

Executive functioning following paediatric kidney transplantation

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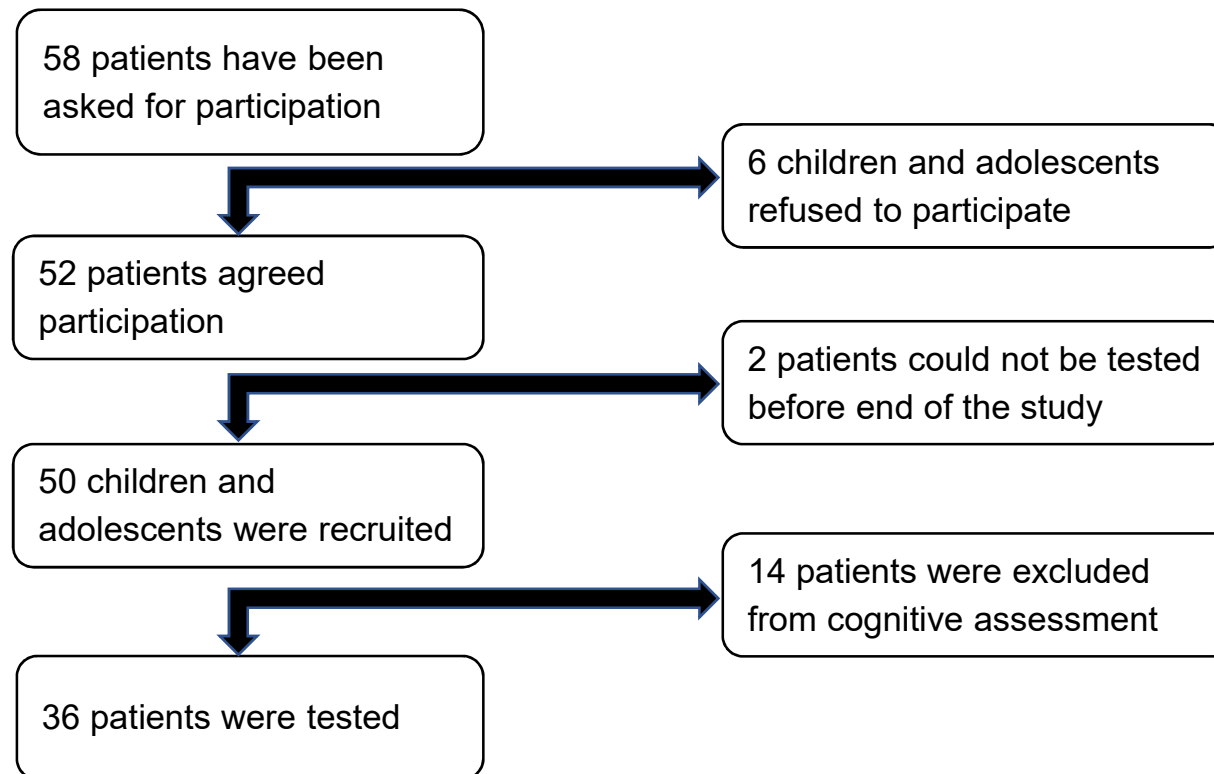
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1. Scientific background

- Neurocognitive function of children following renal transplantation is reported to be below those of healthy children but better than the achievement of children on dialysis
- Other studies have shown associations between cognitive performance / IQ and age at start of renal replacement therapy
- Children with CKD have a reduced attention-span as compared to healthy children; which tends to improve after transplantation
- Children with CKD have a lower performance in working memory tasks with improvements after transplantation

2. Study Design

Recruitment



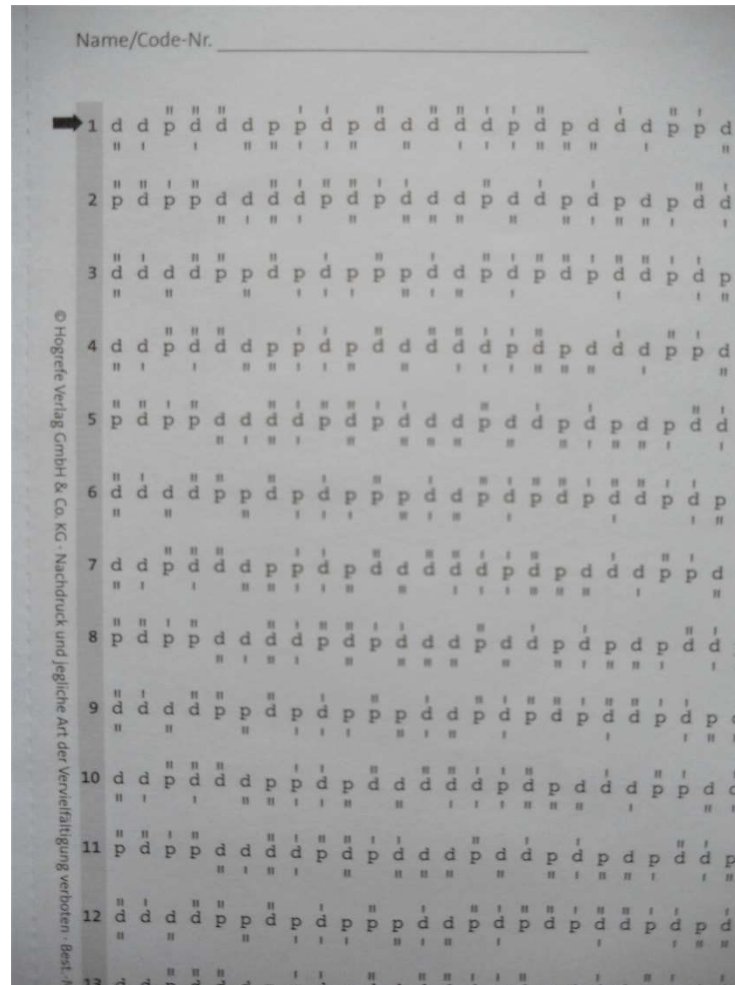
2. Study Design

Research methods

- Cross-sectional design
- Patients age 8-18 at least 3 months post transplantation
- 3 cognitive tests::
 - **d2-R Test** -> attention and concentration
 - **Digit span of WISC** -> working memory
 - **Wisconsin Card Sorting Test** -> cognitive flexibility
- Knowledge about kidney disease and medication for personal responsibility
- Additional information based on a questionnaire and patients hospital file regarding underlying disease, treatment and medication

2. Study Design

d2-R



2. Study Design

Digit span

0 1 2

Rohwertsumme
(Max. = 44)

3. Zahlen nachsprechen (ZN)

Start Alter 6-16: Vorwärts: Aufgabe 1 Rückwärts: Beispiel, dann Aufgabe 1

Abbruch Vorwärts: wenn beide Versuche einer Aufgabe nicht oder falsch gelöst wurden. Rückwärts: wenn beide Versuche einer Aufgabe nicht oder falsch gelöst wurden.

Bewertung Jeder Versuch wird mit 0 oder 1 Punkt bewertet.
ZN-V & ZN-R: Gesamtrahwert für ZN vorwärts bzw. rückwärts
LZ-V & LZ-R: Anzahl der Ziffern, die in der letzten mit 1 Punkt bewerteten Aufgabe genannt werden.

Achtung: Zahlen gleichmäßig und ohne Betonung vorgeben!

Zahlen nachsprechen vorwärts: ZN-V

Aufgabe	1. Versuch	Punkte	2. Versuch	Punkte	0, 1 oder 2 Punkte
1.	2 - 9	0 1	4 - 6	0 1	0 1 2
2.	3 - 8 - 6	0 1	6 - 1 - 2	0 1	0 1 2
3.	3 - 4 - 1 - 7	0 1	6 - 1 - 5 - 8	0 1	0 1 2
4.	8 - 4 - 2 - 3 - 9	0 1	5 - 2 - 1 - 8 - 6	0 1	0 1 2
5.	3 - 8 - 9 - 1 - 7 - 4	0 1	7 - 9 - 6 - 4 - 8 - 3	0 1	0 1 2
6.	5 - 1 - 7 - 4 - 2 - 3 - 8	0 1	9 - 8 - 5 - 2 - 1 - 6 - 3	0 1	0 1 2
7.	1 - 8 - 4 - 5 - 9 - 7 - 6 - 3	0 1	2 - 9 - 7 - 6 - 3 - 1 - 5 - 4	0 1	0 1 2
8.	5 - 3 - 8 - 7 - 1 - 2 - 4 - 6 - 9	0 1	4 - 2 - 6 - 9 - 1 - 7 - 8 - 3 - 5	0 1	0 1 2

Längste Zahlenspanne vorwärts (LZ-V) (Max. = 9) Rohwertsumme vorwärts (ZN-V) (Max. = 16)

Zahlen nachsprechen rückwärts: ZN-R

Aufgabe	1. Versuch	Punkte	2. Versuch	Punkte	0, 1 oder 2 Punkte
1.	8 - 2	0 1	5 - 6	0 1	0 1 2
2.	2 - 1	0 1	1 - 3	0 1	0 1 2
3.	3 - 5	0 1	6 - 4	0 1	0 1 2
4.	5 - 7 - 4	0 1	2 - 5 - 9	0 1	0 1 2
5.	7 - 2 - 9 - 6	0 1	8 - 4 - 9 - 3	0 1	0 1 2
6.	4 - 1 - 3 - 5 - 7	0 1	9 - 7 - 8 - 5 - 2	0 1	0 1 2
7.	1 - 6 - 5 - 2 - 9 - 8	0 1	3 - 6 - 7 - 1 - 9 - 4	0 1	0 1 2
8.	8 - 5 - 9 - 2 - 3 - 4 - 6	0 1	4 - 5 - 7 - 9 - 2 - 8 - 1	0 1	0 1 2
8.	6 - 9 - 1 - 7 - 3 - 2 - 5 - 8	0 1	3 - 1 - 7 - 9 - 5 - 4 - 8 - 2	0 1	0 1 2

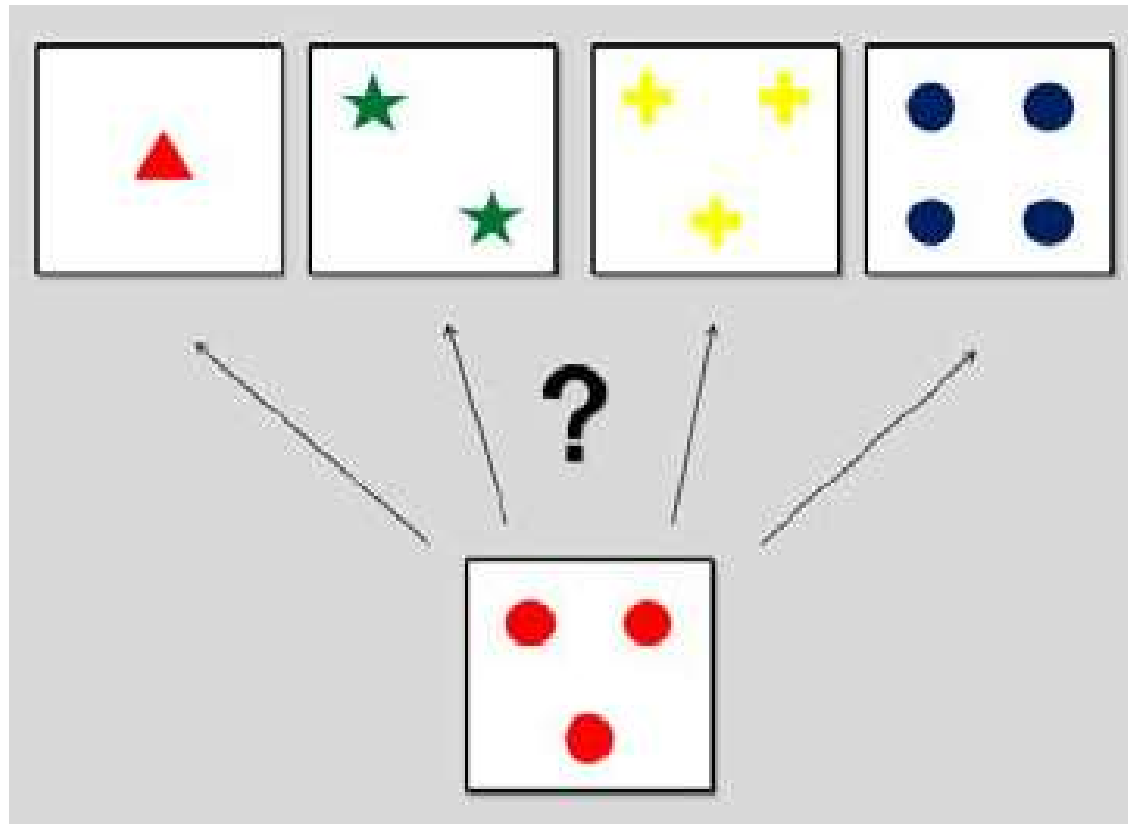
Längste Zahlenspanne rückwärts (LZ-R) (Max. = 8) Rohwertsumme rückwärts (ZN-R) (Max. = 16)

Gesamtrahwert (Max. = 32)

5

2. Study Design

Wisconsin Card Sorting Test



2. Study Design

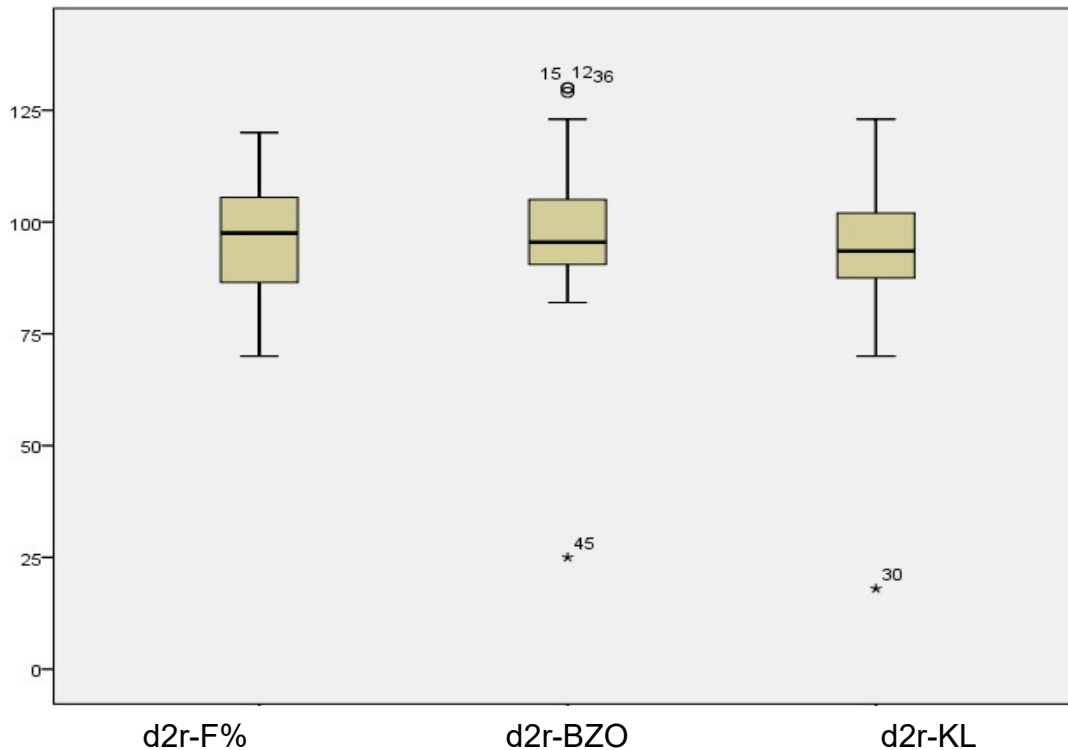
WCST

CATEGORY SEQUENCE: C F N C F N

___ 1. CFNO	___ 17. CFNO	___ 33. CFNO	___ 49. CFNO
___ 2. CFNO	___ 18. CFNO	___ 34. CFNO	___ 50. CFNO
___ 3. CFNO	___ 19. CFNO	___ 35. CFNO	___ 51. CFNO
___ 4. CFNO	___ 20. CFNO	___ 36. CFNO	___ 52. CFNO
___ 5. CFNO	___ 21. CFNO	___ 37. CFNO	___ 53. CFNO
___ 6. CFNO	___ 22. CFNO	___ 38. CFNO	___ 54. CFNO
___ 7. CFNO	___ 23. CFNO	___ 39. CFNO	___ 55. CFNO
___ 8. CFNO	___ 24. CFNO	___ 40. CFNO	___ 56. CFNO
___ 9. CFNO	___ 25. CFNO	___ 41. CFNO	___ 57. CFNO
___ 10. CFNO	___ 26. CFNO	___ 42. CFNO	___ 58. CFNO
___ 11. CFNO	___ 27. CFNO	___ 43. CFNO	___ 59. CFNO
___ 12. CFNO	___ 28. CFNO	___ 44. CFNO	___ 60. CFNO
___ 13. CFNO	___ 29. CFNO	___ 45. CFNO	___ 61. CFNO
___ 14. CFNO	___ 30. CFNO	___ 46. CFNO	___ 62. CFNO
___ 15. CFNO	___ 31. CFNO	___ 47. CFNO	___ 63. CFNO
___ 16. CFNO	___ 32. CFNO	___ 48. CFNO	___ 64. CFNO

3. Results

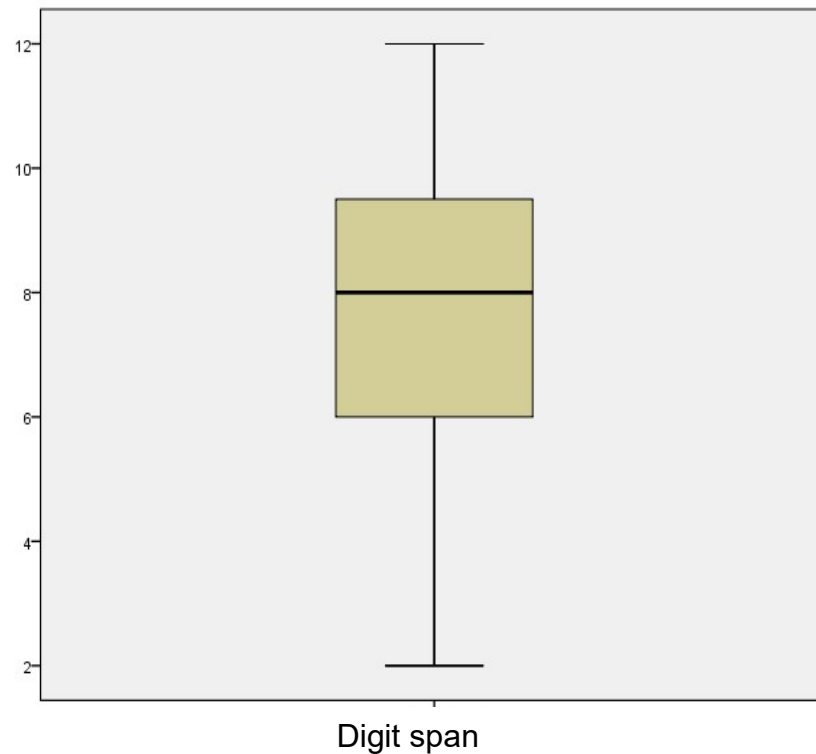
d2-R



- Normal range: 85-115
- The median is <100
- Results of KL is significantly below the results of the healthy population yet within normal range

3. Results

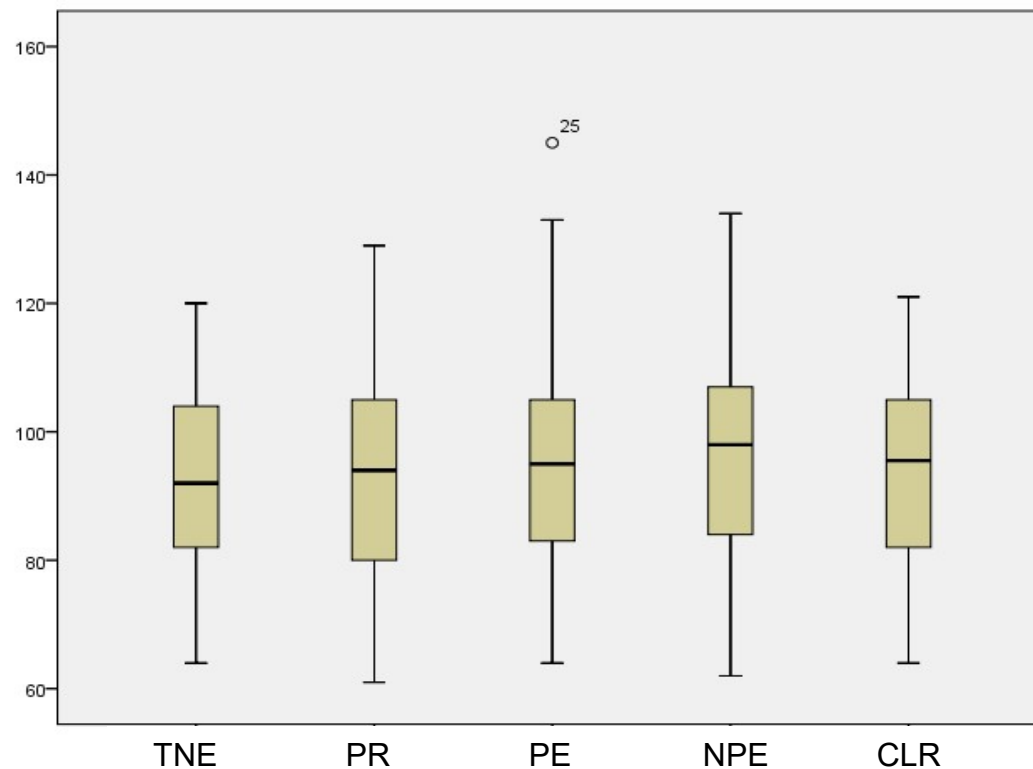
Digit span



- Normal range: 7-13
- Median is <10
- Performance shows significantly below the normative population

3. Results

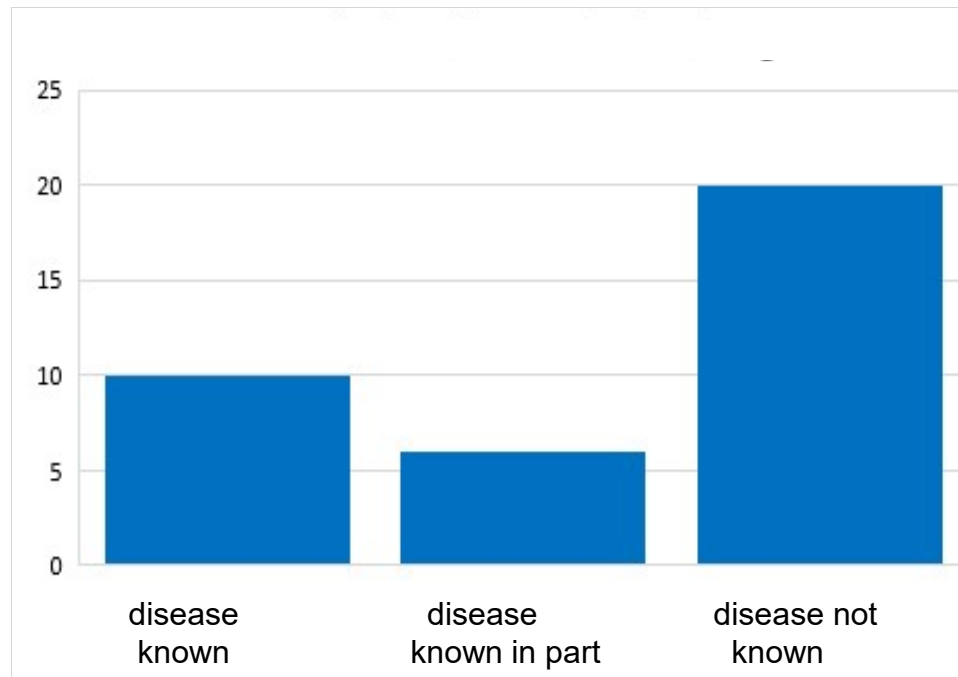
WCST



- Normal range 91-107
- Median is <99
- TNE,CLR significant below the normal population yet within normal range

3. Results

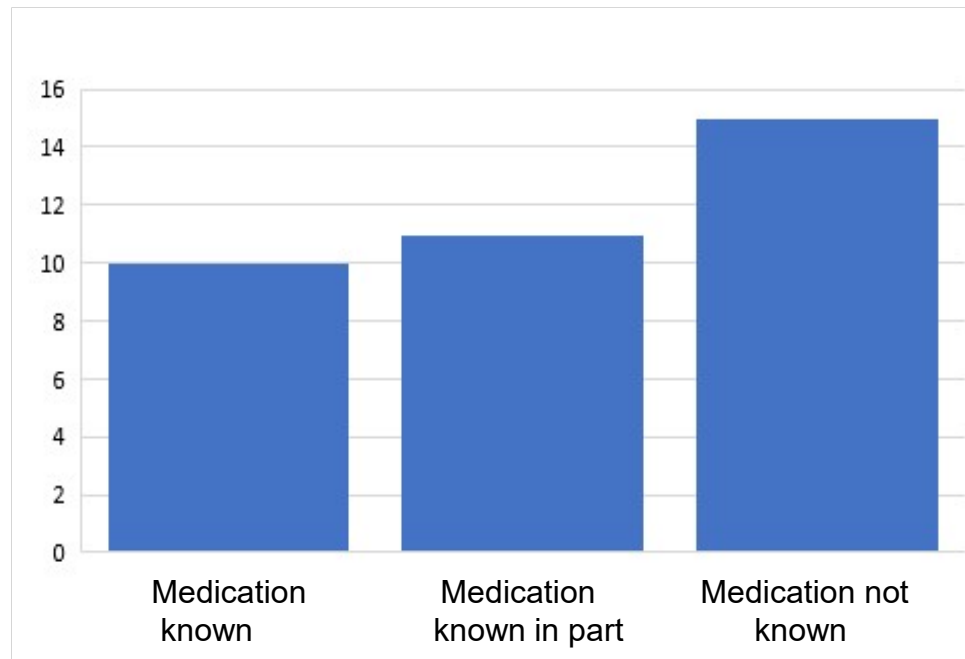
Knowledge about the kidney disease



20 children and adolescent did not know anything about the kidney disease

3. Results

Knowledge of the medication



15 children and adolescent did not know anything about their medication

4. Take Home

- In comparison to healthy children executive functions are reduced
- Duration of dialysis, age at dialysis/ transplantation and time period between transplantation and date of testing correlate with results
- Immunosuppression other than standard of care (i.e. CyA+Everolimus) seems to have a negative influence on cognitive functioning
- Maintenance steroids appear to have a negative influence on executive functioning
- Increasing number of antihypertensive medication and the number of Co-morbidities have correlate with poorer executive functioning
- Knowledge about disease and medication is below the expected level

Thank you for attention!

Are there any
questions?