

Effect of Preterm Premature Rupture of Membranes on Neurodevelopmental Outcome of Infants among Preterm Infants Born at Hawassa Comprehensive Specialized Hospital of Sidama Region, Ethiopia, 2022

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Abstract

To verify whether preterm premature rupture of membranes has effect on neurodevelopmental outcome of Infant among preterm infants born at Hawassa Comprehensive Specialized Hospital of Sidama region, Ethiopia, 2022. A prospective cohort study design will be conducted for 2 years and 6 months from March 1 /2022 to August 30 /2024 . A total of 12 Midwives. 6 supervisors and 1 pediatric neurologist or psychiatrist will be involved in the data collection process.. All preterm infants will be recruited consecutively from preterm infants admitted to neonatal intensive care unit from March 1 /2022 to August 30/2022. The preterm infants will be categorized into Exposed group (preterm infants born after preterm PROM) and non-exposed group (preterm infants born after spontaneous preterm labour).and followed until 2 years of age to assess neurodevelopmental outcome of infants The data will be entered into Epidata software and exported to SPSS software for windows version 23. for analysis. Descriptive statistics will be computed. One-way Anova and post hoc comparisons with Scheffe's procedure will be used X2 test or Fisher's exact test will be used to compare categorical variables The study will be conducted from March 1 /2022 to August 30 /2024.

Key words: preterm premature rupture of membranes; neurodevelopmental outcome of Infant.

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1. Objective

To verify whether preterm premature rupture of membranes has effect on neurodevelopmental outcome of Infant among preterm infants born at Hawassa Comprehensive Specialized Hospital of Sidama region, Ethiopia, 2022.

2. Materials and Methods

2.1 Study area

Hawassa Comprehensive Specialized Hospital

2.2 Study design

A prospective cohort study design will be conducted for 2 years and 6 months from March 1 /2022 to August 30 /2024

2.3 Source population

All preterm infants born at Hawassa Comprehensive Specialised Hospital of Sidama region.

2.4 Study population

All preterm infants born at Hawassa Comprehensive Specialised Hospital and admitted to the neonatal intensive care unit from March 1/2022 to August 30/2022 and meet inclusion criteria

2.5 Eligibility criteria

Inclusion Criteria

Mother has no medical complications during pregnancy

Fetus born alive

Permanent resident in Sidama Region

Exclusion Criteria

Severe malformation

Children with genetic disorders

2.6 Sample size determination

Given the observational nature of the study, no data from the previous study about the proportion of neurodevelopmental disability among preterm infants born from preterm premature rupture of membrane and to obtain sufficient exposed group the is preterm infants born from preterm premature rupture of membrane in a reasonable period of time, we did not calculate a sample size.

2.7 Sampling techniques

All preterm infants will be recruited consecutively from preterm infants admitted to neonatal intensive care unit from March 1 /2022 to August 30/2022. The preterm infants will be categorized into Exposed group (preterm infants born after preterm PROM) and non-exposed group (preterm infants born after spontaneous preterm labour). and followed until 2 years of age to assess neurodevelopmental outcome of infants

2.8 Study variables

Dependent variable: neurodevelopmental outcome of infants

Independent variable

- Socio-demographic factors
- Birth weight
- Gestational Age
- Previous low birth weight
- Previous abortions

2.9 Operational definitions

Preterm PROM was diagnosed when membrane rupture occurred in the absence of regular uterine contractions and the time from membrane rupture to delivery was greater than 12 h;

Spontaneous preterm labour was defined as the presence of regular, painful contractions (more than four in 30 min) with intact membranes or, if membrane rupture had preceded the onset of regular uterine contractions, the time from rupture to delivery was 12 h or less [1]

2.10 Data collection procedure

Maternal sociodemographic. Clinical and obstetrics variables will be collected using a structured questionnaire. The diagnosis of PROM will be based on clinical assessment, and ultrasonography findings

Neurodevelopmental examination of the infants will be done by a child neuro psychiatrist or neurologist not involved in the intensive care of the infants and unaware of maternal and neonatal history.

Examinations will be done at discharge from hospital and at 3 month, 6 month, 12 month and 24 months of corrected age.

Neurological evaluation of the newborns will be based on the methods of Amiel-Tison neurological assessment [2]

The Bayley scales of infant development will be used to assess cognitive development (Mental Developmental Index (MDI)) [3]

Infants will be grouped into three categories of outcome according to their final examination:

An overall level of impairment was defined based on the worst outcome from the 5 domains

Instead of classifying impairments into ‘none’, ‘mild- moderate’ and ‘severe’ impairment, we classify as none, mild, Moderate –severe impairment

Participants who receive a positive response to the following questions into the ‘moderate-severe’ category: with spastic diplegia or hemiplegia or spastic tetraplegia according to neurological examination

D2 Is the child’s development between 6-12 months behind corrected age?

RC1 Does this child have difficulty with understanding outside of familiar context?

EC2 Does this child have difficulty with speech (<10 words/signs)?

FM2 Does this child have difficulty with the use of both hands?

GM2 Is this child’s gait non-fluent or abnormal reducing mobility

GM4 Is this child unstable or needs to be supported when sitting?

Participants who received a positive response to any of the other questions are classified as having mild impairment with abnormalities of tone or reflexes according to neurological examination

A total of 12 Midwives, 6 supervisors and 1 pediatric neurologist or psychiatrist will be involved in the data collection process.

2.11 Data quality control

Three day intensive training will be given on how to assess the cognitive development (Mental Developmental Index (MDI)) and on interviewing techniques using standard checklist and structured questionnaire. Supervision will be conducted. Double data entry will be done and the questionnaire will be pretested on 5 % of total sample size at Dila referral Hospital During data collection, continuous supervision will be done by the supervisors and principal investigator.

2.12 Data processing and analysis

The data will be entered into Epidata software and exported to SPSS software for windows version 23. for analysis. Descriptive statistics will be computed

One-way Anova and post hoc comparisons with Scheffe's procedure will be used

X2 test or Fisher's exact test will be used to compare categorical variables

2.13 Ethical consideration

Prior to data collection appropriate ethical clearance and supportive letter will be obtained from the Ethical Review Committee of Hawassa College of Health Science. Written permission will be obtained to undertake the study from Hawassa Referral Hospital. Participation in the study will be based on voluntary base and the participants will be informed about the right to withdraw at any time from the study. Confidentiality will be assured by using anonymity\

During the period of the study it will be the responsibility of Hawassa referral hospital to manage PROM as well as pre term infants. Preterm infants with neurodevelopment impairment will be linked to appropriate intervention service

Written consent will be requested from mothers/care givers during data collection time after explaining the objectives of the study. For this purpose, a one page consent letter was attached to the cover page of each questionnaire stating about the general objective of the study and issues of confidentiality which was discussed by the data collectors before proceeding with the interview

References

- [1]. Caughey AB, Robinson JN, Norwitz ER. Contemporary diagnosis and management of preterm premature rupture of membranes. *Rev Obstet Gynecol.* 2008;1(1):11-22.
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- [3]. Balasundaram P, Avulakunta ID. Bayley Scales Of Infant and Toddler Development. [Updated 2020 Dec 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK567715/>

Questionnaire on Neurodevelopmental outcomes of preterm infants

Questions

Development (Cognitive)

- D1 Is the child's development between 3-6 months behind corrected age?
- D2 Is the child's development between 6-12 months behind corrected age?
- D3 Is the child's development more than 12 months behind corrected age?

Receptive communication

- RC1 Does this child have difficulty with understanding outside of familiar context?
- RC2 Is this child unable to understand words or signs?

Expressive communication

- EC1 Does this child have any difficulty with communication?
- EC2 Does this child have difficulty with speech (<10 words/signs)?
- EC3 Does the child have <5 meaningful words, vocalisation or signs?

Fine motor

- FM1 Does this child have any difficulty with the use of one hand?
- FM2 Does this child have difficulty with the use of both hands?
- FM3 Is this child unable to use hands (i.e. to feed)?

Gross motor

- GM1 Does this child have any difficulty walking?
- GM2 Is this child's gait non-fluent or abnormal reducing mobility?
- GM3 Is this child unable to walk without assistance?
- GM4 Is this child unstable or needs to be supported when sitting?

GM5 Is this child unable to sit?

A positive response to any of the questions implied the presence of impairment. Questions D3, RC2, EC3, FM3, GM3 and GM5 denote the criteria for severe impairment.

Additional information on whether the child was diagnosed with cerebral palsy, were also entered

In addition gestation at birth, birth weight, sex, ethnicity, singleton or multiple pregnancy, mode of delivery, days of mechanical ventilation, oxygen therapy at 36 weeks' corrected gestational age, maternal ag

A missing response does not count as a 'no'; therefore complete data entry is required to assign participants as having no impairment

An overall level of impairment was defined based on the worst outcome from the 5 domains

Instead of classifying impairments into 'none', 'mild- moderate' and 'severe' impairment, we classify as none, mild, Moderate –severe impairment

Participants who receive a positive response to the following questions into the 'moderate-severe' category:

D2 Is the child's development between 6-12 months behind corrected age?

RC1 Does this child have difficulty with understanding outside of familiar context?

EC2 Does this child have difficulty with speech (<10 words/signs)?

FM2 Does this child have difficulty with the use of both hands?

GM2 Is this child's gait non-fluent or abnormal reducing mobility?

GM4 Is this child unstable or needs to be supported when sitting

Participants who received a positive response to any of the other questions are classified as having mild impairment.

Section A: General information

Table 1

Study Number:		
Gender: Male ☐ Female ☐		
Gestational age at birth:		
Years	Months	Days
Date of assessment:		
EDD:		
Adjusted age: (in months and days)		

Consultant Paediatrician:

Permission to forward
results to Paediatrician: ☐

General Practitioner:

Permission to forward
results to GP: ☐

**What is (are) the main
language(s) spoken at
home?**

Child accompanied by:

Mother ☐ Father ☐ Others ☐

please specify: _____

Site: _____

Section b: neurosensory information

Visual or eye problem

	Left eye	Right eye
Is there a visual or eye defect of any type present?	Yes ☐	Yes ☐
	No ☐	No ☐

Does the child wear glasses?	Yes ☐	No ☐
------------------------------	------------------------------	-----------------------------

Usual vision (with glasses with worn)

Normal	☐	Impaired
or near normal	☐	but appears to have useful
vision	☐	Sees light or gross
movement only	☐	

No useful vision (blind) ☐

Is there a squint present?	Left ☐	Right ☐	No ☐
Are there abnormal eye movement present	Left ☐	Right ☐	No ☐
Has the child had any ophthalmic assessment or intervention?	Left ☐	Right ☐	No ☐

If yes, please describe

Details of ophthalmic specialist (if applicable):

Other comments: (including any parental concerns regarding the child's vision)

Hearing problem

	<i>Left ear</i>	<i>Right ear</i>
Is there a hearing impairment of any type present?	Yes ☐	Yes ☐
	No ☐	No ☐

Does the child normally wear aids?	Left ☐	Right ☐	No ☐
Usual hearing (with aids if worn)			
Normal or near normal ☐			
Hearing loss corrected with aids ☐			
Some hearing but loss not corrected by aids ☐			
No useful hearing even with aids ☐			

Has the child had any hearing assessment or intervention?	Left ☐	Right ☐	No ☐
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If yes, please describe

Details of hearing specialist

(if applicable):

Other comments: *(including any parental concerns regarding the child's hearing)*

Section c: neurological examination**Scores****Table 2**

Cranial Nerves (Max 15)	Posture (Max 18)	Movements (Max 6)	Tone (Max 24)	Reflexes (Max 15)	Total (Max 78)
			R	R	R
			L	L	L

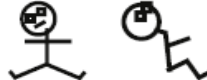
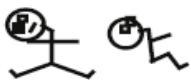
Overall comments:

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Cranial nerve function**Table 3**

	Score 3	Score 2	Score 1	Score 0	Score
Facial appearance (at rest and when crying or stimulated)	smiles or reacts to stimuli by closing eyes and grimacing		closes eyes but not tightly poor facial expression	expressionless, does not react to stimuli	
Eye appearance	normal conjugated eye movements		Intermittent deviation of eyes or abnormal movements	continuous deviation of eyes or abnormal movements	
Auditory response test the response to rattle or bell	reacts to stimuli on both sides		doubtful reaction to stimuli or asymmetrical	does not react to stimuli	
Visual response test the ability to follow a red ball or moving object	follows the object for a complete arc		follows the object for an incomplete arc or asymmetry	does not follow the object	
Sucking/swallowing watch the infant suck on breast or bottle	good suck and swallowing,		poor suck and/or swallowing	no sucking reflex no swallowing	

POSTURE

	Score 3	Score 2	Score 1	Score 0	Score
Head in sitting	 straight; in midline		 slightly to side or backward or forward	 markedly to side or backward or forward	
Trunk in sitting	 straight		 slightly curved or bent to side	 very rounded rocking back bent sideways	
Arms at rest	in neutral position, central straight or slightly bent		slight internal rotation or external rotation intermittent dystonic posture	marked internal rotation or external rotation or dystonic posture hemiplegic posture	
Hands	hands open		intermittent adducted thumb or fisting	persistent adducted thumb or fisting	
Legs in sitting in supine and in standing	able to sit with straight back and legs straight or slightly bent (long sitting) legs in neutral position; straight or slightly bent	slight internal rotation or external rotation	sit with straight back but knees bent at 15-20 ° internal rotation or external rotation at hips	unable to sit straight unless knees markedly bent (no long sitting) marked internal rotation or external rotation or fixed extension or flexion or contractures at hips and knees	
Feet in supine and in standing	central; in neutral position toes straight midway between flexion and extension		slight internal rotation or external rotation intermittent tendency to stand on tiptoes or toes up or curling under	marked internal rotation or external rotation at the ankle persistent tendency to stand on tiptoes or toes up or curling under	

MOVEMENTS

	Score 3	Score 2	Score 1	Score 0	Score
Quantity Watch infant lying in supine	Normal		Excessive or sluggish	Minimal or none	
Quality	Free, alternating, and smooth		Jerky, Slight tremor	• Cramped & synchronous, • Extensor spasms, • Athetoid; • Ataxic, • Very tremulous, • Myoclonic spasm • Dystonic movement	

Figure 1

TONE

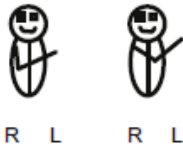
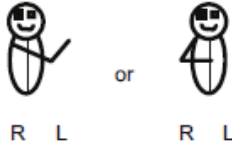
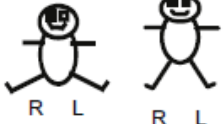
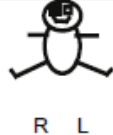
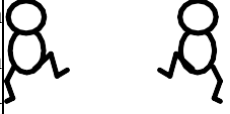
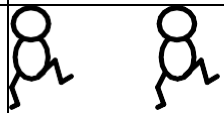
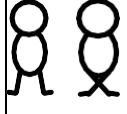
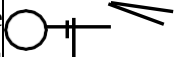
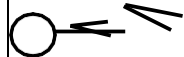
	Score 3	Score 2	Score 1	Score 0	Score
Scarf sign Take the infant's hand and pull the arm across the chest until there is resistance. Note the position of the elbow.	Range:  R L R L		 R L	 R L or R L	R L
Passive shoulder elevation Lift arm next to the infant's head. Note resistance at shoulder and elbow.	resistance but overcomeable  R L	resistance difficult to overcome R L	no resistance  R L	resistance, not overcomeable  R L	R L
Pronation/ supination Steady upper arm while pronating and supinating forearm, note resistance	full pronation and supination, no resistance R L		full pronation and supination but resistance to be overcome R L	full pronation and supination not possible, marked resistance R L	R L
Adductors With the infant's legs extended, open them as far as possible. The angle formed by the legs is noted.	Range: 150°-80°  R L R L	150°-160°  R L	>170°  R L	<80°  R L	R L
Popliteal angle Legs are flexed at the hip simultaneously on to the side of the abdomen, then extended at the knee until there is resistance. Note angle between lower and upper leg.	Range: 100°-150°  R L R L	150°-160°  R L	90° or >170°  R L R L	<80°  R L	R L
Ankle dorsiflexion With knee extended, dorsiflex ankle. Note the angle between foot and leg.	Range: 30°- 85°  R L R L	20°-30°  R L	<20° or 90°  R L R L	>90°  R L	R L
Pulled to sit Pull infant to sit by wrists					
Ventral suspension Hold infant in ventral suspension; note position of back, limbs and head					

Figure 2

Reflexes and reactions

Table 4

	Score 3	Score 2	Score 1	Score 0	Score
Tendon reflexes	easily elicitable	mild brisk	Brisk	clonus or absent	
Arm protection Pull the infant by one arm from the supine position and note the reaction of the opposite side.	 arm & hand extended R L	 arm semi-flexed L	 arm fully flexed L	 arm fully flexed R L	R L
Vertical suspension hold infant under axilla make sure legs do not touch any surface	 kicks symmetrically		 kicks one leg more, or poor kicking	 no kicking even if stimulated, or scissoring	
Lateral tilting (describe side up). Infant held vertically tilt quickly to horizontal. Note spine, limbs and head	 R L	 R L	 R L	 R L	R L
Forward parachute Infant held vertically and suddenly tilted forward. Note reaction of the arms.	 asymmetrical partial				

Section d: assessment of cerebral palsy

Cerebral palsy algorithm

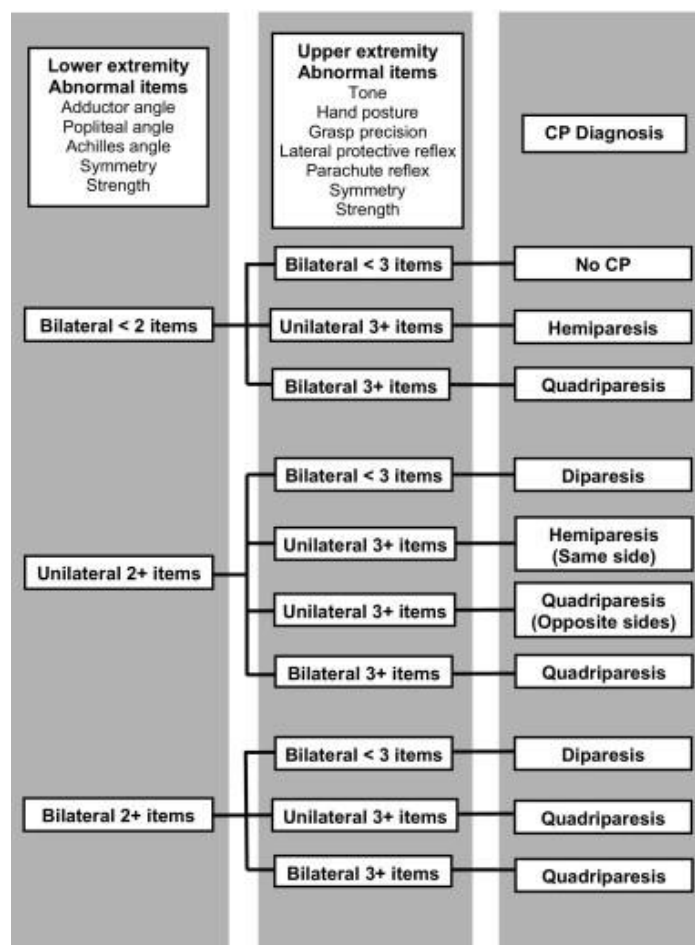


Figure 3

NO CEREBRAL PALSY

Classification of cerebral palsy

- | | | |
|-------------------|--|--------------------------|
| Spastic bilateral | 2 limb involvement/ Diparesis | ☐ |
| | 3 limb involvement/ Asymmetric quadriparesis | ☐ |
| | 4 limb involvement/ Quadriparesis | ☐ |
| Hemiplegia | Right-sided | ☐ |
| | Left-sided | ☐ |

Other _____ Dyskinetic

Comments:

Gross motor function classification scale (GMFCS)

Level of gross motor ability

Table 5

□ 24 months corrected age	
Level 1	Infants move in and out of sitting and floor sit with both hands free to manipulate objects. Infants crawl on hands and knees, pull to stand and take steps holding on to furniture. Infants walk between 18 months and 2 years of age without the need for any assistive mobility device.
Level 2	Infants maintain floor sitting but may need to use their hands for support to maintain balance. Infants creep on their stomach or crawl on hands and knees. Infants may pull to stand and take steps holding on to furniture.
Level 3	Infants maintain floor sitting when the low back is supported. Infants roll and creep forward on their stomachs.
Level 4	Infants have head control but trunk support is required for floor sitting. Infants can roll to supine and may roll to prone.
Level 5	Physical impairments limit voluntary control of movement. Infants are unable to maintain antigravity head and trunk postures in prone and sitting. Infants require adult assistance to roll.
□ 24 months corrected age	
Level 1	Children floor sit with both hands free to manipulate objects. Movements in and out of floor sitting and standing are performed without adult assistance. Children walk as the preferred method of mobility without the need for any assistive mobility device.
Level 2	Children floor sit but may have difficulty with balance when both hands are free to manipulate objects. Movements in and out of sitting are performed without adult assistance. Children pull to stand on stable surface. Children crawl on hands and knees with a reciprocal pattern, cruise holding onto furniture and walk using an assistive mobility device as preferred methods of mobility.
Level 3	Children maintain floor sitting often by “W-sitting” and may require adult assistance to assume sitting. Children creep on their stomach or crawl on hands and knees (often without reciprocal leg movements) as their primary methods of self mobility. Children may pull to stand on a stable surface and cruise short distances. Children may walk short distances indoors using an assistive mobility device and adult assistance for steering and turning.
Level 4	Children floor sit when placed, but are unable to maintain alignment and balance without use of their hands for support. Children frequently require adaptive equipment for sitting and standing. Self mobility for short distances is achieved through rolling, creeping on stomach, or crawling on hands and knees without reciprocal leg movement.
Level 5	Physical impairments restrict voluntary control of movement and the ability to maintain antigravity head and trunk postures. All areas of motor function are limited. Functional limitations in sitting and standing are not fully compensated for through the use of adaptive equipment and assistive technology. Children

	have no means of independent mobility and are transported.
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Manual abilities classification system (MACS)



Level of manual ability

Table 6

Level 1	Handles objects easily and successfully: At most limitations in the ease of performing manual tasks requiring speed and accuracy; however, any limitations in manual activities do not restrict independence in any daily activities.
Level 2	Handles most objects but with somewhat reduced quality and/or speed of achievement: certain activities may be avoided or be achieved with some difficulty; alternative ways of performance might be used but manual abilities do not usually restrict independence in daily activities.
Level 3	Handles objects with difficulty, needs help to prepare and/or modify activities: the performance is slow and achieved with limited success regarding quality and quantity; activities are performed independently if they have been set up or anticipated.
Level 4	Handles a limited selection of easily managed objects in adapted situations: performs part of activities with effort and limited success; requires continuous support and/or adapted equipment for even partial achievement of activity.
Level 5	Does not handle objects and has severely limited ability to perform even simple actions: requires total assistance.

SECTION E: behaviour observation record

Examiner rating

	☐	Observed most of the time	Observed some of the time	Never or rarely observed
1. Positive affect (smiles and laughs)	☐	☐	☐	
2. Shows enthusiasm or excitement	☐	☐	☐	
3. Explores objects in the environment	☐	☐	☐	
4. Readily takes part in activities	☐	☐	☐	
5. Cooperates with requests	☐	☐	☐	
6. Alertness (quiet and attentive, not drowsy)	☐	☐	☐	
7. Appropriate muscle tone (not overly stiff, floppy or with tremor)	☐	☐	☐	
8. Adapts easily to changes in stimulation or routines	☐	☐	☐	
9. Works without being overly active or fidgety	☐	☐	☐	
10. Distracted easily, interfering with performance on items	☐	☐	☐	
11. Overly sensitive to touch or textures	☐	☐	☐	
12. Approaches new tasks with apprehension	☐	☐	☐	
13. Negative affect (cries, frown, whines or complains)	☐	☐	☐	

SECTION F: socio-demographic information

Maternal age at child's birth: _____

Maternal status

Number of children in household: _____

Educational status

Occupational status

Child care arrangements

Age of child when mother returned to work: _____ or N/A

Alternative childcare:

	Regularly		Sometimes	
Partner/ husband/wife				
Grandparent(s)				
Other relatives				
Friends				
Nursery				
Child minder				

Other: _____

Does the child regularly attend:

Yes	No
Playgroup	☐

If yes, number of half day sessions per week: _____

Nursery	☐
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If yes, number of half day sessions per week: _____

Bayley-III Social-Emotional questionnaires

An important part of your child's evaluation is to learn how he or she interacts with you. Because you

understand your child so well, you are the best person to provide this information. We will use this information to help us understand how premature children learn social skills.

Please complete all the questions in this booklet as accurately as possible.

Please bring the completed booklet to the research appointment and give it to the doctor.

PART ONE

For each question, circle the number in the column that best describes how often you observe the behaviour in your child. Circle **only one** number for each question.

	Behaviour Frequency					
	Can't tell	None of the time	Some of the time	Half of the time	Most of the time	All of the time
1. Takes a calm and enjoyable interest in most sounds.	0	1	2	3	4	5
2. You can easily get your child's attention without having to be very dramatic.	0	1	2	3	4	5
3. Takes a calm and enjoyable interest in most sights, including colourful or bright things.	0	1	2	3	4	5
4. You can easily get your child to look at things without them being very bright or colourful.	0	1	2	3	4	5
5. Calmly enjoys touching or being touched by different things.	0	1	2	3	4	5
6. You can easily get your child to respond to your touch without having to touch your child firmly to get his or her attention.	0	1	2	3	4	5
7. Likes to be swung around, danced with while in your arms, or quickly lifted up in the air.	0	1	2	3	4	5
8. You can easily get your child's attention by approaching him or her, or moving him or her around slowly.	0	1	2	3	4	5
9. You can help your child to calm down.	0	1	2	3	4	5
10. Looks at interesting sights, such as your face or a toy.	0	1	2	3	4	5

11. Looks at or turns toward interesting sounds.	0	1	2	3	4	5
12. Seems happy or pleased when he or she sees a favourite person (e.g. looks or smiles, makes sounds, or moves arms in a way that expresses joy or delight).	0	1	2	3	4	5
13. Responds to people talking or playing with him or her by making sounds or faces (e.g. happy sounds or a curious or annoyed look).	0	1	2	3	4	5
14. Reaches for or points at things, or makes distinct sounds to show you what he or she wants (e.g. reaches out to be picked up or points at a toy).	0	1	2	3	4	5
15. Exchanges two or more smiles, other looks, sounds, or actions (e.g. reaching, giving or taking) with a favourite person.	0	1	2	3	4	5
16. Shows you that he or she understands your actions or gestures by making an appropriate gesture in return (e.g. makes a funny face back at you, looks at something you point to, stops doing something when you shake your head and use a firm voice to say "No!" or smiles and does more of something when you nod with a big smile and say "Yes!").	0	1	2	3	4	5
17. Uses many consecutive actions in a back-and-forth way to show you what he or she wants or to have fun with you (e.g. smiles, reaches out for a hug, and, when you hug, takes your hat, puts it on his or her head, and smiles proudly OR takes your hand, leads you to the refrigerator, tugs on the handle, and, after you open it, points to something he or she likes, such as food, a bottle of juice, or milk).	0	1	2	3	4	5
	Behaviour Frequency Can't tell None Some Half Most All of the time of the time of the time of the time of the time					
18. Copies or imitates many of your sounds, words, or actions while playing with you (e.g. if you make funny faces and sounds, he or she copies them).	0	1	2	3	4	5
19. Searches for something he or she wants by looking or getting you to look for it.	0	1	2	3	4	5
20. Shows you what he or she wants or needs by using a few actions in a row (e.g. leads you by the hand to open a door and then touches or bangs on the door).	0	1	2	3	4	5
21. Uses words or tries to use words when people talk with or play with him or her.	0	1	2	3	4	5

22. Copies or imitates familiar make-believe play (e.g. feeds or hugs a doll).	0	1	2	3	4	5
23. Tells you what he or she wants with one or a few words (e.g. “juice”, “open” or “kiss”).	0	1	2	3	4	5
24. Shows you he or she understands your simple verbal wish (e.g. “Please show me your toy”).	0	1	2	3	4	5
25. Plays make-believe (e.g. feeds a doll, plays house, or pretends to be a TV or movie character) with you or others.	0	1	2	3	4	5
26. Uses words or pictures to tell you what he or she is interested in (e.g. “See truck!”).	0	1	2	3	4	5
27. Uses words with one or more peers.	0	1	2	3	4	5
28. Uses words or pictures to show what he or she likes or dislikes (e.g. “Want that” or “No want”)	0	1	2	3	4	5

Thank you for completing this questionnaire

Your help is greatly appreciate