

Extended roles in primary care when physiotherapist-initiated referral to X-ray can save time and reduce costs

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Abstract

Objective: The objective of this study was to evaluate an extended role for the physiotherapist in primary care in referring patients to plain X-ray.

Methods: This prospective cohort study was set in a single region in Sweden. It included 20 physiotherapists who were educated in a 1-day training in performing referral to X-ray, along with 107 patients with musculoskeletal disorders who were referred to X-ray. We evaluated referral quality and patient and physiotherapist satisfaction and calculated healthcare and patient costs.

Results: All referrals fulfilled the basic requirements of quality, and 78% were classified as good, fulfilling all criteria. Both patients and physiotherapists were satisfied with the extended role for the physiotherapist that decreased the waiting time to diagnosis and to adequate treatment. Costs were reduced for patients (by €53/patient) and healthcare (by €6286.2/107 patients). The cost to visit a physician was twice that of a physiotherapist visit.

Conclusions: An extended role for physiotherapists in primary care in referring patients to X-ray was effective and safe for patients and reduced costs for patients and for healthcare. Physiotherapists in primary care were able to refer patients to X-ray after a 1 day of training, and the extended role freed up 45 min of physician time for each patient with a musculoskeletal disorder in need of an X-ray.

Key words: physiotherapy, extended scope, primary healthcare, musculoskeletal pain

Introduction

The global healthcare system is poised to experience challenges with the worldwide ageing of the population [1] and the growing number of people living with chronic diseases [2]. Finite resources and physician shortages already have led to limited access to care and high costs for patients and society as wait times for care increase [3]. Low back pain, neck pain and other musculoskeletal disorders (MSDs) are among the top seven causes of years lived with disability globally [4]. This situation highlights the need for increased productivity, improved efficacy [5] and new strategies in primary care delivery. Task shifts or extended roles, when work traditionally performed by one profession transfers to another [6], can improve access to healthcare [7–11]. Extended roles for physiotherapists have been suggested to include triaging, referring patients to specialist care or ordering diagnostic imaging [7]. Having a physiotherapist as the first assessor results in decreased wait times and lengths of stay for patients with musculoskeletal injuries [9], without any adverse effects [9, 10] and with patient satisfaction [10, 12]. With the physiotherapist as the first assessor for patients with MSDs in primary

care, outcomes improve and costs are lower compared with a physician visit for the same purpose [13–15]. Among the improvements, fewer patients require multiple general practitioner (GP) visits for MSD, sick-leave recommendations or prescriptions during the year after a first assessment by a physiotherapist [14]. Furthermore, fewer patients need additional assessment by a GP, and the physiotherapist can identify pathology [13] at a lower cost [15]. However, patients with MSD meeting a physiotherapist as primary assessor currently also need to visit their GP if they require a referral to X-ray. Two visits to healthcare will cause diagnostic delay and higher costs for both the patient and the healthcare system than if the physiotherapists could refer the patients directly to X-ray during their first visit. Physiotherapists in primary care can undertake referral to X-ray if they have appropriate knowledge to perform a task [16] that physicians traditionally do. A physiotherapist's referral could save time and costs for both the healthcare and patient. The patient would not need a second visit to a GP, and the GP could book another patient who does need the knowledge and skills of a physician. To extend the physiotherapist role to referring patients with MSD to

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X-ray, laws and regulations for high-quality healthcare and patient safety need to be followed [17], as well as the regulations of the Swedish Radiation Safety Authority [18] in Sweden.

Our aim was to evaluate an extended role for the physiotherapist in referring patients to X-ray. We evaluated referral quality and patient and physiotherapist satisfaction and calculated the costs for patients and for healthcare.

Methods

The project was conducted in the region of Sörmland in Sweden from October 2017 to April 2018 and was evaluated in April 2018. Twenty physiotherapists were provided with training to enable them to refer for plain X-rays. The project followed regulations for referral in the region of Sörmland and the directions from the National Board of Health and Welfare [17]. Sweden is divided into 21 regions, and they have a considerable degree of autonomy [19]. The project was approved by the Head of Division Primary Care, Region of Sörmland, and followed the regulation for healthcare in Sweden [20]. In Sweden, patients' position, integrity, autonomy and participation in healthcare are regulated by law (Patientlag 2014:821). Healthcare may not be provided without the patient's informed consent (unless in specific circumstances, for example, unconsciousness). Healthcare should, as far as possible, be designed and implemented in consultation with the patient. The present study has followed Swedish law and regulations in the development of primary healthcare.

Process

In 2016, a process was begun to improve physiotherapy with a focus on minimizing patient wait time to the first contact in primary care and improve outcomes. Physiotherapists are expected to be the first contact for patients with MSD in primary care [13, 15] and to use their full set of clinical tools before sending a patient to a GP if the patient needs referral to X-ray.

Before beginning the project, the leader contacted the National Board of Health and Welfare (December 2016) and the Swedish Radiation Safety Authority (March 2017) to ensure that physiotherapists could make referrals to X-ray according to Swedish laws. The National Board of Health and Welfare [17] is a government agency under the Ministry of Health and Social Affairs and works to ensure high-quality health and social care in Sweden. The National Board of Health and Welfare determined that 'it is not regulated in detail in legislation who may perform which tasks in the health care system and the task of writing referrals is not in the constitution reserved for any particular professional category. Of the National Board of Health and Welfare's regulations, SOSFS 2004:11 follows, however, that the care provider must provide written directives and ensure that there are routines for how referrals will be designed and handled. The head of primary care should also establish routines for the referrals to be used following SOSFS 2004:11 (Responsibility for referrals for patients in health care, dental care etc.) and SOSFS 2011:9 (Management system for quality work)'.

In response to the query, the Swedish Radiation Safety Authority [18] said that 'if the referral to X-ray follows

the National Board of Health and Welfare's regulations and the region have routines for that, there is no obstacle for physiotherapists to write referrals for X-ray examination'. Based on these responses, the project leader determined that the project could move forward.

The project team

The project team consisted of a medical doctor and registered physiotherapist (GEP), a registered physiotherapist, the chief physician for patient security (MP), the chief physician for X-ray (JF), a registered physiotherapist in primary care (not a study author) and associate professor and physician in primary care (not a study author). In accordance with the Region Sörmland regulations governing referral and the direction from the National Board of Health and Welfare, a routine was developed. To ensure patient safety and minimize radiation risk, the physiotherapists could make referrals for X-ray only of the extremities (shoulder, arm and hand, pelvis, leg and foot) in adults (>18 years). X-rays of the spine or head were excluded.

Routine developed by the project team

The criteria for physiotherapists stated that physiotherapists needed to have 3 years of experience working in primary care, with knowledge in musculoskeletal diagnosis. The referral to X-ray was to contain the following information: clinical diagnosis and relevant findings during physical examination, information about previous relevant examinations, relevant medical history with symptoms and symptom development over time, relevant other diseases, information on contraindications and how the result of an X-ray would affect continued handling and treatment. The routine also encouraged the physiotherapists to be clear with written question(s) to the radiologist because these questions guide the choice of method, projections and areas and facilitate the radiologist's assessment.

The physiotherapists were also to follow the regulations for referral in the region of Sörmland. When sending an emergency referral for X-ray, the patient had to receive a response no later than the next working day. For non-emergency referral, the physiotherapist was to monitor responses at least twice a week. In case of absence, the physiotherapist was to ensure that another physiotherapist or physician covered these tasks. The finding from the referral was to be communicated to the patient by telephone or letter and documented in the medical record.

In cases in which the X-ray findings indicated a need for further investigation, were difficult to understand or indicated serious illness, the physiotherapist was to contact the GP for discussion and further engagement with the patient.

Physiotherapist education and training

Prior to referring for X-rays, the physiotherapists received 1 day of theoretical and practical training. The education included information about the routine for physiotherapists in referring for X-rays in the region (GEP and MP), information about the X-ray examination and how to write a referral to X-ray (MP and JF), education about X-ray and radiation physics by a physicist working at Medical Physics and Technology in the region and practical training in writing a referral (GEP and MP).

Measurements

All referrals were followed during the project period. The chief radiologist read them and assessed their quality based on quality standards for referral in the region of Sörmland and criteria from the National Board of Health and Welfare and the Swedish Radiation Safety [17, 18], a GP read patient medical records and patients were contacted with a survey, the physiotherapists also answered a survey immediately after the project ended and 6 months after the training, and a cost evaluation was conducted.

In reviewing referrals, the chief radiologist analysed them for (i) concise and clear anamnesis, (ii) validity of the request per national and department standards and guidelines, (iii) the presence of a specific clinical question to address, (iv) inclusion of adequate status information, with an explanation if necessary, and (v) use of abbreviations. Items (i)–(iii) were considered basic requirements. The referrals were classified as poor (not fulfilling i–iii), meets basic requirements (fulfilling i–iii) or good (fulfilling i–v). Stratified sampling was used for the referrals in two stages: (i) referrals from all physiotherapists and (ii) referrals from different body areas (shoulder, arm and hand, pelvis, leg and foot).

To avoid adverse events and validate the physiotherapist referral decisions, the chief physician for patient security or a GP read the medical record to evaluate the decision for the X-ray referral and further contact with the patient. A survey also was sent to the patients with questions about how dissatisfied/satisfied they were with the referral to X-ray by their physiotherapist (0 = very dissatisfied to 7 = very satisfied), time to feedback from physiotherapist after the X-ray, and explanations of the X-ray findings and further examinations or treatment after it was performed (0 = no feedback to 7 = yes excellent and fast feedback).

Physiotherapists evaluated the training immediately after it took place (0 = not at all good to 100 = very good) and completed a survey 6 months later. The survey included questions about how many referrals they had handled since the start of the project, any difficulties they experienced and how they handled the findings from the X-rays.

The cost evaluation included both patient and healthcare costs. Patient costs included the fee for the healthcare visit, loss of income during the visit and travel time. Considerations for the healthcare costs were the average salaries for a GP, physiotherapist and office assistant, including the payroll taxes. The time spent was the average visiting time in primary care, which is 45 min for a GP, including anamnesis and physical examination, dictation of examination findings and referral, and reading and signing of the transcription. For the physiotherapist, the time is an average of 60 min for a visit, including anamnesis and physical examination, advice on and/or training in exercises and/or treatment, written medical record and referral, and reading and signing the medical record. For the office assistant, the time is an average of 15 min to record the clinician's dictation and referral into the medical record. Overhead costs, such as facilities, building and equipment, were not included in the cost analysis.

Data analyses

All data were analysed with SPSS, version 22. Descriptive statistics were calculated for the quality of X-ray referrals and data from the surveys. Parametric statistics for normally distributed variables are presented as mean and

standard deviation (SD) and range (the lowest and highest scores). Non-parametric tests (not normally distributed data) are presented as median and interquartile range (IQR; 25th and 75th percentiles) and range (lowest and highest scores). Patient costs were calculated based on the average income among people in Sweden in 2019 of €41 936/year, for an average of €20.2/h × travel time + waiting time + visit. The cost for the average healthcare salary was calculated as GP €76.8/h × time, physiotherapist €29.46/h × time and office assistant €24.6/h × time, including the payroll taxes.

Results

In total, 107 X-ray referrals were made by physiotherapists from October 2016 to April 2017. No adverse events were reported.

Evaluation of referral to X-ray

Of 82 referrals evaluated, 64 were classified as good and 18 met the basic requirements. Common issues were a lack of adequate status information and use of abbreviations without explanation and that are probably not understood outside the physiotherapist profession. No referral was classified as poor. The radiologist concluded that X-ray referrals written by physiotherapists were as good as those from physicians.

Validation of patient need for X-ray examination

All X-ray referrals were deemed to be clinically appropriate.

Patient survey

The response rate was 78%, or 82 out of 105 patients responding to the patient survey. Of these, 91% were very satisfied with the physiotherapist referral to X-ray (mean 6.7; SD 0.8), and 84% received feedback quickly (within 2–3 days) and were satisfied with feedback from the physiotherapist (mean 6.2; SD 1.7) (Figure 1). Eight patients (7%) did not receive feedback from the physiotherapist, five of them because they had not been called to schedule the X-ray examination when they answered the survey and three patients had not been contacted by the physiotherapist. Five patients received the answer directly from a GP because of the results of the X-ray (i.e. fracture and joint dislocation) in line with routine. For 63% ($n = 52$) of the patients, the X-ray examination led to further treatment or extended evaluation. Of these, 27 had a visit to the GP or orthopaedist, and 25 continued physiotherapy treatment or exercises. The remaining 30 patients (37%) did not need another visit related to their problem.

Survey physiotherapist

All 20 physiotherapists completed the evaluation of the training. The mean score regarding content and satisfaction was high (95.1, SD 6.1). At the 6-month follow-up, one physiotherapist had left their position, and one was on parental leave; 17 of the remaining 18 completed the survey (94%). Physiotherapists had sent a median of 5.5 referrals (IQR 2.7–10.5; range 0–16). After the project ended, all of the physiotherapists expressed interest in continuing to write referrals to X-ray. The task was not time-consuming, the physiotherapists were satisfied and the time to X-ray was shortened, leading to a faster diagnosis for the patient.

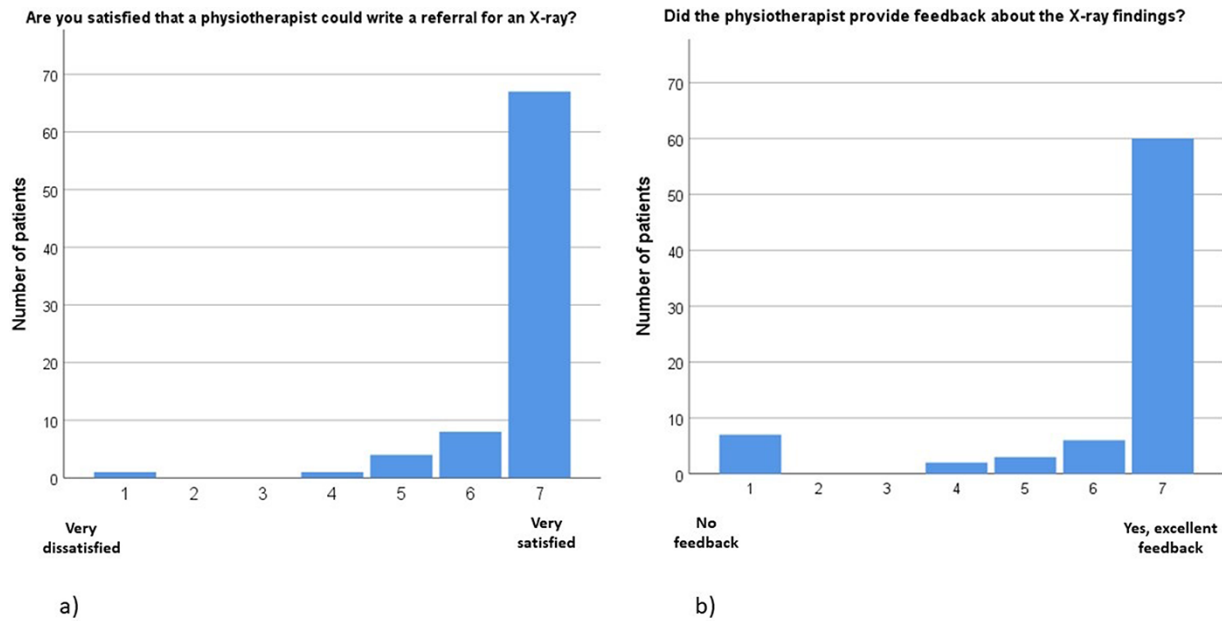


Figure 1 (a) Number of patients and their level of satisfaction with a physiotherapist referral to X-ray (0 = very dissatisfied to 7 = very satisfied). (b) Number of patients and their evaluation of feedback received after the X-ray examination (0 = no feedback to 7 = yes, excellent feedback).

Table 1 Health system cost per patient visit to a physiotherapist compared to visiting physician in primary care

| Health system costs | Physiotherapist | Cost | Physician | Cost |
|------------------------------|-----------------------|------|-----------------|------|
| Staff time per patient | 60 min | 29.5 | 45 min | 57.6 |
| Staff time, office assistant | | | 15 min | 6.2 |
| Total cost, health care | | 29.5 | | 63.8 |
| Patient costs | Visit physiotherapist | Cost | Visit physician | Cost |
| Travelling time ^a | 45 min | 12 | 45 min | 12 |
| Wait time | 15 min | 4.1 | 15 min | 4.1 |
| Visit time | 45 min | 12 | 30 min | 8 |
| Fee for health care | | 19.8 | | 19.8 |
| Travel costs | | 9.9 | | 9.9 |
| Total costs, patient | | 57.8 | | 53.8 |

Staff time per patient (min). Cost per patient encounter (Euro).

^aTravelling time: average time to the healthcare visit and return.

Cost evaluation

The healthcare cost to visit a physiotherapist was €29.5 per patient, compared to €63.8 to visit a physician. During the project period, the healthcare cost decreased by €6286.2 when the 107 patients did not need an extra visit to a physician. The patient cost was reduced by €53 per patient (Table 1).

Discussion

Statement of principal findings

The current results show that physiotherapist referrals to X-ray were as good as those of physicians, with no adverse events, and that the patients were satisfied. Healthcare costs as well as costs for patients were reduced when physiotherapists in primary care made referrals to X-ray. The 1-day training for physiotherapists in making a referral to X-ray was an effective method. This extended role for physiotherapists frees up 45 min of physician time for each patient with MSD in need of X-ray, which was 107 patients in this study. This time could be used for patients in need of GP-specific skills, reduce waiting lists and decrease wait time for patients.

Interpretation within the context of the wider literature

The findings are in agreement with results from previous studies in specialist care with no adverse events [9, 10] and may reduce wait times [21, 22]. The physiotherapists reported that their extended role in making referrals to X-ray led to a faster diagnosis and thus faster treatment. Of the referred patients, 27 needed to visit the GP or orthopaedic clinic after the X-ray because of fracture, joint dislocation, loosening of hip prosthesis or the need for further examination. When a patient had already undergone an X-ray exam, the visit to the GP or orthopaedist was more efficient, and further decisions could be made based on the already completed X-ray. A total of 25 patients continued with physiotherapy after their X-ray. Patients and physiotherapists both reported believing that adequate treatment and/or exercises could be performed faster without worry about skeletal damage. Previous studies have shown that a first visit for MSD to a physiotherapist in primary healthcare also improved results and offered advantages compared to a first visit with a GP [13–15]. Traditional roles for physicians and physiotherapists, with responsibilities

for specific tasks, have been reserved for each profession based on custom and practice. After appropriate education and training, physiotherapists can perform new tasks outside the traditional scope of their profession.

Strengths and limitations

Task shifting expands capacity by extending the roles of the professionals involved and can reduce healthcare costs and wait times while improving quality [10, 15]. One risk of extending referral to X-ray responsibilities to professionals other than physicians is the overuse of X-ray investigations. Ionizing radiation may cause cellular damage, and too much exposure over time can increase the risk for cancer [23]. However, the education programme included information about national and departmental standards and guidelines and a segment on radiation physics taught by a physicist. Furthermore, the project's radiologist and GP reviewers both found that the X-ray referrals by the physiotherapists were valid, with adequate and rapid follow-up and without X-ray overuse.

Implications for policy, practice and research

An extended role for physiotherapists in primary care in referring patients to X-ray was effective with no adverse events for patients and reduced costs for patients and for healthcare. One-day education and training for physiotherapists on making referrals to X-ray was sufficient. However, in this study, physiotherapists could only make referrals for an X-ray of the extremities (shoulder, arm and hand, pelvis, leg and foot). Further research is needed to evaluate if X-rays of the spine can be included in education and training for physiotherapists.

Conclusion

Physiotherapists in primary care can effectively make referrals to X-ray after 1 day of targeted training. The extended role for physiotherapists was effective, safe for patients and cost-saving. The project has led to making the practice permanent in the region of Sörmland, with continued education of physiotherapists in making referrals to X-ray for patients with MSDs.

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Data availability statement

The data sets used and analysed during the current study are available from the corresponding author on reasonable request.

Contributorship

Conception/design of the work: G.P., M.P. and J.F.; data collection: G.P., M.P. and J.F.; data analysis: G.P.; drafting the article: G.P.; critical revision of the article: G.P., M.P. and J.F.

Permissions

The project was approved by the Head of Division Primary Care, Region of Sörmland. The project followed the regulation for healthcare in Sweden (Health and Medical Services Act 2017:30 and Patientlag 2014:821) and the Swedish Radiation Safety Authority.

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