

The PAIR European Project

Physical Activity after hip or knee Replacement

WP3- Professionals and patients' attitude towards physical activity

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1. Background

The overall goal of the PAIR EUROPEAN project was to “promote at European level shared knowledge, methods and approaches to support patients to regain functioning, optimal physical activity and participation in social and vocational domains after total hip replacement (THR)/total knee replacement (TKR)”. The project was divided into six work packages between the project partners:

- **WP1-** PAIR management, coordination, monitoring and evaluation (University of Bologna)
- **WP2-** Analysis of literature review on exercise good practice for individuals after total hip or knee replacement (University Medical Center Groningen)
- **WP3-** Professionals' and patients' attitude towards physical activity (Norwegian University of Science and Technology)
- **WP4-** Development of PAIR exercise protocol (University of Bologna)
- **WP5-** Intervention multicenter study (Rizzoli Orthopedic Institute)
- **WP6-** Advocacy and Dissemination (University of Bologna)

The Norwegian University of Science and Technology (NTNU) was responsible for WP3, and the main objectives of this part of the project was:

- a) Evaluation of attitudes of clinicians (medical doctor, physiotherapist, nurse) and professional physical exercise trainers towards promotion of physical activity and sport programs after completing rehabilitation for THR/TKR
- b) Assessments of patients' attitude and preferences towards PA in the medium - long term after completing treatment for THR/TKR.

The NTNU research group consisted of:

Team Leader

Ann-Katrin Stensdotter, *Professor*

Team members

Odd Magne Hals, *Physiotherapist specialist*

Monica Unsgaard-Tøndel, *Associate professor*

Håvard Østerås, *Physiotherapist specialist*

2. Questionnaires

2.1 Development of questionnaires

NTNU made the first drafts of the questionnaires for patients and for clinicians and trainers. All participating PAIR partners gave feedback and variations were discussed. The questionnaires had to accommodate the differences between countries and agree upon a common version to enable comparisons across different European countries. The final English versions of the two questionnaires were translated into the language of each participating partner country, and then back translated to English by an independent translator. Discrepancies between English versions were discussed and final versions in each language determined. A trial survey was conducted by each partner country for context validity of the questionnaires.

The questionnaires were divided into one part for background information about the informant and a second part with questions relating to attitudes toward physical activity. A Likert scale ranging from 1 = strongly disagree to 4 = strongly agree, was used. A high score indicated a positive attitude towards physical activity. As some questions were about negative assumptions on the importance of physical activity, those scores were in the analysis turned so that strongly agreeing to questions e.g. “physical activity is not good” would be scored as 1, meaning a negative attitude.

2.2 Questionnaire for clinicians

The questions for clinicians were designed in four parts: 1), background information about working place and profession, 2) personal information about age, gender, education, 3) advice, information and service from work place, contextual factors (i.e., did the clinic they worked at offer exercise programs, means of information, advice about smoke secession and weight management, and 4) about the clinicians own attitudes toward physical activity (for full questionnaire see annex 1).

2.3 Questionnaire for patients

The questionnaire was divided into three parts. To be able to assess patients’ attitudes towards physical activity, the first part was patient characteristics (age, education level, occupation, other diagnoses, walking aids etc.). Factors such as age, other diagnoses and walking aids can have a decisive impact on their attitudes, and therefore important to assess. The next part was information from the health service and included questions about time since surgery and whether they had participated in any pre/rehab program before/after surgery. The final part was attitudes towards physical activity and consisted of four subcategories: quality of life, level of physical activity, function, and fear of movement. The full questionnaire is found in annex 2.

2.4 Distribution of questionnaires and data collection

All partners of the project distributed both types of questionnaires during 2022. The means of collecting information was at the liberty for each participating PAIR partner country. In Norway, the Norwegian Arthroplasty Register <https://helse-bergen.no/nrl> was engaged as they have a complete list of all patients who have undergone joint prosthesis surgery. Data from clinicians were collected anonymously online via e-mail lists distributed hospital and community health service institutions. For the Netherlands, the researchers used their extensive network of clinics and hospitals to collect data from patients and clinicians. For Italy, Romania, and Bulgaria data from patients and clinicians were collected internally only within the hospitals that participated in this project.

A sample size calculation was made for each separate country to estimate the number of informants necessary to represent the population in question [<https://www.surveymonkey.com/mp/sample-size-calculator/>]. For clinicians the population categories were registered orthopedic surgeons, nurses, physiotherapists, occupational therapists, other categories of medical doctors, and sports trainers (Table1). For patients, the sample size was based on the number of total prosthesis surgeries for knee- and hip surgeries, respectively per year. All data was uploaded into the Web CRF data base by each participating partner and managed by NTNU.

2.5 Data protection (GDPR) and ethical considerations

WEB CRF is a tool for registering data [<https://www.klinforsk.no/info/WebCRF>]. The data base is managed by Klinforsk, a collaboration between NTNU and St Olav's Hospital. WEB CRF is GDPR approved [<https://gdpr-info.eu/>]. As responsible for WP3, NTNU has obtained ethical approval on behalf of all PAIR partner countries under guarantee of local ethical approvals received from each partner (REK 244244 / 25.08.2021).

Each partner has status as Data Controller and thus owns the right to their own data for use at their own convenience (Norwegian personal data legislation and regulation (EU) 2016/679 of 27th April 2016, Articles 28 and 29, cf. Article 32-36). NTNU is the Data Processor and has according to the agreement the right to process data from each contributor in this project. Data stored in WEB CRF can be acquired upon request from each PAIR partner country entered into this agreement.

2.5 Analysis

The data was analyzed only descriptively due to great differences in response rates between countries.

3. Results

The response rate varied to a large degree between participating countries, whereas the number of responses were relatively evenly divided between TKR and THR. Table 1 shows the relation between population, sample size, and responses. Due to non-available information the table is incomplete. Sample size was calculated where the population number was available, otherwise suggested by the country in question or missing. THR response rate for Norway exceeds 100% as the number of questionnaires was increased with 30% to account for non-responses. Norway sent reminders twice to non-responders.

Total number of patient responses was for Norway 714, for the Netherlands 523, Italy 67, Romania 22, and Bulgaria 39.

Table 1. Response rate relative to estimated sample size per partner country for patients (Population total knee replacement (TKR) or total hip replacement (THR) = n primary replacement surgeries / year) and health professionals.

Country	TKR			THR			Health professional			
	Surgeries	Sample size	Response Rate N (%)	Surgeries	Sample size	Response Rate N (%)	Category	Population	Sample size	Response rate N (%)
Norway ¹	5905	361	340 (94)	9553	368	374 (101)	OS	830	127	4 (3)
							PT.	5000	146	83 (57)
Netherland ²	29 221	379	237 (62)	29 397	379	286 (75)	OS.	-	7	7 (100)
							Nurse	-	120	23 (19)
							Trainer	-	49	4 (8)
							PT.			157
							OT			3
							GP			17
							PM			2
							MS			28
							Total			241 / 241
Italy ³	60 000	382	30 (8)	50 000	381	37 (10)	OS.	9000	368	103 (28)
							Nurse.	3500	346	54 (16)
							Trainer	11400	372	49 (13)
							PT.			51
							OT.	1835	318	2 (0.6)
							GP			7
							PM			11
							MS			47
							Total			324 / 365*
Romania ⁴	4 785	356	13 (0.4)	12 350	373	9 (2)	Total	-	-	212 / 212
Bulgaria ⁵			20			19	OS.			11
							Nurse.			2
							PT.			3
							PM.			3
							MS.			1
							Total			20 / 20

¹<http://nrlweb.ihelse.net/Rapporter/Rapport2019.pdf>

²https://www.lroi-rapportage.nl/media/pdf/PDF%20Online_LROI_annual_report_2018.pdf

³<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5672872/figure/FI1603207-3/>

⁴<https://www.statista.com/statistics/643939/knee-replacement-procedures-conducted-in-romania/>

⁵official statistics unavailable

the number is calculated as: (population / 100 000)(n surgeries / 100 000): 190 * 65

OS = orthopaedic surgeon, PT = physiotherapist, PT = OT = occupational therapist, GP = general practitioner, PM = physical med. physician, MS = medical student, Trainer non-medical personnel

*n = responses to question 4 on category / n = total received responses

3.1 Patients background data

The age distribution between countries (Figure 1) shows a similar distribution across countries except for Bulgaria that has an overall slightly younger patient group. The majority of patients are found in the age span of 60-80 years. The distribution between TKR and THR was similar for Norway and the Netherlands, while a lower number of THR was found in the upper half of this age span for Italy, Romania, and Bulgaria.

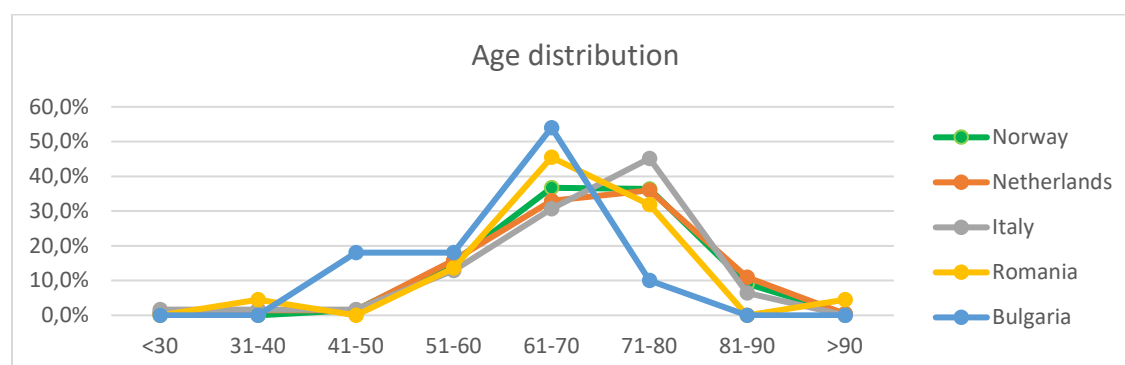


Figure 1. Age distribution across countries for TKR and THR. N relative to total response rate: Norway: 692 / 714, Netherlands 467 / 523, Italy 62 / 22267, Romania 22 / 22, Bulgaria 39 / 39.

Education level

There were some differences in education level between countries as showed in Figure 2. Bulgaria had the highest proportion (70%) of participants with university degrees, while most of the participants from Italy (60%) reported grammar school level education. All countries, except Bulgaria, reported education mainly on the lower level. Norway, The Netherlands, and Bulgaria had the highest proportion of patients' responses with university degrees. Educational level was generally similar for TKR and THR. For Italy the relative number with TKR was higher than THR at grammar school level, and the opposite at college level. For Romania a higher relative number of TKR than THR was found on college level, and a higher number of THR than TKR had undergraduate university degree. For Bulgaria most THR had undergraduate university degree, while THR had a higher proportion of university postgraduates had TKR.

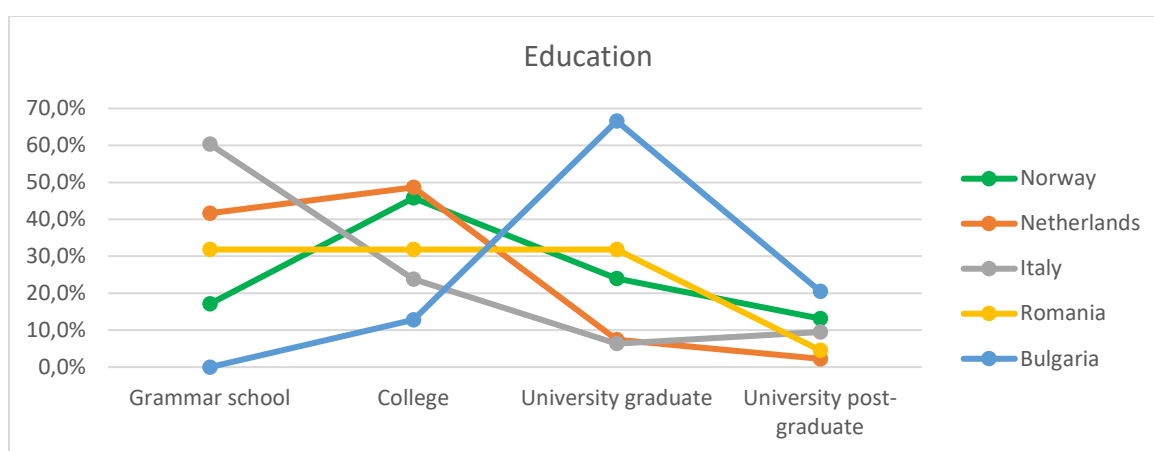


Figure 2. Educational level across countries for TKR and THR. N relative to total response rate: Norway: 692 / 714, Netherlands 467 / 523, Italy 62 / 67, Romania 22 / 22, Bulgaria 39 / 39.

Occupational sector

Figure 3 shows the between countries differences in occupation. Apart from Bulgaria, where most patients had office jobs with sedative work, most patients were not working. Note that the retirement age varies between countries as does the age span for the responding groups.

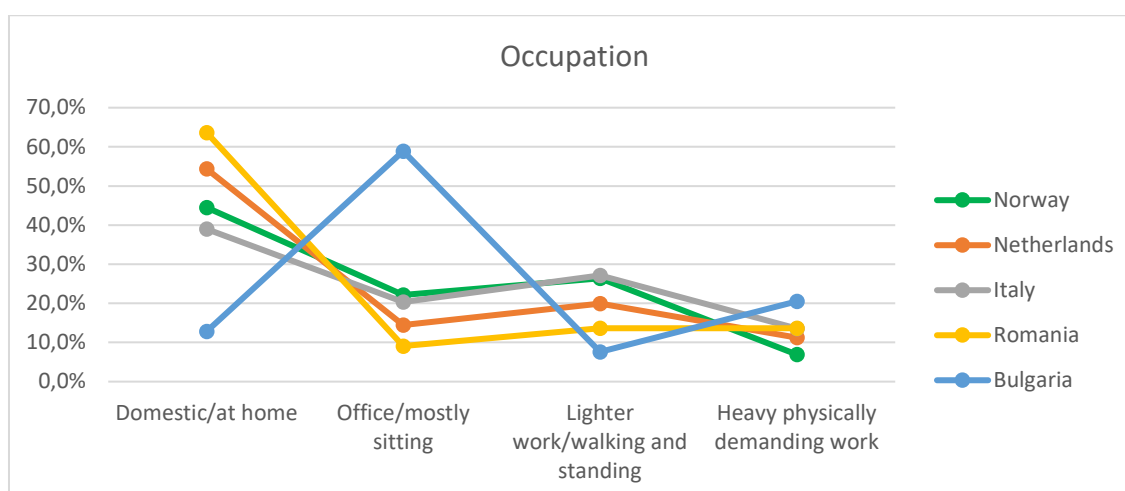


Figure 3. Occupation across countries for TKR and THR. N relative to total response rate: Norway: 708 / 714, Netherlands 436 / 523, Italy 59 / 67, Romania 22 / 22, Bulgaria 39 / 39.

Walking aids

The majority of patients did not use walking aids (Figure 4). Romania and Italy had more patients in need of walking aids. The need for a roller was low, but The Netherlands and Romania had a higher

number of these patients. Italy and Bulgaria showed a slightly relative lower use of walking aids in general in THR than in TKR.

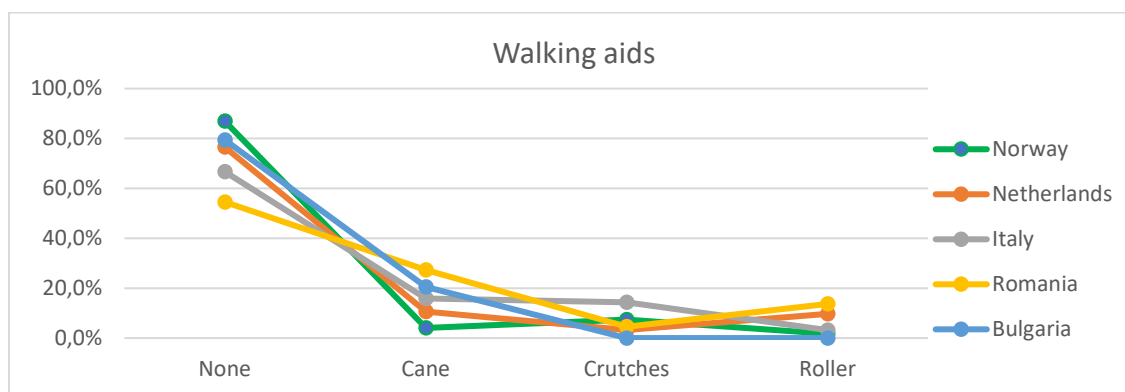


Figure 4. Use of walking aids across countries for TKR and THR. N relative to total response rate: Norway: 695 / 714, Netherlands 453 / 523, Italy 63 / 67, Romania 22 / 22, Bulgaria 39 / 39.

Time since surgery

Figure 5 shows the time since surgery when responding to this survey. For Norway and The Netherlands, the majority of respondents answered more than six months after surgery, while the other countries had a mix from one week and upwards. For Romania, most patients responded between 3-6 months after surgery. The earliest responses were found for Bulgaria only 1-week post-surgery. The relative response time between TKR and THR was similar between Norway and The Netherlands but varied between TKR and THR for the others, particularly for Bulgaria.

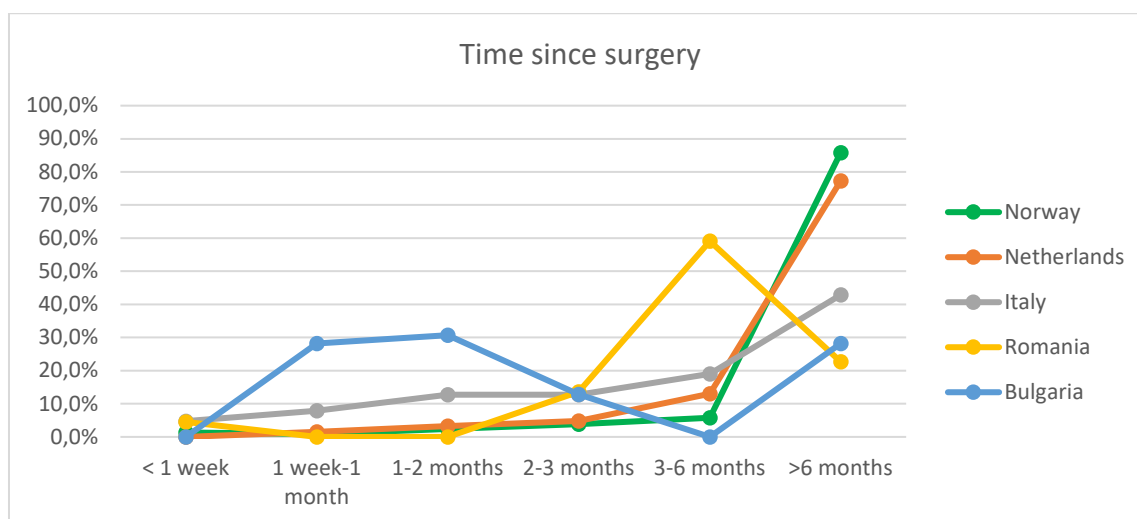


Figure 5. Use of walking aids across countries for TKR and THR. N relative to total response rate: Norway: 698 / 714, Netherlands 453 / 523, Italy 63 / 67, Romania 22 / 22, Bulgaria 39 / 39.

Prehab

Prehab is a pre-surgery training program for optimizing function. Most respondents did not participate in a prehab program, shown in figure 6. Bulgaria reported no patients in prehab programs. Norway had the most (24,5%) patients who participated in prehab lasting more than two months. There were some differences between TKR and THR, as Norway, The Netherlands and Italy reported more patients with longer prehab periods (weekly >2 months) for TKR than THR.

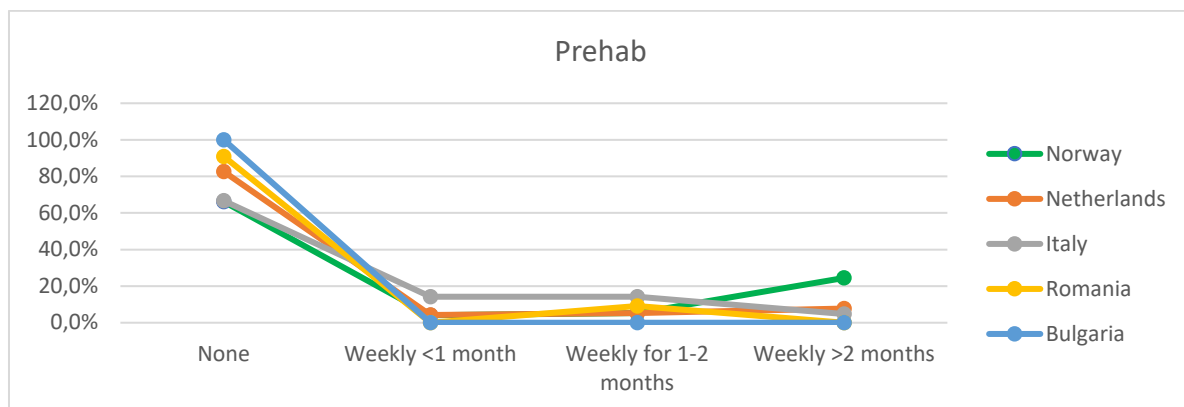


Figure 6. Reported participation in prehab across countries for TKR and THR. N relative to total response rate: Norway: 707 / 714, Netherlands 449 / 523, Italy 63 / 67, Romania 22 / 22, Bulgaria 39 / 39.

Information about physical activity was given by

All countries except Bulgaria reported that several professions gave advice about physical activity (Figure 7). Italy reported the highest number of physicians who gave advice (88,9%). There were few and only small differences between TKR and THR.

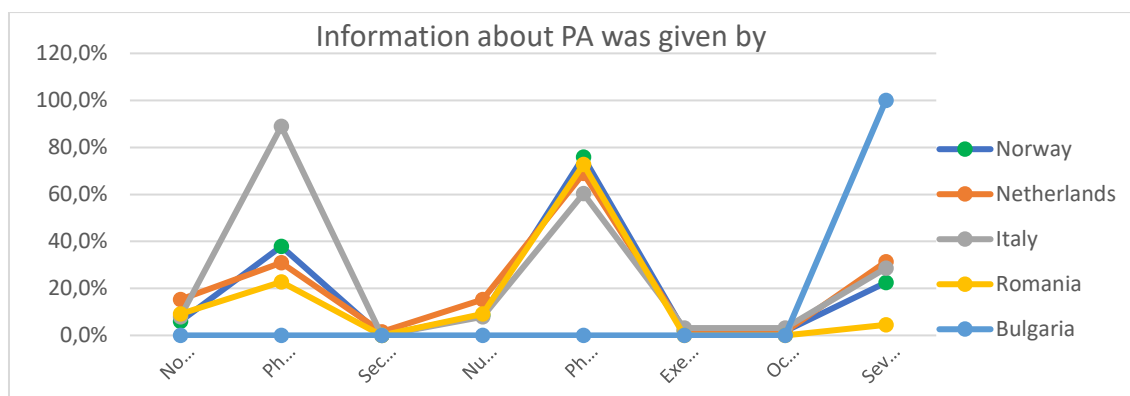


Figure 7. Information about physical activity was given by across countries for TKR and THR. N relative to total response rate: Norway: 721* / 714, Netherlands 460 / 523, Italy 63 / 67, Romania 22 / 22, Bulgaria 39 / 39. *Number exceeding participants due to answering several alternatives.

How was information provided

Most patients were given information about physical activity orally and to a less extent written (Figure 8). Bulgaria had the highest proportion of patients who received advice orally (84,6%), and Italy the highest proportion who received written information (72,6%). There were some small variations how the information was given to TKR and THR patients.

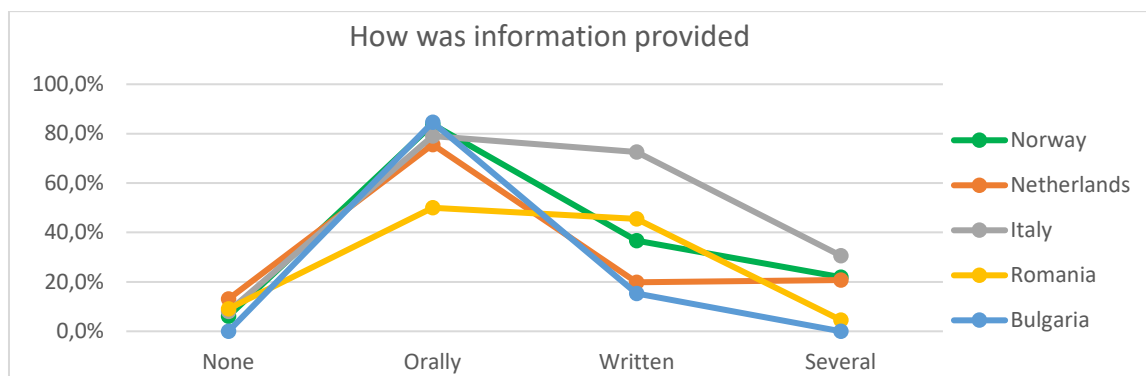


Figure 8. Reported participation in prehab across countries for TKR and THR. N relative to total response rate: Norway: 702 / 714, Netherlands 414 / 523, Italy 62 / 67, Romania 22 / 22, Bulgaria 39 / 39.

Prosthesis earlier

Figure 9 show that most patients did not already have a prosthesis prior to the present surgery. Bulgaria stood apart with no patients with prior ankle or shoulder prosthesis.

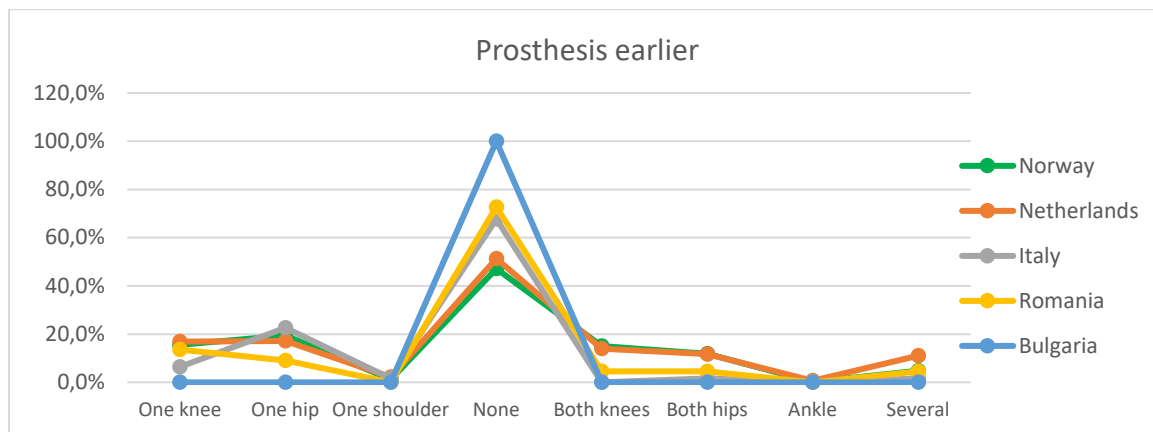


Figure 9. Earlier prosthesis surgery across countries for TKR and THR. N relative to total response rate: Norway: 698 / 714, Netherlands 460 / 523, Italy 62 / 67, Romania 22 / 22, Bulgaria 39 / 39.

3.1 Patients' attitudes towards physical activity

Table 2 shows the four categories of attitude towards physical activity and mean score for each category across countries. A high score indicates a positive view on physical activity. Norway reported the most positive attitude on how physical activity influences quality of life (3.69), and Bulgaria the least positive attitude (2.43). The Netherlands, Italy and Romania reported a similar positive attitude. The same trend was reported on level of physical activity, with Norway having the most positive attitude (3.02) and Bulgaria the least positive attitude (2.48). The attitude towards physical activity and its impact on function was similar between Norway, The Netherlands, Italy, and Romania. Bulgaria reported the least positive attitudes (2.88). Norway had the highest total score followed in order by the Netherlands, Romania, Italy, and Bulgaria.

Table 2. Patients' attitude towards physical activity across countries for TKR and THR. Mean scores of categories. Range 1-4. Higher score indicates a more positive attitude towards physical activity.

Attitudes categories	Norway	Netherlands	Italy	Romania	Bulgaria
Quality of life	3.69	3.48	3.28	3.59	2.43
Level of physical activity	3.02	2.90	2.75	2.71	2.48
Function	3.62	3.43	3.19	3.34	2.88
Fear of movement	3.27	3.12	2.66	2.66	2.53
Total score (mean)	13.6 (3.4)	12.9 (3.2)	11.8 (3.0)	12.3 (3.1)	10.3 (2.6)

3.3 Clinicians background data

The categories who answered the survey varied largely in both number and categories. Italy had the greatest total number of responses however low relative to estimated sample size. The sample size is however founded on differing premises between countries with regard how the number of clinicians in different categories were counted. Therefore, a valid and fair comparison cannot be made between countries (Table 1). The Netherlands presented the second highest number of responses, thereafter in turn Romania, Norway, and Bulgaria.

For Bulgaria 95% of the clinicians were between 30-60 years of age. Romania reports 35% being younger than 30 years of age. Likewise, The Netherlands and Italy reported a young workforce with 65% younger than 40. Norway had the oldest work force represented by 95% physiotherapists (Table 1, Figure 10) where 45% were older than 50 years of age.

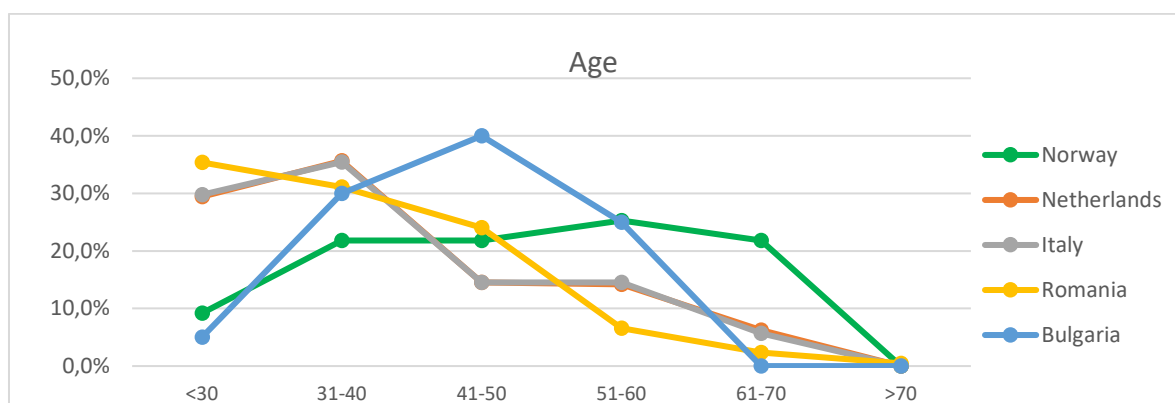


Figure 10. Age span for the total of categories. N relative to total response rate not calculated for individual questions relative to total number of responses.

Figure 11 shows that the educational level differed widely between countries. For Bulgaria 50% of the respondents had PhD degree while others had about 10% of the respondents with PhD. For the Netherlands and Italy close to 60% had a Masters' degree, whereas 50% of the respondents from Romania and Norway had Bachelors' degree. The discrepancies can be explained both by responding professional categories, age span, and the academic system issuing degrees in different health professions.

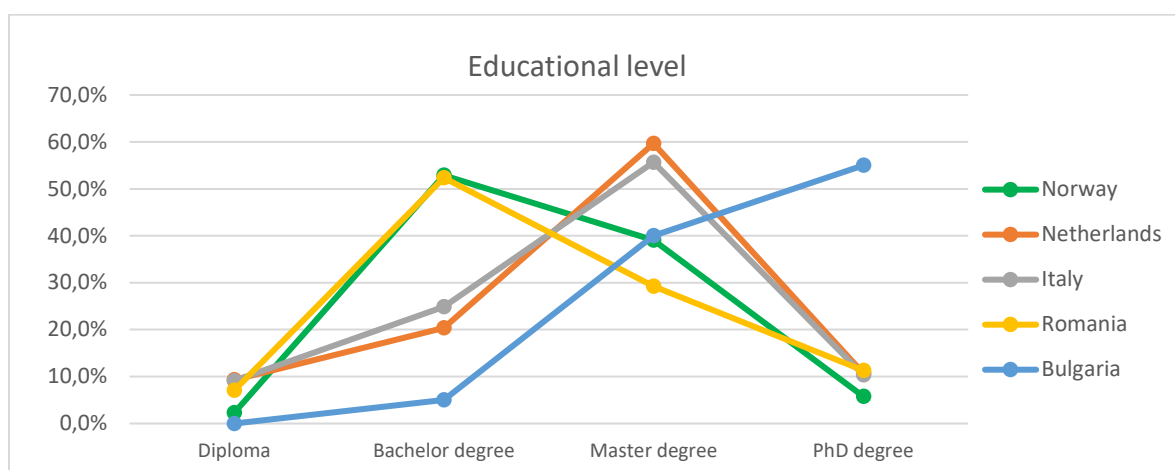


Figure 11. Educational level across the total of categories for each country. N relative to total response rate not calculated for individual questions relative to total number of responses.

Figure 12 shows that the work experience is well reflected in the age span of the respondents where Norway represents the longest experience more than 20 years for more than 50% of the respondents. Bulgaria also presents a high proportion of the workforce with long experience, also in line with the age span of the respondents. For the other three countries 30% of the respondents had between 1-5 years of experience and 10% with less experience than 1 year. Again, the variation can be explained by the age span and the professional category of responders.



Figure 12. Work experience across the total of categories for each country. *N* relative to total response rate not calculated for individual questions relative to total number of responses.

The clinic offers exercise classes for this patient group

Figure 13 shows a wide variety of responses whether the clinic offered exercise classes for this group of patients. The answers may vary due to the variety in professional categories and workplace of responders, and how the question was interpreted.

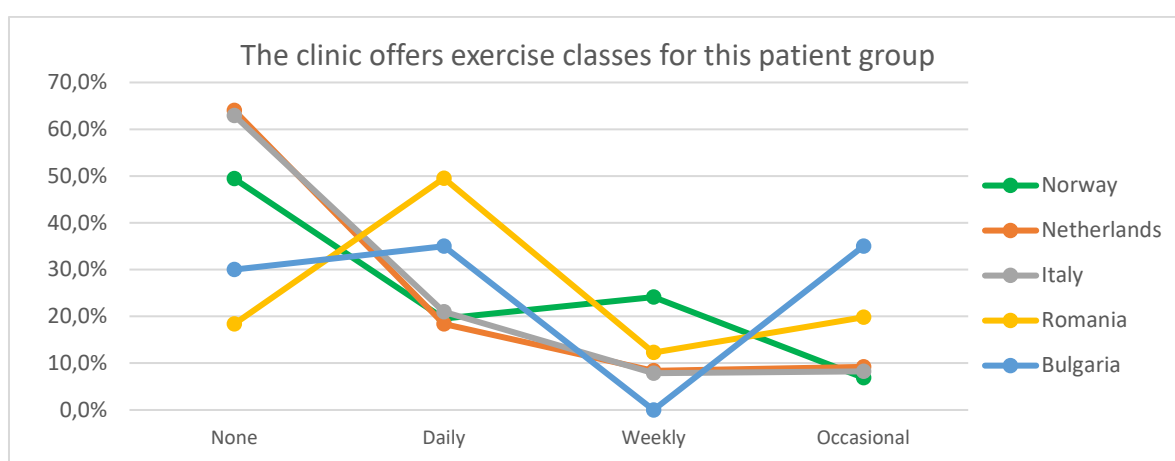


Figure 13. Responses about exercise classes for TKR ad THR operated across the total of categories for each country. *N* relative to total response rate not calculated for individual questions relative to total number of responses.

Figure 14 shows more uniform responses of whether the clinic offered prehab exercise classes. The answers here may however also vary due to the variety in professional categories and workplace of responders, and how the question was interpreted.

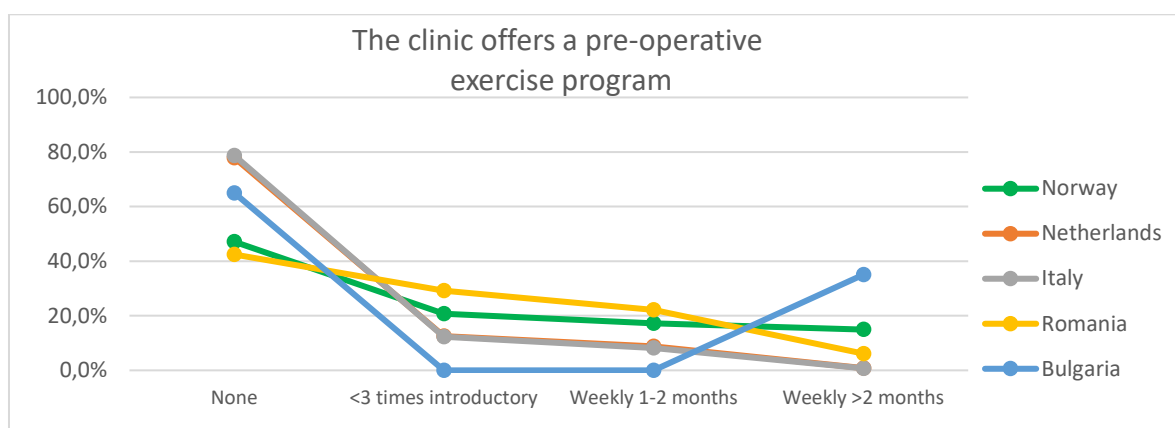


Figure 14. Responses about prehab exercise classes for TKR ad THR operated across the total of categories for each country. N relative to total response rate not calculated for individual questions relative to total number of responses.

Figure 15 shows big differences between countries whether a post-operative exercise program was provided. Between 15-35% of respondents reported that their clinic did not offer such a program. Again, the responses depend on the workplace of the responder.

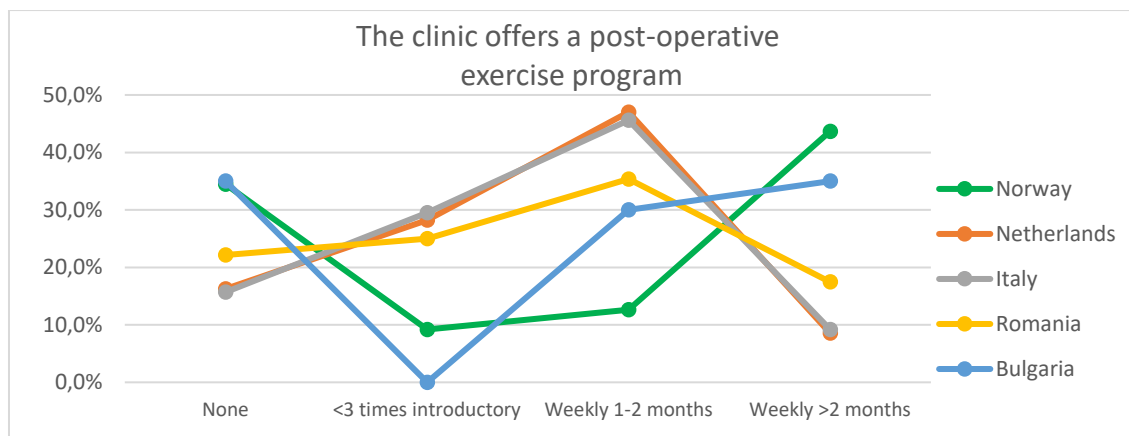


Figure 15. Responses about post-operative exercise classes for TKR ad THR operated across the total of categories for each country. N relative to total response rate not calculated for individual questions relative to total number of responses.

Figure 16 shows that almost all respondents reported that they gave information about the importance of physical activity, and the majority gave information both orally and written. Bulgaria was the only country that the majority of the clinicians gave information orally.

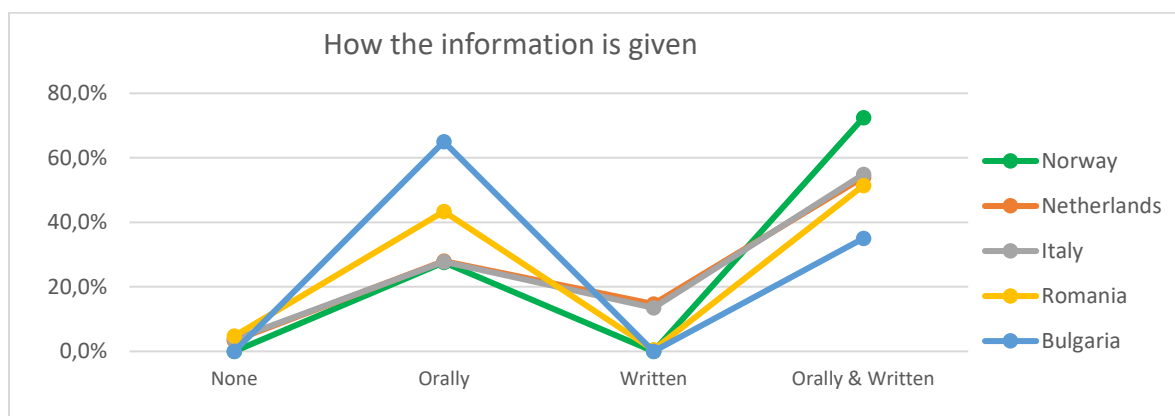


Figure 16. Responses about post-operative exercise classes for TKR ad THR operated across the total of categories for each country. N relative to total response rate not calculated for individual questions relative to total number of responses.

Figure 17 shows that Norway was the country where the least proportion of clinicians always gave weight reduction advice, and where most gave advice only sometimes. Bulgaria and Romania reported the highest number of respondents reporting that they always give such advice. As for the questions, the results depend on the categories who answered the survey.

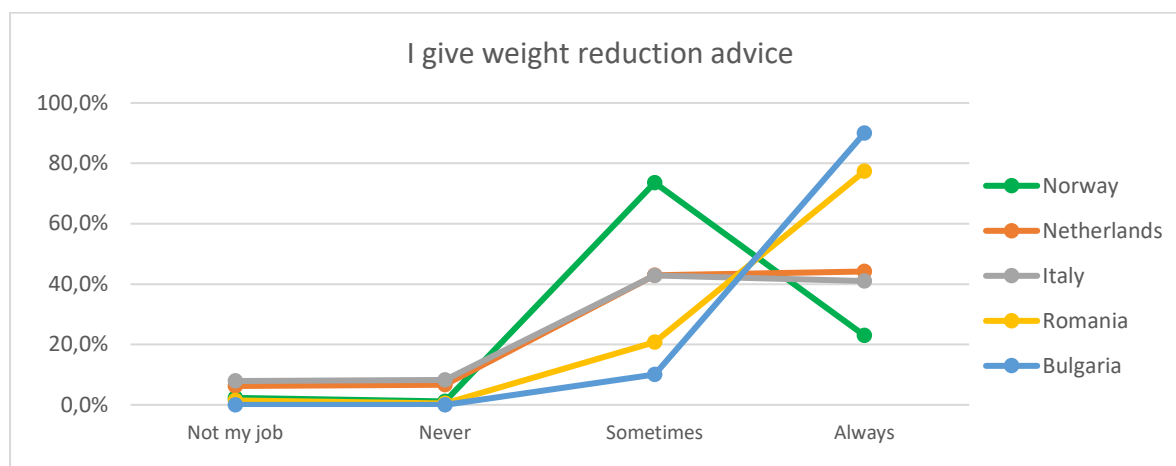


Figure 17. Advice given about weight reduction across the total of categories for each country. N relative to total response rate not calculated for individual questions relative to total number of responses.

Clinic gives information about importance of physical activity by

Figure 18 shows a variety in how the respondents reported what kind of profession gave information about the importance about physical activity. Norway had the least variety, and most here reported that the physiotherapists provided such information. Note that 95% of the respondents were physiotherapists. The answers thus may reflect the profession of the respondent. All countries other than The Netherlands reported a high number of several.

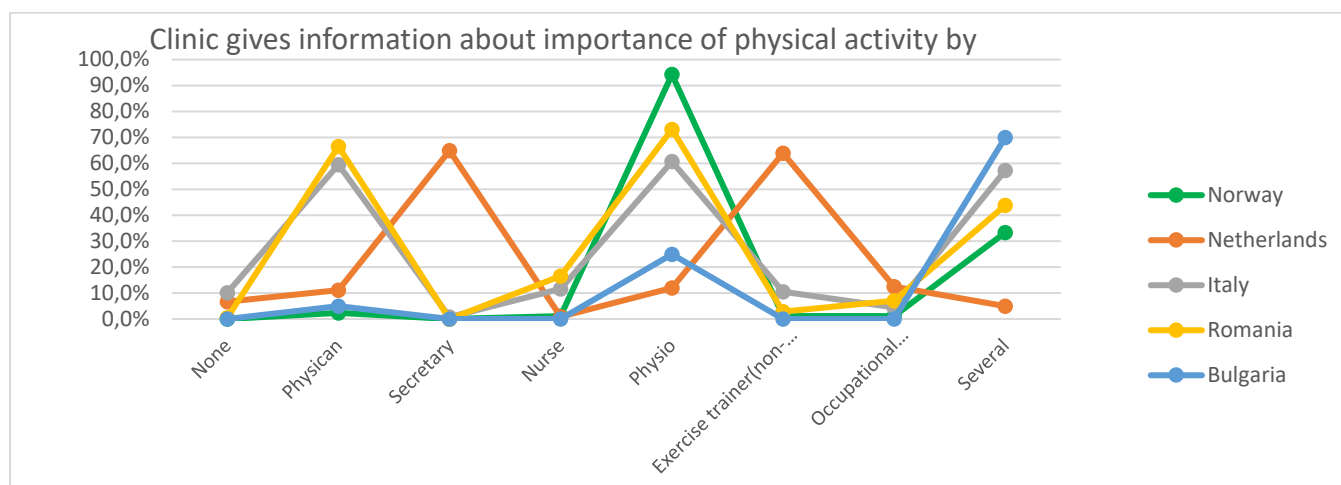


Figure 18. Advice given about importance of physical activity given across the total of categories for each country. N relative to total response rate not calculated for individual questions relative to total number of responses.

3.4 Clinicians attitudes towards physical activity

Table 3 shows the complete list of statements from the survey on attitude towards physical activity and mean score for each statement across countries. A high score indicates a positive view on physical activity. Note that for statements that do not promote physical activity the score is turned in the analysis so that strongly agree, 4, becomes 1. There was generally strong agreement between the participating PAIR partner countries where a positive attitude toward the importance of physical activity after total hip or knee replacement was prevailing. Bulgaria did however indicate that the prosthesis alone restores function but at the same time scores high on other items. All countries disagreed on that vigorous physical activity may damage the prosthesis.

Table 3. Complete list of statements about physical activity in the Clinicians Survey. Means values. Note that scores for item 5 and 6 are turned in the analysis (1=strongly agree – 4 strongly disagree).

Attitudes	Norway	Netherlands	Italy	Romania	Bulgaria
	Mean	Mean	Mean	Mean	Mean
1. Strongly disagree					
2. Disagree					
3. Agree					
4. Strongly agree					
Physical activity is important for general health	3,91	3,95	3,82	3,92	4,00
Physical activity is important for physical function	3,91	3,93	3,79	3,90	4,00
Physical activity is important for quality of life	3,77	3,82	3,77	3,89	4,00
Physical activity is for everyone	3,82	3,74	3,45	3,54	4,00
The prosthesis alone restores full physical function	3,11	3,20	2,97	3,00	1,55
Physical activity is not necessary	3,90	3,90	3,71	3,60	1,20
Vigorous physical activity may damage the prosthesis	1,86	2,09	2,75	2,49	2,10
Physical activity increases joint function	3,78	3,53	3,25	3,54	3,70
Vigorous physical activity is contra-indicated for this patient group	1,72	1,94	2,65	2,40	2,45
I recommend physical activity	3,85	3,83	3,53	3,62	3,55
Balance training is important for this patient group	3,71	3,57	3,58	3,52	4,00
Maintaining normal body weight is important for this patient group	3,54	3,52	3,76	3,80	4,00
I am familiar with WHO's recommendation for moderate physical activity	3,83	3,37	3,07	3,29	3,75
The intensity (i.e. increased heart rate) of physical activity is important for this patient group	3,37	3,00	2,93	2,72	3,00
I am familiar with WHO's recommendation for muscle strengthening exercise	3,62	3,20	2,86	3,13	4,00
Exercises for muscle strength is important for function for this patient group	3,94	3,68	3,38	3,56	4,00
Physical activity is important to enable participation (social, work, leisure)	3,54	3,53	3,40	3,58	4,00
Physical activity is important for coping with having prosthesis	3,63	3,51	3,24	3,53	3,80

4.0 Discussion

The overall goal of the PAIR EUROPEAN project was to “promote at European level shared knowledge, methods and approaches to support patients to regain functioning, optimal physical activity and participation in social and vocational domains after total hip replacement (THR)/total knee replacement (TKR)”. The aim of WP3 was to determine the attitude toward physical activity in patients who had undergone total replacement of either the knee (TKR) or the hip (THR) joint, and the opinion of clinicians and exercise trainers whether or why these patients should be physically active.

For patients, the highest score meaning the most positive attitude was found for Norway, followed by the Netherlands, Romania, Italy, and Bulgaria who had the lowest score. For clinicians and exercise trainers, there was strong agreement on the importance of physical activity although Bulgaria, in contrast to others, indicated that the prosthesis alone would restore physical function and that physical activity is not necessary. Note that items bearing a negative attitude toward physical activity, such as *physical activity is not necessary* are transformed in the analysis so that a high score indicates a positive attitude, pro physical activity. On whether vigorous physical activity should be contra-indicated after total knee- or hip replacement, Norway and the Netherlands disagreed, whereas the other three countries were somewhat more uncertain about contra indication.

The results from this survey need to be interpreted against the background of sample size and who the respondents were. The response rate relative to the sample size calculation for representativeness on national level varied greatly as did the geographical coverage, targeted populations, and the respondents both for the patient and clinician surveys.

Sample size and response rate

Table 1 shows the response rate versus sample size. The sample size for TKR and THR was calculated relative to the number of surgeries performed per category during one year for each country. Registry data were found for all countries except for Bulgaria. Thus, sample size could not be calculated for Bulgaria. Although sample size was calculated, there was no information given from the different countries on the number of surveys that were distributed for TKR and THR respectively. Response rate is usually estimated to 60 or 70%. Thus, between 30 or 40% extra surveys should be calculated and a second or even third reminder should be sent out to reach the number of responses to reach the decided sample size. This was done for Norway which resulted to satisfactory response rate. Patient surveys were sent by post via the Norwegian Arthroplasty Register (NAR) to the respondents. The Netherlands did not disclose the number of surveys sent. They used their network and thus obtained responses via several hospitals and achieved a satisfactory number of responses with regard to sample size. Italy and Romania did the survey only with patients involved in their RCT which was also part of the PAIR project. Due to Covid-19, a low number of responses was returned. Bulgaria performed the survey only within their own hospital.

Additionally, Table 1 displays the sample size for clinicians per profession. The list is incomplete as statistics were partly unavailable for size of the different clinical populations. Italy had the greatest number of responses, 365, where the largest responding group were orthopaedic surgeons, which corresponds to 28% of the calculated sample size. The Netherlands presented a total of 241 responses where the largest group consisted of physiotherapists. Almost the same number was returned from Romania, but without information on professions. Bulgaria presented the lowest number of total returns, 20, where half were orthopaedic surgeons. Again, data collection was small as it was limited to own hospital. Norway had a 57% response rate from physiotherapists relative to sample size (83 / 146), but only 4 orthopaedic surgeons answered the survey. The number of responses was generally too low and varied too much to enable statistical analysis for comparison between countries or for meaningful correlation between attitudes toward physical activity and background data. The sample size was for three out of the participating countries too small for generalization with regard to population. Sample size and response rate is however not enough for generalization of survey results.

Generalization of results

For responses to the patient survey, geographic coverage varied greatly between participating countries. Norway had access to all operated patients nationally, and surveys were distributed evenly geographically and between city and countryside to patients who had undergone surgery approximately between 6 – 12

months ago as the survey was intended for patients recently operated but should have finished rehabilitation after surgery. The Netherlands also reached reasonable geographical representation by using several hospitals for data collection. For Italy and Romania, patients answering the survey were typically included in a RCT which limited geographical representation and may have introduced a certain bias regarding representation and responses. Bulgaria included only their own patients with high risk of bias with regard to representation and responses. Thus, for Norway and the Netherlands, the responses can be generalized nationally, while for the other three, generalization is limited. During this project we found that there are considerable differences in health systems organization, universal health coverage, and socioeconomic status as well as in culture, physical activity level in the population and what physical activity entails. The results should therefore not be generalized across Europe.

There are several factors that may affect and explain patient responses. Whereas a large number of responses evens out the effect of background variables, a small sample is more sensitive, in particular if the sample is homogenous. Homogeneity strengthens internal validity as it represents the sample but weakens the external validity as it represents only a limited group of a general population. Bulgaria has the smallest sample, $n=39$, only 5% relative to Norway with a total of 714 responses. Bulgaria differed from the other partners by having the youngest responders with highest education and more sedentary work. This is probably explained by that the Bulgarian institution was a private clinic receiving a selected group of patients which was reflected in the responses to the questionnaire. They also answered the survey 2-3 months after surgery, whereas responses for Norway and the Netherlands were filed more than 6 months after surgery.

Other variables such as hospital policy and information to patients may contribute to explain patient's attitudes. For instance, participation in a prehab program, i.e., exercising to reach a required functional level before surgery, could influence the attitude toward physical activity. For Bulgaria, no one had participated in prehab, whereas 60% of the responders from Norway and Italy had not participated in prehab. For the others, 80% had not participated. For Norway, 20% responded that they had participated in a prehab program for more than two months. Note that in Norway, the patient is not offered surgery as firsthand treatment, but is received by physiotherapist who offers an osteoarthritis school program with education about osteoarthritis, advice, and groups exercise classes <https://aktivmedartrose.no/english/>. Others reported a mixture of shorter participation. All had received information about physical activity after surgery. For Italy 80% received information from orthopaedic surgeons, 60% of the respondents also received information from physiotherapist. Bulgaria reported that information was given by several professions.

No conclusions can be drawn across countries from the patient survey due to low statistical power for three of the participating countries and geographical and demographic differences making statistical analyses invalid.

Similar problems are true for interpretations of the results from the clinician survey. The discrepancies between the countries with regard to number of responses and the difference in representation of professions makes comparison complicated. The workforce in Italy, Romania, and Bulgaria was younger, and Norway presented the oldest workforce. Bulgaria presented the highest educated work force, whereas Norway the lowest. Notably, 50% of the Bulgarian responders were orthopaedic surgeons and 96% of the Norwegian responders were physiotherapists. More than 80% of the Bulgarian responders were younger than 50 years of age, while 80% of the Norwegian responders were older than 60 years of age. All responders answered that the clinic offers exercise programs both before and after surgery, and that

information about physical activity is given both written and orally. Our survey did not cover details on information content.

Limitations

The results should be taken at face value and comparisons between countries should be avoided for patient as well as clinician data as sample size and source differs. The setting for data collection differed greatly between countries. Whereas Bulgaria did all data collection within their own hospital, Italy and Romania collected data in parallel with performing a multicenter RCT, the teams in Norway and the Netherlands were in contrast not situated in hospitals but were employed in the university sector. Thus, Norway and the Netherlands had to find other means to collect data without own access to patients. Differences in health systems organization between countries was not taken into consideration when the PAIR project was planned. Examples of such differences are private versus universal health coverage, pay out of pocket, surgical and rehabilitation protocols, division of work tasks in clinic. Unique for Norway is that it is not the surgeon, but the physiotherapist who meets the patient with joint pain. Firsthand intervention is not surgery but “osteoarthritis school”. Thus, there are numerous factors that may influence the survey results on attitude toward physical activity in addition to information that can be derived from the background information in the surveys. Finally, it is generally known that physical activity is supposed to be something positive and that everyone should be physically active. Thus, the results may be biased by responders’ tendency to satisfy the survey rather than giving honest answers.

5.0 Conclusion

The results of the surveys show a generally positive attitude toward physical activity in patients as well as clinicians. There were however large discrepancies between the different participating countries how and where the surveys were distributed, sample size, geographical distribution, and demography. For the clinician survey, sample size and professional groups differed. Thus, statistical comparisons could not be made between all countries, or correlations between background factors and attitudes toward physical activity. Generalization of the results differs between participating countries. Whereas Norway and the Netherlands presented a large number of patient responses with large demographic and geographic coverage that can be generalized, the responses from the other countries were considerably smaller in terms of number of responses, and demographic and a geographic coverage. The experience from this project has shown the importance to take into consideration that there are many differences between northern, southern, and eastern European countries in terms of health systems, culture, and functions that different professionals perform that may influence the results of the surveys. Further research needs to take such differences into consideration when setting up a research protocol, interpreting results, and when planning interventions accordingly.

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