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Stallinga, H.A.

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6

Nurse practitioners’ focus on health care in terms of cure and care: analysis of graduate theses using the International Classification of Functioning, Disability and Health

Hillegonda A. Stallinga
Gerard J. Jansen
Marijke C. Kastermans
Albert Pranger
Pieter U. Dijkstra
Petrie F. Roodbol

Submitted
Abstract

**Aim:** To explore the focus of nurse practitioners on health care in terms of cure and care.

**Background:** Nurse practitioners are expected to act on the intersection of cure and care. However, in clinical practice and education, a clear model covering this area is lacking; therefore, it is unknown to what extent nurse practitioners are focused on this specific area. Graduate theses may reflect the focus of nurse practitioners.

**Design:** Sequential-exploratory mixed-method.

**Methods:** In total 413 published abstracts of graduate theses of the Master of Advanced Nursing Practice (MANP) (2000-2015) were analyzed using the International Classification of Functioning, Disability and Health (ICF). Data source included aim, question, and outcome of each thesis, as well as graduates' characteristics. A qualitative deductive approach was used for the analyses. Theses were classified as focused on cure, care, or on the intersection of cure and care.

**Results:** A small majority of 53% \( n = 219 \) of the graduate theses addressed patient’s health status and could be classified in the ICF. Of the classified theses, 48% were focused on cure, 39% on the intersection of cure and care, and 13% on care. While the percentage of theses addressing health status increased significantly over the 15-year period, the percentage of theses focused on cure, care and on the intersection of cure and care remained the same.

**Conclusion:** The graduate theses reflected that nurse practitioners are increasingly oriented toward patients’ health status. However, their focus is predominantly on cure rather than on the intersection of cure and care.
6.1 Introduction

In the debate about the roles of health care professionals, physicians are associated with cure, whereas nurses and allied health care professionals are associated with care.\(^1\) Nurse practitioners\(^a\) are unique in this respect, because they act on the intersection of cure and care, combining medical and nursing competencies.\(^2,4\) This specific area is known for its unique blending of medicine and nursing.\(^5,6\) However, a clear scope or model of practice that adequately covers this specific area of cure and care is lacking for both clinical practice and graduate education.\(^2,7-11\)

Advanced nursing practice\(^b\) finds its origins in the task substitution and delegation of certain medical activities from physicians to nurses.\(^12\) As a result, the professional development of advanced nursing practice reflects an extended nursing practice rather than an advanced nursing practice.\(^13\) This primarily economic and instrumental perspective has dominated the nurse practitioners’ professional development to date and has failed to capture the nature of what it means to be a nurse practitioner.\(^4,14\)

Our study aims to explore the health care focus (cure, care, or the intersection of cure and care) of advanced nursing practice by analyzing graduate theses of students of a Dutch Master of Advanced Nursing Practice (MANP).

The International Classification of Functioning, Disability and Health (ICF) was used as a reference tool for determining cure, care, and the intersection.

6.1.1 Background

The World Health Organization (WHO) published the ICF as the international standard terminology for functioning and environmental factors, together with the conceptual model of health\(^15\) (Figure 6.1). The conceptual model is based on the biopsychosocial model and represents the components of the health status in which functioning has been conceptualized as a result of a dynamic

\(^a\)The International Council of Nurses (2008) defines a nurse practitioner as a “registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competence for expanded nursing practice, the characteristics of which are shaped by the context and/or country in which she/he is credentialed to practice. A Masters degree is recommended for entry level”.\(^4,11\)

\(^b\)Advanced nursing practice is defined as the expert practice within a regulated nursing scope.
interaction between a health condition (disease or disorder) and contextual factors (environmental and personal factors). Functioning encompasses the components body functions and structures, activities, and participation. Diseases or disorders (i.e. health conditions) are included in the conceptual model, but they are classified in the International Classification of Diseases and Related Health Problems (ICD). The ICF and the ICD are complementary; both classifications have to be used to describe an individual’s health status (Figure 6.1).

Both cure and care aim to improve the health status of individuals. When expressed in the conceptual model of health, cure is primarily focused on the biomedical aspects, including disease and disorders in body functions and structures, whereas care is primarily focused on aspects related to functioning (Figure 6.1). Although cure and care can be distinguished from one another, they should not be seen as separate units in health care provision but as a continuum in which both can be considered as endpoints. By recording information related to the health status in the components of the conceptual model, a clinical decision model emerges that can be used in health care provision regarding cure and care.

The MANP started in the Netherlands in 1998. The program, which was designed with the aim to provide more efficient health care, was motivated
by a shortage of doctors and growing health care costs. The curriculum of the MANP \((N = 9)\) in the Netherlands is similar to that of the MANP in the United States.\(^4\) Being a registered nurse is an entry requirement for the MANP. Following the general competency profiles, students have to integrate cure and care.\(^6\) In addition, the so-called cure competencies, which are competencies aimed at biomedical aspects of health such as prescribing medication, ordering of diagnostic tests, and referral to specialists, are required for the granting of nurse practitioner status.\(^13\) However, a clear model of practice that demonstrates how to integrate cure and care does not exist. It was actually expected that MANP students would automatically integrate cure competencies with care competencies because of their nursing background.

Writing graduate thesis gives students the opportunity to study a specific topic of their own choice related to clinical practice. In this context, graduate theses reflect the contribution of the MANP and the perception of the field of

6.2 The study

6.2.1 Aim
The aim of this study was to explore the focus of nurse practitioners on health care in terms of cure and care by analyzing MANP graduate theses using the WHO’s conceptual model of health, including the ICF and the ICD, as a reference tool. The current trends with respect to the focus on health care reflected in the graduate theses can help establish guidelines for the MANP’s curriculum in order to meet the competency profiles for nurse practitioners regarding the integration of cure and care.

The following research questions were answered:

- To what extent are graduate theses focused on cure, care, or on the intersection of cure and care?
- What is the content of graduate theses and how can this content be coded in the components of the WHO’s conceptual model of health using the ICD and the ICF?

6.2.2 Design
A sequential exploratory mixed-methods design was employed in which textual data were collected. First, data were analyzed in a qualitative content analysis, using a deductive approach. This approach was appropriate as the
aim was to map existing qualitative data in a new context with predefined categories. The conceptual model, including the chapters and categories of the ICD and the ICF, provided for the predefined categories. Next, a quantitative analysis was performed using an algorithm derived from the concept model of health. The algorithm enabled the classification of graduate theses as cure-focused (= theses coded in disease (ICD) and not in activities and participation (ICF)), care-focused (= theses coded in activities and participation (ICF) and not in disease (ICD)) and intersection of cure- and care-focused (= theses coded in disease (ICD) and in activities and participation (ICF)).

6.2.2 Sample
The sample consisted of published abstracts (n = 413) of theses of MANP graduates of a Dutch University of Applied Sciences, written between March 2000 and September 2014. The sample represents 16% of the total number of graduated and registered nurse practitioners (N = 2 573) of the MANPs (N = 9) in the Netherlands.

6.2.4 Data collection
The abstracts were obtained from internally published graduate theses and the website of the University of Applied Sciences (www.hanze.nl/kopstukken). These abstracts were written by the graduates themselves and published by the University. Three independent research assistants extracted the research question, the research goal, and the research conclusion from each thesis abstract. Graduate characteristics, such as age, gender, graduation year, and field of activity were obtained from the administration office of the MANP involved. Three lecturers of the MANP (GJJ, MCK, AP), trained in using the conceptual model including the ICD and the ICF, coded the research question, the research goal and the research conclusion of the graduate theses. Each of the three encoders independently coded two-thirds of the graduate theses. As a result, each thesis was coded twice. An independent expert (HAS) in using the conceptual model and linking meaningful concepts to the ICD and the ICF checked all codes and acted as a gold standard. Discordant opinions were discussed until consensus was reached. If consensus was not reached, the expert had the final say.
6.2.5 **Ethical considerations**
Informed consent was not obtained from graduates as the data were anonymized and it was not possible to link specific features of the abstracts to individual graduates.

6.2.6 **Data analysis**

*Qualitative content analysis*
A qualitative content analysis was conducted on the total sample of 413 graduate theses. A detailed manual and coding scheme were developed based on the established linking rules. The manual and coding schema specifically aimed to indicate the classification of the meaningful concepts of the master theses into the components of the conceptual model of health and the chapters and categories of the ICD and the ICF. First, the topic of each thesis was assessed. A graduate thesis was coded health status-oriented if the topic of the thesis reflected components of the conceptual model (Figure 6.1) i.e. disease (classified in the ICD), and/or body functions and structures, and/or activities and participation (classified in the ICF). Environmental factors do not determine the focus on cure or care and were therefore not included in this first step. Personal factors are included in the conceptual model but not classified in the ICF and were therefore excluded from coding in this study.

In the second step, the health status-oriented theses were coded into one or more components of the conceptual model and chapters and categories of the ICD and the ICF. Environmental factors are included in this coding procedure in order to describe the content of the graduate theses.

The first 10% of the coded graduate theses were discussed between the three encoders and the ICF expert. Subsequently, the expert modified and reinforced the manual and the coding scheme with examples of how specific meaningful concepts should be coded. The agreement between the encoders was calculated using Cohen’s kappa (κ) and interpreted as follows: < 0.20 indicated slight agreement; 0.21–0.41 fair agreement; 0.42–0.60 moderate agreement; 0.61–0.80 substantial agreement; and κ > 0.80 almost perfect agreement.

*Quantitative analysis*
Descriptive statistics were computed for characteristics of the graduates and the content of the different types of graduate theses i.e. not health
status-oriented and health status-oriented and subsequent for cure-focused, care-focused, and intersection of cure- and care-focused. Differences in characteristics between graduates with not health status-oriented theses and health status-oriented theses and between cure-focused, care-focused, and intersection of cure- and care-focused theses were analyzed using chi-square test (gender and working field) and independent sample t-test and ANOVA (age). Effect sizes ($d$ or Phi ($\phi$)) were calculated and assessed against Cohen's criteria ($d$ 0.2 or $\phi$ 0.1 = small, $d$ 0.5 or $\phi$ 0.3 = medium, $d$ 0.8 or $\phi$ 0.5 = large).\(^{25}\) A $p$-value < 0.05 was considered statistically significant. Data were analyzed using IBM Statistical Package for the Social Sciences Version 22.0 for Windows (SPSS Inc., Chicago, IL, USA).

6.2.7 Validity and reliability
To increase the validity and reliability of the qualitative data, content validity was ensured by: a training of three encoders in using the conceptual model of health, including the chapters and categories of the ICD and the ICF; an extensive coding scheme and manual derived from established linking rules;\(^{23}\) involvement of an coding expert (HAS) as the gold standard; and obtaining agreement between the encoders about the coding of the graduate theses. The data were analyzed in a transparent and systematic way using careful documentation, triangulation (encoder, analysis) and reassembling by means of an algorithm.

6.3 Results

6.3.1 Qualitative analysis
In the first step, a substantial to almost perfect agreement was achieved ($k = 0.79–0.98$) between the encoders regarding the orientation of the graduate theses (health status-oriented or not health status-oriented). After discussions between the encoders and the expert a full agreement was achieved. Of the 413 graduate theses, 53% ($n = 219$) were health status-oriented and 47% ($n = 194$) not health status-oriented. The following research question illustrates a health status-oriented thesis: “What is the effectiveness of secondary prevention related to fatigue and resumption of work in stroke patients at a younger age?” This thesis was coded as follows: stroke was coded in the component disease; fatigue was coded in body functions; resumption of
work was coded in activities and participation; and secondary prevention was
coded in the environmental factors.

Thesis topics that were not health status-oriented addressed
organizational issues, quality of care or the positioning of nurse practitioners.
The following research topic illustrates a thesis that is not health status-
oriented: “To develop a job description for the nurse practitioner in nursing
homes.”

In the second step, regarding the coding of the 219 health status-oriented
theses, κ was fair for diseases (0.52–0.63) and body functions (0.44–0.51),
moderate for activities and participation (0.26–0.43) and slight to moderate
for the environmental factors (0.10–0.34). After the encoders received extra
training in linking rules and discussed a number of meaningful concepts,
they revised their initial coding. This resulted in an almost perfect agreement
(κ = 0.95–1) for all the components. After discussing the coding differences,
consensus could be reached.

6.3.2 Quantitative analysis

Sample characteristics

No significant differences were found between graduates with the health
status-oriented theses compared with graduates with not-health-status-
oriented theses in mean age (resp. 42.0 years, SD 7.9; 40.5, 7.4) and gender
(Table 6.1). Significant differences were found in working field; more graduates
with health status-oriented theses worked in psychiatric care, primary care,
rehabilitation, or geriatric and palliative care, compared with graduates with

Table 6.1 Comparison of characteristics of graduates with health status-oriented and not
health status-oriented theses.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Health status-oriented</th>
<th>Not health status-oriented</th>
<th>p value</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean (SD))</td>
<td>n = 413</td>
<td>41.3 (7.7)</td>
<td>42.0 (7.9)</td>
<td>40.5 (7.4)</td>
<td>0.055*</td>
</tr>
<tr>
<td>Gender n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>326 (79)</td>
<td>170 (78)</td>
<td>156 (80)</td>
<td>0.488*</td>
<td>0.01</td>
</tr>
<tr>
<td>Male</td>
<td>87 (21)</td>
<td>49 (22)</td>
<td>38 (20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working field n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>350 (85)</td>
<td>174 (80)</td>
<td>176 (91)</td>
<td>0.001#</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>63 (15)</td>
<td>45 (20)</td>
<td>18 (9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SD: standard deviation; A: generic hospital care; B: psychiatric care, primary care,
rehabilitation, geriatric and palliative care; *Pearson chi-square and effect size Phi
coefficient φ; #t-test and effect size Cohens’d
not-health-status-related theses ($p = 0.001; \varphi = 0.2$).

Female graduates and graduates working in general hospital care were predominant in both groups. A significant upward trend in the number of health status-oriented theses was found for recent years. ($\chi^2 (14, n = 413) = 109.34 \ p < 0.001, \varphi = 0.5$) (Figure 6.2).

**Figure 6.2** Percentage of theses with different focuses per year; between brackets the number of theses published in that year (sig. chi-square for trend $p < 0.001; \varphi = 0.5$).

**Focus of the graduate theses**

Of the 219 health status-oriented graduate theses, 48% ($n = 106$) were focused on cure, 13% ($n = 28$) on care, and 39% ($n = 85$) on the intersection of cure and care ($p < 0.001; \varphi = 1.9$). There was no statistically significant difference between the 219 graduates regarding basic characteristics, except for age ($p = 0.022; d = 0.04$). The graduates with theses focused on care were older compared with the graduates whose theses focused on cure or on the intersection of cure and care (Table 6.2).

---

**Table 6.2**

<table>
<thead>
<tr>
<th>Year</th>
<th>Not health status related</th>
<th>Cure &amp; Care</th>
<th>Care</th>
<th>Cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>100</td>
<td>43</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>2001</td>
<td>57</td>
<td>57</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>2002</td>
<td>64</td>
<td>44</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>2003</td>
<td>78</td>
<td>15</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>2004</td>
<td>81</td>
<td>82</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>2005</td>
<td>71</td>
<td>84</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>2006</td>
<td>60</td>
<td>42</td>
<td>39</td>
<td>10</td>
</tr>
<tr>
<td>2007</td>
<td>50</td>
<td>36</td>
<td>44</td>
<td>18</td>
</tr>
<tr>
<td>2008</td>
<td>36</td>
<td>44</td>
<td>23</td>
<td>11</td>
</tr>
<tr>
<td>2009</td>
<td>29</td>
<td>32</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>2010</td>
<td>21</td>
<td>30</td>
<td>33</td>
<td>21</td>
</tr>
<tr>
<td>2011</td>
<td>28</td>
<td>32</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>2012</td>
<td>34</td>
<td>28</td>
<td>32</td>
<td>15</td>
</tr>
<tr>
<td>2013</td>
<td>32</td>
<td>30</td>
<td>33</td>
<td>21</td>
</tr>
<tr>
<td>2014</td>
<td>29</td>
<td>29</td>
<td>21</td>
<td>24</td>
</tr>
</tbody>
</table>

---

**Chapter 6**

118
Of the 219 health status-oriented graduate theses, 87% (n = 191) included a health condition (i.e. disease). Diseases related to mental and behavioral disorders (total: 20%; n = 45) and the circulatory system (total: 19%; n = 41) were the most frequently included diseases (Table 6.3).

There was no significant difference in frequency of included diseases between the theses focused on cure compared to theses focused on the intersection of cure and care ($\chi^2 (13, n = 191) = 17.23, p = 0.18, \phi = 0.3$).

### Table 6.2 Comparison of characteristics of graduates with cure-focused, care-focused, and cure- and care-focused theses (total n = 219).

<table>
<thead>
<tr>
<th></th>
<th>Cure n = 106</th>
<th>Care n = 28</th>
<th>Cure and care n = 85</th>
<th>p value</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean (SD))</td>
<td>41.8 (7.9)</td>
<td>45 (6.0)</td>
<td>40.3 (8.0)</td>
<td>0.022*</td>
<td>0.04</td>
</tr>
<tr>
<td>Gender n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>81 (76)</td>
<td>22 (79)</td>
<td>68 (80)</td>
<td>0.836†</td>
<td>0.0</td>
</tr>
<tr>
<td>Male</td>
<td>25 (24)</td>
<td>6 (21)</td>
<td>17 (20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working field n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>78 (74)</td>
<td>23 (82)</td>
<td>73 (86)</td>
<td>0.105†</td>
<td>0.1</td>
</tr>
<tr>
<td>B</td>
<td>28 (26)</td>
<td>5 (18)</td>
<td>12 (14)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SD: standard deviation; A: generic hospital care; B: psychiatric care, primary care, rehabilitation, geriatric and palliative care; †Pearson chi-square and effect size Phi coefficient $\phi$; * t-test and effect size Cohens' $d$

### Content of the graduate theses

Of the 219 health status-oriented graduate theses, 87% (n = 191) included a health condition (i.e. disease). Diseases related to mental and behavioral disorders (total: 20%; n = 45) and the circulatory system (total: 19%; n = 41) were the most frequently included diseases (Table 6.3).

### Table 6.3 Diseases in health status-oriented theses ordered by frequency.

<table>
<thead>
<tr>
<th>Diseases (ICD chapters)</th>
<th>Total n (%)</th>
<th>Cure n (%)</th>
<th>Cure and care n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental and behavioral disorders</td>
<td>45 (20)</td>
<td>31 (29)</td>
<td>14 (17)</td>
</tr>
<tr>
<td>Circulatory system</td>
<td>41 (19)</td>
<td>23 (22)</td>
<td>18 (21)</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>17 (8)</td>
<td>8 (8)</td>
<td>9 (11)</td>
</tr>
<tr>
<td>Nervous system</td>
<td>16 (7)</td>
<td>7 (7)</td>
<td>9 (11)</td>
</tr>
<tr>
<td>Endocrine, nutritional and metabolic system</td>
<td>17 (8)</td>
<td>12 (11)</td>
<td>5 (6)</td>
</tr>
<tr>
<td>Respiratory system</td>
<td>15 (7)</td>
<td>6 (6)</td>
<td>9 (11)</td>
</tr>
<tr>
<td>Musculoskeletal system</td>
<td>11 (5)</td>
<td>6 (6)</td>
<td>5 (6)</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>7 (3)</td>
<td>2 (2)</td>
<td>5 (6)</td>
</tr>
<tr>
<td>Genitourinary system</td>
<td>6 (3)</td>
<td>3 (3)</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Digestive system</td>
<td>5 (2)</td>
<td>4 (4)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Blood and immune mechanism</td>
<td>4 (2)</td>
<td>3 (3)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Skin</td>
<td>3 (1)</td>
<td>0 (0)</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Not specified</td>
<td>3 (1)</td>
<td>1 (1)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Pregnancy, childbirth, puerperium</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

Total n (%) within disease 191 (87) 106 (48) 85 (39)

ICD: International Classification of Diseases. Note: Care-focused theses (n = 28; 13%) are left out because diseases were not included in these theses.

6.3 Results
Diseases were not a topic of theses focused on care.

In total 52% (n = 113) of the health status-oriented graduate theses included activities and participation. Self-care was the most frequently included topic of the component of activities and participation (total: 19%; n = 42), directly followed by activities and participation not specified (total: 18%; n = 40) (Table 6.4). These unspecified activities and participation referred to concepts such as quality of life and psychosocial support or behavior. These concepts are too broad to be coded. Hence, they could be related to various chapters in the component activities and participation. There was no significant difference in frequency of included activities and participation between theses focused on care and theses focused on the intersection of cure and care ($\chi^2 (7, n = 113) = 8.18, p = 0.32, \phi = 0.3$). Activities and participation were not a topic of theses focused on cure.

**Table 6.4 Activities and participation in health status-oriented theses ordered by frequency.**

<table>
<thead>
<tr>
<th>Activities and participation (ICF chapters)</th>
<th>Total n (%)</th>
<th>Cure n (%)</th>
<th>Cure and care n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-care</td>
<td>42 (19)</td>
<td>11 (39)</td>
<td>31 (37)</td>
</tr>
<tr>
<td>Not specified</td>
<td>40 (18)</td>
<td>9 (32)</td>
<td>31 (37)</td>
</tr>
<tr>
<td>Interpersonal interactions and relationships</td>
<td>13 (6)</td>
<td>3 (11)</td>
<td>10 (12)</td>
</tr>
<tr>
<td>Learning and applying knowledge</td>
<td>11 (5)</td>
<td>2 (7)</td>
<td>9 (10)</td>
</tr>
<tr>
<td>General tasks and demands</td>
<td>2 (1)</td>
<td>2 (7)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Mobility</td>
<td>2 (1)</td>
<td>1 (4)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Domestic life</td>
<td>2 (1)</td>
<td>0 (0)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Major life areas</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Communication</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Community, social, and civic life</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

Total n (%) within activities and participation = 113 (52) 28 (13) 85 (39)

ICF: International Classification of Functioning, Disability and Health. Note: Cure-focused theses (n = 106; 48%) are left out because activities and participation were not included in these theses.

In total 88% (n = 192) of the health status-oriented graduate theses included body functions. Body functions related to cardiovascular, hematological, immunological, and respiratory systems were the most frequently included topics, (total: 29%; n = 62) followed by mental functions (total: 20%; n = 44). The care-focused theses addressed these topics less frequently compared with the cure-focused and the intersection of cure- and care-focused theses.
Graduate theses focused on care were mostly directed to various chapters of body functions, although 28% \((n = 8)\) of these theses did not address any body functions.

Table 6.5 Body functions in health status-oriented theses ordered by frequency.

<table>
<thead>
<tr>
<th>Body functions (ICF chapters)</th>
<th>Total (n (%))</th>
<th>Cure (n (%))</th>
<th>Care (n (%))</th>
<th>Cure and care (n (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular, hematological, immunological and respiratory</td>
<td>62 (29)</td>
<td>36 (33)</td>
<td>1 (4)</td>
<td>25 (29)</td>
</tr>
<tr>
<td>Mental</td>
<td>44 (20)</td>
<td>25 (24)</td>
<td>3 (11)</td>
<td>16 (19)</td>
</tr>
<tr>
<td>No focus on body functions</td>
<td>27 (12)</td>
<td>2 (2)</td>
<td>8 (28)</td>
<td>17 (20)</td>
</tr>
<tr>
<td>Digestive, metabolic, and endocrine</td>
<td>29 (13)</td>
<td>17 (16)</td>
<td>2 (7)</td>
<td>10 (12)</td>
</tr>
<tr>
<td>Sensory and pain</td>
<td>20 (9)</td>
<td>14 (13)</td>
<td>3 (11)</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Genitourinary and reproductive</td>
<td>16 (7)</td>
<td>6 (6)</td>
<td>4 (14)</td>
<td>6 (7)</td>
</tr>
<tr>
<td>Not specified</td>
<td>7 (3)</td>
<td>2 (2)</td>
<td>4 (14)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Neuromusculoskeletal and movement-related</td>
<td>8 (4)</td>
<td>2 (2)</td>
<td>1 (4)</td>
<td>5 (6)</td>
</tr>
<tr>
<td>Skin</td>
<td>6 (3)</td>
<td>2 (2)</td>
<td>2 (7)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Voice and speech</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

| Total \(n (\%)\) within body functions                | 219 (100)        | 106 (48)        | 28 (13)         | 85 (39)                   |

ICF: International Classification of Functioning, Disability and Health. Note: Theses with no focus on body functions \((n = 27; 12\%)\) are included.

Environmental factors were also included in 88\% \((n = 192)\) of the health status-oriented graduate theses. Environmental factors related to services, systems, and policies were the most frequently addressed topics \((total: 65\%; n = 142)\), followed by products and technology \((total: 19\%; n = 43)\) (Table 6.6).

Table 6.6 Environmental factors in health status-oriented theses ordered by frequency.

<table>
<thead>
<tr>
<th>Environmental Factors (ICF chapters)</th>
<th>Total (n (%))</th>
<th>Cure (n (%))</th>
<th>Care (n (%))</th>
<th>Cure and care (n (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services, systems, and policies</td>
<td>142 (65)</td>
<td>66 (62)</td>
<td>14 (50)</td>
<td>62 (73)</td>
</tr>
<tr>
<td>Products and Technology</td>
<td>43 (19)</td>
<td>26 (25)</td>
<td>3 (11)</td>
<td>14 (17)</td>
</tr>
<tr>
<td>No focus on environmental factors</td>
<td>27 (12)</td>
<td>12 (11)</td>
<td>9 (32)</td>
<td>6 (7)</td>
</tr>
<tr>
<td>Not specified</td>
<td>2 (1)</td>
<td>0 (0)</td>
<td>2 (7)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Attitudes</td>
<td>3 (1)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Natural environment</td>
<td>1 (1)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Support and relationships</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

| Total \(n (\%)\) within environmental factors            | 219 (100)        | 106 (48)        | 28 (13)         | 85 (39)                   |

ICF: International Classification of Functioning, Disability and Health. Note: Theses with no focus on environmental factors \((n = 27; 12\%)\) are included.
The care-focused theses addressed products and technology less frequently compared with the cure-focused and the intersection of cure- and care-focused theses.

6.4 Discussion

This study analyzed the content of 413 graduate theses (2000-2015) of graduates of a Dutch MANP in order to explore the focus of nurse practitioners on health care in terms of cure and care. About half ($n = 219$) of the graduate theses were oriented toward patients’ health status, of which 48% ($n = 106$) were focused on cure, 13% ($n = 28$) on care, and 39% ($n = 85$) on the intersection of cure and care. The number of health status-oriented graduate theses increased significantly from the period of 2000 to 2015. The percentage of theses focused on cure, care and the intersection of cure and care remained the same.

The increase of the number of health status-oriented graduate theses can be explained by the aim of the MANP at the start in 1998, which was to improve efficiency in health care practice.\(^4\) In those early years, the professional role development of the nurse practitioners was related to the consolidation of their own role and position. In recent years, however, the professional role development of the nurse practitioners is moving toward the improvement of patients’ health status.\(^4,26\)

However, while the percentage of theses oriented to patients’ health status increased significantly from the period of 2000 to 2015, the percentage of theses focused on cure, care and on the intersection of cure and care remained the same. In addition, the majority of the graduate theses were focused on cure. This may be explained by the aim of the MANP as well, for the MANP aims to legalize the transfer of medical procedures and certain medical activities from physicians to nurses.\(^12\) Nurse practitioners have been granted direct legal authority for medical health checks and certain medical procedures within selected fields for selected patients in the Netherlands since 2012.\(^1\) Consequently, students of the MANP are strongly focused on the medical competencies required for granting of nurse practitioners status.\(^13\) This focus is confirmed in studies that compared the cure competencies of physicians and nurse practitioners. In general, these studies concluded that both professions are very well comparable when it comes to particular
competencies related to cure. Considering this, the over-representation of the cure-focused graduate theses in the present study might have been caused by the preceptor in clinical practice of the nurse practitioner, who is often a physician and might have influenced the choice of the topic of the student’s thesis.

Despite the fact that the nurse practitioner is a health care professional who is expected to act on the intersection of cure and care, and to combine medical and nursing competencies, the number of graduate theses that were focused on the intersection of cure and care was small. The findings did not indicate that the focus of graduate theses will shift to the intersection of cure and care in the future. Moreover, the predominance of the focus on cure over a 15-year period indicates that the integration of cure and care will come to a halt without the development of a specific model of practice covering the intersection of cure and care. Our results are consistent with studies testing health status assessments. Their results demonstrated that only when health care professionals were offered a tool enabling them to assess patients’ health status, including functioning, cure and care were integrated. This finding supports a recently published ICD-ICF joint use initiative, in which health information was displayed combining the ICD and the ICF in order to guide clinical decision-making related to health care provision.

The findings of the present study indicate that type of disease or activities and participation did not define the focus of the graduate theses. There were no differences in type and number of diseases and activities and participation between the cure-focused, care-focused, and intersection of cure- and care-focused theses. Mental functions and body functions related to the cardiovascular system were the most frequently coded topics in the cure-focused as well as in the intersection of cure- and care-focused graduate theses (Table 6.3). The predominance of these topics may be explained by the predominance of nurse practitioners working in mental health care and cardiovascular care. The Dutch nurse practitioners register showed that 48% \((n = 1223)\) of nurse practitioners are registered in the category intensive care, which covers cardiovascular care, and 28% \((n = 722)\) in the category mental care. The predominance of diseases related to the circulatory system and mental disorders (Table 6.3) corresponded to the predominance of body functions related to the cardiovascular, hematological, immunological and respiratory system and to mental functions (Table 6.5). This finding confirmed
that there is a close link between diseases and body functions, for they represent the same types of categories.\textsuperscript{34}

The predominance of self-care activities (Table 6.4) was demonstrated in both care-focused and the intersection of cure- and care-focused theses. This finding confirmed that self-care activities are part of the core business of nursing, also in advanced nursing practice.

Our study is the first to examine MANP graduate theses in relation to the focus on health care of nurse practitioners. Other studies have analyzed MANP graduate theses in relation to educational outcomes, including graduates’ research knowledge and skills, methodological approach, thematic area of research,\textsuperscript{35,36} and the examiners’ consistency in the grading of theses.\textsuperscript{37} The results of the present study support the opinion, that it may be essential to reexamine the curriculum of MANPs to ensure that educational institutions are meeting the needs of nurse practitioners, consumers, and health care systems.\textsuperscript{38} A clear scope or model of practice that incorporates tools representing the intersection of cure and care has to be developed. The WHO’s conceptual model, which integrates health conditions and functioning, may provide such a clear scope or model and may be useful for guiding the MANP program.

6.4.1 Limitations and strengths
It can be debated whether graduate theses reflect the focus of nurse practitioners on health care. Graduate theses are primarily intended for testing research competencies, and this aim might have interfered with a focus on health care. On the other hand, graduate theses do not only reflect the graduates’ focus but also the faculty’s perspectives, worldviews, perception of the field, and areas of expertise.\textsuperscript{39} In this respect, graduate theses do reflect the focus of nurse practitioners in relation to cure, care, and the intersection of cure and care. Although our results provide a reflection of advanced nursing practice in an educational context, future studies should collect data in the context of clinical practice to validate the results, for instance, by analyzing registered problems and professional health care activities by nurse practitioners in patient health records.

Another limitation concerns the coding of the graduate theses. In a number of graduate theses it was difficult to determine the topic of the study (i.e. focused on disease or one of the components of functioning) and the
patient population involved. This is illustrated by the following graduate thesis topic: *The experienced participation of patients with chronic heart failure.* Although the cardiovascular patient population was involved, the focus was not primarily on the disease of heart failure itself. This graduate thesis should only be coded in the component activities and participation.

A final limitation concerns the lack of knowledge of the encoders related to the linking of meaningful concepts to the components of the conceptual model and the chapters and categories represented by ICD and ICF. This lack of knowledge can explain the moderate to fair level of agreement of the initial coding of the health status-oriented thesis. For example, the encoders did not know that *noncompliance* is classified in the ICF component activities and participation, chapter d5 self-care (category d5702 maintaining one’s health) or that *diabetic alert dog* is classified in environmental factors, chapter e3 support and relationships (category e350 domesticated animals). This means that linking aspects of the health status to components of the conceptual model and categories of the ICD and ICF requires training and supervision.

The strength of the study is the large number of graduate theses conducted over a 15-year period, that were included in the study. Because they covered a substantial period of time, the field of advanced nursing practice was adequately reflected. The analysis consisted of an intensive and careful coding process using established linking rules and classifications (i.e. ICD and ICF). An expert in using the linking rules and the related classifications within the conceptual model provided supervision and additional training when necessary. Although the single center character of the study limited the generalizability of the results, almost one-fifth of all Dutch registered nurse practitioners were represented in this study. Generalization outside the Netherlands is hampered due to the large variety of professional titles and the diversity of functions, roles, and education programs related to nurse practitioners. 39

6.5 Conclusion

Graduate theses reflected that nurse practitioners are increasingly oriented toward patients’ health status. However, their focus is predominantly on cure, rather than on the intersection of cure and care. Findings from this study indicate that a clear model or scope of practice should be developed to guide
the MANP to that particular area of practice. The WHO’s conceptual model of health, including the integration of disease (ICD) and functioning (ICF) represents the intersection of cure and care and can form the basis of this model. Finally, additional studies are needed to evaluate the outcomes and to validate the findings.
References


34. Tesio L. From codes to language: is the ICF a classification system or a dictionary? *BMC Public Health* 2011; 11 Suppl 4: S2-2458-11-S4-S2.


“Mag je nog ergens een keer aan doodgaan?”

de Volkskrant, 23 juni 2012, Henriëtte van der Horst.
Effects of a short training in using the International Classification of Functioning, Disability and Health (ICF) on perceived usefulness of the ICF: a randomized controlled trial in Master of Advanced Nursing Practice students

Hillegonda A. Stallinga
Pieter U. Dijkstra
Huib ten Napel
Gabriël Roodbol
Jeroen W. B. Peters
Yvonne F. Heerkens
Petrie F. Roodbol

Submitted
Abstract

Objective: To test effects of a 4-hour instructor-led training in using the International Classification of Functioning, Disability and Health (ICF) on perceived usefulness of the ICF.

Design: Randomized controlled trial.

Subjects: A total of 74 students enrolled in the Master of Advanced Nursing Practice (MANP) were randomly allocated to intervention or control group.

Methods: The intervention group received a 4-hour instructor-led training in using the ICF. The control group did not receive ICF training. Primary outcome measure was perceived usefulness of the ICF. Secondary outcome measures were ICF-related knowledge, skills and attitude. Data were collected using an ICF survey and learning assessment tool at baseline, immediately after the training, and at 3-months follow-up.

Results: Data of 56 students were included for analysis. Perceived usefulness of the ICF was significantly increased in the intervention group immediately after training ($p = 0.002$) but no longer at 3-months follow-up ($p = 0.054$). Attitude and knowledge related to the ICF were significantly increased in the intervention group at both post-training assessments ($p < 0.001$ to 0.02). Skills were not affected.

Conclusion: A short ICF training has positive influence on perceived usefulness of the ICF, which is relevant for including ICF in the MANP curriculum.
7.1 Introduction

The World Health Organization (WHO) published the International Classification of Functioning, Disability and Health (ICF) as the international standard terminology for functioning, together with the conceptual model of health. Functioning encompass the components body functions and structures, activities, and participation. These components dynamically interact with one another and are influenced by contextual factors (environmental and personal factors) and health condition (Figure 7.1). Health conditions (diseases or disorders) are classified in the tenth version of the International Classification of Diseases and Related Health Problems (ICD-10). The ICF and the ICD are complementary; both classifications have to be used to describe an individual’s health status.

Health care provisions aim to improve the health status of individuals by means of cure and/or care. Within the conceptual model, cure is primarily focused on disease or disorders and body functions and structures, and care is primarily focused on activities and participation. The latter is particularly relevant in the face of the ageing global population and the increasing burden of non-communicable chronic diseases.

In the debate about the role of health care professionals, cure has been associated with physicians and care with nurses and other allied health professions. In this respect, nurse practitioners (NPs) are unique health care professionals who operate on the intersection of cure and care and who

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**Figure 7.1** WHO’s conceptual model of health representing the interactions between the components (disease, body functions and structures, activities, participation, environmental and personal factors) of the health status. ICD: International Classification of Diseases; ICF: International Classification of Functioning, Disability and Health.
combine medical and nursing competencies.\textsuperscript{5,6}

The Master of Advanced Nursing Practice (MANP) educates nurses to become a NP\textsuperscript{a}, following the Dutch established competency profiles, in which the integration of cure and care is included.\textsuperscript{7} However, a clear scope and model that adequately cover the roles and position of NPs is currently lacking.\textsuperscript{5,6-12} The use of the conceptual model and the terminology of the ICF may be useful in the integration of cure and care. The use of this model and the including of the focus on functioning in clinical decision-making require a paradigm shift in health care provision from a pathogenetic orientation to a broader, so-called salutogenetic orientation. Following the salutogenic orientation, health care provisions focus on how to stay healthy, rather than on what causes diseases.\textsuperscript{13-15} MANP students may not favor the introduction of the conceptual model and the use of the ICF in their curriculum, because of their focus on the pathogenically-oriented competencies, required for the granting of NP status.\textsuperscript{16} However, by using the conceptual model of health and the ICF, the focus on cure and medical competencies is not lost.\textsuperscript{17}

There are currently only a few ICF-related educational programs that have been tested for their effects.\textsuperscript{18-20} In addition, MANP students may not perceive the ICF as useful, whereas a positive attitude is a prerequisite for effective cognitive and skill-based learning outcomes.\textsuperscript{21} Therefore, this study aimed to analyze the effects of a short instructor-led ICF-training on perceived usefulness of the ICF in MANP students in a randomized controlled trial.

### 7.2 Methods

#### 7.2.1 Participants and procedure
Participants were students \((n = 74)\) enrolled in the 2-year MANP program at a University of Applied Sciences in the Netherlands. The sample represents 15\% of the total student population \((N = 500)\) of the MANPs \((N = 9)\) in the Netherlands.

Both the ICF training and the control training were included in the schedule of the MANP program, labeled as ‘testing an educational concept’.

\textsuperscript{a}The International Council of Nurses (2008) defined a nurse practitioner as “a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competence for expanded nursing practice, the characteristics of which are shaped by the context and/or country in which she/he is credentialed to practice”. A Masters degree is recommended for entry level.\textsuperscript{30}
The non-disclosure of the topic of the training was necessary to prevent information bias. All students received an information letter and the consent form one month prior to the training. All students were fully informed about the research procedure immediately after the final data collection by means of a presentation of the researcher.

Data were collected using questionnaires that were handed out immediately before the training (T1, pre-test), immediately after the 4-hour training (T2, post-test), and 3 months after the training (T3, follow-up). Four independent research assistants collected and anonymized the data.

The study was approved by the Ethics Committee of the Dutch Association for Medical Education (NVMO Ethical Review Board; Dnr 2013/294).

7.2.2 Randomization
All students of the 2-year MANP program were randomized into an intervention group and 2 control groups using 2 strata with blocks of 4 by means of a blind drawing of sealed opaque envelopes. Randomization was performed by an independent research assistant. Strata were made for academic year (first year versus second year) and working field (somatic hospital care versus psychiatric care, primary care, rehabilitation care, geriatric care and palliative care). The control groups consisted of one group with a pre-test (C⁺ group) and one group without a pre-test (C⁻ group) to analyze a testing effect of the questionnaire; the ICF survey and learning assessment tool. For every 2 persons in the intervention group there was one person in the C⁺ group and one person in the C⁻ group.

7.2.3 Intervention
The intervention was a 4-hour instructor-led discussion-based training in using the ICF. This training was part of an existing ICF training course developed and given over the past several years in the Netherlands. The instructor (HAS) is a nurse as well as a teacher. The format of the training is based on the concept of meaning and application-oriented learning, indicating that the training appeals to the experience of health care professionals and focuses on the practical application of the ICF in patient care. Short lectures were interspersed with group assignments and interaction between students and instructor. The goal of the present training is to provide students of the MANP
with knowledge and skills related to the ICF, enabling them to learn about the ICF’s practical applications and potential utilization in daily practice. The knowledge content of the course included: a conceptual overview of using the concept of functioning in health care; basic concepts related to the ICF (conceptual model of health, components, categories, and qualifiers); ICF core sets\(^b\); inking rules; and some simple clinical vignettes to explain what using the conceptual model and the standard terminology of the ICF entails. The skills content of the course included exercises in making clinical vignettes based on participants own professional settings. The exercises demonstrated how the application of the conceptual model and the standard terminology of the ICF can be applied throughout the health care process.

The control groups received a training in diabetes. Break times during the training were scheduled separately in order to prevent contact between the ICF group and the control groups so as to minimize information bias.

### 7.2.4 Measures

Data on students’ learning competencies including ICF-related attitude, knowledge and skills, were collected with the ICF survey and learning assessment tool developed by Reed et al.\(^18\) This tool consists of an attitude section, a knowledge section and a skills section.

The attitude section contains 12 statements on the construct of usefulness (2 statements) and the construct of mastery (10 statements). The level of agreement (5-point Likert scale) was summed for the 2 subscales (range: 2 to 10; 10 to 50, respectively) as well as for the total attitude scale (range 12 to 60). The knowledge section contains of 15 questions, including true/false questions and multiple choice questions. The percentage of knowledge questions answered correctly was calculated (range 0 to 15). The skills section contains 38 ICF categories classified in body functions (8 categories), activity and participation (21 categories), and external factors (9 categories), which have to be coded with qualifiers to a patient case. The percentage of agreement with a key-coding that had been established by 2 ICF experts coders (HAS and HN) was calculated for the 3 subscales separately (range 0

\(^b\)An ICF core set is a selected set of categories out of the whole ICF, related to a specific health condition. This set can serve as a minimal standard for the assessment and reporting of functioning and health for that specific health condition.\(^31\)
to 8; 0 to 21; 0 to 9, respectively) as well as for the total skills scale (range 0 to 38).

A higher score on the scales indicates a more positive attitude, more knowledge, and better skills. The ICF survey and learning assessment tool has not been tested yet for psychometric properties. A factor analysis has been performed for the items of the attitude scale, resulting in the constructs usefulness and mastery.¹⁸

Students in the ICF group and the C⁺ group filled out the survey and learning assessment tool 3 times (T1, T2 and T3) and students of the C⁻ group 2 times (T2 and T3). The C⁻ group completed a questionnaire about diabetes at T1 (data not presented).

Questions about student characteristics such as gender, age, and working field, as well as questions about prior exposure to the ICF, were added to the first assessment of each group.

The primary outcome measure was perceived usefulness of the ICF, a subscale of the attitude scale, dichotomized into ≤ 6 or > 6. This measure is similar to the measure in the study of Reed et al.,¹⁸ which was the first study with sample size calculation. Secondary outcome measures were knowledge, skills (total scale and 3 subscales), and attitude (total scale and 2 subscales: usefulness and mastery) as continuous variables.

### 7.2.5 Sample size calculation

The sample size was estimated based on the assumption that in the intervention group 29% of subjects would have changed to a score on the usefulness scale > 6, whereas this percentage would be 0% in the control group.¹⁸ With an α value of 0.05 and 80% power, this difference results in a sample of 22 students in the intervention group and 22 students in the control group (11 C⁺ group; 11 C⁻ group). Given the dropout rate of 15% of students in the MANP program, the non-participation rates, and the missing data, we decided to include all enrolled students (n = 74).

### 7.2.6 Statistical analysis

The data were expressed as mean values (standard deviation or 95% confidence interval) because they were normally distributed on Probability Plots and percentages. Testing effect was evaluated between the C⁺ group and the C⁻ group. The chi-square test was applied for analysis of usefulness
scores (≤ 6 or > 6). Independent-samples t-test was used to analyze the secondary outcome measures for the between-groups comparison and the difference in change scores between T1 and T2 and between T1 and T3. Paired t-test was used for the within-group analysis. Effect sizes statistics (d or Phi (φ)) were calculated and assessed against Cohen’s criteria (d 0.2 or φ 0.1 = small, d 0.5 or φ 0.3 = medium, d 0.8 or φ 0.5 = large). A p-value < 0.05 was considered statistically significant. Data were analyzed using IBM Statistical Package for the Social Sciences (v.22.0).

7.3 Results

Of the 74 students scheduled for testing an educational concept, 36 students were allocated to the experimental group (ICF group), 19 students to the C⁺ group and 19 students to the C⁻ group. Nine students dropped out (did not attend the training) and a further nine students did not give informed consent.

Data of 56 students were included for analysis. Fifty-two out of the 56 students, completed all questionnaires. Four students completed only the first 2 questionnaires (Figure 7.2).

7.3.1 Baseline characteristics

The mean age of the participants was 40 years (SD 10). The majority were female (84%; n = 47); two-thirds were first-year students; and one-third were second year students (Table 7.1).

Table 7.1 Baseline characteristics of intervention group (ICF), control group with pre-test (C⁺) and control group without pre-test (C⁻).

<table>
<thead>
<tr>
<th></th>
<th>Total (n = 56)</th>
<th>ICF-group (n = 23)</th>
<th>C⁺ group (n = 16)</th>
<th>C⁻ group (n = 17)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (female), n (%)</td>
<td>47 (84)</td>
<td>18 (78)</td>
<td>13 (81)</td>
<td>16 (94)</td>
<td>0.35*</td>
</tr>
<tr>
<td>Age, years, mean (SD)</td>
<td>41 (10)</td>
<td>38 (10)</td>
<td>44 (6)</td>
<td>40 (10)</td>
<td>0.18²</td>
</tr>
<tr>
<td>Academic year 1st n (%)</td>
<td>35 (63)</td>
<td>16 (70)</td>
<td>10 (63)</td>
<td>9 (53)</td>
<td>0.57*</td>
</tr>
<tr>
<td>Working field A n (%)</td>
<td>24 (43)</td>
<td>11 (48)</td>
<td>6 (38)</td>
<td>7 (41)</td>
<td>0.84*</td>
</tr>
</tbody>
</table>

SD: standard deviation; working field A: somatic hospital care; *Pearson chi-square test exact; ²ANOVA.

Approximately half of the participants were employed in somatic hospital care, and the other half were employed in psychiatric care, primary care, rehabilitation care, geriatric care, and palliative care. Between consent givers
(n = 56) and non-consent givers (n = 9), no statistically significant differences were found in age (p = 0.47), gender (p = 0.70), academic year (p = 0.10), and working field (p = 0.93). At baseline (T1), 55% (n = 31) of the students reported they had heard about the ICF before, 26% (n = 14) reported they had read parts of the ICF, and 3 students (6%) reported that they currently used or had used the ICF in clinical practice. No significant differences were found in baseline characteristics between the ICF-group and control groups (Table 7.1).

No testing effect was found between the C⁺ group and the C⁻ group. Chi-square test indicated no significant difference in the primary outcome measure, the usefulness score (p = 0.18), or in the secondary outcome measures (Appendix). The control groups were therefore considered as one in the analysis. To evaluate the difference between the pre-test and the follow-up, the post-test of the C⁻ group was considered as pre-test.

No significant differences were found in outcome measures between the ICF group and the control group at baseline (T1), except for the skills total scale (Table 7.2). The ICF group had significantly better skills compared with the C⁺ group (p = 0.04).

Figure 7.2 Flow chart of the randomized controlled trial. ICF, intervention group; C⁺, Control group with pre-test, C⁻, control group without pre-test.
Table 7.2 Outcome measurements of knowledge, skills and attitude at the 3 measurement points and comparison of the change scores between the measurements over time and effect size of change between the ICF group and the Control group.

<table>
<thead>
<tr>
<th>Scales</th>
<th>T1= Pre-test</th>
<th>T2= Post-test</th>
<th>T3= Follow up</th>
<th>Differences over time between ICF and C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICF n=22</td>
<td>C* n=16</td>
<td>ICF n=32</td>
<td>C n=32</td>
</tr>
<tr>
<td></td>
<td>mean (sd)</td>
<td>mean (sd)</td>
<td>mean (sd)</td>
<td>mean (sd)</td>
</tr>
<tr>
<td>Knowledge (range 0-15)</td>
<td>3.2 (3.0)</td>
<td>3.1 (3.4)</td>
<td>11.3 (1.4)</td>
<td>4.7 (4.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.8 (2.6)</td>
<td>4.7 (4.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.7 (0.8)*</td>
<td>4.7 (0.9)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>Skills (total) (range 0-38)</td>
<td>16.6 (5.0)</td>
<td>13.1 (2.7)</td>
<td>15.1 (3.8)</td>
<td>14.7 (3.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17.3 (4.0)</td>
<td>14.7 (3.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-2.2 (1.9)</td>
<td>0.4 (1.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Functions (range 0-8)</td>
<td>3.4 (1.3)</td>
<td>2.6 (1.6)</td>
<td>3.6 (1.6)</td>
<td>2.3 (1.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.1 (1.7)</td>
<td>2.3 (1.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.3 (0.6)</td>
<td>-0.6 (0.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.3</td>
</tr>
<tr>
<td>Act. &amp; Part. (range 0-21)</td>
<td>7.8 (2.7)</td>
<td>7.0 (2.3)</td>
<td>7.1 (2.7)</td>
<td>6.7 (2.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.9 (2.7)</td>
<td>6.7 (2.3)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>-1.2 (1.0)</td>
<td>0.3 (1.1)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>-0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Environ. (range 0-9)</td>
<td>5.0 (2.6)</td>
<td>4.3 (2.4)</td>
<td>4.7 (1.8)</td>
<td>5.4 (1.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6.1 (1.2)</td>
<td>5.4 (1.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.4 (0.7)</td>
<td>0.5 (0.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>Attitude (total) (range 12-60)</td>
<td>31.2 (7.9)</td>
<td>32.4 (7.4)</td>
<td>41.7 (6.6)</td>
<td>30.0 (8.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35.7 (9.6)</td>
<td>30.0 (8.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12.1(1.9)*</td>
<td>5.3 (2.2)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.7</td>
</tr>
<tr>
<td>Usefulness (range 2-10)</td>
<td>6.6 (1.3)</td>
<td>6.3 (1.5)</td>
<td>7.7 (1.4)</td>
<td>6.31 (1.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.0 (1.5)</td>
<td>6.31 (1.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.7 (0.4)*</td>
<td>0.4 (0.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Mastery (range 10-50)</td>
<td>24.6 (7.5)</td>
<td>26.1 (6.4)</td>
<td>34.1 (5.8)</td>
<td>23.7 (7.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>28.7 (8.6)</td>
<td>23.7 (7.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10.4(1.9)*</td>
<td>4.9 (2.0)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.7</td>
</tr>
</tbody>
</table>

Range scales: higher score means more knowledge, better skills or more positive attitude; ICF, intervention Group; C*, control group with pre test; C, control group; sd, standard deviation; se, standard error; *p < 0.05-value (2-tailed); d, Cohens'd; Note: both control groups are presented combined the results differ with respect to Figure 7.3, in which both control groups were presented separately.
7.3.2 Primary learning outcome measure: the dichotomous variable usefulness score > 6

Between T1 and T2, 48% (n = 10) of the students in the ICF group changed from a score on the usefulness scale from ≤ 6 to > 6, compared with 0% in the control group (Table 7.3). At T2, significantly more students in the ICF group (86%; n = 19) had a usefulness score > 6 compared with the control group (47%; n = 15).

Between T1 and T3, 33% (n = 7) of the students in the ICF group changed from a score ≤ 6 to > 6, compared with 14% (n = 4) in the control group (Table 7.3). At T3, the differences between students scoring > 6 on usefulness in the ICF group (55%; n = 12) and the control group (48%; n = 14) were no longer significant.

### Table 7.3 Comparison of the change in percentage of students in the ICF group and the Control group scoring > 6 on usefulness over time and effect size of change between groups.

<table>
<thead>
<tr>
<th>change</th>
<th>ICF group</th>
<th>C group</th>
<th>p*</th>
<th>effect size φ</th>
<th>ICF group</th>
<th>C group</th>
<th>p*</th>
<th>effect size φ</th>
</tr>
</thead>
<tbody>
<tr>
<td>increase</td>
<td>48% (10)</td>
<td>0% (0)</td>
<td>0.002</td>
<td>0.6</td>
<td>33% (7)</td>
<td>14% (4)</td>
<td>0.054</td>
<td>0.3</td>
</tr>
<tr>
<td>no change</td>
<td>43% (9)</td>
<td>93% (14)</td>
<td>38% (8)</td>
<td>72% (21)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decrease</td>
<td>9% (2)</td>
<td>7% (1)</td>
<td>29% (6)</td>
<td>14% (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

T1: pre-test; T2: post-test; T3: follow-up; ICF: intervention group; C: Control group; †data only for control group with pre-test; *p value (Pearson chi-square Test Exact); φ, Phi coefficient; Note: increase: from ≤ 6 to > 6; no change: remains in the same class; decrease: from > 6 to ≤ 6.

7.3.3 Secondary learning outcome measures: the continuous variables knowledge, skills, and attitude

The mean change scores (T1 to T2 and T1 to T3) of knowledge, attitude-total, and mastery differed significantly between the ICF group and the control group (p < 0.001 to 0.02: d ranging from 0.7 to 3.6) (Table 7.2).

Similar to the dichotomous results, the mean change score on usefulness differed significantly compared with the control group between T1 and T2 (p < 0.001; d = 1.4) but not significantly between T1 and T3 (p < 0.38; d = 0.3). Figure 7.3 summarizes the mean usefulness score over time for the ICF group.

7.3 Results 143
and both control groups.

The mean change score on skills, measured with total scale as well as with subscales, did not differ significantly between the ICF group and the control group between the different measurement points.

![Figure 7.3](image)

**Figure 7.3** The mean usefulness score presented at baseline (T1), immediately after the intervention (T2), and at 3-months follow-up (T3). Higher scores indicate more usefulness. ICF, intervention group; C⁺, control group with pre-test, C⁻, control group without pre-test. Note: both control groups are presented separately; the results differ with respect to Table 7.2, in which both control groups were combined.

### 7.4 Discussion

The aim of this randomized controlled trial was to test the effects of a 4-hour instructor-led training in using the ICF on perceived usefulness of the ICF in MANP students. Perceived usefulness was the primary outcome measure.

Our findings demonstrated that perceived usefulness of the ICF increased significantly immediately after a 4-hour instructor-led training in using the ICF in the intervention group (ICF group) compared with the control group. At 3-months follow up, the usefulness score of the ICF group was no longer statistically significantly different from the control group. In the ICF group,
the secondary outcome measures of knowledge, attitude total-scale, and
mastery were significantly increased compared with the control group at both
measurement points after the training. ICF-related skills were not affected by
the training.

A large percentage of students in the ICF group considered the ICF to be
useful immediately after the training compared with the control group. The
large effect size indicates that the training positively and substantially affected
students’ attitude toward the ICF. If the ICF is to be incorporated successfully
in the curriculum of the MANP, a positive attitude toward the ICF is important,
for attitude is conditional to cognitive and skill-based learning outcomes. A large percentage of students in the ICF group considered the ICF to be
useful immediately after the training compared with the control group. The
large effect size indicates that the training positively and substantially affected
students’ attitude toward the ICF. If the ICF is to be incorporated successfully
in the curriculum of the MANP, a positive attitude toward the ICF is important,
for attitude is conditional to cognitive and skill-based learning outcomes.

In addition, a positive attitude toward the ICF implicates support for directing
the goal of health service interventions away from disease toward a broader
scope of health care provisions and involvement in life situations.

Similar findings related to attitude were reported previously in a study
showing that usefulness scores increased after an short instructor-led training
to 8.2. Our large training effect may be explained by the pre-test scores, in
which the mean usefulness score was 6.6, compared with 7.9 in the other
study. The likelihood of improvement was therefore larger in our study.

In the C⁺ group a negative trend in perceived usefulness of the ICF was
found at T2 (Figure 7.3). This trend may be explained by the disappointment
or frustration of the students who had to fill out the ICF survey for the second
time without receiving an ICF training. Another explanation might be found
in the effect of the questionnaire itself. Subjects may have experienced the
ICF as complex after completion of the questionnaire, which is supported by
the negative trend in the C⁻ group between T2 and T3 (Figure 7.3). This trend
corresponds to previous findings that a training in using the ICF is necessary
for understanding its complexity. Perceptions about the usefulness
of the ICF, for example, changed from ‘too complex to apply’ to ‘having
advantages’ during a 2-year implementation process.

In the ICF group a negative trend in usefulness scores was found
between T2 and T3. This trend may be explained by difficulties the students
experienced in their attempts to use the ICF in clinical practice during the
3-month follow-up period. Support in using the ICF was absent during this
period. Similar findings were seen after self-directed ICF training programs,
which showed that 29% of the students had lower scores on usefulness (≤ 6)
after the training. The trend of a small increase in scores on usefulness of the

7.4 Discussion
control group in the current study may suggest that students of the control group have spoken with students of the ICF group and were influenced by the positive attitude of the ICF group immediately after the training.

In contrast to usefulness scores, mastery scores increased significantly at both time points compared with the control group. This finding justified the 2 different constructs of the attitude scale and corresponds to previous outcomes.18

The significant increase in knowledge after the training with a large effect size indicates that the training was effective, even 3 months after training. The outcomes correspond to all other training programs,18,25,27 indicating that increase in knowledge is a guaranteed outcome regardless of the type of training program. This finding can be explained by the fact that the ICF is new to health care professionals in clinical practice. Consequently, the participants have limited knowledge of the ICF prior to the training. In the control group knowledge increased to a mean of 4.7 at T3; this may suggest that students became interested in the ICF, during the follow up period, which confirmed the previously found positive attitude toward the ICF that started with gathering knowledge by reading ICF-related information.

Skills related to the ICF were not affected by the training, which could be related to the patient case used in our study: an elderly stroke patient in a primary care setting. This patient case may not have appealed to all students. Moreover, some studies have suggested that to increase skills related to the ICF a longer ICF training program of at least 2 days (12 hours) is required.18,19

A limitation of the current study concerns the number of students that did not give consent for using the data. This was an unexpected finding because MANP students have had high participation rates in previous studies. The non-disclosure of the topic of the training and the explicitly requested consent could explain the non-consent rate. Nevertheless, our sample size was still sufficient. Some students gave consent after the debriefing at the end of the study when the study procedure was explained, and these students were included as well.

Another limitation is that the survey tool used in the study was not fully tested for psychometric properties. When data collection began, no other assessment instruments had been published for evaluating ICF training. Only one questionnaire was found that tested knowledge and understanding of
the use of the ICF. In the future development of a measurement instrument for ICF training, the skills section requires special attention because of the specific requirements for a patient case which should reflect the students' clinical experiences with patients.

Finally, because we wanted to analyze test effects, samples sizes of the control group differed per measurement which prevented us from performing a repeated measures ANOVA. The strength of this study is that we have tested and measured the effect of an ICF training in a randomized controlled trial, which means that the observed effects can be attributed to the ICF training itself.

In conclusion, a 4-hour instructor-led ICF training has a positive influence on learning outcomes in MANP students. This short training program leads to a more positive attitude towards the ICF, including improved perceived usefulness of the ICF and more ICF-related knowledge. This is relevant for the implementation of the ICF in the curriculum, because a positive attitude is a prerequisite for effective cognitive and skill-based learning outcomes. To establish an increase in ICF-related skills, a comprehensive ICF training should be incorporated throughout the curriculum of the MANP. Also, additional studies are needed to evaluate extended training and to validate the findings.

**Appendix** Testing the effect of the ICF measurement instrument between both control groups.

<table>
<thead>
<tr>
<th>Scales</th>
<th>C⁺ n=16</th>
<th>C⁻ n=17</th>
<th>Change</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td></td>
</tr>
<tr>
<td>Knowledge (range 0-15)</td>
<td>3.8 (3.9)</td>
<td>3.1 (3.6)</td>
<td>0.6 (1.3)</td>
<td>-2.0 to 3.3</td>
</tr>
<tr>
<td>Skills (total) (range 0-38)</td>
<td>14.2 (5.0)</td>
<td>13.8 (3.1)</td>
<td>0.4 (1.9)</td>
<td>-3.7 to 4.5</td>
</tr>
<tr>
<td>Functions (range 0-8)</td>
<td>3.2 (1.7)</td>
<td>3.5 (1.4)</td>
<td>0.4 (0.6)</td>
<td>-1.7 to 0.9</td>
</tr>
<tr>
<td>Act.&amp; Part. (range 0-21)</td>
<td>7.2 (2.6)</td>
<td>6.9 (2.4)</td>
<td>0.2 (1.0)</td>
<td>-1.8 to 2.3</td>
</tr>
<tr>
<td>Environ. (range 0-9)</td>
<td>4.2 (2.6)</td>
<td>4.2 (2.0)</td>
<td>0.0 (0.9)</td>
<td>-1.9 to 2.0</td>
</tr>
<tr>
<td>Attitude (total) (range 12-60)</td>
<td>31.8 (8.3)</td>
<td>29.2 (8.7)</td>
<td>2.6 (3.0)</td>
<td>-3.6 to 8.7</td>
</tr>
<tr>
<td>Usefulness (range 2-10)</td>
<td>5.9 (2.0)</td>
<td>6.3 (1.6)</td>
<td>0.4 (0.6)</td>
<td>-1.7 to 0.9</td>
</tr>
<tr>
<td>Mastery (range 10-50)</td>
<td>25.9 (6.8)</td>
<td>22.9 (7.7)</td>
<td>3.0 (2.6)</td>
<td>-2.3 to 8.2</td>
</tr>
</tbody>
</table>

Range scales: higher score means more knowledge, skills, or positive attitude; C⁺, control group with pre test; C⁻, the control group without pre-test; CI, Confidence Interval of the difference.
References


“Langer leven doen we al, nu nog beter.”

Trouw, 4 januari 2014, Marcel Levi.