

Motherhood in women with motor disability due to a rare disease: an exploratory observational study of childbirth, infant development, and mother-infant interactions

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Abstract

Background

Women with motor disability willing to become mothers face a double challenge: relatives or caregivers may question their ability to provide a safe environment for their child, and specialists in perinatal medicine unfamiliar with rare diseases may perceive their pregnancy as extremely risky, or feel unable to cope with such patients.

Our purpose was to evaluate parenting needs, early child development and mother-infant interaction in a series of 22 pregnant women or young mothers with motor impairment due to a rare disease, followed up to 14 months postpartum.

Results

There were 10 impairments of four limbs, 4 impairments of both lower limbs, 7 unilateral impairments, and one distal tremor; 11 genetic diseases and 11 sporadic conditions.

Mean Barthel Index (BI) of self-reported independence in daily activities was 87.

Social deprivation Epices score, Cutrona social support scale, Edinburg Postnatal Depression scale, and Spielberger State/Trait Anxiety Inventory were unremarkable.

As for perinatal outcome, there were 4 gestational diabetes, 1 pre-eclampsia, 9 caesareans, 6 assisted and 7 spontaneous vaginal deliveries, 20 term live-births and 2 premature deliveries (35-36 weeks).

Six of the 12 women independent for daily activities ($BS \geq 90$); all those with $BS < 90$ reported to be dependent for at least one parenting activity.

Distribution of the Brunet-Lezine child development score was normal. Parent-infant relationship global assessment scale (PIR-GAS) was well adapted in 2 cases, adapted in 8, perturbed in 7, significantly perturbed in 2, and distressed in 3 (mean 71.8; 95% CI 49.6-93.9). This was unrelated to any somatic or emotional characteristics of the participants. Coding interactive behavior revealed that infant engagement was lower and infant avoidance greater than in controls ($p < 0.05$).

Conclusion

Infant development was normal, but mother-infant interaction altered in half of participants independently from the degree of motor impairment, underscoring need for parenting support. Disability due to rare diseases or rare conditions requires compensation for parenting even for a parent independent in daily activities.

Background

About 10% of women of childbearing age are living with a disability that impedes their activities of daily living (Sumito et al. 2012, Iezzoni et al. 2014, Redshaw et al. 2013, Shpigelman 2015). Among them, due to improved medical care, a growing number of women affected with a rare disease now reach childbearing age and have the same well-founded desire to become a mother as other women. Their ability to provide a safe environment for their child may be questioned by their families or by professionals, including social workers, nurses, midwives, or doctors (Smeltzer et al. 2016, Mitra et al. 2017, Powell et al. 2017, Walsh-Gallagher et al. 2011). When impairment results from a rare condition, women may face puzzled healthcare providers, who fear severe complications might occur should they become

pregnant. Besides, women with disabilities often fail to obtain financial support to help them becoming independent in their activity as a caregiver to their child. These difficulties partly result from the scarcity of data on pregnancy, parenthood and children outcome in women affected by a rare disease with a motor expression. Our goal was to provide a new insight in that matter. Therefore, we took advantage of a long established practice of parenting support for women with rare conditions resulting in motor impairment to recruit a sample of volunteers who would report on their experience as parents, have their child's development assessed, have their infant screened for withdrawal, and undergo assessment of mother-infant relationship and interaction.

Methods

Participants and ethics

The study was approved by the committee of protection of persons participating in clinical research (CPP Ile de France VI, 2016, April 25th decision) and declared as Clinical Trial (ID : NCT02727010). We recruited prospectively a consecutive series of volunteer women who were either pregnant or mother to a child under 12 months, and had motor impairment resulting from a rare condition. Participants were recruited between March 2016 and August 2017 among women referred for parenting support. All women received verbal and written information regarding the study. Those expressing interest received additional information, together with their partner if applicable. They gave written consent to participate. A specific consent form was signed for authorizing video of mother-child interactions. When applicable their partner or the co-parent signed a consent form for retrieving information on their child and for performing videos. Inclusion criteria were maternal age 18 or greater, being either pregnant > 14 weeks, or mother of a child < 1 year, having motor disability due to a rare disease, health insurance and written consent to enroll. Exclusion criteria were known intellectual disability, known psychiatric disorder, or not being fluent in French. The inclusion visit took place either pre or postnatally, immediately before a planned parenting support visit.

One hundred and fifteen pregnant women with motor disability and rare condition were eligible. Twenty-nine consented to participate. Two were excluded because of pre-existing psychiatric disorders. One was excluded because of mild intellectual disability. Four declined to be monitored following inclusion. Twenty-two women had a complete follow-up and form our database. Of these, 15 consented to be videotaped with their infant.

Data analyzed

At inclusion, data were obtained based on medical records and self-administered questionnaires. The investigator however could help the participant on request. We recorded the following variables.

Motor impairment and disability

The name of the disease affecting the patient was recorded based on the participant's declaration and on the specifications of her medical record. The Barthel index (BI) was used as a measure of independence in activities of daily living (1). Briefly participants declared if they felt independent, or needed help, for performing the following activities: feeding, bathing, dressing, bowels, bladder, toilet use, transfers (bed to chair and back), and mobility. This resulted in a score ranging from zero (completely dependent) to 100 (completely independent). We did not modify scoring based on our own observation.

We also asked participants if they felt they were independent, or needed help for each of the following parenting activities: changing or bathing, feeding, outing, dressing, playing, cuddling, and calming down a crying baby. For each activity, participants declared if they were independent (with or without an adapted environment), could do the activity

with help, or were unable to do it. Eventually this enabled us to identify two groups of participants: those who considered they were independent for all baby-care activities and those who declared they needed help for at least one activity. We included a detailed description of the number of body parts with motor impairment and additional non-motor impairment.

Obstetrical and perinatal data

We recorded obstetrical history and pregnancy outcome based on the declaration of participants and on their medical record.

Social context

We recorded social context based on marital status, housing, source of income, education level, the Epices score of social deprivation (2–4) and the Cutrona scale for social support (5–7) .

Emotional status

We assessed maternal emotional status at inclusion and during the postnatal visit. At inclusion, we used the State Trait Anxiety Inventory (STAI)-A for anxiety level, the STAI-B for anxiety trait (Spielberger 1983, Gunning et al. 2010). At the post-natal visit we used the State Trait Anxiety Inventory (STAI)-A for anxiety level, and the Edinburg Postnatal Depression (EPDS) scale (8) for depressive mood. Participants were considered as depressed when EPDS score was greater than 12 (9, 10). Anxiety was considered high when STAI score was greater than 42 (11).

Child development and mother-infant interaction

The postnatal visit took place between 3 and 13 months after delivery. One of the authors (LB, a clinical psychologist) made an appointment with the mother either at home (21 cases) or at the parenting support center (one case). She assessed child development using the Brunet Lézine scale. The Brunet-Lézine Scale evaluates the psychomotor development of infants aged 2 to 30 months. It analyses motor or postural development, eye-hand coordination, vocalization, and sociability. Combining these items, results in a global developmental score (12, 13).

Infant withdrawal was assessed by LB using the Guedeney and Fermanian Modified Alarm Distress Baby Scale, M-AADB (14–16). Briefly, m-AADB is a screening tool including only five areas: (a) facial expression, (b) eye contact, (c) vocalization, (d) activity level, and (e) relationship. In addition, the scoring is changed to three global levels: “Satisfactory,” “Possible problem,” or “Definite problem” for each area. “Definite problem” or two “Possible problems” on the m-AADB indicates that the infant required further assessment.

Mother infant relationship was assessed by LB based on clinical evaluation using the parent-infant relationship global assessment scale (PIR-GAS) (17). The PIR-GAS allows for a global rating of the quality of a parent-infant (or parent–child) relationship on a numerical scale, with higher scores indicating higher relationship quality. We used the original score, which classifies the quality of relationship as follows. 90: well adapted, 80: adapted, 70: perturbed, 60 significantly perturbed, 50: distressed, 40: disturbed, 30: disordered, 20: severely disordered, and 10: grossly impaired (18).

When parents gave consent, we made a video of mother infant interaction. Mothers freely fed or played with their child either at home or at the parenting support center. Videos were analyzed offline by a trained child psychiatrist (SVS) blinded to the perinatal history, using the Coding Interactive Behavior (CIB) New-born and Feeding Scale (19, 20) using a validated French version (21). The CIB is a global rating system of parent-child interaction that contains micro-level codes and global rating scales. Each code is rated from 1 (a little) to 5 (a lot). Forty-two different codes are grouped into several interactive composites. Six composites were used in the current study focusing on the mother (N = 2), the

infant (N = 2) and the dyad (N = 2). (1) Maternal sensitivity was the average of maternal acknowledgment of infant interactive signals, imitation and elaboration of the infant's behavior, gaze directed to the infant or joint activity, appropriate tone of voice/motherese, expression of appropriate range of affect, resourcefulness in dealing with infant negative states, affectionate touch, supportive presence, and infant-led interaction, i.e. mother focusing on the child's needs and state. (2) Maternal intrusiveness was the average of maternal inappropriate physical manipulation, mother overriding behavior (i.e. mother disregarding the infant's signals and interrupting the infant's ongoing behavior), maternal anxiety, maternal negative affect/anger toward the baby, maternal criticizing of infant's behavior, and mother-led interaction (i.e. interactions being led by the mother's needs rather than infant's needs, pace, and agenda). (3) Dyadic reciprocity was the average of the mother's elaboration of the infant's vocalizations and movements, maternal gaze directed to the infant, child gaze directed to mother or joint activity, verbal praise of the infant's behavior, affectionate touch and enthusiasm, infant vocalization, warm and positive affect for both parent and child, dyadic adaptation – regulation, and fluency of the interaction. (4) Negative dyadic status was the average of maternal negative affect/anger, mother's hostility behavior, child's negative or labile affect, withdrawal of the infant from the environment, dyad constriction, and expression of tension. (5) Infant avoidance was the average of the child's avoidance behavior toward the mother, child's negative and labile affect, and withdrawal from the environment. (6) Infant social engagement was the average of joint attention, child positive affect, affection to parent, alertness, low fatigue, vocalizations/verbal output, initiation, competent use of the environment, and infant-led interaction.

During the post-partum visit, we also recorded somatic and psychological events that occurred before pregnancy, during pregnancy, and post-partum. We recorded the needs expressed by women regarding medical care, psychological, social, and environmental support (self-administered questionnaire). We recorded child protection legal decisions if applicable.

Data management and analysis

As for data management, we used an electronic research form from Ad Scientiam, Paris, France. Data were stored anonymously, according to a procedure authorized by the *Comité Consultatif sur le traitement de l'information en matière de recherche* or CCTIRS, an independent agency of the French government. Most statistics were descriptive and exploratory.. To compare the distribution of CIB dimensions to that of controls, we used videos from dyads enrolled as controls in a previous study. (22). We compared the median score for each dimension in the 15 cases who consented to video recordings to 13 controls using a bilateral Mann and Whitney non-parametric test. Statistics were run using StatView, Abacus Concept California USA.

Results

Mothers' medical characteristics

Maternal age ranged from 26 to 41 years (mean 31,6 years). Ten women were included during pregnancy and 12 in the postnatal period. Eleven participants were primigravidae. Eleven had had a previous pregnancy, of which 7 had had 1, one had had 2, and three had had 3 previous pregnancies. Out of the 18 previous pregnancies, there were 7 spontaneous fetal losses < 24 weeks, two abortions for social reasons, 1 intrauterine death > 24 weeks, 1 premature live birth, and 7 term live births.

The type of motor impairment is displayed on table 1 and associated disabilities and Barthel scores are displayed on table 2.

Regarding emotional status, at inclusion the mean Spielberger YB trait score was 42.6 (SD 9.7). It was greater than 42 in 9 cases (range: 50–68). The mean Spielberger YA state score was 41.1 (SD 15.2). It was greater than 42 in 10 cases (range: 48–61).

At the post-natal visit, the mean EPDS score was 6.2 (SD 4.2). It was greater than 12 in two cases (13 and 16) and greater than 10 in three. The mean Spielberger YA state score was 34.7 (SD 12.0). It was greater than 42 in 5 cases (range 44–68)

Social context

Twenty-one participants lived with a husband or partner. One was single. Six worked full time, and 4 part-time, 3 were unemployed, 1 was a student, 8 declared they were housewives. Seventeen of their partners worked full time and four were unemployed. One partner had epidermolysis bullosa. The others did not suffer from any chronic disease. Fifteen participants received social benefits. Twenty lived in their own home, and two lived at a relative. Fifteen considered their home was adapted to their disability, and 7 declared it was not.

Educational level was as follows: master degree (n = 8), Bachelor (n = 6), upper secondary education (n = 3), did not complete secondary education (n = 4)

Regarding social deprivation, 7/22 (32%) had an Epices score above 30, i.e. belonged to the quintiles 4 and 5 of social deprivation in France (4). The mean Cutrona social support score was 77 (SEM 1.9 ; SD 9.0), similar to what is expected in the general population (7).

Obstetrical history and perinatal outcome

Twenty-one pregnancies were spontaneous, and one resulted from intra uterine insemination. Nineteen pregnancies were planned; three were unplanned, yet welcome.

Regarding obstetrical complications, there were 4 gestational diabetes, one pre-eclampsia. There were 9 caesareans, 6 assisted vaginal deliveries, and 7 spontaneous vaginal deliveries. Epidural or spinal anesthesia was provided in 16 cases, 4 women labored under opioids, and two caesarean sections were performed under general anesthesia.

Participants gave birth to 13 girls 9 boys. 8 were bottle-fed, 14 were breast-fed. There were 20 term live births and 2 premature deliveries at 35 and 36 weeks. One neonate required resuscitation maneuvers in the labor ward. Twenty-one did not: two had 5 minutes Apgar scores at 9 and nineteen at 10. Four neonates were transferred to NICU (2 respiratory distresses, 1 hypoglycemia, 1 cephalhematoma). All babies were eventually alive and well at discharge. They all lived with their mother. No legal measure was taken for child protection.

Child development and mother-infant interaction

We performed the post-natal visit at three months in 10 cases, at four months in 2, at eleven months in 2, and at twelve months in 8.

As for mothers' self-perception regarding independence for baby care activity, 21 participants declared they felt independent for playing with their baby, 20 for cuddling, 19 for feeding, 19 for calming the baby, 15 for dressing it up, 12 for outings, and 10 for body care such as changing, cleaning or bathing the baby. Only 6 participants declared they considered themselves as independent for all the above activities. Declared independence regarding baby care activities did not correlate with the reported independence for self-care as assessed by the Barthel Index (Fig. 1).

Child development, assessed by the distribution of the Brunet Lezine score was within normal range for all infants (mean, 99.8; range 91–109) Regarding the M-ADBB scale, no infant was considered as having a "definite problem" and

5/22 (22%) were considered as having two “possible problems”, i.e. were positive for withdrawal screening. Based on PIR-GAS scoring, mother-infant relationship was considered well adapted in 2 cases, adapted in 8, perturbed in 7, significantly perturbed in 2, and distressed in 3, with a mean score of 71.8 (95% confidence interval: 49.6–93.9). The five infants positive for M-ADBB withdrawal screening belonged to dyads with perturbed ($n = 2$), significantly perturbed ($n = 2$) or distressed ($n = 1$) mother-infant relationships assessed by PIR-GAS score. PIR-GAS scores were not correlated to the degree of motor impairment (Fig. 2), to the independence women perceived in their daily life (Bathel index), to the age at which the disease started, to the indices of social support or of social deprivation, to the scores of anxiety and depression (data not shown).

Finally, Fig. 3 displays the distribution of CIB scores in participants compared to controls. The median score for infant engagement was significantly lower and the median score for infant avoidance was significantly greater in dyads with maternal motor impairment than in control ones.

Discussion

Our results suggest that in selected cases, with dedicated perinatal and parenting support, women with motor impairment resulting from a rare condition can achieve a successful pregnancy with a good short-term outcome in terms of infant development and health, and a reasonably good outcome in terms of mother-infant interactions. There was no correlation between the quality of mother-infant interactions and the degree of motor impairment. In addition, independence in daily activities did not predict independence for baby care. Half of the women who considered themselves as nearly or thoroughly independent in daily activities declared that they were not for at least one parenting activities. All women with dependency in daily activity also felt dependent for parenting.

To the best of our knowledge, our exploratory study is the first to provide an insight on child development and mother-infant interactions in women with rare motor disabilities. Previous studies focused on fecundity (23–25), health care consumption (26, 27), the risk of post-partum depression (28), somatic perinatal and maternal outcome (29–31), on women’s expectations (32–36), and on the opinion of professional (37, 38) or lay people (39).

Consequently, to date, recommendations were issued based mainly on the opinions of experts (40, 41). We choose to focus on infant development and mother-child interaction using a comprehensive clinical approach in an attempt at assessing whether the environment provided by disabled mothers could lead to a normal infant development, and if motor impairment was associated with difficulties in mother- infant interactions.

Our study should be regarded as exploratory given its numerous limitations. First, we failed to follow our initial plan. To start with, we intended to use women with traumatic spine injury as a comparison group with women having a rare disease. We failed to recruit such pregnant women, because one of the obstetrical teams that was to be part of the project withdrew before we started inclusions. This made it impossible for us to determine the specific role of the etiology of the motor deficiency on parenthood. Second, our sample size was small, and self-selection of participants hampers generalization of our results. Pregnant women or young mothers who decided to participate may represent a group of persons less socially deprived and more educated than the average patients we take care of. Eventually, generalization of our results should take into account the fact that participants received intense pre and post-natal parenting support from a dedicated institution, which is likely to have gradually optimized care since one of the authors (ET) started it by the mid 1980’s.

Interpreting our results in terms of outcome is complex. Short-term child development was unarguably standard. The rate of PIR-GAS scoring considered, perturbed or distressed was slightly above 50%. This is more than expected in the general population; i.e. around 20–30% (42), but slightly less than what has been found in dyads following a

premature delivery (43). The fact that no PIR-GAS score was below 50 is reassuring, suggesting there was no case of child neglect. However, CIB assessment evidenced that infants are aware of their mothers' difficulties. Despite normal CIB maternal and dyadic scores, we found that the median infant avoidance score was greater and the infant engagement lower in dyads with maternal motor impairment than in controls. These differences are mild, yet statistically significant. Their magnitude is not greater than what we observed in women with no impairment who had a normal baby, but had been exposed to the prenatal finding of a minor variant at fetal screening ultrasound (Viaux-Savelon et al. 2012). These findings support the idea that parenting support should be continued after the first year of the infant.

Interestingly, low PIR-GAS scores were not correlated to the degree of motor impairment, to the independence women perceived in their daily life, to the age at which the disease started, to the indices of social support or of social deprivation, to the scores of anxiety and depression. This suggests that parenting is a complex process whose success cannot be anticipated by gross indicators such as motor impairment. It is also possible that we could not predict PIR-GAS based on maternal characteristics because factors we did not study play a key role, for example the situation of the co-parent and the family at large.

The fact that declared independence for baby care did not match with declared independence in daily life assessed by the Barthel index was striking. This suggests that disability in parenting activity should be compensated specifically, even in persons who otherwise declare they achieve independence in daily activities.

In conclusion, our results support the hypothesis that at least in the short run, women with motor deficiencies resulting from rare conditions may become successful parents. Parenting difficulties may occur, however, underlying the need for support based on what mothers express and on the clinical evaluation of mother infant interaction.

Declarations

Ethics

The ethic committee "CPP Ile de France VI" approved the study on April 26th 2016

Consent for publication

The manuscript contains no individual person's data in any form. Participants gave written consent to enrol in the study, and that their data be analysed anonymously for research and publication purposes. For data involving their child, written consent was obtained from both parents.

Availability of data and materials

All data can be made available on request

Competing interest

None

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Authors' contribution

All authors contributed

Marc Dommergues,

Designed of the study, data analysis, writing the manuscript

Drina Candilis,

Design of the study, contributed in writing the manuscript

Ludivine Becerra,

Did the interviews, collected data, contributed in writing the manuscript

Edith Thoueille

Design of the study,

David Cohen

Contributed in writing the manuscript

Sylvie Viaux-Savelon

Design of the study, analysed the coding interactive behaviour, contributed in writing the manuscript

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Clinical trial registration

<https://clinicaltrials.gov/ct2/show/NCT02727010?term=MMOMA&rank=1>

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Tables

Table 1: Motor impairment						
Case number	Type of impairment	Movement disorders	Disease	Pathophysiology	Transmission	Risk for offspring
	Bilateral upper and lower limbs					
1	Tetraparesis	No	Type 2 spinal muscular atrophy	Genetic	Autosomal recessive	Low
2	Tetraparesis	Yes	Type 2 spinal muscular atrophy	Genetic	Autosomal recessive	Low
3	Tetraparesis	Yes	Mitochondrial disorder	Genetic	Mitochondrial	Uncertain
4	Tetraparesis	Yes	Charcot Marie Tooth disease	Genetic	Autosomal recessive	Low
5	Tetraparesis	No	Autosomal dominant Myopathy	Genetic	Autosomal dominant	High
6	Tetraparesis	Yes	Cervical Hemangioma, C2-C3	Stroke	Sporadic	Low
7	Bone / joints disorders	No	Juvenile chronic arthritis	inflammatory	Sporadic	Low
8	Bone / joints disorders	No	Ehlers-Danlos Syndrome	Genetic	Autosomal dominant	High
9	Bone / joints disorders	No	Ehlers-Danlos Syndrome	Genetic	Autosomal dominant	High
10	Ectrodactyly	No	Ectrodactyly of left upper limb, agenesis of right lower limb and left upper limb	Genetic	Autosomal dominant ?	Uncertain
	Unilateral					
11	Congenital Hemiplegia	Yes	Cerebral palsy	Birth asphyxia	Sporadic	Low
12	Congenital Hemiplegia	Yes	Brain malformation	Malformation	Sporadic	Low
13	Hemiparesis	Yes	Left hemiparesis	Stroke	Sporadic	Low
14	Upper limb paresis	No	Brachial plexus birth injury	Birth injury	Sporadic	Low
15	Upper limb paralysis	Yes	Brachial plexus birth injury	Birth injury	Sporadic	Low

Table 1: Motor impairment						
16	Amputation	No	Congenital agenesis of a forearm	Malformation	Sporadic	Low
17	Amputation	No	Traumatic amputation of an arm	Trauma	Sporadic	Low
	Bilateral lower limbs					
18	Paraparesis	Yes	Friedreich's ataxia	Genetic	Autosomal recessive	Low
19	Paraparesis	Yes	Spinocerebellar ataxia	Genetic	Autosomal dominant	High
20	Paraparesis	No	Autoimmune myopathy	inflammatory	Sporadic	Low
21	Brown-Sequard syndrome	No	Spinal astrocytoma	Tumor	Sporadic	Low
	Movement disorder					
22	Distal tremor	yes	Tetrahydrobiopterin deficiency	Genetic	Autosomal recessive	Low

Table 2. Associated non-motor disabilities and Barthel index

Case number	Dyspnea	Impaired vision	Impaired hearing	Hypoesthesia	Pain (past week)	Speech impairment	Barthel Index
1	Yes	No	No	No	4/10 and less	No	30
2	Yes	No	No	No	5/10 and more	No	30
3	No	No	No	No	4/10 and less	No	90
4	No	No	No	Yes	5/10 and more	No	60
5	No	No	No	No	4/10 and less	No	100
6	No	No	No	No	5/10 and more	No	95
7	Yes	No	No	No	4/10 and less	No	50
8	Yes	No	Yes	Yes	5/10 and more	No	70
9	Yes	No	No	Yes	4/10 and less	No	100
10	No	No	No	No	5/10 and more	No	85
11	No	No	Yes	Yes	5/10 and more	No	60
12	No	No	No	No	4/10 and less	Yes	75
13	No	Yes	No	Yes	5/10 and more	Yes	95
14	No	No	No	Yes	4/10 and less	No	100
15	No	No	No	Yes	5/10 and more	No	90
16	No	No	No	No	5/10 and more	No	100
17	No	No	No	Yes	5/10 and more	No	100
18	No	No	Yes	No	4/10 and less	Yes	55
19	No	Yes	Yes	No	4/10 and less	Yes	90
20	No	No	No	No	4/10 and less	No	85
21	No	No	No	Yes	5/10 and more	No	95
22	No	No	No	No	4/10 and less	No	100

Figures

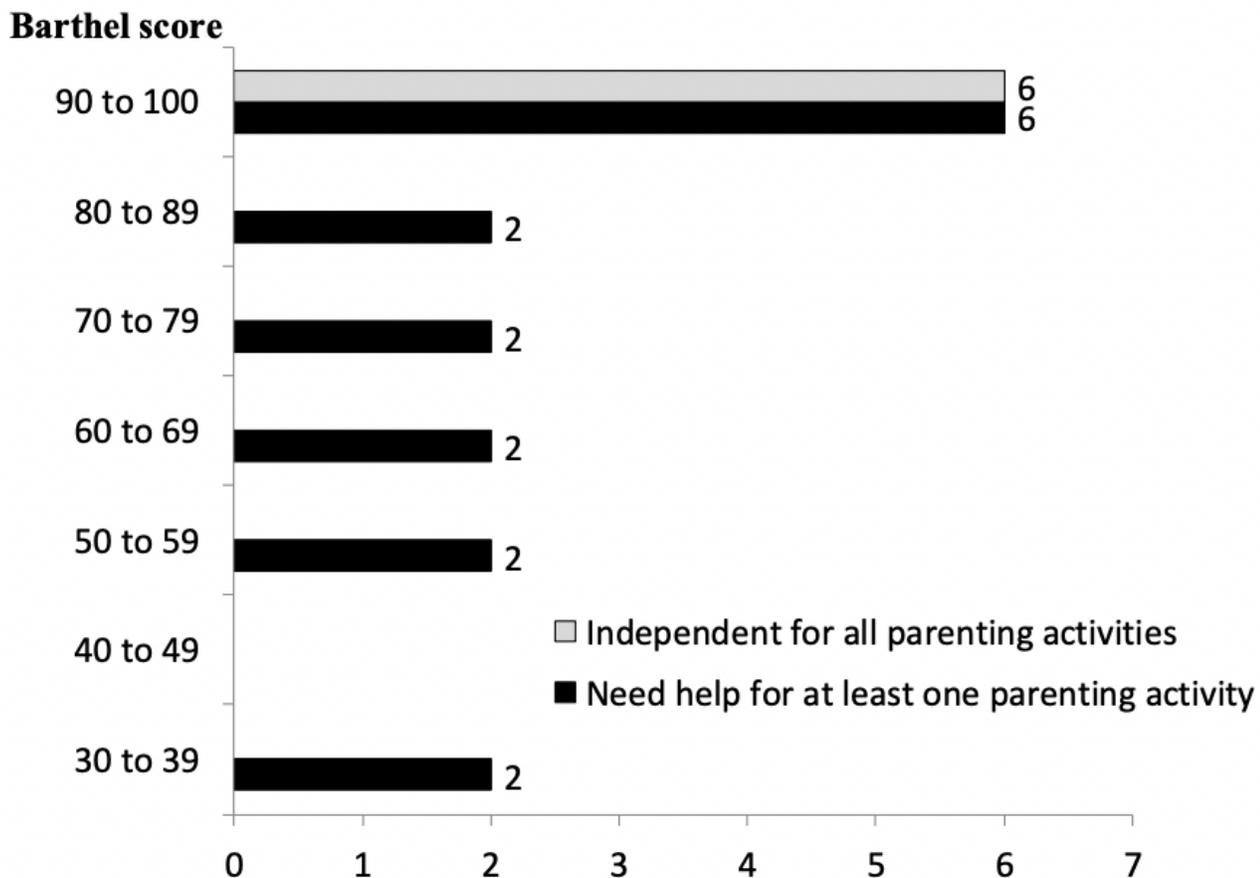


Figure 1

Barthel score and independence for parenting activities. Note: All women with Barthel score < 90 (i.e. dependent for daily activity) felt dependent for at least one parenting activity. Six of 12 women with Barthel score \geq 90 (i.e. independent or nearly independent for daily activity) felt dependent for at least one parenting activity.

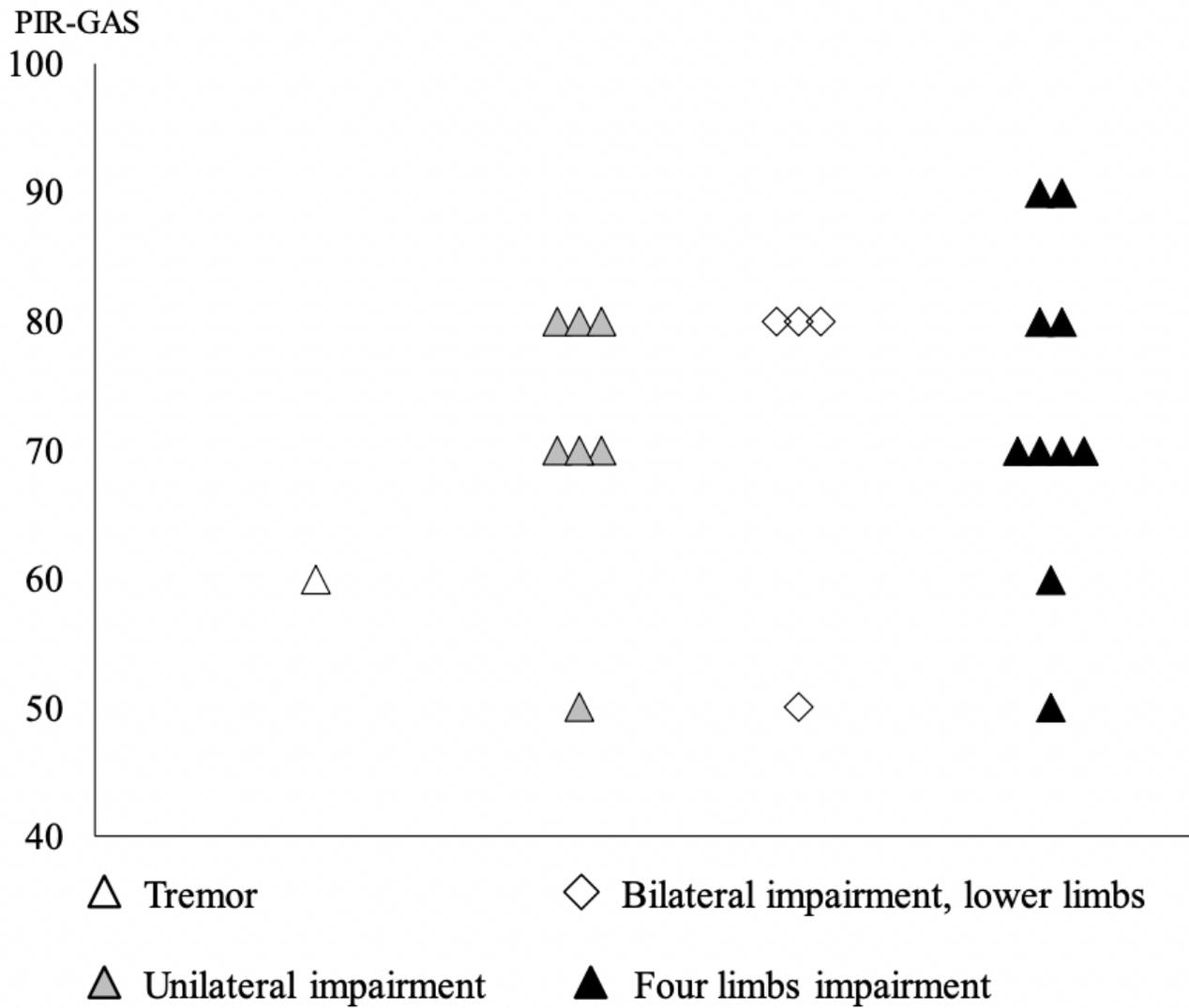


Figure 2

PIR-GAS and motor impairment. Note: Parent-Infant Global Assessment Score (PIR-GAS) was independent from the type of motor impairment

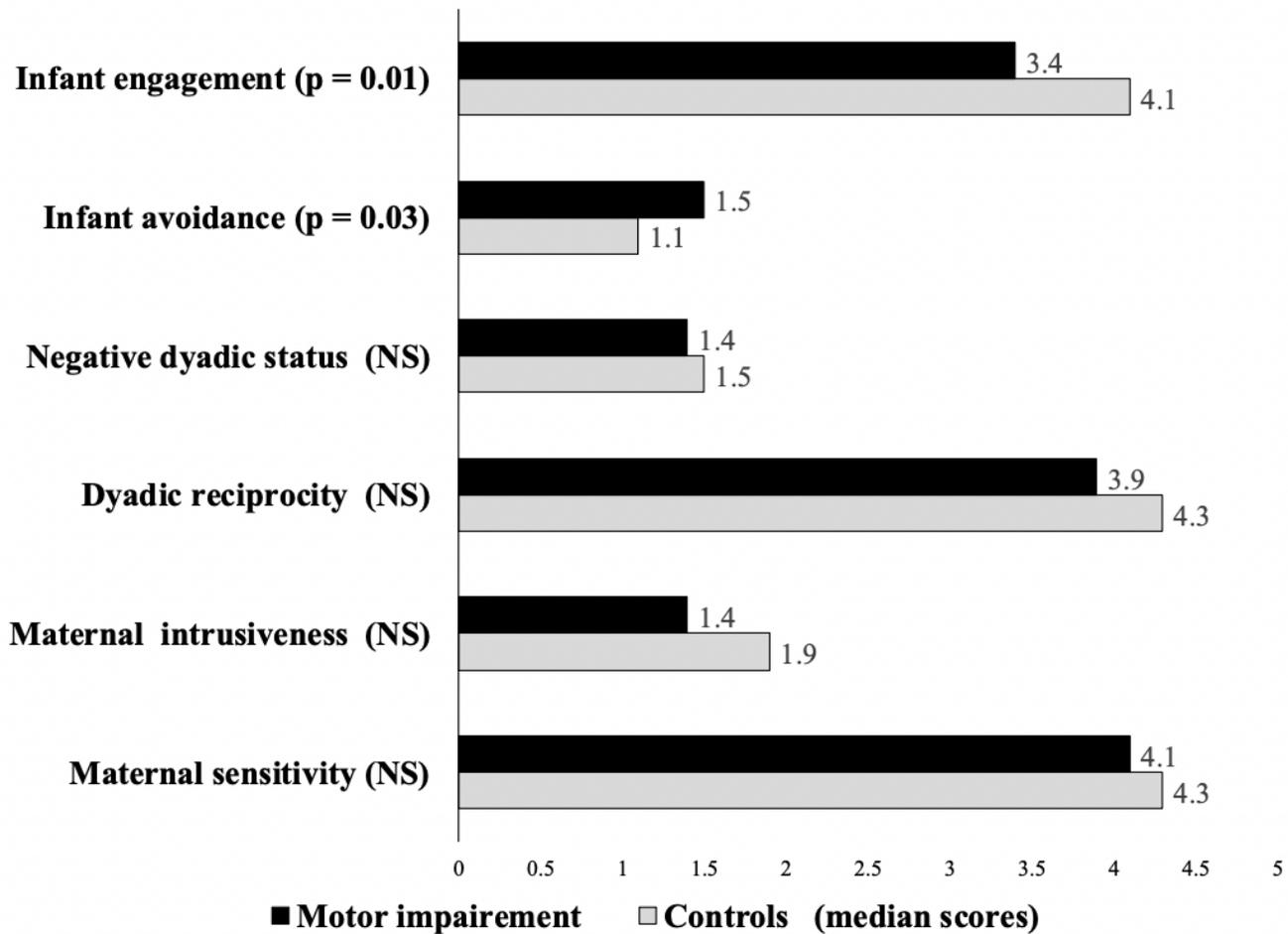


Figure 3

Coding interactive behavior: cases vs. controls. Note: Mother-infant interactions were significantly different regarding infant engagement towards the mother and infant avoidance of the mother in dyads with maternal motor disability compared to control dyads without maternal disability.