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# Distribution of Blood Pressure in a National Sample of Malaysian Adults

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**Summary**

We describe the distribution of blood pressure (BP) by age, sex and ethnicity in Malaysian adults. A national sample of 21391 individuals aged 30 or older had usable data. They were selected by stratified 2-stage cluster sampling. BP was measured using an automated oscillometric device, Visomat®. Percentile tables and curves by age, sex and ethnicity are presented. The systolic and diastolic BP distribution was right skewed and showed the expected increase with age. This was markedly so in Malay and other indigenous women; as a result they had most severe hypertension.

*Key Words:* Blood pressure, Hypertension, Population survey, Percentile, Distribution

## Introduction

The distribution of blood pressure (BP) in a representative national sample of Malaysian adults has not previously been described. Such information is of epidemiological interest, and is also useful in public health practice. High levels of BP are associated with increase risk of cardiovascular morbidity[1]. While prevalence estimates of hypertension are convenient and simple to interpret, it suffers from dependence on choice of arbitrary cut-off level on a continuous distribution to define hypertension. It is well known that health risk increases progressively throughout the entire range of BP with no evidence of a threshold in risk[2]. Information on the population distribution of BP is therefore useful for describing BP related health burden as well as for planning prevention strategy.

We present here the distribution of systolic and diastolic BP by age, sex and ethnicity using the data from the National Health and Morbidity survey (NHMS) completed in 1996.

## Materials and Methods

### Sampling design and sample

The NHMS was a multi-purpose health survey designed to describe the health status, health related behaviour and health services utilisation for a representative sample of the population of Malaysia. An up to date and representative sampling frame for this population was provided by the frame used by the annual Labour Force survey conducted by the Department of Statistics[3]. The sampling frame was stratified by state and urban/rural residence. A stratified two stage cluster sampling design with self-weighting sample was used to draw a sample of 17995 private dwellings. However, only 13025(87%) dwellings were contactable or responded. All residents of sampled dwellings were included yielding a sample size of 59903 individuals. For NHMS component on blood pressure, 23007 individuals aged 30 years or older were eligible. 21391 (93%) of them agreed to have their measurements taken or had evaluable measurements. Table I and II show the composition of the sample.

### Blood pressure measurement

Respondent's BP was measured by a trained nurse. The procedure was explained and verbal permission obtained from the respondent prior to the examination. Blood pressure was measured with the respondent in the sitting position and his/her arm supported at the same level as his heart. One of two calibrated electronic devices (Visomat® OZ 30 or OZ 2) was used to measure blood pressure according to the manufacturer's guideline. Visomat® OZ 30 was used for patients with arm size 22 - 32cm and Visomat® OZ 2 for obese patients with arm size more than 32cm. The cuff was placed on respondent's right arm 2 - 3cm above the antecubital fossa. Two BP measurements were taken with an interval of 3 minutes apart. Respondents were informed of their BP measurements. All nurses attended centralised training on standardised protocol for BP measurement. During field survey, supervisors conduct weekly check on compliance with BP measurement protocol.

The decision to use electronic device instead of mercury sphygmomanometer was based on the assumption that electronic device ought to be more robust. Survey field work can be difficult especially in outlying parts of the country. A previous national health survey in 1986 had encountered problem with mercury leaking rendering the device unusable or measurements unreliable. Method comparison study between measurements taken with Visomat® and those taken with mercury sphygmomanometer simultaneously was carried out in a clinic patient population[4]. The intra-class correlation coefficient between measurements obtained by the 2 methods was 0.89 and 0.58 for systolic and diastolic BP respectively. Overall, systolic BP measurement taken with Visomat® was 3% lower than that of mercury sphygmomanometer. For diastolic BP, it was 6% lower. The 95% limits of agreement was 83% - 114% and 72% - 123% for systolic and diastolic BP respectively. The agreement was judged satisfactory for survey use.

### Definitions

The mean of the two BP measurements are used for analysis. If only one is available, then only that single measurement is used. For purpose of analysis, blood pressure levels were categorised as optimal, normal, high normal, stage 1,2, 3 and 4 hypertension according to the classification system recommended by the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure[5].

### Statistical methods

Probability weighted estimation was used to obtain all estimates as appropriate for the sampling design[6-8]. The sampling weights were adjusted for household non-response using adjustment cells formed by state and urban/rural residence. Post stratification[9] was used to adjust the weighted sample totals to known population totals for age, gender and ethnicity based on 1996 census population projection. Mean and percentage distribution were standardised by the direct method to the age distribution of the 1996 adult Malaysian population. S-PLUS[10] and STATA[11] software packages were used for analysis.

## Results

### Percentiles distribution

The percentiles of systolic and diastolic blood pressure (BP) by age, gender and ethnicity are shown in Tables III to XVIII. In all ethnic-gender groups, systolic BP rose with increasing age, and likewise its standard deviation. In contrast, the magnitude of the skew to the right tended to decrease with age. In men, the rise in systolic BP was less steep and tended to flatten in the older age groups compared to that of women. This was particularly obvious for the lower percentiles. As a result, while younger and middle aged men in all ethnic groups had higher systolic BP than women, the centile curves of the 2 sexes begun to cross at age 40 to 65 so that in the older age groups, systolic BP of women exceeded that of men.

Similarly for diastolic BP, the level increased with age, though much less steep than that observed in systolic BP. However, beyond the sixth decade, diastolic BP began to decline especially in men. This was more obvious for the lower percentiles. As for systolic BP, young and middle aged men had higher diastolic BP than women, that then converged or reversed at older age.

**Table I**
**Characteristics of Respondents Compared with Total Population of Malaysia Age 20 or Older in 1996**

| | % Respondents (unweighted) n=21391 No. (%) | % Malaysia Population Aged 30 or Older n=7.84 million % |
|---|---|---|
| Sex | | |
| Male | 10004 (47%) | 50% |
| Female | 11387 (53%) | 50% |
| Age | | |
| 30 - 34 | 4252 (20%) | 21% |
| 35 - 39 | 3944 (18%) | 19% |
| 40 - 44 | 3344 (16%) | 16% |
| 45 - 49 | 2638 (12%) | 12% |
| 50 - 54 | 1935 (9%) | 9% |
| 55 - 59 | 1651 (8%) | 7% |
| 60 - 64 | 1360 (6%) | 6% |
| 65 - 69 | 951 (4%) | 4% |
| >=70 | 1316 (6%) | 6% |
| Ethnic | | |
| Malay | 9656 (45%) | 43% |
| Chinese | 5978 (28%) | 31% |
| Indian | 1467 (7%) | 8% |
| Other indigenous | 3194 (15%) | 9% |
| Others | 1096 (5%) | 10% |

### Mean BP

Tables XVIII and XX show the mean blood pressure (BP) values by gender and ethnicity. Malay and other indigenous women had the highest age-adjusted mean systolic BP (SBP), Chinese and Indian men had the highest diastolic BP (DBP) while Chinese and Indian women had the lowest DBP as well as SBP. In all groups, mean SBP rose with increasing age but DBP tended to decline beyond the age 50 - 55. Younger women had lower SBP than men but the rise in mean SBP with age was steeper for women than men such that eventually the mean curves of the 2 sexes crossed. The cross occurred at the young age of 35 - 40 in Malay and other indigenous women. As a result, they had higher mean SBP than their Chinese and Indian counterparts throughout the entire age range.

### Percentage distribution of BP

Tables XXI to XXIII show the percentage distribution of BP according to the classification recommended by the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure[5]. Overall, about a third of the adult population had BP in the optimal range, a fifth in the normal range and as much as 4% had stage 3 - 4 hypertension. Even in the youngest age group (age 30 - 39), only Indian women had a majority with BP in the optimal range. Among Malay women, Chinese men and other indigenous men and women, more than half of the adult population had BP beyond the normal range. Malay and other indigenous women had the most severe hypertension, and getting worse with advancing age. 14% and 13% respectively had hypertension at stage 2 through 4 overall, and beyond 70 years of age, the percentage was 41% for both.

## Discussion

We advise caution in interpreting the results. Firstly, the stability of the centile estimates is assured only if based on large sample sizes. This was clearly the case for Malay, Chinese and other indigenous ethnic group's estimates. However sample sizes for Indian in the older age groups (age 60 - 70+) were small though they all exceeded[30]. Secondly, BP was measured by Visomat® in this survey and its measurements of both systolic and diastolic BP were systematically lower than conventional mercury sphygmomanometer. Thus the results would have been higher than those reported here had mercury sphygmomanometer been used in the survey. This also renders comparison with other surveys' findings difficult. Finally, one should be cautious in interpreting cross sectional data longitudinally. The observed age trends in both systolic and diastolic BP may not be due to ageing effect alone. One alternative explanation is selective survival. People with lower BP tend to survive with increasing age thus shifting the BP distribution of survivors downwards. Another explanation is the so call cohort effect. The people who were 70 years or older were born before 1926 while the younger people

**Table II**
**Sample Size by Age, Sex and Ethnicity in the Survey**

| | Malay | Chinese | Indian | Other indigenous |
|---|---|---|---|---|
| Men, age in years | | | | |
| 30 - 34 | 821 | 433 | 130 | 322 |
| 35 - 39 | 799 | 420 | 155 | 278 |
| 40 - 44 | 705 | 422 | 120 | 233 |
| 45 - 49 | 592 | 406 | 82 | 145 |
| 50 -54 | 420 | 304 | 49 | 155 |
| 55 - 59 | 399 | 243 | 39 | 91 |
| 60 - 64 | 282 | 195 | 36 | 101 |
| 65 - 69 | 212 | 150 | 31 | 55 |
| >=70 | 273 | 173 | 37 | 102 |
| Women, age in years | | | | |
| 30 - 34 | 1002 | 556 | 165 | 433 |
| 35 - 39 | 971 | 543 | 172 | 343 |
| 40 - 44 | 854 | 532 | 124 | 210 |
| 45 - 49 | 599 | 421 | 101 | 199 |
| 50 - 54 | 453 | 316 | 46 | 123 |
| 55 - 59 | 400 | 264 | 57 | 112 |
| 60 - 64 | 325 | 217 | 56 | 105 |
| 65 - 69 | 221 | 161 | 29 | 72 |
| >=70 | 329 | 222 | 38 | 115 |

(age 30 - 40) were born between 1956 and 1966. The vast socio-economic changes this country has witnessed in the last few decades will have greater impact on the younger than the older cohorts. Socio-economic changes are known to be associated with increasing BP[10]. Nevertheless, the above caveats aside, the rise and flattening of BP with age is likely to be genuine. This has been confirmed by the longitudinal Framingham study[11]. While no doubt selective survival and cohort effects may contribute partially to the observed trends, cross sectional data however cannot differentiate the individual contribution of each.

Characteristics of the BP distribution of the Malaysian population, as shown here, largely resemble those observed in other substantial population surveys in 'westernised' countries[10,12]. The unimodal right skewed distribution, the decussation of the centile curves of the 2 sexes, the rise in systolic BP with age while that of diastolic BP decline with resulting higher prevalence of isolated systolic hypertension in the elderly are all well described characteristics of 'westernised' population BP distribution . The tendency of men's BP to flatten and decline with age compares to that of women is usually attributed to the relative susceptibility of men to succumb to hypertension related cardiovascular morbidity[10]. However, the most striking finding in this survey was the upward shift in the systolic BP distribution observed in Malay and other indigenous women. This was already apparent as young as age 30 - 40. Further research is required to elucidate the determinants of this unusual BP distribution in these two sub-populations.

The BP distribution of Malaysian adults described here is not merely of epidemiological interest. It is useful in its own right. In public health practice, the planning of any prevention strategy must take into account the burden of illness due to any risk factor in the community. Population BP distribution can help in estimating the burden of illness due to BP related cardiovascular morbidity in the population. For

**Table III**
**Empirical Percentiles of Systolic Blood Pressure for Malay Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| N | 821 | 799 | 705 | 592 | 420 | 398 | 282 | 212 | 273 |
| Percentiles | | | | | | | | | |
| 2.50th | 98 | 99 | 101 | 102 | 106 | 102 | 102 | 96 | 98 |
| 5.00th | 102 | 101 | 104 | 103 | 109 | 108 | 105 | 102 | 106 |
| 10.00th | 106 | 105 | 107 | 108 | 115 | 112 | 112 | 112 | 113 |
| 15.00th | 109 | 107 | 109 | 112 | 117 | 115 | 117 | 115 | 118 |
| 20.00th | 110 | 110 | 112 | 114 | 120 | 119 | 121 | 119 | 122 |
| 25.00th | 113 | 112 | 115 | 117 | 123 | 120 | 125 | 124 | 126 |
| 30.00th | 115 | 114 | 117 | 120 | 124 | 124 | 128 | 127 | 128 |
| 35.00th | 116 | 116 | 119 | 121 | 126 | 128 | 131 | 129 | 131 |
| 40.00th | 118 | 118 | 121 | 123 | 128 | 131 | 132 | 131 | 133 |
| 45.00th | 120 | 120 | 123 | 125 | 131 | 133 | 136 | 134 | 137 |
| 50.00th | 121 | 122 | 125 | 128 | 133 | 135 | 138 | 137 | 141 |
| 55.00th | 123 | 124 | 126 | 129 | 135 | 137 | 140 | 140 | 143 |
| 60.00th | 124 | 126 | 129 | 131 | 138 | 140 | 142 | 143 | 146 |
| 65.00th | 126 | 127 | 131 | 133 | 140 | 142 | 146 | 145 | 150 |
| 70.00th | 128 | 129 | 133 | 136 | 142 | 146 | 149 | 147 | 153 |
| 75.00th | 130 | 132 | 135 | 139 | 147 | 152 | 151 | 151 | 159 |
| 80.00th | 132 | 135 | 138 | 143 | 152 | 156 | 155 | 155 | 163 |
| 85.00th | 136 | 139 | 142 | 148 | 158 | 160 | 159 | 160 | 169 |
| 90.00th | 140 | 143 | 147 | 155 | 165 | 168 | 166 | 168 | 176 |
| 95.00th | 148 | 149 | 154 | 163 | 175 | 178 | 176 | 177 | 185 |
| 97.50th | 152 | 156 | 162 | 174 | 186 | 188 | 187 | 187 | 192 |
| mean | 122.01 | 123.00 | 125.91 | 129.24 | 136.16 | 137.42 | 138.67 | 137.84 | 142.07 |
| sd* | 13.48 | 15.21 | 16.14 | 18.37 | 19.96 | 21.71 | 21.47 | 22.06 | 24.54 |
| skew** | 0.41 | 0.71 | 0.90 | 0.78 | 0.81 | 0.62 | 0.53 | 0.30 | 0.32 |

**sd means standard deviation, **skew means skewness*

**Table IV**
**Empirical Percentiles of Systolic Blood Pressure for Malay Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 1002 | 971 | 854 | 599 | 453 | 400 | 325 | 221 | 329 |
| Percentiles | | | | | | | | | |
| 2.50th | 91 | 94 | 99 | 96 | 97 | 103 | 100 | 104 | 109 |
| 5.00th | 96 | 98 | 102 | 101 | 103 | 108 | 108 | 112 | 116 |
| 10.00th | 100 | 102 | 107 | 106 | 112 | 115 | 115 | 119 | 125 |
| 15.00th | 103 | 106 | 110 | 111 | 116 | 119 | 122 | 122 | 128 |
| 20.00th | 105 | 108 | 112 | 114 | 121 | 123 | 125 | 130 | 133 |
| 25.00th | 107 | 110 | 115 | 117 | 124 | 126 | 128 | 134 | 137 |
| 30.00th | 109 | 111 | 118 | 121 | 126 | 128 | 131 | 137 | 140 |
| 35.00th | 111 | 114 | 120 | 123 | 131 | 131 | 133 | 140 | 144 |
| 40.00th | 113 | 116 | 122 | 125 | 133 | 134 | 136 | 142 | 146 |
| 45.00th | 115 | 119 | 124 | 128 | 137 | 137 | 139 | 145 | 150 |
| 50.00th | 117 | 121 | 126 | 131 | 139 | 141 | 141 | 149 | 152 |
| 55.00th | 119 | 122 | 128 | 133 | 142 | 143 | 144 | 151 | 157 |
| 60.00th | 120 | 125 | 130 | 137 | 145 | 146 | 147 | 154 | 161 |
| 65.00th | 122 | 129 | 133 | 140 | 147 | 151 | 150 | 158 | 164 |
| 70.00th | 124 | 132 | 135 | 143 | 151 | 154 | 153 | 163 | 168 |
| 75.00th | 127 | 135 | 139 | 147 | 154 | 158 | 158 | 167 | 170 |
| 80.00th | 130 | 138 | 143 | 151 | 157 | 161 | 164 | 170 | 176 |
| 85.00th | 134 | 142 | 148 | 155 | 161 | 164 | 168 | 179 | 184 |
| 90.00th | 139 | 146 | 155 | 162 | 164 | 172 | 174 | 186 | 190 |
| 95.00th | 147 | 152 | 162 | 170 | 178 | 181 | 190 | 191 | 201 |
| 97.50th | 152 | 158 | 169 | 182 | 193 | 191 | 203 | 198 | 212 |
| mean | 117.96 | 122.47 | 128.25 | 132.56 | 139.51 | 141.88 | 143.74 | 150 | 154.77 |
| sd* | 16.13 | 16.79 | 18.92 | 21.56 | 23.25 | 22.44 | 23.96 | 25.67 | 25.91 |
| skew** | 1.00 | 0.41 | 0.90 | 0.55 | 0.61 | 0.43 | 0.46 | 0.27 | 0.22 |

** sd means standard deviation, ** skew means skewness*

example, the risk of death from coronary heart disease (CHD) increases steadily with increasing levels of systolic BP. Using published rates of hypertension related CHD deaths[13], one can easily estimate the expected number of CHD deaths a year given our population BP distribution. Similarly we could also estimate the number of excess CHD deaths avoided had we been successful in shifting the BP distribution downwards. In the planning of hypertension screening programme, the choice of a BP cut-off level to initiate follow-up, investigation or treatment must partly be informed by BP distribution in the population. This is necessary for resource planning. The available resources must match the number of individuals in the population targeted for intervention, the number in turn depends on the population distribution for any choice of cut-off level. Current guideline on screening practices is of little help if the resulting number of people above recommended cut-off level would completely overwhelm the health service. For example, a common recommendation is to follow up people with BP above 140/90 on first screen. Based on our population BP distribution, 2.1 million (30%) adult Malaysians can be expected to have BP above such a level.

To our knowledge, this is the first detailed description of BP distribution in a representative national sample of Malaysian adults. The distribution can serve as a baseline for comparison with future repeat survey to determine the effectiveness of intervention programme in shifting the population BP distribution in a favourable direction. The population BP distribution described here can also serve as a yardstick for assessing the representativeness of sample in small scale survey. The BP distribution of a representative sample should closely match that described here.

In clinical practice, population reference centile charts are widely used for interpreting clinical measurements on individual patients. This is particularly so for blood pressure and body weight which are strongly dependent on age and other covariates like sex and ethnicity. In paediatric practice, this is already standard practice[14]. Conventional criteria for defining and treating hypertension is not always appropriate. For example, many young people with say diabetic nephropathy would not be regarded as hypertensive by current criteria as published by various authoritative bodies[5,15]. In such patient population, it may be more appropriate to use population age and sex specific reference centile charts both to define the BP level to commence treatment as well as to define the target BP level to achieve on treatment. A reasonable strategy would be to initiate treatment at BP above 95th percentile and to achieve target BP below 75th percentile on treatment.

In conclusion, we found the distribution of BP of Malaysian adults was largely similar to those in other 'westernised' populations except for Malay and indigenous women's distributions that were shifted upward. Detailed description of BP distribution in our population is useful for both public health and clinical practice.

## Acknowledgement

We are grateful to the investigators of the Second National Health and Morbidity survey (NHMS2), and in particular its principal investigator, Dr Maimunah A. Hamid for agreeing to release NHMS2 sample survey data for secondary analysis that made this research possible.

**Table V**
**Empirical Percentiles of Systolic Blood Pressure for Chinese Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 433 | 420 | 422 | 406 | 304 | 243 | 195 | 150 | 173 |
| Percentiles | | | | | | | | | |
| 2.50th | 100 | 99 | 98 | 99 | 100 | 104 | 104 | 107 | 100 |
| 5.00th | 102 | 103 | 102 | 103 | 105 | 106 | 109 | 110 | 108 |
| 10.00th | 105 | 106 | 106 | 108 | 111 | 111 | 115 | 120 | 113 |
| 15.00th | 108 | 110 | 111 | 112 | 113 | 115 | 118 | 124 | 119 |
| 20.00th | 110 | 111 | 113 | 115 | 116 | 117 | 122 | 125 | 126 |
| 25.00th | 112 | 113 | 115 | 118 | 119 | 121 | 125 | 130 | 129 |
| 30.00th | 115 | 115 | 117 | 121 | 121 | 125 | 128 | 134 | 133 |
| 35.00th | 117 | 117 | 119 | 123 | 123 | 128 | 130 | 136 | 138 |
| 40.00th | 118 | 120 | 120 | 125 | 124 | 131 | 132 | 138 | 140 |
| 45.00th | 119 | 121 | 122 | 128 | 127 | 134 | 134 | 140 | 140 |
| 50.00th | 121 | 123 | 124 | 130 | 129 | 138 | 137 | 142 | 144 |
| 55.00th | 122 | 124 | 126 | 132 | 131 | 141 | 139 | 144 | 147 |
| 60.00th | 124 | 126 | 128 | 133 | 134 | 142 | 143 | 145 | 150 |
| 65.00th | 127 | 128 | 130 | 137 | 136 | 145 | 145 | 147 | 154 |
| 70.00th | 129 | 130 | 132 | 140 | 139 | 147 | 148 | 149 | 157 |
| 75.00th | 132 | 134 | 134 | 143 | 144 | 149 | 151 | 153 | 160 |
| 80.00th | 133 | 136 | 139 | 145 | 147 | 155 | 155 | 155 | 166 |
| 85.00th | 136 | 139 | 142 | 148 | 151 | 159 | 162 | 164 | 171 |
| 90.00th | 139 | 143 | 149 | 151 | 156 | 166 | 166 | 169 | 180 |
| 95.00th | 147 | 148 | 156 | 163 | 163 | 175 | 190 | 174 | 184 |
| 97.50th | 151 | 152 | 164 | 168 | 171 | 184 | 198 | 180 | 192 |
| mean | 121.86 | 123.47 | 125.77 | 130.40 | 131.26 | 137.25 | 139.59 | 141.71 | 145.19 |
| sd* | 13.43 | 14.40 | 16.81 | 18.19 | 18.25 | 20.89 | 22.15 | 19.02 | 23.67 |
| skew** | 0.45 | 0.56 | 0.82 | 0.55 | 0.65 | 0.37 | 0.83 | 0.20 | 0.12 |

**sd means standard deviation, **skew means skewness*

**Table VI**
**Empirical Percentiles of Systolic Blood Pressure for Chinese Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 556 | 543 | 532 | 421 | 316 | 264 | 217 | 161 | 222 |
| Percentiles | | | | | | | | | |
| 2.50th | 90 | 90 | 92 | 92 | 95 | 98 | 97 | 102 | 103 |
| 5.00th | 94 | 95 | 95 | 99 | 98 | 104 | 105 | 112 | 111 |
| 10.00th | 97 | 99 | 100 | 103 | 105 | 113 | 113 | 118 | 117 |
| 15.00th | 100 | 101 | 103 | 106 | 110 | 116 | 117 | 123 | 120 |
| 20.00th | 101 | 103 | 106 | 109 | 115 | 121 | 123 | 126 | 123 |
| 25.00th | 102 | 105 | 109 | 111 | 120 | 125 | 125 | 130 | 129 |
| 30.00th | 104 | 108 | 112 | 116 | 122 | 127 | 130 | 132 | 134 |
| 35.00th | 105 | 110 | 114 | 118 | 126 | 129 | 133 | 135 | 139 |
| 40.00th | 107 | 111 | 116 | 120 | 128 | 131 | 136 | 138 | 140 |
| 45.00th | 108 | 113 | 119 | 123 | 131 | 133 | 138 | 139 | 143 |
| 50.00th | 111 | 115 | 121 | 125 | 133 | 135 | 141 | 144 | 146 |
| 55.00th | 112 | 117 | 123 | 127 | 136 | 137 | 143 | 146 | 148 |
| 60.00th | 113 | 119 | 125 | 130 | 141 | 140 | 145 | 149 | 152 |
| 65.00th | 115 | 121 | 128 | 133 | 143 | 142 | 148 | 151 | 157 |
| 70.00th | 117 | 122 | 132 | 135 | 146 | 147 | 153 | 153 | 161 |
| 75.00th | 120 | 125 | 134 | 139 | 150 | 149 | 156 | 155 | 166 |
| 80.00th | 123 | 128 | 137 | 141 | 153 | 153 | 159 | 160 | 169 |
| 85.00th | 126 | 131 | 140 | 148 | 156 | 156 | 164 | 165 | 175 |
| 90.00th | 130 | 136 | 146 | 152 | 163 | 163 | 171 | 174 | 181 |
| 95.00th | 141 | 144 | 155 | 159 | 171 | 168 | 177 | 183 | 186 |
| 97.50th | 147 | 155 | 165 | 168 | 176 | 175 | 185 | 196 | 197 |
| mean | 112.05 | 116.33 | 121.80 | 126.30 | 134.09 | 135.75 | 140.43 | 143.80 | 147.50 |
| sd* | 13.94 | 15.78 | 18.06 | 19.34 | 22.05 | 19.28 | 21.79 | 21.32 | 25.14 |
| skew** | 0.90 | 0.89 | 0.44 | 0.56 | 0.10 | -0.07 | 0.09 | 0.37 | 0.47 |

** sd means standard deviation, ** skew means skewness*

**Table VII**
**Empirical Percentiles of Systolic Blood Pressure for Indian Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 130 | 155 | 120 | 82 | 49 | 39 | 36 | 31 | 37 |
| Percentiles | | | | | | | | | |
| 2.50th | 98 | 105 | 100 | 96 | 94 | 117 | 10 | 102 | 100 |
| 5.00th | 101 | 108 | 104 | 99 | 98 | 117 | 107 | 102 | 102 |
| 10.00th | 104 | 110 | 107 | 108 | 109 | 120 | 112 | 119 | 107 |
| 15.00th | 106 | 111 | 112 | 112 | 109 | 122 | 117 | 121 | 118 |
| 20.00th | 107 | 113 | 115 | 113 | 113 | 123 | 120 | 126 | 118 |
| 25.00th | 110 | 114 | 116 | 118 | 117 | 126 | 123 | 134 | 120 |
| 30.00th | 111 | 117 | 117 | 120 | 120 | 131 | 126 | 134 | 126 |
| 35.00th | 112 | 119 | 120 | 120 | 120 | 137 | 127 | 137 | 126 |
| 40.00th | 115 | 120 | 123 | 122 | 121 | 139 | 128 | 139 | 127 |
| 45.00th | 116 | 121 | 126 | 124 | 125 | 140 | 130 | 143 | 133 |
| 50.00th | 118 | 123 | 127 | 126 | 129 | 143 | 136 | 144 | 134 |
| 55.00th | 121 | 126 | 128 | 128 | 132 | 147 | 142 | 145 | 134 |
| 60.00th | 123 | 127 | 130 | 131 | 134 | 149 | 142 | 147 | 141 |
| 65.00th | 125 | 129 | 131 | 135 | 137 | 152 | 144 | 149 | 141 |
| 70.00th | 127 | 132 | 133 | 139 | 140 | 154 | 148 | 156 | 153 |
| 75.00th | 130 | 136 | 138 | 140 | 143 | 165 | 153 | 158 | 156 |
| 80.00th | 132 | 138 | 139 | 144 | 148 | 168 | 156 | 174 | 162 |
| 85.00th | 134 | 140 | 141 | 149 | 150 | 172 | 161 | 174 | 174 |
| 90.00th | 144 | 145 | 145 | 153 | 158 | 179 | 164 | 175 | 177 |
| 95.00th | 161 | 151 | 156 | 162 | 169 | 183 | 170 | 185 | 177 |
| 97.50th | 165 | 152 | 157 | 168 | 184 | 187 | 172 | 185 | 200 |
| mean | 120.95 | 125.41 | 126.90 | 129.36 | 130.45 | 145.42 | 137.02 | 145.78 | 138.96 |
| sd* | 16.37 | 14.65 | 15.42 | 20.54 | 20.95 | 21.90 | 19.14 | 22.91 | 25.52 |
| skew** | 1.06 | 1.12 | 0.47 | 1.55 | 0.50 | 0.25 | 0.13 | 0.15 | 0.75 |

**sd means standard deviation, **skew means skewness*

**Table VIII**
**Empirical Percentiles of Systolic Blood Pressure for Indian Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 165 | 172 | 124 | 101 | 46 | 57 | 56 | 29 | 38 |
| Percentiles | | | | | | | | | |
| 2.50th | 83 | 87 | 99 | 93 | 103 | 99 | 90 | 99 | 108 |
| 5.00th | 91 | 91 | 101 | 98 | 105 | 99 | 97 | 119 | 113 |
| 10.00th | 97 | 95 | 105 | 103 | 109 | 110 | 103 | 125 | 123 |
| 15.00th | 99 | 98 | 108 | 106 | 110 | 113 | 107 | 129 | 124 |
| 20.00th | 101 | 102 | 111 | 107 | 113 | 116 | 111 | 130 | 128 |
| 25.00th | 103 | 104 | 112 | 111 | 115 | 120 | 118 | 132 | 131 |
| 30.00th | 106 | 106 | 113 | 113 | 118 | 122 | 121 | 134 | 136 |
| 35.00th | 108 | 108 | 115 | 116 | 122 | 124 | 122 | 135 | 138 |
| 40.00th | 108 | 109 | 117 | 118 | 124 | 127 | 124 | 137 | 145 |
| 45.00th | 110 | 111 | 119 | 121 | 125 | 130 | 131 | 143 | 147 |
| 50.00th | 111 | 113 | 122 | 123 | 125 | 131 | 132 | 145 | 147 |
| 55.00th | 112 | 115 | 125 | 127 | 129 | 132 | 139 | 151 | 150 |
| 60.00th | 114 | 118 | 127 | 129 | 132 | 140 | 140 | 154 | 151 |
| 65.00th | 114 | 119 | 129 | 131 | 135 | 142 | 146 | 155 | 154 |
| 70.00th | 116 | 122 | 131 | 136 | 136 | 143 | 147 | 158 | 156 |
| 75.00th | 120 | 123 | 134 | 138 | 140 | 146 | 151 | 158 | 158 |
| 80.00th | 122 | 127 | 137 | 143 | 148 | 148 | 154 | 164 | 164 |
| 85.00th | 123 | 130 | 144 | 146 | 155 | 157 | 162 | 175 | 167 |
| 90.00th | 126 | 134 | 149 | 155 | 160 | 161 | 166 | 182 | 171 |
| 95.00th | 133 | 141 | 165 | 160 | 161 | 172 | 170 | 197 | 186 |
| 97.50th | 138 | 149 | 167 | 179 | 179 | 179 | 173 | 214 | 186 |
| mean | 111.10 | 114.06 | 124.43 | 125.57 | 130.43 | 133.00 | 133.92 | 148.99 | 145.73 |
| sd* | 12.93 | 15.29 | 17.72 | 20.19 | 20.54 | 21.13 | 23.28 | 24.53 | 20.25 |
| skew** | 0.13 | 0.38 | 0.92 | 0.72 | 1.08 | 0.24 | -0.03 | 0.73 | -0.07 |

** sd means standard deviation, ** skew means skewness*

**Table IX**
**Empirical Percentiles of Systolic Blood Pressure for Other Indigenous Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 322 | 278 | 233 | 145 | 155 | 91 | 101 | 55 | 102 |
| Percentiles | | | | | | | | | |
| 2.50th | 99 | 99 | 99 | 96 | 98 | 103 | 95 | 106 | 106 |
| 5.00th | 103 | 101 | 103 | 109 | 104 | 103 | 100 | 110 | 115 |
| 10.00th | 108 | 107 | 110 | 114 | 111 | 108 | 110 | 113 | 122 |
| 15.00th | 110 | 110 | 113 | 117 | 115 | 110 | 114 | 114 | 124 |
| 20.00th | 113 | 114 | 114 | 120 | 121 | 115 | 118 | 128 | 127 |
| 25.00th | 116 | 116 | 117 | 124 | 123 | 119 | 122 | 131 | 132 |
| 30.00th | 119 | 117 | 119 | 127 | 126 | 124 | 125 | 134 | 134 |
| 35.00th | 120 | 120 | 120 | 129 | 127 | 127 | 126 | 135 | 136 |
| 40.00th | 122 | 121 | 122 | 131 | 129 | 130 | 128 | 136 | 139 |
| 45.00th | 123 | 123 | 123 | 132 | 131 | 132 | 132 | 137 | 143 |
| 50.00th | 124 | 125 | 125 | 133 | 134 | 134 | 135 | 137 | 145 |
| 55.00th | 126 | 127 | 126 | 136 | 135 | 135 | 138 | 140 | 148 |
| 60.00th | 128 | 128 | 128 | 137 | 138 | 139 | 141 | 142 | 152 |
| 65.00th | 130 | 130 | 132 | 139 | 141 | 140 | 149 | 150 | 156 |
| 70.00th | 132 | 132 | 134 | 141 | 145 | 146 | 156 | 152 | 161 |
| 75.00th | 133 | 134 | 138 | 143 | 147 | 150 | 159 | 160 | 164 |
| 80.00th | 136 | 136 | 140 | 146 | 155 | 155 | 164 | 164 | 168 |
| 85.00th | 138 | 141 | 147 | 151 | 160 | 160 | 168 | 175 | 176 |
| 90.00th | 143 | 147 | 150 | 158 | 170 | 170 | 175 | 181 | 186 |
| 95.00th | 148 | 156 | 154 | 167 | 183 | 175 | 191 | 192 | 197 |
| 97.50th | 154 | 160 | 162 | 171 | 191 | 193 | 208 | 193 | 219 |
| mean | 124.82 | 125.62 | 127.22 | 134.05 | 136.95 | 135.89 | 140.23 | 144.30 | 149.12 |
| sd* | 13.64 | 16.22 | 15.78 | 17.38 | 22.75 | 24.07 | 27.48 | 25.04 | 26.29 |
| skew** | 0.19 | 0.81 | 0.55 | 0.22 | 0.71 | 0.46 | 0.60 | 0.65 | 0.70 |

** sd means standard deviation, ** skew means skewness*

**Table X**
**Empirical Percentiles of Systolic Blood Pressure for Other Indigenous Females, by age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 433 | 343 | 210 | 199 | 123 | 112 | 105 | 72 | 115 |
| Percentiles | | | | | | | | | |
| 2.50th | 95 | 96 | 98 | 97 | 95 | 97 | 95 | 107 | 102 |
| 5.00th | 98 | 101 | 100 | 103 | 103 | 99 | 101 | 111 | 106 |
| 10.00th | 103 | 103 | 105 | 108 | 112 | 108 | 110 | 118 | 112 |
| 15.00th | 106 | 107 | 111 | 113 | 113 | 116 | 116 | 121 | 119 |
| 20.00th | 108 | 111 | 112 | 116 | 118 | 120 | 118 | 129 | 125 |
| 25.00th | 110 | 113 | 115 | 119 | 119 | 122 | 125 | 131 | 129 |
| 30.00th | 112 | 116 | 119 | 122 | 125 | 126 | 127 | 136 | 134 |
| 35.00th | 114 | 119 | 122 | 124 | 126 | 131 | 128 | 139 | 137 |
| 40.00th | 116 | 121 | 125 | 127 | 128 | 134 | 132 | 142 | 140 |
| 45.00th | 118 | 123 | 128 | 129 | 132 | 137 | 133 | 145 | 143 |
| 50.00th | 122 | 125 | 130 | 133 | 135 | 141 | 137 | 148 | 150 |
| 55.00th | 123 | 127 | 134 | 136 | 136 | 143 | 141 | 152 | 155 |
| 60.00th | 125 | 130 | 137 | 139 | 140 | 148 | 145 | 154 | 161 |
| 65.00th | 127 | 131 | 140 | 140 | 145 | 151 | 148 | 157 | 163 |
| 70.00th | 131 | 133 | 142 | 143 | 150 | 155 | 149 | 164 | 166 |
| 75.00th | 132 | 135 | 145 | 150 | 154 | 158 | 152 | 166 | 170 |
| 80.00th | 134 | 138 | 148 | 153 | 158 | 165 | 157 | 170 | 176 |
| 85.00th | 137 | 143 | 153 | 158 | 163 | 169 | 163 | 177 | 184 |
| 90.00th | 140 | 149 | 159 | 162 | 172 | 183 | 172 | 189 | 197 |
| 95.00th | 147 | 155 | 167 | 180 | 176 | 191 | 180 | 192 | 203 |
| 97.50th | 156 | 163 | 176 | 192 | 183 | 204 | 189 | 218 | 215 |
| mean | 121.43 | 125.48 | 131.43 | 134.79 | 137.31 | 142.51 | 138.73 | 150.17 | 151.48 |
| sd* | 15.69 | 17.88 | 20.90 | 23.04 | 23.02 | 27.25 | 23.09 | 26.57 | 29.92 |
| skew** | 0.71 | 0.73 | 0.47 | 0.83 | 0.39 | 0.53 | 0.36 | 0.53 | 0.29 |

**sd means standard deviation, **skew means skewness*

**Table XI**
**Empirical Percentiles of Diastolic Blood Pressure for Malay Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 821 | 799 | 705 | 592 | 420 | 399 | 282 | 212 | 273 |
| Percentiles | | | | | | | | | |
| 2.50th | 57 | 58 | 61 | 60 | 62 | 58 | 60 | 56 | 53 |
| 5.00th | 60 | 61 | 64 | 64 | 64 | 63 | 62 | 59 | 57 |
| 10.00th | 64 | 65 | 67 | 67 | 68 | 67 | 65 | 64 | 61 |
| 15.00th | 66 | 67 | 69 | 68 | 70 | 70 | 69 | 66 | 64 |
| 20.00th | 68 | 69 | 71 | 70 | 72 | 71 | 70 | 67 | 66 |
| 25.00th | 70 | 71 | 72 | 72 | 74 | 74 | 73 | 69 | 67 |
| 30.00th | 72 | 72 | 74 | 74 | 76 | 74 | 74 | 70 | 68 |
| 35.00th | 73 | 74 | 75 | 75 | 77 | 76 | 75 | 72 | 70 |
| 40.00th | 74 | 75 | 76 | 76 | 78 | 77 | 76 | 73 | 73 |
| 45.00th | 75 | 76 | 77 | 78 | 80 | 78 | 79 | 75 | 74 |
| 50.00th | 77 | 78 | 79 | 79 | 81 | 79 | 80 | 76 | 76 |
| 55.00th | 78 | 79 | 80 | 81 | 83 | 81 | 82 | 78 | 78 |
| 60.00th | 79 | 80 | 81 | 82 | 84 | 82 | 82 | 79 | 80 |
| 65.00th | 81 | 82 | 82 | 84 | 86 | 83 | 84 | 81 | 81 |
| 70.00th | 82 | 83 | 83 | 86 | 87 | 85 | 85 | 82 | 85 |
| 75.00th | 83 | 85 | 85 | 88 | 90 | 87 | 88 | 84 | 86 |
| 80.00th | 85 | 87 | 87 | 90 | 92 | 89 | 90 | 86 | 87 |
| 85.00th | 87 | 90 | 90 | 94 | 94 | 92 | 91 | 91 | 90 |
| 90.00th | 90 | 93 | 94 | 97 | 102 | 95 | 94 | 94 | 95 |
| 95.00th | 94 | 98 | 104 | 104 | 112 | 100 | 102 | 98 | 104 |
| 97.50th | 98 | 103 | 108 | 109 | 118 | 108 | 106 | 104 | 111 |
| mean | 76.72 | 78.05 | 79.52 | 80.65 | 82.83 | 80.30 | 80.18 | 77.19 | 77.11 |
| sd* | 10.46 | 11.07 | 11.57 | 12.80 | 13.28 | 11.56 | 12.90 | 12.07 | 14.69 |
| skew** | 0.28 | 0.44 | 0.95 | 0.86 | 0.85 | 0.72 | 1.37 | 0.62 | 0.87 |

**sd means standard deviation, **skew means skewness*

**Table XII**
**Empirical Percentiles of Diastolic Blood Pressure for Malay Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 1002 | 971 | 854 | 599 | 453 | 400 | 325 | 221 | 329 |
| Percentiles | | | | | | | | | |
| 2.50th | 56 | 57 | 60 | 56 | 59 | 59 | 58 | 57 | 56 |
| 5.00th | 59 | 60 | 62 | 60 | 62 | 63 | 61 | 61 | 58 |
| 10.00th | 62 | 64 | 65 | 64 | 66 | 66 | 64 | 65 | 63 |
| 15.00th | 64 | 66 | 68 | 67 | 69 | 69 | 68 | 68 | 66 |
| 20.00th | 66 | 69 | 70 | 69 | 70 | 71 | 70 | 70 | 69 |
| 25.00th | 68 | 70 | 71 | 70 | 72 | 73 | 72 | 73 | 71 |
| 30.00th | 70 | 71 | 73 | 72 | 74 | 75 | 74 | 75 | 72 |
| 35.00th | 71 | 72 | 74 | 74 | 76 | 77 | 75 | 76 | 74 |
| 40.00th | 72 | 73 | 76 | 76 | 77 | 78 | 77 | 78 | 76 |
| 45.00th | 73 | 75 | 78 | 77 | 79 | 79 | 78 | 80 | 77 |
| 50.00th | 75 | 77 | 80 | 80 | 80 | 81 | 80 | 81 | 79 |
| 55.00th | 76 | 79 | 81 | 81 | 82 | 82 | 81 | 82 | 81 |
| 60.00th | 78 | 80 | 82 | 83 | 83 | 84 | 84 | 84 | 83 |
| 65.00th | 79 | 81 | 83 | 84 | 84 | 86 | 86 | 85 | 84 |
| 70.00th | 81 | 83 | 85 | 86 | 86 | 88 | 88 | 87 | 86 |
| 75.00th | 82 | 85 | 87 | 89 | 89 | 90 | 90 | 90 | 89 |
| 80.00th | 84 | 87 | 90 | 91 | 91 | 93 | 91 | 93 | 92 |
| 85.00th | 86 | 89 | 93 | 93 | 94 | 95 | 95 | 96 | 96 |
| 90.00th | 89 | 93 | 97 | 97 | 98 | 100 | 98 | 101 | 100 |
| 95.00th | 95 | 98 | 105 | 106 | 105 | 108 | 105 | 107 | 109 |
| 97.50th | 100 | 103 | 109 | 112 | 115 | 114 | 111 | 111 | 121 |
| mean | 75.27 | 77.54 | 80.05 | 80.25 | 81.10 | 82.09 | 80.95 | 81.88 | 80.71 |
| sd* | 11.54 | 11.81 | 12.72 | 14.76 | 13.54 | 13.70 | 13.45 | 14.84 | 15.70 |
| skew** | 0.66 | 0.48 | 0.67 | 1.21 | 0.76 | 0.70 | 0.46 | 0.61 | 0.95 |

**sd means standard deviation, **skew means skewness*

**Table XIII**
**Empirical Percentiles of Diastolic Blood Pressure for Chinese Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 433 | 420 | 422 | 406 | 304 | 243 | 195 | 150 | 173 |
| Percentiles | | | | | | | | | |
| 2.50th | 60 | 61 | 62 | 62 | 63 | 61 | 58 | 61 | 56 |
| 5.00th | 61 | 65 | 65 | 66 | 66 | 64 | 64 | 63 | 59 |
| 10.00th | 64 | 67 | 68 | 69 | 70 | 69 | 67 | 66 | 62 |
| 15.00th | 68 | 69 | 70 | 71 | 72 | 71 | 70 | 68 | 65 |
| 20.00th | 70 | 71 | 71 | 73 | 75 | 72 | 73 | 72 | 69 |
| 25.00th | 71 | 73 | 73 | 76 | 76 | 74 | 73 | 74 | 72 |
| 30.00th | 73 | 74 | 75 | 77 | 77 | 76 | 75 | 76 | 73 |
| 35.00th | 74 | 76 | 76 | 79 | 79 | 79 | 77 | 77 | 74 |
| 40.00th | 75 | 77 | 78 | 80 | 80 | 81 | 79 | 79 | 76 |
| 45.00th | 77 | 79 | 79 | 82 | 81 | 82 | 82 | 81 | 78 |
| 50.00th | 78 | 80 | 80 | 83 | 82 | 83 | 83 | 82 | 79 |
| 55.00th | 79 | 81 | 81 | 84 | 83 | 84 | 84 | 84 | 80 |
| 60.00th | 80 | 82 | 82 | 86 | 85 | 85 | 85 | 86 | 81 |
| 65.00th | 81 | 83 | 84 | 88 | 87 | 87 | 86 | 87 | 85 |
| 70.00th | 82 | 84 | 86 | 89 | 89 | 89 | 89 | 89 | 86 |
| 75.00th | 84 | 87 | 88 | 91 | 91 | 90 | 92 | 92 | 89 |
| 80.00th | 85 | 88 | 90 | 93 | 93 | 93 | 94 | 93 | 90 |
| 85.00th | 88 | 90 | 92 | 96 | 96 | 97 | 97 | 97 | 93 |
| 90.00th | 91 | 93 | 95 | 99 | 101 | 103 | 100 | 99 | 98 |
| 95.00th | 95 | 98 | 104 | 105 | 108 | 107 | 106 | 102 | 105 |
| 97.50th | 100 | 103 | 111 | 111 | 112 | 115 | 113 | 109 | 109 |
| mean | 77.61 | 79.85 | 80.97 | 83.63 | 83.76 | 83.54 | 82.94 | 82.45 | 79.46 |
| sd* | 9.93 | 10.60 | 12.40 | 12.19 | 12.27 | 13.10 | 12.88 | 12.65 | 13.65 |
| skew** | 0.27 | 0.55 | 1.11 | 0.56 | 0.82 | 0.55 | 0.3 | 0.15 | 0.25 |

**sd means standard deviation, **skew means skewness*

**Table XIV**
**Empirical Percentiles of Diastolic Blood Pressure for Chinese Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 556 | 543 | 532 | 421 | 316 | 264 | 217 | 161 | 222 |
| Percentiles | | | | | | | | | |
| 2.50th | 52 | 57 | 56 | 58 | 57 | 57 | 56 | 61 | 55 |
| 5.00th | 56 | 59 | 58 | 61 | 61 | 61 | 60 | 63 | 58 |
| 10.00th | 59 | 61 | 62 | 64 | 65 | 64 | 63 | 66 | 61 |
| 15.00th | 62 | 64 | 65 | 66 | 68 | 67 | 67 | 68 | 64 |
| 20.00th | 63 | 65 | 67 | 69 | 70 | 70 | 70 | 72 | 67 |
| 25.00th | 65 | 67 | 69 | 70 | 72 | 72 | 71 | 73 | 70 |
| 30.00th | 66 | 68 | 71 | 71 | 74 | 73 | 74 | 75 | 72 |
| 35.00th | 67 | 70 | 73 | 72 | 75 | 75 | 76 | 77 | 75 |
| 40.00th | 68 | 71 | 74 | 74 | 78 | 76 | 78 | 78 | 77 |
| 45.00th | 70 | 73 | 76 | 75 | 79 | 77 | 80 | 79 | 78 |
| 50.00th | 71 | 74 | 77 | 77 | 81 | 78 | 81 | 81 | 80 |
| 55.00th | 72 | 75 | 78 | 78 | 82 | 81 | 82 | 82 | 81 |
| 60.00th | 73 | 77 | 80 | 80 | 83 | 83 | 83 | 83 | 83 |
| 65.00th | 75 | 78 | 81 | 82 | 85 | 85 | 85 | 86 | 84 |
| 70.00th | 76 | 80 | 83 | 83 | 87 | 87 | 88 | 89 | 87 |
| 75.00th | 78 | 81 | 84 | 85 | 89 | 88 | 91 | 90 | 90 |
| 80.00th | 80 | 83 | 86 | 87 | 92 | 91 | 92 | 92 | 94 |
| 85.00th | 82 | 84 | 88 | 89 | 95 | 95 | 94 | 95 | 97 |
| 90.00th | 84 | 87 | 91 | 92 | 99 | 98 | 97 | 102 | 101 |
| 95.00th | 89 | 96 | 96 | 98 | 108 | 103 | 104 | 105 | 106 |
| 97.50th | 96 | 100 | 101 | 106 | 116 | 108 | 112 | 114 | 112 |
| mean | 71.31 | 74.33 | 76.69 | 77.61 | 81.51 | 80.29 | 81.17 | 82.07 | 80.51 |
| sd* | 10.44 | 10.79 | 11.59 | 11.73 | 14.21 | 13.07 | 14.78 | 13.06 | 15.34 |
| skew** | 0.57 | 0.57 | 0.25 | 0.63 | 0.75 | 0.40 | 1.02 | 0.57 | 0.42 |

**sd means standard deviation, **skew means skewness*

**Table XV**
**Empirical Percentiles of Diastolic Blood Pressure for Indian Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 130 | 155 | 120 | 82 | 49 | 39 | 36 | 31 | 37 |
| Percentiles | | | | | | | | | |
| 2.50th | 61 | 65 | 65 | 60 | 66 | 66 | 59 | 64 | 56 |
| 5.00th | 62 | 66 | 66 | 67 | 69 | 68 | 64 | 64 | 56 |
| 10.00th | 64 | 69 | 72 | 68 | 70 | 70 | 69 | 71 | 58 |
| 15.00th | 66 | 71 | 72 | 70 | 72 | 74 | 69 | 72 | 58 |
| 20.00th | 67 | 72 | 74 | 73 | 74 | 75 | 72 | 73 | 62 |
| 25.00th | 70 | 74 | 75 | 74 | 76 | 79 | 72 | 74 | 65 |
| 30.00th | 71 | 75 | 76 | 76 | 80 | 81 | 73 | 75 | 68 |
| 35.00th | 72 | 78 | 78 | 78 | 80 | 82 | 76 | 76 | 71 |
| 40.00th | 73 | 79 | 80 | 79 | 81 | 83 | 80 | 76 | 73 |
| 45.00th | 75 | 80 | 81 | 81 | 81 | 85 | 82 | 79 | 74 |
| 50.00th | 76 | 81 | 82 | 82 | 81 | 86 | 83 | 80 | 76 |
| 55.00th | 78 | 83 | 82 | 84 | 82 | 88 | 84 | 82 | 79 |
| 60.00th | 80 | 84 | 85 | 85 | 83 | 93 | 84 | 83 | 82 |
| 65.00th | 80 | 85 | 88 | 88 | 85 | 95 | 86 | 87 | 83 |
| 70.00th | 82 | 86 | 90 | 89 | 86 | 96 | 90 | 89 | 84 |
| 75.00th | 83 | 88 | 91 | 91 | 87 | 96 | 90 | 90 | 85 |
| 80.00th | 85 | 89 | 93 | 93 | 91 | 102 | 92 | 91 | 86 |
| 85.00th | 91 | 91 | 94 | 95 | 95 | 102 | 97 | 95 | 88 |
| 90.00th | 94 | 93 | 98 | 98 | 96 | 105 | 99 | 104 | 90 |
| 95.00th | 100 | 102 | 103 | 106 | 109 | 113 | 108 | 113 | 91 |
| 97.50th | 105 | 103 | 109 | 111 | 116 | 116 | 118 | 115 | 94 |
| mean | 77.56 | 81.57 | 83.10 | 82.92 | 83.32 | 87.96 | 82.43 | 83.14 | 75.03 |
| sd* | 11.81 | 10.97 | 10.93 | 12.76 | 11.4 | 13.20 | 13.22 | 12.93 | 12.23 |
| skew** | 0.87 | 1.40 | 0.34 | 0.67 | 0.97 | 0.28 | 0.62 | 0.89 | -0.17 |

** sd means standard deviation, ** skew means skewness*

**Table XVI**
**Empirical Percentiles of Diastolic Blood Pressure for Indian Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 165 | 172 | 124 | 101 | 46 | 57 | 56 | 29 | 38 |
| Percentiles | | | | | | | | | |
| 2.50th | 56 | 53 | 58 | 56 | 66 | 59 | 55 | 58 | 52 |
| 5.00th | 58 | 57 | 61 | 59 | 67 | 63 | 61 | 67 | 60 |
| 10.00th | 61 | 60 | 64 | 62 | 68 | 68 | 64 | 71 | 67 |
| 15.00th | 63 | 62 | 66 | 66 | 69 | 69 | 65 | 74 | 68 |
| 20.00th | 65 | 64 | 68 | 69 | 71 | 71 | 67 | 74 | 69 |
| 25.00th | 66 | 66 | 70 | 71 | 72 | 74 | 71 | 75 | 72 |
| 30.00th | 68 | 68 | 71 | 72 | 72 | 75 | 73 | 75 | 73 |
| 35.00th | 69 | 70 | 72 | 73 | 74 | 75 | 75 | 78 | 74 |
| 40.00th | 70 | 71 | 74 | 74 | 76 | 76 | 77 | 78 | 76 |
| 45.00th | 71 | 71 | 76 | 77 | 77 | 78 | 80 | 81 | 77 |
| 50.00th | 72 | 73 | 77 | 78 | 80 | 80 | 81 | 84 | 79 |
| 55.00th | 73 | 74 | 79 | 81 | 81 | 81 | 81 | 85 | 80 |
| 60.00th | 74 | 76 | 80 | 82 | 83 | 81 | 83 | 91 | 81 |
| 65.00th | 76 | 77 | 81 | 84 | 87 | 82 | 84 | 92 | 82 |
| 70.00th | 78 | 78 | 83 | 85 | 88 | 83 | 86 | 93 | 85 |
| 75.00th | 80 | 80 | 85 | 87 | 88 | 84 | 86 | 96 | 87 |
| 80.00th | 81 | 82 | 86 | 90 | 92 | 89 | 89 | 98 | 89 |
| 85.00th | 82 | 83 | 89 | 93 | 100 | 93 | 90 | 98 | 92 |
| 90.00th | 86 | 88 | 93 | 98 | 101 | 102 | 91 | 105 | 97 |
| 95.00th | 90 | 92 | 100 | 105 | 116 | 108 | 101 | 119 | 103 |
| 97.50th | 94 | 94 | 104 | 108 | 122 | 109 | 106 | 120 | 130 |
| mean | 72.81 | 73.05 | 77.61 | 79.25 | 82.58 | 80.78 | 79.14 | 86.00 | 80.10 |
| sd* | 9.61 | 10.63 | 11.53 | 13.39 | 14.91 | 12.51 | 13.29 | 14.84 | 14.95 |
| skew** | 0.41 | 0.25 | 0.60 | 0.35 | 1.39 | 0.76 | 0.51 | 0.59 | 1.14 |

** sd means standard deviation, ** skew means skewness*

**Table XVII**
**Empirical Percentiles of Diastolic Blood Pressure for Other Indigenous Males, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 322 | 278 | 233 | 145 | 155 | 91 | 101 | 55 | 102 |
| Percentiles | | | | | | | | | |
| 2.50th | 59 | 60 | 61 | 59 | 59 | 57 | 54 | 53 | 53 |
| 5.00th | 61 | 62 | 64 | 65 | 62 | 63 | 56 | 59 | 57 |
| 10.00th | 64 | 65 | 66 | 67 | 64 | 63 | 63 | 65 | 61 |
| 15.00th | 67 | 66 | 69 | 70 | 67 | 66 | 67 | 67 | 63 |
| 20.00th | 69 | 68 | 71 | 72 | 69 | 69 | 68 | 68 | 66 |
| 25.00th | 71 | 71 | 72 | 74 | 72 | 71 | 71 | 71 | 67 |
| 30.00th | 72 | 72 | 73 | 76 | 74 | 72 | 73 | 72 | 70 |
| 35.00th | 73 | 74 | 75 | 77 | 75 | 73 | 75 | 73 | 72 |
| 40.00th | 75 | 76 | 76 | 77 | 78 | 75 | 77 | 78 | 73 |
| 45.00th | 76 | 77 | 78 | 80 | 79 | 77 | 78 | 81 | 76 |
| 50.00th | 78 | 78 | 79 | 82 | 80 | 78 | 81 | 82 | 79 |
| 55.00th | 80 | 79 | 81 | 84 | 82 | 81 | 82 | 83 | 80 |
| 60.00th | 81 | 80 | 82 | 85 | 84 | 82 | 84 | 85 | 82 |
| 65.00th | 82 | 82 | 83 | 87 | 86 | 84 | 86 | 87 | 84 |
| 70.00th | 84 | 83 | 84 | 88 | 87 | 86 | 88 | 87 | 85 |
| 75.00th | 85 | 85 | 86 | 89 | 88 | 87 | 91 | 90 | 86 |
| 80.00th | 86 | 86 | 88 | 91 | 91 | 88 | 95 | 93 | 89 |
| 85.00th | 88 | 88 | 91 | 94 | 93 | 92 | 97 | 95 | 100 |
| 90.00th | 90 | 91 | 97 | 97 | 98 | 94 | 100 | 98 | 105 |
| 95.00th | 95 | 100 | 102 | 103 | 105 | 101 | 110 | 103 | 118 |
| 97.50th | 97 | 107 | 109 | 105 | 114 | 105 | 122 | 107 | 120 |
| mean | 77.55 | 78.29 | 0.09 | 81.88 | 80.75 | 79.13 | 81.14 | 80.65 | 79.50 |
| sd* | 10.15 | 11.93 | 11.93 | 11.85 | 13.26 | 12.05 | 15.72 | 13.54 | 17.22 |
| skew** | 0.12 | 1.00 | 0.63 | 0.29 | 0.40 | 0.22 | 0.42 | 0.03 | 0.79 |

**sd means standard deviation, **skew means skewness*

**Table XVIII**
**Empirical Percentiles of Diastolic Blood Pressure for Other Indigenous Females, by Age**

| Age Group | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | >=70 |
|---|---|---|---|---|---|---|---|---|---|
| n | 433 | 343 | 210 | 199 | 123 | 112 | 105 | 72 | 115 |
| Percentiles | | | | | | | | | |
| 2.50th | 57 | 57 | 58 | 58 | 54 | 60 | 56 | 59 | 52 |
| 5.00th | 59 | 60 | 61 | 62 | 61 | 61 | 57 | 61 | 56 |
| 10.00th | 62 | 64 | 64 | 65 | 65 | 64 | 62 | 64 | 64 |
| 15.00th | 64 | 66 | 66 | 67 | 68 | 66 | 64 | 67 | 65 |
| 20.00th | 66 | 68 | 69 | 70 | 70 | 68 | 66 | 69 | 67 |
| 25.00th | 68 | 70 | 70 | 72 | 71 | 71 | 69 | 71 | 69 |
| 30.00th | 70 | 71 | 72 | 73 | 73 | 72 | 71 | 71 | 71 |
| 35.00th | 71 | 73 | 74 | 75 | 75 | 74 | 72 | 72 | 73 |
| 40.00th | 72 | 74 | 75 | 76 | 77 | 76 | 76 | 73 | 74 |
| 45.00th | 74 | 76 | 77 | 78 | 79 | 78 | 77 | 75 | 76 |
| 50.00th | 75 | 78 | 80 | 79 | 81 | 80 | 78 | 76 | 77 |
| 55.00th | 77 | 78 | 81 | 80 | 82 | 81 | 79 | 79 | 78 |
| 60.00th | 78 | 80 | 83 | 82 | 83 | 82 | 80 | 81 | 79 |
| 65.00th | 79 | 81 | 84 | 84 | 85 | 84 | 81 | 82 | 83 |
| 70.00th | 81 | 83 | 85 | 86 | 87 | 87 | 83 | 85 | 86 |
| 75.00th | 82 | 85 | 87 | 87 | 90 | 91 | 85 | 87 | 89 |
| 80.00th | 85 | 86 | 88 | 89 | 92 | 94 | 88 | 91 | 91 |
| 85.00th | 87 | 89 | 91 | 91 | 94 | 100 | 90 | 94 | 95 |
| 90.00th | 90 | 91 | 96 | 96 | 97 | 103 | 95 | 103 | 97 |
| 95.00th | 96 | 97 | 102 | 102 | 101 | 109 | 105 | 107 | 99 |
| 97.50th | 102 | 101 | 104 | 108 | 105 | 113 | 110 | 112 | 101 |
| mean | 75.79 | 77.48 | 79.15 | 79.92 | 80.57 | 81.05 | 77.94 | 79.48 | 78.37 |
| sd* | 11.67 | 12.16 | 12.48 | 12.73 | 13.37 | 14.57 | 13.33 | 14.21 | 13.70 |
| skew** | 0.80 | 1.02 | 0.31 | 0.71 | 0.31 | 0.59 | 0.56 | 0.67 | 0.46 |

**sd means standard deviation, **skew means skewness*

**Table XIX**
**Crude and Age-Adjusted Mean Systolic and Diastolic BP**

| | | Diastolic BP, mmHg | | Systolic BP, mmHg | |
|---|---|---|---|---|---|
| | | Mean (SE) | Age-adjusted (SE) | Mean (SE) | Age-adjusted Mean (SE) |
| All | | 79 (0.1) | 79 (0.1) | 129 (0.2) | 129 (0.2) |
| | Men | 80 (0.1) | 80 (0.1) | 129 (0.2) | 130 (0.2) |
| | Women | 78 (0.2) | 78 (0.1) | 129 (0.3) | 129 (0.2) |
| Malay | | 79 (0.2) | 79 (0.1) | 130 (0.3) | 130 (0.2) |
| | Men | 79 (0.2) | 79 (0.2) | 129 (0.3) | 129 (0.3) |
| | Women | 79 (0.2) | 79 (0.2) | 131 (0.4) | 131 (0.3) |
| Chinese | | 79 (0.2) | 79 (0.2) | 128 (0.4) | 127 (0.3) |
| | Men | 81 (0.3) | 81 (0.3) | 130 (0.4) | 129 (0.4) |
| | Women | 77 (0.3) | 77 (0.2) | 126 (0.5) | 125 (0.4) |
| Indian | | 79 (0.4) | 79 (0.4) | 126 (0.6) | 127 (0.5) |
| | Men | 82 (0.5) | 82 (0.5) | 129 (0.8) | 129 (0.8) |
| | Women | 77 (0.5) | 77 (0.5) | 123 (0.8) | 124 (0.7) |
| Other | | 79 (0.3) | 79 (0.2) | 132 (0.5) | 132 (0.4) |
| indigenous | Men | 79 (0.3) | 80 (0.3) | 131 (0.5) | 131 (0.5) |
| | Women | 78 (0.4) | 78 (0.3) | 132 (0.6) | 132 (0.6) |

**Table XX**
**Age Specific Mean Systolic and Diastolic BP**

| | | Age Group | Mean Diastolic BP, mmHg (SE) | Mean Systolic BP, mmHg (SE) |
|---|---|---|---|---|
| Malay | Men | 30 - 39 | 77 (0.3) | 123 (0.4) |
| | | 40 - 49 | 80 (0.4) | 127 (0.5) |
| | | 50 - 59 | 82 (0.5) | 137 (0.9) |
| | | 60 - 69 | 79 (0.6) | 138 (1.0) |
| | | >=70 | 77 (1.0) | 142 (1.6) |
| Malay | Women | 30 - 39 | 76 (0.3) | 120 (0.4) |
| | | 40 - 49 | 80 (0.4) | 130 (0.6) |
| | | 50 - 59 | 82 (0.5) | 141 (0.9) |
| | | 60 - 69 | 81 (0.7) | 146 (1.2) |
| | | >=70 | 81 (1.0) | 155 (1.6) |
| Chinese | Men | 30 - 39 | 79 (0.4) | 123 (0.5) |
| | | 40 - 49 | 82 (0.5) | 128 (0.7) |
| | | 50 - 59 | 84 (0.6) | 134 (1.0) |
| | | 60 - 69 | 83 (0.8) | 140 (1.3) |
| | | >=70 | 80 (1.2) | 145 (2.0) |
| Chinese | Women | 30 - 39 | 73 (0.4) | 114 (0.5) |
| | | 40 - 49 | 77 (0.4) | 124 (0.7) |
| | | 50 - 59 | 81 (0.6) | 135 (1.0) |
| | | 60 - 69 | 82 (0.8) | 142 (1.2) |
| | | >=70 | 81 (1.2) | 148 (1.8) |
| Indian | Men | 30 - 39 | 80 (0.7) | 123 (1.0) |
| | | 40 - 49 | 83 (0.9) | 128 (1.4) |
| | | 50 - 59 | 85 (1.6) | 137 (2.7) |
| | | 60 - 69 | 83 (1.7) | 141 (2.6) |
| | | >=70 | 75 (2.1) | 139 (4.7) |
| Indian | Women | 30 - 39 | 73 (0.6) | 113 (0.8) |
| | | 40 - 49 | 78 (0.9) | 125 (1.3) |
| | | 50 - 59 | 82 (1.5) | 132 (2.1) |
| | | 60 - 69 | 82 (1.6) | 140 (2.7) |
| | | >=70 | 80 (2.7) | 146 (3.2) |
| Other indigenous | Men | 30 - 39 | 78 (0.4) | 125 (0.6) |
| | | 40 - 49 | 81 (0.7) | 130 (0.9) |
| | | 50 - 59 | 80 (0.8) | 137 (1.7) |
| | | 60 - 69 | 81 (1.2) | 142 (2.1) |
| | | >=70 | 80 (2.0) | 149 (2.7) |
| Other indigenous | Women | 30 - 39 | 77 (0.5) | 123 (0.7) |
| | | 40 - 49 | 80 (0.7) | 133 (1.1) |
| | | 50 - 59 | 81 (1.0) | 140 (1.8) |
| | | 60 - 69 | 79 (1.0) | 144 (2.0) |
| | | >=70 | 78 (1.2) | 152 (2.8) |

**Table XXI**
**Crude Percentage Distribution of BP According to JNC* Classification**

| | | Normotensive | | | Hypertensive | | |
|---|---|---|---|---|---|---|---|
| | | % Optimal (SE) | % Normal (SE) | % High normal (SE) | %Stage 1 (SE) | % Stage 2 (SE) | % Stage 3 - 4 (SE) |
| SBP | | <120 | 120 - 29 | 130 - 39 | 140 - 59 | 160 - 79 | >=180 |
| DBP | | <80 | 80 - 84 | 85 - 89 | 90 - 99 | 100 - 109 | >=110 |
| All | | 32 (0.5) | 20 (0.3) | 17 (0.3) | 20 (0.3) | 8 (0.2) | 4 (0.2) |
| | Men | 29 (0.5) | 23 (0.5) | 19 (0.5) | 20 (0.5) | 7 (0.3) | 3 (0.2) |
| | Women | 35 (0.6) | 18 (0.4) | 15 (0.4) | 20 (0.4) | 8 (0.3) | 4 (0.2) |
| Malay | | 31 (0.6) | 21 (0.5) | 17 (0.4) | 20 (0.5) | 8 (0.3) | 4 (0.2) |
| | Men | 30 (0.8) | 23 (0.7) | 18 (0.7) | 19 (0.6) | 7 (0.4) | 3 (0.3) |
| | Women | 31 (0.8) | 18 (0.6) | 15 (0.6) | 21 (0.6) | 9 (0.4) | 5 (0.3) |
| Chinese | | 34 (0.8) | 19 (0.6) | 16 (0.5) | 20 (0.6) | 7 (0.4) | 3 (0.3) |
| | Men | 28 (1.0) | 21 (0.9) | 18 (0.8) | 22 (1.0) | 7 (0.5) | 4 (0.4) |
| | Women | 40 (1.1) | 18 (0.7) | 14 (0.7) | 18 (0.7) | 7 (0.5) | 3 (0.4) |
| Indian | | 37 (1.4) | 20 (1.0) | 15 (1.0) | 18 (1.1) | 7 (0.8) | 3 (0.5) |
| | Men | 29 (1.8) | 22 (1.6) | 17 (1.5) | 20 (1.6) | 8 (1.1) | 4 (0.8) |
| | Women | 45 (1.9) | 18 (1.3) | 13 (1.3) | 16 (1.4) | 6 (1.0) | 3 (0.6) |
| Other indigenous | | 28 (0.9) | 20 (0.8) | 21 (0.8) | 19 (0.8) | 8 (0.5) | 4 (0.4) |
| | Men | 26 (1.2) | 22 (1.2) | 23 (1.2) | 19 (1.1) | 7 (0.7) | 4 (0.5) |
| | Women | 30 (1.2) | 18 (1.0) | 19 (1.1) | 20 (1.0) | 9 (0.8) | 5 (0.5) |

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**Table XXII**
**Age Adjusted* Percentage Distribution of BP According to JNC** Classification**

| | | Normotensive | | | Hypertensive | | |
|---|---|---|---|---|---|---|---|
| | | % Optimal (SE) | % Normal (SE) | % High Normal (SE) | % Stage 1 (SE) | % Stage 2 (SE) | % Stage 3 - 4 (SE) |
| SBP | | <120 | 120 - 29 | 130 - 39 | 140 - 59 | 160 - 79 | >=180 |
| DBP | | <80 | 80 - 84 | 85 - 89 | 90 - 99 | 100 - 109 | >=110 |
| All | | 32 (0.4) | 20 (0.3) | 17 (0.3) | 20 (0.3) | 8 (0.2) | 4 (0.1) |
| | Men | 28 (0.5) | 22 (0.5) | 19 (0.5) | 20 (0.5) | 7 (0.3) | 3 (0.2) |
| | Women | 36 (0.5) | 18 (0.4) | 15 (0.4) | 19 (0.4) | 8 (0.3) | 4 (0.2) |
| Malay | | 31 (0.5) | 21 (0.5) | 17 (0.4) | 20 (0.4) | 8 (0.3) | 4 (0.2) |
| | Men | 30 (0.7) | 23 (0.7) | 18 (0.7) | 19 (0.6) | 7 (0.4) | 3 (0.3) |
| | Women | 31 (0.7) | 18 (0.6) | 15 (0.6) | 21 (0.6) | 9 (0.4) | 5 (0.3) |
| Chinese | | 36 (0.7) | 19 (0.6) | 16 (0.5) | 19 (0.6) | 7 (0.3) | 3 (0.2) |
| | Men | 29 (1.0) | 21 (0.9) | 18 (0.8) | 22 (0.9) | 7 (0.5) | 3 (0.4) |
| | Women | 42 (0.9) | 18 (0.8) | 14 (0.7) | 17 (0.7) | 6 (0.4) | 3 (0.3) |
| Indian | | 36 (1.3) | 20 (1.1) | 15 (1.0) | 18 (1.1) | 7 (0.8) | 3 (0.5) |
| | Men | 29 (1.8) | 22 (1.7) | 17 (1.4) | 20 (1.6) | 8 (1.2) | 4 (0.8) |
| | Women | 44 (1.7) | 18 (1.4) | 13 (1.4) | 16 (1.4) | 6 (0.9) | 3 (0.6) |
| Other indigenous | | 27 (0.9) | 20 (0.7) | 21 (0.8) | 20 (0.8) | 8 (0.5) | 4 (0.4) |
| | Men | 25 (1.1) | 21 (1.1) | 23 (1.2) | 19 (1.1) | 7 (0.7) | 4 (0.5) |
| | Women | 29 (1.2) | 18 (0.9) | 19 (1.1) | 20 (1.0) | 9 (0.7) | 5 (0.5) |

**Age adjusted to 1996 Malaysian population*
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**Table XXIII**
**Age Specific Percentage Distribution of BP According to JNC* Classification**

| | | | Normotensive | | | Hypertensive | | |
|---|---|---|---|---|---|---|---|---|
| | | Age group | % Optimal (SE) | % Normal (SE) | % High normal (SE) | %Stage 1 (SE) | % Stage 2 (SE) | % Stage 3 - 4 (SE) |
| SBP | | | <120 | 120 - 29 | 130 - 39 | 140 - 59 | 160 - 79 | >=180 |
| DBP | | | <80 | 80 - 84 | 85 - 89 | 90 - 99 | 100 - 109 | >=110 |
| Malay | Men | 30 - 39 | 39 (1.3) | 26 (1.2) | 17 (1.1) | 14 (0.9) | 2 (0.4) | 1 (0.3) |
| | | 40 - 49 | 30 (1.4) | 25 (1.3) | 19 (1.2) | 17 (1.2) | 7 (0.8) | 2 (0.4) |
| | | 50 - 59 | 19 (1.6) | 18 (1.5) | 21 (1.5) | 24 (1.6) | 11 (1.1) | 6 (1.1) |
| | | 60 - 69 | 17 (1.9) | 17 (1.8) | 18 (1.9) | 31 (2.3) | 14 (1.7) | 4 (0.9) |
| | | >=70 | 16 (2.4) | 16 (2.3) | 15 (2.3) | 29 (3.0) | 15 (2.3) | 9 (2.0) |
| Malay | Women | 30 - 39 | 47 (1.3) | 21 (1.0) | 13 (0.9) | 14 (0.8) | 3 (0.4) | 1 (0.3) |
| | | 40 - 49 | 29 (1.3) | 21 (1.2) | 17 (1.1) | 21 (1.2) | 9 (0.8) | 4 (0.6) |
| | | 50 - 59 | 17 (1.5) | 15 (1.4) | 17 (1.4) | 30 (1.7) | 14 (1.3) | 7 (0.9) |
| | | 60 - 69 | 10 (1.4) | 12 (1.5) | 17 (1.8) | 31 (2.2) | 17 (1.8) | 12 (1.5) |
| | | >=70 | 7 (1.6) | 8 (1.6) | 13 (2.0) | 30 (3.0) | 25 (2.6) | 17 (2.3) |
| Chinese | Men | 30 - 39 | 38 (1.9) | 25 (1.7) | 18 (1.5) | 16 (1.4) | 2 (0.5) | 1 (0.3) |
| | | 40 - 49 | 30 (1.8) | 20 (1.5) | 20 (1.5) | 21 (1.5) | 6 (1.0) | 3 (0.7) |
| | | 50 - 59 | 21 (1.9) | 21 (2.1) | 17 (1.7) | 25 (2.0) | 11 (1.5) | 6 (1.1) |
| | | 60 - 69 | 14 (2.0) | 15 (2.2) | 19 (2.3) | 34 (2.8) | 12 (1.9) | 7 (1.5) |
| | | >=70 | 16 (3.2) | 8 (2.2) | 17 (3.2) | 33 (4.3) | 17 (3.2) | 10 (2.4) |
| Chinese | Women | 30 - 39 | 63 (1.7) | 20 (1.3) | 8 (0.9) | 7 (0.8) | 2 (0.4) | 1 (0.3) |
| | | 40 - 49 | 40 (1.8) | 20 (1.5) | 19 (1.4) | 16 (1.3) | 4 (0.6) | 2 (0.5) |
| | | 50 - 59 | 22 (1.9) | 16 (1.8) | 18 (1.8) | 28 (2.1) | 12 (1.5) | 4 (0.9) |
| | | 60 - 69 | 14 (2.0) | 12 (1.8) | 19 (2.1) | 32 (2.6) | 16 (2.0) | 7 (1.5) |
| | | >=70 | 15 (2.6) | 8 (1.9) | 12 (2.6) | 31 (3.4) | 21 (2.9) | 12 (2.4) |
| Indian | Men | 30 - 39 | 41 (3.3) | 22 (2.4) | 17 (2.0) | 14 (2.2) | 5 (1.4) | 1 (0.6) |
| | | 40 - 49 | 27 (3.3) | 22 (3.2) | 19 (2.7) | 24 (3.0) | 6 (1.8) | 3 (1.2) |
| | | 50 - 59 | 14 (3.7) | 22 (4.7) | 18 (4.3) | 23 (4.7) | 14 (3.7) | 8 (3.3) |
| | | 60 -69 | 13 (3.9) | 21 (5.2) | 14 (4.6) | 31 (6.2) | 13 (4.5) | 9 (3.8) |
| | | >=70 | 19 (6.8) | 19 (7.3) | 19 (6.3) | 20 (7.1) | 19 (8.2) | 4 (2.9) |
| Indian | Women | 30 - 39 | 64 (2.7) | 18 (1.9) | 8 (1.5) | 9 (1.7) | 1 (0.4) | 0 (0.2) |
| | | 40 - 49 | 41 (3.5) | 18 (2.7) | 17 (2.8) | 15 (2.4) | 7 (2.0) | 2 (0.9) |
| | | 50 - 59 | 25 (4.6) | 21 (4.2) | 17 (4.6) | 18 (4.0) | 13 (3.4) | 5 (2.1) |
| | | 60 - 69 | 19 (4.4) | 10 (3.6) | 16 (4.1) | 32 (5.7) | 13 (3.6) | 9 (3.3) |
| | | >=70 | 8 (4.7) | 15 (6.0) | 14 (6.1) | 37 (7.9) | 17 (5.9) | 9 (5.3) |
| Other indigenous | Men | 30 - 39 | 33 (2.0) | 25 (1.9) | 23 (1.8) | 15 (1.6) | 3 (0.7) | 1 (0.4) |
| | | 40 - 49 | 24 (2.1) | 22 (2.2) | 24 (2.4) | 20 (2.3) | 7 (1.4) | 2 (0.9) |
| | | 50 - 59 | 20 (2.6) | 18 (2.6) | 23 (2.9) | 25 (2.9) | 9 (1.9) | 6 (1.5) |
| | | 60 - 69 | 18 (3.0) | 15 (2.8) | 21 (3.4) | 20 (3.0) | 16 (2.9) | 10 (2.6) |
| | | >=70 | 9 (3.1) | 11 (3.3) | 21 (4.2) | 26 (4.4) | 19 (4.1) | 15 (3.7) |
| Other indigenous | Women | 30 - 39 | 40 (2.0) | 21 (1.5) | 22 (1.8) | 13 (1.2) | 3 (0.7) | 2 (0.6) |
| | | 40 - 49 | 27 (2.3) | 17 (1.9) | 18 (1.9) | 25 (2.3) | 10 (1.6) | 4 (1.0) |
| | | 50 - 59 | 22 (3.0) | 14 (2.4) | 17 (2.6) | 23 (2.9) | 16 (2.5) | 8 (1.8) |
| | | 60 - 69 | 15 (2.6) | 15 (2.8) | 16 (2.9) | 31 (3.7) | 16 (2.9) | 8 (2.0) |
| | | >=70 | 15 (3.4) | 9 (2.7) | 15 (3.3) | 20 (4.5) | 24 (4.2) | 17 (3.5) |

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