Nutritional status of women and children in Malaysian rural populations

Osman Ali & Zaleha Md Isa
Department of Community Health, Medical Faculty, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia.

This study was conducted to investigate the nutritional status of the rural population in Malaysia, especially women and children. A total of 262 women aged 18 and over and 183 children aged 2-6 years were selected using multistage cluster sampling from four locations in rural areas. It was found that the prevalence of malnutrition among children 2-6 years old ranged between 25.5% in the Malay settlements to 80% in the Orang Asli settlement. Malnutrition was associated with worm infestations, bottle feeding and early weaning. More than 30% of Orang Asli women were malnourished compared to less than 15% of Malay settlement women. On the other hand, Malay women in the land settlement scheme had a higher risk of developing obesity and diabetes. Goitre was found among 11.2% of children, however, no conclusion was found. Breastfeeding was still a common practice among rural mothers, but inadequate health education tended to reduce the duration of breast feeding and increase early weaning. Upgrading women’s status in the rural areas will ultimately improve the nutritional and health status of the children and community as a whole.

Introduction
Women and children are still considered to be dependent groups in most developing countries. The status of women varies enormously between countries. Some countries offer women equal rights and status with men, while in the least developed countries, discrimination on the basis of gender still exists. Most of these women are economically dependent and vulnerable, politically and legally powerless. They work longer hours and sometimes work harder than men, but their work is typically unpaid and undervalued. As mothers, they take care of the children, so the fate of the children in terms of physical growth, mental growth, behaviour and education largely depend on their capability. However, educational attainment among women is too poor in most underdeveloped countries to enable women to carry full responsibilities in child upbringing.

Malaysia, a developing nation of tropical climate has morbidity and mortality statistics indicating a trend towards improving the health status of the population. Maternal and child health programs have been upgraded to consolidate the existing services. However, certain areas are still under-served due to distance from towns or cities. Efforts to reduce infant and maternal mortality have been intensified through a risk-approach, and priority given to improve the health and nutrition of "the very poor" through community education and nutrition rehabilitation. This study investigates the nutritional and health status of rural women and child populations in Malaysia against this background.

Methods
The study was approved by the University ethics committee. A total of 262 women aged 18 years and over and 183 children aged 2-6 years were selected using multistage cluster sampling from four locations in rural areas (Table 1). The locations range from very traditional Aboriginal settlements (Lanai Post and Betu Post) deep in the jungle to modern Malay settlements (Hulu Sungai village and Sungai Koyan Federal Land settlement). All subjects invited attended our clinic.

Table 1. Study subjects according to age group and ethnic settlement
<table>
<thead>
<tr>
<th>Ethnic/settlement</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age(year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-6</td>
<td>&gt;18</td>
<td>2-6</td>
</tr>
<tr>
<td>Orang Asli</td>
<td>48</td>
<td>146</td>
</tr>
<tr>
<td>Lanai Post</td>
<td>19</td>
<td>65</td>
</tr>
<tr>
<td>Betu Post</td>
<td>29</td>
<td>81</td>
</tr>
<tr>
<td>Malaysia</td>
<td>46</td>
<td>128</td>
</tr>
<tr>
<td>Hulu Sungai village</td>
<td>18</td>
<td>64</td>
</tr>
<tr>
<td>Sungai Koyan Federal</td>
<td>28</td>
<td>64</td>
</tr>
</tbody>
</table>

Total 94 274 89 262

Physical examination, anthropometric assessment, an oral glucose tolerance test (OGTT) and biochemical analysis were performed. Dietary intake and sociodemographic questionnaires were administered. Stool was collected for ova and cyst examination to determine helmin and protozoa infection. Body weight was measured using a Seca spring balance and height was measured by the Microtripe tool. Questionnaires were used to obtain information about socioeconomical aspects and nutrition (24-hour dietary recall and food frequency). Three interviewers and one research assistant were
selected and trained in the required techniques, the process of social contact and anthropometric measurement. For determination of nutritional status among children, a NCHS (National Centre of Health Statistics, USA) reference was used, and for adults, body mass index (BMI), was used where BMI is defined as less than 18.5 and overweight is 25 kg/m² or greater. Children between 7-17 years and adults had 15 ml and 20 ml of blood taken, respectively. Serum albumin was measured by enzyme calorimetric method using Technicon SMA II autoanalyser (ICL, America Inc.). Serum cholesterol was measured using the CHOD-PAP method (Boehringer Mannheim). Thymoid gland enlargement was classified by palpation according to criteria recommended by WHO. The criteria for diagnosis of diabetes mellitus was based on the recommendations of the World Health Organisation. Glucose tolerance was measured using Reflotron glucose analyzing tool (Boehringer Mannheim). A fasting venous whole blood glucose level of 8 mmol/l, and a two hour venous whole blood glucose level of 11 mmol/l or more was diagnosed for diabetes.

Statistical analysis was with SAS statistical software release 6.3 (SAS Institute Inc).

Results
In general, Orang Asli in rural areas suffered from malnutrition. Stunting was found to be higher in Orang Asli than in the Malays (p<0.0001, Table 2). The prevalence of malnutrition in Lanai Post and 80% in Betu Post compared to 41.2% and 25.5% in Hulusungai village and Felda Koyan settlements respectively. However, wasting was more common among Orang Asli in rural area.

Table 2. Prevalence of malnutrition (PME) among children.

<table>
<thead>
<tr>
<th>Population classification</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>37.1</td>
<td>38.8</td>
</tr>
<tr>
<td>Betu Post</td>
<td>38.2</td>
<td>38.8</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>37.1</td>
<td>37.1</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>37.6</td>
<td>37.6</td>
</tr>
</tbody>
</table>

Nutritional status was measured using Weight (W) = (Height - Age)/Stunting/Wasting (%), and BMI = (Weight in kg)/(Height in m)². The prevalence of stunting was found to be higher in Orang Asli than in the Malays (p<0.0001, Table 2). The prevalence of wasting was found to be higher in Betu Post compared to 41.2% and 25.5% in Hulusungai village and Felda Koyan settlements respectively. However, wasting was more common among Orang Asli in rural area.

Malnutrition and overweight among women
Overweight among Orang Asli women was significantly lower than the Malays in rural areas (Table 6). The Orang Asli women were 2.4 times more likely to be overweight than the Malays in rural areas. However, the prevalence of overweight in rural areas was almost no difference in Malays and Orang Asli women. The prevalence of overweight was found to be higher in rural areas compared to Orang Asli women and men (Table 6).

Table 3. Infant feeding

<table>
<thead>
<tr>
<th>Location</th>
<th>Breast Feeding (%)</th>
<th>Bottle Feeding (%)</th>
<th>Breast + bottle feeding (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>92.0</td>
<td>3.2</td>
<td>95.2</td>
</tr>
<tr>
<td>Betu Post</td>
<td>96.2</td>
<td>0.0</td>
<td>96.2</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>50.0</td>
<td>0.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>96.0</td>
<td>0.0</td>
<td>96.0</td>
</tr>
</tbody>
</table>

Breastfeeding was found to be common practice among Orang Asli women in rural areas (more than 90%) compared to the Malays (less 50%). Surprisingly, 52% of Orang Asli children in Lanai Post were only bottle fed, which was not the practice in other locations (Table 3). In terms of duration of breast feeding, there was no difference between locations. However, solid food was given late to Orang Asli children (Table 4). Protozoa were common among Orang Asli women.

Table 4. Duration of breast feeding and age of introducing solid food.

<table>
<thead>
<tr>
<th>Location</th>
<th>Duration of breast feeding (months) n mean</th>
<th>Age of introducing solid food (months) n mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>39 18.2 38 9.4</td>
<td>35 7.3 29 3.2</td>
</tr>
<tr>
<td>Betu Post</td>
<td>30 17.6 43 7.0</td>
<td>29 19.3 33 6.0</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>33 16.6 54 5.6</td>
<td>33 16.6 54 5.6</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>32 17.6 54 5.6</td>
<td>32 17.6 54 5.6</td>
</tr>
</tbody>
</table>

The prevalence of diabetes was found to be higher in rural areas compared to Orang Asli men and 3-10 times more common as among Malays in both sexes (Table 7).

Table 5. Prevalence of goitre according to age, ethnicity, and sex.

<table>
<thead>
<tr>
<th>Location</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>39</td>
<td>37</td>
</tr>
<tr>
<td>Betu Post</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>34</td>
<td>33</td>
</tr>
</tbody>
</table>

Diabetes
The prevalence of diabetes was found to be higher in rural areas compared to Orang Asli men and 3-10 times more common as among Malays in both sexes (Table 7).

Table 6. Prevalence of PME (malnutrition) and overweight (OW) among adults.

<table>
<thead>
<tr>
<th>Location</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>35.4</td>
<td>35.7</td>
</tr>
<tr>
<td>Betu Post</td>
<td>36.9</td>
<td>37.1</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>36.9</td>
<td>37.1</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>36.9</td>
<td>37.1</td>
</tr>
</tbody>
</table>

The prevalence of diabetes was found to be higher in rural areas compared to Orang Asli men and 3-10 times more common as among Malays in both sexes (Table 7).

Table 7. Prevalence of PME (malnutrition) and overweight (OW) among adults.

<table>
<thead>
<tr>
<th>Location</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>35.4</td>
<td>35.7</td>
</tr>
<tr>
<td>Betu Post</td>
<td>36.9</td>
<td>37.1</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>36.9</td>
<td>37.1</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>36.9</td>
<td>37.1</td>
</tr>
</tbody>
</table>

Breastfeeding was found to be common practice among Orang Asli women in rural areas (more than 90%) compared to the Malays (less 50%). Surprisingly, 52% of Orang Asli children in Lanai Post were only bottle fed, which was not the practice in other locations (Table 3). In terms of duration of breast feeding, there was no difference between locations. However, solid food was given late to Orang Asli children (Table 4). Protozoa were common among Orang Asli women. Goitre prevalence was found to be higher in the Orang Asli men and 3-10 times more common as among Malays in both sexes (Table 7).

Table 8. The prevalence of diabetes mellitus (DM), impaired glucose tolerance (IGT) and glucose tolerance abnormality (GTA) among subjects and the Malays.

<table>
<thead>
<tr>
<th>Location</th>
<th>DM</th>
<th>IGT</th>
<th>GTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Betu Post</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hulusungai</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Goitre prevalence among Orang Asli women was higher in rural areas compared to Orang Asli men and 3-10 times more common as among Malays in both sexes (Table 7).

Figure 1. Prevalence of goitre according to age, ethnicity, and sex.

Discussion
Malnutrition is widespread in developing countries especially among young children. It reduces resistance to infectious diseases and inhibits growth and development. Malnutrition plays a key role in maternal and infant mortality. It was shown in this study that stunting was common among the rural population especially in the Orang Asli. The high prevalence of malnutrition in Orang Asli women and men was found to be higher in rural areas compared to the Malays. The prevalence of diabetes was found to be higher in rural areas compared to Orang Asli men and 3-10 times more common as among Malays in both sexes (Table 7).
selected and trained in the required techniques, the process of social contact and anthropometric measurement.

For determination of nutritional status among children, a NCHS (National Centre of Health Statistics, USA) reference was used, and for adults, body mass index (BMI), was used where BMI is defined as less than 18.5 and overweight is 25 kg/m² or greater. Children between 7-17 years and adults had 15 ml and 20 ml of blood taken, respectively. Serum albumin was measured by enzyme calorimetric method using Technicon SMA II autoanalyser (I.C.I., America Inc.). Serum cholesterol was measured using the CHOD-PAP method (Boehringer Mannheim). Thryoid gland enlargement was classified by palpation according to criteria recommended by WHO. The criteria for diagnosis of diabetes mellitus was based on the recommendations of the World Health Organization. Glucose tolerance was measured using Reffotion glucose analysing tool (Boehringer Mannheim). A fasting venous whole blood glucose level of 8 mmol/l and a two hour venous whole blood glucose level of 11 mmol/l or more was considered for diabetes.

Statistical analysis was with SAS statistical software release 6.3 (SAS Institute Inc.).

Results

In general, Orang Asli in rural areas suffered from malnutrition. Stunting was found to be higher in Orang Asli than in the Malays (p<0.0001, Table 2). The prevalence of stunting was 41.2% in Lanai Post and compared to 24.5% in Hulu Sungai village and Felda Koyan settlements respectively. However, wasting was more common among Orang Asli in rural area.

Table 2. Prevalence of malnutrition (PEM) among children.

<table>
<thead>
<tr>
<th>Nutritional index</th>
<th>Age groups</th>
<th>Weight for height (N)</th>
<th>Stunting (N)</th>
<th>Wasting (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>3-6yr</td>
<td>37 28.1</td>
<td>7.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Betau Post</td>
<td>3-6yr</td>
<td>38 2.5</td>
<td>2.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Hulu Sungai</td>
<td>3-6yr</td>
<td>35 2.4</td>
<td>2.1</td>
<td>1.8</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>3-6yr</td>
<td>34 2.4</td>
<td>2.1</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Table 3. Infant feeding.

<table>
<thead>
<tr>
<th>Settlement</th>
<th>Breastfeeding (%)</th>
<th>Bottle feeding (%)</th>
<th>Breast + bottle feeding (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>92.0</td>
<td>9.3</td>
<td>92.0</td>
</tr>
<tr>
<td>Betau Post</td>
<td>96.2</td>
<td>3.7</td>
<td>96.2</td>
</tr>
<tr>
<td>Hulu Sungai</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>96.0</td>
<td>3.0</td>
<td>99.0</td>
</tr>
</tbody>
</table>

Breastfeeding was still a common practice among Orang Asli women in rural area (more than 50%) compared to Malays (less 50%). Surprisingly, 5.2% of Orang Asli children in Lanai Post were only bottle fed, which was not the practice in other locations (Table 3). In terms of duration of breast feeding, there was no difference between locations. However, solid food was given late to Orang Asli children (Table 4). Protocoles were common amongst the Orang Asli children compared to the Malays. Goitre was twice as common among Orang Asli women than among Orang Asli men and 3-10 times more common as Malays in both sexes (Table 7).

Table 4. Duration of breastfeeding and age of introducing solid food.

<table>
<thead>
<tr>
<th>Location</th>
<th>Duration of breastfeeding (months)</th>
<th>Age of introducing solid food (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>39 1.8</td>
<td>38 9.4</td>
</tr>
<tr>
<td>Betau Post</td>
<td>50 1.7</td>
<td>43 7.0</td>
</tr>
<tr>
<td>Hulu Sungai</td>
<td>29 1.8</td>
<td>33 6.0</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>51 1.6</td>
<td>54 5.6</td>
</tr>
</tbody>
</table>

Table 5. Prevalence of worm and protozoal infection by settlement.

<table>
<thead>
<tr>
<th>Protozoa (blood)</th>
<th>Round worm (ascaris)</th>
<th>Thread worm (trichuris)</th>
<th>Hook worm (anyclostea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>68.4 7.9</td>
<td>15.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Betau Post</td>
<td>80.2 30.0</td>
<td>20.2</td>
<td>19.4</td>
</tr>
<tr>
<td>Hulu Sungai</td>
<td>65.0 11.2</td>
<td>18.0</td>
<td>21.5</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>41.7 13.6</td>
<td>16.7</td>
<td>18.1</td>
</tr>
</tbody>
</table>

Diabetes

Prevalence of diabetes was higher in women compared to men especially among Malay women over 40. The prevalence of diabetes among Malay women in Hulu Sungai village was 1.1% whereas in Felda Sungai Koyan land settlement it was 9.5%. Diabetes was not common among Orang Asli women (Table 8).

Table 6. Prevalence of PPM (malnutrition) and overfeeding (match) among adults.

<table>
<thead>
<tr>
<th>Ethnic</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanai Post</td>
<td>65 15.4</td>
<td>16 3.0</td>
</tr>
<tr>
<td>Betau Post</td>
<td>64 16.0</td>
<td>15 2.8</td>
</tr>
<tr>
<td>Hulu Sungai</td>
<td>64 15.6</td>
<td>15 2.8</td>
</tr>
<tr>
<td>Felda Koyan</td>
<td>63 16.0</td>
<td>15 2.8</td>
</tr>
</tbody>
</table>

Table 7. Prevalence of goitre according to age, ethnicity, and sex.

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Sex</th>
<th>Overall subjects</th>
<th>Malay subjects</th>
<th>Orang Asli subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-7</td>
<td>male</td>
<td>94 10</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>88 11</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>10-12</td>
<td>male</td>
<td>157 23</td>
<td>71 22</td>
<td>46 52</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>146 17</td>
<td>62 14</td>
<td>44 32</td>
</tr>
<tr>
<td>13-15</td>
<td>male</td>
<td>60 9</td>
<td>27 8</td>
<td>33 1</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>71 33</td>
<td>37 25</td>
<td>34 8</td>
</tr>
<tr>
<td>16-18</td>
<td>male</td>
<td>89 20</td>
<td>60 18</td>
<td>29 2</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>127 63</td>
<td>76 57</td>
<td>53 14</td>
</tr>
<tr>
<td>19-29</td>
<td>male</td>
<td>147 28</td>
<td>65 25</td>
<td>38 2</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>146 61</td>
<td>33 23</td>
<td>98 2</td>
</tr>
<tr>
<td>30 and</td>
<td>male</td>
<td>96 20</td>
<td>43 16</td>
<td>52 4</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>74 27</td>
<td>30 18</td>
<td>44 9</td>
</tr>
</tbody>
</table>

Table 8. The prevalence of diabetes mellitus (DM), impaired glucose tolerance (IGT) and glucose tolerance abnormality (GTA) among subjects and the Malays.

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Sex</th>
<th>Overall subjects</th>
<th>Malays</th>
<th>Orang Asli</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-7</td>
<td>male</td>
<td>94 10</td>
<td>46 8</td>
<td>16 7</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>88 11</td>
<td>45 9</td>
<td>20 43</td>
</tr>
<tr>
<td>3-6</td>
<td>male</td>
<td>157 23</td>
<td>71 21</td>
<td>29 86</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>146 17</td>
<td>62 14</td>
<td>10 84</td>
</tr>
<tr>
<td>7-12</td>
<td>male</td>
<td>60 9</td>
<td>27 8</td>
<td>15 2</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>71 33</td>
<td>37 25</td>
<td>34 8</td>
</tr>
<tr>
<td>13-15</td>
<td>male</td>
<td>89 20</td>
<td>60 18</td>
<td>29 2</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>127 63</td>
<td>76 57</td>
<td>53 14</td>
</tr>
<tr>
<td>16-18</td>
<td>male</td>
<td>147 28</td>
<td>65 25</td>
<td>38 2</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>146 61</td>
<td>33 23</td>
<td>98 2</td>
</tr>
<tr>
<td>19-29</td>
<td>male</td>
<td>96 20</td>
<td>43 16</td>
<td>52 4</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>74 27</td>
<td>30 18</td>
<td>44 9</td>
</tr>
</tbody>
</table>

Discussion

Malnutrition is widespread in developing countries especially among young children. It reduces resistance to infectious diseases and inhibits growth and development. Malnutrition plays a key role in maternal and infant mortality. It was shown in this study that stunting was common among the rural population especially in the Orang Asli. The high prevalence of malnutrition in Orang Asli children compared to the Malays. Goitre was twice as common among Orang Asli women than among Orang Asli men and 3-10 times more common as Malays in both sexes (Table 7).

Figure 2. Median level of serum cholesterol among women by ethnic group.

NUTRITIONAL STATUS OF WOMEN AND CHILDREN IN MALAYSIAN RURAL POPULATIONS

Figure 1. Median level of serum albumin by ethnic group.
Asi children were associated with feeding (especially late introduction of solid food) and infection. However, protein energy malnutrition is not a problem in children, but also among women (PESM) as defined as BMI<18.5 kg/m². Malnutrition among mothers in rural areas, particularly the Orang Asli, is a common phenomenon. The prevalence of these two types are underestimated, anaemia due to malaria and nutritional deficiencies; and iodine deficiency disorders.

Children born to healthy mothers normally have higher birth weights and less malnourished mothers. There is strong epidemiological evidence of an association between maternal nutritional status, both during and prior to pregnancy (prepregnancy weight and weight gain during pregnancy), and birth weight and intrauterine growth retardation. Stunting, which was common among the Orang Asli children, may result from impaired growth in utero when the foetus is deprived of essential substances.

Mothers with high parity are often more affected by malnutrition; as too many pregnancies or pregnancies too close together deplete the mother's stores and result in low birth weight babies. Low birth weight babies have high morbidity and mortality rates especially in the first year of life. Malnourished mothers often fail to breast-feed their children successfully and hence there is a higher chance for the child to become malnourished due to early development of problems in the adult Orang Asli were high among the females in which their weight, height and body mass index were found to be low. This indirectly pictures unequal distribution of food in a family and among family size.

Children and mothers usually consumed less than others of the family's food.

Despite the protein energy malnutrition that affects the Orang Asli in all of the studied areas, overweight (BMIa25) is a problem among the Malay adult population particularly among the females. The prevalence of overweight is associated health outcomes, such as diabetes mellitus and cardiovascular diseases. It is caused by excess energy and decreased energy output. In this study, it was found that Malay women in rural areas had a higher risk of developing overweight among Orang Asli women and men. Data from NHANES (National Health and Nutrition Examination Study, USA) showed that the prevalence of overweight was more frequent among women. In general, there are more women who are overweight than men; and this increases with age.

Education and income have a significant association with the prevalence of overweight, with moderate education and income related to an increment. Aside from that, the factor that contributes most is the intake of an energy dense, high fat diet (especially of animal source) and lack of activity (especially among women in the field). Women's dietary intake, especially cholesterol among Malays are consistent with high fat diets and a high risk of developing coronary disease and other cardiovascular diseases.

Overweight is not a problem among the Orang Asli. However, the median cholesterol levels were higher in Malay women at all ages. The high median cholesterol levels in Malay women may relate in part to the high prevalence of diabetes and overweight among them.

In women, pregnancy outcome depends on nutritional status. Women need nutritious food from birth to maturity, adequate nutrition for educational opportunities and less sexual discrimination. Poor nutrition can prevent malnutrition and goitre. However, malnutrition can be reduced by supplementation of nutrients. Prevention of diseases such as non-insulin dependent diabetes mellitus (NIDDM) and impaired glucose tolerance (IGT) will require appropriate intake of food in the context of upgrading the status of women in rural areas.

Acknowledgements The authors wish to thank all the villagers in the study.

NUTRITIONAL STATUS OF WOMEN AND CHILDREN IN MALAYSIAN RURAL POPULATIONS
Osman Ali & Zaleha Md Isu

馬來西亞農村婦女及兒童的營養狀況
摘要

本文研究了馬來西亞農村居民，特別是婦女及兒童的營養狀況，作者從4個農村地區選擇了262位18歲以上的婦女和183位2-6歲的兒童對象，分階段進行了研究，結果發現，馬來西亞Felda村社的2-6歲兒童營養不良患病率為25.5%，Orang Asli村社為58%。營養不良與缺碘有關，人類無碘和早期營養有關。Orang Asli婦女患病和營養不良者超過30%，而Felda婦女卻少於15%。另一方面，內陸的馬來西亞農村易患肥溼症及糖尿病。雖然兒童沒有先天性病，但肥胖症癥為11.5%。農村婦女通常服用母乳喂養，但由於教育水平不足，往往使用母乳及增進早期營養，從長遠看，增加農村婦女的營養狀況最終將改善農村女性整個社會的營養和健康狀況。

Kajian ini dilakukan untuk melihat status pemanfaatan (gizi) populasi laur bandar di Malaysia terutama dalam kalangan wanita dan kanak-kanak. Sejumla 262 orang wanita yang berumur 18 tahun ke atas dan 183 orang kanak-kanak di antara 2-6 tahun digunakan mengenakan persampelan gugusan berbilang periode di 4 lokasi di kawasan laur bandar. Dicapai bahawa prevalensi malnutrisi di kalangan wanita yang berumur di antara 2-6 tahun menunjukkan litar di antara 25.5% di skim penenapan FELDA Orang Melayu sehingga 80% di penenapan Orang Asli. Malnutrisi adalah dikaitkan dengan infeksi cacing, penyusutan botol dan waktu cera ruang yang awal. Lebih daripada 30% wanita Orang Asli mengalami kekurangan zat makanan berbanding dengan kurang daripada 15% di kalangan wanita di penenapan Felda Orang Melayu. Sebaliknya, wanita Melayu & kawan skim pemanfaat mempunyai risiko lebih tinggi untuk mengalami obesiti dan diabetes. Sebanyak 11.5% kanak-kanak mengalami gula, walaupun bagaimanapun, tiada kecemasan dijumpa. Pemberian susu ibu masih lagi merupakan suatu kebiasaan di kalangan ibu-ibu di laur bandar tetapi kurangnya pendidikan kelezatan mempunyai pengaruh pentingnya untuk mengurangkan gangguan penyusutan dan meningkatkan kadar cera ruang yang awal. Untuk jangka masa panjang, peningkatan status wanita & anak laur bandar akan dapat memperbaiki status pemanfaat dan kesihatan kanak-kanak dan masyarakat secara keseluruhan.

References
Asli children were associated with feeding (especially later introduction of solid food and infection). However, protein energy malnutrition is only a problem in children, but also among women (PEN is defined as BMI<18.5 kg/m²). Malnutrition among mothers in rural areas, particularly the Orang Asli, is a common phenomenon. The high prevalence of protein energy malnutrition among women, reflects iodine deficiency and malnutrition. Among traditional communities, malnutrition among women is associated with cultural discrimination and paternal domination. The high prevalence of goitre is associated with the remoteness of an area—the more remote the area, the higher the prevalence of goitre, particularly in areas where the distance from health centres is large. There were also low levels of iodine intake among the villagers, exacerbated by low levels of iodine in drinking water in the area. The urban community generally had no sign of endemic goitre, although the level of iodine intake in drinking water was quite low. Besides lack of iodine in drinking water, food (such as eggs and chicken), remote communities were also threatened by goitrogens in their daily food such as tapioca and millet.

This study showed a higher prevalence of diabetes in women compared to men. Diabetes was common, especially among Malay women aged over 40, compared with women from other countries. Diabetes, however, was not common among Orang Asli women. The prevalence of diabetes in Malay women was most likely related to declining physical activity and increased energy density.

Kajian ini dilakukan untuk melihat status pemanfaatan (gizi) populasi laur bandar di Malaysia terutama dalam kalangan wanita dan kanak-kanak. Sejumlah 262 orang wanita yang berumur 18 tahun ke atas dan 183 orang kanak-kanak di antara 2-5 tahun digunakan untuk melihat pengetahuan dan kebiasaan (gaya hidup) di dalam populasi laur bandar Malaysia. Adapun hasil yang diperoleh, menunjukkan bahwa kalangan wanita dan kanak-kanak dalam populasi laur bandar memiliki pengetahuan dan kebiasaan yang baik dalam hal gizi. Lebih daripada 30% wanita Orang Asli mengalami kekurangan zat makanan berbaur dengan kurang daripada 15% di kalangan wanita di penempatan Felda Orang Melayu. Sebaliknya, wanita Melayu & kawasan skimp penanam mempunyai risiko yang lebih tinggi untuk mengalami obeesi dan diabetes. Sebabnya 15% kanak-kanak mengalami gizi buruk. Walau begitu, minuman dan jadian khas di populasi laur bandar ini masih utama. Untuk mengurangkan jumlah penggunaan minuman dan jadian, perlu adanya program edukasi dan sosialisasi yang diperlukan untuk melibatkan semua pihak yang berperanan dalam hal ini.

References

Abstracts from a conference on healthy eating, aspartame, and chronic non-communicable disease. Beijing, and Shanghai, 1994

Preventive nutrition and health: an Asia-Pacific perspective
Mark L. Wahlgvist, BM&MS, MD (Adelaide), MD (Upsala), FRACP, FAFST, FACC, FAPHPH
Department of Medicine, Monash University Monash Medical Centre, Melbourne, Australia

The economics and socio-demography of the Asia-Pacific region are changing rapidly. With these changes come changes in the food supply, food intake and related health advantages and problems. The nexus between obesity and disease malaria in the young is being replaced by a new nexus between nutrient excess, with associated food component deficiencies, and non-communicable disease in an ageing population. A food supply that is abundant, refined and fatty characterizes the present situation. The early expressions of adult obesity, with its attendant metabolic dysfunctions and health sequelae, are indicative of the transitional health problems. These include cardiovascular disease, diabetes, certain cancers, osteoporosis and immune deficiency. Urbanization and population pressures will be eased by innovations in food production and food technology, with attention to the full risk-benefit equation for individuals and the need for an environmentally sustainable food supply. Prevention will depend on how well the region manages each of these dimensions.

Correspondence address: Prof. Mark L. Wahlgvist, Department of Medicine, Monash University, Monash Medical Centre 246 Clayton Road Clayton, Melbourne, Victoria 3168, Australia
Tel: +61-3-550-5525 Fax: +61-3-550-5524

Nutrition transition in China: the growth of affluent diseases with the alleviation of undernutrition
Xiao-Shu Chen, MD and Ke-You Ge, MD
Institute of Nutrition and Food Hygiene, Chinese Academy of Preventive Medicine, Beijing, China

This paper has been published in its entirety on pages 287-293

Studies on the relationship between changes in dietary patterns and health status
Zhao Fajj, MD, Guo Junsheng, MD and Chen Hongchang, MD
Department of Public Health, Second Military Medical University, Shanghai, China

This paper has been published in its entirety on pages 294-297

Diabetes mellitus: classification, therapeutic aspects, interventions and complications
Edward S Horton, MD
Medical Director, Joslin Diabetes Center, Boston, MA, USA

Diabetes mellitus is a major cause of morbidity and mortality and is increasing in prevalence in many populations around the world. The most common forms of diabetes is non-insulin dependent (NIDDM or Type II) diabetes, comprising over 95% of cases. Gestational diabetes mellitus (GDM) and impaired glucose tolerance (IGT) may be forerunners of NIDDM and when they are diagnosed appropriate interventions should be taken to prevent or delay progression to NIDDM.

Although the pathogenesis of NIDDM is not fully understood, at least three factors are important: a genetic predisposition, the presence of insulin resistance, and a defect in pancreatic B-cell function. Conditions associated with the development of insulin resistance increase the risk of NIDDM greatly. Chief among these are obesity, advancing age and decreased physical activity. Moderate degrees of weight reduction and increased physical activity are associated with decreases in plasma insulin, improved insulin sensitivity and lower plasma glucose levels.

Appropriate diet, weight reduction and exercise programs are the first step in the prevention and treatment of NIDDM. If these are unsuccessful, oral hypoglycaemic agents or insulin therapy should be used to achieve blood glucose levels as close to normal as possible.

The Diabetes Control and Complications Trial has demonstrated conclusively that improved glycemic control in patients with insulin dependent diabetes (EEDM) is associated with a marked reduction in the development and progression of retinopathy, nephropathy and neuropathy as well as improved lipid profiles. It is logical to assume that these beneficial effects of improved glycemic control will also apply to patients with NIDDM. Since many patients with NIDDM are not diagnosed, it is important to increase awareness of this disease, identify high risk populations and previously undiagnosed cases and implement life style changes in diet and physical exercise that will reduce the risk of developing NIDDM or provide effective treatment.

Correspondence address: Prof. Edward S. Horton, MD, Joslin Diabetes Center 1 Joslin Place, Boston, MA 02215, USA
Tel: +1 (617) 732-2301 Fax: +1 (617) 732-2774