CHAPTER 2

RESEARCH DESCRIPTION

2.1 Goal & Objectives

2.1.1 Goal

To control and prevent iron deficiency anemia in women of reproductive age.

2.1.2 Objectives

1) To decrease iron deficiency anemia in women of reproductive age in Chicony Electronics (Thailand) Co. LTD factory in Chachengsao province, central Thailand.

2) To improve awareness on iron deficiency anemia among women of reproductive age in Chicony Electronics (Thailand) Co. LTD factory in Chachengsao province, central Thailand.

2.2 Research Methodology

2.2.1 Research design

This is an Action Research study that used both qualitative and quantitative data collection methods for intervention design and impact measurement purposes.

2.2.2 Sampling

Among 1,043 women employed as direct laborers, 113 women, volunteered to participate throughout this study, and 5 women of 80 indirect laborers wished to join the project also. The 118 women met following criteria (1) female (2) aged 15-44 years (3) working at Chicony Electronics (Thailand) Co. LTD. at the time of study and (4) being literate. Prior, a number of 239 women of reproductive age of 15-44 years came for blood examination at the beginning of the project and then 121 women dropped out as the factory was down sizing (Total number of indirect and direct labourers in December 1999, 2001 and 2000 were 1,152, 816 and 652 respectively).

Out of approximately 100 factories, this factory proposed by the Administration Manager to be a pilot factory for the supplementation of weekly iron tablet to women of reproductive age project. In Chicony factory, the majority of the employees were women. The factory is located in Bangpakong District in Chachengsao Province. The factory produces small electronic pieces to form computer keyboards. 80 persons, indirect laborers, work in the Administration Section. 1,043 direct workers are divided into 4 Sections: Production, Quality Assurance, Purchase, Planning & Material Control. The Production Section which was the major Section and consisted of several lines; Office, Assemblys (A1-A7), Key Caps (KC1-KC2), Laser, Switch, Support and Sort.

2.2.3 Data collection Methods

1) Blood examination:

An amount of 5 cc. blood sample was collected through venous blood from each of the women to analyze for Hemoglobin Concentration (Hb), Serum Ferritin and Red Blood Cell Morphology Differentiation, prior to program implementation and after 20 weeks of supplementation.

2) Self administered questionnaire

A pre and post questionnaire was distributed to the 118 women to answer structured questions. Besides a demographic profile, the questionnaire focused on the history of illness of respiratory tract infection and gastrointestinal tract infections, food frequency consumption and nutrition knowledges and practices.

3) Observation

Observation was performed every time the researcher had the opportunity to visit the factory. Observations included visits to the food cafeteria, morning market, nursing room and information boards and bill post.

Transect walk was employed for baseline data collection to form the design of the intervention. The purpose was to adjust and develop the strategies during the process of the intervention and at the end of the project and to measure the effects of the interventions. A transect walk along the factory's boundary was performed to observe the process of information mobilization on iron deficiency anemia among the women. Observations were made regarding the varieties of iron-rich food, iron enhancers and inhibitors sold and consumed by the women also a compliance checklist was maintained.

2.2.4 Interventions

1) Deworming

At registration, a 400 mg single dose of Albendazole was administered to each woman under direct observation. Albendazole eradicates worm infestation especially hookworm, which is a cause of iron deficiency anemia.

2) Information, Education and Communication (IEC)

A letter from the Nutrition Division, Department of Health, Ministry of Public Health was submitted to the Operation Director of the factory asking to launch this action research in the factory after the proposal form to join the project signed by the factory's Administration Manager. After permission, the benefits and consequences of iron deficiency anemia were communicated to a few key-people in the factory. Among the key-people, a woman who was the Training Supervisor became a **"change agent"**. She then selected a woman who worked as a Training Group Leader to assist her as another **"change agent"**. Later on, the research team including the 2 change agents planned further activities; such as pre-data collection, programme implementation and post-data collection.

In this study, education was an important component to combat iron deficiency anemia. The Training Supervisor arranged nutrition education for all women in a meeting room. Groups of 30 women were given nutrition education for half an hour. The nutrition education materials prepared by the researcher were as follows;

a) A set of transparency presentation

A set of 20 transparencies of knowledge and practice for control and prevention on iron deficiency anemia was given to the Training Supervisor.

b) Twelve-month calendar cards

A twelve-month calendar card was distributed to every woman at the beginning to record her weekly iron tablet consumption by herself. On the other side of the card, knowledge and practice on iron tablet consumption, potential side effects of iron tablet consumption, iron-rich food and both the enhancers and inhibitors were described.

c) A 5 minute video tape

A video tape promoting the recommendation of weekly iron tablet supplementation among women of reproductive age and the benefits and consequences of iron deficiency anemia was provided for viewing at the factory. Usually the Training Supervisor operated the video during the programme training.

3) Weekly iron supplementation

A large number of Ferrous Sulfate iron tablets (60 mg elemental iron) was provided throughout the year as a seed grant for all women in the factory. The iron tablets were kept in the health care unit at the factory where there is a nurse working during office hours.

After deworming the women and disseminating education regarding nutrition knowledge, the women were distributed weekly iron tablets every Monday administrated directly by the Training Group Leader. For those women who did not work on Monday, the Training Group Leader would follow-up the next day when they came to work. With the exception for the women of indirect labor, they were given packages of 20 iron tablets. They

had to remind themselves regularly to take the tablets every week.

2.3 Ethical issues

Women among participants with hemoglobin < 7 gm/dL, were treated with daily iron tablets for 3 months as a curative method. Individuals were referred to a hospital if their condition worsened at the 1st week follow-up or if their condition showed no improvement at the 4th weeks follow-up.

For the target group of women with hemoglobin below normal (< 12 g/dL) but with normal Serum Ferritin levels (>=20mg/L), which suggests anemia from other causes, were informed for further diagnosis and treatment.

2.4 Work Plan

Year/ Activities	2000				2001				2002
	1	2	3	4	1	2	3	4	1
1.Inform the factory	X								
2.Tools preparation	X								
3.Pretest & develop tools	X								
4.Data collection		X							
5.Implement		X	X	X					
6.Follow-up			X						
7.Evaluation				X					
8. Data analysis					X	X	X	X	
9.Report									X

2.5 Budget

	Baht
1) Blood collection and laboratory analysis	
239 cases X Baht 250 (1st examination)	59,750
118 cases X Baht 250 (2nd examination)	29,500
2) Deworming tablets	
239 cases X Baht 8	1,912
3) Education materials	2,000
4) Iron tablets	
300 mg. Ferrous Sulfate	
(60 elemental iron)	
239 cases (+ 25% surplus) X Baht 5	1,494
5) Travelling expenditure	5,000
6) Stationery	2,000
Total	101,656

(One hundred and one thousand six hundred and fifty six Baht only-approximately US$ 2,500)

2.6 Data analysis

Quantitative data of the demographic profile, health behaviors, food frequency consumption and nutrition knowledge were analyzed through Epi.Info version 5. Such as frequencies, proportion, mean and S.D.

Qualitative data were content analyzed for the narrative and descriptive report.

2.7 Result

Besides seeking information about the demographic profile of the 118 women in this study, weekly iron tablet consumption and nutrition knowledge were also studied.

2.7.1 Demographic Profile

Table 1 shows that the majority of the 118 women in this study were:

- 78 women (66.1%) aged between 20-29 years
- 62 women (52.5%) were single
- 56 women (47.4%) were married and42 women had children {26 women (61.9%) had only one child, 16 women had 2-3 children (41.1%)}
- 71 women (60.2%) graduated at the secondary educational level
- The majority of 74 women (62.7%) had their birthplace in the central region; 24 women (20.3% migrated from the nearby Chonburi province while 34 women (28.8%) were born at Chachengsao province. The rest 44 women (37.3%) came form the nort-eastern, north and the south.

Table 2 describes the income of the participants as follows;

- 118 women's income ranged from Baht 2,338 (US$ 50 approximately) to Baht 15,000 (US$ 300 approximately)
- The average income:
  of the 118 women was Baht 4,838.4±1,770.8,
  of the 113 direct workers was Baht 4,654.9±1,370.8
  and of the 4 indirect workers was Baht 9,700±3,931.9
  The income of only one woman in indirect labor was not revealed.

2.7.2 History of iron tablet consumption and compliance

Table 3 shows that only 5 women (4.2%) of the target group had experience in taking iron tablets and 39 women (34.0%) reported that they were not sure that the tablet they had taken in the past was indeed an iron tablet.

Table 10, question number 10 shows that among 43 married women who were pregnant in the past, 14 women (32.6%) reported in the pre test questionnaire that they took iron tablets during their pregnancies and 30 women (69.8%) reported that they had taken iron tablets in the post test questionnaire. These reports showed that they did not know the kind and benefits of iron tablet they were given when they were pregnant or there are many varieties of iron tablets.

However table 3 shows high compliance during the intervention. Only 12 women (10.2%) did not regularly take weekly iron tablets. The reason of those women who missed few iron tablets was that they went up country and did not take the tablet with them. The reasons of the participants who stopped taking iron tablet after few

tablets consumption was that they were afraid of being fat since they had better appetite during taking iron tablets.

2.7.3 History of Health

Table 4 reveals that 9 women (7.6%) had respiratory infections of more than 5 episodes during the previous 5 months before the intervention. Similarly, only 5 women (4.3%) reported that they had diarrhoea more than 5 episodes in the same period. The incidences of both infections among the participants declined after the 20 week intervention.

Table 5 shows the history of menstruation blood loss of the target women. The majority 51 women (43.2%) had 3 day-menstruation blood loss. The average day of menstruation among the women was 4.0 ± 1.5. One woman reported of having only one-day menstruation and also another woman told that she had a 10-day menstruation. The average number of days of heavy menstruation blood loss was 2.5 ± 1.6. One woman reported that she does not menstruate as such because she has had a birth control injection. At the end of the intervention it seemed that the time of menstruation was shorten among the women who had history of long time of menstruation. On the other hand, few women who had short time of menstruation or no menstruation had their time of menstruation expanded.

Out of 118 women, 8 women (6.8%) experienced abortions and only one woman experienced this twice while the remaining of the married women, 25 women (21.3%) had permanent birth control.

Table 6 shows that 83 participants (70.3%) never had their stool examined before.

Tables 7 reveals that the majority 89 women (75.4%) had no experience of taking de-worm tablets.

2.7.4 Food frequency consumption practice and iron-rich food Knowledge

Table 8 shows data on pre test questionnaire. The majority 75 women (63.6%) had accessed to meat (heme iron) everyday. For meat products which are iron-rich foods such as blood and liver, 25 women (21.2%) reported that they had never consumed blood and 15 women (12.7%) indicated that they had never consumed liver at all.

Approximately half of the participants, 67 women (56.8%) consumed green leafy vegetable as non heme iron-rich food everyday.

Fruits, enriched vitamin C food, enhancers of iron absorption, were consumed by 62 women (52.5%) everyday.

Inhibitors of iron absorption such as tea, coffee, carbonated drinks and soy bean milk were mentioned by the minority that they consumed that kind of food everyday.

Figure 4 shows the distributation of pre and post practice scores on iron-rich food frequency consumption. The detail of scores were; 1 score summed from each consumption of meat, green leafy vegetables and fruit everyday and 1 score summed from each blood, liver and offal meat from once a week to everyday. Mean pre test score was 3.03 ± 1.67 and mean post test score was 3.10 ± 1.67.

It was found that the scores of practice on iron-rich food frequency consumption did not significantly change among the target group (Kruskal-Wallis H = 0.12, p=0.733).

Table 9 shows knowledge of the various kinds of iron-rich food among the participants. The correct knowledge was increased in heme iron such as meat and fish products, However, milk was believed to be the source of iron rich-food by half of the participants.

Figure 5 shows the distributation of pre and post knowledge scores on iron-rich food. Mean pre test score was 4.68±2.23 and mean post test score was 6.09±1.94.

It was found that the scores of knowledge on iron-rich food significantly changed among the target group (Kruskal-Wallis H = 24.14, p=<0.001).

2.7.5 Knowledge on IDA control and prevention

Table 10 shows that some of the women did not know the importance and role of iron in the body at the baseline data collection. When summed up the score for each correct answer from question 1-19, there was a statistical significant difference between the scores of pre and post test (Krusal Wallis Test = 7.17, p=<0.01) as shown the distributation of scores in figure 6. The question 20 was excluded from this analysis since this question meant to be answered by married women who had experienced pregnancies.

2.7.6 Blood examination

Blood examination prior the implementation

The average of SF were 80.73 ± 66.31 microgram/dl and Hb was 12.2 ± 1.07 g/dL.

Figure 1 shows iron status among the target group. By using cut off point SF < 30 microgram/dl for iron deficiency as recommended by Thai Hematology Association and Hb < 12 g/dL as recommended by WHO for anemia, it was found that normal blood status, ID, IDA and other A were 63.6, 5.1, 8.5 and 22.9% respectively. Using cut off point SF < 60 microgram/dl for iron deficiency as there are prevalence of hookworm infestation and Thalassemia, Hb < 12 g/dL as recommended by WHO for anemia , it was found that normal blood status ID, IDA and other A were 40.7, 28.0, 40.7 and 11.9% respectively.

Blood examination after 20 weeks of Implementation

The average of SF were 109.95 ± 92.37 microgram/dl and Hb was 12.20 ± 1.03 g/dL.

Figure 1 also shows that using cut off point SF < 30 microgram/dl for iron deficiency as recommended by Thai Hematology Association and Hb < 12 g/dL as recommended by WHO for anemia, it was found that normal blood status, ID, IDA and other A were 67.8, 0.0, 3.4 and 28.8% respectively. Using cut off point SF < 60 microgram/dl for iron deficiency as there are prevalence of hookworm infestation and Thalassemia, and Hb < 12 g/dL as recommended by WHO for anemia, it was found that normal blood status, ID, IDA and Other A were 54.2, 13.6, 14.4 and 17.8% respectively.

It was found that the Serum Ferritin significantly changed among the target group (Kruskal-Wallis H = 13.46, p=0.<001) as shown the distributation in figure 2. Hb did not significantly change (Kruskal-Wallis test = 0.02, p=0.879) as shown the distributation in figure 3.

Rbc morphology differentiation was also statistically significant different (χ^2=6.12, p= 0.01). The number of 68 women (57.6%) had normal rbc at both examination while 14 women (11.9%) had abnormal rbc at both examination. Out of 31 women who had abnormal rbc at first examination, 17 women (54.8%) had normal rbc. These women reported regularly consuming weekly iron tablets.

2.7.7 Observation

a) Food Security

In early morning before office hours, there is a large mobile market where food, fruits and dessert are sold at a cheap price. The participants could easily access food. There is a cafeteria provided for the workers in the factory. The place is clean with comfortable dining tables and chairs. There are also varieties of cooked food such as noodle soups, rice with meat and vegetable on top, beverage drinks and desserts. The price of one meal is Baht 10/dish as the factory subsidizes water and electricity to the food sellers.

b) Iron tablet supplementation

The researcher had a few opportunities to visit the factory at the time of iron tablet distributation on Monday. The Training Group Leader had her book of list of iron tablet consumers. She recorded the distributation while she visited the lines and offered iron tablets to the participants. After finishing her task she checked the absent consumers and prepared the lists for follow up the next day. For those who were absent and missed the distribution they could come to the nursing room to take iron tablet. The participant lists were kept in the nursing room. In front of the nursing room there was a water cooler with glasses prepared for the iron tablet consumers. Above the cooler there was a bill written the words **" On Monday don't for get to take iron tablet for your health".**

c) Nutrition education

There is a room used to educate the workers in this factory. The Training Supervisor who agreed to be the change agent organized a class of twenty participants to educate them an hour using 20 copies of transparency presentation leaflets and a video tape prepared by the researcher.

2.7.8 Transect walk

A transect walk was employed around the morning market and all the food shops in the cafeteria to note the food sold in the places. The food composition was then recorded to estimate the iron contents in the food. At the beginning of the intervention there were many dishes of cooked food enriched with meat, liver and blood curd. After 10 weeks without monitoring or education the food sellers, food menu was not enriched with iron-rich food as before the intervention.