







Supervised teaching and feedback improve physiotherapists' reporting of the International Classification of Functioning, Disability and Health in physiotherapeutic electronic patient records: A proof-of-concept randomized controlled trial

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Abstract

Rationale, aims, and objectives: The International Classification of Functioning, Disability and Health (ICF) is a landmark for physiotherapy to describe the full spectrum of human functioning, but ICF patient record completion could improve. In this study, we examine the effect of supervised teaching and personalized feedback on physiotherapists' completion and reporting of ICF in electronic patient records.

Method: In this proof-of-concept randomized controlled trial, the intervention group (10 physiotherapists) received supervised teaching and four rounds of personalized feedback on reporting of ICF components in electronic patient records. In the intervention group, review on patient record completion ($n = 670$ records) was performed at baseline, after teaching, after each of four feedback rounds, and at long-term follow-up. In the control group (five physiotherapists), which received no supervised teaching nor personalized feedback, review ($n = 140$ records) was performed at baseline, after the third feedback round of the intervention group, and at follow-up.

Results: After the third round of feedback (95% vs 72% completion; β , 2.68; 95% CI, 0.62–4.74), patient record completion was significantly higher in the intervention group. This was also true for following ICF components: “activity” (93% versus 64% completion; β , 3.03; 95% CI, 1.52–4.54), “participation” (50% versus 14% completion; β , 3.67; 95% CI, 1.79–5.55), and “personal factors” (35% versus 20% completion; β , 2.10; 95% CI, 0.63–3.57). These statistically significant and clinically relevant effects persisted at long-term follow-up. For “environmental factors,” effects after the third round of feedback (75% vs 30% completion; β , 1.88; 95% CI, 0.63–3.13) disappeared at follow-up. Reporting of “body functions and structures” improved similarly across groups.

Conclusions: Supervised teaching and personalized feedback are active ingredients of an intervention to improve reporting of ICF components in physiotherapeutic patient records.

KEYWORDS

behaviour therapy, Disability and Health, electronic health records, hospitals, International Classification of Functioning, randomized controlled trial

1 | INTRODUCTION

The International Classification of Functioning, Disability and Health (ICF) was developed by the World Health Organization to provide a standardized framework to support the definition, measurement, and policy regulations for health and disability.¹ It is based on the biopsychosocial approach, in which functioning and disability are outcomes of complex interactions among intrinsic features of the person on the one hand and contextual factors (environmental and personal) on the other hand. The ICF embraces two parts with two components each. Part 1 "Functioning and Disability" includes (a) "body functions and structures" (ie, physiological and psychological functions of the body and anatomic parts of the body) and (b) "activities and participation" (ie, the execution of actions or tasks and the effects in daily life). "Activities" are nevertheless often distinguished from "participation." Part 2 "Contextual Factors" includes (a) "environmental factors" (ie, physical, social, and attitudinal situations in which people live) and (b) "personal factors" (ie, background of individual's life and living situation).

Apart from the obvious advantage that ICF recognizes the complex interaction between disability and functioning, physiotherapists would be able to better communicate with each other and with other health care providers by avoiding the use of confusing or vague terms in their electronic patient records.² Preliminary evidence showed that interdisciplinary productivity increased through easier communication as a result of the ICF model.³ Electronic patient records may serve as an effective tool to this end.^{4,5} The reporting of disability in medical records is especially relevant because people who are unable to work due to reduced health can receive support for return to work and/or wage replacement benefits.⁶ However, several studies have demonstrated a wide variability in reporting of patients' functioning in electronic patient records.⁷⁻¹⁰

The objective of this study was therefore to investigate the impact of supervised teaching and personalized feedback on physiotherapists' completion of physiotherapeutic electronic patient records and reporting of the components of the ICF: (a) body functions and structures, (b) activities, (c) participation, (d) environmental factors, and (e) personal factors.

2 | METHODS

2.1 | Setting and participants

This was a single-centre two-arm parallel group randomized controlled trial at University Hospitals Leuven in Belgium. This is a large tertiary care centre with 161 employed physiotherapists. Service meetings, internal audits, and external audits by Joint Commission International

repeatedly confirmed that physiotherapists, in terms of content, volume, and format, do not consistently complete physiotherapeutic patient records. This varies not only across physiotherapists but also by the same physiotherapists at different occasions.

Five care areas were included: acute musculoskeletal rehabilitation, cardiovascular rehabilitation, cancer rehabilitation, pulmonary rehabilitation, and ambulatory rehabilitation. Each of these care areas has one physiotherapist team leader. Fifteen physiotherapists (non-leaders), three from each care area, were randomized with a 2:1 allocation ratio into either the intervention group ($n = 10$; two in each care area) or the control group ($n = 5$; one in each care area). As detailed below, these physiotherapists completed patient records, which present the outcomes. Randomization occurred for physiotherapist as well as for patient records. Random assignment was done from a computer-generated list of random numbers and was stratified by care unit. L.L. was responsible for randomization, enrolling participants, and assigning them to the intervention.

A written informed consent was signed by the included participants. The study conformed to the principles of the Declaration of Helsinki (1964) and was approved by the Ethics Committee of University Hospitals Leuven.

2.2 | Intervention

First, in February 2016, a general 1-hour teaching session was organized, covering all physiotherapists in both the intervention and control group. The session consisted of an informative oral presentation and discussion on quality management in physiotherapy and on reporting ICF components in the electronic patient record.

Second, in March 2016, supervised teaching in the form of a specific 2-hour joint workshop was organized for the physiotherapists in the intervention group as well as their care area team leaders. This teaching focused on using the ICF model in physiotherapy, related to the electronic reporting of a physiotherapeutic session. The ICF model was explained in detail, and example patient records were analysed. At this time, personalized feedback was also provided on the baseline record review. This feedback allowed physiotherapists to compare with colleagues the completion of patient records and the description of the ICF components.

Third, the physiotherapists received weekly personalized feedback via email during 4 weeks regarding their electronic reporting and description of the ICF components. The team leaders of each care area received this weekly feedback as well. This feedback was provided by a summary table showing for each physiotherapist the number of patient records that were completed as well as the reporting of ICF components and personalized written feedback for each participating physiotherapist. This personalized feedback was provided in a

constructive manner. The focus was on the process and the effort of the physiotherapists.¹¹ Physiotherapists were again able to compare their scores with peers. Starting from the second week, the results of the present week and the previous week were compared, so that the participating physiotherapist and the team leaders of each care area could follow their evolution over time. Further, in-between questions from the participating physiotherapists were answered orally or by telephone. L.L. was responsible for this aspect of the study.

In the control group, no supervised teaching nor feedback in any form were organized.

2.3 | Primary outcomes

The primary outcomes were completeness of the patient record and presence of ICF components. Outcome data for the intervention group were collected at seven measurement occasions (baseline [October 2015], after teaching [April 2016], after each of four feedback rounds [April to May 2016], and long-term follow-up [September 2016]). An equal number of patient records ($n = 10$) were reviewed for all 10 physiotherapists in the intervention group at each of seven measurement occasions. A patient record is defined as the reporting of a single physiotherapy treatment. Patient records were randomly selected. They were returned from the hospital's clinical working system using a stored query invoked by L.L.

Outcomes of the control group were collected at baseline, after the third feedback round of the intervention group, and long-term follow-up. Similar to the intervention group, an equal number of patient records ($n = 10$) were reviewed for all five physiotherapists in the control group at each of these measurement occasions.

The completeness of the patient record was evaluated as follows. If a patient record with at least one ICF component reported was

available at the day of the relevant physiotherapy session, it was scored "1." Else, it was scored "0." To evaluate the presence of each of the five ICF components, analysis of free text was conducted for the electronic patient records that were available. In addition to completeness of the patient record, the reporting of each of the five ICF components was scored separately. When a specific ICF component was described, it was scored "1." Else, it was scored "0." There were no exclusion criteria for patient records.

2.4 | Data analysis

Because the training and feedback were given to the physiotherapists, the patient records linked to these physiotherapists are the outcome measure of the intervention. We account in our statistical analysis for the patient records being clustered in physiotherapists.¹²

To present the study findings, first, we described characteristics of the participating physiotherapists for the intervention and control group. Second, we described the outcomes from the patient record review for the intervention and control group (primary outcome). Findings are presented at the aggregate group level, but we also showed variation across physiotherapists within groups. We then conducted a repeated measures mixed-model logistic regression analysis with the three time points that had data for both groups (baseline, after the third feedback round of the intervention group, and long-term follow-up). The patient record constituted the unit of analysis. We included random effects to account for repeated measures among physiotherapists as well as for the clustering of patient records within physiotherapists. We also included a fixed effect for care area in addition to the fixed effects for measurement occasion, group (1 for intervention group, 0 for control group), and group by measurement occasion. The intervention effect was evaluated on the basis of the

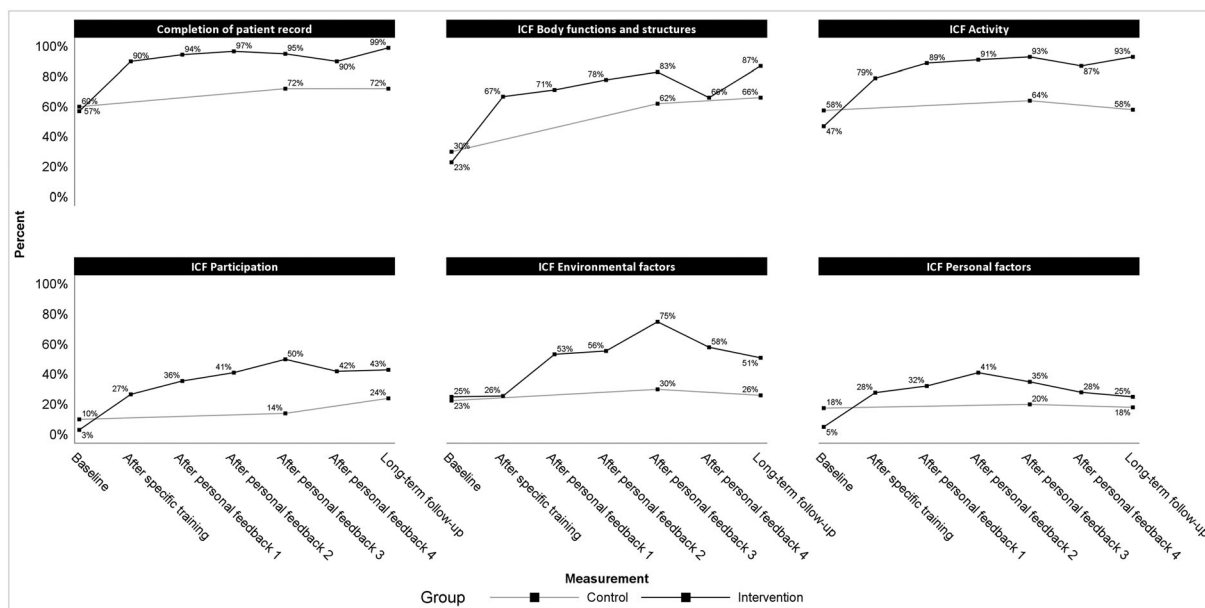


FIGURE 1 Aggregate descriptive findings for completion of patient record and reporting of International Classification of Functioning, Disability and Health (ICF) components in the intervention group versus the control group

interaction between the group and measurement occasion. Sensitivity analyses were conducted adding physiotherapist gender and years of experience to the model. The data analysis was generated using SAS software, Version 9.4.

3 | RESULTS

3.1 | Flow of participants through the study

No participants were lost to follow-up. Since physiotherapists were sometimes absent because of holidays, a set of 10 patient records for the same physiotherapist in the intervention group was missing at two occasions (after specific training and first round of personal feedback), a set of 10 patient records for another physiotherapist in the intervention group was missing at one occasion (after second round of personal feedback) and a set of 10 patient records for one physiotherapist in the control group was missing at baseline.

3.2 | Physiotherapist characteristics

The mean age of physiotherapists in the intervention group was 39 years (SD, 10), and physiotherapists in the control group were on average 34 years (SD, 7) old. Years of experience in the intervention group was 13 (SD, 10), whereas this was 5.8 (SD, 7) in the control group. In both groups, there was one male physiotherapist. In the intervention group, one physiotherapist's highest degree was a bachelor's degree, whereas all other physiotherapists had obtained a master's degree.

3.3 | Primary outcomes

A total of 670 and 140 patient records were reviewed for the intervention and control groups, respectively. The patient records were for 729 unique patients, as several patients received physiotherapy on multiple occasions during the study period.

At baseline, 57% ($n = 57$ of 100) of the patient records in the intervention group and 60% ($n = 24$ of 40) of the patient records in the control group were completed, respectively (Figure 1). This difference was not significant (β , 0.68; 95% CI, -2.75 to 4.11); see Table 1. In the intervention group, a completion rate of 90% ($n = 81$ of 90) was noted after the teaching session. It remained at these levels after the personalized feedback and achieved a 99% ($n = 99$ of 100) rate at follow-up. In the control group, completion never got higher than 72% ($n = 36$ of 50 after the personalized feedback in the intervention group and $n = 36$ of 50 at follow-up). As shown in Table 1 by the statistical interaction between intervention group and measurement occasion, after personalized feedback (β , 2.68; 95% CI, 0.62-4.74) as well as at follow-up (β , 4.71; 95% CI, 1.48-7.94), these differences were statistically significant. It can be observed in Figure 2 that half of the physiotherapists in the intervention group already had an excellent completion rate at baseline and that the other half joined them as the study progressed.

TABLE 1 Repeated measures analysis for completion of patient records and reporting of International Classification of Functioning, Disability and Health (ICF) components in the intervention versus the control group

	Completion of patient record		ICF "Body functions and structures"		ICF "Activities"		ICF "Participation"		ICF "Environmental factors"		ICF "Personal factors"	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Intercept	4.55	-0.13 to 9.23	-0.77	-2.98 to 1.44	2.71	0.53 to 4.89	-2.06	-3.59 to -0.53	-1.23	-2.80 to 0.34	-2.12	-3.18 to -1.06
Intervention group	0.68	-2.75 to 4.11	-0.32	-2.46 to 1.82	-0.75	-1.23 to 2.73	-1.65	-3.41 to 0.11	0.14	-1.33 to 1.61	-1.28	-2.53 to -0.03
After third round of personalized feedback	0.55	-0.29 to 1.39	1.83	0.69-2.97	0.17	-0.75 to 1.09	-0.08	-1.47 to 1.31	0.41	-0.57 to 1.39	0.28	-0.80 to 1.36
Long-term follow up	0.54	-0.38 to 1.46	2.11	0.93-3.29	-0.12	-1.06 to 0.82	0.64	-0.65 to 1.93	0.20	-0.82 to 1.22	0.17	-0.93 to 1.27
After third round of personalized feedback X Intervention	2.68	0.62-4.74	1.27	-0.28 to 2.82	3.03	1.52-4.54	3.67	1.79-5.55	1.88	0.63-3.13	2.10	0.63-3.57
Long-term follow up X Intervention	4.71	1.48-7.94	1.46	-0.36 to 3.28	3.40	1.64-5.16	2.63	0.79-4.47	0.97	-0.38 to 2.32	1.74	0.25-3.23

Abbreviations: Est, estimate; ICF, International Classification of Functioning, Disability and Health; SE, standard error; X, the interaction between the group and measurement occasion to evaluate the intervention effect.

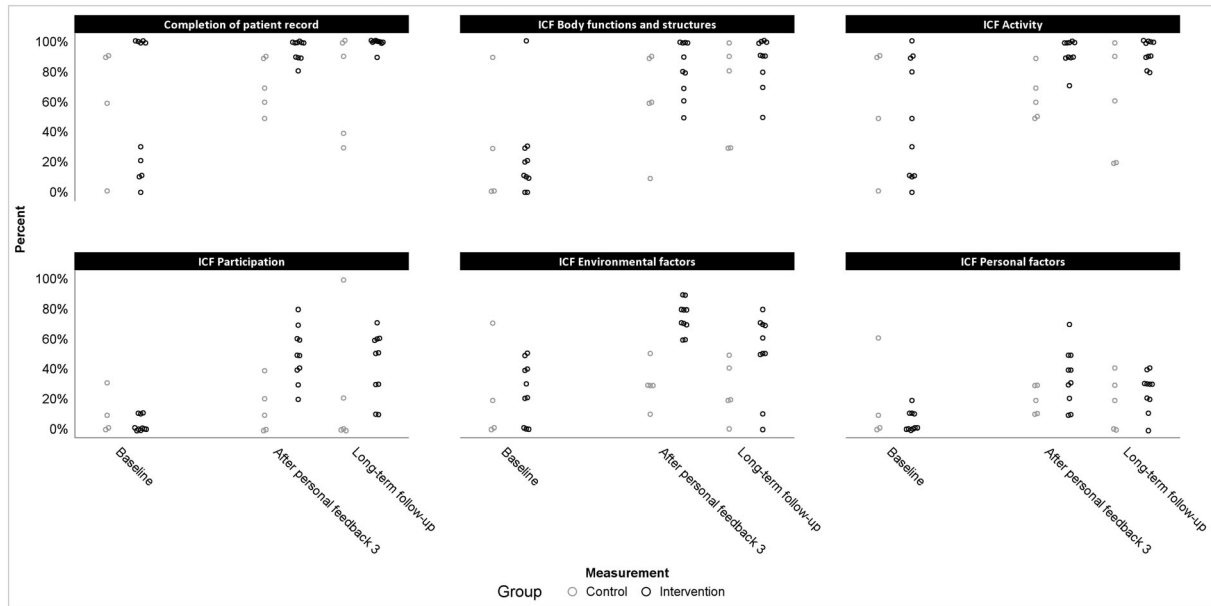


FIGURE 2 Physiotherapist variation in completion of patient record and reporting of International Classification of Functioning, Disability and Health (ICF) components in the intervention group versus the control group

At baseline, there was no significant difference between both groups regarding the description rate of the ICF components in the patient record, except for the ICF component of “personal factors” (18% [control] vs 5% [intervention]; β , -1.28; 95% CI, -2.53 to -0.03). Notably, at baseline, only for the ICF component “activities” was a description rate of higher than 50% observed, and in the control group only (58%, $n = 23$ of 40). In the intervention group, sharp increases in description rates were noticed, with statistically significant differences after the third round of feedback in favour of the intervention group for all ICF components, except for “body functions and structures” (β , 1.27; 95% CI, -0.28 to 2.82). Reporting for the latter also improved in the control group. Other than that, in the control group, ICF description rates remained stable or only modestly improved over time. Except for the ICF components of “body functions and structures” and “activities,” decreases in description rates in the intervention group were seen at follow-up. While those rates remained above baseline levels, in general, they were poor, with only about half of the records including the reporting of ICF “environmental factors” and “participation” at follow-up. Only a quarter of patient records included a description of “personal factors” at follow-up. Nevertheless, description rates for “activities” (β , 3.40; 95% CI, 1.64-5.16), “participation” (β , 2.63; 95% CI, 0.79-4.47), and “personal factors” (β , 1.74; 95% CI, 0.25-3.23) remained statistically significantly better compared with the control group on the long term. Figure 2 demonstrates that large variation existed for reporting of “environmental factors” in the intervention group, which became much smaller during an overall steep increase in reporting at after personalized feedback, but which steeply decreased again at long-term follow-up, at which variation also increased again. For reporting of “body functions and structures,” which scored second best after reporting of “activities,” Figure 2 illustrates that still noteworthy variation existed in the intervention group after completing the intervention. Sensitivity analyses

including physiotherapist gender and years of experience did not alter our findings.

4 | DISCUSSION

This study identifies supervised teaching and personalized feedback as active ingredients of a successful intervention to improve reporting of ICF components in electronic health records. Clinically relevant and statistically significant effects were seen for several ICF components. These effects continued at long-term follow-up, although much room for improvement remains for the components of “participation,” “environmental factors,” and “personal factors.” Physiotherapists seem less familiar with scoring “personal factors” and “environmental factors.” Possibly, “personal factors” may be hard to classify because of their subjective nature and the large societal and cultural difference between patients.

There remain several avenues for further research. First, future studies could examine the different components of the ICF more into detail by using the core sets of the ICF model, which provide a list of essential categories that are relevant for specific health conditions and health care contexts within each component.¹³ This may also result in the identification of other active ingredients that may lead to even greater improvement in reporting of ICF components. Second, research into the benefits associated with ICF reporting in physiotherapeutic patient records should be expanded. It could be investigated whether and how complete patient records facilitate communication within and across teams and guarantee the continuity and quality of physiotherapeutic health care. Also, further alignment of multidisciplinary electronic patient records would be beneficial. Third, it could be investigated what impact of ICF reporting has on physiotherapists' daily work. Figure 2 showed a decline in reporting after

the fourth round of personal feedback. Of note, no intern students were present during this period, which may suggest that students are a great help in patient record administration or that physiotherapists are more alert or committed to complete the records when guiding intern students. Their role and experiences with patient records should be further investigated. Finally, future studies can investigate which interventions are needed to ensure that the completion of the patient record and ICF reporting are routinely and permanently embedded in clinical practice. This is of critical importance in the relationship between the patient and the health care practitioner and to improve health care quality. The Belgian Law on Patients' Rights (22 August 2002) mentions that health care practitioners, including physiotherapists, must duly keep health records up to date for each patient. Qualitative, quantitative, or mixed method approaches that integrate theory into implementation research are required to better understand the dynamics of implementing interventions to promote the use of (electronic) patient records among health care practitioners. Normalization process theory for one identifies, characterizes, and explains mechanisms that have been empirically demonstrated to motivate and shape implementation processes and affect their outcomes.¹⁴ The decrease in the intervention effect for specific ICF component reporting about half a year after completing the intervention implies that extensions are needed in the form and the direction of the implementation process to ascertain that patient record completion is adopted into routine work (normalization). For example, future implementation efforts could focus on ways for care area team leaders to play a pivotal role to sequentially increase coherence, increase cognitive participation, and collective action to support reflexive monitoring among physiotherapists. Also, technical aspects of importance during the intervention could be further optimized. Documentation templates, for example, may increase structure and increase the consistency of reporting.¹⁵

This study is not without limitations. First, the study is monocentric, and a relatively small number of physiotherapists participated, which limits generalizability of our findings. However, the large number of patient records and consistency of the effect across participants in the intervention group are important strengths. Second, because the physiotherapists from the control group work in the same care areas with the same team leaders as the physiotherapists in the intervention group, spillover effects cannot be ruled out. However, at follow-up, the control group had only improved by 12% (versus 42% in intervention group) on completing patient records and by 14% and 36% (versus 40% and 64%) on reporting ICF components "participation" and "body functions and structures," respectively. Reporting of the other ICF components remained at the same level. Third, only one investigator assessed the physiotherapeutic patient records, making it unclear whether other investigators would assign the same score to the same patient record; ie, interrater reliability is not known.

In conclusion, this study showed that supervised teaching and personalized feedback improved completion and reporting of ICF components in physiotherapeutic patient records. Our findings on long-term follow-up however showed that continuous monitoring is needed to

evaluate that the intervention has been well delivered and that objectives are met.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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