How do Shouldernetworks operate in relation to patient population and provided care?

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Joost Peter Nagelmaeker,

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SAMENVATTING

Doelstelling: Schouderklachten zijn veel voorkomende klachten van het bewegingsapparaat in de eerstelijns gezondheidszorg. 44-80% van alle schouderklachten komen voort uit aangedane structuren in de subacromiale ruimte en zijn gegroepeerd onder de noemer Subacromiaal Pijn Syndroom (SAPS). Richtlijnen bevelen aan SAPS aanvankelijk conservatief te behandelen. Echter, het succes van de fysiotherapeutische behandelingen varieert tussen de 20 en 79%. Het SchouderNetwerk Amsterdam (SNA) probeert optimale fysiotherapeutische zorg bij patiënten met schouderklachten te bieden. SNA fysiotherapeuten gebruiken het Egmond-Schuitemaker protocol. Binnen dit protocol wordt op basis van een selectie van een patiëntenprofiel en diagnosegroep, optimale fysiotherapeutische zorg geleverd. Op dit moment is er geen informatie beschikbaar over de toegevoegde waarde van SchouderNetwerken (SN). Deze studie identificeert (i) in welk opzicht de patiëntenpopulatie en inhoud van de SNA fysiotherapeuten verschilt van reguliere zorg en (ii) in welke mate de SNA fysiotherapeuten patiënten behandelen volgens het ES-protocol.

Methode: Een retrospectieve analyse van medische dossiers gegevens in beide groepen werd uitgevoerd.

Resultaten: Het percentage patiënten met schouderklachten was bijna twee keer zo hoog bij SNA fysiotherapeuten in vergelijking met reguliere fysiotherapeuten. Het aantal behandelingen was lager en de duur van de behandelepisodes was korter bij SNA fysiotherapeuten. Ook de uitgevoerde verrichtingen in de behandelingen verschilde in de SNA en referentiegroep. Het naleven van het ES-protocol varieerde zowel per indicator als per SNA fysiotherapeut.

Conclusie: Aanzienlijke verschillen in de patiëntenpopulatie en de inhoud van de zorg werden gevonden tussen SNA fysiotherapeuten en reguliere therapeuten. SNA fysiotherapeuten hadden een middelmatige naleving van de ES-protocol.

Klinische relevantie: Het zorgproces van de SchouderNetwerk Amsterdam lijkt efficiënter dan de reguliere zorg. Om dit te bevestigen moet nader onderzoek worden gedaan naar de resultaten van de zorg gegeven door fysiotherapeuten die lid zijn van een SchouderNetwerk. Vervolgens wordt het mogelijk de (kosten)effectiviteit van SchouderNetwerken te bestuderen.

ABSTRACT

Aim: Shoulder complaints are frequent complaints of the musculoskeletal system in primary care. 44-80% of all shoulder complaints derive from structural defects in the subacromial space and are grouped under the header of the Subacromial Pain Syndrome (SAPS). Guidelines recommend to treat SAPS initially conservatively. However, the success rate of the physiotherapy treatments varies between 20 and 79%. The ShoulderNetwork (SNA) Amsterdam tries to provide optimal physiotherapy care in patients with shoulder complaints. SNA physiotherapists use the Egmond-Schuitemaker Protocol, in which the selection of a patient profile and a diagnostic group could provide optimal physiotherapy care for SAPS patients. At this moment, no information is available on the added value of ShoulderNetworks (SNs). This study indentifies (i) in what respect the patient population and care of the SNA physiotherapists differ from regular physiotherapists and (ii) to what extent the SNA physiotherapists treat patients according to the ES-Protocol. *Method:* An retrospective analysis of medical record data comparing both groups was conducted.

Results: The percentage of patients with shoulder complaints was almost twice as high for SNA physiotherapists compared to regular physiotherapists. The number of treatment sessions was lower and duration of episode of care was shorter in SNA physiotherapists. The interventions used in the treatment sessions differs between SNA and reference group. Adherence to the ES-protocol varied per indicator as well as per SNA physiotherapist.

Conclusion: Significant differences in patient population and content care were found between SNA physiotherapists and regular therapists. SNA physiotherapists have moderate adherence to the ES-protocol.

Clinical Relevance: The care process of the ShoulderNetwork Amsterdam seems to be more efficient than regular care. To confirm this, further research must be done into the outcomes of care given by physiotherapists who are a member of a Shouldernetworks. Subsequently the possible (cost)effectiveness of ShoulderNetworks can be studied.

Keywords: Expert Networks, ShoulderNetworks, SN, ShoulderNetwork Amsterdam, SNA, Subacromial Pain Syndrome, SAPS, patient population, content of care.

INTRODUCTION

Shoulder complaints are one of the most frequent musculoskeletal health problems reported in primary care. Between 7% and 34% of adults have occasional shoulder complaints (1). The incidence of shoulder disorders in the Netherlands is estimated at 19 per 1000 person-years (2). Half the number of patients still have shoulder complaints after 6 months, and after 12 months one third of the original patients still prove to have some form of pain and/or limitation (1).

It is estimated that about 44-80% of all shoulder complaints derive from irritation of structural defects in the subacromial space (4, 5). Impingement and/or inflammation of these structures causes a decreased range of motion as well as pain (3). Complaints that derive from irritation of structures in the area under the acromion are grouped under the header of the Subacromial Pain Syndrome (SAPS) (4). In the recent literature, SAPS is defined as *"all non-traumatic, usually unilateral, shoulder problems that cause pain, localized around the acromion, often worsening during or subsequent to lifting of the arm"* (5).

In line with existing guidelines it is recommended to initially treat SAPS conservatively (4, 7-8). As part of this conservative treatment various interventions can be used, including manual interventions and exercise therapy. The success rate of physiotherapeutic interventions varies between 20% and 79% (9, 10). Knowledge concerning the results of the specific physiotherapeutic interventions used in the treatment of patients with SAPS is not adequately available (3).

The above indicates that the demand of care regarding SAPS patients is complex and therefore specific and individualized treatment by experienced physiotherapists is needed. Which might suggest that the demand of care concerning SAPS patients, resembles the demand of care of, for example, Parkinson and Claudicatio Intermittens patients. At first and due to their specialized nature, the specific demands of these patients (e.g. practicing transfers with Parkinson patients) were not always properly addressed by general physiotherapists (11-12). To address these specific demands, ParkinsonNet and ClaudicatioNet were established in 2004 and 2011 respectively (11-12). As a result of these networks, the specific demands of Parkinson and Claudicatio Intermittens patients were

answered by corresponding treatments. Research shows that specialized healthcare professionals, treating larger numbers of patients with similar complaints on a yearly basis, have better results (e.g. in terms of fall risk reduction and improved mobility) than less specialized healthcare professionals (13-14). For instance, the transmural network Parkinsonnet leads to a 55% reduction in hip fractures and €381 cost reduction per patient per year (10).

Because of this added value of specialized networks, several ShoulderNetworks (SNs) were founded in the Netherlands. Since 2010, the ShoulderNetwork Amsterdam (SNA) is one of these networks. The SNA consists of 55 physiotherapists who are trained 4 times a year in diagnostics and treatment of patients with shoulder complaints. In order to provide optimal physiotherapy care, SNA physiotherapists use the *Egmond-Schuitemaker protocol for non-specific and mild-specific shoulder pain* (hereinafter referred to as ES-Protocol) (11). This protocol is based on expert opinions and is as much as possible supported by scientific evidence. The ES-Protocol uses innovative differential diagnostics (11) and improved diagnostic coding. By using this diagnostic coding patients with both a-specific and mild-specific shoulder pain are classified in three patient profiles. According to the guideline profiles in the Royal Dutch Society for Physiotherapy (KNGF) guideline for low back pain (12), these patient profiles are: (i) normal course, (ii) abnormal course and (iii) abnormal course with yellow flags. Furthermore, patients are classified in three diagnostic groups. According to the Dutch College of General Practitioners guideline for shoulder complaints (13), these groups are: (i) with restriction of movement, (ii) without restriction of movement but with painful abduction, (iii) without restriction of movement and without painful abduction. Based on this classification, recommendations for treatment are given in the ES-protocol. For example, in patients classified in patient profile iii (abnormal course with yellow flags), the use of questionnaires with a focus on psychosocial aspects are recommended.

At this moment, no information is available on the added value of SNs. Before determining the (cost)effectiveness of SNs, it needs to be described to which extent a SN (more specifically the SNA network) differs from care by regular physiotherapists. Therefore, the objective of this study is (i) to identify in what respect the patient population and care of the

SNA physiotherapists differ from regular physiotherapists and (ii) to what extent the SNA physiotherapists treat patients according to the ES-Protocol.

METHODS

Study design

The first part of this study is a retrospective analysis of medical record data comparing patient characteristics and content of care by SNA physiotherapists with patient characteristics and content of care by reference physiotherapists. The second part of this study is a retrospective analysis of medical record data into the compliance of SNA physiotherapists with the ES-Protocol.

Study population

This study focuses on physiotherapists in the Netherlands. The research study population consists of a group of 54 SNA physiotherapists. A variety of electronic medical record systems used by SNA physiotherapists were used to extract data (i.e. electronic medical records). The medical records include patient characteristics, health problem, content of treatment, evaluation of episode of care and health care use. An episode of care in this study is defined as the period from the first treatment contact for a particular complaint until the last treatment contact for this complaint. Patient records from episodes of care started in 2012, 2013 or 2014 were used.

The reference group (hereinafter referred to as reference physiotherapists) is a group of regular physiotherapists participating in a registration network of physiotherapy practices called NIVEL Primary Care Database. NIVEL, the Netherlands Institute for Health Services Research, uses the NIVEL Primary Care Database (hereinafter referred to as NIVEL Database) to collect data regarding patient characteristics, access method, the health problem and treatment since 2001. Data were extracted from this database by a researcher (DB) of the NIVEL. Data from 2012 and 2013 were used. These data were the most recent available. Overall, 154 therapists have been registered in the NIVEL in 2012 and 2013.

NIVEL checks the representativeness of the physiotherapists that participate in the NIVEL Database annually. In 2012 and 2013, the therapeutic characteristics were in general representative for the therapists of nationwide physiotherapy practices (15-16).

Data collection SNA physiotherapists
Data from SNA physiotherapists is collected in three stages, which will be described below. In broad terms these stages were: (i) a briefing, (ii) data extraction by the SNA physiotherapists and (iii) submitting the extracted data to researchers.

The briefing of SNA physiotherapists was done during a members' meeting. Information was provided on the research, the type of anonymous data needed and the method of data extraction. All SNA physiotherapists received an information letter, a registration form, a participants form, instruction manuals and delivering instructions (Appendix A-J) for the extraction of data out of their electronic patient record systems. In order to obtain data comparable to the NIVEL data, this registration form was an exact copy of the registration form used by the NIVEL Database.

The extraction of data out of electronic patient record systems differed per objective. Concerning the description of the patient population (hereinafter objective 1a), patient records of all episodes of care were extracted. Concerning content of care, (hereafter objective 1b), as well as compliance with the ES-protocol, (hereinafter objective 2), a systematic selection of patient records of episodes of care was extracted. In Figure 1, a schematic summary of the extracted data per objective is given.
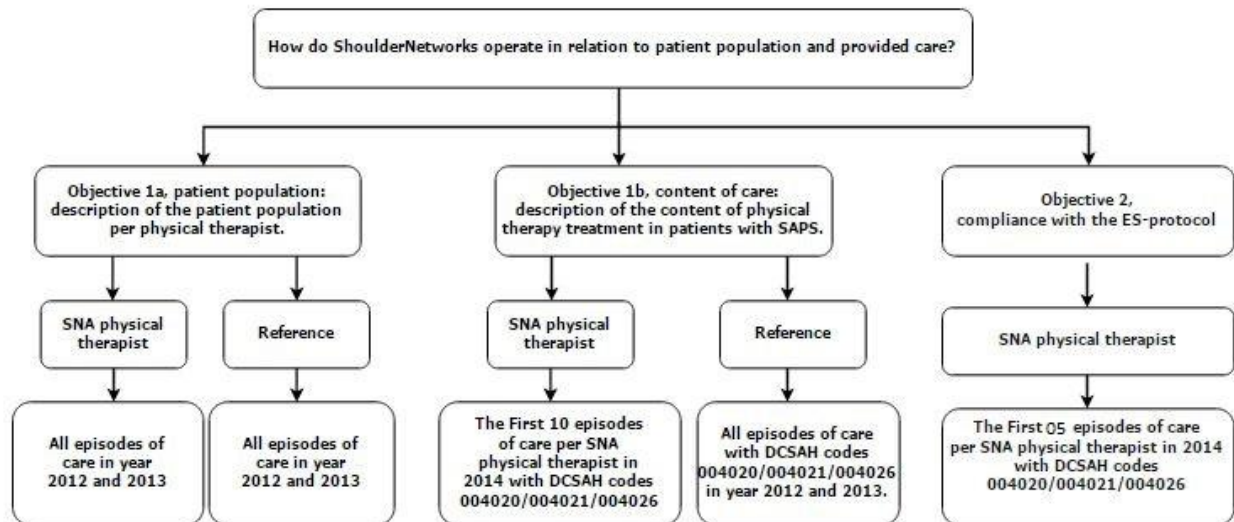
Figure 1. Flow diagram of episode of care selection

Concerning objective 1a (patient population), physiotherapists were requested to methodically formulate a list of all episodes of care given in 2012 and 2013 in order to calculate the average percentage of episodes of care for patients with shoulder complaints per physiotherapist. To select patients with shoulder complaints, Diagnosis Coding System Allied Healthcare (DCSAH) codes were used (Appendix K). DCSAH codes starting with '004' were used to select patients with shoulder complaints.

Concerning objective 1b (content of care) and 2 (compliance with the ES-protocol), records of episodes of care of patients with DCSAH codes 004020 (epicondylitis/ tendinitis/ tendovaginitis), 004021 (bursitis (non-traumatic)/ capsulitis) and 004026 (muscle, tendon and fascia disorders) were extracted. SNA physiotherapists were subsequently requested to methodically extract the first 10 episodes of care meeting the selection criteria (DCSAH codes 004020, 004021 and 004026) of 2014. Only the first 5 episodes of care extracted were used for objective 2. These codes were chosen because of the following reasons. Firstly, an online survey filled out by 49 out of 54 SNA physiotherapists showed that these three codes are predominantly used to encode episodes of care of patients with Subacromial Pain Syndrome for invoices to health insurance companies. Secondly, in an earlier study by Kooijman et al. (3) of patients with SAPS, the International Classification of Primary Care (ICPC) (16) code L92 (shoulder syndrome/ periarthritis humeroscapularis) was used to identify the population of

SAPS patients in the NIVEL Database. After further exploration of the NIVEL Database, the DCSAH codes 004020, 004021 and 004026 appeared to be the physiotherapeutic equivalents of the L92 code.

Subsequently, physiotherapists were asked to fill out a registration form per extracted episode of care. Of every episode of care the duration of the treatment episode was registered in weeks and amount of treatment sessions. Also registered were the age and gender of the patient, the access mode, the type of referrer, appearance on a chronic list, relapses, prior physiotherapy/ exercise therapy, duration of the complaint before start of the treatment, onset of the complaint, result of the treatment and the reason for the termination of the care. At the end of the treatment a maximum of three interventions were registered by the therapist. These are interventions that have been employed for a minimum of 50% of the therapy sessions. Finally SNA physiotherapists were requested to extract the complete eligible medical records.

Data collection reference physiotherapists

As previously mentioned, data was extracted from the NIVEL Database, summarized and delivered by a researcher (DB) of the NIVEL. Concerning objective 1a (patient population), the average percentage of episodes of care for patients with shoulder complaints per physiotherapist was calculated on the basis of the total amount of episodes of care given in 2012 and 2013. To identify episodes of care given to patients with shoulder complaints DCSAH codes starting with '004' were used. To obtain the data concerning objective 1b (content or care), episodes of care of patients with DCSAH codes 004020, 004021 and 004026 were extracted, summarized and conveyed to the researchers.

Quality indicators ES-protocol

To measure the compliance of SNA physiotherapists with the ES-protocol (objective 2), quality indicators (Appendix L) were developed. Together with co-developer of the ES-procotol R. Schuitemaker, the identification of indicators took place using a systematic method to develop indicators (17). All nine quality indicators are process indicators, representing the most important recommendations of the ES-protocol. Two parameters were calculated: (i) the percentage of physiotherapists that comply to a specific indicator and (ii)

the percentage of compliance with the ES-protocol per SNA physiotherapist. Adherence was classified using an interval scale. This classification was in accordance with the classification of Rutten et al. (18). Rates from 0-33,3% were classified as low, those from 33,4 to 66,6% as moderate and 66,7% to 100% as high adherence.

The study protocol was approved by the local Medical Ethical Committee of the UMC Utrecht. Since this retrospective study only includes observational research of patient records, the study is not covered by the scope of the Medical Research Involving Human Subjects Act (WMO).

Data analysis

Data were analyzed using SPSS 23, Microsoft Excel 2007 and two websites (20-21) containing online calculators. Descriptive statistics were calculated for all variables. Chi-square tests and Fisher's Exact Test were used to test the differences in dichotomous and categorical data between SNA physiotherapists and reference physiotherapists. Two-sample t-tests were used for continuous data. P-values lower than 0.05 were considered significant.

RESULTS

In total, 48 SNA physiotherapists have participated in the study, providing a representative sample of the SNA physiotherapists with regard to age and gender. In total 154 physiotherapists were registered in the NIVEL Database in 2012 and 2013. The characteristics of both the SNA and reference physiotherapists are shown in table 1. No difference was found concerning age and gender in both groups.

Table 1

Characteristics of SNA therapists and reference therapists

	SNA (N=48)	Reference (N=154)
Age in years mean (± SD)	(N=48) 46,5(±11,6)	(N=81) 46,8 (±13,3)
Gender % male	(N=48) 58,3	(N=124) 63,7

Abbreviations: N, number of patients; SD, standard deviation.

Patient characteristics

Overall, 335 episodes of care performed by SNA physiotherapists and a total of 968 episodes of care performed by reference physiotherapists were selected in this study. The characteristics of patients of both groups are shown in table 2. A difference in age and gender, access mode and type of referrer and duration of the complaint before start of the episode of care was found between the groups. The percentage of complaints with a duration less than three months before start of episode of care was lower and the percentage of complaints with a duration longer than three months before start of episode of care was higher in SNA physiotherapists compared to reference physiotherapists. Onset of complaint, appearance on chronic list, relapse and prior physiotherapy/ exercise therapy did not differ between groups.

Table 2

Characteristics of patients treated by SNA physiotherapists and reference physiotherapists

	SNA (N=335)	Reference (N=968)	P-value
Age in years Mean (± SD) †	(N=329) 50,9 (15,8)	(N=968) 54,2 (15,8)	0.001
Gender % male †	(N=335) 49,3	(N=968) 43	0.046
Access mode N (% referral) †	(N=335) 162 (48%)	(N =968) 590 (61%)	<0.001
Type of referrer N (%) ‡ †	(N=159)	(N=571)	<0.001
General practitioner	106 (66,7%)	497 (87%)	
Medical specialist – different*	6 (3.8%)	17 (3%)	
Medical specialist – surgeon	1 (0,6%)	2 (<1%)	
Medical specialist – orthopedic surgeon	45 (28,3%)	40 (7%)	
Medical specialist - neurologist	1 (0,6%)	2 (<1%)	
Duration of the complaint before start of episode of care N (%) †	(N=322)	(N=770)	<0.001
< 1 month	71 (21,2%)	246 (32%)	
1-3 months	78 (23,3%)	262 (34%)	
3-6 months	72 (21,5%)	116 (15%)	
> 6 months	111 (33,1%)	154 (20%)	

Abbreviations: N, number of patients; SD, standard deviation; †, significant difference between SNA physiotherapists and reference physiotherapists; ‡, Fisher exact, difference between SNA physiotherapists and reference physiotherapists; *, the original categories 'medical specialist – different' and 'medical specialist – not specified' are combined in the created category ' medical specialist – different'.

Objective 1a: Patient population

Concerning objective 1a, the response rate of SNA physiotherapists was 80%. The average percentage of patients treated for shoulder complaints differed between SNA physiotherapists and reference physiotherapists. As shown in table 3, this percentage was almost twice as high for SNA physiotherapists.

Table 3

Shoulder complaints in SNA physiotherapists and reference physiotherapists

	SNA (N=13.642) (n=28)	Reference (N=19.240) (n=154)	P-value
Shoulder complaints N (%) †	2.499 (18,4)	1.789 (9,3)	<0.001

Abbreviations: N, number of patients; n, number of therapists; †, significant difference between SNA physiotherapist and reference physiotherapist

Objective 1b: Content of care

Concerning objective 1b, the response rate of SNA physiotherapists was 79%. The average duration of an episode of care differed between both groups. Average duration of an episode of care was 10.5 weeks in SNA physiotherapists and 17.3 weeks in reference physiotherapists. The average number of treatment sessions differed between groups, namely 7.7 in SNA physiotherapists versus 13.3 in the reference group. The interventions used in the treatment sessions differed between both groups. As shown in table 4, *other manual interventions* and *information & advice* were used more by SNA physiotherapists than by reference physiotherapists. On the other hand, *manual mobilizations* and *massage* were less often used by SNA physiotherapists compared to the reference group. Result of treatment and reason to terminate care did not differ between groups.

Table 4

Content of care by SNA physiotherapists and reference physiotherapists

	SNA (N=335)	Reference (N=968)	P-value
Treatment sessions mean (± SD)* †	(N=321) 7,5 (5,5)	(N=929) 13,3 (21,5)	<0.001
Duration of episode of care mean (± SD) †	(N=319) 10,5 (8,8)	(N=929) 17,3 (37,3)	0.001
Interventions % used in ≥50% of the treatment sessions †	(I=1132)	(I=1189)	<0.001
Manual mobilizations	17	24	
Massage	5	16	
Other manual interventions	12	1	
Exercise therapy	33	34	
Information & advice	27	19	
Physiotherapy agent modalities	1	3	
Other interventions	5	4	

Abbreviations: N, number of episodes of care; I, total number of interventions registered; SD, standard deviation; †, significant difference between SNA physiotherapists and reference therapists

Objective 2: Compliance to the ES-protocol

Concerning objective 2, the response rate of SNA physiotherapists was 80%. Concerning the compliance to each specific indicator of the ES-protocol, percentages of episodes of care are shown in table 5. The compliance varies from 14% to 91%. Noticeable are the indicators that were used by less than 33,3 percent of the SNA physiotherapists (low compliance); the two indicators concerning the classification of the health problem (indicator 1 and 2), the circumduction and or deviation movement (indicator 6) and eccentric exercises (indicator 7). In contrast, the remaining indicators were used by more than 66,6% of the psychical therapists (high compliance).

The overall compliance with the ES-protocol by SNA physiotherapists was moderate (55%). More specific, 10% of the physiotherapists had a low score on compliance (0-33,3%) to the ES-protocol, 73% of the physiotherapists had a moderate score on compliance (33,3-66,6%) and 17% had a high score on compliance (66,6-100%).

Table 5

The percentage SNA physiotherapists that comply to a specific indicator.

| | N=162 | |
INDICATOR	% YES	% NO
Examination		
1. The 3 protocol profiles	14	86
2. The NHG diagnosis groups	14	86
3. The bucket metaphor	86	14
Treatment		
4. Preconditional manual interventions with biomechanical and neuroreflectoir goal.	91	9
5. Exercises based on reduction tests	79	21
6. The circumduction and or deviation movement	33	66
7. Eccentric exercises	25	75
Evaluation		
8. The 24 hour rule	83	17
9. The use of clinimetrics	67	33

Abbreviations: N, number of episodes of care

DISCUSSION

The objective of this study was to identify in what respect the patient population and care of the SNA physiotherapists differ from regular physiotherapists and to what extent the SNA physiotherapists treat patients according to the ES-Protocol. The results show significant differences in patient population and content of care between SNA physiotherapists and regular physiotherapists. More specifically, the percentage patients with shoulder complaints was higher, the average duration of an episode of care was shorter and the average number of episodes of care was lower in SNA physiotherapists. Used interventions during treatment also differed significantly between groups. Because SNA physiotherapists use the ES-protocol in the treatment of shoulder complaints, adherence of SNA physiotherapists to this protocol has been studied. Adherence to the ES-protocol varied by indicator and by therapist.

Patient population

In reference physiotherapists, 9.3% of all episodes of care were given to patients with shoulder complaints in 2012 and 2013. For comparison, in 2009/2010 and 2011 this percentage was 9.0% (21) and 9.8% (3) respectively. Since there were no percentages of shoulder complaints available for the years 2012 and 2013, these findings complement the already made analyses and results from the NIVEL Database. In SNA physiotherapists, 18.4% of all new episodes of care were given to patients with shoulder complaints by SNA in 2012 and 2013. These findings confirm the expectation that the percentage of shoulder complaints treated by SNA physiotherapists is higher than the percentage in regular physiotherapists. In accordance, Munneke et al. (10) found ParkinsonNet physiotherapists treated more than twice as many patients with Parkinson per physiotherapist than regular physiotherapists. Percentages of patients with intermittent claudication in physiotherapists member of ClaudicatioNet are not available.

Content of care

In the current study, the average number of treatment sessions per episode of care was significantly lower in SNA physiotherapist compared to reference physiotherapists, respectively 7.5 and 13.3 per calendar year. In an earlier study using the NIVEL Database, Kooijman et al. (3) found an average number of 15 treatment sessions per episode of care in

2006 to 2010. The average duration of an episode of care was significantly lower in SNA physiotherapists compared to reference physiotherapists, respectively 10.5 and 17.3 weeks. In the study of Kooijman et al. (3) an average duration of 12 to 13 weeks for patients with shoulder syndromes was found. The differences in findings between Kooijmans' study and the current study could be explained by the fact that selection of episode of care was based on the coding system used by general practitioners (16) instead of the DCSAH (Appendix K) used in this study. Concerning comparison with other expert networks the current study is (as far as can be found) the first study that compares the number of treatment sessions and average duration of episode of care of an expert network with those of regular practices. For this reason, comparable figures of ParkinsonNet and ClaudicatioNet are not available.

The findings of the current study show not only a shorter treatment duration in weeks, but also show fewer treatment sessions per episode of care in SNA physiotherapist compared to reference physiotherapists. From this it can be assumed that SNA physiotherapist have a faster treatment completion and need less treatment sessions. They need fewer sessions, but seem to have the same results as regular therapists: the extent to which treatment goals were met did not differ between the groups. This is not because SNA therapists treat patients with less severe health problems; it seems that SNA physiotherapists even treat patients with more severe health problems than regular therapists. Since there is no consensus concerning the most effective exercise strategy in the treatment of shoulder pain (22), it is important to look for possible explanations for the faster treatment completion and lower number of treatment sessions. The expertise of the SNA therapists seems to play a role; SNA physiotherapists treat more patients with shoulder complaints and treat them differently than regular therapists, namely according to the ES-protocol. The extent to which SNA therapists actually treat patients according to this protocol is discussed below.

Compliance to the ES-protocol

The results that 10% of the SNA physiotherapists were not, 73% were moderate and 17% were well able to work according to the ES-protocol, show that the ES-protocol is applied in daily practice. It is however difficult to compare these results with other studies on adherence because of a difference in study design, registration and indicators (23). From previous research it is known that there is substantial variation in guideline adherence among

physiotherapist, a finding that is confirmed in this study (24). Based on the 55% overall adherence found in this study and using the interval scale of Rutten et al. (18) it can be concluded that SNA therapists have a moderate adherence to the ES-protocol. Given the fact that all data regarding the ES-protocol is collected out of medical records registered by physiotherapists, it could be that the adherence to the protocol in fact is higher than reported. The reason for this could be that physiotherapists do not administer every intervention, among others due to the current high administrative pressure. It may therefore be that physiotherapists have a higher accordance to the ES-protocol, but have simply not registered it.

Strengths and limitations of the study.

The present study has several strengths. First, for the selection of episodes of care in both groups the same three diagnosis codes from the DCSAH were used. Combined with the relatively large number of episodes of care, this creates a large and comparable group of patients treated by both groups physiotherapists. Furthermore, the information needed to answer the research question of objective 1a (patient population) and objective 2 (compliance with the ES-protocol) is obtained by a retrospective analysis of medical record data. This ensures that it is not possible to obtain socially desirable responses.

On the other hand, several limitations of the present study need to be taken into account. First, the data in this study is collected using diagnosis codes from the DCSAH. This means that detailed information is not available. An examples of this is the lack of information concerning co-morbidities. Second, the lack of consensus concerning the diagnostic criteria of shoulder problems complicates diagnosing them. An additional problem relating to the DCSAH coding system is that according to both the ES-protocol and to the latest scientific insights (22), physiotherapy treatment should be based on shoulder physical assessment findings and not structural pathology. The DCSAH however, uses diagnosis that are based on structural pathology. Therefore it is possible that patients without SAPS are included in both groups and that patients with SAPS are not included in the study. The fact that this applies to both groups, however, ensures that comparison between the two groups is possible. Finally, SNA physiotherapists were aware of the research purposes. This could lead to a bias of the found data relating to objective 1b (content of care) for which the SNA physiotherapists

themselves had to fill in registration forms. This does not apply to objective 1a (patient population) and objective 2 (compliance to the ES-protocol).

CONCLUSION

This study is a first step identifying the added value of Shouldernetworks and describes to which extent care provided by Shouldernetworks differs from care by regular physiotherapists. The findings of this study seem to imply that the care process of ShoulderNetworks is more efficient than regular care. To confirm this, further research must be done into the outcomes of care given by physiotherapists who are a member of a Shouldernetworks. Subsequently the possible (cost)effectiveness of ShoulderNetworks can be studied.

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APPENDIX

Appendices accompanying this study can be found in the attached Winzip folder called 'Appendices - how do shoulder networks operate in relation to patient population and provided care? – 3 July 2015'.