Physical Therapy and Manual Physical Therapy: Differences in Patient Characteristics

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Abstract: This study compared socio-demographic characteristics, health problem characteristics, and primary process data between database samples of patients referred to physical therapy (PT) versus a sample of patients referred to manual physical therapy (MPT) in the Netherlands. Statistical analysis indicated that that the MPT sample was significantly (P<0.01) different from the PT samples with regards to the socio-demographic data in that the patients in the MPT sample were younger, had attended post-secondary education to a greater degree, and were more often gainfully employed. The MPT sample was significantly (P≤0.01) different from the PT samples in that health problem data in the MPT sample indicated mainly acute, non-surgical orthopaedic or neurological, spine-related complaints of recent occurrence. Recurrence was significantly (P<0.01) more common and complaints were significantly (P=0.01) more often non-traumatic in the MPT sample. MPT referrals were significantly (P<0.01) different from PT referrals in that the MPT referral originated more frequently with a general practitioner but not with a medical specialist and that referral occurred within three months of occurrence. Primary treatment goals and interventions are discussed, as are study limitations, suggestions for future research, and relevance to the international situation.

Key Words: Manual Physical Therapy, Physical Therapy, Patient Characteristics, Socio-demographic, Health Problem, Primary Process

Since the inception of the profession, manual therapy is and has been an intervention used by physical therapists[1,2]. Early manual physical therapy (MPT) could hardly be called sophisticated, but neither were manual interventions in other health care professions[3]. Manual therapy training for physical therapists starts in the entry-level professional program with specific manual therapy and related foundational courses and continues with post-professional educational opportunities in the form of continuing education seminars, clinical residency and fellowship training, post-graduate academic and diploma programs, clinical mentorship, and manual therapy certification programs[4,5]. Both at the national and international level, educational guidelines, criteria, and standards have been developed to standardize entry-level as well as post-professional curricular content[6-8]. Physical therapists have significantly contributed to technique and concept development and description[9-18], research[19], and guideline development in the field of MPT, and have, when compared to other manual therapy practitioners, a superior safety record in the clinical application of manual therapy[4,20].

Compared to the international situation described above, the MPT education and reimbursement environment

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in the Netherlands is somewhat unique. In contrast to the situation in the United States, for example, where entry-level education over the years has placed an increasing emphasis on manual therapy curricular content including thrust techniques[21-24], entry-level education in the Netherlands deals almost entirely with non-thrust manual techniques. To become a registered manual (physical) therapist, therapists have to successfully complete one of five different post-graduate programs all conforming to IFOMT standards[8,25]. Manual physical therapists enter into capitated care contracts with insurance providers separate from and at a higher reimbursement rate than physical therapists. In the Netherlands, physical therapists use thrust and non-thrust manual interventions at a high frequency in clinical practice[26], yet only registered manual physical therapists are reimbursed at the higher MPT rate. This unique education and reimbursement environment has resulted in a sharp delineation of MPT from physical therapy (PT) in the Netherlands with an almost separate professional identity for MPT versus PT. As discussed above, this is quite unlike the international situation where MPT remains firmly integrated into the PT profession as a whole.

Indications for PT and MPT overlap, for example, for patients with non-specific low back and neck pain, but they also clearly differ: e.g., neurodegenerative and internal diseases may present an indication for PT, but not MPT. In the overlap area, both the physical therapist and the manual physical therapist have expertise with health problems involving movement dysfunction. In the Netherlands, professional profiles describe and delineate PT and MPT scopes of practice. A comparison of the *Physical Therapist Professional Profile*[27] and the *Manual Therapist Function Profile*[28] shows that the MPT primary process (i.e., examination, evaluation, diagnosis, treatment planning, and intervention) emphasizes evaluation and treatment/improvement of joint function, especially of joints in the spine and pelvis. To this end, the manual physical therapist uses knowledge, methods, and techniques considered unique to MPT. In daily clinical practice, PT and MPT are often less distinct, because the same person, i.e., the physical therapist with a specialization in MPT, provides both PT and MPT. This seems to result in a treatment continuum where the switch between what is considered MPT or PT occurs whenever indicated. Despite the implicit logic of said continuum evident in clinical patient management, the question regarding PT and MPT distinctiveness remains. For the primary process, this distinctiveness is described in the above-mentioned professional profiles[27,28]. However, a practical distinction can be hard to make. Which patient with low back pain (LBP) would benefit more from MPT intervention and which one would be more appropriately treated with PT? General practitioners (GP) also make use of implicit referral criteria, but they frequently ask for more explicit criteria with regards to appropriate patient selection for referral to either PT or MPT. For now, there is no answer to this question. Review of the relevant international literature has provided no data on referral criteria to help the GP identify patients, who might benefit more from a PT or an MPT referral.

The Dutch Society for Manual Therapy recognized this problem and contracted with the Dutch Institute for Allied Health Care for a descriptive and explorative study. The questions we meant to answer with this study included:

1. What is the distribution of patients referred for MPT with regards to socio-demographic characteristics, health problem characteristics, and primary process data?
2. Is there a difference in socio-demographic characteristics between patients referred to MPT and those referred to PT?
3. If so, is the distribution of patients referred to MPT or to PT different with regards to health problem characteristics after correction for the differences in socio-demographic characteristics?

Methods and Materials

Data Collection Form

We developed a data collection form for this study consisting mainly of closed-ended questions, complete with a manual. This form was used to collect data on socio-demographic (age, gender, education, and occupation/activities) and health problem characteristics using ICF (International Classification of Functioning, Disability, and Health) terminology (i.e., mechanism of injury, cause of injury, duration, recurrence, pathology, structure and function, activities, and participation). Table 1 provides definitions of relevant ICF terminology[29]. We also collected primary process data including treatment goals, number of treatment sessions, interventions, and reasons for discharge. The data collection form used and the data collected for this study were similar to PT data collection forms used in earlier studies[30-32], allowing for comparison between these studies and the current study on socio-demographic and health problem characteristics of the PT and MPT samples. (The data collection form is available upon request from the primary author). The MPT interventions used have been defined in the *"Classification of Interventions"*[33]. Reliability of a similar form used in a study on the PT diagnostic consult was found to be good[34].

Therapist Selection

The roster of the Dutch Society for Manual Therapy was used to select the registered manual physical therapists involved in this study. Subdivided into 19 geographical regions, this roster contains therapists, who

Table 1: Definitions of International Classification of Functioning, Disability, and Health (ICF) terminology

ICF Terminology	Definitions
Impairment	Any loss or abnormality of body structure or of a physiological or psychological function.
Activity	The nature and extent of functioning at the level of the person. Activities may be limited in nature, duration, or quality.
Participation	The nature and extent of a person's involvement in life situations in relation to impairments, activities, health conditions, and contextual factors. Participation may be restricted in nature, duration, or quality.

have completed one of the five different approved MPT educational programs. Based on a balanced distribution of larger and smaller communities within the same region, for this study we selected the regions Amersfoort and Eindhoven. Assuming that each therapist would, on average, see and fill out a data collection form for two new MPT patients a week for the 3-month duration of this study, we expected to end up with 1,976 data collection forms. We did a power analysis to determine the minimum number of data collection forms needed to show significant differences between the PT and MPT samples for the relevant variables with $\alpha=0.01$. This analysis showed that data for at least 1,200 patients was required.

We provided educational sessions for the participating therapists that addressed the goal and hypothesis of this study, and we provided information on the data collection form and its manual, the ICF terminology, and study logistics.

At an intermediate count, the number of data collection forms returned proved to be significantly lower than expected. We made three adaptations to the original study design to achieve the required number of data collection forms:

1. We increased study duration by two months to a total of five months.
2. We increased the number of participating therapists in the original regions.
3. We collected data from two additional regions, Apeldoorn and Zwijndrecht.

The selection procedure for therapists from the two additional regions was similar to the one described for the two original regions.

Patient Population

The study was intended to be representative of MPT daily clinical practice. We used no selection criteria for patient inclusion. Patients were informed regarding study goals and were asked to sign an informed consent. The therapists were requested to ask the first two new patients of each week to participate to prevent selection bias on the part of the therapist.

Statistical Analysis

Fully completed data collection forms were analyzed with SPSS for Windows 6.1.3. Software (SPSS Inc. 223 S. Wacker Drive. Chicago, IL 60606 USA). Frequency distribution tables described the patient population with regards to relevant socio-demographic and health problem characteristics. Non-parametric tests, i.e., Chi-square, Fisher exact, and Mann-Whitney tests ($\alpha=0.05$), were used for statistical analyses. To determine the presence of statistically significant differences between PT and MPT samples, we used a comparable national population database of 4,617 PT patients[30]. Where absence of data did not allow for comparison with this national population, we used data from another comparable population database of 2,234 patients, the Amsterdam PT group (PT-A)[31]. As noted above, data on both PT samples were collected using a similar data collection form as used in this study. Data on these PT samples are provided in Tables 2 to 7.

We performed a one-way analysis of variance (ANOVA) both to investigate the relationship between, on the one hand, patient age, level of education, and symptom duration and, on the other hand, the number of sessions. A factorial analysis of variance was used to correct for effects based on socio-demographic differences. This latter analysis was performed on the patient subgroup aged 25-54 to prevent skewing the results due to the larger proportion of older patients in the PT sample. Because age is correlated to other socio-demographic characteristics, e.g., education and employment status, this way we attempted to minimize the effects of higher age in the PT sample. This additional analysis was done for the data from the MPT and the PT-A samples, as no data were available for the national PT sample.

Table 2: Socio-demographic characteristics MPT and PT samples

Personal Data	MPT sample (n=1,198)	PT sample (n=4,617)
	%	%
Gender		
Male	41.3	41.1
Female	58.1	58.1
Data not entered / unknown	0.6	0.8
Age category (in years)		
0-14	0.7	2.8
15-24	7.7	8.0
25-34	23.3	16.6
35-44	28.4	19.6
45-54	23.1	18.1
55-64	10.3	12.5
Over 65	5.8	19.1
Data not entered / unknown	0.8	3.1
Education		
None / special education / primary education	5.8	17.7
4-year secondary education	27.8	30.1
5- to 6-year secondary education	14.3	20.6
Associate level	25.0	10.5
Undergraduate / graduate level	22.9	12.5
Data not entered / unknown	4.2	8.6
Daily activities (multiple answers allowed)		
Student	3.9	7.2
Homemaker	32.5	35.0
Gainfully employed	70.9	48.6
Unemployed	15.7	32.2
Other	1.7	- - -

Results

Study Population

Of 413 therapists selected at random, 214 (52%) agreed to participate. Of those, 87 (41%) attended the educational session. Of the participating therapists, 97 (45%) sent in data collection forms. Overall, we collected data on 1,198 patients (MPT sample: n=1,198). The referral originated with the GP in 93%, while a medical specialist referred 5% of patients. In comparison, referrals in the PT group database originated with medical specialists in 15% of cases. The MPT sample had a significantly higher number of GP referrals than did the PT sample (P<0.01).

Socio-Demographic Characteristics

Table 2 summarizes socio-demographic characteristics (gender, age, education, and occupation/daily activities). There was a significant age difference between the MPT patient sample and PT database patient sample (P<0.01). Patients 55 and older were underrepresented in the MPT sample (16% in the MPT versus 32% in the PT sample). The MPT sample had attained a statistically significant (P<0.01) higher educational level. Gainful (remunerated) employment was significantly more common in the MPT as compared to the PT sample (P<0.01).

Health Problem Characteristics

Table 3 describes patients' health problem characteristics, e.g., cause and mechanism of injury, duration of complaints, and whether the complaints were recurrent. Comparison with the PT sample was only possible

for duration of complaints, as the other data were not collected for this database. For the other variables, MPT data were compared to the similar available data from the PT-A sample.

The MPT patient sample more often had non-traumatic, acute complaints than the PT-A sample (P=0.01). The PT-A patient sample more often had traumatic, acute complaints or exacerbations of congenital or pre-existing complaints (P<0.01). Duration of complaints < 1 week was more common in the MPT patient sample than in the PT-A patient database sample (P<0.01). The complaints were recurrent (defined by a symptom-free interval of at least four weeks) in 34% of MPT patients, therefore, nearly twice as frequent as in the PT-A patient database sample (P<0.01). Of PT-A patient database sample, 57% had been symptom-free for over six months and 30%

for over a year, the latter another significant difference between the MPT patient sample and the PT-A patient database sample (P=0.01).

Therapists recorded the medical diagnosis/referral data in conformity to the 4-digit code used by the Association of Dutch Health Insurance Companies, which consists of a 2-digit localization and a 2-digit pathology code. Table 4 contains the two main categories of localization and pathology. In 81.2% of cases, the localization code for the MPT sample indicated spine-related complaints; almost double that of this localization code for the PT sample. The PT sample was referred more frequently for extremity complaints (Table 3). The MPT sample was also significantly different from the PT sample in the other main category of pathology (P<0.01): being referred more frequently for non-surgical orthopaedic

Table 3: Health problem characteristics MPT, PT-A, and PT samples

Health problem	MPT sample (n=1,198)	PT-A sample (n=2,234)	PT sample (n=4,617)
	%	%	%
Mechanism of injury			
Acute / traumatic	12.4	16.4	
Acute / non-traumatic	21.0	14.7	
Non-acute / gradual	57.8	52.7	
Exacerbation congenital or pre-existing problem	3.9	10.5	
Other	1.8	4.1	
Data not entered / unknown	3.0	1.6	
Cause of injury			
Work-related	27.5	18.6	
In and around the house	6.3	9.6	
Sports / hobby	10.6	10.5	
Transportation	2.8	4.7	
Other	19.2	24.4	
Data not entered / unknown	33.6	32.1	
Duration			
0-7 days	10.8	5.6	7.4
1 week to 1 month	25.8	22.3	27.7
1 to 3 months	22.4	21.8	25.4
3 to 6 months	10.9	12.4	11.7
6 months to 1 year	9.0	8.2	7.9
More than 1 year	20.7	24.5	18.1
Data not entered / unknown	0.6	0.5	1.7
Recurrence			
Yes	33.8	18.2	
No	65.6	81.8	
Data not entered / unknown	0.6	0	

Table 4: Distribution percentages main categories "localization" and "pathology" (coding system Association of Dutch Health Insurance Companies) in MPT and PT samples

	MPT sample (n=1,198)	PT sample (n=4,617)
	%	%
Main category of localization		
Head / throat	3.0	3.3
Thorax / abdomen / internal organs	1.9	2.1
Spine	81.2	40.4
Shoulder / upper arm	3.9	9.7
Elbow / lower arm / hand	2.0	5.6
Pelvis / thigh	2.9	7.4
Knee / lower leg / foot	1.1	17.1
More than 1 main category	1.5	5.0
Indicated category not possible	2.4	-
Unknown	-	9.4
Main category of pathology		
Musculoskeletal surgery	0.8	12.2
Non-surgical orthopaedic dysfunction	9.8	3.7
Overuse / degeneration / dystrophy	42.2	48.0
Traumatic dysfunction	6.8	12.1
Cardiovascular or lymphatic disease	-	0.3
Pulmonary disease	0.1	0.5
Other internal disease	-	0.4
Neurological dysfunction	10.9	6.5
Symptomatology / psychosomatic / urologic / gynecologic	27.0	14.3
Rheumatic disease	0.2	1.2
Indicating pathology not possible	2.4	-
Unknown	-	0.7

diagnoses, neurological diagnoses, or symptoms of unknown etiology.

Tables 5, 6, and 7 provide an overview of MPT evaluation findings in terms of impairments in structure and function, limitations in activities, and restrictions in participation. The health problem characteristics of the MPT sample were compared to those of the PT-A sample, as no such data was available for the PT sample. Differences were statistically analyzed for the five most common problems between samples in impairments and limitations in activities. Some impairments (most commonly related to joint mobility and stability, pain, resting muscle tone, body posture, and muscle strength and length) occurred in both samples resulting in overlap. The between-group differences in the most common impairments were significant (P<0.01) with impaired joint mobility more frequent in the MPT sample (Table 5). The most common limitations in activities were related to work posture/carrying/lifting; leisure time activities; training/occupation; squatting/kneeling/bending; household activities; and walking/negotiating stairs. There were significant differences between the samples on the most common limitations (P<0.01): limitations in work posture/carrying/lifting and in specific activities related to training and occupation were more common in the MPT sample, walking/negotiating stairs in the PT-A sample (Table 6). Restrictions in participation more commonly affected occupation and training in the MPT than in the PT-A sample (P<0.01) (Table 7).

Relation between Variables

As noted above we used a one-way ANOVA to study the relation between the number of sessions on the one hand and patient age, level of education, and symptom duration on the other. To this end, we made sub-samples based on age, education, and symptom duration and then by way of said ANOVA investigated the existence of significant differences between said sub-samples on median

Table 5: Impairments present in MPT and PT-A samples

MPT evaluation	MPT sample (n=1,198)	PT-A sample (n=2,234)
	%	%
Impairment of structure		
Lesion	39.6	-
Structural abnormality	15.8	-
Impairment of function		
Mobility / glide bone	26.5	-
Joint mobility	94.1	60.8
Joint range of motion	83.7	-
Manual end-feel	77.3	-
Joint position	18.4	15.1
Joint stability	18.8	24.2
Movement pattern bone / joint	29.9	-
Body posture	24.0	22.7
Pain	89.9	91.2
Sensation and proprioception	11.4	8.2
Neurologic impairment	9.0	-
Muscle strength	13.4	36.6
Muscle length	16.3	26.1
Resting muscle tone	45.8	58.7
Mental / psychological impairment	8.6	25.4
Hearing and balance	1.9	-
Dizziness	7.3	-
Vascular system	0.6	20.5
Other	4.0	-

number of sessions. In the PT sample, patient age, level of education, and symptom duration were significantly related to the number of sessions. For the MPT sample, there was only a significant relation between the duration of complaints and number of sessions (P<0.01). Generally, a shorter duration of complaints resulted in fewer sessions (0-7 days of complaints resulted in a median of 4 sessions; one week to a month in a median of 5; one month to two years in a median of 6). Complaints for longer than two years again resulted in fewer sessions (median of 5). There was also a significant relation linking gender and number of sessions (P<0.01): on average, women received 0.7 sessions more than men.

Initial analyses showed differences between the MPT, PT, and PT-A samples with regards to socio-demographic and health problem characteristics. We used a factorial analysis of variance to also determine the influence of said differences in socio-demographic characteristics between the MPT and PT-A samples on the differences in health problem characteristics between the samples. After correction by way of factorial analysis of variance for socio-demographic characteristics (age, gender, education, gainful employment status), the MPT and PT-A samples continued to be significantly different with regards to pathology (P<0.01). The MPT sample more often had non-surgical orthopaedic or neurologic diagnoses. The PT-A sample more often came with traumatic, rheumatological, and surgical musculoskeletal diagnoses.

Recurrence was more common in the MPT than in the PT-A sample (34% versus 18%). Correction for socio-demographic characteristics still resulted in a significant difference between the two samples with regards to recurrence (P<0.01). Because recurrence can be related to pathology, we evaluated the correlation with pathology codes. With the pathology code included as a covariate, the difference between the MPT and PT-A samples remained significant (P<0.01).

After correction for socio-demographic characteristics, the MPT and PT-A samples were not significantly different with regards to duration of complaints; differences were due to different socio-demographic characteristics, especially educational level and gainful employment status with gender contributing least.

After adjusting for socio-demographic characteristics, the MPT and PT-A samples were still significantly different for mechanism of injury (P<0.01). For the MPT

Table 6: Limitations in activities in MPT and PT-A samples

MPT evaluation	MPT sample (n=1,198)	PT-A sample (n=2,234)
	%	%
Limitation in activities		
Dressing, grooming, toileting, eating	21.5	17.4
Squatting, kneeling, bending, etc.	32.1	36.6
Reaching, gripping, manipulating, manual dexterity, etc.	21.7	24.8
Transfers, rolling, rising and sitting down	28.0	19.5
Walking, negotiating stairs	19.3	39.2
Work posture, carrying, lifting (work / house work)	63.0	50.9
Doing dishes, cleaning, cooking (household activities)	28.5	28.2
Leisure time activities (sports / hobby)	42.5	31.4
Specific activities related to work / training	37.2	22.6
Instrumental ADL	1.8	4.3
Use of coping strategies	8.7	24.8
Use of compensation strategies	11.1	12.8
Other activities	9.3	5.9

Table 7: Restrictions in participation in MPT and PT-A samples

MPT evaluation	MPT sample (n=1,198)	PT-A sample (n=2,234)
	%	%
Restrictions in participation		
Participation in household	27.9	29.7
Participation in occupation / activities / education	44.3	30.9
Participation in sports / hobby / leisure time activities	36.6	31.2
General independence	6.3	12.0
Other	2.9	-

sample, the mechanism was more frequently acute and non-traumatic (21% versus 15%); for the PT-A sample, it more often involved an acute trauma (17% versus 12%) or an exacerbation of congenital or pre-existing problems (11% versus 4%).

The first additional analysis showed that even after correction for socio-demographic characteristics the MPT and PT-A sample differed with regards to pathology. Because it seems plausible that pathology is partly responsible for the mechanism of injury, we also evaluated the effect that pathology had on the difference in mechanism of injury between the MPT and PT-A samples. With the main category of pathology as a covariate, both samples were significantly different for mechanism of injury ($P<0.01$). In other words, the difference for

mechanism of injury between the samples was not the result of different socio-demographic characteristics or pathology.

Primary Process Data

The data collection forms provided an overview of the MPT treatment goals. The five most common treatment goals at the level of impairments in function were (as indicated on the percentage of data collection forms):

1. Increasing joint mobility (93%)
2. Decreasing pain (50%)
3. Improving resting muscle tone (31%)
4. Improving movement pattern joint or bone (28%)
5. Improving body posture (25%)

Table 8: Nature of the MPT intervention (n=1,198)

MPT intervention	%
Producing	
Traction motion	47.3
Compression motion	5.3
Glide motion	44.1
Traction-glide motion	31.9
Compression-glide motion	6.5
Joint motion with traction	50.5
Joint motion without traction	27.2

The most important treatment goals at the level of limitations in activities and restrictions in participation were:
1. Improving skills (33%)
2. Teaching the patient to self-manage the health problem (26%)
3. Improving participation as indicated (25%)

Table 8 describes the nature of the MPT interventions used. Producing joint motion with or without traction was the most common intervention (51% and 47%, respectively).

The mean number of sessions for the MPT sample was 5.8 (median 5; range 1-30). This included sessions with only MPT, and sessions in which MPT was combined with PT (e.g., initially MPT, followed by PT). In 11% of the MPT sample, the therapists recommended continued PT: 62% to further affect the impairment level, 56% to affect the level of limitations in activities, and 36% with goals at the level of restrictions in participation. The mean number of sessions in the PT sample was 12.3 (median 9; range 1-150).

In 82% of MPT cases, a "favorable result" (in the opinion of the therapist and the patient) was the reason for discharge. Insufficient result to justify continued treatment was the reason for discharge in 8% of cases. In the PT-A sample, these percentages were 60% and 9%, respectively. These differences were significant (P<0.01).

Discussion

Patient Population

We used no selection criteria for patient inclusion. This is in contrast with, for example, the influx of patients in a randomized controlled trial where inclusion and exclusion criteria serve to achieve the goal of optimal study population homogeneity. In this study, homogeneity was not a requirement. To the contrary, the goal here was to create a study population maximally representative of the clinical situation, which was also the goal in the studies where the PT data used in this study were collected.

Socio-Demographic and Health Problem Characteristics

The MPT sample was characterized by age (mainly 35-44 years old; 28%), level of education (associate's, undergraduate, and graduate level; 48%), and by being gainfully employed (71%). The referral diagnosis mainly concerned spinal dysfunction (82%) due to overuse/degeneration/dystrophy (42%) or with unknown etiology (27%) based on the 4-digit code system used. The mechanism of injury was often non-acute (58%) and non-recurrent (66%). In 37% of cases, the duration of complaints was less than four weeks. MPT evaluation findings emphasized:
1. Impairments of joint mobility (94%) and pain (90%)
2. Limitations in work posture/carrying/lifting in specific occupation-related activities (63%)
3. Work-related restrictions in participation (44%)

The MPT patient profile is not surprising: it seems logical that MPT deals mainly with dysfunction of the spine and pelvis. MPT was much less frequently used for peripheral joint dysfunctions. Attention was almost exclusively directed at joint mobility and pain and to a much lesser extent at muscle and movement dysfunctions.

For most of the above-mentioned characteristics, the patients in the MPT sample were significantly different from those in the PT sample. For the subgroup aged 25-54, we determined to what extent the between-group differences were the result of different socio-demographic characteristics. Even after correction for socio-demographic differences, the subgroups were significantly different with regards to pathology, (non) recurrence, and mechanism of injury (P<0.01), meaning they represented true between-group differences. Difference in duration of complaints was an exception in that it disappeared after correction for the socio-demographic differences, showing that it was related to these differences.

We used statistical tests to determine if the MPT and PT samples were significantly different. The degree to which statistical significance translates into clinical significance (e.g., with regards to choice of interventions or indication for either PT or MPT referral) is different for the therapist, the patient, or the referring physician. There is an obvious difference in the degree of objectivity for the variables evaluated in this study; age, gender, education, employment status, duration of complaints, and recurrences are easily objectified.

For localization and pathology, we used the referral diagnosis coded by the therapists, with or without further referral data. There is opportunity for improve-

ment with regards to application as well as content of this list of diagnostic codes. Because the list was in use nationally at the time of this study, we chose to use it. Impairments in function and structure, limitations in activities, and restrictions in participation are at times hard to objectify. Determining the extent to which they are present might have been determined by differences in education, evaluation methods, and areas of emphasis between physical and manual physical therapists. Therefore, the differences in patient health problem characteristics need to be interpreted more carefully than the differences in socio-demographic and other characteristics of the patients' health problem.

Relation between Variables

Duration of complaints positively related with the number of MPT and PT sessions: the number of sessions increased with increasing duration of complaints. The PT sample showed greater variation than the MPT sample in the type of health problem, patient characteristics, and, possibly as a result, the number of sessions. Direction of the correlation between these variables was the same for PT and MPT.

The high percentage (11%) of patients referred to MPT by their GP within one week of occurrence (recurrence) of complaints was remarkable. The number of MPT referrals within a month of occurrence was substantial as well. Of the MPT patients, 37% (n=438) had complaints of less than one month's duration. It would be interesting to determine if these patients can be characterized by the specific health problems, e.g., LBP, neck pain, or a specific pathology. Subgroup analysis of patients with, for example, LBP is needed to answer this question, and we will be performing a secondary analysis with the same research questions of the data collected in this study of patients presenting with LBP.

Primary Process Data

The percentage of patients with mainly spinal complaints referred to MPT within one month of occurrence (37%) was high with the GP as the main referral source. This is all the more remarkable because over the last few years GPs have tended to use a policy of skillful neglect (i.e., a lack of intervention with the expectation that a benign natural history will resolve complaints) for patients with spine-related complaints due to the generally benign natural course of such complaints. Obviously, both patient and GP motives not researched in this study may affect the decision to refer to MPT. Treatment goals were determined by the therapist's evaluation findings. The two most prevalent treatment goals mentioned were "improving joint mobility" (93%) and "decreasing pain" (50%). Treatment goals at the level of activities and participation were mentioned in

approximately 30% of cases.

The data collection form distinguished MPT and PT interventions. This distinction was based on the *Manual Therapist Function Profile*[28]. This document defines which interventions are considered "specific" or "non-specific" to MPT. The data collection form classified these non-specific interventions under PT interventions. Some manual physical therapists assert, however, that non-specific interventions provided by a manual physical therapist should not be classified as PT interventions. Their argument is that even non-specific interventions are selected and used from within the specific framework of knowledge and experience of MPT. As a result, the content of education and advice is considered different from those provided by the physical therapist. Then again, research has shown that MPT is provided very frequently in daily clinical practice by non-specialized physical therapists in the Netherlands[26]. As noted previously in a study by Koes et al[35], the number of sessions was fewer in the MPT than in the PT group. This has also been shown in patients with cervical complaints[36]. Manual physical therapists did indicate that continued PT treatment would be beneficial for 11% of patients after discharge from MPT. This shows that MPT and PT are commonly applied consecutively over time in the treatment of patients mainly with spine-related complaints. Because of this, the dividing line between MPT and PT is again hard to draw. Continued discussion within the profession on the topic of delineation of PT and MPT (and, indeed, whether this is a desirable situation) is clearly required.

Selection and Participation of Therapists

Above we have discussed a number of methodological limitations to the current study. In our opinion, the main limitation relates to whether the MPT patient sample was, indeed, representative of MPT clinical practice. Therapist selection was randomized and with the expansion of the number of regions, 413 therapists were selected of whom 214 (52%) agreed to participate. Based on our original assumptions, 76 therapists should have been sufficient to produce 1,976 data collection forms. In the end, 97 therapists produced 1,198 forms. This seems to indicate that on average the participating therapists saw only one new MPT patient a week. This number did not meet our initial expectations. We must question whether and to what extent patient selection bias occurred in this study. However, no conclusions regarding selection bias can be drawn, because we did not control for this by, for example, comparing patient influx in this study with clinic appointment books. This problem of fewer patients than expected in a certain period is a common phenomenon in research.

The number of therapists participating (n=97) did not meet our initial expectations either. We did not

systematically analyze the reasons that therapists gave for not participating. Telephone contact did provide a number of reasons, e.g., vacation during the data collection period of this study; part-time clinical practice, which resulted in the perception that the expectation with regards to new patients was too high; and lacking time needed to fill out the data collection form. In addition, a negative attitude became evident with regards to systematic documentation using the closed-ended data collection form. It is obvious that we made some false assumptions as to therapist participation and weekly influx of new patients. Also, the limited motivation to use systematic documentation is a reason for concern deserving more emphasis in MPT education; it will become a requirement in the near future as a result of the proposed development of the electronic patient file. The limited number of therapists participating invites the question how representative this study was of MPT clinical practice.

Conclusion

This study is unique in that it researched and compared socio-demographic characteristics, health problem characteristics, and primary process data for patients referred to PT or MPT. A review of the literature turned up no comparable studies, and an international frame of reference for this study is missing. Trying to interpret the data collected and the differences found raises many new questions:

1. Is MPT more cost-effective than PT? A cost-effectiveness analysis is needed to determine if MPT is cheaper than PT. This study did not collect data to allow for such analysis. However, Korthals-De Bos et al[37] used data from the randomized trial by Hoving et al[36] for patients with non-specific neck pain and calculated that total costs for MPT (Euro 448) amounted to approximately one-third of costs of PT (Euro 1,300) or GP (Euro 1,381) management.

2. Does MPT result in more favorable long-term results than PT? MPT treatment was mostly concluded with a "favorable result". These results are short-term, indicating patient status at the moment of discharge.

We have not collected data on long-term results.

3. Does MPT use the paradigm of serial treatment goals, i.e., treatment goals prioritized differently in consecutive treatments? Future studies should record if treatment goals are consecutive over a series of treatments and also how goal achievement is measured. Of course, for such research, the use of valid and responsive clinimetric tools is desirable.

Of course, two larger questions are of the utmost importance related to this study. First, what did we actually study? Did we study socio-demographic characteristics, health problem characteristics, and primary process data of patients most appropriate for MPT versus PT referral? Or did we collect such data of patients more knowledgeable of MPT and thus more apt to request an MPT referral from their GP? Or did we measure the impact an almost separate professional identity of MPT versus PT has on the referral behavior of physicians in the Netherlands? Further study is clearly needed to clarify these questions.

The second question concerns external validity. How is this situation relevant to manual physical therapists outside of the Netherlands? First, there is the fact that in some countries PT has gained direct access practice rights. In those countries, a study discussing patient referral may seem less relevant. However, in many countries despite legal direct access privileges PT remains largely dependent on physician referral due to insurance requirements. Second, the MPT situation in the Netherlands is somewhat unique with MPT profiling itself almost as a separate profession in relation to PT. Again, even though MPT is clearly more integrated into PT in other countries, manual physical therapists with specialized post-graduate training do position themselves as a specialization within the PT profession in many countries. Duplication of this study wherever sufficient similarities regarding PT and MPT exist might reveal international similarities in patient characteristics that may indicate avenues for future research.

Acknowledgments

REFERENCES

1. Paris SV. A history of manipulative therapy through the ages and up to the current controversy in the United States. *J Manual Manipulative Ther* 2000;8:66-77.
2. Grunewald LR. A study of physiotherapy as a vocation. *Physiotherapy Review* 1928;8(4):37-49.
3. Wiese G, Peterson D. Daniel David Palmer: "Old Dad Chiro," the founder of chiropractic. In: Peterson D, Wiese G. *Chiropractic:*
An Illustrated History. St. Louis, MO: Mosby-Year Book, Inc., 1995: 56-89.
4. Virginia Board of Medicine. Study of spinal manipulation [website], 1999. Available at: http://www.dhp.state.va.us/PhysicalTherapy/docs/Report%20on%20Spinal%20Manipulation.doc. Accessed September 22, 2004.
5. CPA. Position Statement on Manipulation. Toronto, ON: Canadian

Physiotherapy Association, July 2003.

6. Manual Therapy Steering Committee CPA. CPA Entry-Level Manual Therapy Curriculum Guidelines. Toronto, ON: Canadian Physiotherapy Association, Feb 2003.

7. CAPTE. Evaluative Criteria for Accreditation Programs for the Preparation of Physical Therapists. Alexandria, VA: APTA, 1998.

8. IFOMT. Educational Standards. International Federation of Orthopaedic Manipulative Therapists, November 2000. Available at: http://www.ifomt.org/ifomt/about/standards. Accessed October 26, 2004.

9. Kaltenborn FM, Evjenth O, Baldauf-Kaltenborn T, Vollowitz E. *The Spine: Basic Evaluation and Mobilization Techniques*. 2nd ed. Oslo Norway: Olaf Norlis Bokhandel, 1993.

10. Kaltenborn FM. *Manual Mobilization of the Joints: The Extremities*. Vol. 1. 5th ed. Oslo, Norway: Olaf Norlis Bokhandel, 1999.

11. Maitland GD, Hengeveld E, Banks K, English K. *Maitland's Vertebral Manipulation*. 6th ed. Oxford, UK: Butterworth and Heinemann; 2001.

12. Maitland GD. *Peripheral Manipulation*. 3rd ed. Boston, MA: Butterworth Heinemann; 1991.

13. Van der El, A. *Manuele Diagnostiek Wervelkolom*. Rotterdam, The Netherlands: Uitgeverij Manthel, 1992.

14. Mink AJF, Veer HJ ter, Vorselaars JACT. *Extremiteiten: Functie-Onderzoek en Manuele Therapie*. Houten, The Netherlands: Bohn Stafleu Van Loghum, 1990.

15. Winkel D, Aufdemkampe G, Matthijs O, Meijer OG, Phelps V. *Diagnosis and Treatment of the Spine*. Gaithersburg, MD: Aspen Publishers, 1996.

16. McKenzie RA. *The Lumbar Spine: Mechanical Diagnosis and Therapy*. Waikanae, New Zealand: Spinal Publications, 1981.

17. McKenzie RA. *The Cervical and Thoracic Spine: Mechanical Diagnosis and Therapy*. Waikanae, New Zealand: Spinal Publications, 1990.

18. Butler DS. *Mobilisation of the Nervous System*. Melbourne, Australia: Churchill Livingstone, 1991.

19. Johnson D, Rogers R. Letter to the Editor: Spinal manipulation. *Phys Ther* 2000;80:820-823.

20. Di Fabio RP. Manipulation of the cervical spine: Risks and benefits. *Phys Ther* 1999;79:50-65.

21. Stephans EB. Manipulative therapy in physical therapy curricula. *Phys Ther* 1973;53:40-50.

22. Ben-Sorek S, Davis CM. Joint mobilization education and clinical use in the United States. *Phys Ther* 1988;68:1000-1004.

23. Bryan JM, McClune LD, Romito S. Spinal mobilization curricula in professional physical therapy education programs. *J Phys Ther Education* 1997;11:11-15.

24. Boissonnault W, Bryan JM, Fox KJ. Joint manipulation curricula in physical therapist professional degree programs. *J Orthop Sports Phys Ther* 2004;34:171-181.

25. Over de manueeltherapeut en de opleiding [Website]. Available at: http://www.nvmt.nl/verwijzers.asp. Accessed September 20, 2004.

26. Wimmers R, et al. *Jaarboek LiPZ 2002. Deel 1: Beroepsgroep Fysiotherapie*. Utrecht, The Netherlands; NIVEL, 2003. Available at: http://www.nivel.nl/pdf/LIPZ-fysiotherapie_1_2003.pdf. Accessed October 26, 2004.

27. Koninklijk Nederlands Genootschap voor Fysiotherapie. *Beroepsprofiel fysiotherapeut*. Amersfoort, The Netherlands: Koninklijk Nederlands Genootschap voor Fysiotherapie, 1998.

28. Baumgarten K, Hoppenbrouwers GCJ, Van der Wurff P, Oostendorp RAB, Heerkens YF. *Functieprofiel Manueeltherapeut*. Amersfoort, The Netherlands: Nederlandse Vereniging voor Manuele Therapie/Nederlands Paramedisch Instituut, 1996.

29. World Health Organization (WHO). *International Classification of Functioning, Disability and Health*. Geneva, Switzerland: WHO, 2001.

30. Pijnenborg A, Van Berkel L, Van de Ende E, Van Ravensberg CD, Oostendorp RAB, et al. *De beperkende maatregel fysiotherapie, oefentherapie Cesar en oefentherapie-Mensendieck: Resultaten van het evaluatieonderzoek*. Utrecht, The Netherlands: Nederlands Paramedisch Instituut/NIVEL; 1998.

31. Storm I, Hofhuis H, Van Berkel L, Van de Ende E, De Visser D, et al. *Het Amsterdams Dienstenmodel: Evaluatie en vergelijking met de landelijke vergoedingsregelingen*. Utrecht, The Netherlands: Nederlands Paramedisch Instituut/NIVEL, 1998.

32. Van Ravensberg CD, Oostendorp RAB, Elvers JWH, Hendriks HJM. *Analyse FON-PPP gegevens: Variabelen in samenhang met aantal behandelingen fysiotherapie*. Amersfoort, The Netherlands: Nederlands Paramedisch Instituut, 1995.

33. Heerkens YF, Van den Heuvel J, Van den Heuvel SP, Mischner-Van Ravensberg CD. *Deel II, ontwerpstandaard voor een classificatie verrichtingen paramedische bewegingsberoepen*. Amersfoort, The Netherlands: Stichting Wetenschap en Scholing Fysiotherapie, 1993.

34. Hendriks HJM, Brandsma JW, Heerkens YF, Oostendorp RAB, Nelson RM. Intraobserver and interobserver reliability of assessments of impairments and disabilities. *Phys Ther* 1997;77:1097-1106.

35. Koes BW, Bouter LM, Van Mameren H, Essers AHM, Verstegen GMJR, et al. The effectiveness of manual therapy, physiotherapy, and treatment by the general practitioner for nonspecific back and neck complaints: A randomized clinical trial. *Spine* 1992;17:28-35.

36. Hoving JL, Koes BW, De Vet HCW, Assendelft WJJ, Van der Windt DAWN, et al. Manual therapy, physical therapy or continued care by the general practitioner for patients with neck pain: A pragmatic randomized trial. *Ann Intern Med* 2002;136:713-722.

37. Korthals-de Bos IBC, Hoving JL, Van Tulder MW, Rutten-Van Mölken MPMH, Adèr HJ, et al. Cost-effectiveness of physiotherapy, manual therapy and general practitioner care for neck pain: Economic evaluation alongside a randomised control trial. *BMJ* 2003;326:911-916.