The Confidence of Pediatric Trainees in Performing Musculoskeletal Screening Examination in Children in the Emirate of Abu Dhabi

Rami Raad Al Ani1*, Mustafa Al Maini2 and Khulood Khawaja2

1Department of Pediatrics, Al Mafraq Hospital, Abu Dhabi, United Arab Emirates
2Department of Rheumatology, Al Mafraq Hospital, Abu Dhabi, United Arab Emirates

*Corresponding Author: Rami Raad Al Ani, Department of Pediatrics, Al Mafraq Hospital, Abu Dhabi, United Arab Emirates.

Received: August 31, 2017; Published: September 21, 2017

Abstract

Background: Pediatric residents have limited training in musculoskeletal (MSK) screening examination. This causes delay in identifying red flags that warrant referral to pediatric rheumatology. This study assessed the confidence of pediatric residents in two public teaching hospitals: Al-Mafraq Hospital (AMH) and Sheikh Khalifah Medical City (SKMC) in performing (MSK) examination. It also improved their performance by teaching them to follow a screening examination; pGALS (pediatric Gait, Arms, Legs, Spine) using video and tutor demonstration. This is a simple and reliable tool for MSK assessment, which facilitates early recognition and prompt referral.

Methods: Pediatric residents anonymously answered a survey assessing their confidence in performing musculoskeletal examination. They were then offered training by a pediatric rheumatologist with video demonstration of pGALS and a practice period. Three months later, the survey was repeated. Our primary outcome was to improve the residents’ confidence in musculoskeletal examination. The secondary outcome was to increase identification of pathology.

Results: Thirty-four residents in both hospitals completed the initial survey and attended the session, 29 of them completed the follow up survey. Fifty percent of residents reported having to perform musculoskeletal examination at least once a month. Only 38% of them reported being comfortable performing it prior to the tutorial. Seventy-four percent of residents evaluated themselves at six out of ten or less in their musculoskeletal examination skills with a mean of 4.5 out of 10 indicating low level of confidence. Thirty-three residents had no systematic approach to their musculoskeletal screening. After the tutorial, all residents were using pGALS for screening and that increased confidence as 72% of residents evaluated themselves at six out of ten with a mean of 6.72 out of 10. The training has given an improvement in the resident’s mean score of 22% (p value= 0.000153). Seventeen percent of the residents reported identifying pathologies using pGALS.

Conclusions: Our numbers are small but the surveys confirmed the lack of confidence in musculoskeletal examination amongst pediatric residents. Teaching the residents pGALS increased their confidence and ability to identify pathologies. PGALS should be integral to pediatric residents’ training.

Keywords: pGALS; Pediatric Trainees; Confidence; Musculoskeletal Examination; Abu Dhabi

Abbreviations

ACR: American College of Rheumatology; PGALS: Pediatric Gait, Arms, Legs and Spine; ILAR: International League of Associations for Rheumatology; JIA: Juvenile Idiopathic Arthritis; MSK: Musculoskeletal System; SKMC: Sheikh Khalifa Medical City; UAE: United Arab Emirates

Introduction

Musculoskeletal complaints in pediatrics are very common, constituting around 18% of symptoms presenting to the emergency department [1]. The differential diagnosis ranges from serious illnesses requiring emergent intervention to normal variants needing only reassurance given to the family. The main distinguishing factor is a proper musculoskeletal examination.

Pediatric residents, unfortunately, have very limited exposure to training and experience in musculoskeletal examination. Pediatric rheumatology rotation constitutes the only four weeks in which residents receive training and are supervised by an expert in the field. This is not a specific issue to residents in Al Mafraq or Sheikh Khalifa Medical City alone, pediatric residents in University of Texas and Baylor college of medicine were assessed for performance in musculoskeletal examination and performance was found to be generally poor among all levels assessed [2]. Another study, done in Children’s hospital of Eastern Ontario and University of Ottawa found that most pediatric residents were not comfortable performing musculoskeletal examination and only about 10 - 15% of them overestimated their skills indicating that their confidence levels are not high in performing the examination [3].

A simple solution to such issue would be for residents in training to learn and perform a validated standardized screening tool for children so as not to miss serious pathology. The knowledge that performing such screening would make them be able to detect red flags and hence translate to earlier referrals and access to care which would improve outcome.

Pediatric Gait, Arms, Legs and Spine (pGALS) examination is a standardized screening tool for school aged children that can be used to detect red flags in those children and either to refer them or further examine them and investigate for the presence of serious pathology. It includes general examination of the musculoskeletal system and takes about 2 minutes to perform. By using this tool with its three questions and simple steps in physical examination, pediatric residents would be almost certain not to miss pathologies that would warrant investigations and referrals.

The screening examination has been validated and extensively studied. Research done in the University of Newcastle found pGALS to have excellent sensitivity and specificity when tested compared with examination by expert pediatric rheumatologists and the median time to finish the screening examination was found to be 2 minutes. Acceptability among children and their parents was also surveyed and found pGALS to be well accepted [4].

Aims

The aim of our study is to assess the confidence level pediatric residents in two tertiary care hospitals in the capital city of Abu Dhabi, Al Mafraq hospital and Sheikh Khalifa Medical City, have in performing musculoskeletal examination by allowing them to evaluate themselves by filling self-assessment questionnaires independently and anonymously. We then aimed to improve their performance by providing them with a training session, with video demonstration as well as hands on training, on following a recognized system for screening tool. Following a unified system in examination will help improve the skill and increase the level of confidence among residents in performing musculoskeletal examination. Two months after the initial survey and training tutorial, pediatric residents from both hospitals were asked to answer another survey assessing their use of the screening examination as well as to find out if the training session and the use of pGALS has increased their confidence or not.

Methods

Pediatric residents from two tertiary hospitals, Al Mafraq and Sheikh Khalifa Medical City, were asked to fill out a survey. The surveys were distributed to the residents during the academic half day in both hospitals to ensure maximum number of participation and residents were asked to answer the surveys in their own time, individually and anonymously. The surveys were then returned to us via the chief residents and the program coordinators without any designations to the papers by the answering residents.

The initial surveys contained five questions asking the residents to report the frequency with which they encounter musculoskeletal complaints, assessing their confidence in performing musculoskeletal examination on their patients and asking them to assess their skills on a scale out of ten in performing musculoskeletal examination. The survey then asks the residents to specify a system or an approach they use in performing their examination.

After the initial survey, a teaching tutorial was provided to pediatric residents in both Al Mafraq and Sheikh Khalifa Medical City as part of the schedule for the academic day. The lecture was given by the pediatric rheumatologist and involved a video tutorial of the exact steps of pGALS as well as hands on demonstration using one of the residents as a patient. Some of the residents were then asked to perform the screening to be corrected. The tutorial lasted about one hour and followed the same format and was given by the same pediatric rheumatologist to residents of both hospitals to ensure uniformity. The residents were then encouraged to use pGALS in their examinations and encounters with school aged children older than 5 years of age.

Two months after the initial survey and the tutorial session, pediatric residents were asked to answer a follow up survey in the same anonymous manner as the initial one. The surveys were also handed during the academic day and collected later via the chief residents and program coordinators without the conductors of the study knowing to whom any of the answered papers belonged to.

The follow up survey contained five questions where residents were asked to evaluate whether the tutorial was beneficial or not. The survey then asked the residents how often they used pGALS in that period, whether they document their findings using the pGALS format in their notes and again assess their skills on a score out of 10 to see if the use of pGALS has enhanced their self-assessment and hence their confidence in their own performance. A final question was included in the survey to see if they have uncovered any pathologies or red flags in the time they have been using the screening exam.

Results

Thirty-four out of total of 45 residents (75%) from both hospitals completed the initial survey and attended the session, 29 of them (85%) completed the follow up survey. Both junior and senior residents participated so the group was diverse spanning all four years of residency.

Seventeen (50%) of residents reported having to perform MSK examination at least once a month while only 13 (38%) of them reported being comfortable performing it prior to the tutorial.

Out of the 34 Pediatric residents, 25 (73%) gave themselves an evaluation of 6 out of ten or less with a mean initial evaluation of 4.5 out of 10 indicating the low level of confidence residents have in their performance in musculoskeletal examination.

Thirty three out of the 34 residents had no system to their examination of the musculoskeletal system. Only one resident out of the group reported using pGALS in their answer.

After the tutorial and practice period, follow up survey showed that all residents were able to report a system (pGALS) they knew to use for paediatric MSK screening examination. Twenty-five (73%) residents were using pGALS routinely as their screening examination and that resulted in increase in confidence as 72% of residents gave themselves 6 out of 10 or higher in their examination skills with a mean of 6.72 out of ten. The tutorial has given an improvement in the resident’s mean score of 22% (p value = 0.000153).

The p value and hence the significance of the above results was assessed by using the unpaired t test for two independent groups as the group answering the initial and follow up survey were not matched. The number of sample was found to be good enough to ensure normal distribution and hence the use of the t test. This was confirmed by calculating the significance using the Whitney Mannney test for non-normalized sample and obtaining a significant z-score indicating normality.
The effect size for our intervention has been calculated between the two means using the Glass’ Delta method as the two groups had different standard deviations and showed an effect size of 0.46. This effect size indicates that the average score of a resident after the tutorial would be higher than 66-69% of residents before the tutorial.

Finally, 5 (17%) residents of the participating residents reported uncovering pathologies using pGALS that warranted further evaluation.

Discussion

This study documented self-rated confidence in pediatric MSK clinical skills in trainees in pediatrics in the capital city (Abu Dhabi) of the United Arab Emirates (UAE). We have shown that our pediatric trainees had no specific system to use in their screening examination of the musculoskeletal system. We have also shown low self-rated confidence amongst our trainees. Following the training session and two months of practice, all residents reported being aware of a system to use for the pediatric MSK screening examination. Confidence improved and five residents were able to pick up pathology in their screening examination. The results of this study support previous documented literature of poor performance of pediatric MSK assessment in routine clinical practice amongst trainees in general pediatrics [5].

The reason for poor confidence in pediatric MSK is likely to be multifactorial. The teaching of pediatric MSK is not core in our medical schools. The teaching is delivered by general pediatricians who themselves are not confident in pediatric MSK and may have not had appropriate training in pediatric MSK.

Our numbers are small but important to highlight an important gap in pediatric MSK training in the UAE. We acknowledge that our data collection and anonymous responses would have incurred bias but the improved confidence and pick up of pathology following the use of pGALS proves important. MSK presentations are common in pediatrics. Acquiring the appropriate skills to screen the musculoskeletal system is important for all pediatric trainees. Teaching of the pediatric MSK should have similar precedence to other systems.

Core clinical skills start at undergraduate level and continue to develop through post graduate training. We know that children are not "small adults" and the teaching of adult MSK cannot be extrapolated to children. A different approach is required with children. Adult MSK is taught in medical schools in the UAE but not children. PGALS is a good tool to be introduced to our medical schools. It taught to pediatric trainees, family and emergency doctors as they see children routinely presenting with musculoskeletal problems [6-13].

Conclusions and Recommendations

Our surveys confirmed that even though musculoskeletal complaints are common and pediatric residents have to deal with them frequently, most of them feel uncomfortable and lack the confidence in their examination skills to pick up pathologies. Teaching the residents pGALS dramatically increased their confidence in their skills as well as helped some of them in picking up pathologies guaranteeing prompt diagnosis and management.

We plan to continue with teaching batches of residents pGALS and emphasize the importance of following a system in screening for musculoskeletal abnormalities. Our next project will be auditing the documentation of pGALS in the patients’ medical records. A reassessment of the number of referrals and comparing those with the period when pGALS was not so heavily implemented will give us an idea of the direct implication our work has done to patient care. We are delighted that the Royal College of Paediatric and Child Health (UK) has implemented pGALS as the standard screening musculoskeletal examination in their clinical exam and so we would recommend other centers give more attention to making sure pediatric residents follow a system in their screening for musculoskeletal pathologies and incorporate pGALS in their training curriculum.

Acknowledgments

We thank all of the residents who contributed to the questionnaire and allowing us to use this data.

The Confidence of Pediatric Trainees in Performing Musculoskeletal Screening Examination in Children in the Emirate of Abu Dhabi

Funding
The authors declare they have not received any funding for this study.

Availability of Data and Materials
All data included in the manuscript are available upon request.

Authors’ Contributions
RA, KK and MM: design of study, data collection, analysis of results, drafting the manuscript, editing the manuscript. All authors read and approved the final manuscript.

Competing Interests
The authors declare they have no competing interests.

Consent for Publication
Consent for Publication

Annex 1
Result Tables
Total Initial Survey
Q1 Results

<table>
<thead>
<tr>
<th>More than once a week</th>
<th>Once a week to once a month</th>
<th>Less than once a month</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>15</td>
<td>17</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 1

Q2 Results

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>21</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 2

Q3 Results

<table>
<thead>
<tr>
<th>0/10</th>
<th>1/10</th>
<th>3/10</th>
<th>4/10</th>
<th>5/10</th>
<th>6/10</th>
<th>7/10</th>
<th>8/10</th>
<th>9/10</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>11</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 3

Q4 Results

<table>
<thead>
<tr>
<th>No answer</th>
<th>Don't know</th>
<th>Description of movement no system</th>
<th>pGALS</th>
<th>GALT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>7</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 4

Q5 Results

<table>
<thead>
<tr>
<th>No answer</th>
<th>Don't know</th>
<th>Description of movement no system</th>
<th>GALT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 5

Total Follow up results

Q1 Results

<table>
<thead>
<tr>
<th>Very</th>
<th>Somewhat</th>
<th>Not beneficial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>12</td>
<td>3</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 1

Q2 Results

<table>
<thead>
<tr>
<th>Every time</th>
<th>Most times</th>
<th>A few times</th>
<th>None</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>13</td>
<td>8</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 2

Q3 Results

<table>
<thead>
<tr>
<th>Every time</th>
<th>Most times</th>
<th>A few times</th>
<th>None</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>11</td>
<td>15</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 3

Q4 Results

<table>
<thead>
<tr>
<th>0/10</th>
<th>3/10</th>
<th>5/10</th>
<th>6/10</th>
<th>7/10</th>
<th>8/10</th>
<th>9/10</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 4

Q5 Results

<table>
<thead>
<tr>
<th>n/a</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>13</td>
<td>5</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 5


Figure 1
Annex 3: Survey Images.

Figure 2

Bibliography


The Confidence of Pediatric Trainees in Performing Musculoskeletal Screening Examination in Children in the Emirate of Abu Dhabi


Volume 7 Issue 6 September 2017
© All rights reserved by Rami Raad Al Ani., et al.