

One Hundred Children and Adolescents Consulting General Practice With Musculoskeletal Pain.

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Abstract

Background

Each year, 8% of all child and adolescent consultations in general practice are due to musculoskeletal conditions, with pain as the most frequent symptom. Despite the commonality of musculoskeletal pain, limited knowledge exists about care-seeking children and adolescents with musculoskeletal pain.

The purpose of this study was to describe characteristics of children and adolescents consulting their general practitioner with musculoskeletal pain.

Methods

This is a cross-sectional study based on the baseline data from the child and adolescent musculoskeletal (ChiBPS) pain cohort study, carried out in 17 Danish general practice clinics. Patients aged 8-19 years with musculoskeletal pain complaints when consulting their GP completed a questionnaire on demographics, physical activity, pain impact, psychosocial factors, and expectations of their general practitioner. Descriptive statistics were used to summarize data. Normally distributed continuous data are described using mean and standard deviations while non-normally data are described using median and interquartile range.

Results

We included 100 participants (54% female, median age 13 [12-16] years). The most frequent activity limiting pain regions were knee (56%), back (20%), ankle (19%), and neck (13%). The majority (63%) consulted their general practitioner because they were not able to use their body as usual due to pain. At time of consultation the median pain duration was 5 months [3 weeks-1 year]. Above a third were often or sometimes nervous (34%), worried or anxious (33%), and took pain medication when in pain (33%). Pain made it difficult to participate in sport activities at school (79%) and disturbed spare time activities (88%). Pain made it difficult to concentrate (58%) and to fall asleep (38%) and only 38% expected a pain free long-term future.

Conclusion

This study demonstrates the bio-psycho-social impact of musculoskeletal pain in care-seeking children and adolescents. Demographics, pain characteristics, psychosocial characteristics, and physical characteristics should be included in addressing children and adolescents with musculoskeletal pain.

Trial registration

The ChiBPS study where the participants in this study are from, was pre-registered before recruitment (ClinicalTrials.gov Identifier: NCT03678922) date: 09.20.18.

Background

Each year, 8% of children and adolescents aged 3–17 years consult their general practitioner (GP) due to a musculoskeletal (MSK) problem (1). Of all consultations that receive a diagnostic or symptom code, MSK problems account for 4% for those aged under 15 years (2). Despite the ubiquity of pain, it remains poorly understood in children and adolescents and can be misinterpreted as inconsequential (3). Adolescent MSK pain has long been assumed to be innocuous with a limited impact beyond the pain experience. However, evidence indicates adolescent MSK pain to be associated with psychological distress (4), decreased quality of life (5), and a negative impact on sports participation and social activities (6, 7). The prognosis of adolescent MSK pain is not as favorable as once assumed, and around one in every two continue to experience MSK pain even 1–4 years after initial onset (8). This may potentially predispose to chronic pain and other chronic health problems in adulthood (3).

The GP is the gatekeeper in and often the first point of contact into many health care systems. It is important to provide the GP with a proper understanding of this patient group in terms of their needs and impact of pain in supporting the patient-centered care, that the GP as a health care professional is trained to facilitate.

Emerging data show the importance of addressing anxiety, and coping among other conditions, during the consultation as these may contribute to the development and maintenance of pain in children and adolescents (3). However, the commonality of these pain characteristics and the consequences on their everyday lives are unknown in a general practice setting.

To inform the selection of recruitment criteria and collection of variables we performed a systematic review investigating prognosis and prognostic factors for adolescent MSK pain (8). We discovered a complete knowledge gap on children and adolescents in general practice, a strong focus on pain characteristics in previous studies, and less on psychosocial aspects of the pain experience.

Aim

The aim of this study was to explore demographics, pain features, psychosocial factors, physical variables, and expectations of children and adolescents consulting their GP with MSK pain.

Method

Study design and pilot work to inform the study

This cross-sectional analysis was based on baseline data within the child and adolescent musculoskeletal (ChiBPS) pain cohort study. The aim of the ChiBPS study was to describe prognostic factors associated to long term MSK pain among children and adolescents consulting their GP with MSK pain.

The STROBE checklist for cross-sectional studies was used in the reporting of the study (9).

Setting and recruitment

GP clinics

From October 2018, general practice clinics across Denmark were approached by the lead author (NP), a physician, who offered to visit the clinics in order for a proper introduction to the ChiBPS study (10). Seventeen rural and urban area clinics were included (Supplementary file 1) with GPs of both genders.

Participants

Children and adolescents were recruited either by an employee prior to consultation or by the consulting GP either prior to or during the consultation. Prior to the first consultation of the day, an employee was suggested to screen all scheduled patients for eligibility according to: 1. MSK pain complaint and 2. Age 8 to 19 years. The word **MSK** could be added next to the name of the eligible patient, thus reminding the consulting GP to recruit this patient for this study. If the GP opted to screen or recruit participants without involvement of other employees, they could do so. Several suggested ways of recruitment were presented, of which the GP could choose the most suitable in relation to the infrastructure of their clinic.

We didn't have a pre-defined minimum or maximum MSK pain duration as an eligibility criterion, and patients were eligible regardless of whether this was their first consultation or not for their MSK complaint. Pain regions were labelled according to the region affected, e.g. back, neck, shoulder, knee pain etc.

Once the study was explained to the children and adolescents by the GP and the decision was made to participate, they were requested to complete a REDCap questionnaire hosted by a secure server at University of Aalborg (AAU), not given any specific information of the content of the questionnaire beforehand.

Study population

To be eligible, MSK pain had to be mentioned during the consultation with the GP, but not required as the main reason for consultation. MSK pain included pain arising from muscle, tendon, bone, and joint as per the International Association for the Study of Pain (IASP) definition (11).

Inclusion Criteria:

- Age 8–19 years.
- Self-reported MSK pain (non-traumatic and traumatic caused by soft tissue damage, contusion or otherwise (excluding diagnosed fracture)).
- Ability to read and understand either Danish or English.

Exclusion Criteria:

- Self-reported MSK pain due to tumour, infection, or systemic and neurological causes.

Data collection and management

Data was collected and managed using REDCap electronic data capture tools hosted at Aalborg University (12, 13). REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies, providing 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources (REDCap link). The REDCap questionnaire was installed as a shortcut on the desktop on tablets placed at the majority of clinics except a few who chose to give NP the name and phone number of eligible patients (with their consent) instead. NP subsequently sent these children and adolescents a link to the questionnaire.

All extracted data was handled in concurrence with The Danish Data Protection Agency (14) and all data extracted from REDCap and transferred to an Excel table, with anonymized participant ID.

Questionnaire and measures

The questionnaire was developed based on our systematic review, discussions with a GP reference group, and questions used in previous work (8, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26) (Appendix 1). Our measures are divided in four sections: demographics, pain characteristics, psychosocial measures, and physical measures.

To ensure comprehensibility, we piloted the questionnaire with seven 8–19 year old children and adolescents with recent MSK pain; two girls (11 and 17 years old) and five boys (8, 9, 11, 13, 14, and 19 years old) and received feedback concerning difficulties comprehending the words: mark (mark the region), previous, and: in what extent. Most of the pilots preceded without any problems in reading and understanding the questions and the language was appropriate to abilities according to the youngest eligible participant entering the study. The mentioned obstacles in interpretation were handled with revision of wording to enhance readability.

Musculoskeletal pain

We differentiated between activity limiting and non-activity limiting pain and single or multi-site pain. Single site pain was defined as pain experienced in one of 33 predefined regions on a mannequin (Appendix 1) and rated on a 11-point numerical rating scale from 0 to 10. Activity limiting pain was defined as pain during the past two weeks leading to not being able to participate in play in the school

yard (15) or spare time activities while pain not impacting on activities was defined as non-activity limiting pain (Fig. 1). Multi-site pain (Table 1) was defined as activity limiting MSK pain experienced in at least two of the predefined 33 regions on the mannequin during the past two weeks leading to not being able to participate in play in the school yard or spare time activities. Headache was not defined as MSK pain region and thus not countable as a MSK pain region. Our questionnaire was initiated with three questions, each ensuring eligibility, and which will be referred to as: Pain questions 1, 2, and 3 (Appendix 1). Pain question 1 was the only one requesting activity limiting pain, whereas pain questions 2 and 3 requested non-activity limiting pain. Ex.: In the case a child or adolescent responded no to pain question 1 and yes to pain question 2, the individual was considered without activity limiting pain and with non-activity limiting pain. Confirmed pain solely to pain question 3 was considered as non-activity limiting pain. To limit the effect of recall bias, we used a short recall period of two weeks on questions related to pain.

Data handling and statistical methods

All data from the questionnaires exported from REDCap to the Excel table were checked for any potential errors by NP. Descriptive statistics were used to summarize data (Table 1 and Table 2). Normally distributed continuous data were described using mean and standard deviations while non-normally data were described using median and interquartile range. Categorical data were described using percentages.

Results

Study group characteristics

A total of 109 children and adolescents were recruited from 17 GP clinics. Of these, three were excluded due to missing consent, two withdrew from the study, and four were excluded due to lack of fulfilment of eligibility criteria resulting in 100 participants (Table 1 and Table 2). The primary activity limiting pain regions were knee (56%), ankle (18%), back (14 %), heel (12%), foot (12%), and neck (9%) with a median pain intensity of 7 (IQR 6–8). The median pain duration was 5 months [3 weeks-1 year]. Multi-site activity limiting pain was reported by 53%. Almost all children and adolescents had pain outside school hours (97%) and were disturbed during their hobbies due to pain (88%).

Table 1. Demographics and pain characteristics of 100, 8-19-year old care-seeking children and adolescents with MSK pain. N=100. All numbers equals percentages because of the total population of 100.

Demographics	
Median age [IQR]	13 years [12-16.5]
Sex	Female: 55, Male: 45
Median number of siblings [IQR]	1 [1-2]
Position in sibling line* (excluding only children, n=91)	Only child: 7 First: 31 Second: 36 Third/fourth: 21 Youngest: 41
Pain characteristics	
Median numerical rating scale [IQR]	7 [6-8]
Multi-site activity limiting pain, n = 53*	2 regions: 23 3 regions: 14 4 regions: 7 ≥ 5 regions: 9
Pain episode duration	< than 3 hours: 34 < than 24 hours: 24 1-7 days: 24 > than 7 days: 18
Pain episode frequency	=/> once a week: 80 < once a week: 20

Data in Table 1 are based on 97%-100% replies. *fifth child, n=3, twins, n=2. **five participants reported only one pain region and this was non-activity limiting – as answer to pain question 3, of these one of the regions were the jaw. (ID 40, 42, 51, 57, 90).

Table 2. Psychosocial and physical characteristics of 100, 8-19-year old care-seeking children and adolescents with musculoskeletal pain. N=100. All numbers equals percentages because of the total population of 100.

Psychosocial characteristics	
Pain outside school hours	97
Nervous	Often/sometimes: 34 Seldom/never: 66
Worried or anxious	Yes: 33, No: 32, I don't know: 35
Low self-esteem	Yes: 7, No: 78, I don't know: 15
Believe in God	Yes: 36, No: 35, I don't know: 29
Difficult to fall asleep because of pain	38
Tired during the day	57
With a job	33
Know the cause of pain	58
Expect the GP to prescribe pain medication	Yes: 8
Pain affects my concentration	58
Take pain medication for pain	33
Frequency of pain medication	Once/month: 13 Once/week: 12 More than once/week: 6 Every day 1
Know the name of pain medication, n=26	Paracetamol: 17 NSAID*: 1 Paracetamol and NSAID: 8
Physical characteristics	
Physical active besides school hours times/week, n=80**	1: 11 2-3: 39 4-6: 16 >6: 5
Screen time/other activities mostly sitting down outside school hours hours/day***	0: 2 1-2: 36 3-6: 49 >= 7: 7
Pain disturbs (separate questions):	a walk longer than 1 km: 70 my spare time activities: 88
Pain makes it difficult to (multi-choice):	stand in a queue for 10 min.: 36 carry my school bag to school 22 sit on a chair for a 45-min. lesson 31 bend down to put on my socks: 33 do sport activities at school 79 run fast to catch a bus: 67

Data in Table 2 are based on 97%-100% replies; question concerning screen time had the lowest reply percentage.

*NSAID: non-steroidal anti-inflammatory drug. **incl. one answer to; sometimes once other times 3, 1-2 times, 1-3 times, and 4-7 times, two answers 3-4 times, three answers: 3-5 times. Possible to answer No to this question, explaining the total percentage below 100%. ***one answer to; all the time, many times, 1-2

times, and 1,5 times. Three answers: 2-3 times. Possible to answer No to this question, explaining the total percentage below 100%.

Figure 1 highlights the difference in participants with activity limiting pain from those with non-activity limiting pain, by pain regions, with knee pain being the most frequent region of both. Figure 2 visualizes the common characteristics of a typical Danish child or adolescent with MSK pain, including demographics, physical activity, family pattern and pain impact on school.

Discussion

Main findings

Knee and ankle pain were the two most common activity-limiting pain regions among a care-seeking population of adolescents with MSK pain in general practice. Fifty three percent experienced multi-site pain and 13% used pain killers a least once a month. The median pain duration was 5 months and a range of different functional and social limitations due to pain were reported.

Findings in relation to existing literature

Previous research from UK revealed that 8% of an adolescent population seek care from their GP due to MSK conditions each year (1). It has so far been unknown how large an impact there is among this population seeking primary care. Previous research has been conducted in secondary care populations or in school-based populations. These studies have generally observed a longer duration of pain complaints (often >12 months) (8) and a high proportion which have earlier been in contact with the health care practitioner (27). The proportion experiencing multi-site pain was also lower compared with previous studies (28) suggesting they contact general practice early in the pain development and acknowledges the commonality of multi-site pain among children and adolescents.

Early intervention has been proposed as a way to improve long-term outcomes due to duration of pain complaints, multi-site pain and psychological symptoms associated with a poor prognosis (8). The majority suffered from either back or knee pain which aligns with the findings from UK general practice (1) and school-based populations in Denmark (29).

The impact of pain

The Konijnenberg study (30) found approximately 50% school absence because of pain and even though we did not collect data on school absence, we found 22% with difficulties in carrying a school bag to school, 31% with difficulties sitting down for a 45-minute lesson, and 58% with affected concentration due to their pain. The most common causes for consultation in this study were limitation of habitual use of the body (64%), wanting the pain to stop (59%), and worry for the cause of pain (55%), which is similar to previous findings that a high pain intensity and activity limiting MSK pain are important drivers for care-seeking among adolescents (31, 32).

Explanation of findings

We underline the need to consider psychological and social factors, especially since female sex (55%), pain duration more than one year (24%), feeling anxious (33%), daytime tiredness (57%), above 6 non-school hours of sitting down/day (7%), smoking (2%), and alcohol consumption more than once a month (14%) previously have been shown as strong prognostic factors for long term pain (8). Co-occurring pain, psychological, and social factors and how to manage them in general practice should be considered treatment-targets and we recommend questioning any recent happenings in the family or surroundings, that could potentially have an impact on the child since there is a lack of knowledge on the effect of these modifiable risk factors.

Care-seeking behaviour

Care-seeking behavior for back pain has been uncommon in children, and in a lesser extent among adolescents when compared to the prevalence of back pain, 6% vs. 33% (children) and 34% vs. 48% (adolescents) (33). This could indicate that years of pain duration or pain among adolescents vs. children push for a consultation rather than a wait and see approach.

Previous research describes that 50-65% of children and adolescents had MSK pain 1-4 years after initial onset whereas 14% of our population reported a pain duration of one year prior to the current consultation. Both numbers call for clinical implications, since the waiting period with MSK pain can push toward a more progressive investigation by the GP, since the pain hasn't ceased, yet. The GPs commonly prescribe a wait and see treatment for MSK pain (34, 35).

Implications for practice and future research

These results underline the bio-psycho-social impact of MSK pain in care-seeking children and adolescents. Importantly, the results reveals the wide-reaching impact such as problems carrying their back pack, problems with concentration due to pain and negative impact on leisure time activities. MSK pain in adolescents was once considered a benign self-limiting condition with limited impact beside the actual pain experience. These results underline that GPs needs to be cognizant of the widespread impact and challenges these young individual's experience.

Strengths and limitations of the study

Our study data was drawn from a nationwide cohort, representative of the Danish population in age, sex, and environment (Table 1, Table 2, Supplementary file 1). We used validated questions when possible and included pilots to ensure that children and adolescents comprehended the questions. Due to the commonality of pain, we collected data on pain that affected their typical activities and otherwise pain. This distinction is important and ensure we can separate pain from pain that have an impact on the individual. Self-report measures of pain and other factors may be affected by recall bias. To limit this effect, we used a short recall period of two weeks. Due to the small number of adolescents included, we did not stratify pain characteristics or pain impact into specific body regions. We did not collect data on

NSAID intake for specifically MSK pain and are not able to exclude dysmenorrhea as a common pain condition among menstruating female adolescents.

Conclusion

Two thirds of children and adolescents consult their GP because of limitations in the habitual use of their body caused by pain. One third of children and adolescents are nervous or worried/anxious and above half are affected in their ability to concentrate due to pain. These findings and other bio-psycho-social factors are important in addressing children and adolescents with musculoskeletal pain as they represent co-occurring conditions.

Abbreviations

GP, general practitioner

MSK, musculoskeletal

Declarations

Ethics approval and consent to participate

The ChiBPS study was pre-registered before recruitment (ClinicalTrials.gov Identifier: NCT03678922) and submitted to The Committee of Multipractice Studies in General Practice receiving approval prior to initiation (ID: MPU 20-2017/date 100117). The Ethics Committee of the North Denmark Region/The National Ethics Committee (NVK) waived ethical approval of the ChiBPS cohort study necessary due to the nature of the study. The STROBE checklist for cross-sectional studies was used in the reporting of the study (9).

Once the GPs were informed of the study at time of recruitment visits and decision was made to participate, statement of consent and data processor agreements were signed and the clinics were compensated for their part as intermediaries of contact to the children and adolescents, according to regulation §3 by the Danish Committee of Multipractice Studies in General Practice. Written informed consent was obtained from the adolescent (18–19 years old) or from the guardian of participants 8-17 years old. Participation in this study did not interfere with the consultation and care provided by the GP nor did it include an intervention.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used in the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

NP wrote the first draft of the manuscript, MSR helped with the final write-up and all other authors commented on this draft and contributed to, and improved the manuscript with critical review of the content. All authors read and approved the final manuscript.

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Figures

Activity limiting pain, Non-activity limiting pain

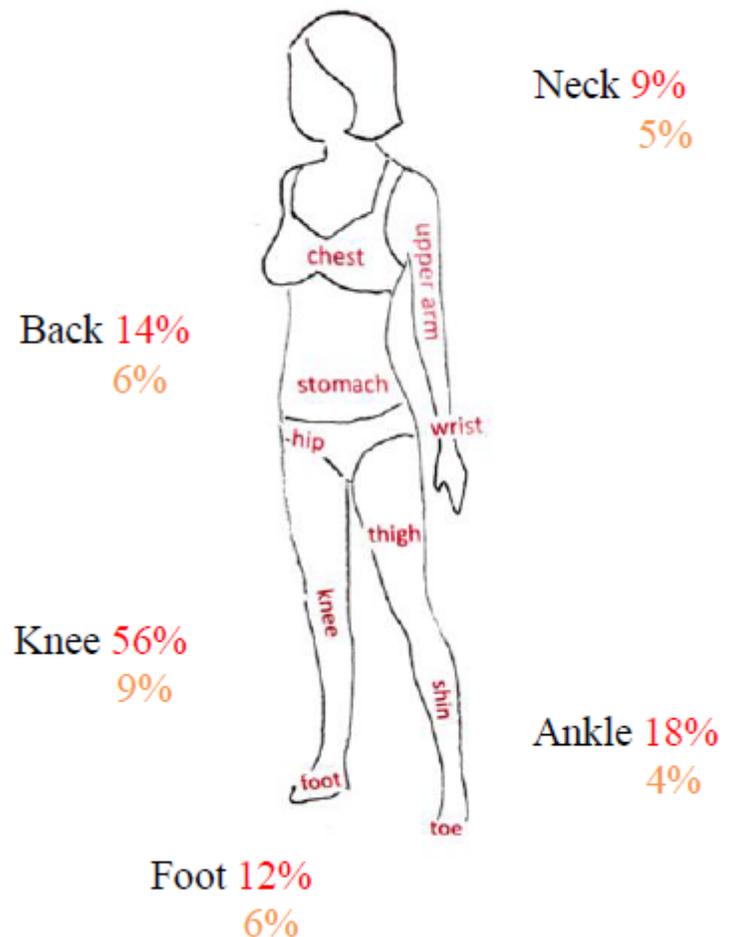


Figure 1

Differentiating between activity limiting and non-activity limiting pain regions. The data depicts participants with the most frequent pain regions, stratified as activity and non-activity limiting pain. Data based on all participants, n= 100 and the mannequin as used in the questionnaires. Both activity limiting and non-activity limiting pain – multi-choice questions. One participants experienced activity limiting right sided knee pain and non-activity limiting left sided knee pain.



Figure 2

Common characteristics of a GP care-seeking 8-19-year old with musculoskeletal pain. A short story about a young girl with pain. A typical Danish child or adolescent with musculoskeletal pain is a 12 or 13 year-old girl. She has pain in her knee and in at least one more body part. She visits her general practitioner because she can't use her body as usual due to pain and she decides to do so after having had pain for one year with pain episodes occurring as frequently as once every week. In her household she is the youngest of two children. In school her concentration is affected by her pain, and she goes on with her day feeling tired, but after school she is active in sports 2-3 times a week, even though her pain disturbs her spare time activities. During a typical day, she spends 3-6 hours looking at a screen. She believes in God. When her day is over, and it is time for her to turn in she goes to bed knowing what causes her pain. Data is based on all participants, n=100 including both activity limiting and non-activity limiting pain. Cut off limit is defined at a minimum of 31% of all participants for inclusion of the characteristics included in this figure.

Supplementary Files

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- [Appendix1.pdf](#)
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