# CHAPTER VI

# RESULTS

## IRON DEFICIENCY ANEMIA

Out of the 640 selected subjects, 629 (98.3%) permit blood extraction. Among those who permit blood extraction, 30 of them have hematocrit lower than 36% and serum ferritin lower than 15 ng/ml. The prevalence of iron deficiency anemia among the study population is 4.8 %.

Out of 629 subjects, 145 cases have hematocrit lower than 36%. They were identified as anemia cases. The prevalence of anemia among the study population is 23.1%.

## IRON STATUS

Using serum ferritin as the indicator to identify iron status of the subjects, we found that 69 out of 629 subjects had iron deficiency (serum ferritin lower than 15 ng/ml). Among these only 30 cases (43.5%) were anemic.

The people who have serum ferritin higher than 160 ng/ml are identified as having increased iron stored. If serum ferritin is higher than 250 ng/ml, they were identified as having iron overload. There are 64 cases having

increased iron stored, 11 of them have iron overload. The prevalence of iron overload is 1.7%. The prevalence of increased iron stored is 10.2%.

Out of 64 subjects who have increased iron stored, 12 (18.8%) have hematocrit lower than 36%

There are 66 subjects having serum ferritin between 15 and 25 ng/ml. Those subjects were identified as decreased iron stored, only 19 of them have hematocrit lower than 36%. When number of iron deficient cases and decreased iron stored cases were combined, it shows that 135 cases or 21.5% of all subjects have inadequate iron intake.

Among 430 subjects who have serum ferritin within normal range, 84 of them (19.5%) had anemia.

The results of hematocrit and serum ferritin were shown on table 3.

## MEAN HEMATOCRIT

The mean hematocrit among the subjects in this study is 38.97 ± 4.03%

## MEAN SERUM FERRITIN

The mean serum ferritin among the subjects in this study is 69.75 ± 63.98 ng/ml.

FACTORS ASSOCIATED WITH IRON DEFICIENCY ANEMIA

1. Age Distribution,

Among the 629 subjects, 20.3% age between 15 and 24 years, 38.5% age between 25 and 35 years and 41.2% age between 35 and 45 years. The prevalence of iron deficiency anemia among the three groups are 5.47%, 4.96% and 4.25% .The average age of all subjects is 32.03 + 8.36 years. The mean age of the group who had iron deficiency anemia is 31.27 ± 9.97 years , while the mean age of the group who did not have iron deficiency anemia is 32.08 ± 8.28 years . When we compaire the mean age of the two group using unpaired T-test , the difference has no statistical significance. ( t = 0.437498 , P-value >0.05 )

2. Number of Offspring

There are 14.1% of all subjects who do not have any child. Some of them are single, some are infertile. 34.8% of the subjects have two children, 18.9% have one child, 23% have 3 children, only 9.1% have four children or more. The highest number of offspring among these group of population is 7. The frequency of age distribution, marital status and number of offspring have been shown on table IV.

The prevalence of iron deficiency anemia among the subjects who have no child, one child, two children, three children and four children or more are 7.87%, 2.52%, 3.65%, 6.21% and 5.26%. The difference of prevalence of

iron deficiency anemia among the five groups has no statistical significance. The chi-square is 4.49 and P-valve is 0.3433.

3. Menstrual History

The regularity of menstrual cycle has no effect on the prevalence of iron deficiency anemia. The prevalence of iron deficiency anemia among the group of subjects who have regular menstruation cycle and irregular menstruation cycle are 4.89% and 4.08%. There is no statistical significant when compare the two groups. P-valve calculated by using Fisher-exact test is 0.4862.

The average duration of menstruation among all subjects is 3.41 ± 1.22 days per cycle . Among those who have iron deficiency anemia , the average duration of menstruation is slightly higher than those who do not have (3.80 ± 1.54 compare to 3.39 ± 1.20 ) . However the difference has no statistical significant ( t =0.46043 , P-value >0.05 )

4. Dietary type

Since there is no vegetarian among the subjects, therefore this variable was excluded. Out of 112 cases of clay-eater, 7.14% have iron deficiency anemia. Among the non clay-eater only 4.26% have iron deficiency.

When compared the two groups using chi-square test, the chi-square is 1.69, P-value is 0.1936. Although the difference of the prevalence of iron deficiency anemia between the two groups exists, there is no statistical significant.

5. Analgesic Used

The subjects were identified as three groups, not used, occasionally used and regularly used. The definition of these term was mentioned at the assumption. The frequency of analgesic used was shown on table 10.

Out of 243 subjects who do not use aspirin or any other kinds of NSAID, only 6 (2.47%) have iron deficiency anemia. Among those who occasionally use them 5.32% have iron deficiency anemia. In the group which regulary used analgesic the prevalence of iron deficiency anemia is 17.24%. The chi-square is 13.00 and P-value is 0.0015. There is statistical significant.

6. History of GI blood loss

Concerning the history of gastro intestinal hemorrhage , out of 88 subjects who had history of gastro-intestinal hemorrhage at least once in their life, 7(7.95%) have iron deficiency anemia. Among 541 subjects who did not have history of gastro-intestinal hemorrhage, 23(4.25%) have iron deficiency anemia. The chi-square is 2.29 and P-value is 0.1306. The P-value calculated by Fisher-exact test is 0.1109.

In the group of subjects who have history of hemorrhoid, 4 out of 106 have iron deficiency anemia. The prevalence is 3.77%. On the other hands, among the group who have no history of hemorrhoid, the prevalence is 4.97%. The Chi-square is 0.28 and P-value is 0.5978.

7. Birth Control.

Among 629 subjects, 137(21.8%) of them do not use any method of birth control, 264 (42.0%) use oral contraceptive pills, 68 (10.8%) use injected contraceptive hormone and 95(15.1%) use intrauterine contraceptive devices. (IUD's).

The prevalence of iron deficiency anemia among those five groups of subjects are 5.1% in non birth control group, 5.3% in sterilization group, 6.3% in IUD's group, 4.6% in oral contraceptive pills group and 0.0% in injected contraceptive hormone group. When compare the five group together using chi-square test. The chi-square is 4.11 and P-value is 0.3914.

If we consider the subjects who use injected contraceptive hormone as one groups and others subjects as another groups, using Fisher-exact test to compare the difference of the prevalence of iron deficiency anemia, the P-value is 0.02963. There is statistical significant.

8. Migration

136 subjects had history of migration to big city or other province for three months per year or more during the last three years. Among those subjects, 6 of them or 4.41% have iron deficiency anemia. The prevalence of iron deficiency anemia among the 493 subjects who do not migrate is 4.68%. There is no statistical significant of the difference between the two groups. The Chi-square is 0.05, P-value is 0.8250.

9. Stool Exam

The sucess rate of stool collection is 76.5%, only 481 cases of subjects gave their stool to be examined.

Only 10 subjects have hook worm infestation, One of them have iron deficiency anemia. The prevalence is 0.1%. The prevalence among the subjects who do not have parasitic infestation and who have parasite other than hook worm is 5.43% and 1.94% respectively.

There is no statistcal significant of the difference of prevalence of iron deficiency anemia between the three groups. The Chi-square is 2.77 and P-value is 0.2507.

We also performed stool occult blood test using Guaiac test. 43 out of 481 cases or 8.94% have stool occult blood positive. Among these subjects, 4 have iron deficiency anemia. The prevalence is 9.3%. There are 438 subjects who do not have occult blood in stool, 4.34% of them have iron deficiency anemia. The difference of prevalence of iron deficiency anemia among those who have stool occult blood positive and negative has no statistical significant. The P-value calculated by Fisher-exact test is 0.13984.

SUMMARY

1. The prevalence of anemia among the study population is 23.1%

2. The prevalence of iron deficiency anemia among the study population is 4.8%

3. The prevalence of iron overload among the study population is 1.7%

4. The mean hematocrit of the study population is 38.97±4.03%

5. The mean serum ferritin of the study population is 69.75±63.98 ng/ml.

6. The factors which show association with iron deficiency anemia and reach statistical in this study are :

a. History of analgesic used : The prevalence of iron deficiency anemia varied by the frequency of analgesic used. The group which used regularly have highest prevalence of iron deficiency.

b. Method of birth control : The prevalence of iron deficiency anemia lowest in the group of injected contraceptive hormone, while in the other groups the prevalence of iron deficiency anemia are not much difference.

TableIII : RESULTS OF HEMATOCRIT AND SERUM FERRITIN

| FERRITIN (ng/ml) HCT (%) | < 15 IRON DEFICIENT | 15-25 ↓ IRON STORED | 25.1 - 159.9 NORMAL RANGE | 160-250 ↑ IRON STORED | > 250 IRON OVERLOAD | TOTAL |
|---|---|---|---|---|---|---|
| < 36 (ANEMIA) | 30 | 19 | 84 | 10 | 2 | 145 |
| > 36 (NON-ANEMIA) | 39 | 47 | 346 | 43 | 9 | 484 |
| TOTAL | 69 | 66 | 430 | 53 | 11 | 629 |

TableIV: DEMOGRAPHIC CHARACTERISTICS.

| DESCRIPTION | SUBJECTS N = 629 | REFUSED TO BE SUBJECT N = 11 |
|---|---|---|
| 1.MEAN AGE | 32.03 ± 8.36 | 28.82 ± 5.52 |
| 2. MARITAL STATUS (%) | | |
| SINGLE | 11.8 | 18.2 |
| MARRIED | 84.7 | 63.6 |
| WIDOW | 3.5 | 18.2 |
| 3. NUMBER OF OFFSPRING (%) | | |
| 0 | 14.1 | 27.3 |
| 1 | 18.9 | 36.4 |
| 2 | 34.8 | 0 |
| 3 | 23.1 | 18.2 |
| >4 | 9.1 | 18.2 |

TableV: AGE OF OFFSPRINGS

| AGE | SUBJECTS | | REFUSED TO BE SUBJECTS | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| < 2 YEARS | 108 | 20% | 0 | 0 |
| > 2 YEARS | 432 | 80% | 8 | 100% |
| TOTAL | 540 | 100% | 8 | 100% |

Table VI :MENSTRUATION HISTORY

| DESCRIPTION | SUBJECTS | | REFUSED TO BE SUBJECTS. | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| 1. REGULARITY | | | | |
| REGULAR | 531 | 84.4% | 8 | 72.7% |
| IRREGULAR | 98 | 15.6% | 3 | 27.3% |
| 2. DURATION | | | | |
| < 5 DAYS | 537 | 85.4% | 10 | 90.9% |
| > 5 DAYS. | 92 | 14.6% | 1 | 9.1% |
| 3. SANITARY PAD USED | | | | |
| < 10 PAD | 471 | 74.9% | 10 | 90.9% |
| ≥ 10 PAD | 158 | 25.1% | 1 | 9.1% |

Table VII : TYPE OF DIET

| TYPE OF DIET | SUBJECTS | | REFUSE TO BE SUBJECTS | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| VEGETARIAN | 0 | 0% | 0 | 0% |
| NON-VEGETARIAN | 629 | 100% | 11 | 100% |
| CLAY EATERS | 112 | 17.8% | 2 | 18.2% |
| NON-CLAY EATERS | 517 | 82.2% | 9 | 81.8% |

TableVIII : HISTORY OF GI BLEEDING

| | SUBJECTS | | REFUSE TO BE SUBJECTS. | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| HX. OF GI BLEED | 88 | 14.0% | 0 | 0% |
| NO HX. OF GI BLEED | 541 | 86.0% | 11 | 100% |
| HEMORRHOID | 106 | 16.9% | 1 | 9.1% |
| NO HEMORRHOID | 523 | 83.1% | 10 | 90.9% |

TableIX : HISTORY OF BIRTH CONTROL

| TYPE OF BIRTH CONTROL | SUBJECTS | | REFUSE TO BE SUBJECTS. | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| NO BIRTH CONTROL | 137 | 21.8% | 3 | 27.3% |
| ORAL PILLS | 65 | 10.4% | 2 | 18.2% |
| INJECTED | 68 | 10.8% | 0 | 0 |
| IUD'S | 95 | 15.1% | 5 | 45.5% |
| STERILIZATION | 264 | 42.0% | 1 | 9.1% |

TableX: FREQUENCY OF ANALGESIC USED

| FREQUENCY OF ANALGESIC USED | SUBJECTS | | REFUSE TO BE SUBJECTS. | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| NO USE | 243 | 38.6% | 3 | 27.3% |
| NO OCCASIONAL USE | 357 | 56.8% | 7 | 63.6% |
| REGULAR USE | 29 | 4.6% | 1 | 9.1% |

TableXI: HISTORY OF MIGRATION

| MIGRATION | SUBJECTS | | REFUSE TO BE SUBJECTS. | |
|---|---|---|---|---|
| | FREQUENCY | PERCENT | FREQUENCY | PERCENT |
| MIGRATE | 136 | 21.6% | 5 | 45.5% |
| NOT MIGRATE | 493 | 78.4% | 6 | 54.5% |

TableXII: PARASITIC INFESTATION AMONG SUBJECTS.

| TYPE OF PARASITE | FREQUENCY | PERCENT |
|---|---|---|
| . NO PARASITE | 516 | 82.0% |
| . HOOK WORM | 10 | 1.6% |
| . STRONGELOID | 32 | 5.1% |
| . TAENIA | 48 | 7.6% |
| . OTHERS | 23 | 3.7% |

Table XIII : STOOL OCCULT BLOOD AMONG SUBJECTS

| STOOL OCCULT BLOOD | FREQUENCY | PERCENT |
|---|---|---|
| POSITIVE | 43 | 8.9% |
| NEGATIVE | 481 | 91.1% |

Table XIV FACTORS RELATED TO IRON DEFICIENCY ANEMIA

| FACTORS | IRON DEF. | NO IRON DEF. | CHI-SQUARE | P-VALUE |
|---|---|---|---|---|
| NUMBER OF OFFSPRING | | | | |
| 0 | 7 | 82 | 4.49 | 0.3433 |
| 1 | 3 | 116 | | |
| 2 | 8 | 211 | | |
| 3 | 9 | 136 | | |
| ≥ 4 | 3 | 54 | | |
| MENSTRUAL HISTORY | | | | |
| REGULAR | 26 | 505 | 0.12 | 0.7280 |
| IRREGULAR | 4 | 94 | | (0.4862*) |
| DIETARY TYPE | | | | |
| VEGETARIAN | 0 | 0 | – | – |
| NON-VEGETARIAN | 30 | 599 | | |
| CLAY-EATER | 8 | 104 | 1.69 | 0.1936 |
| NON CLAY-EATER | 22 | 495 | | |
| ANALGESIC USED | | | | |
| NOT USED | 6 | 237 | 13.00 | 0.0015 |
| OCCASIONAL | 19 | 338 | | |
| REGULARS | 5 | 24 | | |
| GI BLOOD LOSS | | | | |
| HX OF GI HEMORRHAGE | 7 | 81 | 2.29 | 0.1306 |
| NO HX OF GI HEMORRHAGE | 23 | 518 | | (0.1109) |
| HX OF HEMORRHOID | 4 | 102 | 0.28 | 0.5978 |
| NO HX OF HEMORRHOID | 26 | 497 | | |
| AGE OF YOUNGEST OFFSPRING | | | | |
| < 2 Yrs. | 2 | 106 | 1.92 | 0.1660 |
| > 2 Yrs. | 21 | 411 | | |

Table XIV .(CONT.) FACTORS RELATED TO IRON DEFICIENCY ANEMIA

| FACTORS | IRON DEF. | NO IRON DEF. | CHI-SQUARE | P-VALUE |
|---|---|---|---|---|
| BIRTH CONTROL | | | | |
| NO BIRTH CONTROL | 7 | 130 | 4.11 | 0.3914 |
| STERILIZATION | 14 | 250 | | |
| IUD's | 6 | 89 | | |
| PILLS | 3 | 62 | | |
| INJECTED | 0 | 68 | | |
| MIGRATION | | | | |
| MIGRATE | 6 | 130 | 0.05 | 0.8250 |
| NOT MIGRATE | 24 | 469 | | |
| STOOL EXAM | | | | |
| NO PARASITE | 20 | 348 | 2.77 | 0.2507 |
| HOOK WORM | 1 | 9 | | |
| OTHERS PARASITE | 2 | 101 | | |
| OCCULT BLOOD POSITIVE | 4 | 39 | 2.12 | 0.1454 |
| OCCULT BLOOD NEGATIVE | 19 | 419 | | (0.13984*) |

REMARKS : * = P-VALUE BY FISHER EXACT TEST.

Table XV. : FACTORS RELATED TO IRON DEFICIENCY ANEMIA . ( AGE , MENSTRUATION )

| FACTORS | IRON DEF. | NO IRON DEF. | T-TEST | P-VALUE |
|---|---|---|---|---|
| AGE | 31.27 + 9.29 | 32.08 + 8.28 | 0.437498 | >0.05 |
| DURATION OF MENS. | 3.80 + 1.22 | 3.39 + 1.20 | 0.460431 | >0.05 |
| SANITARY PAD USED ( PER CYCLES ) | 8.83 + 5.46 | 7.28 + 4.22 | 1.48997 | >0.05 |