[35] The participants were requested to suggest additional topics related to physical activity of hospitalised adults of all ages. Furthermore, problems as a result of unclear translation or unclear formulation were solved with the help of the participants. The second draft was constructed by two researchers (NK, SvdH) with quality indicators from both the literature review and additional input from healthcare professionals and managers. Each topic was converted into an indicator by formulating a definition, numerator and denominator. All converted topics were checked for loss of information due to the translation by a third researcher (TJH).

Consensus rounds

The second draft of the longlist of quality indicators was presented for relevance rating in the three consensus rounds with experts.[36] To include a group of multidisciplinary experts in the consensus rounds, we purposely

sampled national experts.[37] The multidisciplinary expert panel consisted of 28 experts (12 physical therapists, 11 nurses, 5 managers). All experts worked in a university medical centre (secondary care); participated in care, research and innovation of physical activity in patients during the hospital stay; and were representatives of an acknowledged national workgroup called *Moving Hospitals* (in Dutch: *Beweegziekenhuizen*). The experts were approached by email and telephone for participation in this study.

In the first consensus round (Delphi method), the experts received the longlist of quality indicators online in LimeSurvey. All indicators were rated on relevance by 14 experts for the first consensus label: *selection*, *discussion* or *no selection*. In the second round, all quality indicators were discussed in a panel meeting with five experts (panel members) moderated by an experienced moderator (PvdW). First, the panel members discussed the acceptability to healthcare professionals and managers, the feasibility of use, and the validity in terms of providing more appropriate care and optimising patient outcomes.[29] Finally, all panel members voted (yes or no) for final consensus on *selection*, *discussion* or *no selection* of the quality indicators. A methodologist (TJH) observed the panel meeting from the side-line and intervened if methodological errors occurred. In the third consensus round (Delphi method), all five panel members received the modified quality indicators and the quality indicators which were still under discussion online in LimeSurvey for final consensus.

Data analysis

The experts were instructed to rate the quality indicators only on relevance, not on, for example, feasibility or reliability. The relevance was scored using a 9-point Likert scale ranging from 1 *not relevant* to 9 *very relevant*. Consensus outcomes from the relevance ratings were calculated using the *IQ healthcare consensus tool*.[38] The consensus outcomes were based on the median score and the highest tertile, which resulted in labels *selection*, *discussion* or *no selection* (table 1).[38] Quality indicators were labelled *selection* when the median score was ≥8 on the 9-point Likert scale and ≥70% of the responses were in the highest tertile. The label *discussion* was given as a

result of three possible outcomes: (1) the median score was ≥8 though less than 70% of the responses were in the highest tertile, (2) the median score was <8 though more than 70% of the responses were in the highest tertile, or (3) 30% of the responses were in the lowest and highest tertile. An indicator was labelled *no selection* when the median was ≤7 and less than 70% of the responses were in the highest tertile.

In the second consensus round (panel meeting), five panel members received information on all first-round outcomes with corresponding labels per quality indicator. The panel members voted yes or no for final *selection*, *discussion* or *no selection*, and consensus meant that at least 75% of the members voted for one outcome. Where needed, the quality indicators were modified to improve the concise formulation. If modification(s) were suggested, the quality indicators were reformulated and rated (online and anonymous) for a second time by the panel members. The quality indicators needing further discussion were modified and rated by the same five panel members in the third online consensus round. After the third consensus round, quality indicators which were labelled *selection* were included in the longlist of quality indicators. All selected quality indicators were charted by domain and translated into the English language with a standardised forward-backward method by the Language Centre of the HAN University of Applied Sciences, Nijmegen, the Netherlands.

Patient and public involvement

No patients or public were involved in the design and conceptualisation of this study.

RESULTS

Literature search

The systematic literature search retrieved a total of 1556 studies, including 8 studies through searching the grey literature (online supplementary table A2 and figure A1). Full-text articles of 53 studies were assessed for eligibility, resulting in the inclusion of 17 articles.[1–3 6 19–21 39–48] Data extraction resulted in the identification of 29 unique indicators and 5 domains related to hospitalised adults of all ages with (or at risk of) low physical activity during hospital stay for a first draft longlist of quality indicators.

Extra survey

The 29 indicators and 5 domains were translated into the Dutch language and surveyed among 296 healthcare professionals. Eighteen nurses and one physical therapist responded, and they suggested 20 additional domains. Twenty-five domains were reformulated and converted into indicators, resulting in 54 unique indicators in the second draft longlist of quality indicators (online supplementary table A3).

Table 1 Labels corresponding to the consensus outcomes following different quantitative relevance ratings of experts in the consensus rounds using the IQ healthcare consensus tool

	≥70% in the highest tertile	≥30% in the lowest tertile and ≥30% in the highest tertile	<70% in the highest tertile
Median ≤3	Discussion	Discussion	No selection
Median 4≤7	Discussion	Discussion	No selection
Median ≥8	Selection	Discussion	Discussion

Consensus rounds

Consensus round 1—Twenty-eight experts were invited to participate in the first online Delphi round. Fourteen experts responded: eight physical therapists, four nurses and two managers. A total of 22 indicators were labelled *selection*, 12 indicators *discussion* and 20 indicators *no selection* as a result of the first round. A detailed overview of ratings and selections is provided in online supplementary table A4.

Consensus round 2—The panel meeting lasted 3 hours with a total of five panel members: four physical therapists and one nurse. At the start, the moderator asked to discuss two key issues which were identified in the first Delphi round. First, the concept of physical activity during hospital stay was discussed and defined for the panel meeting as *"an active transfer of a body(part) by a hospitalized patient"*. This did not include exercises or a transfer of a body(part) using a machine or object such as a standing aid or hospital bed. Second, the physical activity plan was defined as *"an object in which physical activity should be reported, tailored at individual patients' needs, with a specific structure stating personal goals, frequency, intensity, time, and type of physical activity. Besides, the amount of support needed for mobilization should be described, for example, the need for a walking aid"*. Of all 22 indicators with the label *selection*, the panel members voted consensus for *selection* of 15 indicators, *discussion* of 5 indicators and *no selection* of 2 indicators. Of all 12 indicators with the label *discussion*, the panel members voted consensus for *selection* of 5 indicators, *discussion* of 1 indicator and *no selection* of 6 indicators. Of all 20 indicators with the label *no selection*, the panel members voted consensus for *discussion* of 1 indicator and *no* selection of 19 indicators. As a result of the second consensus round, 20 indicators were *selected*, 7 indicators remained under *discussion* and were included in round 3, and 27 indicators were *not selected* (online supplementary table A4).

Consensus round 3 (Delphi)—In the third round, the same five panel members performed the final rating of seven remaining indicators resulting in the *selection* of three indicators, *discussion* of three indicators and *no selection* of 1 indicator. The discussion remained for three indicators (numbers 30, 32, 47) resulting in *no selection* due to a lack of consensus (online supplementary table A4). A flow diagram of the quality indicators selection is presented in figure 1.

Final longlist indicators

The final longlist of quality indicators includes 23 indicators within 7 domains (table 2). The first domain, '*Policy*', includes two structure indicators to evaluate institutional characteristics of the hospital ward. The second domain, '*Attitude and education*', describes four structure indicators to assess the attitude and education of physicians and nurses related to physical activity stimulation. The third domain consists of three structure indicators and one process indicator on '*Equipment and support*' to assess, for example, the availability of walking aids and ergometers. The fourth domain, '*Evaluation*', includes five process indicators on the evaluation of freedom-limiting and mobility-limiting equipment (such as five-point fixation, intravenous lines and urinary catheters), physical functioning of patients and timely documentation of falls by a healthcare professional. The fifth domain, '*Information on physical activity*', consists of two process indicators related to the provision of educational information to both patients and close-relatives. The sixth domain, '*Patient-tailored physical activity plan*', includes three process indicators to assess the use and follow-up of a patient-tailored physical activity plan that '*should be reported, tailored at individual patients' needs, with a specific structure stating personal goals, frequency, intensity, time, and type of physical activity*'. The seventh domain, '*Outcome measure*', consists of three outcome indicators to measure if patients are physically active within 48 hours after hospital admission, if patients perform physical activities as described in a physical activity plan and whether patients have an acceptable degree of pain.

DISCUSSION

The current study presents the development of a longlist of quantitative and qualitative healthcare quality indicators for the healthcare of hospitalised adults of all ages with (or at risk of) low physical activity during the hospital stay. A multidisciplinary expert panel agreed on a list of 23 quality indicators with important domains such as an aim, patient-tailored physical activity plan, evaluation of physical activity, information on physical activity, equipment to stimulate physical activity, policy regarding physical activity and attitude related to physical activity. The quality indicators involve several stakeholders such as patients, close relatives and healthcare professionals (ie, physical therapists, nurses and physicians), which is consistent with the multifactorial nature of low physical activity of patients during the hospital stay.[39]

Reviewing current literature related to indicator development in secondary healthcare shows several studies reporting on physical activity of the elderly people.[19–21] In contrast to our study, none of these aimed to evaluate physical activity in hospitalised adults of all ages during the hospital stay. Bail and Grealish[19] performed a literature review and constructed a theoretical framework called 'Failure to maintain'. This study suggested quality indicators on physical environment factors and process factors (treatment and regimes that may affect the patient) to increase physical activity in complex older patients and ultimately decrease the incidence of urinary tract infections, pneumonia, delirium and pressure injuries. Arora et al[20] also performed a literature review for the general medical care of hospitalised vulnerable elderly people. Out of 30 reported quality indicators, only two related to physical activity of patients during the hospital stay: mobilisation and inpatient fall evaluation. These two domains are likely to be important, although two quality indicators do not completely address the complex issue of low physical activity in patients during the hospital stay.[10] Tropea et al[21] performed a Delphi study with anonymous

Table 2 Final longlist of healthcare quality indicators for the care of patients with (or at risk of) low physical activity during the hospital stay

Domain	Healthcare quality indicators
1. Policy	
Title:	1. The hospital ward should have the policy to improve the physical activity of patients (**Structure indicator**)
Numerator:	The hospital ward policy was to inform patients to be physically active during the hospital stay
Denominator:	The hospital ward
	Expert opinion
Title:	2. The hospital ward should have the policy to inform close relatives about physical activity (**Structure indicator**)
Numerator:	The hospital ward policy was to inform close relatives of patients about the importance of physical activity during the hospital stay
Denominator:	The hospital ward
	Expert opinion
2. Attitude and education	
Title:	3. Physicians should stimulate the physical activity of patients (**Structure, qualitative indicator**)
Numerator:	The number of physicians who had a stimulating attitude towards the physical activity of patients during the hospital stay
Denominator:	The number of physicians at the hospital ward
	Adapted from Inouye et al[44] and Sourdet et al[40]
Title:	4. Nurses should stimulate the physical activity of patients (**Structure, qualitative indicator**)
Numerator:	The number of nurses who had a stimulating attitude towards the physical activity of patients during the hospital stay
Denominator:	The number of nurses at the hospital ward
	Adapted from Inouye et al[44] and Sourdet et al[40]
Title:	5. Nurses should stimulate independent functioning in daily activities of patients (**Structure, qualitative indicator**)
Numerator:	The number of nurses who had a stimulating attitude towards independent physical functioning in daily activities of patients during the hospital stay
Denominator:	The number of nurses at the hospital ward
	Adapted from Sourdet et al,[40] Pedersen et al[1] and Brown et al[3]
Title:	6. Nurses should have followed education related to physical activity of patients (**Structure indicator**)
Numerator:	The number of nurses who followed education concerning the importance of physical activity of patients during the hospital stay
Denominator:	The number of patients at the hospital ward
	Adapted from Bail and Grealish[19]
3. Equipment and support	
Title:	7. Patients should have adequate walking aids (**Structure indicator**)
Numerator:	The number of patients who were advised to use (a) walking aid(s), with (an) adequate walking aid(s) available
Denominator:	The number of patients at the hospital ward who were advised to use (a) walking aid(s)
	Expert opinion
Title:	8. The hospital ward should provide adequate resources to stimulate physical activity (**Structure indicator**)
Numerator:	The hospital ward provided physical activity stimulating resources. Examples are walking routes, treadmills, ergometers

Domain	Healthcare quality indicators
Denominator:	The hospital ward
	Adapted from Bail and Grealish[19] and Covinsky et al[39]
Title:	9. The hospital ward should have orientation promoting resources **(Structure indicator)**
Numerator:	The hospital ward provided orientation stimulating resources. Examples are maps, direction signs, banners with route information
Denominator:	The hospital ward ward
	Adapted from Bail and Grealish[19] and Covinsky et al[39]
Title:	10. Patients should receive support for mobilisation **(Process indicator)**
Numerator:	The number of patients who received the support of (at least) one person for mobilisation
Denominator:	The number of patients at the hospital ward who needed the support of (at least) one person for mobilisation
	Adapted from Growdon et al[43] and Lafont et al[41]
4. Evaluation	
Title:	11. Nurses should evaluate freedom-limiting equipment **(Process indicator)**
Numerator:	The nurses performed a daily assessment of the use of freedom-limiting equipment. Examples are five-point fixation, wheelchair tables and wheelchair brakes
Denominator:	The number of nurses at the hospital ward
	Adapted from Inouye et al[44] and Sourdet et al[40]
Title:	12. Nurses should evaluate mobility-limiting equipment **(Process indicator)**
Numerator:	The nurses performed a daily assessment of the use of mobility-limiting equipment in patients. Examples are intravenous lines, urinary catheters and oxygen tubes
Denominator:	The number of nurses at the hospital ward
	Adapted from Inouye et al[44] and Sourdet et al[40]
Title:	13. Nurses or physical therapists should evaluate the preadmission physical ability **(Process indicator)**
Numerator:	The number of patients in which the preadmission physical functioning was evaluated within 24 hours after hospital admission
Denominator:	The number of patients at the hospital ward
	Adapted from Brown et al,[3] Pedersen et al,[1] Lafont et al,[41] Zisberg et al,[6] Covinsky et al,[39] Bail and Grealish,[19] Arora et al,[42] Tropea et al,[21] and Counsell et al[47]
Title:	14. Nurses or physical therapists should evaluate the mobility **(Process indicator)**
Numerator:	The number of patients in which the mobility was evaluated within 24 hours after hospital admission
Denominator:	The number of patients at the hospital ward
	Adapted from Covinsky et al[39]
Title:	15. Patients should be evaluated after a fall incident **(Process indicator)**
Numerator:	The number of patients in which a fall incident was evaluated within 24 hours after the fall
Denominator:	The number of patients at the hospital ward with a fall incident
	Adapted from Arora et al[20] and Tropea et al[21]
5. Information	
Title:	16. Patients should be informed about the importance of physical activity **(Process indicator)**

Table 2 Continued

Domain	Healthcare quality indicators
Numerator:	The number of patients who were informed about the importance of physical activity during the hospital stay
Denominator:	The number of patients at the hospital ward
	Adapted from Bail and Grealish[19]
Title:	17. Close relatives of patients should be informed about the importance of physical activity **(Process indicator)**
Numerator:	The number of close relatives of patients who were informed about the importance of physical activity during the hospital stay
Denominator:	The number of patients at the hospital ward with close relatives
	Adapted from Bail and Grealish[19]
6. Patient-tailored physical activity plan	
Title:	18. Patients should have a physical activity plan **(Process indicator)**
Numerator:	The number of patients who had a physical activity plan within 48 hours after hospital admission
Denominator:	The number of patients at the hospital ward
	Adapted from Growdon et al[43] *and Lafont et al*[41]
Title:	19. Patients in need for support during mobilisation should have a physical activity plan **(Process indicator)**
Numerator:	The number of patients, who needed the support of (at least) one person for mobilisation, with a physical activity plan
Denominator:	The number of patients at the hospital ward who needed the support of at (least) one person for mobilisation
	Adapted from Growdon et al[43] *and Lafont et al*[41]
Title:	20. Patients without need for support during mobilisation should have a physical activity plan **(Process indicator)**
Numerator:	The number of patients, who did not need the support of a person for mobilisation, with a physical activity plan. Patients who only use (a) walking aid(s) are considered independent
Denominator:	The number of patients at the hospital ward who did not need the support of a person for mobilisation
	Adapted from Growdon et al[43] *and Lafont et al*[41]
7. Outcome measure	
Title:	21. Patients should be physically active within 48 hours after hospital admission **(Outcome indicator)**
Numerator:	The number of patients who were physically active within 48 hours after hospital admission
Denominator:	The number of patients at the hospital ward
	Adapted from Arora et al[20]
Title:	22. Patients should perform physical activities as described in their physical activity plan **(Outcome indicator)**
Numerator:	The number of patients who performed physical activities as described in their physical activity plan
Denominator:	The number of patients at the hospital ward with a physical activity plan
	Adapted from Growdon et al[43] *and Lafont et al*[41]
Title:	23. Patients should have an acceptable degree of pain **(Outcome indicator)**
Numerator:	The number of patients who scored *pain at rest* and *pain during physical activities* with a Numeric Pain Rating Scale ≤4
Denominator:	The number of patients at the hospital ward
	Adapted from Sourdet et al,[40] *Covinsky et al*[39] *and Arora et al*[42]

voting rounds and a panel meeting similar to the current study, resulting in a set of quality indicators for healthcare in older hospitalised patients. The set exists of three quality indicator domains related to physical activity in patients during the hospital stay with five relevant quality indicators: inpatient fall evaluation, fall-related injuries including fractures, pressure ulcer risk assessment, discharge assessment and assessment of physical function.

Interestingly, the current study found two quality indicators with a focus on hospital ward policy. In line with the Medical Research Council recommendations, quality improvement studies which aim to improve physical activity in hospitalised adults of all ages should include the perspective of local hospital policy in their study development and process evaluation.[49] Furthermore, qualitative quality indicators were described to evaluate the attitudes of healthcare professionals related to physical activity. Attitudes are often hard to measure and therefore underexposed in other studies,[25] despite the knowledge that attitudes of different stakeholders play an important role in healthcare quality improvement.[50] With low physical activity during hospital stay being a multifactorial issue in hospitalised adults of all ages, the current study provides crucial knowledge to evaluate healthcare for hospitalised adults of all ages (with or) at risk of low physical activity during the hospital stay.

Strengths and limitations

The current study has several strengths. First, all methods as suggested by the modified RAND/UCLA are followed in detail. The use of a thorough systematic review with duplicate study selection, an extra survey in healthcare professionals and consensus rounds with a panel meeting is considered as a very rigorous quality indicators development procedure.[51] Second, the panel meeting has been moderated by an internationally experienced moderator (PvdW) which contributed to an efficient and systematic discussion of all quality indicators.

There are some limitations to the current study that need to be discussed. First, only five panel members participated in the panel meeting and the third consensus round which is lower than the preferred 7 to 15 members within the RAND/UCLA method.[29] Despite the reduced diversity of representation, the smaller group size was found to stimulate the involvement of every panel member in the group discussion. Second, two items of the AGREE II were not met.[30] The quality indicators were not submitted to external review, and stakeholders such as patients, managers and healthcare insurers were insufficiently included in the process of quality indicators development. However, the limited external review and stakeholder involvement could be adequately addressed in future research.

Recommendations for future research

As the next step of our quality improvement initiative, a multicentre study will be performed to assess the acceptability, feasibility and reliability of the longlist of quality indicators for the healthcare in hospitalised adults of all ages with (or at risk of) low physical activity during the hospital stay. The longlist of quality indicators will be applied in practice to further assess the acceptability to patients, healthcare professionals and managers, as well as its feasibility and reliability.[52] Future research will include a validation study following the Delphi technique of Hasson et al[51] in a team of national and international experts. This would provide crucial information on the appropriateness of care and optimisation of patient outcomes. To improve feasibility in daily practice, it would be useful to select approximately three or four key performance quality indicators from the current longlist. Ultimately, a quality improvement study should use the key performance quality indicators in daily healthcare and assess their effect on patient outcomes such as strength and functional decline.

CONCLUSIONS AND IMPLICATIONS

The healthcare quality indicators developed within the current study form a rigorous basis to evaluate healthcare for hospitalised adults of all ages with (or at risk of) low physical activity during the hospital stay. Improvements in healthcare related to low physical activity of patients during the hospital stay are urgently needed, as the epidemic of low physical activity has already existed for decades with known, well-reported adverse effects. Quality improvement projects to increase the physical activity of patients during the hospital stay using currently developed healthcare quality indicators are promising, relevant and will improve outcomes in hospitalised adults of all ages.

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