

ePIPARI as a digital tool to follow up preterm infants up to 24 months of corrected age

Liisa Lehtonen, Tiina Saarinen, Riikka Korja, Suvi Stolt, Helena Lapinleimu, Päivi Rautava, Leena Haataja, Helena Ollila, Milla Ylijoki, on behalf of the PIPARI Study group

Background: ePIPARI is a digital tool on a web-based platform to complement the clinical follow-up of preterm infants and their families.

Objective: To investigate the feasibility of ePIPARI in the follow-up of preterm infants and its accuracy to identify children and parents in a need of clinical interventions such as physiotherapy, nutritionist consultation, speech therapist consultation due to eating/feeding problems, and concerns of early speech and language development.

Design/methods: 113 premature born infants (<34 weeks of gestation) from 102 families were recruited to the ePIPARI-study comparing ePIPARI with the routine clinical follow-up at the Turku University Hospital during years 2019-2025. ePIPARI included eight assessment points (at term age and at 1, 2, 4, 8, 12, 18, and 24 months of corrected age). In ePIPARI, parents filled in questionnaires regarding their own well-being as well as the health and growth, eating and feeding, and neurodevelopment of their child. Responses of ePIPARI were classified using a traffic light model (green-yellow-red) for motor development and using threshold values for typical development and concern regarding growth and behavior.

Results: The completion rate of ePIPARI was over 70% for up to 4 months, 50 to 60% at 8-12 months of age, and 41% at 24 months of age. The number and percentages of completed questionnaires and accuracy in identifying the need of interventions are shown in Figure 1 and Table 1.

Conclusions: A web-based follow-up tool, ePIPARI, was shown to be sensitive in detecting needs for interventions and therefore it is a promising tool to complement clinical follow-up.

Figure 1: The number and percentages of completed questionnaires at different age points. The percentages are reported in relation to the number of questionnaires sent to parents (n).

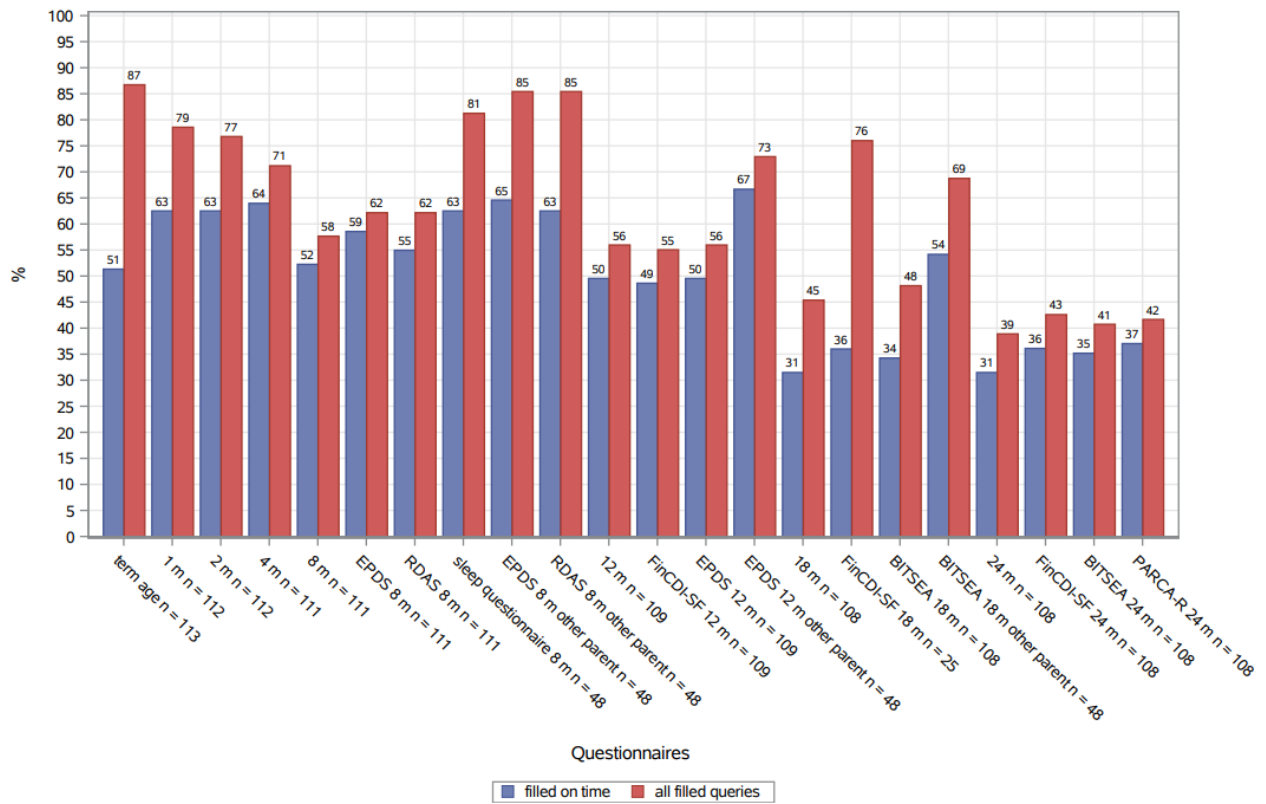


Table 1: ePIPARI's accuracy in identifying the concerns/the need for interventions compared to clinical follow-up at different age points. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) with 95% confidence intervals were calculated.

Concern/need for intervention	Term age	1 month	2 months	4 months	8 months	12 months
Studied (n)	58	63	91	83	67	60
Concern in motor development by ePIPARI: Yellow (n) Red (n)	not studied	not studied	65 26	75 56	54 32	25 10
<i>A need to start physiotherapy at the clinical visit</i> Sensitivity, yellow Sensitivity, red Specificity, yellow Specificity, red PPV, yellow PPV, red NPV, yellow NPV, red	not studied	not studied	0	1 1(1,1) 1(1,1) 0.10(0.03, 0.16) 0.33(0.23, 0.43) 0.01(0, 0.05) 0.02(0.05) 1(1,1) 1(1,1)	0	1 1(1,1) 1(1,1) 0.59(0.47,0.72) 0.85(0.75,0.94) 0.04(0, 0.12) 0.1(0, 0.29) 1(1,1) 1(1,1)
<i>A need to start physiotherapy before the next age point</i> Sensitivity, yellow Sensitivity, red Specificity, yellow Specificity, red PPV, yellow PPV, red NPV, yellow NPV, red	not studied	not studied	1 1(1,1) 1(1,1) 0.29(0.20, 0.38) 0.72(0.63, 0.81) 0.02(0, 0.05) 0.04(0, 0.11) 1(1,1) 1(1,1)	6 1(1,1) 1(1,1) 0.10(0.04, 0.17) 0.35(0.24, 0.46) 0.08(0.02, 0.14) 0.11(0.03, 0.19) 1(1,1) 1(1,1)	0	1 1(1,1) 1(1,1) 0.59(0.47,0.72) 0.85(0.76,0.94) 0.04(0.19) 0.1(0, 0.29) 1(1,1) 1(1,1)
Concern in nutrition and growth by ePIPARI (n) <i>A need to consult nutritionist at the clinical visit</i> Sensitivity Specificity PPV NPV	18 0	20 1 1(1,1) 0.69(0.58,0.81) 0.05(0, 0.15) 1(1,1)	21 1 1(1,1) 0.78(0.69,0.86) 0.05(0, 0.14) 1(1,1)	28 6 0.67(0.29, 1) 0.69(0.58, 0.79) 0.14(0.01,0.27) 0.96(0.91,1.0)	30 2 1(1,1) 0.57(0.45, 0.69) 0.07(0, 0.16) 1(1,1)	28 1 1(1,1) 0.54(0.41,0.67) 0.04(0, 0.10) 1(1,1)
<i>A need to consult nutritionist before the next age point</i> Sensitivity Specificity PPV NPV	0	1 1(1,1) 0.69(0.58,0.81) 0.05(0, 0.15) 1(1,1)	2 1(1, 1) 0.79(0.70, 0.87) 0.10(0, 0.22) 1(1,1)	13 0.54(0.27, 0.81) 0.70(0.59, 0.81) 0.25(0.09, 0.41) 0.89(0.81,0.97)	2 1(1,1) 0.57(0.45, 0.69) 0.07(0, 0.16) 1(1,1)	1 1.0(1,1) 0.54(0.41,0.67) 0.04(0, 0.10) 1(1,1)
Concern in feeding and eating by ePIPARI(n)	17	17	20	25	25	28

<i>A need to consult speech therapist at the clinical visit</i>	1	1	1	1	1	1
Sensitivity	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)
Specificity	0.72(0.60,0.84)	0.74(0.63,0.85)	0.79(0.70, 0.87)	0.71(0.61,0.81)	0.64(0.52, 0.75)	0.54(0.42,0.67)
PPV	0.06(0, 0.17)	0.06(0, 0.17)	0.05(0, 0.15)	0.04(0, 0.12)	0.04(0, 0.12)	0.04(0, 0.10)
NPV	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)
<i>A need to consult speech therapist before the next age point</i>	1	1	2	3	1	1
Sensitivity	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)
Specificity	0.72(0.60,0.84)	0.74(0.63,0.85)	0.80(0.71, 0.88)	0.73(0.63,0.82)	0.64(0.52, 0.75)	0.54(0.42,0.67)
PPV	0.06(0, 0.17)	0.06(0, 0.17)	0.10(0, 0.23)	0.12(0, 0.25)	0.04(0.12)	0.04(0, 0.10)
NPV	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)	1(1,1)
Concern in language development by ePIPARI (n)	not studied	not studied	not studied	not studied	12	34
<i>A need to guide language development at the clinical visit:</i>					0	3
Sensitivity						1 (1,1)
Specificity						0.46(0.33,0.59)
PPV						0.09(0, 0.18)
NPV						1(1,1)