Introduction

"Height-for-age is a widely used indicator of long-run nutritional status, with growth stunting defined as height-for-age below the fifth percentile on a reference growth curve (usually the WHO/NCHS median)". Studies have been conducted examining the negative correlates of low height-for-age in general, and in some cases stunting in particular. Mendez and Adair's, 1999 study of more than 2000 Filipino children showed a negative association of stunting in early childhood with the child's cognitive development and school performance. Studies in several developing country contexts, including the Philippines and Guatemala among others, suggest that low early childhood height-for-age tends to predict short adult stature. A well-known study in Brazil reports that taller men and women are more likely to be in the labor force wherein taller men earn higher wages (Strauss and Thomas, 1998). This sequence of results suggests the possibility that early childhood height-for-age has significant effects on adult labor force outcomes.

As of January 2005, 66 per cent of the Philippines' adult population participates in the labor force and employment rates among these participants are 89 percent for both males and females. Half of the population was below 21 years old, which means that employment options and patterns for young adults are particularly important. But there are not previous studies that examine the effects of early childhood height-for-age on the work participation of young adults. This paper, therefore, examines the effects of height-for-age in early childhood on the type of work in early adulthood. Our hypothesis is: A child who has smaller height-for-age is less likely to work in the formal sector.

Data and Methodology

Data from the Cebu Longitudinal Health and Nutrition Survey (CLHNS) are used. The CLHNS is a longitudinal study of mothers and their children born from 1 May 1983 to 30 April 1984. A baseline survey was conducted in randomly selected 17 urban and 16 rural barangays (smallest political unit) in Metro Cebu. Among the 78 provinces of the Philippines, Cebu ranks second in terms of population size (NSO, 2000). There were 3,080 single live births and birth information was collected on all of them. Interviews every two months thereafter were done for 2 years. Other follow-up surveys followed in 1991, 1994, 1998, 2002 and 2005. The same sociodemographic, environmental, health, nutrition and household information were gathered in each survey round. The baseline however, included information on infant feeding practices. Later surveys collected additional data on adolescents' health, education and labor force participation.

Our dependent variable is the work status of young adults in 2005. The CLHNS young adults in this survey totaled 1,912. Attrition was due to migration, refusals and deaths. For our sample analysis, we purposely exclude 24 non-singletons (because, as is well-known, the distribution of birth weights and therefore early stunting for twins is below that of singletons), so we have a total of 1,888 young adults from the CLHNS. A job is considered formal if it satisfies three conditions, namely (a) hours worked >= 40 hours/week, (b) pay is >=P 173/day (~$3.46), the minimum pay in Metro Cebu (stipulated by the Department of Labor and Employment), and (c) benefits are included

from the Social Security System/GSIS, PhilHealth/other health insurance or Pag-ibig (Housing Program). Working in the formal sector in the Philippines, as in most countries, is advantageous compared to working in the informal sector. A formal job generally offers more security and higher wages and benefits.

Table 1 shows the profile of our sample of young adults in 2005. There are 993 (52.6%) males and 895 (47.4%) females whose ages range from 20-22 years old. Most of them are never married (72.6%) and the majority resides in urban areas (70.4%). On the average, they have completed three years of high school and only nine per cent had finished college. As of the 2005 survey, 15% were enrolled in school. Table 2 further describes the percentage distribution of young adults by occupational classification and, by informal and formal types of job. Formal sector jobs tended more likely to be in crafts and production and clerical occupations and less likely in sales than informal sector jobs.

Our main exposure variable is the height-for-age z score (HAZ) at the age of two years old. We chose HAZ at two years old over other earlier or later years of childhood HAZ because it is at this stage that HAZ tends to level off (Adair and Guilkey, Ricci and Becker, 1996). We also control for possible confounding variables: biological, maternal and household factors such as birthweight - a continuous variable with normal distribution; the educational attainment of the mothers - a continuous variable; the household location - whether it was in an urban or rural setting; and ownership of selected household assets – a categorical variable. All information pertaining to the covariates are taken from the baseline survey of CLHNS in 1983. The dependent and independent variables used in our model are listed in Table 3.

Medical studies revealed that in infancy males and females are biologically different. Many infant deaths occur among males and females. The Philippines' National Demographic and Health Survey in 2003 reported that the infant mortality rate for males was 10% higher compared to females. Also sex differentials in the labor force participation were observed (Handa and Neitzert, 1997) with men doing more energy-demanding jobs. In the study conducted by Anker and Hein in 1986, they found differences in wage earnings with men receiving higher wages than women. Furthermore, the Philippines' 2004 Labor Force Survey reported that there were more males working compared to females -19,836,000 vs. 11,905,000. In view of these studies, we use sex as stratifying variable for our sample population.

A multinomial logistic regression is used to examine the effects of each of the independent variables mentioned in Table 3 using the Statistical Package STATA 8.0. Test for multi-collinearity (i.,e., Pairwise correlations) have been done and the relevant right-side variables are not very correlated.

Preliminary results show that young adults with greater height-for-age z scores at 2 years of age are more likely to engage in formal jobs. Controlling for sex, birth weight, mother's schooling attainment, parental household location and parental ownership of assets, children who have HAZ that is one unit higher at 2 years old are about 0.2 more likely to work formal jobs though there is not a significant effect on working in informal

jobs versus not working at all (Table 4). However, estimates with a similar specification but that are separate for females and males show that this effect is significant only for males with about a 0.35 higher probability of participating in formal sector jobs for males with a HAZ that is one unit higher at 2 years of age (Tables 4). This might be related to the types of work that male young adults do that may have greater strength and energy demands in the formal sector. Thus, at least for males, early childhood stunting and lower HAZ at 2 years of age are associated with less attractive employment in the critical years of their employment as young adults. Because there often is persistency in types of employment over the work life cycle, this is likely to have long-run implications for their labor market experiences.

Table 1. Background characteristics of sample young adults by work status, CLHNS 2005

Characteristic	Work status (%)			Both sexes
	Not working (n=734)	Working informal job (n=853)	Working formal job (n=301)	
Sex				
Male	36.6	51.9	11.5	993
Female	41.3	37.8	20.9	895
Age				
20	45.5	44.2	10.3	165
21	38.5	45.0	16.5	1,662
22	31.2	54.1	14.7	61
Marital status				
Never married	40.2	41.3	18.5	1,370
Ever married	35.3	55.4	9.3	518
Schooling status				
Not enrolled	32.4	49.2	18.4	1,605
Enrolled	75.3	22.6	2.1	283
Educational level				
Elementary	31.4	64.8	3.8	287
High school	33.6	48.7	17.7	1,073
College	53.6	27.5	18.9	528
Household location				
Rural	35.2	44.4	20.4	559
Urban	40.4	45.5	14.1	1,329
Height-for-age z score (at 2 yrs. old)	Mean -2.358314 Std. Dev. 1.047614	Mean -2.51647 Std. Dev. 1.046694	Mean -2.279674 Std. Dev. 1.043711	1,888
TOTAL				1,888

Table 2. Percent distribution of young adults by occupational classification, by informal and formal types of job, CLHNS 2005

Classification	Informal job		Formal job	
	Number	Percent	Number	Percent
Professional, technical	28	3.3	15	5.0
Administrative, executive, managerial	11	1.3	2	0.7
Clerical	46	5.4	57	18.9
Sales	204	23.9	23	7.6
Farming, fishing	31	3.6	0	0
Mining, quarrying	3	0.4	0	0
Transport and communication	78	9.1	9	3.0
Crafts and production	331	38.8	164	54.5
Service, sports and related work	121	14.2	31	10.3
TOTAL	853	100.0	301	100.0

Table 3. Dependent and independent variables used in the model, by sex

Variable type	Variable name and description	Males (%)	Females (%)	Both sexes (%)	N cases
Dependent variable	JOBSTAT - categorical (2005)				
	0 - Not working	36.5	41.0	38.9	734
	1 - Working informal job	52.0	38.1	45.2	853
	2 - Working formal job	11.5	20.9	15.9	301
Independent variables	Biological factor				
	ROHAZ12 - continuous (1985-1986)	Mean -2.320229 Std. Dev. 1.016466	Mean -2.524855 Std. Dev. 1.076848	Mean -2.417231 Std. Dev. 1.050231	1888
	IMBW - continuous (1983-1984)	Mean 3030.266 Std. Dev. 424.4523	Mean 2984.023 Std. Dev. 411.8893	Mean 3008.344 Std. Dev. 419.0703	1888
	Maternal factor				
	MOTGRD- continuous (1983-1984)	Mean 7.057402 Std. Dev. 3.365762	Mean 6.949721 Std. Dev. 3.223366	Mean 7.006356 Std. Dev. 3.298594	1888
	Household factor				
	URBAN - categorical (1983-1984)				
	0 - Rural	25.9	26.6	25.9	495
	1 - Urban	74.1	73.4	74.1	1393
	NEWASET83 - categorical (1983-1984)				
	0 - No house or TV	50.65	51.17	50.9	961
	1 - Owns house or TV	35.65	34.30	35.0	661
	2 - Owns house and TV	13.70	14.53	14.1	266
	TOTAL	993	895	100.0	1888

Table 4. Preliminary Results of the Multinomial Logistic Regression

JOBSTAT	Males		Females		Both Sexes	
JOBSTAT=1	RRR	P>|z|	RRR	P>|z|	RRR	P>|z|
Height-for-age z score at age 2 yrs.	1.0925	0.243	0.8866	0.122	0.9853	0.784
Sex	-	-	-	-	0.6110	0.000
Birthweight	0.9997	0.085	1.0000	0.871	0.9998	0.269
Mother's highest grade	0.8582	0.000	0.8648	0.000	0.8592	0.000
Household location	0.7772	0.147	1.5436	0.021	1.0683	0.598
Ownership of asset	0.8410	0.113	0.9889	0.923	0.9176	0.276
JOBSTAT= 2						
Height-for-age z score at age 2 yrs.	1.3453	0.012	1.0704	0.467	1.1869	0.019
Sex	-	-	-	-	1.6394	0.000
Birthweight	0.9995	0.089	1.0003	0.215	1.0000	0.796
Mother's highest grade	0.9810	0.611	0.9414	0.054	0.9561	0.061
Household location	0.7252	0.224	0.6750	0.055	0.6878	0.020
Ownership of asset	0.7239	0.054	1.0628	0.652	0.9085	0.357

(Jobstat=0 is the comparison group)

Table 5. Preliminary Results of the Multinomial Logistic Regression

JOBSTAT	Males		Females		Both Sexes	
JOBSTAT=0	RRR	P>|z|	RRR	P>|z|	RRR	P>|z|
Height-for-age z score at age 2 yrs.	0.9153	0.243	1.1278	0.122	1.0149	0.784
Sex	-	-	-	-	1.6365	0.000
Birthweight	1.0003	0.085	1.0000	0.871	1.0001	0.269
Mother's highest grade	1.1652	0.000	1.1564	0.000	1.1638	0.000
Household location	1.2867	0.147	0.6478	0.021	0.9360	0.598
Ownership of asset	1.1891	0.113	1.0112	0.923	1.0898	0.276
JOBSTAT= 2						
Height-for-age z score at age 2 yrs.	1.2314	0.069	1.2072	0.047	1.2045	0.010
Sex	-	-	-	-	2.6829	0.000
Birthweight	0.9998	0.549	1.0002	0.281	1.0001	0.572
Mother's highest grade	1.1431	0.000	1.0886	0.011	1.1128	0.000
Household location	0.9332	0.779	0.4373	0.000	0.6439	0.005
Ownership of asset	0.8608	0.365	1.0746	0.606	0.9901	0.925

(Jobstat=1 is the comparison group)

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