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Musculoskeletal Physiotherapy in the Emergency Department

Evaluation of a New Physiotherapy Service in a Swiss University Hospital

Muskuloskelettale Physiotherapie in der Notaufnahme

Evaluation eines neuen physiotherapeutischen Dienstes in einem Schweizer Universitätsspital

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Key words

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ABSTRACT

Background Many countries report a significant increase in emergency department (ED) visits. Patients with musculoskeletal disorders account for a large proportion of non-urgent cases.

Objective Characterization and evaluation of a new service that provides immediate access to physiotherapy for patients in the ED.

Method To characterize a new service at the Department of Emergency Medicine, Bern University Hospital, and to evaluate first experiences with it, a mixed methods approach was chosen. Data was collected from the electronic patient file and from a logbook kept by the physiotherapists. In addition, guideline-based interviews with involved health care staff were conducted.

Results During the 63 days of the pilot study 79 patients were treated by physiotherapists. The most frequently reported patient complaint was back pain (47 %). Interventions included taking the medical history, performing manual tests and multimodal treatment and developing recommendations for further treatment. In 59 % of patients no medical imaging and in 58 % no additional physiotherapy was prescribed. Patients rated the physiotherapeutic service as very good or excellent (88 %). Physiotherapy was experienced as positive and appreciated by the other professions, and all interviewees emphasized the added value for patients.

Conclusion The pilot study indicates that the physiotherapeutic consultation service has the potential to improve quality of care. The findings of this study are therefore valuable when considering the introduction of such a service in an ED.

ZUSAMMENFASSUNG

Hintergrund Viele Länder berichten über einen signifikanten Anstieg von Behandlungen in der Notaufnahme. Patient*innen mit muskuloskelettalen Erkrankungen machen einen großen Anteil der nicht dringenden Fälle aus.

Ziel Charakterisierung und Evaluation eines neuen Dienstes, der Patient*innen in der Notaufnahme einen sofortigen Zugang zur Physiotherapie bietet.

Methode Um den neuen Dienst im Notfallzentrum des Universitätsspitals Bern zu charakterisieren und erste Erfahrungen zu evaluieren, wurde ein gemischter methodischer Ansatz gewählt. Dabei wurden Daten aus der elektronischen Patientenakte und aus einem von Physiotherapeut*innen geführten Logbuch gesammelt. Zusätzlich wurden Leitfaden gestützte Interviews mit involvierten Gesundheitsfachpersonen durchgeführt.

Ergebnisse Während der 63 Tage der Pilotstudie wurden 79 Patient*innen von Physiotherapeut*innen behandelt.

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Rückenschmerzen waren die häufigsten Beschwerden (47 %). Die Interventionen umfassten die Erebung der Anamnese, die Durchführung manueller Tests und multimodaler Behandlungen sowie die Entwicklung von Empfehlungen für die weitere Behandlung. Bei 59 % der Patient*innen wurde keine medizinische Bildgebung und bei 58 % keine zusätzliche Physiotherapie verordnet. Die Patient*innen bewerteten die physiotherapeutische Leistung als sehr gut oder ausgezeichnet (88 %). Die Physiotherapie wurde von den anderen Berufsgruppen als positiv erlebt und geschätzt, und alle interviewten Personen betonten den Mehrwert für die Patient*innen.

Schlussfolgerung Die Pilotstudie liefert Hinweise darauf, dass der physiotherapeutische Konsiliardienst das Potential hat, die Qualität der Versorgung zu verbessern. Die Erkenntnisse dieser Studie sind daher bei Überlegungen zur Einführung eines solchen Dienstes in einer Notaufnahme wertvoll.

Background

Many countries, including Canada [1], Australia [2], England [3], Ireland [4] and Switzerland [5], report a considerable increase in emergency department (ED) visits. The increase in patients with complex and chronic conditions is seen as a major driver for this development [6].

In 2016, 14 % of the Swiss population visited an accident and emergency unit at least once. The resulting costs amount to approx. 624 million Swiss Francs (i. e., approx. 640 million US dollars), which corresponds to 2.2 % of total hospital costs in Switzerland [7].

Musculoskeletal disorders (MSD) account for a large proportion of non-urgent presentations to the ED [8–11]. Poor quality healthcare including overuse of radiological imaging, surgery and opioids and a failure to provide patients with education and advice may contribute to its societal burden [12, 13].

At Bern University Hospital (Switzerland), a continuous increase of ED patients with minor musculoskeletal complaints was also observed over the last few years. These patients with diagnoses such as acute lumbago, acute torticollis and pain in the peripheral joints due to osteoarthritis and/or minor trauma have so far been treated primarily by pharmacotherapy and orthotic treatment. Physiotherapy (PT) has traditionally been prescribed based on a medical assessment and has taken place in an outpatient setting (usually in a private practice), days to weeks after discharge from the ED. However, the literature reports potential benefits of musculoskeletal PT in the ED, such as fewer unnecessary hospital admissions, fewer requests for imaging, improved access to care and higher patient satisfaction [14–22]. As a considerable number of patients with minor musculoskeletal complaints are treated in the Bern University Hospital ED every year (approx. 2.5 % of about 50 000 patients), the authors conducted a pilot study to gather their own experience with the use and acceptance of such a service.

Based on the ED patient statistics of the past years and the experience with such services reported from other countries, it was assumed that the new service would have a positive impact on patient care and interprofessional cooperation.

The main objective of this study was to characterize and evaluate a new service in the ED that provides immediate access to PT for patients with minor musculoskeletal complaints in terms of use and acceptance.

Methods

Study design

To investigate the new service, a mixed methods approach was chosen, i. e. triangulation was addressed by using a combination of quantitative and qualitative methods. Data were collected to describe and characterize the new service. In addition, interviews with the involved staff and clinic stakeholders were conducted. The study design was reviewed by the responsible Ethics Committee of the Canton of Bern (No. Req-2019–00 208); it does not fall under the Swiss Human Research Act.

Setting and procedure

The study was conducted at the adult section of the Department of Emergency Medicine, Bern University Hospital, i. e. only adult patients were included in this study. Patients accessed the ED either by ambulance or self-admittance. ▶ **Fig. 1** illustrates the patient flow and the decisions that were involved. After entering the ED, patients were greeted by trained nursing staff and an initial triage was conducted. The urgency of the consultation was classified and patients were guided to a corresponding waiting area. Then, all patients, including those with musculoskeletal complaints of any cause, were briefly seen by a senior physician who decided whether or not to call the PT service. The indication for PT was based on clinical reasoning of the senior physician regarding the potential benefit of a PT intervention. If there was an indication for PT, the new service was called to the ED. Otherwise the patient was treated according to standard ED procedures.

The PT team consisted of 6 experienced physiotherapists from the musculoskeletal department of the hospital, who had specialized in manual therapy and/or sports PT (4 of them had completed or were about to complete a master's degree). Each day, one of them was on call for this new service.

The PT examination and treatment was tailored to the individual problems of each patient and was carried out according to clinical assessment criteria [23].

Data collection

All data was collected during the study period from 29 April to 30 June 2019.

Physiotherapists documented their interventions in the electronic patient record system of the ED (E.care, iLINK) and additionally completed a logbook (using the software MS Excel).

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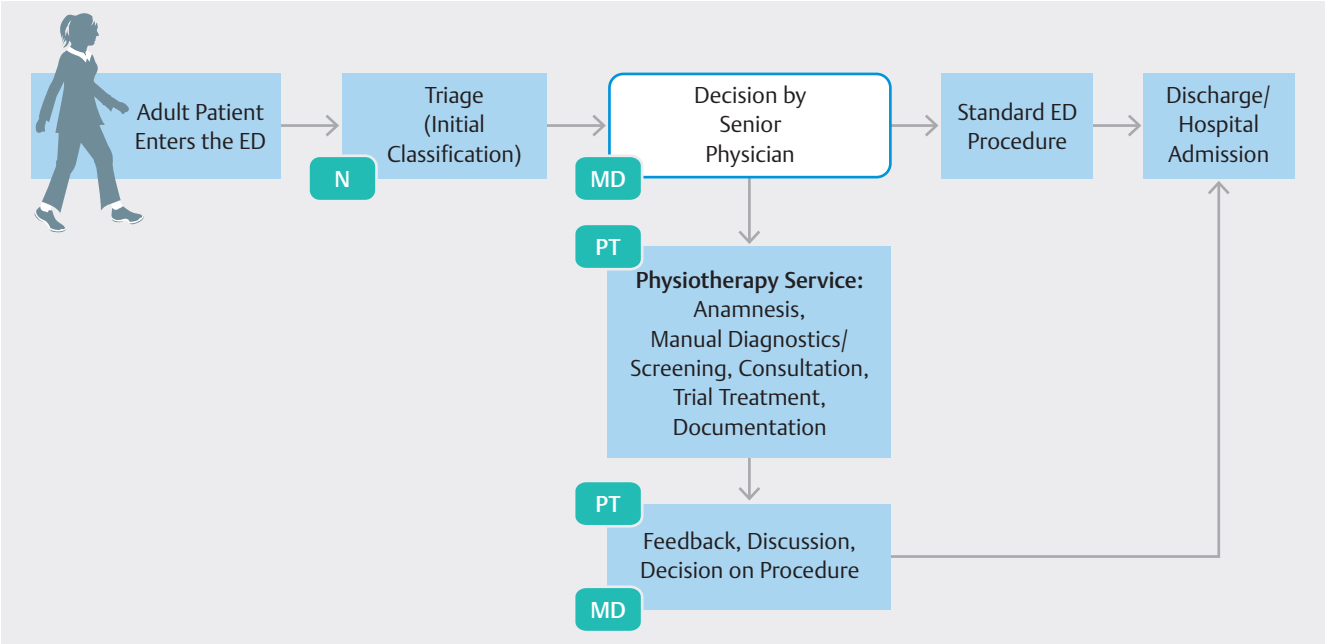

▶ **Fig. 1** Process of the physiotherapeutic service at the ED (ED = emergency department, N = nurse, MD = medical doctor, PT = physiotherapist).

The logbook included aspects of the anamnesis (as derived by the physiotherapists), examination and treatment (categorized in groups according to clinically meaningful aspects), the physiotherapists' rating of perceived agreement between theirs and the doctors' clinical evaluation on a scale from 0 to 100 % (0 % = no agreement, 100 % = full agreement), patient satisfaction (according to 6 possible answers from the Patient Satisfaction Questionnaire (PSQ)-German [24]) and the further need for PT intervention (rated by dichotomous (yes/no) answers of the physiotherapists after patient contact and discussion with the responsible doctor).

Telephone interviews

Patients who agreed were contacted by telephone a few days after their visit to the ED to clarify whether they needed any further measures after the initial PT consultation.

Data analysis

All patient data were continuously collected; all data were coded for analysis. Descriptive statistics was used to analyze the data recorded in the clinical documentation and the logbook (software MS Excel).

Interviews

At the end of the pilot phase, 6 interviews (5 individual and 1 with 2 persons) were conducted. Directly involved staff (2 physiotherapists, 1 nurse and 1 senior physician) and the management of the participating clinics (the deputy head of nursing and the deputy head physician of the ED as well as the head of the PT department of the hospital) were interviewed. The interviews were based on a specifically tailored semi-structured interview guide. It included questions about interprofessional collaboration, patient care, stakeholder experiences and expectations as well as the optimization potential of the new service. The content, comprehensibility and completeness of the interview questions were discussed within the study team and reflected on again after the first interview had been conducted [24]. Since, according to the interviewee, the questions were easy to understand and answer and all important issues were addressed, no further adjustments were made to the interview guide. The interviews were audio recorded. An interviewer who was not otherwise involved in the study conducted all interviews on site in separate hospital offices. Each interview lasted about half an hour. 2 members of the study team who had no direct relationship with the interviewees (i. e. were unbiased) then listened to the audio recordings and summarized them in writing according to themes, using a pragmatic approach based on Brown & Clarke [25]. The key statements of the interviews were thus extracted.

Results

In 2018, a share of 2.46 % of all patients treated at the ED (1292 out of a total 51 179 patients for the year 2018) visited the ED because of musculoskeletal complaints. The share increased to 3.49 % in the first half of 2019 (891 out of 25 531 cases, 1st January to 30th June 2019). During the period of the pilot study, the percentage of such diagnoses remained at comparable levels (3.64 % i. e. 319 out of 8766 cases, May/June 2019).

Within the 63 days of the pilot study, a quarter of all ED patients with musculoskeletal complaints were referred to physiotherapists, i. e. a total of 79 patients were included in this study. Patients with more serious injuries or those who needed further assessment by experts from other medical fields were not assigned to PT. The following results always refer to these 79 patients seen by the physiotherapists during the study period.

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Patient characteristics

51 men (65 %) and 28 women (35 %) were taken care of. The median age was 41 years (min 16, max 86, ±SD 16).

The most frequently presented complaint of those patients was acute, worsening or immobilizing back pain (47 %). 16 % suffered from neck pain (▶ **Fig. 2**). Other symptoms were associated with polyosteoarthritis, type 1 diabetes (neuropathic pain), suspected post-Benign Paroxysmal Positional Vertigo (BPPV), unclear pain in the left sacroiliac region with myofascial involvement of the muscles in the gluteal region, suspected chronic pain disorder with nonspecific whole-body pain, diffuse musculoskeletal pain after physical assault, and chronic pelvic pain syndrome. The reasons for presenting to the ED were new pain, loss of control over pre-existing pain and/or uncertainty about whether something more serious could be the cause of the complaints.

Most frequently, the physiotherapists were consulted for a combination of pain reduction, improvement of joint function and manual mobilization (35 %) (▶ **Fig. 3**). In individual cases, repositioning maneuvers for BPPV, respiratory PT or help transferring a patient from a wheelchair to bed were demanded.

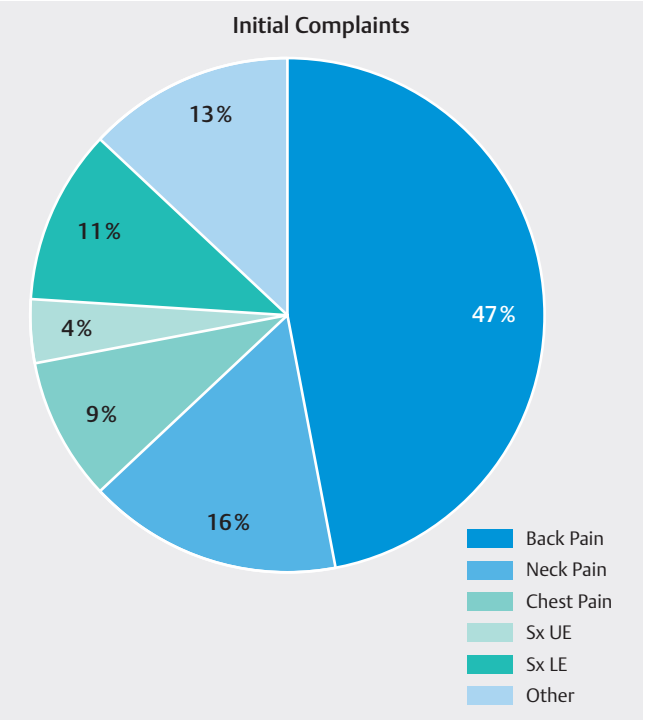
In 94 % of the cases, the physiotherapists recorded a complementary medical history, which often included a verification of the onset of the symptoms (45 %). In 11 % of the cases, the therapists, using red flags, explicitly screened for serious pathologies such as cauda equine syndrome and vascular pathologies (▶ **Fig. 4**).

The physical examinations of the involved physiotherapists comprised palpation, passive and active movements, differentiation (hip, sacroiliac joint, lumbar), safety tests (upper cervical spine, vertebrobasilar insufficiency, pre-manipulative testing), neurodynamics, clinical neurological testing, sympathetic reactivity evaluation, deep neck flexors, impingement and stability tests, shift correction and push-up's as well as muscle tone and strength testing.

Furthermore, the PT treatments consisted of instructions for self-management, education and advice as well as myofascial and/or manual therapeutic applications (= "multimodal PT").

In 3 cases, patients were seen directly by a physiotherapist after triage. In these cases, the senior physician was unable to see the patient at triage due to a more urgent case. However, based on the information he/she had received from the nursing staff at triage, he/she had decided to refer the patient directly to a physiotherapist. The physiotherapists took the medical history, did manual testing, developed a suggestion for further procedures and subsequently presented the patient to the senior physician on duty.

Patients were grouped according to their initial complaints: back pain, neck pain, chest pain, symptoms in the upper extremities and symptoms in the lower extremities. In general, physiotherapists may have contributed to an enhanced diagnostic accuracy since the proportion of non-assignable cases (initially vague suspected diagnoses) was reduced from 13 % to 9 % with completion of the diagnosis process involving medical doctors and physiotherapists. However, this result is not statistically significant (X2, $p > 0.05$) and would have to be specified in further studies.



▶ **Fig. 2** Initial complaints of patients treated by physiotherapists (Sx = symptoms, UE = upper extremities, LE = lower extremities).

The agreement between doctors and physiotherapists, as assessed by the physiotherapists involved, can be described as very good. In 93 % of the cases, the physiotherapists indicated full agreement regarding the assessment of the patient's problem and the further procedure. Only in 2 cases, the senior physician on duty did not follow the procedure recommendation of the physiotherapist.

In the majority of patients with minor musculoskeletal complaints, who were seen by the physiotherapists, no medical imaging (59 %) and no additional physiotherapy (58 %) prescriptions were necessary.

The mean patient contact time of the physiotherapists was 44 min. (min 15, max 60). The Swiss tariff system was applied to account for the cost of the PT service (time-independent single session flat rate, approx. 65 Euros per session).

Most patients rated the physiotherapeutic service as very good (47 %) to excellent (41 %), 10 % as good. Only one patient was not satisfied with the service and another one was not able to provide a judgement. 5 patients, who were contacted a few days after their visit to the ED, said they were very satisfied with the new service and had no further need of care. One patient asked for a follow-up appointment to be instructed in exercises for secondary prevention.

In 13 consultations (18 % of the cases), mutual coaching took place between the involved physiotherapists and medical doctors (10 inputs on the part of physiotherapists, 3 on the part of medical doctors). This included professional exchange at the patient's bedside, joint discussions about imaging and PT options as well as the adequate writing of prescriptions for further outpatient PT if necessary.

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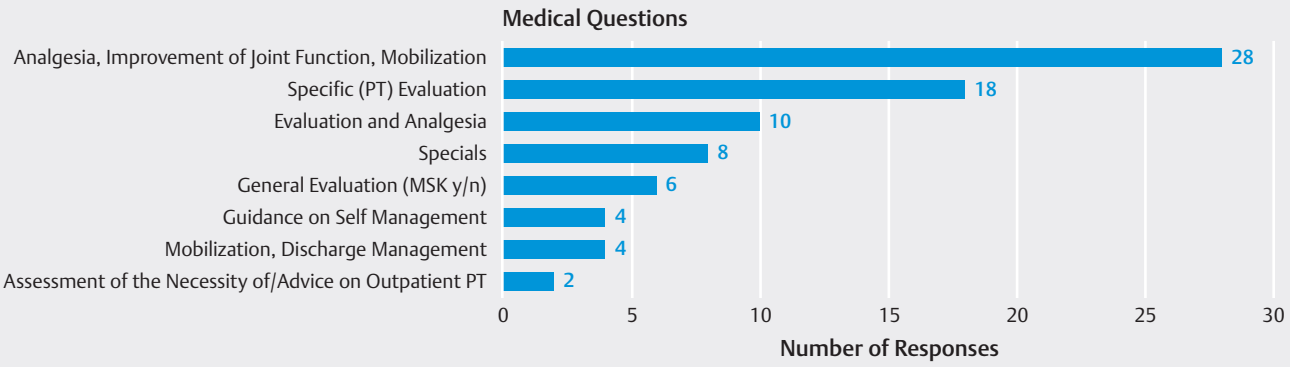
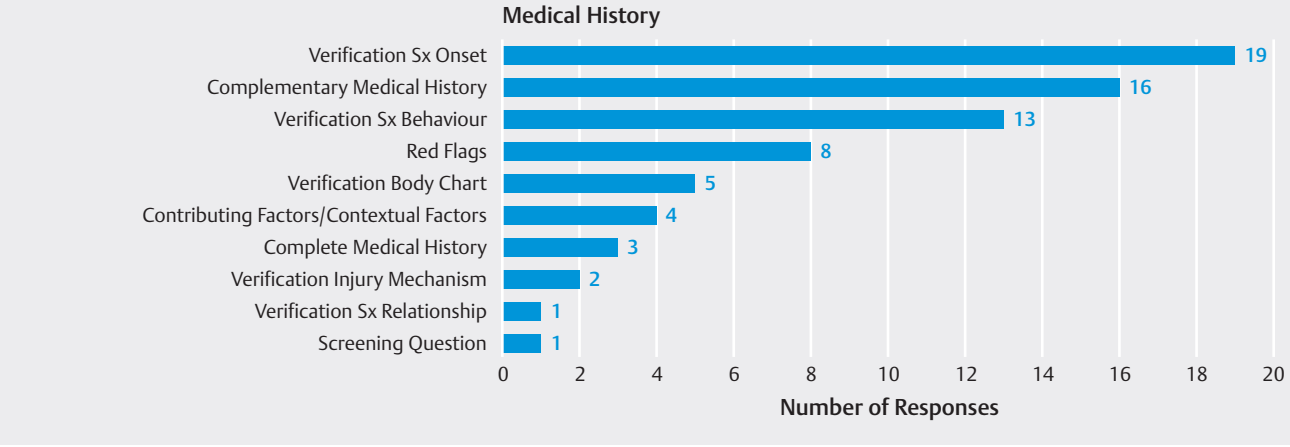


▶ **Fig. 3** Request to physiotherapists (multiple choices possible) (PT = physiotherapy, MSK = musculoskeletal, y = yes, n = no).



▶ **Fig. 4** Contents of the medical history related to physiotherapy (Sx = symptom).

Interviews

The main issues that emerged from the interviews were related to collaboration, patient care and the potential to further develop the new service. The service was experienced as positive and appreciative: "Such a service represents a unique selling point and improves the quality of care for patients" [interview 2]. The cooperation was perceived as good: "Only positive experiences were made in the cooperation with physiotherapy" [interview 1]. All interviewees emphasized the added value for patients; patients had benefited from better quality of care and support and were very satisfied with the service. No negative feedback was given. Opportunities for improvement were identified regarding the integration into the standard processes at the ED, in order to better exploit the potential of the service: "One would have wished for more "real" initial contacts; in this respect, expectations were not met" [interview 4].

Discussion

A physiotherapeutic consultation service for patients with minor musculoskeletal complaints in the ED was introduced and evaluated. Such a service does not yet exist in Switzerland. For patients with respiratory problems, however, Lausanne University Hospital offers PT in the ED. Since the clinical setting and the medical context of their interventions strongly differ from this study, we could not benefit from their experience. In other countries, physiotherapists have been part of inter-professional ED teams for some time. Experience from Australia shows that patients expect pain reduction, relaxation, care of their acute soft tissue injuries and help to fix joint subluxations from PT care in the ED [27]. These patients value the interprofessional environment. Regardless of the professional group, patients expect competent, efficient and participative ED treatment [28].

The share of patients with musculoskeletal complaints, who visited the ED during the study period (3.64 % of all ED patients), was similar to the share that was expected based on data of past patient admittance. However, only a quarter of these patients with musculoskeletal complaints visiting the ED during the study period were referred to the physiotherapists. Possibly this number of patients would be higher if therapists or medical doctors were involved in the first triage (currently, initial contact with patients and triage is carried out exclusively by trained nurses). In general, triage can be effectively performed by a number of clinicians [29].

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In the United Kingdom, PT-led triage provides adequate referral to intermediate musculoskeletal care [30]. Furthermore, Samsson, Bernhardsson & Larsson (2016) found good patient satisfaction and adherence among orthopaedic patients [31].

Analysis of the overall admittances to the ED shows an increase in patients with musculoskeletal complaints. In Switzerland this includes many patients with minor complaints that could also be dealt with by a General Practitioner. Depending on the conditions of the individual health insurance, visiting an ED instead is possible and obviously made use of. Consequently, this also results in a higher proportion of patients qualifying for PT intervention and explains why an increase in patients is to be expected. Further potential is seen in patients with other diagnoses such as respiratory problems, dizziness, neurological problems, headache, and orthopaedic knee problems as well as patients after plaster removal.

Back and neck pain were the 2 main complaints of the patients. Nevertheless, the variety of symptoms and problems was great. The physiotherapists therefore had to be able to recognize red flags and precautions and had to be experienced in handling complex patient situations as well as in manual diagnostics. The physiotherapists involved in this study met these requirements. Thus, there was no negative feedback either from the patients or from the doctors and nurses.

The activities of the physiotherapists were broad and met the expectations of the clinic to offer comprehensive care. The therapists of the musculoskeletal team fulfilled an important role in educating patients and teaching them self-management strategies. The overall aim was to reassure the patients and access their own resources. Manual therapeutic skills were used for clinical diagnosis and adjuvant pain therapy.

According to Downie et al. (2019), 1 in 3 patients seeking ED care for lower back pain receives imaging [32]. Moreover, their systematic review and meta-analysis revealed an increase in complex imaging in this patient group over a study of 21 years. In this submitted study, patients seen by physiotherapists may have had less imaging prescribed (fewer total ED imaging performed compared to the same period in the prior year; no imaging was prescribed for 59 % of patients seen through PT). It is conceivable that thorough manual diagnosis contributes to a more accurate clinical diagnosis, which determines the indication for medical imaging. It is known from observational studies that physiotherapists with primary contact or advanced musculoskeletal knowledge are less likely to order imaging in the ED [17, 33]. As selection bias may also have played a role in this study (patients sent to physiotherapists were triaged beforehand and therefore more likely to suffer from milder musculoskeletal conditions that did not require imaging), further research is needed to interpret the findings more conclusively.

In the course of the diagnostic process, the proportion of initially unclear and unclassifiable diagnoses fell from 13 to 9 percent. As this result is not statistically significant, the influence of PT performance on diagnostic accuracy needs to be further specified in additional studies. Similar as for imaging, further PT was only prescribed in less than half of the patients. It seems that for some patients a single PT treatment was sufficient to empower them to have more confidence in themselves to deal with their problem. Patients who were contacted by telephone a few days after their consultation stated that they were symptom-free, had regained full functional capacity, and had no further need for medical measures. Since patients with minor musculoskeletal complaints only received a prescription for outpatient physiotherapy in addition to diagnostics before the introduction of the service, the new service can be regarded as improved care from the patients' perspective. Lentz, Beneciuk & George (2018) report that the effects on the reduction of pain intensity, the prevention of disability and pain-related mental impairment are maximal for an early intervention [34]. It is also known that undertreatment of pain is common in the ED [35]. In 2008, Lau, Chow & Pope already showed that early physiotherapeutic intervention in the ED is effective in reducing pain in patients with acute lower back pain [36]. In addition, the interviewed doctors in this study stated that the intake of pain medication and sick leave were lower among the patients seen by the physiotherapists. Early PT also leads to a lower intake of opioids in patients with chronic pain [37], whereas passive standard interventions such as thermotherapy, positioning and immobilization, also in combination with non-steroidal anti-inflammatory drugs or distraction, do not provide clinically significant pain relief in adults with musculoskeletal trauma [38]. Therefore, PT which primarily pursues active treatment strategies, can play a key role in the pain management of patients with minor musculoskeletal complaints in the ED. However, since the sample sizes most existing studies that have investigated non-pharmacological pain interventions in the ED are small, further investigation of their use to optimize pain management is justified [39]. In summary, the results of this pilot study confirm the scientific literature with regard to the positive effect on patients of early intervention.

The physiotherapists were aware of the importance to build trustworthy relationships with the other professions in the ED. The therapists participating in this pilot study were committed to be open to learn new things, share skills and limit competitive behaviour. Experience from Australia highlights that such aspects are essential for a successful implementation of such a service in an interprofessional environment like the ED [40]. In the interviews, the cooperation between physiotherapists and ED staff was described as very good. This is very promising and in line or somewhat better, respectively, than reported by Ferreira et al. (2018), who found in their systematic review predominantly positive perceptions of physiotherapists by staff and patients only [41]. The physiotherapists in this study expressed themselves highly positive about the cooperation with other professions and felt that they were much appreciated by others. None of the interviewees questioned the usefulness of a PT service in the ED. The new inputs that the physiotherapists brought into the ED were found to be enriching. In general, the new service was perceived as contributing to a better quality of care and support for patients. Several interviewees underlined the uniqueness of such a service in Switzerland. It was also mentioned that PT counselling, education and instruction had contributed to calming down the patients and supporting their well-being. Within the mean contact time of 44 minutes, it was possible to respond to the patients' needs. This is confirmed by the high values of patient satisfaction directly after the PT treatment.

The telephone follow-ups carried out confirmed this satisfaction and indicated that further treatment was hardly needed.

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This is consistent with the evaluation of PT services in Canada, which states that access to physiotherapists in the ED reduces future use of health services [42].

The new PT service was implemented in the ED with minimal impact on existing processes. Therefore, the patients were first seen by a medical doctor even if only very shortly as part of an initial check. During the pilot study, the new service was organized to complement the current processes. For a permanent introduction of such a service, the internal processes could be revisited to ensure a best possible implementation. Particularly, the organization of the initial triage has a great influence on the design of the PT service and possibly also on the waiting times and treatment costs of the patients.

In the interviews, representatives of the ED clearly stated that all patients should first be seen by a medical doctor while physiotherapists would not mind seeing a patient first. During the pilot study, doctors were hardly involved in the initial assessment (primarily carried out by specially trained nurses). Therefore, the decision to involve the PT service was only made at a later stage of the treatment pathway. As a result, the new service had no impact on waiting times for patients. It can be assumed that waiting times could be shorter if the decision to involve the physiotherapists in the treatment is made earlier [17, 19, 43, 44]. The physiotherapists described the 3 initial contact situations in which they took the medical history and conducted the initial physical examination as very attractive. They also see great potential for reducing the workload of doctors. A model of care in the ED, where physiotherapists have "real" initial contacts with patients with musculoskeletal complaints, has already been introduced in other countries such as Australia and shows promising benefits for all stakeholders in the health system.

Limitations

It is likely that the potential of possible patient contacts was not fully exploited. Causes can be manifold, ranging from insufficient knowledge about the pilot study, the possibilities of PT in general or not having the service in mind while on duty. Perhaps it would have been easier to carry out this pilot study over a longer period of time or at a smaller hospital.

In order to improve the general validity of the quantitative results of this study, a larger number of patients examined over a longer period of time is necessary. In addition, a reference group obtaining standard care (i. e. without PT) should be considered to analyze the validity of the measured effects.

Conclusion

The implementation of a physiotherapeutic service at the ED of University Hospital Bern indicated that the focus on patients with primarily musculoskeletal complaints was appropriate, but could be extended to other conditions in the future. The evaluation indicated that the therapeutic interventions led to a better quality of care and support. The pilot study showed the feasibility and great potential of the new service in the Swiss context. Furthermore, indications were found that the efficiency of the care system could be increased by reducing follow-up treatments, imaging and use of analgesics. However, to draw conclusions on such longer-term aspects, further research and consideration of health economic aspects are needed.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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