

# A PILOT STUDY TO INVESTIGATE THE MUSCLE STRENGTH OF CHILDREN INFECTED WITH HIV

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## ABSTRACT

Paediatric Human Immunodeficiency Virus (HIV) remains a significant challenge to children and caregivers in South Africa. Although the availability of antiretroviral (ARV) therapy has improved, it is not yet universally accessible. Rates of transmission from mother to child thus remain high and the virus widely uncontrolled.

One aspect affecting children infected with HIV is that of muscle strength. For children weakness has been inferred by way of developmental studies in young children infected with HIV. Impaired performance in activities such as standing, walking, stair-climbing and jumping have been noted. These gross motor activities require higher muscle outputs and strength against gravity.

This study sought to ascertain the feasibility of a full study on muscle strength in children infected with HIV. It analysed the effect of HIV on muscle strength, height and weight of those children receiving and not receiving highly active antiretroviral therapy (HAART). Children were recruited from Harriet Shezi Children's HIV Clinic at Chris Hani Baragwanath Hospital, Soweto, Gauteng Province, South Africa. The study population included a group of children receiving HAART (n=16) and a group of children not receiving HAART (n=16). A once off test of muscle strength was administered to each child using a hand-held dynamometer. A demographic questionnaire and the Household Economic and Social Status Index (HESSI) were administered to their primary caregiver.

Results showed the sample population to be of low socio-economic status (average score=54%) and the children to be underweight and short for their age ( $p<0.001$ ). The CD4 count of the group on HAART was significantly higher than the group not receiving HAART ( $p<0.05$ ). The group not receiving HAART was significantly stronger than the HAART group ( $p<0.05$ ). Length of time having received HAART and muscle strength showed no significant correlation ( $p=0.647$ ). No significant correlation was shown between CD4 count and muscle strength in the group receiving HAART ( $p>0.1$ ). A

significant negative correlation was shown between CD4 count and muscle strength in the group not receiving HAART ( $p < 0.05$ ). As statistically significant normative muscle strength data for children not infected with HIV in this age group fails to exist, the study was unable to ascertain a quantitative measure of weakness in these children. Comparison of those values available, however, showed normative values to be double that of children who participated in the study.

The implications of these findings are that as one observes this group of children's CD4 count drop, so too does their muscle strength. HAART, once initiated, stems the decrease in muscle strength over a period of time but does not reverse it. Furthermore, children and caregivers who participated in this study were faced with the adversities of poor socioeconomic status, limited access to medication and ARV treatment and inadequate nutritional intake, most of which were largely beyond their immediate control.

This pilot study has indicated the feasibility and importance of a full study to investigate the muscle strength of children infected with HIV. Further research is needed to establish the impact of earlier administration of HAART on muscle strength. The effect of exercise on the muscle strength of children who are infected with HIV has yet to be documented. The implication of these factors on gross motor development in children infected with HIV has yet to be investigated.

**“Let the little children come to me, and do not hinder them, for the kingdom of God belongs to such as these.”**

Luke 18:16

Holy Bible (NIV)

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## DECLARATION

I, Carolyn Ruth Michelle Zeijlstra declare that this research report is my own work, except to the extent indicated in the reference citation and acknowledgements. It is being submitted in partial fulfilment of the degree of Master of Science in Physiotherapy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signed: \_\_\_\_\_

\_\_\_\_\_ day of \_\_\_\_\_, 2008

## LIST OF ABBREVIATIONS

3TC	-	lamivudine
AIDS	-	Acquired Immune Deficiency Syndrome
ARV	-	Antiretroviral
CD4	-	CD4+ T-lymphocyte
CNS	-	Central Nervous System
d4T	-	stavudine
ddl	-	didanosine
DNA	-	deoxyribonucleic acid
EFV	-	efavirenz
Elb Ext	-	elbow extension
Elb Flex	-	elbow flexion
HAART	-	Highly Active Antiretroviral Therapy
HESSI	-	Household Economic and Social Status Index
Hip Ext	-	hip extension
Hip Flex	-	hip flexion
HIV	-	Human Immunodeficiency Virus
IDV	-	indinavir
INH	-	isoniazid
Knee Ext	-	knee extension
Knee Flex	-	knee flexion
LIP	-	lymphocytic interstitial pneumonia
NRTI	-	nucleoside reverse transcriptase inhibitor
NNRTI	-	non-nucleoside reverse transcriptase inhibitor
NVP	-	nevirapine
PCP	-	Pneumocystis jiroveci pneumonia (previously Pneumocystis carinii pneumonia)
PCR	-	polymerase chain reaction
PI	-	protease inhibitor
PMTCT	-	Prevention of mother-to-child transmission (of HIV)

RNA	-	ribonucleic acid
SD	-	standard deviation
Shld Abd	-	shoulder abduction
Shld Flex	-	shoulder forward flexion
TB	-	tuberculosis
UNAIDS	-	Joint United Nations Programme for HIV/AIDS
UNICEF	-	United Nations Children's Fund
WBC	-	white blood cell
WHO	-	World Health Organisation
ZDV	-	zidovudine



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