

Tasks and responsibilities in physical activity promotion of older patients during hospitalization: A nurse perspective

Kira Scheerman^{1,2}, Joram W. Mesters¹, Jay N. Borger¹, Carel G. M. Meskers^{2,3}, Andrea B. Maier^{2,4,5*}

¹ Department of Internal Medicine, Section of Gerontology and Geriatrics, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

² Amsterdam Movement Sciences, Amsterdam, The Netherlands

³ Department of Rehabilitation Medicine, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

⁴ Department of Human Movement Sciences, @AgeAmsterdam, VU University, Amsterdam, The Netherlands

⁵ Department of Medicine and Aged Care, @AgeMelbourne, Royal Melbourne Hospital, University of Melbourne, Melbourne, Australia

*Corresponding author: andrea.maier@unimelb.edu.au (AM)

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1 **Abstract**

2 **Objective:** To investigate how nurses perceive tasks and responsibilities in promoting
3 physical activity during hospitalization of older patients and which factors are of influence.

4 **Design:** Observational cohort study

5 **Setting and participants:** One hundred and eight nurse students, nurses and nurse
6 supervisors employed by an academic Dutch teaching hospital participated in a questionnaire
7 survey and 51 nurses took part in a subsequent in-depth interview.

8 **Measures:** Data were collected on tasks and responsibilities in physical activity promotion
9 and their influencing factors as perceived by nurses. Descriptive statistics were used to
10 analyze the data from the questionnaire survey and a deductive approach with directed content
11 analysis was used for the data from the interviews.

12 **Results:** Nurses perceived to have a dominant role in physical activity promotion of older
13 patients during hospitalization. Ninety percent of the nurses stated to be responsible for
14 physical activity promotion and 32 percent stated to be satisfied with the actual level of
15 physical activity of their patients. Influencing factors were low patient motivation, high
16 workload causing priority shifts of tasks and the role of physicians.

17 **Conclusion:** Although their perceived dominant role in physical activity promotion, nurses
18 identified a number of barriers interfering with actual level of physical activity. Improvement
19 strategies should involve physicians, patients and carers.

20 **Introduction**

21 More than one third of all hospital discharges in the US affects patients 65 years or older
22 (Data from Healthcare Cost and Utilization Project database 2013). Older hospitalized
23 patients spend most of the time lying in bed (1-5) while physical inactivity in this group is
24 associated with functional decline (6, 7), readmissions (8), nursing home admissions and
25 death (6).

26 The level of physical activity during hospitalization has been indicated as a modifiable
27 risk factor for complications related to hospitalization (9). Patient related, organizational and
28 environmental factors have been shown to contribute to physical activity promotion of
29 hospitalized older patients (10-13). Nurses are a vital actor due to the high amount of patient
30 contact hours. Based on the education and professional profile, nurses are expected to signal
31 risks and perform tasks to promote physical activity during hospitalization (14-18). However,
32 it was shown that nurses infrequently initiate physical activity during hospitalization (19, 20),
33 whereas evidence on the perception of nurses on their role in physical activity promotion is
34 scarce (21).

35 The aim of the study was to investigate how nurses perceive tasks and responsibilities
36 in promoting physical activity and to gain insight in what factors influence physical activity
37 promotion by nurses in older patients during hospitalization.

38 **Methods**

39 **Study design**

40 This study encompassed both questionnaire surveys (March to July 2016) and in-depth
41 interviews (June to August 2017). The study was conducted at an academic teaching hospital
42 in The Netherlands and was approved by the medical ethical committee of Amsterdam UMC.
43 All enrolled nurses provided written informed consent.

44

45 **Participants**

46 Nurses were eligible when they were 18 years and older, were working on wards providing
47 care to patients 70 years and older and had provided care to at least one patient of 70 years or
48 older in the previous month. Nurses working on the medium or intensive care unit were
49 excluded. All wards, with exception of gynecology and pulmonology, were included for the
50 questionnaire component. Included wards for the interview component were: internal
51 medicine, traumatology, oncological surgery and a combined ward of vascular surgery,
52 nephrology and urology. Nurses were selected at random from staff lists using a numerical lot
53 drawing. Participation in both the questionnaire as well as interview component was allowed.
54 The questionnaire component addressed nurse students, nurses and nurse supervisors. For the
55 interview component only nurses were included.

56

57 **Procedure**

58 **Questionnaire component**

59 A questionnaire was developed to investigate tasks and responsibilities in physical activity
60 promotion and factors influencing physical activity promotion during hospitalization of older
61 patients as perceived by nurses. Questions were compiled by interviewing three nurses after
62 they filled in the questionnaire and tested on feasibility and nurses' interpretation. Selected
63 nurses were approached by the head of the ward or by a researcher (JB). Questionnaire
64 completion took approximately 20 minutes.

65 The following data were collected: age, gender, educational level, work experience,
66 education on physical activity promotion, self-perceived motivation to promote physical
67 activity, responsibilities in physical activity promotion, self-perceived level of knowledge of
68 physical activity promotion, satisfaction of physical activity promotion of the ward,
69 satisfaction of physical activity promotion of physicians and satisfaction of level of physical
70 activity of the patient. Nurses were asked if they considered daily activities (e.g. teeth
71 brushing at the sink, walking towards the toilet), unsupervised additional physical activity
72 (e.g. stretch and gait exercises), additional physical activity supervised by a nurse and
73 additional physical activity supervised by other health care professionals as physical activity
74 during hospitalization and whether they promote daily activities, additional physical activity
75 or consulted other health care professionals. Furthermore, nurses were asked to score the
76 importance of 34 factors in physical activity promotion of older patients during
77 hospitalization using a Likert-scale from 1 (totally not important) to 5 (very important) and to
78 indicate their most important factor. Factors were selected based on literature and were
79 categorized in characteristics of the professional, patient, organization or intervention, and
80 social factors (22-30).

81

82 **Interview component**

83 Targeted semi-structured interviews were conducted to gain in-depth information on nurses'
84 perspective on task and responsibilities of different actors in physical activity promotion and
85 factors influencing physical activity promotion. The interview design was evaluated on
86 feasibility and interpretation of the questions during a pilot interview with two nurses and,
87 after adjustments, re-evaluated in a second pilot interview with two different nurses. Selected
88 nurses were approached by the head of the ward or by the researcher (JM). Interviews were
89 held in private rooms and had a duration of 30 to 50 minutes. The interviews were held by
90 one researcher (JM), the first ten interviews were supervised by a second researcher (KS). The
91 interviews were audio recorded and notes were made.

92 A patient case was provided at the start of the interview, describing a 82 year old
93 woman with urosepsis, who had high fever and showed signs of delirium at admission,
94 progressively got better at days two of admission and almost completely recuperated at day
95 five of admission. Nurses were asked to define physical activity during hospitalization, to
96 score the importance of physical activity promotion on a VAS-score and to describe how
97 satisfied they were with the level of physical activity promotion during hospitalization. Tasks
98 and responsibilities of nurses, physiotherapists, occupational therapists, physicians, patients,
99 and carers were further explored with questions on the nurses' perspective on responsibilities
100 in signaling and performing different physical activity promotion tasks; transfer from bed to
101 chair, activities of daily living, supervised and unsupervised additional physical activity.
102 Nurses were also asked to motivate which actor they thought to have final responsibility of
103 execution of these tasks and, subsequently, if these responsibilities would change when a
104 patient would be able to, but not performing physical activity during hospitalization. Factors

105 influencing physical activity promotion were discussed when nurses named factors during the
106 interview and explicitly at the end of the interview supported with an overview of the 34
107 factors used in the questionnaire.

108

109 **Data processing and analysis**

110 **Questionnaire component**

111 Statistics were performed using IBM SPSS statistics 22.0. Data were expressed as number
112 and percentages. Factors were considered important when Likert scores exceeded four.
113 Fishers exact test was used to analyze differences between nurse students, nurses and nurse
114 supervisors.

115

116 **Interview component**

117 The interviews were fully transcribed and data on nurse characteristics, importance of
118 physical activity promotion, tasks and responsibilities were analyzed quantitatively and
119 qualitatively. A deductive approach with directed content analysis was used (31, 32) to
120 analyze the qualitative data. Interview transcripts were read through and initial coding with
121 pre-determined codes based on the topics of the interview were added to the correlating text.
122 Open coding was used to refine labels. Atlas.ti 8.0 was used in the qualitative coding process.
123 Discussions on interpreting data took place between two researchers (JM and KS) and all
124 codes and data were verified by a second researcher (KS).

125 **Results**

126 All 108 selected (student) nurses participated in the questionnaire component of the study. In
127 the interview component, three nurses refused to participate resulting in a total of 51
128 interviews, see Table 1 for the characteristics of the participating nurses. Eighty-six percent of
129 the nurses was female and the nurses in the questionnaire and interview component had a
130 comparable median age (32 vs. 31 years) and level of work experience (6 vs. 7 years). In the
131 questionnaire component, more nurses had a high educational level compared to the interview
132 component (57.6% vs. 47.1%). A minority of nurse students (38.5%), nurses (20.0%) and
133 nurse supervisors (30.0%) received education on physical activity promotion in the prior year.

134 **Table 1: Characteristics of the study population, stratified by nurse student, nurse and nurse supervisor (questionnaire component,**
 135 **n=108 and interview component, n=51).**

	Questionnaire			Interview
	Nurse student n=13	Nurse n=85	Nurse supervisor n=10	Nurse n=51
Age, y, median [IQR]	25 [23.0-29.0]	32 [25.0-51.0]	49 [42.8-54.5]	31 [26.0-45.0]
Female, n (%)	11 (84.6)	73 (85.9)	10 (100)	44 (86.3)
Educational level high ^A , n (%)	7 (53.8)	49 (57.6)	10 (100)	24 (47.1)
Work experience nurse, y, median [IQR]	N/A	6 [3.0 – 20.0]	25 [19.3– 30.3]	7 [2.5- 18.0]
Work experience nurse supervisor, y, median [IQR]	N/A	N/A	7 [5.5 – 10.0]	N/A
Education about PA promotion last year, yes, n (%)	5 (38.5)	17 (20.0)	3 (30.0)	N/a

136 A: High educational level defined as applied university and higher; N/A: not applicable; N/a: not available; PA: physical activity.

137 **Tasks and responsibilities in physical activity promotion**

138 The questionnaire component revealed that nurses feel responsible (89.4%) to promote
 139 physical activity during hospitalization. As presented in Table 2, nurses promote daily
 140 activities (95.3%) and consult other health care professionals to promote physical activity
 141 (90.6%). Seventy-eight percent of the nurses stated to actively promote additional physical
 142 activity like stretch and gait exercises. Only one nurse reported to not promote physical
 143 activity at all. No differences were observed between nurse students, nurses and nurse
 144 supervisors. Eighty-seven percent of the respondents stated that physiotherapists, physicians
 145 or the patients had responsibilities in physical activity promotion. Occupational therapists
 146 (13%) and carers (22%) were also mentioned to be responsible.

147

148 **Table 2: Perception of physical activity promotion during hospitalization and methods**
 149 **to promote physical activity, stratified by nurse student, nurse and nurse supervisor**
 150 **(questionnaire component, n=108).**

	Nurse student n=13	Nurse n=85	Nurse supervisor n=10
Perception of physical activity promotion, n (%)			
Motivated to promote PA, yes	12 (92.3)	83 (97.6)	10 (100)
Responsible to promote PA, yes	13 (100)	76 (89.4)	10 (100)
Self-perceived level of knowledge about PA promotion, sufficient	9 (69.2)*	77 (90.6)	8 (80.0)
PA promotion on ward, present	8 (61.5)	45 (52.9)	6 (60.0)
Satisfied with PA promotion on ward, yes	9 (69.2)	56 (65.9)	7 (70.0)
Satisfied with PA promotion by physicians, yes	5 (38.5)	41 (48.2)	6 (60.0)
Satisfied with level of PA of patient, yes	4 (30.8)	27 (31.8)	4 (40.0)
Definition of physical activity during hospitalization, n (%)			
Daily activities	12 (92.3)	68 (80.0)	8 (80.0)

Unsupervised additional PA of patient	10 (76.6)	66 (77.6)	8 (80.0)
Supervised additional PA with nurse	11 (84.6)	70 (82.4)	8 (80.0)
Supervised additional PA with other health care professionals	12 (93.2)	68 (80.0)	8 (80.0)
Methods of physical activity promotion during hospitalization, n (%)			
Promote daily activities	12 (92.3)	81 (95.3)	10 (100)
Promote additional PA (e.g. stretch and gait exercises)	9 (69.2)	66 (77.6)	8 (80.0)
Consult other health care professionals to promote PA	11 (84.6)	77 (90.6)	10 (100)
I do not promote PA	0 (0)	1 (1.2)	0 (0)

151 PA; physical activity; *: Difference between nurse student, nurse and nurse supervisor
 152 (P<0.05).

153

154 During the interviews, nurses stated to be responsible for signaling and performing
 155 physical activity promotion tasks and had final responsibility for transfers from bed to chair
 156 and promotion of daily activities. Nurses indicated that physiotherapists have a greater
 157 responsibility of supervised additional physical activity and it is the patients responsibility to
 158 do unsupervised additional physical activity. The majority of the nurses stated that patients'
 159 responsibilities increase when patients become more independent during hospital admission
 160 and that they would motivate patients to be physically active by providing information on
 161 consequences of physical inactivity and discussing the reasons for the patients' physical
 162 inactivity. The tasks and responsibilities of the physician were described as to determine the
 163 patient's ability to perform different levels of physical activity and to motivate patients when
 164 they refuse to perform physical activity. The different tasks and responsibilities in physical
 165 activity promotion of all actors according to nurses are visualized in Fig 1.

166

167 **Fig 1: Tasks and responsibilities of different actors in physical activity promotion during**
168 **hospitalization according to nurses (%) (interview component, n=51). PA: Physical**
169 **activity**

170

171 **Factors influencing physical activity promotion**

172 Sixty-six percent of nurses of the questionnaire component were satisfied with physical
173 activity promotion on their ward, 48% were satisfied with physical activity promotion by
174 physicians, and 32% were satisfied with the actual level of physical activity of the patients
175 during hospitalization. An overview of the importance of factors influencing physical activity
176 promotion during hospitalization is provided in Table 3. Differences in importance between
177 nurse students, nurses and nurse supervisors were observed for the factors ‘Fear of falling
178 during PA promotion’, ‘Availability of protocol’ and ‘Opinion towards PA promotion of
179 colleagues’.

180 **Table 3: Importance of factors (Likert-score >3) influencing physical activity promotion in older patients during hospitalization,**
 181 **stratified by nurse student, nurse and nurse supervisor (questionnaire component, n=108).**

	Importance (Likert-score >3)			Fisher's exact test	Rated as most important (%)	
	Overall (n=108)	Nurse student (n=13)	Nurse (n=85)			Nurse supervisor (n=10)
Characteristics of the professional, n (%)						
Motivation for PA promotion	96 (88.9)	11 (84.6)	76 (89.4)	9 (90.0)	.854	2.8
Knowledge of methods of PA promotion	97 (89.8)	12 (92.3)	75 (88.2)	10 (100)	.845	0.9
Knowledge of importance of PA promotion	99 (91.7)	11 (84.6)	78 (91.8)	10 (100)	.448	7.4
Fear of loss of function when PA is not promoted	66 (61.1)	9 (69.2)	51 (60.0)	6 (60.0)	.882	1.9
Fear of decubitus ulcer when PA is not promoted	85 (78.7)	10 (76.9)	68 (80.0)	7 (70.0)	.704	0.9
Fear of falling during PA promotion	43 (39.8)	2 (15.4)	39 (45.9)	6 (60.0)	.049*	-
Characteristics of the patient , n (%)						
Admission diagnosis	81 (75.0)	7 (53.8)	68 (80.0)	6 (60.0)	.068	4.6
Comorbidity	81 (75.0)	8 (61.5)	65 (76.5)	8 (80.0)	.483	2.8
Delirium	86 (79.6)	11 (84.6)	66 (77.6)	9 (90.0)	.758	-
Dementia	48 (44.4)	4 (30.8)	38 (44.7)	6 (60.0)	.393	-
Pain	96 (88.9)	13 (100)	74 (87.1)	9 (90.0)	.466	7.4
Physical constraints	98 (90.7)	11 (84.6)	77 (90.6)	10 (100)	.494	2.8

Motivation performing PA	90 (83.3)	12 (92.3)	72 (84.7)	6 (60.0)	.106	11.1
Self-efficacy performing PA	83 (76.9)	10 (76.9)	66 (77.6)	7 (70.0)	.846	0.9
Ethnic background	40 (37.0)	2 (15.4)	34 (40.0)	4 (40.0)	.249	-
Language barrier	48 (44.4)	4 (30.8)	41 (48.2)	3 (30.0)	.346	-
Characteristics of the organization, n (%)						
Availability of equipment	107 (99.1)	13 (100)	84 (98.8)	10 (100)	1.000	2.8
User friendliness of equipment	104 (96.3)	12 (92.3)	82 (96.5)	10 (100)	.622	-
Staffing ratio	102 (94.4)	12 (92.3)	80 (94.1)	10 (100)	.771	14.8
Workload	83 (76.9)	8 (61.5)	68 (80.0)	7 (70.0)	.269	9.3
Physical environment of ward	86 (79.6)	8 (61.5)	69 (81.2)	9 (90.0)	.197	1.9
Educational support for PA promotion	73 (67.6)	7 (53.8)	57 (67.1)	9 (90.0)	.197	0.9
Characteristics of the intervention, n (%)						
Availability of protocol	41 (38.0)	1 (7.7)	35 (41.2)	5 (50.0)	.038*	-
Clarity of instructions of protocol	50 (46.3)	4 (30.8)	41 (48.2)	5 (50.0)	.515	-
Evidence based practice	53 (49.1)	5 (38.5)	42 (49.4)	6 (60.0)	.615	-
Availability of information materials	77 (71.3)	6 (46.2)	62 (72.9)	9 (90.0)	.062	-
PA promotion incorporated in daily work routine	92 (85.2)	11 (84.6)	71 (83.5)	10 (100)	.540	-
Time investment in PA promotion	90 (83.3)	11 (84.6)	69 (81.2)	10 (100)	.459	0.9
Visible progress after PA promotion	88 (81.5)	9 (69.2)	70 (82.4)	9 (90.0)	.447	-
Social factors, n (%)						
Culture PA promotion at ward	94 (87.0)	12 (92.3)	73 (85.9)	9 (90.0)	1.000	-
PA promotion by physician	88 (81.5)	9 (69.2)	70 (82.4)	9 (90.0)	.447	-
Opinion towards PA promotion of colleagues	63 (58.3)	4 (30.8)	50 (58.8)	9 (90.0)	.016*	-
Influence of cares on PA promotion	100 (92.6)	12 (92.3)	79 (92.9)	9 (90.0)	.818	-

182	Professional patient–nurse relationship	56 (51.9)	6 (46.2)	46 (54.1)	4 (40.0)	.694	-
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PA; physical activity; *: Difference between nurse student, nurse and nurse supervisor (P<0.05).

183 **Characteristics of the professional**

184 Almost all nurses scored knowledge of methods of physical activity promotion (88.2%),
185 knowledge of importance of physical activity promotion (91.8%) and nurse' motivation
186 (89.4%) as important factors influencing physical activity promotion (Table 3). Nurses
187 perceived their level of knowledge of physical activity promotion as sufficient (90.6%) in
188 contrast to 69.2% of the nurse students (Table 2). Nurses were motivated to promote physical
189 activity (97.6%) and considered daily activities (80.0%) and additional physical activity
190 supervised by a nurse (82.4%) or other health care professional (80.0%) as physical activity
191 during hospitalization (Table 2). Unsupervised additional physical activity was not seen as
192 physical activity during hospitalization by 22.4% of the nurses. No differences were observed
193 between the nurse students, nurses and nurse supervisors.

194 During the interviews, nurses described physical activity during hospitalization as:
195 “out of bed”, “walking”, “movement in bed” and “sitting in chair”. Nurses scored the
196 importance of physical activity during hospitalization with a median VAS score of 8.9 [5.5-
197 10.0]. Most frequently named motivations were preventing risk of complications (e.g.
198 decubitus and pneumonia), loss of muscle mass and slower recovery. Long term adverse
199 outcomes like functional loss and regaining self-reliance were named less frequent compared
200 with more immediate noticeable adverse outcomes. Nurses stated they were not always
201 motivated to promote physical activity, because they were empathic towards patients
202 facilitating comfort rather than physical activity. Also, the need for physical activity
203 promotion in older patients was questioned. Nurses stated to understand the low motivation of
204 older patients when being sick, had a bad night sleep or being tired after a day with multiple
205 examinations.

206

207 **Characteristics of the patient**

208 Physical constraints (90.6%), pain (87.1%) and motivation of the patient (84.7%) were
209 identified as important factors in physical activity promotion (Table 3). The factor
210 ‘motivation performing physical activity’ was scored as most important by 11.1% of the
211 nurses.

212 During the interviews, patient motivation was stated as a barrier by 65% of nurses.
213 Tiredness, pain, lines like catheters and drip-lines, their previous inactivity at home and the
214 belief it is uncommon to be physically active at an older age were explanations for a low
215 motivation of patients. In addition, the patient’ perception of the hospital admission (47%) as
216 a place to rest, be sick and were it is justified to be physically inactive was identified as factor
217 influencing the patient’ level of physical activity during hospitalization. Seventy-three percent
218 of the nurses suggested hospitals to focus on increasing patient awareness on importance of
219 physical activity, for example using a flyer or video.

220

221 **Characteristics of the organization**

222 Sufficient staffing ratio (94.1%) and availability of equipment (98.8%) were identified as
223 important factors in physical activity promotion (Table 3). The factor ‘staffing ratio’ was
224 scored as most important by 14.8% of the nurses.

225 Nurses in the interview group stated that in case of a high number of complex patients
226 (e.g. patients with delirium, physical impairments or multiple drip lines), workload and
227 staffing ratio become barriers. Priorities shifts when nurses experienced a low staff ratio and a
228 high workload; physical activity was regarded as one of the first activities to be dropped and

229 nurses stated that concessions were made in their physical activity promotion (e.g. use of bed
230 urinal). Nurses suggested hospitals to invest in more staff (physiotherapists and medical
231 students), equipment and adjustment of patient rooms to make them more attractive for
232 physical activity. A living room, walking routes and activity counseling were other
233 suggestions to increase physical activity of the older patients during hospitalization.

234

235 **Characteristics of the intervention and social factors**

236 Social factors like influence of carers (92.9%), culture of physical activity promotion on ward
237 (85.9%), and physical activity promotion by the physician (82.4%) were indicated as
238 important factors in physical activity promotion. Availability (41.2%) and clarity (48.2%) of a
239 protocol regarding physical activity promotion were scored less frequently as important factor
240 in the questionnaire component (Table 3).

241 **Discussion**

242 Nurses perceive to have a dominant role in physical activity promotion and feel responsible,
243 however, they were not satisfied with the actual level of physical activity of older patients
244 during hospitalization. Low patient motivation and priority shifts of tasks due to high
245 workload were indicated as barriers. In addition, the role of physicians was indicated to be
246 important to influence physical activity promotion behavior.

247

248 **Tasks and responsibilities in physical activity promotion**

249 This study indicated that nurses have to adopt various roles in physical activity promotion
250 during older patients' hospital admissions. Besides signaling and supporting physical activity
251 promotion tasks and consulting other health care professional, nurses have an important role
252 in motivating patients. Motivating patients and supporting self-management become more
253 prominent in nursing (33, 34). However, nurse activities in physical activity promotion during
254 hospitalization seem to target prevention of potential harm more than supporting
255 rehabilitation goals (35). The reserved attitude of a part of the nurses in our study regarding
256 physical activity of older patients during hospitalization and unsupervised physical activity
257 suggests that the perception on physical activity during hospitalization needs further attention.

258

259 **Factors influencing physical activity promotion**

260 The identified factors influencing physical activity promotion by nurses, most importantly
261 patient motivation and high workload causing priority shifts of tasks, are in line with previous

262 studies addressing barriers in physical activity promotion during hospitalization (10, 13, 36,
263 37). The nurses in our study suggested to increase patient awareness on the importance of
264 physical activity. Barriers for being physically active during the hospital admission from a
265 patient perspective were previously addressed (10), but better understanding of what causes
266 low patient motivation is important.

267 According to the nurses in our study, physical activity promotion tasks became less of
268 a priority when nurses experienced a low staff ratio and a high workload. Staff ratio and
269 workload are associated with nursing tasks being left undone which was found to be related to
270 the nurses perception of quality of nursing care (38). In addition, an increase in nurses'
271 workload was found to affect patient outcomes (39). This implies that nurse staffing levels
272 should be increased or tasks must shift towards other actors or targeted by eHealth
273 interventions (40). However, intervention studies on physical activity promotion of
274 hospitalized patients showed positive results on physical activity levels using preexisting staff
275 ratios (41, 42).

276 In the current study, physical activity promotion by the physician and carers
277 involvement were indicated as influencing factors. Physicians were expected to indicate the
278 ability of patients to be physical active. Physicians orders regarding physical activity are
279 found to influence patients' decisions to perform physical activity during hospitalization (43)
280 but are infrequently discussed (43) and often bed rest orders during hospital admission do not
281 have valid and specified reasons (6). Awareness of the role of physicians in physical activity
282 promotion might contribute to strengthen nurses' physical activity promotion behavior and
283 increase physical activity levels of older hospitalized patients. Furthermore, carers could play
284 a more prominent role in physical activity promotion. In our study the role of carers in

285 physical activity promotion during hospitalization was indicated as minor, but including
286 carers in physical activity promotion of older patients was previously emphasized (13).

287

288 **Strengths and limitations**

289 This study used a mixed-methods approach and included a large group of nurses to explore
290 the tasks and responsibilities in physical activity promotion of older patients during
291 hospitalization. The questionnaire and interview design were self-developed and not cross
292 validated. The use of another validated instrument was not possible while there was none
293 available for this specific interest. However, both questionnaire and interview design were
294 based on literature and tested in advance on feasibility and interpretation of the questions.

295

296 **Conclusion**

297 Nurses perceive to have various roles in physical activity promotion and feel responsible, but
298 they were not satisfied with the level of physical activity of patients. Contributing factors
299 were low patient motivation and priority shifts due to high workload. Hospital managers and
300 health care professionals should be aware of the various roles of nurses in physical activity
301 promotion. Emphasis should be on the multidisciplinary approach of physical activity
302 promotion including physicians, patients, and carers.

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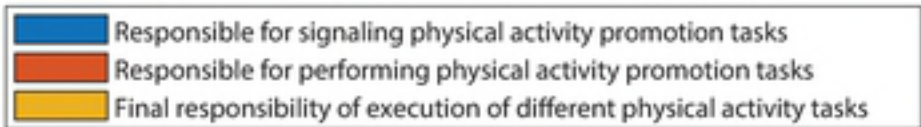
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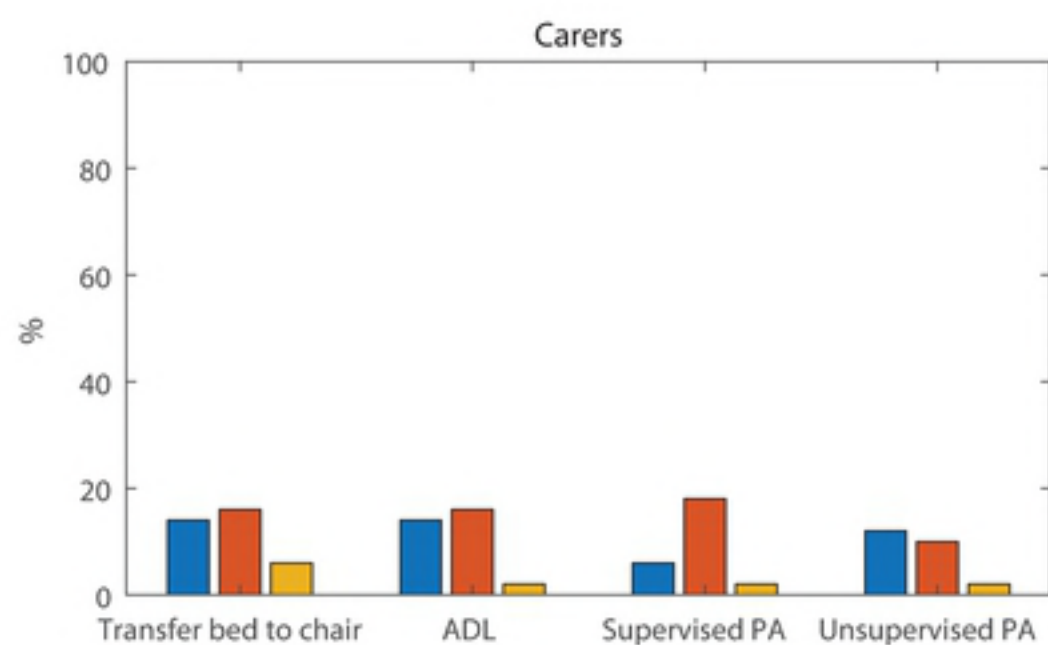
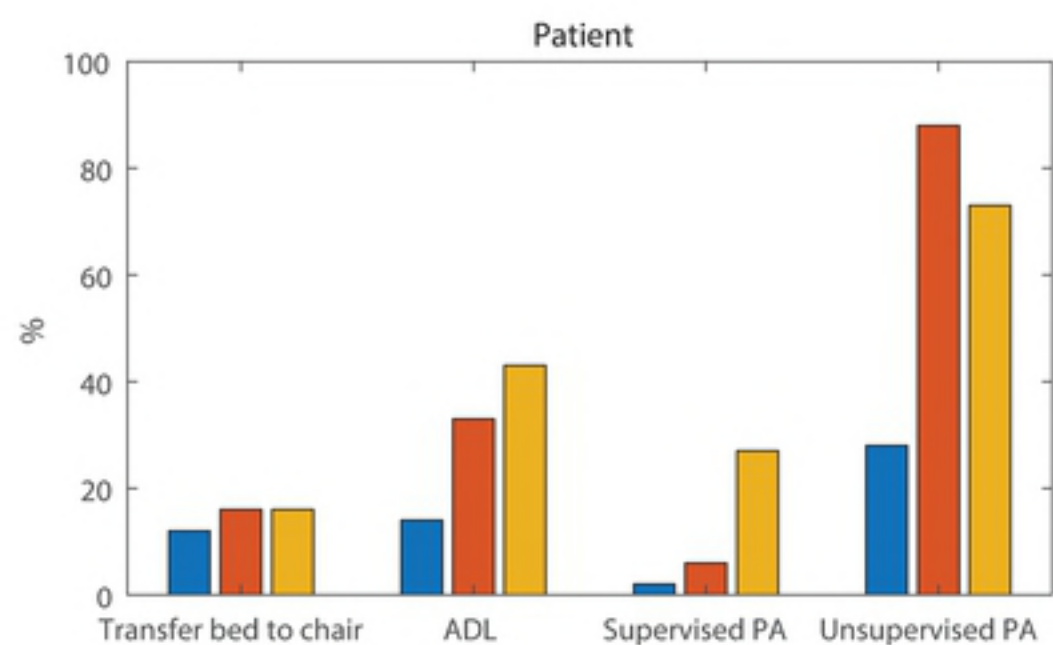
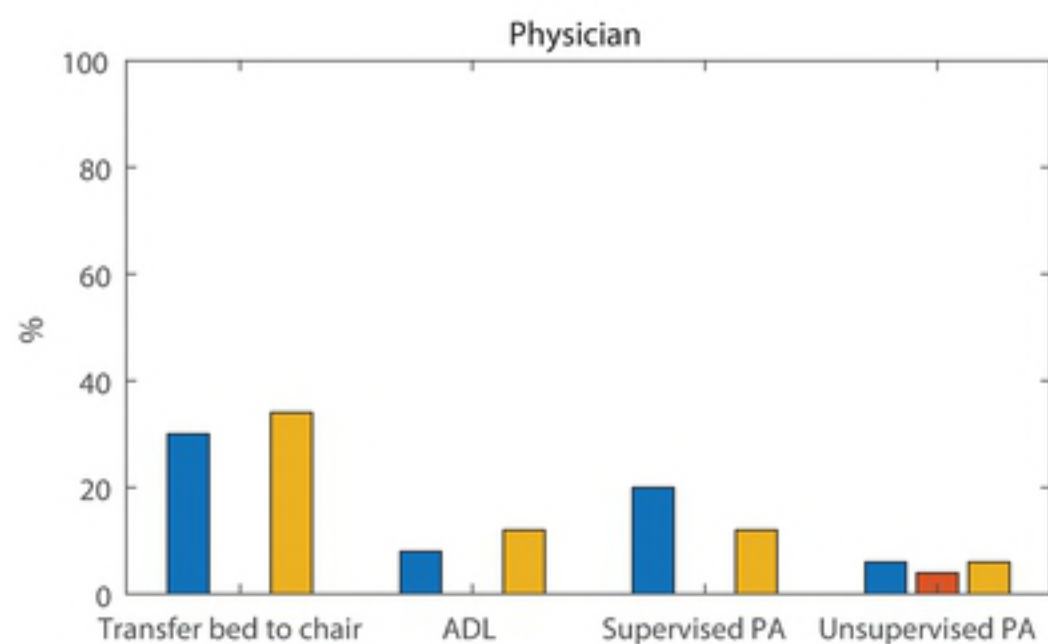
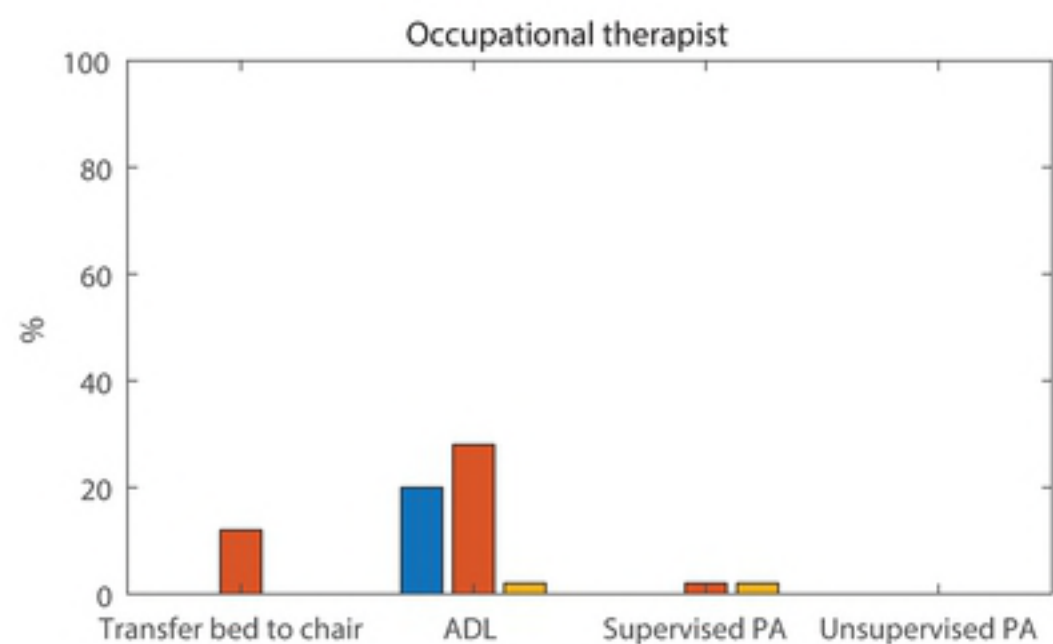
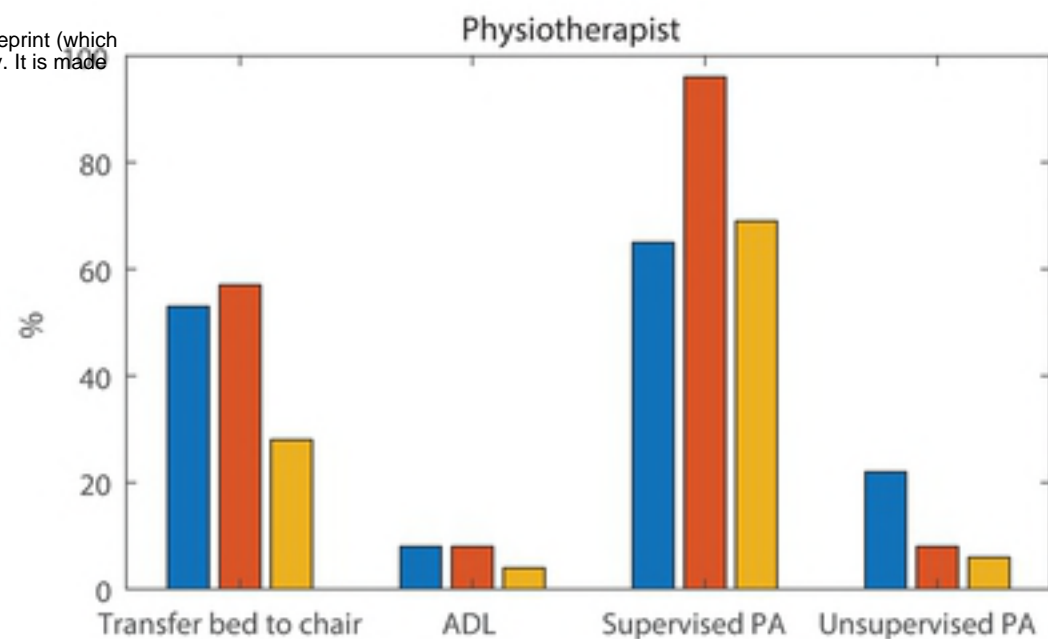
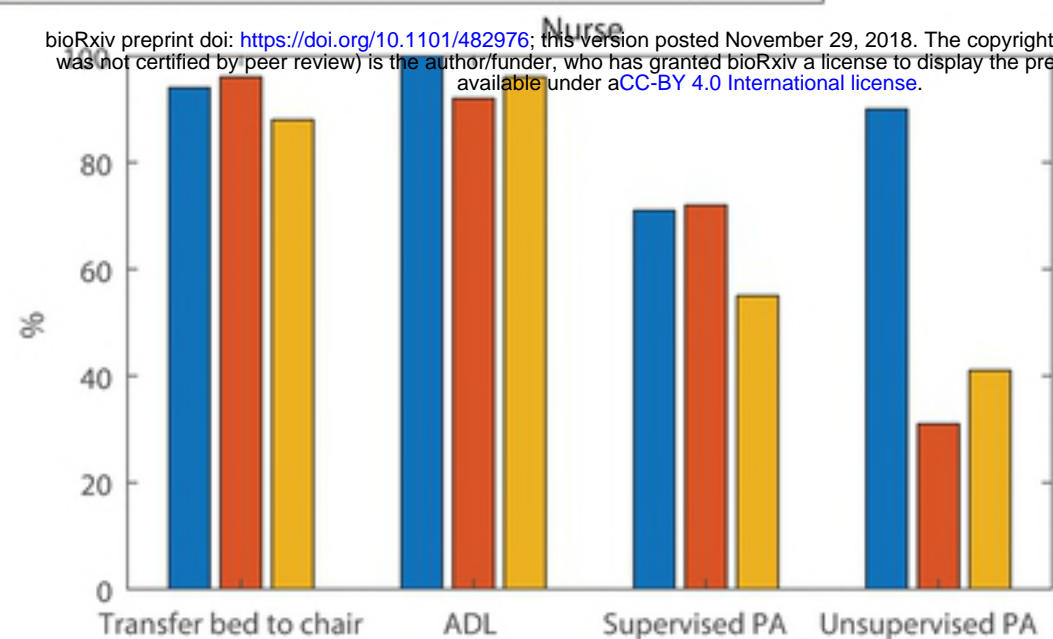


Fig 1