Patterns and seasonality in pediatric referrals for functional somatic symptoms

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ABSTRACT

Functional somatic symptoms (FSS), or medically unexplained physical symptoms, are common in children and it has been suggested that the incidence is increasing. To determine the incidence and pattern of referrals for FSS to pediatricians, we performed a retrospective analysis including newly referred pediatric patients to our secondary pediatric practice in Zwolle, The Netherlands, ultimately diagnosed with FSS between 2013 and 2018. FSS was defined as functional abdominal pain, chronic fatigue, chronic musculoskeletal pain and chronic headache without an underlying medical diagnosis. In the 6-year period, 10.4% of elective referrals were related to FSS without a significant upward trend. We found clear seasonal variation with peaks in incidences in March (+31%) and November (+21%) and a nadir around August (−48%). In conclusion, FSS account for 1 in 10 non-acute pediatric referrals, without an increase in incidence in the past 6 years. The seasonal pattern is remarkable and warrants further analysis.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Functional somatic symptoms (FSS) are common among both adults and children with varying prevalences of 14.6%–25%.
⇒ Well-known symptoms are chronic headache, abdominal pain, chronic fatigue and chronic muscoskeletal pain.

WHAT THIS STUDY ADDS

⇒ One in 10 non-acute referrals to pediatricians are related to FSS without a significant upward trend.
⇒ Referrals for pediatric FSS show clear seasonal variation with peaks in incidences in March and November and a nadir in August.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ It is interesting to further investigate the effect of preventive measures in schools such as spreading exam periods, or paying attention to FSS at school during 'body and mind' lessons aiming to increasing mental resilience and reduce stress in schools.

INTRODUCTION

Functional somatic complaints or symptoms (FSS), also referred to as medically unexplained physical symptoms, are defined as persistent physical symptoms with impairment in daily functioning for which adequate medical examination has not revealed a condition that adequately explains the condition.[1 2] Known FFS clusters in children are chronic headache, abdominal pain, chronic fatigue and chronic musculoskeletal pain. Symptoms such as dysfunctional breathing or autonomic symptoms such as dizziness are categorized as a remainder group.

FSS are common among both adults and children, with prevalences of 14.6%–25%, varying according to definitions, ages and populations.[1 3] Anecdotal experiences of pediatricians suggests that the amount of referrals for functional complaints seems to be increasing in recent years.[4 5] Earlier, we found that 5.7% of pediatric diagnosis in our secondary pediatric clinic was related to FFS with a remarkable seasonal variation.[6] More recently, comparable seasonality was shown in a pediatric population in the USA, suggesting a possible association with school-related stress.[7] A potential association between predictable seasonal school-related stress, for example, exam periods, and FSS would impose interesting possibilities for preventive measures.

In this study, we aimed to assess the incidence and characteristics of referrals for FFS in pediatric patients in a secondary hospital, with special attention to the occurrence of seasonal variation and further exploration within the specific pediatric FSS clusters and differences between different age groups.

MATERIALS AND METHODS

This retrospective study was carried out at the pediatric outpatient clinic of Isala, a large, secondary, teaching hospital in Zwolle, The Netherlands. The pediatric outpatient clinic yearly receives around 4000 new non-acute or elective referrals from general practitioners or a children's healthcare center that children in the Netherlands go to for regular developmental, well-child visits. Using the national registration for reimbursement purposes based on the International Classification of Diseases 10th revision system ('Diagnosis Treatment Combinaton'

(DBC)), we searched for patients under 18 years of age referred for functional complaints in the 6-year period from 1 January 2013 to 31 December 2018. We searched for the diagnoses: 'functional complaints', 'irritable bowel syndrome', 'abdominal pain, chronic recurrent', 'headache (non-migrainic)', 'myalgia/arthralgia', 'malaise/fatigue e.c.i.' and 'chronic fatigue syndrome'. Patients could only be included once and although some FSS clusters may overlap, we chose to classify patients according to the most prominent complaint or symptom as decided by the treating physician depicted by the DBC registration.

Since the DBC registration was developed for financial reimbursement purpose and not for quality assessment, we validated these data by hand-checking approximately half of the patient files whether the DBC diagnosis was correct. Furthermore, we prospectively recorded all newly referred non-acute pediatric patients to our pediatric outpatient clinic during a 4-month period (August through November 2019) to compare the incidences of referrals for FSS with the retrospectively collected data. The inter-rater reliability, of the assessment whether the diagnosis of FSS was applicable, was assessed by an independent review of a sample of 66 patient files by two pediatricians and the researcher (medical student) by calculating the Kappa value.

Statistical analysis

Seasonal variation of functional complaints was evaluated in four ways. First, by use of the SEM, which was calculated using the formula: $\sigma/\sqrt{N}$, where σ is the SD of the mean number of patients with FSS per month and N is the number of months in the study period (n=72). A SEM ≥0.20 was defined as seasonal variation.[6] Second, we calculated the monthly deviation in the number of referrals, as the average number of patients with FFS per specific month over the 6-year period (eg, January 2013+January 2014+January 2015, etc/6) as a percentage of the average monthly number of all non-acute referrals irrespective of the diagnosis). Third, we used the cumulative distribution function to assess the probability that the monthly number of referrals was less than the mean monthly number of referrals. Finally, the '3-month simple moving average' was used, by plotting the average number of referred patients with FSS per 3 months. This 3-month simple moving average facilitates the recognition of a possible trend over time since it is less influenced by small variations.[8]

To investigate a possible influence of the department's capacity (due to holidays, etc) on the referral pattern, we analyzed the time between referral and the scheduled visit to the outpatient clinic: Pearson's correlation coefficient for the linear association between the percentage deviation from the monthly average referral time and the monthly percentual deviation in the number of referrals.

To assess the association between age and the seasonal pattern, we calculated the SEM separately for different age groups (preschool 0–4 years, primary school 5–11 years and secondary school 12–17 years).

We used SPSS V.26 for data analysis.

RESULTS

In the 6-year study period, a total of 52,777 pediatric patients under 18 years of age were treated in our pediatric clinic: 12,478 newborns (24%), 16,372 acute patients (31%) and 23,927 elective, non-acute referrals (45%). A total of 2478 referrals concerned new patients referred to our pediatric outpatient clinic with FSS, 10.4% of all elective referrals. Within the group of 2478 referrals for functional complaints, the patient group with functional abdominal pain was the largest with 1198 patients (48.3%), followed by headache (n=646, 26.1%), chronic fatigue (n=449, 18.1%) and musculoskeletal pain (n=185, 7.5%).

The referred numbers of patients with functional complaints did not significantly change absolutely nor relatively as a percentage of all non-acute referrals over the years: there was no significant upward trend with time in the total number of referrals with functional complaints, nor in any of the four subcategories, except for the subcategory abdominal pain (slight increase in incidence, p=0.043, figure 1).

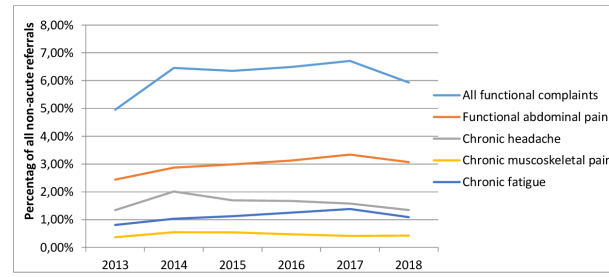

Figure 1 Non-acute referrals for functional symptomatic symptoms as a percentage of all non-acute referrals to our second-line pediatric outpatient clinic. χ^2 for trend: all functional complaints p=0.148, functional abdominal pain p=0.043, headache p=0.706, musculoskeletal pain p=0.981, fatigue p=0.077.

Validation of the data

We selected a random sample of 1050 patients (42.4%) with FSS found via the DBC registrations. By reading the content of the physician's notes in the electronic patient files we checked the diagnosis, showing that 4.8% of files selected by DBC registration were not functional complaints.

From 1 August 2019 to 30 November 2019, data of 1121 new electively referred patients were prospectively collected, showing that 13.7% were diagnosed with FSS.

Since the diagnosis FSS may show interobserver variation, the electronic patients files of 66 newly referred non-acute patients were also independently assessed by two pediatricians with more than five experience in social pediatrics, during 1 week, showing moderate agreement (kappa=0.57). In nine (13.6%) patients, the pediatricians interpreted the complaints as FSS, where the investigator had interpreted them as other complaints.

Seasonal variation

Mean monthly number of referrals for all FSS was 34 (SD 5.7; 95% CI 31.6 to 36.4, n=2478), for functional abdominal pain 17 (SD 5.7; 95% CI 15.7 to 18.3), for chronic headache 9 (SD 3.7; 95% CI 8.1 to 9.9, n=1198), for chronic muskuloskeletal pain 3 (SD 1.7; 95% CI 2.6 to 3.4, n=646) and for chronic fatigue 6 (SD 3.0; 95% CI 5.3 to 6.7, n=449). Seasonal variation (SEM ≥0.20) was present

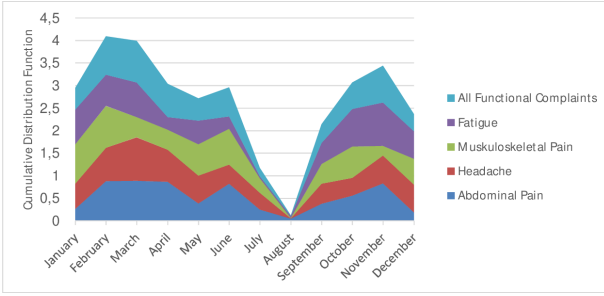

Figure 2 Seasonal variation in referrals for functional symptomatic symptoms in children.

for all referrals concerning FSS (SEM 1.19) including all four subcategories: functional abdominal pain (SEM 0.67), chronic headache (0.46), chronic musculoskeletal pain (0.20) and chronic fatigue (0.35). We identified peak incidences in March (+31%) and November (+21%), and a nadir during summer in August (−48%). This pattern was notable in all subcategories except for 'chronic pain in the musculoskeletal system'. The same seasonal pattern with an evident nadir in August can be seen when plotting the cumulative distribution function (figure 2). Again, the 3-month simple moving average shows clear seasonal variation in referrals for FSS over the 6-year study period (figure 3).

In order to exclude that the seasonal variation was related to changes in outpatient clinic capacity, the time between referral by the general pediatrician and the first contact at the pediatric outpatient clinic visit was examined in a random sample of 720 patients (10 patients per month during the study period). Significant seasonal variation was seen in the time between referral and first contact (mean referral time 17.6 days, SD 14.2, 95% CI 15.1 to 20.1, SEM 1.29) according to our criterion (SEM ≥0.20). However, the graph representing the monthly variation in mean time between referral and appointment and the pediatric outpatient clinic did not exhibit any significant relation between referral time and seasonal variation of FSS (see online supplemental file), nor significant correlations, except for musculoskeletal pain (all FSS R −0.128, p=0.693; abdominal pain R −0.101, p=0.755; headache R −0.093, p=0.774; musculoskeletal pain R −0.644, p=0.024 and fatigue R –0.246, p=0.440).

Association with age

To assess an association of age and the seasonal pattern, we calculated the SEM separately for different age groups (preschool 0–4 years, primary school 5–11 years and secondary school 12–17 years). We found lower monthly variation as depicted by the SEM in the preschool children (SEM 0.10, n=48) compared with the older age groups (5–11 years: SEM 0.69, n=1067; ≥12 years: SEM 0.70, n=1363).

DISCUSSION

Summary of results

In this study, we found that at least 1 in 10 non-acute pediatric referrals is related to FSS. We found no increasing trend during the 6-year period included in this study. However, seasonal variation was remarkable, with peaks around March (+31%) and November (+21%) and a nadir around August (−48%). These numbers are comparable to numbers reported earlier in the sparsely available literature on this topic.[1 3 4] Our numbers are probably an underestimation of the true numbers, since we found increased incidences when experienced pediatrician assessed the patient files.

We found no association between monthly referral time and number of referrals except for muskuloskeletal pain showing a positive correlation. This implies that when the waiting time was longer, more new referrals for abdominal pain were scheduled, while one would expect the opposite association in case of a longer referral or waiting time. Thus, a possible influence of delay in time from referral to first-time visit at the outpatient clinic due to variation in capacity was excluded. As seasonal variation cannot be explained by a longer access time in the summer period, our hypothesis is that functional complaints occur more often around busy and stressful periods at school and less during holidays.[7 9] This hypothesis was supported by the finding that seasonality was less prominent in preschool children.

Comparison with the literature

Seasonal variation of functional complaints was already found in an earlier study in our hospital and confirmed in an US population.[6 7] A lack of social support is associated with the persistence of FSS and children with FSS seem to be less able to cope with daily stress.[9] Dutch children experience increasing pressure at school which could potentially result in more FSS.[10 11]

Strengths and limitations

The main strength of our study is that it is unprecedented, involving large numbers of patients over a longer period in a general secondary pediatric setting. The most important weakness is the use of a diagnosis registration system intended for financial registrations and not for diagnostic

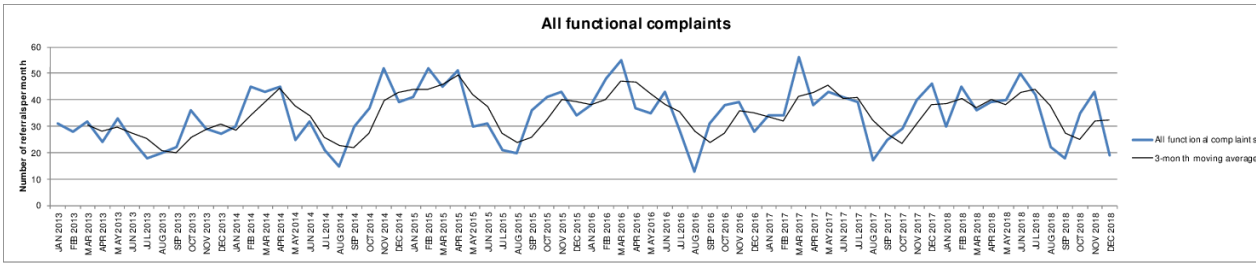

Figure 3 Three-month simple moving average of referrals for functional symptomatic symptoms in children over a 6-year period.

registrations. This is evident from the discrepancies found by taking samples in various ways, suggesting the possibility of underestimating the number of patients with FSS. Nevertheless, we believe that the estimation of the incidence and seasonality of functional complaints in a secondary hospital was reasonably reliable. Another weakness is the evident interassessor variation in diagnosing a clinical presentation as FSS, as was depicted by Cohen's kappa of 0.56 during the assessment of interobserver agreement between experienced pediatricians and the researcher.

Furthermore, these numbers are representative for the Dutch situation, therefore generalizability to other nations may be hampered due to differences in the healthcare organization. In the Netherlands, consultation with a pediatrician is only possible after referral by a general practitioner or youth healthcare specialist.

Consequences for practice and further research

It is interesting to further investigate the effect of preventive measures in schools such as spreading exam periods, or paying attention to FSS at school during 'body and mind' lessons aiming to increase mental resilience and reduce stress in schools. Furthermore, we consider it important to draw attention to FSS and the seasonal variation to all stakeholders concerned with FSS in children.

CONCLUSION

Functional complaints account for over 10% of the pediatrician's non-acute outpatient care with constant incidences and are therefore an important topic. There has been no increasing prevalence of functional complaints in our hospital over the past 6 years. However, clear seasonal variation exists with peaks around March and November and a nadir around August.

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Contributors The manuscript has been read and approved by all authors, and all authors have contributed to preparing the manuscript. PdB performed data analysis, interpreted data and wrote the initial version of the report. JB supervised data analysis and edited the report. PdB and JB designed the study and had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. DB, JvD and BW contributed to the study design and reviewed the report. JB is responsible for the overall content as guarantor.

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