Neonatal brachial plexus palsy : impact throughout the lifespan

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CHAPTER FIVE

Hand Use at Home questionnaire; validity and reliability in children with neonatal brachial plexus palsy or unilateral cerebral palsy

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ABSTRACT

Objective

To investigate construct validity and test-retest reliability of the parent-rated Hand-Use-at-Home questionnaire (HUH) in children with Neonatal Brachial Plexus Palsy (NBPP) or Unilateral Cerebral Palsy (UCP).

Patients and methods

Children with NBPP or UCP, aged 3-10 years, were eligible. The HUH, Pediatric-Outcome-Data-Collecting-Instrument Upper-Extremity-scale (PODCI-UE, NBPP only), and Children's-Hand-Use-Experience-Questionnaire (CHEQ/mini-CHEQ, UCP only) were administered. The HUH was administered twice in subgroups of both diagnoses. Lesion-extent (NBPP) and Manual-Ability-Classification-System (MACS) levels (UCP) were obtained.

Spearman correlations coefficients between the HUH and all clinical variables, Agreement, Standard-Error-of-Measurement (SEM), Smallest-Detectable-Change (SDC), and Intra-Class-Correlation (ICC) were calculated.

Results

260 patients participated (NBPP:181) of whom 56 completed the second HUH (NBPP:16). Median age was 6.9 years for NBPP and 116 had C5-C6 lesions. Median age for UCP was 6.4 years and 33 had MACS II.

The HUH correlated moderately with lesion-extent (r_s=-0.5), PODCI-UE (r_s=0.6) and CHEQ (r_s=0.5), but weakly with MACS-levels (r_s=-0.4). Test-retest reliability was excellent ($ICC_{2,1}$=0.89, SEM=0.599 and SDC=1.66 logits) and agreement was good (mean difference HUH1-HUH2 0.06 logits).

Conclusions

The HUH showed good construct validity and test-retest reliability in children with NBPP or UCP. It is a useful tool to quickly measure spontaneous upper-limb use in the home environment in children with unilateral paresis.

Clinical messages:

- The HUH evaluates spontaneous hand-use in the home environment and shows excellent construct validity and test-retest reliability
- The HUH is able to distinguish between levels of lesion-extent in children with NBPP
- A good ability to use the affected hand not automatically results in a high amount of hand-use
- The HUH fills a gap in the currently available outcome measures

INTRODUCTION

Children with Neonatal Brachial Plexus Palsy (NBPP) or Unilateral Cerebral Palsy (UCP) may have difficulties using their affected upper limb[1-4], and hand use is often less frequent than might be expected based on their functional capacities.[5-9] Upper-limb interventions typically focus on improving functional capacities of the affected upper-limb to optimize daily-life activities and participation (ICF-CY level d). However, a discrepancy is often observed between upper-limb capacity measured in a clinical setting and the actual use in daily life (performance).[7,9] This actual use is important to assess, because one of the most important goals of upper-limb interventions is the transition of newly acquired function and/or capacities to daily use.

Currently available parent-reported questionnaires, validated for children with NBPP and UCP[10,11] or for UCP only[12], assess several aspects of upper-limb performance in daily life, but none of them measure how often the affected upper-limb is spontaneously used in bimanual activities in the home-environment.[13-15]

To capture the amount of daily-life spontaneous use of the affected upper-limb in children with unilateral paresis aged 3-10 years, the parent-reported Hand-Use-at-Home questionnaire (HUH) was recently developed.[16] It was constructed based on the notion that children with unilateral paresis may 'disregard' their affected upper limb, and only use their upper-limb spontaneously when activities require the simultaneous use of both hands (e.g. when closing a zipper). The HUH includes a range of bimanual activities and the scale's internal structure and item-hierarchy was tested in a large sample of children with UCP or NBPP using Rasch analysis.[16] The HUH sum-score was found to be able to discriminate between children with a higher and lower amount of spontaneous use of the affected upper limb.

The HUH is a valuable addition to the current assessment of children with unilateral upper-limb paresis. However, how the HUH is associated with frequently used questionnaires in children with unilateral paresis, disease severity and functional classification has not yet been established to support its construct validity. Furthermore, its test-retest reliability has not yet been examined.

Therefore, the aim of this study was to obtain evidence for construct validity and test-retest reliability of the HUH in children with NBPP or UCP to establish whether the HUH is a useful instrument in daily practice and for future research.

PATIENTS AND METHODS

This study was divided into a construct validity and a test-retest reliability part. It was conducted at the Leiden University Medical Center (LUMC) and the Sint Maartenskliniek rehabilitation center (October 2013-May 2015). Ethical approval was obtained (LUMC P14.071, medical ethical committee Arnhem-Nijmegen 2013/395). All parents gave written informed consent.

The Hand-Use-at-Home Questionnaire

The HUH assesses the amount of spontaneous use of the affected hand in children with unilateral upper-limb paresis aged 3-10 years, performing typical bimanual play and self-care activities.[16] This 18-item, parent-reported questionnaire takes 5-10 minutes to complete. Parents rate items using a 5-point rating scale (never-sometimes-regularly-often-(almost) always). After completion, the ratings are converted into a 3-point rating scale (i.e. never+sometimes=score 0, regularly+often=score 1, always=score 2) and item scores are summed. This sum-score (range 0-36 points) can subsequently be converted into the HUH-score in logits (Appendix 1). The HUH score ranges from -4.69 to 5.17 logits and reflects the extent to which a child spontaneously uses its affected hand in activities at home.

Patients, recruitment, in- and exclusion criteria

Children with unilateral upper-limb paresis (NBPP/UCP) were eligible for the construct validity and the test-retest reliability study if: aged between 3 and 10 years and if their medical record was available. Children with NBPP were recruited from the LUMC NBPP care unit and those with UCP from 11 pediatric rehabilitation centers that are part of the Dutch Collaboration for Implementation of the Pirate Concept (LIPIC, http://www.piratenconcept.nl/).
Parents of eligible patients were invited to participate in this study and could complete the questionnaires online or on paper. Non-responders were reminded once by (e-)mail and/or telephone.

To be included in the construct validity study, the HUH and an additional questionnaire had to be completed (i.e. Pediatric-Outcome-Data-Collecting-Instrument (PODCI) for NBPP and Children's-Hand-Use-Experience-Questionnaire (CHEQ/mini-CHEQ) for UCP)
For inclusion in the test-retest reliability study, parents had to complete a second HUH within a period of 2-4 weeks after the first one and the upper-limb performance of the child had to be stable. Therefore, participants were not invited to complete the second HUH when there had been specific upper-limb interventions (i.e. surgery, botulinum-toxin injections or intensive upper-limb training) less than 3 months prior to completing the first HUH questionnaire or within two weeks thereafter.

Of all participating children, sociodemographic and disease characteristics (age/gender/diagnosis/affected side) were obtained from the medical records. In addition, for NBPP: lesion-extent and treatment history, and for UCP: Manual Ability Classification System (MACS) levels were obtained. Lesion-extent for NBPP was divided into 4 groups based on lesion localization: 1) C5-C6, 2) C5-C7, 3) C5-C8 and 4) C5-T1. Treatment history in children with NBPP can consist of: 1) conservative treatment, 2) primary (nerve) surgery, 3) secondary (orthopaedic: i.e. tendon transfers, osteotomies) surgery or 4) primary and secondary surgery.

PODCI-UE

The PODCI is designed to assess different aspects of daily living, including upper extremity functioning, in children with musculoskeletal disorders (including NBPP) and is available in

Dutch.[17] It is widely accepted to provide information about upper extremity functioning.[13-15] PODCI scale scores range from 0-100, with higher scores indicating better functioning/ Quality of Life (QoL). Only the 'Upper Extremity and Physical Function' scale (PODCI-UE) was used in this study since this scale provides information about difficulties performing activities using the arms/hands (lower score, more difficulties).

MACS

The MACS is a reliable and valid classification for children with Cerebral Palsy and classifies the ability to handle objects in daily activities.[3] It has 5 levels; higher levels representing worse performance.

CHEQ/mini-CHEQ

The CHEQ is a questionnaire validated for children with UCP aged 6 to 18.[10,11] It was also designed for use in children with NBPP[11], but it was only partially validated for this group and has not yet been used in NBPP studies. Therefore, it was not used for this group in this study.

The CHEQ consists of 29 bimanual activities, demanding the use of both hands, assessing a child's experience performing bimanual activities with an impaired hand. The CHEQ measures three aspects of perceived performance, as well as how many activities are executed independently. It also measures whether the affected hand is used as a support or with grip. A trial version of the mini-CHEQ with 21 activities for children aged 4–6 years was used for all UCP children <6 years in this study. We used the percentage of independently performed activities, in which the affected hand was used, as a measure of bimanual performance ($CHEQ_{bim}$).

Statistical analysis

Statistical analyses were executed using SPSS 20.0 (IBM, Armonk, New York/USA). All continuous variables were expressed as means with standard deviations (SD), or as medians with Inter Quartile Ranges (IQR), based on their distributions. Missing values were replaced with predicted values using the Expectation-Maximization technique.

In concordance with the recommended quality criteria to investigate measurement properties of health status questionnaires (COSMIN)[18] we investigated the construct validity by testing the following hypotheses:

- There is a moderate-good negative correlation between HUH-scores and NBPP lesion-extent. NBPP lesion-extent group 1 will have higher HUH-scores than the other groups since a greater lesion-extent will probably affect spontaneous hand use negatively.
- There is a weak negative correlation between HUH-scores and treatment history in NBPP. Conservatively treated children are more mildly affected than surgically treated children and therefore will score higher on the HUH.
- There is a moderate-good positive correlation between HUH-scores and PODCI-UE. Children with less difficulty performing daily-life activities with their affected upper-limb will show more spontaneous use of their affected upper limb.

- There is a weak negative correlation between the HUH and MACS levels in children with UCP because limitations in manual ability will hamper the performance of daily activities but may not necessarily affect the amount of upper-limb use in children with UCP.
- There is a moderate-good positive correlation between the HUH and the $CHEQ_{bim}$ as children who use their affected hand in many of the CHEQ activities are likely to display more spontaneous use of the affected upper-limb.

To test the above hypotheses, Spearman correlation coefficients were calculated. Correlations $0.3<r_s<0.5$ were considered weak, $0.5<r_s<0.75$ moderate to good and $r_s>0.75$ good-excellent ($p<0.05$).[19]
In addition, we used a one-way analysis of variance (ANOVA) with Games-Howell post-hoc testing to further examine our hypotheses regarding the relationships of the HUH with lesion-extent and treatment history in NBPP and with MACS levels in UCP.

Test-retest reliability was investigated by computing the Intra-Class-Correlation coefficient ($ICC_{2,1}$) with the minimum acceptable value being 0.70.[18,20] We used the Bland-Altman method to assess agreement between both HUH-scores. The standard error of measurement ($SEM_{agreement}$) using the within-subject variance (SEM=√error variance) and Smallest Detectable Change (SDC=1.96x√2xSEM) were calculated to determine the minimal change representing a real difference between two scores of an individual above measurement error ($SDC_{individual}$). Additionally, the SDC at group level was computed ($SDC_{group}=SDC_{individual}$ /√n).

RESULTS

In the construct validity study, 260 children and their parents were included (181 NBPP, median age 6.9 years and 79 UCP, median age 6.4 years). Parents of 56 children (16 NBPP, 40 UCP) scored the second HUH within 2-4 weeks after the first HUH and were included in the test-retest reliability study (median age 7.2 years). Table I provides the patient characteristics of the study groups.
There were some missing values in the HUH-questionnaires in the construct validity study (5 questions in 3 individuals). Seven PODCI-UE's could not be calculated, because parents reported that their child was too young to perform several PODCI-UE items. Therefore, 174 PODCI-UE's were used for analysis.

The HUH, PODCI-UE and $CHEQ_{bim}$ scores are presented in Table II. The median HUH-score for the NBPP group was clearly higher than for the UCP group (1.06 and -0.34 logits, respectively). The median PODCI-UE score was 83.0 points (IQR 71.0; 96.0) and 24% obtained the maximum score. The $CHEQ_{bim}$ score was negatively skewed (median 100%). The number of independent activities was normally distributed (mean 16, range 3-28 activities).
In children with NBPP the HUH correlated moderately with lesion-extent ($r_s=-0.5$) and weakly with previous treatment ($r_s=-0.3$). There was a moderate correlation between HUH-scores

Table I Demographic and clinical characteristics of included children with Neonatal Brachial Plexus Palsy (NBPP) and Unilateral Cerebral Palsy (UCP)

	Construct validity study				**Test-retest reliability study**	
	NBPP Group (n=181)		**UCP group (n=79)**		**NBPP=16, UCP=40 (n=56)**	
Gender: n (%)						
Male	87	(48)	40	(51)	30	(54)
Median age in years (Range)	6.9	(3.0-10.5)	6.4	(3.0-10.8)	7.2	(3.3-10.8)
Affected side: n (%)						
Right	86	(48)	40	(51)	18	(32)
Lesion extent: n (%)						
C5-C6	116	(64)			9	(16)
C5-C7	37	(20)	x	x	4	(7)
C5-C8	12	(7)			1	(2)
C5-T1	16	(9)			2	(4)
NBPP treatment history: n (%)						
Conservative treatment	85	(47)				
Primary (nerve) surgery	75	(41)	x	x	x	x
Secondary (orthopaedic) surgery*	4	(2)				
Primary and secondary* surgery	17	(9)				
MACS: n (%)						
I			21	(27)	15	(27)
II	x	x	33	(42)	17	(30)
III			25	(32)	8	(14)

MACS= Manual Ability Classification System,
*i.e. tendon transfers, osteotomies

and the PODCI-UE (r_s=0.6). In children with UCP, the HUH correlated weakly with MACS classification (r_s=-0.4) and moderately with the CHEQbim (r_s=0.5) (all p<0.001).

Table III shows differences in HUH-scores between subgroups of patients with NBPP or UCP. For NBPP we found significant differences between levels of lesion-extent (F=15.65,p<0.001) and treatment history (F=8.41,p<0.001). Greater NBPP lesion-extent was associated with lower HUH-scores. All lesion-extent subgroups differed significantly from the C5-C6 subgroup (p<0.001). A history of primary and/or secondary surgery in children with NBPP was associated with lower HUH-scores (p<0.001). In children with UCP, there were significant differences in HUH-scores between MACS levels (F=7.09, p=0.002). There was no significant difference between MACS I and II, but MACS III was clearly associated with lower HUH-scores (p=0.001).

Table II Group outcomes and correlations with Hand-Use-at-Home Questionnaire (HUH) for NBPP (n=181) and UCP (n=79)

NBPP		
HUH person ability in logits (n=181)		
Median (IQR 25;75)	1.06	(-0.04; 2.78)
PODCI-UE (n=174)		
Median (IQR 25;75)	83.00	(71.0; 96.0)
Correlations:		
NBPP lesion extent (n=181)	-0.5*	p<0.001
NBPP treatment history (n=181)	-0.3*	p<0.001
PODCI-UE (n=174)	0.6*	p<0.001
UCP		
HUH person ability in logits (n=79)		
Mean (SD)	-0.29	(1.27)
Median (IQR 25;75)	-0.34	(-1.22; 0.51)
CHEQbim score (n=79)		
Median (IQR 25;75)	100%	(90.9; 100)
Correlations:		
MACS (n=79)	-0.4*	p<0.001
CHEQbim score (n=79))	0.5*	p<0.001

NBPP= Neonatal Brachial Plexus Palsy, UCP= unilateral cerebral palsy, IQR= Inter Quartile Ranges, SD= Standard Deviation. PODCI-UE = Paediatric Outcome Data Collecting Instrument-Upper Extremity Functioning scale, $CHEQ_{bim}$ = Children's Hand use Experience Questionnaire bimanual score (%)= percentage activities independently executed using both hands, MACS= Manual Ability Classification System. *= Spearman's Rho.

Test-retest reliability (Table IV) was found to be good with an ICC of 0.89 (p<0.001). The absolute agreement is presented in figure 1. The mean difference between the first and the second assessment was 0.06 logits (SD 0.85) The $SEM_{agreement}$ was 0.599 logits, which resulted in a $SDC_{individual}$ of 1.66 logits and a SDC_{group} of 0.22 logits.

DISCUSSION

This study aimed to find evidence for the construct validity and test-retest reliability of the Hand-Use-at-Home questionnaire. Results showed that the HUH is a valid and reliable measure to be used in children with NBPP or UCP aged 3 to 10 years old. The correlation between the HUH and lesion-extent indicated that greater lesion-extent is related to a lower amount of spontaneous hand-use. The weak correlation with MACS levels in children with UCP indicated that a good ability to handle objects is not directly associated with a high amount of spontaneous use of the affected arm/hand. Test-retest reliability was found to be excellent based on a good ICC and good agreement.

Table III Mean Hand-Use-at-Home Questionnaire (HUH) scores and differences within groups for lesion-extent and treatment history in children with NBPP (n=181); and for MACS levels in children with UCP (n=79)

	HUH-score (logits)		**Differences in HUH-score #**	
	Mean	**(SD)**	**Logits**	**(p value)**
Lesion extent (NBPP):			*Compared to C5-C6*	
C5-C6 (n=116)	2.10	(1.98)	-	-
C5-C7 (n=37)	0.72	(1.66)	1.38	**(p<0.001)**
C5-C8 (n=12)	-0.34	(1.24)	2.44	**(p<0.001)**
C5-T1 (n=16)	-0.22	(0.70)	2.32	**(p<0.001)**
Treatment history (NBPP):			*Compared to conservative treatment*	
Conservative treatment (n=85)	2.20	(2.10)	-	-
Primary (nerve) surgery (n=75)	0.88	(1.80)	1.32	**(p<0.001)**
Secondary (orthopaedic) surgery* (n=4)	0.51	(1.53)	1.69	(p=0.301)
Primary and secondary* surgery (n=17)	0.51	(1.40)	1.69	**(p=0.001)**
MACS (UCP):			*Compared to MACS I*	
I (n=21)	0.28	(1.24)	-	-
II (n=33)	-0.14	(1.29)	0.41	(p=0.477)
III (n=25)	-0.99	(0.96)	1.27	**(p=0.001)**

NBPP= Neonatal Brachial Plexus Palsy, UCP= Unilateral Cerebral Palsy, MACS= Manual Ability Classification System
NBPP Lesion extent: Only comparisons of all groups with the C5-C6 group are shown.
NBPP Treatment history: Only comparisons of all groups with the conservatively treated group are shown.
UCP MACS: Only comparisons of all groups with the MACS level I group are shown.
#One way ANOVA with Games-Howell post hoc test
*i.e. tendon transfers, osteotomies

The test-retest reliability results indicate that parents' observations can reliably be used to measure the amount of spontaneous hand use in children with unilateral paresis. In an instrument with high test-retest reliability repeated measurements in an unchanged subject will result in similar outcomes that are not influenced by characteristics of the instrument.[18,20] The absolute agreement between the repeated assessments was good as indicated by the SEMs. When HUH-scores of two groups of children are compared, a group difference of 0.22 logits can be regarded as a real difference, which is not due to natural variation. For individual children, a change in HUH-scores needs to be >1.66 logits to be significantly different.

Little is known about spontaneous use of the affected hand at home in children with unilateral upper-limb paresis. Clinical assessments capture arm/hand use in a test-setting, but do not provide insight into actual daily life performance, nor in the amount of hand use. Spontaneous hand use was investigated in a few studies, but only with regard to children with UCP.[7,21] A qualitative study showed that children with UCP spontaneously use their affected hand mainly in tasks that absolutely require the use of both hands.[7] Another study used an accelerometer in the home environment to objectively measure upper-limb

Table IV Test- retest reliability for the Hand-Use-at-Home Questionnaire (HUH) in children with NBPP or UCP (n=56).

HUH-score Test Median	(IQR 25;75)	0.17 (-0.50; 1.52)
HUH-score Re-Test Median	(IQR 25;75)	0.38 (-0.80; 1.36)
Mean difference	(SD)	0.06 (0.85)
ICC	(95% CI)	0.89 (0.81-0.93)
SEM	(logits)	0.599
$SDC_{individual}$	(logits)	1.66
SDC_{group}	(logits)	0.22

HUH= Hand-Use at Home, IQR= Inter Quartile Ranges, SD= Standard Deviation, ICC=Intra Class Correlation, 95% CI= 95% Confidence Interval, SEM= Standard Error of Measurement, SDC= Smallest Detectable Change

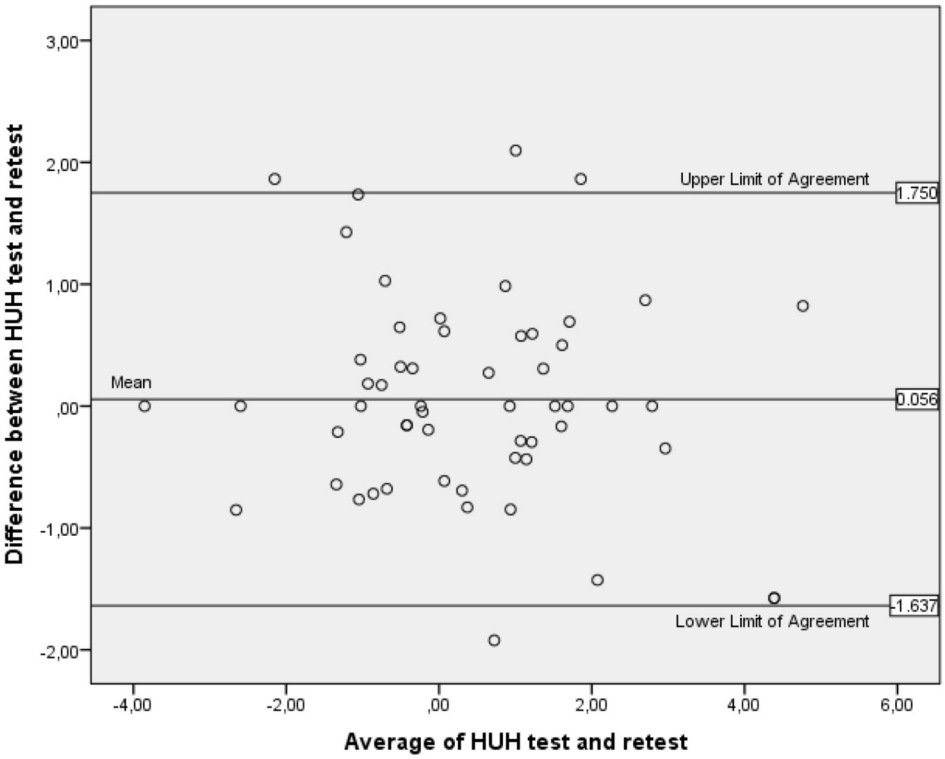

Figure 1 Bland-Altman plot showing agreement between the Hand-Use-at-Home Questionnaire (HUH) test and retest.
(Limits of agreement are located at ± 2 standard deviations from the mean difference)

movements, as was done in adults before.[21] This study found that children with UCP used their affected upper limb, but it was not possible to conclude from the data whether this use was related to bimanual activities.

Several studies reported difficulties in using the affected upper-limb in children with NBPP and found a relationship between lesion-extent and upper-limb capacity.[1,2,4] The actual amount of spontaneous use has, to our knowledge, not been reported for NBPP before. Our study found a moderate relation between (greater) lesion-extent and (lower) amount of spontaneous hand use (Table II/III). In the C5-C6 group the amount of spontaneous hand-use was relatively high but only 22 children (19%, all treated conservatively) had a maximum HUH-score. A possible explanation for this high amount of spontaneous use in the C5-C6 group could be that these children had fully recovered, as occurs in about 70% of the children with NBPP.[2] The association between treatment history and amount of hand use was less strong but conservatively treated children had significantly higher HUH scores than children who were treated surgically. The secondary surgery group (n=4) was too small to explain any relationship with spontaneous hand-use. Our findings indicate that the HUH is able to distinguish between levels of lesion-extent.

The eight daily activities in the PODCI-UE show similarities with items in the HUH, but 3 are unimanual items and some can be performed using only the preferred hand. In contrast, the HUH consists of only bimanual items, hierarchically ordered according to how strong they elicit the use of the affected hand. The moderate relationship between both instruments, measuring different constructs, indicates that children performing well on the PODCI-UE are not automatically inclined to use both their hands simultaneously during daily life activities.

Studies in children with UCP found that higher MACS levels coincided with lower outcomes on unimanual capacity and bimanual performance measures.[22,23] We found that the children with a lower capacity to handle objects independently (MACS III) actually did show significantly less spontaneous use of their affected hand than children with MACS I or II. The weak association between MACS and HUH, however, indicated that a good ability to use the affected hand (MACS I) does not automatically result in a high amount of use of this hand in daily activities.

The association between the HUH and the $CHEQ_{bim}$ in children with UCP was weak. The number of independently performed activities was normally distributed over the sample, but most activities were executed using the affected hand (median 100%). The activities of the CHEQ all specifically require the simultaneous use of both hands and can hardly be performed unimanually, which explains the high $CHEQ_{bim}$ percentages. In contrast, only a few HUH activities explicitly require the use of the affected hand; they elicit the use of the affected hand to an increasing extent in order to assess whether the affected hand is spontaneously used. Our findings indicate that children with UCP do use their affected hand

if the task demands bimanual task execution. The moderate correlation between both instruments indicates that the HUH measures a different construct requiring a specific item-set.

In both diagnosis groups, we found significant relationships between upper-limb capacity reflected by MACS (UCP) and lesion-extent (NBPP) and the amount of spontaneous hand use. This indicates that the amount of hand use is negatively influenced by decreasing abilities to use the upper limb. However, there still is a large portion of unexplained variance in the HUH-score, which might be explained by the presence of developmental disregard.[8,24] Future studies are warranted to establish the possible relationship between developmental disregard and HUH outcomes.

This study had a number of limitations. Firstly, the sample in the NBPP group was relatively heterogeneous in terms of lesion-extent and treatment history, which might have positively influenced HUH outcomes. The UCP sample contained a relative large group of children with MACS III compared to the general UCP population, which might have negatively influenced HUH outcomes. Secondly, there is no golden standard to establish amount of hand-use. Therefore, in our study we used two widely accepted upper-limb outcome measures (PODCI-UE and CHEQ) to examine to what extent the HUH measures a different construct of upper-limb performance. Finally, this study had a cross-sectional design, only measuring arm/hand-use at one point in time. Future studies, for example on analyzing functional outcomes of surgical interventions, are warranted to evaluate the responsiveness of the HUH.

CONCLUSION

In conclusion, our study found that the Hand-Use-at-Home Questionnaire has good clinimetric properties to measure a specific aspect of upper-limb performance: the amount of spontaneous hand use. It can reliably be used by parents of children with unilateral upper-limb paresis, aged 3-10 years, to report spontaneous hand use of their child during daily activities. It provides clinicians and researchers with more insight in daily-life upper-limb performance.

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APPENDIX 1

Conversion table of sum scores to obtain the HUH-person-measure in logit units

Sum score	HUH-score (logits)	SE	Sum score (continued)	HUH-score (logits)	SE
0	-4.695	NA	19	0.513	0.37
1	-3.853	1.04	20	0.649	0.37
2	-3.082	0.76	21	0.786	0.37
3	-2.597	0.64	22	0.925	0.37
4	-2.230	0.57	23	1.066	0.38
5	-1.927	0.53	24	1.211	0.38
6	-1.166	0.50	25	1.361	0,39
7	-1.431	0.47	26	1.518	0.40
8	-1.218	0.45	27	1.684	0.41
9	-1.022	0.44	28	1.861	0.43
10	-0.838	0.42	29	2.053	0.45
11	-0.665	0.41	30	2.265	0.47
12	-0.500	0,40	31	2.506	0.51
13	-0.343	0.39	32	2.788	0.56
14	-0.191	0.39	33	3.134	0.62
15	-0.044	0.38	34	3.599	0.75
16	0.098	0.38	35	4.352	1.03
17	0.238	0.37	36	5.174	NA
18	0.376	0.37			

HUH-score= Hand-Use-at-Home score, SE= standard error, NA= not applicable