

Health and Socioeconomic Determinants of Cognitive Functions and Educational Achievement among Orang Asli Schoolchildren in Malaysia

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K U A L A L U M P U R

INTRODUCTION

- Malaysia had developed a strategy to narrow the educational gap between rural and urban areas by allocating another RM2.6 billion under the 9th Malaysia Plan (2006-2010).
- More than two million rural schoolchildren, including Orang Asli children, will benefit from this agenda.

Causes of poor schooling

The educational gap between rural and urban areas is not only because of the better infrastructure provided to the urban schools but:

- high dropout rate
- poverty
- poor health and nutritional status
- Even, environmental problems could expand this gap

Dropout

- 25% of the children who started primary school, dropped out after only one year,
- 70% of all students dropped out by the end of grade five (aged 12 years)

Health, nutrition & poverty

- Wide spectrum of diseases are prevalent among Orang Asli children: STH, malnutrition, Malaria, Dengue...etc
- Poor nutritional status (almost all children are malnourished) → prevalence of micronutrient malnutrition is very high.
- Poverty is the general character of these communities

Objectives

- To study the cognitive functions and educational achievement status of Orang Asli children
- To investigate the possible determinants affecting the cognitive function and educational achievement of rural aboriginal children

METHODOLOGY

■ Study Area

Sekolah Kebangsaan Betau

Pos Betau, Kuala Lipis, Pahang, Malaysia. (200 km from Kuala Lumpur)

18 Orang Asli villages

■ Subjects

**(241) Primary
Schoolchildren**

Age: 7-12 years

Male/Female: 120/121



DATA COLLECTION

Cognitive functions Assessment (**IQ** scores)
Results of Maths, Malay language and English language
Educational achievement (**TS** Total scores)

. Hb. & iron status
. Anaemia & IDA

Blood samples

Stool samples

. Kato-Katz tech.
. Trichrom stain

Weight & height
. Underweight
. Stunting
. Wasting

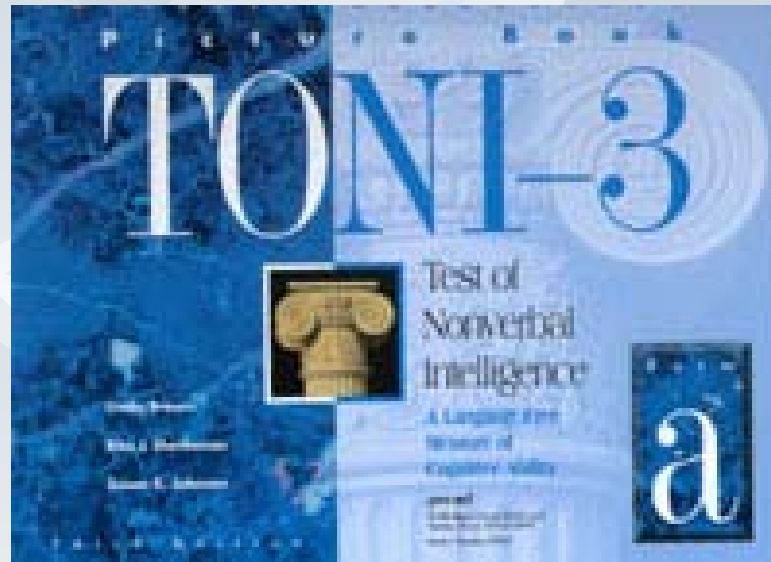
Anthropometry

Questionnaire

Socio-economic
data

Statistical analysis
SPSS
Epi Info

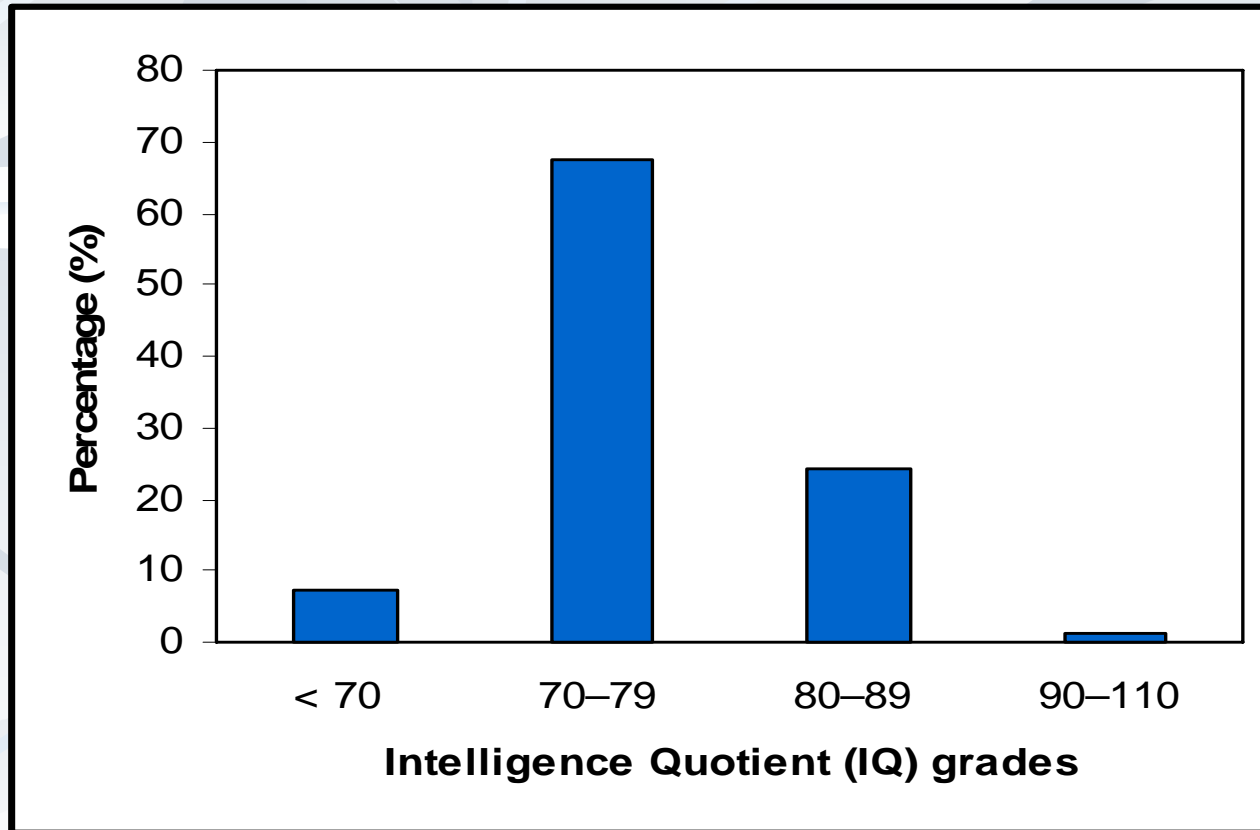
TONI 3 kit



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Bangkok-Thailand

RESULTS



scores > 130 (very superior),
121-130 (superior),
111-120 (above average),
90-110 (average),
80-89 (below average),
70-79 (poor) and
< 70 (very poor).

General characteristics of intelligence quotient (IQ) among Orang Asli schoolchildren in Pos Betau, Pahang

educational achievement test scores (TS) among Orang Asli schoolchildren

Characteristics	Range	Mean scores+SD	Percent with test score ≥ 50 or ≥ 150
Malay language (ML)	30-75	50.9+8.7	56.8
English language (EL)	24-61	45.9+7.5	32.4
Mathematics (MT)	22-63	43.9+7.2	24.9
Total score (TS)	107-184	140.6+14.9	27.4
Raw TONI-3 scores	3-21	7.7+2.8	-
IQ scores	63-100	76.4+5.4	-

Mean scores of intelligence quotient (IQ) and total educational achievement (TS) by socioeconomic and health factors among Orang Asli schoolchildren

Factors	IQ score Mean±SD	t-value P-value	Total score Mean±SD	t-value P-value
Gender Male Female	76.2±5.4 76.6±5.5	t=0.603 P=0.547	141.7±14.3 139.6±15.6	t=-1.139 P=0.256
Age groups ≤10 years >10 years	76.3±5.4 76.6±5.5	t=0.361 P=0.718	142.5±15.5 138.6±13.0	t=1.848 P=0.059
Household income ≥RM450 <RM450	78.5±5.7 75.9±5.2	t=3.041 P=0.003^{a,b}	145.0±17.1 139.6±14.2	t=2.251 P=0.025^a
Fathers' education: ≥6 years formal education No formal education	77.5±5.7 76.5±5.4	t=1.260 P=0.149	140.9±15.5 140.2±14.8	t=0.339 P=0.735
Mothers' education: ≥6 years formal education No formal education	78.7±5.9 75.9±5.1	t=3.256 P=0.001^{a,b}	141.2±14.2 140.5±13.8	t=0.257 P=0.797
Mothers' employment status: Working Not working	75.9±5.2 77.1±5.6	t=1.691 P=0.092	139.7±14.5 141.9±15.6	t=1.125 P=0.262
Family size ≥ 8 members (large) < 8 members	75.8±5.2 76.7±5.5	t=1.047 P=0.296	138.1±15.0 141.7±14.9	t=1.670 P=0.096
STH infections (wormscore≥5) Moderate to Severe Negative to mild	76.2±4.9 76.5±6.5	t=-0.340 P=0.734	137.7±12.2 141.8±15.8	t=1.920 P=0.034^a
Underweight Non-underweight	76.8±5.2 76.2±5.5	t=0.820 P=0.413	140.9±16.1 140.5±14.3	t=0.193 P=0.847
Stunted Non-stunted	76.4±5.4 76.5±5.4	t=0.144 P=0.885	139.8±15.5 141.3±14.6	t=0.771 P=0.441
Iron status IDA Non anaemic	75.4±4.8 76.9±5.6	t=2.140 P=0.033^a	137.4±11.5 142.3±15.3	t=2.460 P=0.007^{a,b}

^a Significant association ($P < 0.05$)

^b Confirmed as significant predictors by logistic regression analysis

DISCUSSION

- Poor cognitive and educational performances
(Zaleha et al. 2003; Zalilah et al. 2000)
- Multifactorial problem
- Educational status of parents and nutritional status of children were identified as significant predictors of these poor performances (Halterman *et al.* 2001; Sungthong *et al.* 2002; Zaini *et al.* 2005; Partovi *et al.* 2007).

- **IDA** has been conclusively seen to delay psychomotor development and impair cognitive performance of preschool and school-age children (Soewondo *et al.* 1989; Boivin and Giordani, 1993; Sungthong *et al.* 2002).
- **Parasitic infections** impaired cognitive function and educational performance → directly (mediators in the systemic circulation including cellular and humoral immune responses to infections (Nokes *et al.* 1992)
or due to the fact that children infected with helminthes are lethargic and weak, and have frequent attacks of diarrhea or dysentery and abdominal pain (Che Ghani, 1995).

CONCLUSION

- Cognitive and educational performances of children in rural areas of Malaysia are poor compared to urban children.
- Integrated measures to improve the situation should be focused on the socioeconomic status and education of parents.
- Interventions to improve education should be intensified among this population to improve their quality of life significantly.



THANK
YOU