

Paediatric Physiotherapists attitudes on the implementation of the CPIP-UK hip surveillance programme in clinical practice.

Amie Neal BSc MSc MCSP
Senior Paediatric Physiotherapist, Sandwell and West Birmingham NHS Trust

Jodie Bryant
Senior Lecturer, Birmingham City University

*Corresponding author: amie.neal1@nhs.net

ABSTRACT

Aim

The aim of this study is to assess paediatric physiotherapists attitudes on the implementation of the CPIP-UK hip surveillance programme in clinical practice.

Method

An online survey was used to collect mixed methods data. The survey was distributed by the Association of Paediatric Chartered Physiotherapists (APCP) to HCPC registered paediatric physiotherapists. Responses to closed questions were analysed using descriptive statistics, and open-ended responses through qualitative inductive thematic analysis to identify themes.

Results

A total of 84 HCPC registered paediatric physiotherapists using the CPIP-UK hip surveillance programme, from 12 different regions throughout the UK completed the online survey. 87% (n=73) of respondents reported they had received direct CPIP-UK training and 43% (n=36) of respondents felt fairly confident to complete the CPIP assessment. Nine main themes emerged through thematic analysis of the qualitative data. These themes were categorised into two: facilitators and barriers to implementing the CPIP-UK hip surveillance programme in clinical practice:

Facilitators: (1) CPIP-UK is an evidence based standardised assessment; (2) The assessment provides regular contact with the children; (3) CPIP-UK provides a system for team working; (4) Parent engagement is reinforced.
Barriers: (5) Limited resources including; staff, time, space and databases. (6) Reliability of the measurement when using goniometry. (7) The assessment is not holistic. (8) Parent and child compliance. (9) Limited support from the wider multi-disciplinary team.

Conclusion

This was the first study to look at paediatric physiotherapist's opinions on the implementation of the CPIP-UK hip surveillance programme. The facilitators and barriers identified will be transferable to clinical practice as they show opinions from across the UK.

Introduction

Cerebral Palsy (CP) is described as a group of movement disorders that affect the development of movement and posture (Rosenbaum et al, 2007). In children with CP the hip joint appears normal at birth, however the effects of delayed motor development and tonal asymmetry as the child grows can often lead to progressive displacement of the femoral head out of the acetabulum socket (Hägglund et al, 2007a). Spasticity and shortening of muscles around the hip joint along with reduced ambulation impact on the development and joint position of the femur. The risk of hip dislocation increases with a higher Gross Motor Function Classification System (GMFCS) level (Hägglund et al, 2007b). A five-year populational based study was completed by Kentish et al (2011) which showed hip dislocation in CP was preventable by patients receiving standardised physical and radiological assessments through a hip surveillance programme. A hip surveillance programme allows for early identification of hip displacement and timely intervention. In Sweden the Quality Registry for Children with Cerebral Palsy (Uppföljningsprogram för Cerebral Pares, CPUP) has shown the incidence of hip dislocation to significantly reduce due to the monitoring and prevention of progressive hip displacement through surveillance programmes and early intervention (Hägglund et al, 2007a). Research in Sweden has attracted international recognition and similar programmes have been introduced in Australia (Wynter et al, 2015), Norway (Elkamil et al, 2011), and Denmark (Rasmussen et al, 2016).

The Cerebral Palsy Integrated Pathway Scotland (CPIPS) has been implemented in Scotland and adopted throughout the UK since 2013. A recent study completed by Wordie et al (2020) has shown the hip surveillance in Scotland to be effective in reducing the prevalence of hip displacement by over half and dislocation almost by half in 2,155 children with CP who were registered in the surveillance programme. CPIPS provides a nationally agreed pathway protocol for standardised musculoskeletal examination for children with CP (Bugler et al, 2018). It is based on the best practice guidelines from Sweden and Australia, and meets standards of care recommended by the National Institute for Health and Care Excellence in the guideline for spasticity in children and young people (2012). The assessment involves a standardised clinical examination by two physiotherapists and a therapy assistant. Measurements of range of movement are measured by goniometry and scored on a traffic light system. A green value indicates 'normal' range, an amber measurement should prompt review of the child's management, and a red value requires onwards referral to orthopaedics. Children are then referred for hip x-rays as per the protocol every 6 or 12 months based on GMFCS. By using a standardised musculoskeletal examination tool, assessing tone, scoring mobility, and observing the spine, pain and the potential need for surgery can be identified early to prevent further irreversible damage which may impair motor function.

Whilst funding for the CPIP-UK programme has been secured and a national network made up of representative paediatric physiotherapists from each of the APCP Regions has been set up (APCP, 2016). There is currently no research into the attitudes of paediatric physiotherapists on the implementation of the CPIP-UK hip surveillance programme. There is also a need to address barriers to implementation, and the promotion of facilitating the hip surveillance programme.

The aims of this study are to assess paediatric physiotherapists attitudes on the barriers and facilitators to the implementation of the CPIP-UK hip surveillance programme in clinical practice.

Method

The study was approved by the Health, Education and Life Sciences Faculty Academic Ethics Committee at Birmingham City University.

A questionnaire was distributed via an online survey (appendix 1). The questionnaire had been peer reviewed and reviewed by two academic healthcare professionals. The questionnaire used a mixture of closed and open questions. Closed questions to gain quantitative responses about demographics, resources and training. Open questions to gain qualitative responses around experiences and opinions of the hip surveillance assessment tool.

Participants

The target population were Health and Care Professionals Council (HCPC) registered paediatric physiotherapists throughout the UK currently using the CPIP-UK hip surveillance programme. Invitations to participate in the research were distributed through the Association of Paediatric Chartered Physiotherapists (APCP) professional network of the Chartered Society of Physiotherapy and web link to the survey was posted on the author's Twitter page. The APCP has over 2,400 members, and is open to open to all physiotherapists, physiotherapy students, therapy support workers, and other healthcare professionals with an interest in paediatric physiotherapy. Before completing the survey, a consent form had to be completed whereby the participant was agreeing to complete the online survey, agreeing that the author could anonymise the responses, and giving consent for the responses to be shared with the wider healthcare community. All responses were voluntarily submitted and non-identifiable.

Data Collection

An online survey was conducted using a secure survey builder through Birmingham City University. The survey took approximately 20 minutes to complete and could be completed on any device that had internet access. The responses given were anonymous and retrieved only by the author. All responses were stored on a password protected laptop, and were coded upon submission to ensure anonymity. All responses were kept in line with current General Data Protection Regulations (GDPR) and Birmingham City University regulations. Data was collected over a 14-day period from 10th June 2019 to 24th June 2019.

Data Analysis

Quantitative responses were analysed using descriptive statistics presented in tables. This allowed data to be grouped into sections including demographics, training and accessibility of resources.

Qualitative responses were analysed through thematic analysis. Inductive thematic analysis was chosen as the most appropriate analytical method for the qualitative responses, through the ability to identify meanings across a dataset (Guest et al, 2011), with little or no structure or framework (Braun and Clarke, 2006). Inductive thematic analysis is particularly valuable when there has been little or no previous study in a specific area. Coding and analysis were completed using Braun and Clark's (2013) guidelines to thematic analysis.

Analysis continued until complete saturation of the data. The coded data was then triangulated with the support of the author's supervisor to develop a comprehensive understanding and to test validity through merging of information from a different perception (Carter et al, 2014).

The survey used mixed methods to collect quantitative and qualitative results. There is currently no established criteria or checklists for assessing the quality of mixed methods studies (Gerrish and Lathlean, 2015). Therefore, results are reported according to the CHERRIES quality Checklist for Reporting Results in Internet E-Surveys (Eysenbach, 2004). Quantitative results are reported first followed by qualitative results.

Results

A total of 85 responses were received, 84 of those met the eligibility and were HCPC registered paediatric physiotherapists using the CPIP hip surveillance programme within clinical practice. The one response that was not used did not fit the criteria and was from a therapy assistant. Respondents identified themselves as Paediatric Physiotherapists (24%), Specialist Paediatric Physiotherapists (30%), Highly Specialised Paediatric Physiotherapists (36%) and Therapy Managers (10%). All of which worked across different regions around the UK (Table 1).

Region (n = 84), n (%)	Number of Participants
East Anglia Region	9 (11%)
London Region	12 (14%)
Northern Ireland	2 (3%)
North East	10 (12%)
North West	4 (5%)
Scotland	12 (14%)
South East	10 (12%)
South West	3 (3%)
Trent	5 (6%)
Wales	9 (11%)
West Midlands	7 (8%)
Other: Derbyshire	1 (1%)

Table 1: Regions of respondents.

Almost half (49%) of participant's reported to complete assessments on an individual need's basis rather than during scheduled clinics (table 2).

How regularly assessment clinics are run.	Number of Participants (n = 84), n (%)
Daily	0 (0%)
Weekly	12 (14%)
Monthly	30 (36%)
Annually	1 (1%)
Other	41 (49%)

Table 2: How regularly assessment clinics are run.

87% of respondents reported they had received direct CPIP-UK training. 13% stated that they had not received any training. 78% of respondents who had received training reported they had been trained by the 'train the trainer' pathway, where one person from their NHS Trust had been directly trained from the CPIP-UK Network and the APCP, with a responsibility to then cascade training down to colleagues. Updates of training were completed every six to 18 months (Table 3).

Training Update (n = 84), n (%)	Number of Participants
0-6 months	1 (1%)
6-12 months	29 (35%)
12-18 months	28 (33%)
18 months +	5 (6%)
Not updated	20 (24%)
Peer Reviewed	1 (1%)

Table 3: Training update of respondents.

Confidence (n=84), n (%)	Number of Participants
Not confident at all	0 (0%)
Slightly confident	5 (6%)
Somewhat confident	8 (9%)
Fairly confident	36 (43%)
Completely confident	35 (42%)

Table 4: Confidence levels in completing the assessment.

Nine main themes emerged through using inductive thematic analysis (Braun and Clarke, 2006) of the qualitative data. These themes were then categorised into two: (1) facilitators and (2) barriers to implementing the CPIP-UK hip surveillance programme. Themes are reported in Table 4 with illustrative quotations to provide supporting evidence from the data. Interestingly, the qualitative results analysed from the open questions did not correspond with the quantitative results. One of the main barriers identified from the qualitative results was the lack of resources including staff, time, space and databases. However, quantitatively, many respondents agreed that they had enough resources including; staff (52%), equipment (55%), training (68%), space (56%) and time (55%) to complete the hip surveillance programme as shown in Table 5.

	Strongly Disagree (n = 84), n (%)	Disagree (n = 84), n (%)	Agree (n = 84), n (%)	Strongly Agree (n = 84), n (%)
Staff	6 (8%)	17 (20%)	44 (52%)	17 (20%)
Equipment	1 (1%)	15 (18%)	46 (55%)	22 (26%)
Training	2 (3%)	3 (4%)	57 (68%)	21 (25%)
Space	4 (5%)	18 (21%)	47 (56%)	15 (18%)
Time	9 (11%)	17 (21%)	46 (55%)	11 (13%)

Table 5: Respondents views on whether sufficient resources are available.

Categories and Themes	Representative Quotes
1. Facilitators to implementing the hip surveillance programme.	
CPIP-UK is an evidence based standardised assessment.	1.1 <i>"Good general assessment of ROM to pick up on tightness and contractures."</i> 1.2 <i>"Structured, systematic and uniform."</i> 1.3 <i>"Structured and nationally guided."</i> 1.4 <i>"The CPIP assessment is very thorough and standardised."</i>
The assessment provides regular contact with the children.	1.5 <i>"Follows up children who may have been missed in the past."</i> 1.6 <i>"Reminder to assess thoroughly every 6 months or year."</i> 1.7 <i>"Schedule for surveillance."</i> 1.8 <i>"Children with CP GMFCS level 1 are being monitored and picked up earlier if any issues."</i> 1.9 <i>"Ability to keep an eye on the children who would have normally been discharged."</i>
CPIP-UK provides a system for team working.	1.10 <i>"Working with peers on a regular basis has been great."</i> 1.11 <i>"Able to work closely as an MDT to affect change in management and rehab as needed."</i> 1.12 <i>"Common language for all clinicians throughout country."</i> 1.13 <i>"Lovely means of communicating with colleagues without the need for enormous reports, we simply refer to the information on the database."</i>
Parent engagement is reinforced.	1.14 <i>"Parent engagement is high."</i> 1.15 <i>"Offers an opportunity to discuss family concerns and inform families."</i> 1.16 <i>"Educational for parents. They understand red, amber, green."</i> 1.17 <i>"Gives us a tool to discuss issues with families and encourage a change in management."</i>

Table 6: Facilitators to implementing CPIP hip surveillance programme

Participants consistently identified the assessment as a standardised and objective measure which provides clear pathways as a facilitator of hip surveillance (Table 6, quotes 1.1-1.4). They also identified the assessment as a beneficial way to obtain regular contact with the paediatric patients, especially those they would not routinely or regularly see for therapeutic treatment or management (Table 6, quotes 1.5-1.9). Upon completion of the assessment, respondents reported that CPIP results provide a common language amongst the multi-disciplinary team (MDT) without the need for lengthy reports. Respondents also agreed that it was valuable to work with colleagues when implementing the hip surveillance programme (Table 6 1.10-1.13).

Respondents highlighted the importance of parental engagement and that the assessment provides an excellent opportunity to educate families (Table 6, quote 1.17). However, disengaged families were identified as a barrier to completing the assessment (Table 7, quote 2.14). The compliance of the child was also identified as a barrier, as the assessment can be painful and difficult for children accessing end of range through fast and slow passive movements (Table 7, quotes 2.15-2.17).

2. Barriers to implementing the hip surveillance programme.	
Limited resources including; staff, time, space and databases.	2.1 "Funding for the universal database has been difficult to secure." 2.2 "Our service does not have colour printers making it difficult to use." 2.3 "We have issues implementing CPIP because of staff, time & space." 2.4 "A long time to complete in full." 2.5 "Will take a lot of time and resources."
Reliability of the measurement when using goniometry.	2.6 "Goniometry and following bony landmarks – differences between staff." 2.7 "Subjective nature of goniometry." 2.8 "Results differ depending on clinician completing assessment." 2.9 "Can be difficult to get accurate measurements."
The assessment is not holistic.	2.10 "Needs to have a 'what matters to you' part of the assessment." 2.11 "It doesn't consider AROM." 2.12 "Becomes a checklist and holistic overview may be missed." 2.13 "Does not consider functional aspects."
Parent and child compliance.	2.14 "Difficult when some families don't engage." 2.15 "Difficult for children to tolerate all the measurements in on session." 2.16 "Depends on compliance of child being measured." 2.17 "For older children with complex needs it can be uncomfortable and unnecessary trauma to put them through."
Limited support from the wider multi-disciplinary team.	2.18 "Feels like it is 'physio thing' at the moment." 2.19 "Further training and engagement for MDT needed." 2.20 "Some consultants aren't utilising the database." 2.21 "Trying to make it multidisciplinary with OT and paediatricians but nightmare organising diaries."

Table 7: Barriers to implementing CPIP hip surveillance programme.

Respondents identified that the assessment is entirely completed by paediatric physiotherapists with other professions having very little, if any responsibility in completing the assessment (Table 7, quotes 2.18 and 2.21). This impacts on the staff resources as the assessment limits resources of time and staff.

Another barrier identified was that the assessment focuses on passive range of movement, excluding any active movement, postural or tonal difficulties and problems or worries expressed by the child or family (Table 7, quotes 2.10-2.13).

Physiotherapists reported that being omitted from correspondence with Orthopaedic Consultants and Paediatricians was also a barrier to fulfilling the role of hip surveillance. (Table 7, quotes 2.18-2.20).

Discussion

This survey found that around half of respondents reported completing CPIP assessments on an individual need's basis rather than in structured clinics, and most felt 'fairly' or 'completely' confident to carry out the assessment. The majority of physiotherapists had been trained to complete the assessment through a 'train the trainer' process, which was reviewed every 6-12 months. Facilitators to the implementation include: (1) CPIP-UK is an evidence based standardised assessment; (2) The assessment provides regular contact with the children; (3) CPIP-UK provides a system for team working; (4) Parent engagement is reinforced. Barriers to implementation include: (5) Limited resources including; staff, time, space and databases. (6) Reliability of the measurement when using goniometry. (7) The assessment is not holistic. (8) Parent and child compliance. (9) Limited support from the wider multi-disciplinary team.

One of the main themes that emerged from the qualitative responses was that CPIP-UK is a standardised musculoskeletal assessment for children with CP. This is in line with the APCP Good Practice Guidelines for Working with Children (2016) and shows an excellent example of evidence-based clinical practice. Standardised assessment tools in physiotherapy show excellent interrater and test-retest reliability (Harvey, 2017). The use of CPIP-UK as a standardised and evidence-based assessment for children with CP is shown as

a facilitator to the implementation within clinical practice, as HCPC registered Physiotherapists are expected to engage in evidence-based practice (HCPC, 2013). The standardisation of the assessment also makes it easy to compare values taken previously to show any deterioration in the migration percentage which then guides management, treatment and onward referral.

When parents attended appointments the reinforcement of parental engagement was reported as a facilitator to the implementation of CPIP-UK. Empowerment of parents supports and facilitates physiotherapy treatment in children with CP (Kruijsen-Terpstra et al, 2016). Ultimately parents are responsible for completing physiotherapy treatment programmes at home, therefore if parents understand the evidence behind hip surveillance by attending the CPIP assessment appointments they are more likely to engage in preventative treatment. Parental engagement is crucial to the success of hip surveillance (Willoughby et al, 2019), and therefore facilitates the implementation of the CPIP-UK hip surveillance programme within clinical practice. However, when appointments are declined or family do not keep appointments the assessments are not able to be completed which questions the compliance of the parent and child and was seen as a barrier. If the child is not brought to an assessment clinic their measurements cannot be taken and any deterioration cannot be identified, making management and treatment difficult.

Respondents reported the CPIP-UK assessments provide regular contact between physiotherapists and children with CP. This is seen to facilitate the implementation as the assessment provides a timely review throughout the child's development and growth.

There are some differences that must be identified between the CPIP-UK and CPUP hip surveillance programme. CPUP assessments are completed by a physiotherapist and an occupational therapist. The results provide a common language amongst health care professionals and allow for a continuation of care. However, the CPIP-UK assessment is completed by physiotherapists and therapy assistants with little or no support from the wider therapy team. Results from this study show that respondents feel the assessment is restricted to physiotherapists and is a barrier to full implementation of the hip surveillance programme throughout multi-disciplinary team. It is crucial that any healthcare professional supporting a child with CP is aware of the prevalence of hip dislocation and identifies the need to facilitate hip surveillance (Willoughby et al, 2019). CPIP-UK is reliant on communication for the ongoing implementation to be successful. Respondents from every region in this study commented on communication difficulties between Radiology, Orthopaedic Consultants and Paediatricians. Communication is seen as a barrier to the full application of CPIP-UK and could question future implementation.

A significant number of respondents reported that the CPIP-UK assessment does not provide a holistic assessment. This is perceived to be a barrier to using the assessment, as body structures and functions are the focus of the musculoskeletal assessment. However, the aim of the CPIP hip surveillance programme was not to provide a holistic assessment, but to focus on hip migration and management. The World Health Organisation's International Classification of Functioning (ICF) (2001) framework is recommended by the APCP (2016) and NICE (2012). The ICF provides a framework for assessment and looks at all potential factors influencing activity and participation, including environmental and personal factors as well as body structure and function factors. Within clinical practice there are multiple outcome measures that focus on other areas of child's development and progress. Therefore, although the respondents found the CPIP-UK assessment not to be holistic, the aim of the assessment is purely to focus on the displacement of the hip and alternative outcome measures are to be used to look at participation and activity.

One of the main reported barriers to the use of the CPIP-UK hip surveillance programme was the lack of resources such as; staff, time, space, and access to the database. This is a barrier because if teams do not have enough time or staff to complete the assessment, they simply cannot complete the assessment. Limited or no access to the database also questions the effectiveness of the CPIP as a tool of hip surveillance. If the results cannot be inputted onto a database and shared with the wider multi-disciplinary team then physiotherapists may question the usefulness of them completing the assessment. The barriers to implementation here are down to each region's staffing and time management, as well as a lack of information sharing.

Another barrier reported was the reliability of goniometry. Research has shown that there is a need for caution when using goniometric measurements in clinical decision making (McDowell et al, 2000). Variations of $\pm 18-28^\circ$ have been reported when goniometry measurements were taken on children with spastic CP on different days (McDowell et al, 2000). The CPIP-UK assessment is made up of goniometric range of movement measurements. This reports as a barrier to the implementation as the accuracy of goniometry questions the

reliability of the assessment.

Study Limitations and Future Research

This is the first known study to report facilitators and barriers to the implementation of the CPIP hip surveillance programme in the UK, however, it does come with limitations. As a result of the use of online surveys, it is not possible to establish if full saturation of themes was reached during the qualitative analysis.

Barriers and facilitators have now been identified; however, their importance is unknown. Future research should look at the importance of the facilitators and compare these to the barriers. For example, is parent engagement and education more important for the child than communication amongst the multidisciplinary team?

The online survey was sent out through the APCP where there are over 2,400 members, the sample size of 84 participants is not enough to reflect the paediatric physiotherapy population. A larger sample size would have increased the precision and validity of the results. Paediatric physiotherapists may also not be registered with the APCP and would have been excluded from participation due to the survey being sent through the APCP. A study comparing regions within the UK using the CPIP hip surveillance programme would also be useful to identify and overcome barriers within clinical practice.

The study only reflects responses of paediatric physiotherapists using CPIP as a hip surveillance tool. There is no consideration of how many centres and/or children are not included in hip surveillance across the UK. This could be due to the barriers discussed in this study. Future research is needed to explore how these barriers can be made more achievable to establish a surveillance programme used across every region in the UK for all centres and children to access.

Furthermore, the CPIP assessment training could be reviewed so every healthcare professional working with children with a diagnosis of Cerebral Palsy has an understanding of hip surveillance and its importance within the treatment and management of children. This would allow for a common language to be created and for the assessment results to be interpreted and used by the multidisciplinary team during the management of children with CP.

Conclusion

The results of this study will inform health care professionals on the implementation of the CPIP-UK hip surveillance programme. The study has shown that use of a standardised musculoskeletal assessment is an important facilitator for the use of the CPIP-UK hip surveillance programme within clinical practice. Also, it supports regular contact with the child, their parents and joint Physiotherapy working. However, difficulties accessing resources, questions around the reliability of goniometry and lack of communication show barriers to the use of CPIP-UK. To ensure that no child with CP misses hip surveillance, has delayed detection or treatment and suffers chronic pain associated with dislocation, the understanding of barriers to implementation are paramount.

Acknowledgements

The author would like to acknowledge Jodie Bryant and Birmingham City University for their support throughout this study. The author would like to thank the APCP for distributing the online survey and for all respondents who took the time to complete the survey.

This study did not receive any financial support, and there were no conflicting interests at the time of the study.

References

- Association of Paediatric Chartered Physiotherapists. (2016). CPIP-UK National Network. Available: <https://apcp.csp.org.uk/content/cpip-uk-national-network>. Last accessed 4th March 2021.
- Association of Paediatric Chartered Physiotherapists. (2016). *Working with Children - Guidance on Good Practice*. Available: https://apcp.csp.org.uk/system/files/?file=working_with_children_2016_1.pdf. Last accessed 13/11/2019.
- Braun, V., and Clarke, V. (2013) *Successful qualitative research: a practical guide for beginners*. London: Sage.
- Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology* 3 (2), 77-101.
- Bugler, K.E., Gaston, M.S., and Robb, J.E. (2018). Hip displacement in children with cerebral palsy in Scotland: a total population study. *Journal of Children's Orthopaedics*. 12 (6), 635-639.
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., and Neville, A. (2014). The Use of Triangulation in Qualitative Research. *Oncology Nursing Forum*. 41 (5), 545-547.
- Elkamil, AI., Anderson, GL., Hägglund, G., Lamvik, T., Skranes, J., and Vik, T. (2011). Prevalence of hip dislocation among children with cerebral palsy in regions with and without a surveillance programme: a cross sectional study in Sweden and Norway. *BMC Musculoskeletal Disorders*, (12), 285.
- Eysenbach, G. (2004) Improving the quality of web surveys: the checklist for reporting results of internet e-surveys (CHERRIES). *Journal of Medical Internet Research*. 6(3) pp. 34.
- Guest, GS., MacQueen, KM., and Namey, EE. (2011) *Applied Thematic Analysis*. Thousand Oaks, CA: Sage Publications.
- Hägglund G, Lauge-Pedersen H, Persson M (2007a) Radiographic threshold values for hip screening in cerebral palsy. *J Child Orthopaedics*. 1(1):43-47.
- Hägglund G, Lauge-Pedersen H, Wagner P (2007b) Characteristics of children with hip displacement in cerebral palsy. *BMC Musculoskeletal Disorder*. 8:101.
- Hägglund, G., Alriksson-Schmidt, A., Lauge-Pedersen, H., Rodby-Bousquet, E., Wagner, P., and Westbom, L. (2014). Prevention of dislocation of the hip in children with cerebral palsy 20-YEAR RESULTS OF A POPULATION-BASED PREVENTION PROGRAMME. *The bone and joint journal*. 96-B (11), 1546-1552.
- Harvey, A.R. (2017). The Gross Motor Function Measure (GMFM). *Journal of Physiotherapy*. 63 (5), 187.
- Health & Care Professionals Council. (2013). The standards of proficiency for physiotherapists. Available: <https://www.hcpc-uk.org/standards/standards-of-proficiency/physiotherapists/>. Last accessed 18th November 2019.
- Kentish, M., Wynter, M., Snape, N., Boyd, R. (2011) Five-year outcome of state-wide hip surveillance of children and adolescents with cerebral palsy. *Journal of Paediatric Rehabilitation Medicine*. 4: 205-217.
- Kruijssen-Terpstra, A.J.A., Verschuren, O., Ketelaar, M., Riedijk, L., Gorter J.W., Jongmas, M.J., and Boeije, H. (2016). Parents' experiences and needs regarding physical and occupational therapy for their young children with cerebral palsy. *Research in Developmental Disabilities*. 53 (2), 314-322.
- McDowell, B.C., Hewitt, V., Nurse, A., Weston, T. and Baker, R., (2000). The variability of goniometric measurements in ambulatory children with spastic cerebral palsy. *Gait & posture*, 12(2), pp.114-121.
- National Institute for Health and Care Excellence. (2012) *Clinical Guideline for Spasticity in Under 19s: Management*. London: The Institute; 2012. Available from: <https://www.nice.org.uk/guidance/CG145/chapter/1-Guidance> [Last accessed 17th March 2019].
- Rasmussen, HM., Nordbye-Nielsen, K., Møller-Madsen, B., Johansen, M., Ellitsgaard, N., Pedersen, C.R., Rackauskaite, G., Engberg, H., and Pedersen, NW. (2016). The Danish Cerebral Palsy Follow-up Program. *Clinical Epidemiology*. 8, 457-460.
- Rosenbaum, P., Paneth, N., Leviton, A., Goldstein, M., Bax, M., Damiano, D. (2007) A Report: The Definition and Classification of Cerebral Palsy. *Developmental Medicine & Child Neurology*, 109, 8-14.
-

Wordie, SJ., Robb, JE., Hägglund, G., Bugler, KE., Gaston, MS. Hip displacement and dislocation in a total population of children with cerebral palsy in Scotland status after five years' hip surveillance. *The bone and joint journal* 2020; 102-B(3), 383-387.

World Health Organisation. (2001). *International Classification of Functioning, Disability and Health (ICF)*. Available: <https://www.who.int/classifications/icf/en/>
Last accessed 13/11/2019.

Willoughby, KL., Toovey, R., Hodgson, JM., Graham, HK., Reddinhough, DS. (2019). Health professionals' experiences and barriers encountered when implementing hip surveillance for children with cerebral palsy. *Journal of Paediatrics and Child Health*. 55 (1), 32-41.

Wynter, M., Gibson, N., and Willoughby, KL., Love, S., Kentish, M., Thomason, P., Graham, HK. (2015). Australian hip surveillance guidelines for children with cerebral palsy: 5-year review. *Developmental Medicine & Child Neurology*. 57, 808-820.