
PACIFIC JOURNAL OF MEDICAL SCIENCES
{Formerly: Medical Sciences Bulletin}
ISSN: 2072 – 1625



Pac. J. Med. Sci. (PJMS); Volume 8, No. 2, May 2011
Special Issue:
National Nutrition Survey Papua New Guinea, 2005; (NNS 2005)

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Chapter 4: Anthropometry Pages 37 – 53

CHAPTER 4. ANTHROPOMETRY

This chapter summarizes data on overall nutritional status of preschool children (6-59 months), non-pregnant women of childbearing age (15-49 years) and adult men age 18 years and older. Cut-offs for anthropometry indicators used the WHO child growth standards (De Onis 2008). The prevalence of stunting, wasting and underweight calculated using the NCHS/CDC/WHO reference is included in appendix 12.

4.1 Preschool Children

4.1.1 Length/Height-for-age (HAZ)

Of the 937 children surveyed 930 had at least one anthropometric measurement, 892 had valid length or height, age and sex data which allowed for the determination of length/height-for-age (HAZ) values. HAZ values outside of the plausible range (described in methods section) were excluded from these analyses. The mean z-score was -1.81 (SD=1.39). Potentially erroneous HAZ values were most likely due to inaccurate age determinations for the children because of inexact birth dates as well as inaccurate height measurements.

The HAZ data in preschool are summarized in Table 4.1. The estimated prevalence of stunting (HAZ <-2 SD) was 43.9%. This is considered “high” (WHO, 1995) and reflects a serious problem of chronic malnutrition among young children in PNG.

Children in the Mamose region were most likely to be stunted whereas children in the Southern region were less stunted. There was a strong association between stunting and urban and rural location, with children in rural areas being more likely to be stunted.

Males were also more likely to be both moderately and severely stunted than females. There was a strong association between age and stunting. Children aged 6-11 months had a lower prevalence of stunting than other age groups (24.1%). The prevalence of stunting rises sharply in children 12-23 months to 45.5% and remains high in children up to 59 months of age.

Table 4.1 Length/Height–for-age Z-score (HAZ) summary statistics among children 6-59 months, PNG National Nutrition Survey 2005. WHO standard 2005

Demographic Characteristic	N	Mean HAZ ± SD	Prevalence of low HAZ (%)			
			<-2 SD	95% CI	<-3 SD	95% CI
National	892	-1.81 ± 1.39	43.9	38.8, 49.2	17.6	14.6, 21.0
Region						
Southern	214	-1.44 ± 1.43	30.8	21.0, 42.8	10.7	5.7, 19.2
Highlands	203	-1.88 ± 1.39	46.3	38.0, 54.9	17.7	13.1, 23.5
Mamose	244	-2.03 ± 1.41	52.0	40.6, 63.3	23.4	16.9, 31.3
Islands	231	-1.77 ± 1.27	40.3	32.1, 49.0	15.2	10.1, 22.2
Residence						
Urban	175	-1.46 ± 1.19	27.8	19.1, 38.5	8.4	4.3, 15.7
Rural	717	-1.90 ± 1.42	47.9	42.3, 53.6	19.9	16.5, 23.8
Sex						
Male	484	-1.99 ± 1.41	47.4	41.6, 53.3	22.8	18.6, 27.6
Female	408	-1.61 ± 1.34	39.6	33.3, 46.3	11.3	8.6, 14.8
Age groups (months)						
6-11	100	-1.09 ± 1.49	24.1	15.9, 34.8	6.1	2.6, 13.6
12-23	223	-1.85 ± 1.47	45.5	37.7, 53.7	19.3	14.3, 25.4
24-35	215	-1.89 ± 1.34	47.4	40.2, 54.7	18.0	13.1, 24.3
36-47	192	-1.97 ± 1.24	46.8	39.8, 53.9	18.9	13.9, 25.0
48-59	162	-1.91 ± 1.33	45.7	37.2, 54.4	20.2	14.5, 27.4

Means and standard deviations (SD) are weighted and are calculated assuming simple random sampling; prevalence estimates and 95% CI are calculated using statistical weights to account for the complex sample design.

4.1.2 Weight-for-Height/Length

Of the 937 preschool children surveyed, 897 children had valid weight, height/length and sex data to allow for the determination of weight–for-height/length Z-scores (Table 4.2). The mean z-score was -0.12 (SD= 1.08), (Table 4.2). Wasting was not very prevalent among children less than five years of age in Papua New Guinea. Using the WHO 2005 standards 4.5% of children had a low Weight-for-Height. Of these children 0.9% of children were severely wasted (WHZ<-3).

Children in the Mamose region were more likely to be wasted than children in the other three regions. The prevalence of wasting in the Highlands was much lower than in the other regions and none of the children in the Highlands were severely wasted. The prevalence of wasting was not substantially different based on urban and rural location or sex of the children.

Table 4.2 Weight-for-Height Z-score (WHZ) summary statistics among children 6-59 months, PNG National Nutrition Survey 2005. WHO standard 2005.

Demographic Characteristic	N	Mean WHZ \pm SD	Prevalence of low WHZ (%)			
			< -2 z-scores	95% CI	<3 z-scores	95% CI
National	897	-0.12 \pm 1.08	4.5	3.1, 6.5	0.9	0.4, 1.9
Region						
Southern	212	-0.41 \pm 0.94	3.3	1.4, 7.7	0.9	0.2, 3.7
Highlands	203	-0.51 \pm 1.02	1.5	0.5, 4.2	0.0	0.0
Mamose	244	-0.55 \pm 1.05	8.2	4.7, 13.8	2.0	0.8, 5.3
Islands	238	-0.23 \pm 1.02	5.0	2.7, 9.1	0.4	0.1, 2.9
Residence						
Urban	174	-0.05 \pm 1.11	2.4	0.5, 10.0	0.0	0.0
Rural	723	-0.13 \pm 1.08	5.0	3.4, 7.4	1.1	0.5, 2.3
Sex						
Male	485	-0.10 \pm 1.12	4.9	3.2, 7.4	1.0	0.4, 2.4
Female	412	-0.15 \pm 1.03	4.0	2.2, 7.0	0.8	0.3, 2.3
Age groups (months)						
6-11	103	-0.49 \pm 1.08	8.3	4.4, 15.0	0.0	0.0
12-23	224	-0.42 \pm 1.11	8.3	5.0, 13.0	1.5	0.5, 4.4
24-35	213	-0.007 \pm 1.02	4.4	2.1, 8.9	0.8	0.2, 3.2
36-47	193	-0.07 \pm 1.06	1.5	0.5, 4.6	1.2	0.3, 4.5
48-59	161	-0.16 \pm 1.00	0.4	0.0, 2.6	0.0	0.0

Means and standard deviations (SD) are weighted and are calculated assuming simple random sampling; prevalence estimates and 95% CI are calculated using statistical weights to account for the complex sample design.

4.1.3 Weight-for-Age

Of the 937 preschool children surveyed, 924 children had valid weight, age and sex data to allow for the determination of weight-for-age Z-scores (Table 4.3). The mean z-score

was -1.10 (SD= 1.15). Overall the prevalence of WAZ <-2 was 18.1%. Most of the children were only moderately underweight, with the prevalence of severe underweight being very low (5.2%).

Children in the Mamose region were more likely to be underweight than children in the other three regions. Almost one third of children in Mamose were underweight and these children were twice as likely to be severely underweight than children from the other regions.

Table 4.3 Weight-for-age summary statistics (WAZ) among children 6-59 months, PNG National Nutrition Survey 2005. WHO standard 2005

Demographic Characteristics	N	Mean WAZ \pm SD	Prevalence of low WAZ (%)			
			<-2 SD	95% CI	<-3 SD	95% CI
National	924	-1.10 \pm 1.15	18.1	14.9, 21.9	5.2	3.7, 7.2
Region						
Southern	217	-1.08 \pm 1.07	17.1	10.3, 26.9	4.6	1.8, 11.2
Highlands	207	-0.69 \pm 1.03	7.2	4.3, 11.9	1.9	0.6, 5.7
Mamose	254	-1.52 \pm 1.12*	31.9	24.4, 40.4	9.1	5.7, 14.0
Islands	246	-1.15 \pm 1.19	15.0	11.2, 19.9	4.9	2.6, 9.1
Residence						
Urban	178	-0.81 \pm 0.96	12.3	4.8, 28.2	0.8	0.1, 4.8
Rural	746	-1.17 \pm 1.17	19.5	16.2, 23.4	6.2	4.5, 8.5
Sex						
Male	500	-1.17 \pm 1.11	21.0	17.1, 25.6	6.4	4.2, 9.6
Female	424	-1.02 \pm 1.17	14.6	11.0, 19.2	3.7	2.2, 6.0
Age groups (months)						
6-11	104	-0.91 \pm 1.43	20.2	13.2, 29.6	2.3	0.7, 7.2
12-23	227	-1.21 \pm 1.20	23.2	18.2, 29.2	8.4	5.2, 13.4
24-35	232	-1.11 \pm 1.12	17.4	12.5, 23.6	4.2	2.2, 7.7
36-47	196	-1.11 \pm 1.04	14.3	9.7, 20.6	5.4	3.2, 9.1
48-59	165	-1.04 \pm 1.01	15.3	10.1, 22.6	3.5	1.3, 8.9

Means and standard deviations (SD) are weighted and are calculated assuming simple random sampling; prevalence estimates and 95% CI are calculated using statistical weights to account for the complex sample design.

4.1.4 Body Mass Index for age

WHO recommends that body mass index for age is used to calculate the prevalence of overweight in children 6-59 months (De Onis 2008).

Of the 937 preschool children surveyed, 892 children had valid weight, height/length, age and sex data to allow for the determination of body mass index for age Z-scores. Overall the prevalence of overweight (BAZ >2 z scores) was 4.8%. In comparison, 2.3 % of children of children in the WHO reference population fall into this category. Children in the Highlands were more likely to be overweight than children from the other regions (Table 4.4).

The prevalence of overweight is very low in children less than one year of age. It peaks at around 3-4 years of age and declines slightly in the 4-5 year old age group.

Table 4.4 Body Mass-for-age Z-score (BAZ) summary statistics among children 6-59 months, PNG National Nutrition Survey 2005. WHO standard 2005.

Demographic Characteristics	N	Prevalence of low BAZ (%)					
		< -2 z-scores	95% CI	-2 - +2 Z-scores	95% CI	> + 2 Z-scores	95% CI
National	892	3.9	2.7, 5.8	91.3	88.5, 3.5	4.8	3.0, 7.5
Region							
Southern	212	2.8	1.2, 6.7	95.3	91.2, 97.5	1.9	0.6, 5.9
Highlands	202	1.0	0.3, 3.7	89.1	81.6, 93.8	9.9	5.4, 17.3
Mamose	241	7.5	4.4, 12.4	90.9	86.3, 94.0	1.7	0.7, 4.1
Islands	237	4.6	2.3, 9.0	91.6	87.5, 94.4	3.8	2.1, 6.9
Residence							
Urban	174	3.0	0.9, 9.5	91.5	78.0, 97.1	5.4	1.0, 24.4
Rural	718	4.1	2.7, 6.3	91.3	88.7, 3.3	4.6	3.2, 6.7
Sex							
Male	483	3.9	2.5, 5.9	90.3	86.9, 92.9	5.8	3.7, 9.0
Female	409	4.0	2.4, 6.7	92.5	88.8, 95.1	3.5	1.6, 7.2
Age groups (months)							
6-11	103	8.6	4.6, 15.6	89.9	82.4, 94.4	1.4	0.2, 9.6
12-23	224	6.8	4.0, 11.3	90.5	85.9, 93.7	2.7	1.2, 6.0
24-35	213	3.0	1.3, 6.7	92.0	86.3, 95.5	5.0	2.2, 10.8
36-47	191	2.1	0.8, 5.5	89.9	84.5, 93.5	8.0	4.8, 13.3
48-59	160	0.4	0.1, 2.6	94.0	85.4, 97.7	5.6	2.0, 14.5

Prevalence estimates and 95% CI are calculated using statistical weights to account for the complex sample design.

Figure 4.1 shows that, as expected, stunting was the most prevalent while wasting was the least common form of malnutrition.

Figure 4.1 Prevalence of general malnutrition among children 6-59 months old based on anthropometric indicators, PNG National Nutrition Survey 2005.

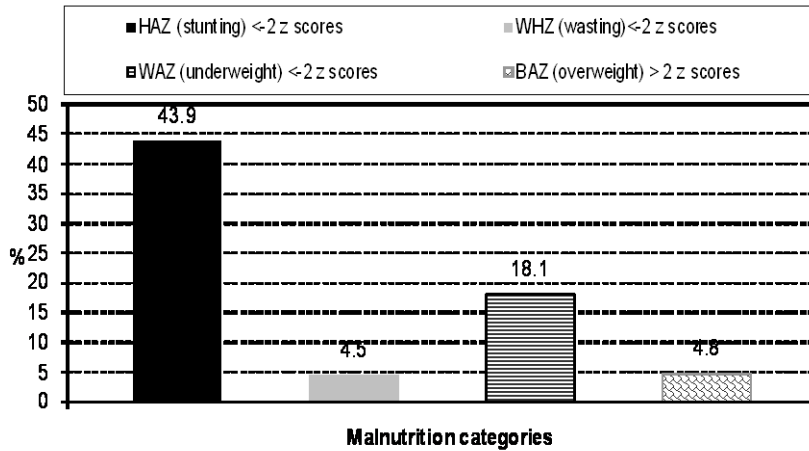


Figure 4.2 presents the distribution of HAZ, WAZ and WHZ z-scores against the WHO 2005 standard. The distribution of HAZ and WAZ z-scores is shifted to the left of the reference population, and the WHZ z-score is shifted only slightly to the left.

Figure 4.2 Observed Z-score distributions (HAZ, WAZ, WHZ) in children 6-59.9 months calculated from the WHO standard, PNG National Nutrition Survey 2005.

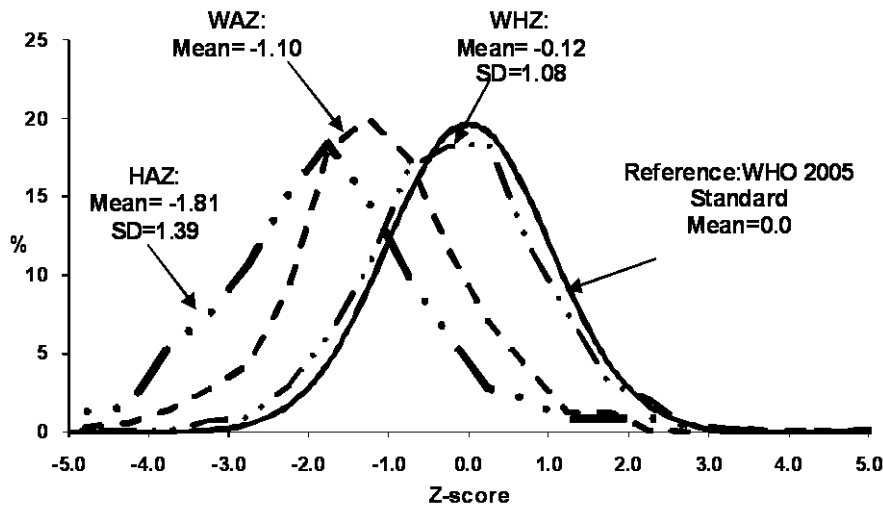
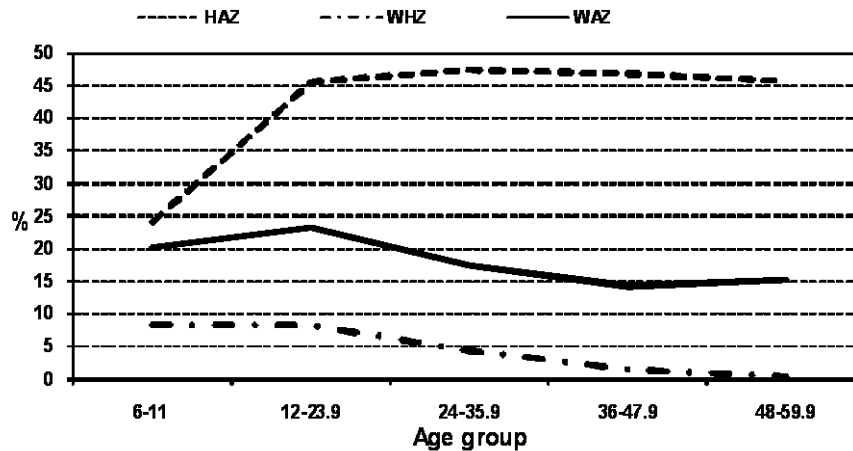


Figure 4.3 shows the prevalence of stunting (HAZ), wasting (WHZ) and underweight (WAZ) by age group. This graph demonstrates that stunting increases very rapidly from 6 months, whereas wasting and underweight peak in the 2nd year of life and, decreased thereafter with age.

Figure 4.3 Prevalence of HAZ, WAZ and WHZ <-2 SD by age group, PNG National Nutrition Survey 2005.



4.2 Non-pregnant women of childbearing age (15-49 years old)

Heights and weights of adult women were measured to assess their overall nutritional status based on body mass index (BMI). Of the 783 non-pregnant women surveyed, 772 women had both valid weight and height data to allow for the determination of body mass index (BMI). There were 64 pregnant women who were not measured. A summary of anthropometric data on 772 non-pregnant women of child bearing age is presented in Table 4.5. There was a trend toward increasing weight of women by age. Women in Mamose were also more likely to weigh less than women in other regions.

Table 4.5 Mean height and weight of non-pregnant women 15-49 years of age, PNG National Nutrition Survey 2005

Demographic characteristic	N	Mean height ¹ ± SD	N	Mean weight ² ± SD
National	772	155.1 ± 6.2	779	55.3 ± 10.7
Regional				
Southern	250	156.6± 6.1	254	55.9 ± 11.7
Highlands	182	153.8± 5.3	182	56.4 ± 8.5
Mamose	174	153.6± 6.7	176	50.7 ± 9.2
Islands	166	156.1± 6.0	167	57.9 ± 11.5
Residence				
Urban	185	156.7 ±6.1	189	60.4 ± 12.9
Rural	587	154.6 ±6.11519	590	53.6 ± 9.4
Age Group (years)				
15-19.9	136	154.5 ± 5.8	136	53.2± 7.6
20-29.9	280	1545.2 ± 6.5	282	54.1 ± 8.7
30 – 39.9	208	155.1 ± 6.6	211	56.7 ± 12.5
40-49.9	141	155.0 ± 5.4	143	57.7± 13.4
Education				
None	173	153.0 ± 6.1	174	51.8 ± 9.5
1-3 years	426	155.5 ± 6.0	431	55.3 ± 10.6
4 years +	144	157.0 ± 5.8	145	59.7 ± 11.1

Means are weighted and standard deviations (SDs) calculated assuming simple random sampling

1 In centimeters

2 In kilograms

The mean BMI for women was 22.9 (SD 3.8). The prevalence of underweight women with a BMI of <18.5 was low (5.3%). The highest prevalence of underweight was in the Southern region (11.2%).

Women in the Highlands and Islands were more overweight than women in the other two regions. The prevalence of obese women with a BMI of >30.0 in PNG was below 10% in all four regions and nationally.

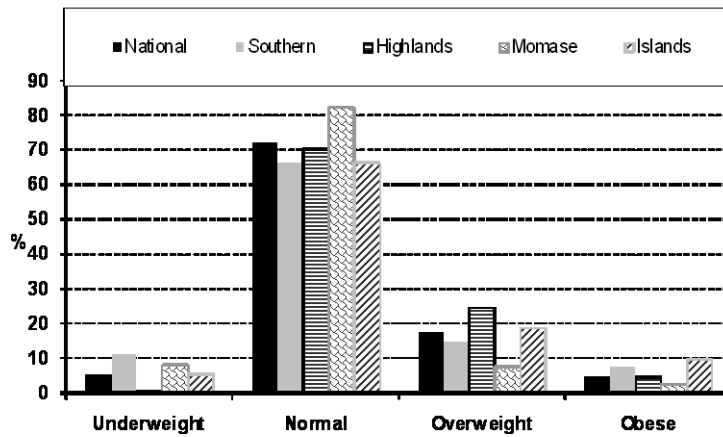
There was a strong association between educational attainment and BMI. A higher proportion of women with education up to grades 9-12 were obese compared with women with less education. Women in urban areas were also more likely to be overweight and obese than women living in rural areas. All BMI calculations by various indicators are displayed in Tables 4.6 and figure 4.4.

Table 4.6 Summary of body mass index (BMI) data for non-pregnant women 15-49 years of age, PNG National Nutrition Survey 2005

Demographic Characteristics	Body Mass Index					Mean \pm SD
	N	<18.5 (CI 95%) Underweight	18.5-24.9 (CI 95%) Normal	25.0-29.9 (CI 95%) Overweight	>30.0 (CI 95%) Obese	
National	772	5.3 3.5, 7.8	72.2 67.5, 76.4	17.4 14.1, 21.4	5.1 3.4, 7.7	22.9 + 3.8
Regional						
Southern	250	11.2 7.6, 16.2	66.4 58.5, 73.5	14.9 9.9, 21.9	7.5 4.2, 13.1	22.8 + 4.3
Highlands	182	0.5 0.1, 3.8	70.3 61.3, 78.0	24.7 18.4, 32.4	4.4 2.0, 9.2	23.8 + 3.0
Mamose	174	8.0 3.5, 17.3	82.2 72.9, 88.8	7.5 3.7, 14.5	2.3 0.7, 7.3	21.4 + 3.0
Islands	166	5.4 3.0, 9.5	66.3 56.6, 74.8	18.7 12.9, 26.2	9.6 3.7, 22.9	23.7 + 4.1
Residence						
Urban	185	4.8 2.2, 10.1	58.4 48.7, 67.5	23.2 14.9, 34.2	13.6 7.5, 23.4	24.6 + 4.7
Rural	587	5.4 3.4, 8.5	75.5 70.6, 79.9	16.0 12.5, 20.2	3.1 1.8, 5.3	22.4 + 3.3
Age Group (years)						
15-19.9	136	3.6 1.8, 7.3	73.0 64.3, 80.2	22.2 15.1, 31.4	1.2 0.2, 8.7	22.3 + 2.9
20-29.9	280	5.1 2.6, 9.5	78.2 70.9, 84.1	13.9 9.4, 20.0	2.8 1.3, 5.9	22.5 + 3.1
30- 39.9	208	6.6 3.8, 11.2	64.0 56.2, 71.1	21.4 15.2, 29.2	8.1 4.5, 14.1	23.4 + 4.4
40-49.9	141	5.5 2.9, 10.1	70.8 62.2, 78.2	14.2 9.1, 21.4	9.5 5.4, 16.3	23.7 + 4.7
Education						
None	173	7.7 4.5, 12.7	76.7 70.2, 82.2	13.8 9.6, 19.5	1.8 0.6, 5.5	22.1 + 3.4
1-3	426	4.6 2.6, 8.0	73.3 68.1, 77.9	18.0 14.0, 22.9	4.1 2.4, 6.9	22.9 + 3.7
4+	144	3.3 1.5, 7.0	59.6 48.7, 69.6	23.5 14.7, 35.3	13.7 8.1, 22.1	24.1 + 4.3

Prevalence estimates and 95% CIs calculated using statistical weights and take into account the complex sample design; the means and SDs were weighted and calculated assuming simple random sampling.

Figure 4.4 BMI among non-pregnant women nationally and by region, PNG National Nutrition Survey 2005



4.3 Men 18 years of age and older

Heights and weights of adult men were measured to assess their overall nutritional status based on body mass index (BMI). Of the 804 men surveyed, 787 men had valid weight and height data to allow for the determination of body mass index (BMI). A summary of anthropometric data on 787 men 18 years and older are presented in Table 4.7

Table 4.7 Mean height and weight of men 18 years and older, PNG National Nutrition Survey 2005

Demographic characteristic	N	Mean height ¹ ± SD	N	Mean weight ² ± SD
National	787	164.3 ± 7.1	789	62.1 ± 10.3
Regional				
Southern	206	165.7 ± 7.2	206	61.9 ± 11.2
Highlands	206	162.7 ± 5.9	207	63.3 ± 9.8
Mamose	195	162.1 ± 7.2	195	57.7 ± 9.0
Islands	180	167.1 ± 6.9	181	65.6 ± 9.4
Residence				
Urban	135	165.6 ± 7.5	135	66.0 ± 13.7
Rural	652	164.1 ± 7.1	654	61.2 ± 9.2
Age Group (years)				
18-29.9	274	164.9 ± 7.3	274	61.1 ± 7.5
30 – 39.9	202	164.8 ± 6.6	202	63.7 ± 9.8
40-49.9	145	164.2 ± 7.1	146	63.1 ± 12.3
50-59.9	98	163.7 ± 7.3	98	62.9 ± 13.6
60+	63	161.5 ± 7.0	64	57.9 ± 10.1
Education				
None	128	161.0 ± 6.2	128	57.4 ± 8.65
1-3 years	86	162.3 ± 7.0	85	58.8 ± 8.9
4 years +	556	165.4 ± 7.0	555	63.5 ± 10.1

Means are weighted and standard deviations (SDs) calculated assuming simple random sampling

1 In centimetres

2 In kilograms

The mean BMI for men was 23.1 (SD 3.1). The prevalence of underweight men with a BMI of <18.5 was very low in all regions. There is a low prevalence of obese men with a BMI of >30.0 in PNG. All BMI calculations by various indicators are displayed in Tables 4.8 and figure 4.5.

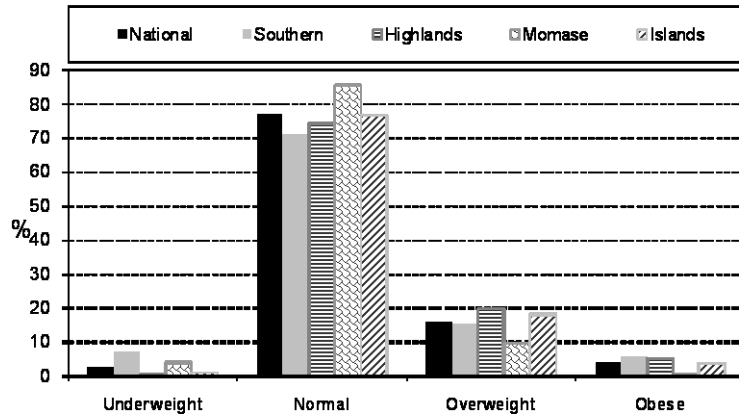
Men who lived in urban areas were much more likely to be obese than men living in rural areas.

Table 4.8 Summary of body mass index (BMI) data for men 18 > years, PNG National Nutrition Survey 2005

Demographic Characteristics	Body Mass Index					
	N	Underweight <18.5 (CI 95%)	Normal 18.5-24.9 (CI 95%)	Overweight 25.0-29.9 (CI 95%)	Obese >30.0 (CI 95%)	Mean ± SD
National	787	2.9 1.9, 4.5	77.0 72.7, 80.8	16.1 13.0, 19.9	4.0 2.4, 6.4	23.1 ± 3.1
Region						
Southern	206	7.5 4.3, 12.7	71.0 62.0, 78.6	15.7 9.7, 24.2	5.9 2.6, 12.9	22.4 ± 3.4
Highlands	206	0.5 0.1, 3.5	74.3 65.5, 81.4	19.9 14.2, 27.2	5.3 2.4, 11.3	23.9 ± 3.0
Mamose	195	4.1 1.9, 8.5	85.6 78.2, 90.8	9.7 5.4, 16.9	0.5 0.1, 3.6	21.8 ± 2.3
Islands	180	1.1 0.3, 4.5	76.7 69.5, 82.6	18.3 12.6, 25.9	3.9 2.1, 7.1	23.4 ± 3.1
Residence						
Urban	135	4.9 2.3, 10.4	63.0 54.4, 70.8	20.7 14.6, 28.4	11.4 6.3, 19.9	24.3 ± 4.2
Rural	652	2.5 1.5, 4.3	79.9 75.2, 83.9)	15.2 11.7, 19.4	2.4 1.2, 4.6	22.8 ± 2.7
Age Group (years)						
18-29	274	2.5 1.2, 5.3	81.6 75.1, 86.7	15.6 10.9, 22.0	0.3 0.0, 1.7	22.6 ± 2.2
30-39	202	1.0 0.3, 3.0	76.2 68.5, 82.4	16.7 11.2, 24.3	6.1 3.4, 10.8	23.5 ± 2.8
40-49	145	2.1 0.8, 5.8	76.8 68.7, 83.3	15.2 9.8, 22.6	5.9 3.1, 11.1	23.2 ± 3.8
50-59	98	7.0 3.4, 13.9	64.8 53.4, 74.7	19.6 12.2, 29.8	8.6 3.5, 19.9	23.6± 4.2
60+	63	6.3 2.7, 14.4	77.7 66.8, 85.7	14.3 7.6, 25.2	1.7 0.2, 11.6	22.3 ± 3.2
Education						
None	128	3.2 1.3, 7.7	85.1 76.2, 91.0	10.7 5.7, 19.2	1.0 0.1, 7.0	22.1 ± 2.6
1-3 years	85	5.4 2.0, 14.2	81.0 70.5, 88.4	13.6 7.7, 22.7	0	23.2 ± 3.2
4 years +	555	2.5 1.5, 4.2	73.8 68.7, 78.4	18.4 14.4, 23.2	5.3 3.2, 8.5	22.3 ± 2.4

Prevalence estimates and 95% CIs calculated using statistical weights and take into account the complex sample design; the means and SDs were weighted and calculated assuming simple random sampling.

Figure 4.5 BMI among men > 18 years nationally and by region, National Nutrition Survey, Papua New Guinea 2005



4.4 Birth weight

A total of 357 women had given birth in the previous 3 years. Of these women, 178 reported that they knew the birth weight of their last born child. Of those who reported the birth weight, 71.0% had the birth weight recorded in the child's clinic book, 27.8% recalled the birth weight and 1.1% of women had another form of documentation with the birth weight recorded.

The mean birth weight was 3140 grams, which is considered a healthy birth weight. Overall, 7.9% of babies were reported to be less than 2500 grams (Table 4.9). The Southern region had the greatest prevalence of low birth weight (22.2%) which is much higher than in any of the other regions.

The birth weight data should be interpreted with caution as there is no way of knowing how soon after birth the child was weighed and only half of the women who had given birth in the last 3 years recalled the baby's birth weight. The WHO recommends that babies are weighed within an hour of birth before postnatal weight loss occurs. In PNG it is possible that some babies were measured a few days after the birth. Moreover, the number of birth weights recorded is small and the birth weights that were recalled might not be accurate. Of the mothers that did recall the birth weight the prevalence of low birth weight was 3.8%. The prevalence of low birth weight recorded on the baby clinic book or other documentation was 8.1%.

Table 4.9 Distribution of birth weights* of infants born within the last three years prior to the survey, by maternal factors, PNG National Nutrition Survey 2005

Demographic Characteristic	N	% <2500	95% CI	Mean birth weight	95% CI
National	178	7.9	4.8, 12.6	3140	3031, 3249
Region					
Southern	68	22.2	12.5, 36.2	2834	2665, 3004
Highlands	38	0.0	0.0	3440	3241, 3639
Mamose	25	8.0	2.0, 26.9	2898	2665, 3129
Islands	47	6.4	2.0, 18.2	3119	2978, 3258
Residence					
Urban	69	7.7	3.2, 17.4	3166	2948, 3383
Rural	109	7.9	4.2, 14.6	3126	2986, 3266

*Birth weights were reported by mothers

Means and standard deviations (SD) are weighted and are calculated assuming simple random sampling; prevalence estimates and 95% CI are calculated using statistical weights to account for the complex sample design.

4.5 Discussion: Anthropometry

Based on WHO classifications (1995) relative to other countries at the time of the survey, PNG is a country with a “high” prevalence of stunting. The overall standard deviation (SD) for stunting distribution was 1.39 (Table 4.1). This is higher than the SD of 1.0 for HAZ distribution in the reference population, and is the result of some measurement errors combined with the lack of exact age determinations for the children. Because of this “artificially” wider HAZ distribution, the prevalence of HAZ <-2 may be somewhat falsely increased.

The prevalence of wasting among Papuan New Guinean preschool children was low except in Mamose where it is nearly four times the expected prevalence of 2.3% in a reference population, and thus places children in Mamose in the “medium” prevalence for wasting (WHO, 1995). The WHZ SD was 1.08. This suggests that there were few measurement errors.

According to WHO categorization, PNG has a “medium” prevalence of underweight among its preschool population (WHO, 1995). The SD of the WAZ distribution (1.15) is smaller than the SD of the HAZ distribution. This may be because the children were weighed with better precision and accuracy than they were measured for length or height. Children in Mamose were more likely to be underweight than children in the other regions.

Although there are differences in methodology, the findings from this survey are similar to those of the NNS1982/83 (Heywood 1988) and PNG HFS 1996 (Gibson and Rozelle 1996). Although the problem of underweight and wasting is not critical at a national level

it is important to recognize that there are regions and age groups which are at particular risk. Children in Mamose are at a much greater risk of the consequences of poor growth for all three indicators (HAZ, WAZ and WHZ) than children in the other three regions.

Children aged 6-23 months had the highest prevalence of wasting. The prevalence of wasting drops drastically at 24 months and was almost non-existent in children in the 48-59 month age group. This is similar to the findings of Gibson and Rozelle reported in the PNG Household Survey 1996⁴. They found that the highest rate of wasting occurs in the second year of life, which was also the time of greatest risk found by the NNS 1982/83 (Heywood 1988).

Recent global estimates suggest that malnutrition, based on anthropometric indicators, is associated with over 50% of all deaths among children (WHO 2000). The high prevalence of stunting and medium prevalence of underweight among young children highlight the poor nutritional status of children in PNG.

The national prevalence of overweight and obesity among non-pregnant women and men are low, but should be monitored for a potential increasing trend as seen in a number of other developing nations and in many other Pacific Island Nations. WHO warns that even in the poorest countries, major chronic disease risk factors are increasing (Chopra et al 2002). Thus, already strained health systems are faced with an increased burden of non-communicable diseases at the same time as a persisting burden of under nutrition and infectious diseases.