



# RESEARCH ON PUBLIC HEALTH OF LOMBOK ISLAND IN INDONESIA : Vital Statistics, Physical Fitness, Nutrition, Blood Groups and Habit of Sasak Tribe

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## RESEARCH ON PUBLIC HEALTH OF LOMBOK ISLAND IN INDONESIA:

### Vital Statistics, Physical Fitness, Nutrition, Blood Groups and Habit of Sasak Tribe

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Yoshiaki TODA and Hideki MORI. *Research on Public Health of Lombok Island in Indonesia: —Vital Statistics, Physical Fitness, Nutrition, Blood Groups and Habit of Sasak Tribe—* Kobe J. Med. Sci. 13, 139-155, September 1967—It is difficult to find out some exact data on public health of Indonesia.

The first Medical Mission opened the poli clinic at Lendang Nangka village in east Lombok during 12 days. Before the medical examination, questions concerning vital statistics, nutrition and some habits were made to the patients as well as the measurements of physical fitness and blood examination.

## INTRODUCTION

The Lombok Island, locating in the east of the Bali Island and in latitude about 8° South, covers an area of 4,800 square kilometers. The number of population is estimated at about 1.3 million, and more than 90% of them belongs to the Sasak Tribe who believes in Islamism. There are 11 medical doctors and 3 dentists including administrative officers and a military doctor, and 3 hospitals with the total of about 500 beds.

It is difficult to find out some exact data on public health of Indonesia. The first Medical Mission opened the free charge poli clinic at Lendang Nangka village in east Lombok during 12 days from August 26, 1964 and patients not only from the village but also from most regions of the island visited the clinic. Before the medical examination, questions concerning vital statistics, food intake and some habits were made to the patients as well as the measurements of physical fitness and blood examination. Results on clinical and epidemiological observations will be published in the other papers<sup>1)</sup> with the data of following two Missions as well as the papers<sup>2)</sup> on the regional distribution of active sweat glands in Sasak Tribe.

## RESULTS

## I. Vital statistics

It is almost impossible to obtain some exact data of vital statistics in Lombok as well as in other islands except some districts on account of the lack of reporting system of birth, death, marriage and so on.

## 1. Marriage

Having wives under four is allowed for husband by the Islam precepts but generally speaking monogamy is common. Mean and the standard deviation (s) of number of times of marriage are 1.94 and 1.37 among the husbands (570 cases) and 1.25 and 0.68 among the wives (557 cases).

Mean, standard deviation and minimum age of first marriage are 22.5, 4.1 and 12 for husbands and 18.7, 3.1 and 12 for wives respectively.

Number and per centage of age groups of first marriage of husbands and wives are shown in Table 1. As given in the Table 1 earlier marriage is seen among both sexes of Sasak tribe than Japanese.

Table 1. Number and per centage of age groups of first marriage of both sexes.

| age group | Husband      |       |                                 | Wife         |       |                                 |
|-----------|--------------|-------|---------------------------------|--------------|-------|---------------------------------|
|           | Sasak number | %     | Japanese % (1962) <sup>a)</sup> | Sasak number | %     | Japanese % (1962) <sup>a)</sup> |
| under 19  | 97           | 17.0  | 0.4                             | 327          | 58.7  | 4.8                             |
| 20~       | 244          | 42.8  | 22.8                            | 188          | 33.7  | 59.9                            |
| 25~       | 184          | 32.3  | 60.6                            | 35           | 6.3   | 28.9                            |
| 30~       | 33           | 5.8   | 14.0                            | 5            | 0.9   | 4.7                             |
| over 35   | 12           | 2.1   | 2.2                             | 2            | 0.4   | 1.7                             |
| total     | 570          | 100.0 | 100.0                           | 557          | 100.0 | 100.0                           |

## 2. Delivery

Times of delivery among married women is shown by age group in Table 2 and age of mother at the time of last delivery in Table 3.

Table 2. Number of times of delivery by age-group of married women

| age group | number of mother | $\bar{x}$ | max. | s    |
|-----------|------------------|-----------|------|------|
| 10~       | 1                | 3.0       |      |      |
| 20~       | 30               | 2.0       | 6    | 1.7  |
| 30~       | 30               | 5.7       | 11   | 3.6  |
| 40~       | 22               | 4.5       | 11   | 3.6  |
| 50~       | 8                | 8.0       | 12   | 3.2  |
| 60~       | 9                | 8.4       | 14   | 4.7  |
| total     | 100              | 4.90      | 14   | 3.74 |

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Table 3. Age of old mother at the time of last delivery

| age group<br>age | 40~49 | 50~59 | over 60 |
|------------------|-------|-------|---------|
| $\bar{x}$        | 36.0  | 40.3  | 42.8    |
| max.             | 44    | 45    | 35      |
| min.             | 20    | 37    | 48      |
| $n$              | 18    | 4     | 5       |

As given in these tables, Sasak woman has very high productivity and mean number of times of delivery among women aged over 50 years old is more than 8 and mean age of last delivery among those women is more than 40.

## 3. Death of Child

Relation between the number of child death and the age groups of mother is given in Table 4. As shown in the table only 41 mothers could bring up all of their children and others lost one to seven children among 131 mothers. (Mothers of old age groups (over 40 years old) have lost about 2 or more children at the time of this survey.)

Table 4. Age groups of mother and number of child death  
(131 mothers)

| age group<br>of mother<br>number of<br>child death | under 29                   | 30~39        | 40~49        | over 50      | total |
|----------------------------------------------------|----------------------------|--------------|--------------|--------------|-------|
| 0                                                  | 15                         | 12           | 9            | 5            | 41    |
| 1                                                  | 14                         | 10           | 7            | 2            | 33    |
| 2                                                  | 5                          | 10           | 4            | 3            | 22    |
| 3                                                  | 2                          | 10           | 3            | 4            | 19    |
| 4                                                  |                            |              | 4            | 3            | 7     |
| 5                                                  |                            | 1            | 2            | 2            | 5     |
| 6                                                  |                            | 1            |              | 1            | 2     |
| 7                                                  |                            | 1            | 1            |              | 2     |
| total                                              | 36                         | 45           | 30           | 20           | 131   |
| number of<br>death                                 | $\bar{x}$ 0.83<br>$s$ 0.87 | 1.74<br>1.51 | 1.90<br>1.88 | 2.40<br>1.85 |       |

Death-rates of newborn and infant are remarkable and each rate of those are as high as 30% as given in Table 5.

Table 5. Deaths of children by age (131 mothers)

| age group of death             | death<br>number | of<br>children<br>% |
|--------------------------------|-----------------|---------------------|
| under 1 month                  | 47              | 27.2                |
| under 1 year<br>(over 1 month) | 58              | 33.5                |
| 1 ~ 6 year                     | 48              | 27.7                |
| 7 ~12 "                        | 7               | 4.0                 |
| 13~19 "                        | 5               | 2.9                 |
| over 20 "                      | 8               | 4.6                 |
| total                          | 173             | 100.0               |

Causes of child death are shown in Table 6 by age groups of death. In most cases causes of death are symptomatic and it might be supposed that "fever" contains diseases such as malaria, pneumonia, tetanus, typhoid fever and some other infectious diseases accompanied with fever. Generally speaking in most cases causes of death are infectious diseases including so-called tropical infectious diseases.

Table 6. Causes of child death by age group of death

| age group<br>cause of death | under 1<br>month | under 1<br>year | 1~6 | 7~12 | 13~20 | over 20 | total |
|-----------------------------|------------------|-----------------|-----|------|-------|---------|-------|
| fever                       | 34               | 30              | 30  | 4    | 2     | 4       | 104   |
| diarrhea                    | 3                | 6               | 3   |      |       |         | 12    |
| pain of abdomen             |                  | 4               |     |      |       |         | 4     |
| cough                       |                  |                 | 2   |      |       | 1       | 3     |
| dyspnea                     | 4                |                 |     |      |       |         | 4     |
| disease of mouth            |                  | 2               |     |      |       |         | 2     |
| small pox                   | 3                | 1               | 2   |      |       |         | 6     |
| tetanus                     | 2                |                 |     |      |       |         | 2     |
| malaria                     | 1                |                 |     | 1    |       |         | 2     |
| dysentery                   |                  | 2               |     |      |       |         | 2     |
| pneumonia                   |                  | 4               | 1   | 1    |       |         | 6     |
| total                       | 47               | 49              | 38  | 6    | 2     | 5       | 147   |

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### 4. Occupation

Rates of the occupations are shown in Table 7. Although farmers take 44% by male and 35% by female as given in Table 7, it might be estimated that the rate of the farmers of the island is about twice of the percentage above shown and farmers had less opportunities to visit our policlinic than officials or teachers.

Total rate of occupation of male is 100.9% and it comes from those numbers of people who have two kinds of occupation, for example, farmers and teachers.

Table 7. Rate of the occupation by sex (%)

| Occupation                                | Male<br><i>n</i> =600 | Female<br><i>n</i> =212 |
|-------------------------------------------|-----------------------|-------------------------|
| farmers                                   | 44.2                  | 34.9                    |
| merchants                                 | 12.3                  | 9.4                     |
| officials                                 | 10.8                  | 0.9                     |
| policemen                                 | 0.8                   | 0.0                     |
| teachers                                  | 11.0                  | 5.7                     |
| needle workers                            | 1.5                   | 2.8                     |
| coachmen                                  | 0.3                   | 0.0                     |
| workers for daily wages                   | 1.7                   | 0.0                     |
| others                                    | 6.8                   | 2.4                     |
| not clear                                 | 5.3                   | 9.0                     |
| without occupation<br>(private household) | 6.2                   | 34.9                    |
| total                                     | 100.9                 | 100.0                   |

## II. Physical fitness

### 1. Body length, weight, girth of chest and body weight ratio

Body length, weight, girth of chest and body weight ratio of male are given in Table 8 and of female in Table 9 by age or age-group.

Mean number of body length of male and female adults (age group 21-50) are about 161 cm and 150 cm and are a little shorter than those of the same age groups of each sex in Japan. Means of body weight of male and female adults are about 52-53 kg and 45-46 kg and the difference of weight of adult of each sexes between Sasak tribe and Japanese<sup>4)</sup> is about 4 kg.

Means of girth of chest of male adults lie in 80 to 82 cm and of female adults in 79-81 cm. The difference of weight between Sasak tribe and Japanese is about 5 cm in male and about 2 cm in female. Means of body weight ratio of male adults lie in 0.30 to 0.33 and of female adults 0.30 to 0.31 and those values of Sasak Tribe are about 10% smaller than those of Japanese. Generally speaking, body construction of adults of Sasak Tribe is not only a little shorter but also pretty thinner than that of Japanese. Such a body construction as Sasak Tribe might come from the food intake of Indonesian style and might be profitable to

Table 8. Body length, weight, girth of chest and body weight ratio by age-group (male)

| age   | body length |              |       |       |          | body weight |              |      |      |          | girth of chest |              |       |      |          | body weight ratio |
|-------|-------------|--------------|-------|-------|----------|-------------|--------------|------|------|----------|----------------|--------------|-------|------|----------|-------------------|
|       | <i>f</i>    | $\bar{x}$ cm | max.  | min.  | <i>s</i> | <i>f</i>    | $\bar{x}$ kg | max. | min. | <i>s</i> | <i>f</i>       | $\bar{x}$ cm | max.  | min. | <i>s</i> |                   |
| 1     |             |              |       |       |          | 5           | 7.4          | 9.0  | 4.0  |          | 5              | 45.20        | 47.0  | 41.0 |          |                   |
| 2     |             |              |       |       |          | 2           | 7.5          | 8.0  | 7.0  |          | 1              | 46.00        |       |      |          |                   |
| 3     | 5           | 88.60        | 107.0 | 75.0  |          | 10          | 11.10        | 15.0 | 9.0  |          | 8              | 51.37        | 53.0  | 47.0 |          |                   |
| 4     | 9           | 97.66        | 116.0 | 86.0  |          | 10          | 13.60        | 18.0 | 8.0  |          | 8              | 50.75        | 55.0  | 46.0 |          |                   |
| 5     | 4           | 103.75       | 110.0 | 95.0  |          | 6           | 15.33        | 19.0 | 10.0 |          | 5              | 50.20        | 55.0  | 42.0 |          |                   |
| 6     | 3           | 100.33       | 105.0 | 92.0  |          | 4           | 15.50        | 18.0 | 13.0 |          | 4              | 54.00        | 57.0  | 49.0 |          |                   |
| 7     | 2           | 117.50       | 127.0 | 109.0 |          | 2           | 20.50        | 23.0 | 18.0 |          | 2              | 60.00        | 61.0  | 59.0 |          |                   |
| 8     | 1           | 132.00       |       |       |          | 1           | 25.00        |      |      |          | 1              | 60.00        |       |      |          |                   |
| 9     | 3           | 119.00       | 122.0 | 107.0 |          | 4           | 20.25        | 22.0 | 18.0 |          | 4              | 55.50        | 58.0  | 54.0 |          |                   |
| 10    | 2           | 137.50       | 155.0 | 120.0 |          | 1           | 22.00        |      |      |          | 1              | 55.00        |       |      |          |                   |
| 11    | 1           | 130.00       |       |       |          | 1           | 23.00        |      |      |          | 1              | 65.00        |       |      |          |                   |
| 12    | 7           | 138.14       | 148.0 | 126.0 |          | 6           | 31.16        | 38.0 | 25.0 |          | 6              | 63.66        | 72.0  | 57.0 |          |                   |
| 13    | 5           | 138.40       | 149.0 | 130.0 |          | 4           | 36.75        | 43.0 | 30.0 |          | 4              | 70.50        | 75.0  | 68.0 |          |                   |
| 14    | 3           | 150.00       | 155.0 | 143.0 |          | 3           | 38.33        | 43.0 | 36.0 |          | 3              | 72.33        | 74.0  | 70.0 |          |                   |
| 15    | 12          | 147.00       | 162.0 | 131.0 |          | 12          | 36.41        | 48.0 | 23.0 |          | 12             | 68.25        | 77.0  | 61.0 |          |                   |
| 16    | 5           | 152.20       | 160.0 | 140.0 |          | 5           | 45.60        | 51.0 | 36.0 |          | 4              | 75.00        | 81.0  | 66.0 |          |                   |
| 17    | 4           | 161.50       | 167.0 | 158.0 |          | 4           | 45.50        | 51.0 | 37.0 |          | 4              | 75.00        | 79.0  | 68.0 |          |                   |
| 18    | 15          | 154.73       | 178.0 | 148.0 |          | 17          | 46.82        | 52.0 | 28.0 |          | 18             | 78.33        | 89.0  | 64.0 |          |                   |
| 19    | 7           | 159.42       | 168.0 | 154.0 |          | 7           | 48.14        | 55.0 | 34.0 |          | 7              | 77.86        | 81.0  | 68.0 |          |                   |
| 20    | 39          | 158.66       | 178.0 | 147.0 | 6.66     | 38          | 46.94        | 60.0 | 37.0 | 4.62     | 38             | 77.45        | 88.0  | 69.0 | 4.88     | 0.295             |
| 21—30 | 263         | 161.29       | 180.0 | 142.0 | 6.38     | 262         | 51.58        | 80.0 | 35.0 | 7.10     | 258            | 79.87        | 102.0 | 68.0 | 4.46     | 0.319             |
| 31—40 | 200         | 161.80       | 186.0 | 145.0 | 5.86     | 203         | 53.24        | 80.0 | 40.0 | 7.22     | 197            | 81.31        | 99.0  | 72.0 | 4.86     | 0.329             |
| 41—50 | 118         | 159.62       | 176.0 | 142.0 | 6.43     | 118         | 52.69        | 79.0 | 37.0 | 8.50     | 113            | 81.82        | 99.0  | 67.0 | 5.94     | 0.330             |
| 51—   | 64          | 157.61       | 172.0 | 140.0 | 6.63     | 60          | 50.68        | 79.0 | 38.0 | 7.98     | 61             | 81.89        | 101.0 | 66.0 | 7.30     | 0.321             |

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Table 9. Body length, weight, girth of chest and body weight ratio by age-group (female)

| age   | body length |              |       |       |      | body weight |              |      |      |       | girth of chest |              |       |      |      | body weight ratio |
|-------|-------------|--------------|-------|-------|------|-------------|--------------|------|------|-------|----------------|--------------|-------|------|------|-------------------|
|       | f           | $\bar{x}$ cm | max.  | min.  | s    | f           | $\bar{x}$ kg | max. | min. | s     | f              | $\bar{x}$ cm | max.  | min. | s    |                   |
| 1     | 1           | 73.00        |       |       |      | 6           | 7.16         | 9.0  | 3.0  |       | 5              | 42.40        | 45.0  | 35.0 |      | 0.098             |
| 2     | 1           | 73.00        |       |       |      | 4           | 9.00         | 11.0 | 7.0  |       | 4              | 46.50        | 50.0  | 42.0 |      | 0.123             |
| 3     | 1           | 87.00        |       |       |      | 2           | 12.00        | 13.0 | 11.0 |       | 1              | 50.00        |       |      |      | 0.137             |
| 4     | 2           | 88.50        | 90.0  | 87.0  |      | 4           | 14.00        | 15.0 | 13.0 |       | 4              | 54.25        | 57.0  | 52.0 |      | 0.158             |
| 5     | 5           | 92.80        | 97.0  | 80.0  |      | 4           | 12.50        | 14.0 | 10.0 |       | 4              | 51.50        | 53.0  | 50.0 |      | 0.134             |
| 6     | 3           | 106.66       | 117.0 | 91.0  |      | 3           | 15.33        | 18.0 | 11.0 |       | 3              | 53.66        | 55.0  | 52.0 |      | 0.143             |
| 7     | 2           | 110.50       | 116.0 | 105.0 |      | 2           | 17.00        | 17.0 | 17.0 |       | 2              | 54.00        | 55.0  | 53.0 |      | 0.153             |
| 8     | 4           | 112.00       | 120.0 | 105.0 |      | 4           | 18.50        | 23.0 | 16.0 |       | 4              | 57.00        | 63.0  | 54.0 |      | 0.165             |
| 9     | 0           |              |       |       |      | 0           |              |      |      |       | 0              |              |       |      |      |                   |
| 10    | 1           | 132.00       |       |       |      | 1           | 34.00        |      |      |       | 1              | 67.00        |       |      |      | 0.257             |
| 11    | 0           |              |       |       |      | 0           |              |      |      |       | 0              |              |       |      |      |                   |
| 12    | 1           | 124.00       |       |       |      | 1           | 23.00        |      |      |       | 1              | 57.00        |       |      |      | 0.185             |
| 13    | 0           |              |       |       |      | 0           |              |      |      |       | 0              |              |       |      |      |                   |
| 14    | 4           | 147.75       | 158.0 | 142.0 |      | 4           | 41.75        | 48.0 | 35.0 |       | 3              | 73.00        | 77.0  | 66.0 |      | 0.282             |
| 15    | 5           | 146.80       | 148.0 | 144.0 |      | 4           | 40.25        | 45.0 | 37.0 |       | 4              | 72.00        | 75.0  | 70.0 |      | 0.274             |
| 16    | 2           | 150.00       | 151.0 | 149.0 |      | 2           | 48.50        | 54.0 | 44.0 |       | 2              | 80.50        | 85.0  | 76.0 |      | 0.323             |
| 17    | 1           | 153.00       |       |       |      | 2           | 55.00        | 66.0 | 45.0 |       | 2              | 88.00        | 100.0 | 76.0 |      | 0.359             |
| 18    | 6           | 144.50       | 151.0 | 140.0 |      | 5           | 46.00        | 52.0 | 29.0 |       | 5              | 77.40        | 85.0  | 63.0 |      | 0.318             |
| 19    | 2           | 151.50       | 156.0 | 147.0 |      | 1           | 45.00        |      |      |       | 1              | 81.00        |       |      |      | 0.297             |
| 20    | 13          | 149.07       | 155.0 | 142.0 |      | 13          | 44.69        | 54.0 | 36.0 |       | 13             | 80.38        | 87.0  | 73.0 |      | 0.299             |
| 21—30 | 62          | 150.72       | 172.0 | 138.0 | 6.56 | 66          | 46.66        | 76.0 | 33.0 | 7.54  | 65             | 81.37        | 97.0  | 70.0 | 6.04 | 0.309             |
| 31—40 | 58          | 148.87       | 164.0 | 132.0 | 6.00 | 65          | 46.06        | 87.0 | 35.0 | 7.78  | 63             | 79.67        | 107.0 | 67.0 | 7.04 | 0.309             |
| 41—50 | 36          | 149.80       | 175.0 | 139.0 | 7.56 | 42          | 45.07        | 76.0 | 30.0 | 10.00 | 46             | 79.28        | 98.0  | 70.0 | 7.24 | 0.300             |
| 51—   | 26          | 143.26       | 154.0 | 130.0 | 5.60 | 24          | 40.04        | 57.0 | 28.0 | 7.00  | 25             | 76.36        | 90.0  | 65.0 | 6.92 | 0.279             |

acclimatize themselves to heat as be analogized with the experimental results by Hirooka<sup>5)</sup>.

The children of Sasak Tribe is a little smaller than Japanese children but the difference is not so remarkable as among adults.

## 2. Ages of menarche and menopause

Mean ages and standard deviations of menarche and menopause are given in Table 10 with the minimum and maximum ages. As seen in Table 10, mean age of menarche is 14.1 and of menopause is 43.3.

Table 10. Ages of menarche and menopause

|                                 |      |
|---------------------------------|------|
| Menarche                        |      |
| Total number of survey          | 225  |
| Total number of answer          | 195  |
| Mean age of menarche            | 14.1 |
| Standard deviation(s)           | 1.77 |
| Minimum age                     | 9    |
| Maximum age                     | 20   |
| Menopause                       |      |
| Total number of survey          | 172  |
| Total number of answer          | 136  |
| Number of women after menopause | 52   |
| Mean age of menopause           | 43.3 |
| Standard deviation              | 8.35 |
| Minimum age                     | 22   |
| Maximum age                     | 60   |

It is well known that the ages of menarche and menopause depend on physiological, social or economical conditions, such as body length, nutrition, grade of education or labour, generation, climate and region etc. Sometimes women in tropical region are misunderstood as most of them are premature growth and premature decay, but at least concerning Sasak women at present time they are neither premature growth nor premature decay.

## III. Blood groups

Blood groups of ABO-type and Rh type were studied and the results are shown in Table 11.

As given in the Table, biochemical race index of the people is 0.52 although the distribution of ABO type blood group is different between the inhabitants of the two villages; Lendang Nangka and Senkol. The biochemical race index<sup>6)</sup> 0.52 belongs to Asia-African type and almost as great as that of Indians 0.56. The index is estimated to have some anthropological meaning and that of Japanese is reported as 1.53 and of Europeans lies in the range from 2.5 to 4.5, for example, of French 3.2 and of German 2.8.

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Table 11. Distribution of blood groups

| Village        |        | A B | A    | B    | O    | Total |
|----------------|--------|-----|------|------|------|-------|
| Lendang Nangka | number | 16  | 39   | 78   | 100  | 233   |
|                | %      | 6.9 | 16.7 | 33.5 | 42.9 | 100.0 |
| Senkol         | number | 0   | 8    | 3    | 13   | 24    |
|                | %      | 0.0 | 33.3 | 12.5 | 54.2 | 100.0 |
| Total          | number | 16  | 47   | 81   | 113  | 257   |
|                | %      | 6.2 | 18.3 | 31.5 | 44.0 | 100.0 |

Remarks : biochemical race index = 0.52

Rh(−) 2 among 960 (0.21%)  
and 1 among 3 Arabs (mother and brothers)

Only two persons out of 960 Sasaks have Rh (−) blood group and the rate of Rh (−) is 0.2% and Rh (+) is 99.8%. The rate of Rh (+) is almost same as that of Japanese and remarkably greater than that of white people.

## IV. Nutrition

The kind and the amount of every food stuff taken by family in the day before visiting polyclinic were recorded with ages and sexes of each family. The results are shown in Table 12.

### 1. Kind and amount of the foodstuffs

As given in Table 12, rice is the staple food of the tribe and taken by 765 families (99.4%) out of 769. Maize is taken by about 20 per cent of all the family with rice as cereals. Wheat or its products is rarely used.

Sweet potatoes is prevalent (20.1%), but other kind of potatoes is not common. Sugar is not common and taken by only 29% of all the family, although it will be easily produced in the island. Fats or oils are rarely used. Soya bean and the other kinds of beans, for example, pea, long bean, black bean and so on are one of main sources of lipid. Peanut is prized highly as a rich diet. Fishes are often taken (20%), but its amount of consumption is not so large. Eggs are not common and milk is rare.

As meat and poultry, beef is very common, but its amount (81 g) is obviously exaggerated and it might be estimated as much as 1/4 or 1/5 of the reported value. Sometimes chicken is taken. Pork and alcohol are prohibited by the Islamic commandments. Sea-weeds, dried vegetables and pickles could not be found. The kinds of green vegetables or other kinds of vegetables and fruits taken are not many, but banana might be taken more often. Generally speaking most foodstuffs taken are vegetable and the kind of the foodstuffs is limited.

Table 12. Kind and amount of foodstuffs and nutritive value of food intake per mean adult male per day (calculated by FAO method)

total number of survey..... 834 families

number of answers about the kind of foodstuffs... 769 //

number of answers about the amount of food... 533 //

| Foodstuff                      | Number and rate of families |       | Amount and nutritive value of food intake (mean adult male) |      |             |           |
|--------------------------------|-----------------------------|-------|-------------------------------------------------------------|------|-------------|-----------|
|                                | Number                      | %     | Amount gm.                                                  | Cal. | Protein gm. | Lipid gm. |
| Cereals                        | 922                         | 119.9 | 533.1                                                       | 1743 | 36.2        | 4.8       |
| rice                           | 765                         | 99.4  | (511.1)                                                     |      |             |           |
| wheat and products             | 1                           | 0.1   | ( 0.0)                                                      |      |             |           |
| maize                          | 156                         | 20.2  | ( 22.0)                                                     |      |             |           |
| Potatoes                       | 165                         | 21.5  | 29.4                                                        | 27   | 0.5         | 0.1       |
| sweet potato                   | 155                         | 20.1  | ( 24.7)                                                     |      |             |           |
| potato                         | 9                           | 1.2   | ( 3.1)                                                      |      |             |           |
| tapioca                        | 1                           | 0.1   | ( 1.6)                                                      |      |             |           |
| Sugars, sweets,                | 223                         | 29.0  | 15.0                                                        | 58   | 0.0         | 0.0       |
| cane sugar                     | 221                         | 28.7  |                                                             |      |             |           |
| candy                          | 2                           | 0.3   |                                                             |      |             |           |
| Fats, oils                     | 1                           | 0.1   | 0.0                                                         | 0    | 0.0         | 0.0       |
| coconut oil                    | 1                           | 0.1   |                                                             |      |             |           |
| Beans & products               | 201                         | 26.0  | 22.3                                                        | 35   | 2.6         | 1.3       |
| soya bean                      | 30                          | 3.9   | 8.6                                                         |      |             |           |
| bean-curd                      | 1                           | 0.1   | 0.0                                                         |      |             |           |
| cake made of beans (fermented) | 1                           | 0.1   | 0.0                                                         |      |             |           |
| other beans                    | 169                         | 21.9  | 13.7                                                        |      |             |           |
| Fishes & shells                | 155                         | 20.2  | 12.6                                                        | 18   | 2.9         | 0.6       |
| raw fish                       | 65                          | 8.5   | ( 7.8)                                                      |      |             |           |
| dried fish                     | 15                          | 2.0   | ( 4.8)                                                      |      |             |           |
| salted fish                    | 75                          | 9.8   |                                                             |      |             |           |
| Eggs                           | 52                          | 6.8   | 1.8                                                         | 3    | 0.3         | 0.2       |
| Milks                          | 3                           | 0.4   | 0.0                                                         | 0    | 0.0         | 0.0       |
| Meat & poultry                 | 604                         | 78.4  | 97.8                                                        | 167  | 20.6        | 8.9       |
| beef                           | 542                         | 70.5  | ( 81.0)                                                     |      |             |           |
| meat of deer                   | 1                           | 0.1   |                                                             |      |             |           |
| chicken                        | 60                          | 7.8   | ( 16.8)                                                     |      |             |           |
| frog                           | 1                           | 0.1   |                                                             |      |             |           |
| Green vegetables               | 698                         | 90.8  | 91.6                                                        | 30   | 1.8         | 0.3       |
| spinach                        | 200                         | 26.0  |                                                             |      |             |           |
| stone-leek                     | 6                           | 0.8   |                                                             |      |             |           |
| others (sajur)                 | 492                         | 64.0  |                                                             |      |             |           |

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| Foodstuff                               | Number | %    | Amount<br>gm. | Cal. | Protein<br>gm. | Lipid<br>gm. |
|-----------------------------------------|--------|------|---------------|------|----------------|--------------|
| Other kinds of<br>vegetables and fruits | 407    | 43.0 | 50.3          | 14   | 0.8            | 0.1          |
| cabbage                                 | 175    | 22.8 |               |      |                |              |
| pepper                                  | 72     | 9.4  |               |      |                |              |
| tomato                                  | 48     | 6.2  |               |      |                |              |
| banana                                  | 57     | 7.4  |               |      |                |              |
| egg apple                               | 21     | 2.7  |               |      |                |              |
| nangka (fruits)                         | 11     | 1.4  |               |      |                |              |
| cucumber                                | 5      | 0.7  |               |      |                |              |
| others                                  | 17     | 2.1  |               |      |                |              |
| Seasoning                               | 66     | 8.5  |               | 0    | 0.0            | 0.0          |
| sambel                                  | 58     | 7.5  |               |      |                |              |
| salt                                    | 8      | 1.0  |               |      |                |              |
| Table-luxuries                          | 297    | 45.0 |               | 0    | 0.0            | 0.0          |
| coffee                                  | 248    | 38.6 |               |      |                |              |
| tea                                     | 49     | 6.4  |               |      |                |              |
| Seaweed                                 | 0      | 0.0  | 0.0           | 0    | 0.0            | 0.0          |
| Dried vegetables                        | 0      | 0.0  | 0.0           | 0    | 0.0            | 0.0          |
| Pickles                                 | 0      | 0.0  | 0.0           | 0    | 0.0            | 0.0          |
| Total                                   |        |      |               | 2095 | 65.7           | 16.3         |

## 2. Nutritive value of food

Nutritive value of food per male adult a day calibrated from the data of 533 families is given in Table 12. Total food energy is 2095 kcal, total protein 65.7 gm and total lipid 16.3 gm, but the amount of beef consumed is exaggerated and when it is estimated as 21 gm, nutritive value will be corrected as below :

|                                               |           |
|-----------------------------------------------|-----------|
| total energy                                  | 2014 kcal |
| total protein                                 | 53.5 gm   |
| animal protein/total protein $\times 100$     | 21.7%     |
| total lipid                                   | 12.8 gm   |
| lipid energy/total energy $\times 100$        | 5.7%      |
| carbohydrate energy/total energy $\times 100$ | 83.7%     |
| energy of rice/total energy $\times 100$      | 87.0%     |

The data show clearly that the food energy is a little too low and the quality of food is very poor in the amounts of protein and lipid. The main cause of the defects of the food quality is due to overeating of rice and lack of animal food. In fact many kinds of symptoms of vitamins deficiency were seen among the patients as reported in the other paper<sup>29</sup>.

## V. Habits and some hygienical problems

Some habits expected to have a important influence upon hygienical situation were studied. Data were obtained by personal interview.

## 1. Number of times of meal

Number of times of meal is given in Table 13. As shown in the table, about three fourths of the population take meals three times a day, and most of others twice.

Table 13. Number of times of meal

| number of times |        | once<br>a day | twice | three<br>times |
|-----------------|--------|---------------|-------|----------------|
| name of village |        |               |       |                |
| Selong          |        | 0             | 3     | 39             |
| Lendang Nangka  |        | 2             | 68    | 148            |
| Kumbung         |        | 0             | 2     | 11             |
| Pantjor         |        | 0             | 3     | 19             |
| Mas Bagik       |        | 0             | 32    | 106            |
| Kota Radja      |        | 0             | 10    | 21             |
| others          |        | 2             | 32    | 110            |
| unknown         |        | 0             | 16    | 48             |
| Total           | number | 4             | 166   | 502            |
|                 | rate % | 0.6           | 24.7  | 74.7           |

## 2. Source of water supply and the mandi

Supply of sufficient amount of water of good quality is one of the most important conditions for good health. Mandi (watering bath) is a popular custom through the country. It might be useful not only for cleaning the skin polluted by sweat and dust but also for the promotion of the rate of metabolism and increasing of appetite by evaporative and conductive heat loss from the skin surface of all the body.

Table 14. Source of water supply

| water source     | number, rate |        |
|------------------|--------------|--------|
|                  | number       | rate % |
| river or stream  | 228          | 24.5   |
| pond             | 1            | 0.1    |
| well*            | 622          | 67.0   |
| rain water       | 2            | 0.2    |
| spring           | 38           | 4.1    |
| no answer        | 38           | 4.1    |
| total            | 929          | 100.0  |
| * exclusive well | 64.8%        |        |
| public well      | 35.2%        |        |

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Source of water supply is given in Table 14, and number of times of mandi in Table 15 as well as the places of mandi. As shown in those tables it is observed that they got water from river or stream, spring, well and so on and these water sources are very often used as the places of mandi at the same time. Moreover they use sometimes the same places for defecation as indicated in Table 16.

Supplied water might be one of the main sources of infectious diseases of intestinal tract. Modern system of water supply was not found in the Island.

Table 15. Mandi (watering bath)

## (a) number of times of mandi

|                  | every day* | at times | without<br>mandi | no answer | total |
|------------------|------------|----------|------------------|-----------|-------|
| number of person | 399        | 9        | 1                | 402       | 811   |
| rate %           | 49.2       | 1.1      | 0.1              | 49.6      | 100.0 |
| * twice a day    | 71.5%      |          |                  |           |       |
| three times      | 22.0%      |          |                  |           |       |

## (b) place of mandi

|                  | number of<br>person | rate % |
|------------------|---------------------|--------|
| river or stream  | 149                 | 38.4   |
| bath room        | 47                  | 12.1   |
| well             | 85                  | 21.9   |
| spring           | 37                  | 9.5    |
| sea              | 1                   | 0.3    |
| lake             | 19                  | 4.9    |
| pond             | 46                  | 11.9   |
| the other places | 4                   | 1.0    |
| total            | 388                 | 100.0  |

## 3. Place of defecation

Places of defecation are shown in Table 16. As indicated in the Table, only about a half of the people uses water closet without cesspool or septic tank. Rivers or streams are one of the most popular places of defecation. After defecation people don't use paper but wash the local with water and a left hand. Improvement of privy system or of the treatment of night soil is one of the most important problems to control the communicable diseases in the Island.

Table 16. Place of defecation

| place                                   | number and rate |        |
|-----------------------------------------|-----------------|--------|
|                                         | number          | rate % |
| water closet<br>(permeation into earth) | 427             | 52.6   |
| river or stream                         | 348             | 42.9   |
| sea                                     | 1               | 0.1    |
| pond                                    | 2               | 0.3    |
| garden                                  | 2               | 0.3    |
| others                                  | 3               | 0.3    |
| no answer                               | 29              | 3.5    |
| total                                   | 812             | 100.0  |

## 4. Habits of washing face and hands and of cleaning teeth and clothing.

These data are given in Table 17. In every item number of those who did not answer the question is not small, most of them might take such kinds of customs as a most familiar habits in daily life and might wonder why the questions were made. As be indicated in the tables most people like the cleaning of their bodies, hands, teeth or clothings. The habit of cleaning teeth with peace of brick or tobacco may look strange for those who do not know much about the habits of the people in Lombok and Bali.

Table 17

## (a) washing face

| number of times    | every day*       |        | at times | without<br>washing | no answer | total |
|--------------------|------------------|--------|----------|--------------------|-----------|-------|
|                    | number of person | rate % |          |                    |           |       |
| number of person   | 663              | 81.7   | 19       | 5                  | 125       | 812   |
| rate %             |                  |        | 2.3      | 0.6                | 15.4      | 100.0 |
| * five times a day | 87.7%            |        |          |                    |           |       |

## (b) cleaning of the teeth

| number of times  | every day        |        | at times | without<br>cleaning | no answer | total |
|------------------|------------------|--------|----------|---------------------|-----------|-------|
|                  | number of person | rate % |          |                     |           |       |
| number of person | 315              | 38.8   | 29       | 119                 | 349       | 812   |
| rate %           |                  |        | 3.6      | 14.6                | 43.0      | 100.0 |

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| Method of cleaning |     |       |
|--------------------|-----|-------|
| tooth powder       | 220 | 32.8% |
| tooth brush        | 338 | 50.4  |
| peace of brick     | 62  | 9.2   |
| tobacco            | 34  | 5.1   |
| root of plants     | 6   | 0.9   |
| finger             | 8   | 1.2   |
| fine sand          | 1   | 0.1   |
| soap               | 2   | 0.3   |
| total              | 671 | 100.0 |

## (c) washing hands

| number of times  | every day | at times | without washing | no answer | total |
|------------------|-----------|----------|-----------------|-----------|-------|
|                  |           |          |                 |           |       |
| number of person | 373       | 20       | 190             | 229       | 812   |
| rate %           | 46.0      | 2.5      | 23.4            | 28.2      | 100.0 |

## (d) cleaning of clothing

| number of times  | every day | at times | without cleaning | no answer | total |
|------------------|-----------|----------|------------------|-----------|-------|
|                  |           |          |                  |           |       |
| number of person | 71        | 456      | 12               | 273       | 812   |
| rate %           | 8.7       | 56.2     | 1.5              | 33.6      | 100.0 |

## 5. Number of times of worship

Most of the people in the Island are the enthusiasts of Islamism. They get up before dawn and worship the god. Number of times of worship is shown in Table 18. Some people who did not worship belong to the descendants of Chinese or Christian.

Table 18. Number of times of worship

|                  | every day* | at times | without worship | no answer | total |
|------------------|------------|----------|-----------------|-----------|-------|
|                  |            |          |                 |           |       |
| number of person | 665        | 1        | 35              | 111       | 812   |
| rate %           | 81.9       | 0.1      | 4.3             | 13.7      | 100.0 |

\* five times a day 98.4%

## 6. Circumcision

Circumcision is a habit of the people, originated in religious ceremony and mean age by sex is indicated in Table 19. The operation for boys by Dukun is one of the main causes of tetanus, but that for girls is only a formal ceremony.

Table 19. Age of circumcision by sex

|                    | male | female |
|--------------------|------|--------|
| number of person   | 528  | 75     |
| mean age           | 6.2  | 2.8    |
| standard deviation | 2.22 | 2.76   |

## SUMMARY

The first Medical Mission to Indonesia in 1964 opened the polyclinic in Lombok Island and researches on vital statistics, physical fitness, blood groups, nutrition and habits of the inhabitants were performed. Results obtained are as follows:

(1) Very high productivity and high death rate of newborn and infant caused mainly by infectious diseases were found.

(2) Body construction of adults of Sasak Tribe is a little shorter and pretty thinner than that of Japanese.

(3) Biochemical race index of Sasak Tribe is 0.52 and the rate of the number of Rh(+) is 99.8%.

(4) Most kinds of foodstuffs are vegetable and the food quality showed very high rate of carbohydrate, low rate of protein and extremely low rate of lipid. The rate of energy taken from rice is estimated as high as 87% for total energy of food.

(5) Water sources are sometimes used as the place of mandi (watering bath) and defecation.

(6) Most of the people are the farmers and enthusiasts of Islamism. Circumcision for a boy operated by an unqualified medical doctor called "Dukun" is sometimes considered as one of the greatest causes of tetanus.

It might be expected that Lombok will be one of the most healthy and prosperous island in the world in the near future by promoting most adequate policy of public health and welfare such as the systematic organization of controlling the communicable diseases, health education, improvement of nutrition, family planning, completion of social security and of the organization of medical treatment and so on.

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