

References

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Table 1 Demographic profile

Demographic data	n	%
Age (yrs.)		
< 20	8	6.8
20-29	78	66.1
30-39	31	26.3
>= 40	1	0.8
Total	118	100.0
Range	18-43	
Mean \pm SD	26.9 \pm 5.0	
Status		
Single	62	52.5
Married	56	47.5
Total	42	100.0
Number of Children		
1	26	61.9
2	13	31.0
3	3	7.1
Total	42	100.0
Range	1-3	
Mean \pm SD	1.45 \pm 0.63	

Table 1 Demographic profile (continued)

Demographic data	n	%
Education level		
Primary	22	18.6
Secondary	71	60.2
Technical	15	12.7
Bachelor degree	10	8.5
Total	118	100.0
Province at birth		
Central	74	62.7
North-eastern	20	16.9
North	17	14.4
South	7	5.9
Total	118	100.0

Table 2 Distribution of income per month by type of work

Income (Baht)	Total		Indirect Labour		Direct Labour	
	n	%	n	%	n	%
< 3,000	2	1.7	-	-	2	1.8
3,001 - 4,000	20	16.9	-	-	20	17.7
4,001 - 5,000	48	40.7	-	-	48	42.5
5,001 - 6000	28	23.7	1	20.0	27	23.9
6,001 - 7,000	6	5.1	-	-	6	5.3
7,001 - 8,000	-	-	-	-	-	-
8,001 - 9,000	-	-	-	-	-	-
9,000 - 10,000	4	3.4	2	40.0	2	1.8
> 10,000	2	1.7	1	20.0	1	0.9
Unknown	8	6.8	1	20.0	7	6.2
Total	118	100.0	5	100.0	113	100.0
Range	2,338-15,000		5,500-15,000		2,338-15,000	
Mean±SD	4,838±1,770		9,700±3,932		4,655±1,371	

Table 3 Experience on iron tablet consumption and weekly iron tablet consumption compliance during the intervention

Iron Tablet consumption	n	%
Experience of iron tablet consumption		
Never	74	62.7
Unsure	39	34.0
Ever	5	4.2
Total	118	100.0
Compliance during intervention		
Regularly	106	89.8
Irregularly	12	10.2
Total	118	100.0
Number of iron tablets that were not taken		
1	5	41.7
2	1	8.3
3	1	8.3
12	1	8.3
16	1	8.3
Unknown	3	25.0
Total	12	100.0

Table 4 History of respiratory tract and gastrointestinal tract infections in previous 2 months pre and post the intervention

History of illness (episode)	Pre		Post	
	n	%	n	%
Respiratory tract infection				
0	31	26.3	66	55.9
1	20	16.9	33	28.0
2	21	17.8	15	12.7
3	23	19.5	2	1.7
4	9	7.6	2	1.7
5	5	4.2	-	-
>5	9	7.6	-	-
Total	118	100.0	118	100.0
Range	0-15		0-4	
Mean \pm SD	2.4 \pm 2.7		0.6 \pm 0.9	
Gastrointestinal tract infection				
0	47	39.8	87	73.7
1	14	11.9	17	14.4
2	22	18.6	5	4.2
3	15	12.7	4	3.4
4	3	2.5	-	-
5	12	10.2	1	0.8
> 5	5	4.3	2	1.7
Total	118	100.0	118	100.0
Range	0-20		0-10	
Mean \pm SD	2.0 \pm 2.8		0.6 \pm 0.9	

Table 5 History of menstruation blood loss pre and after post the Intervention and history of abortion

Menstruation blood loss	Pre		Post	
	n	%	n	%
Duration of Menstruation (day)				
0	1	0.8	0	0
1	1	0.8	0	0
2	4	3.4	5	4.2
3	51	43.2	50	42.4
4	23	19.5	26	22.0
5	23	19.5	22	18.6
>5	15	12.7	15	12.7
Total	118	100.0	118	100.0
Range	0-10		2-7	
Mean \pm SD	4.0 \pm 1.5		4.0 \pm 1.3	
Duration of heavy blood loss menstruation (day)				
0	1	0	0	0
1	32	0	46	39.0
2	44	4.2	53	44.9
3	21	42.4	16	13.6
4	4	22.0	2	1.7
5	11	18.6	1	0.8
>5	4	12.7	0	0
Total	118	100.0	118	100.0
Range	0-10		1-5	
Mean \pm SD	2.5 \pm 1.6		1.8 \pm 0.8	
History of abortion				
Never	48	85.7		
Ever	8	14.3		
Total	56	100		

Table 6 History of worm infestation

History of worm infestation	n	%
Hookworm positive	3	2.5
Unknown worm positive	14	11.9
Worm negative	18	15.3
Unknown result (Never checked)	83	70.3
Total	118	100.0

Table 7 History of deworming

History of deworming	n	%
Never	89	75.4
Ever	29	24.9
Total	118	100.0

Table 8 Food frequency consumption pre and post (*)
intervention

Food item	Food Frequency Consumption						Total n
	Everyday n(%)	4-6/week n(%)	1-3/week n(%)	< 1/week n(%)	Never n(%)	Unknown n(%)	
Meat	75(63.6)	21(17.8)	15(12.7)	4(3.4)	1(0.8)	2(1.7)	118
*	74(62.7)	29(24.6)	15(12.7)	0(0.0)	0(0.0)	0(0.0)	118
Blood	1(0.8)	6(5.1)	30(25.4)	51(43.2)	25(21.2)	5(4.2)	118
*	1(0.8)	6(5.1)	52(44.1)	42(55.6)	15(12.7)	2(1.7)	118
Liver	0(0.0)	12(10.2)	45(38.1)	43(36.4)	15(12.7)	3(2.5)	118
*	1(0.8)	12(10.2)	58(49.2)	37(31.4)	10(8.5)	0(0.0)	118
Offal meat	1(0.8)	10(8.5)	49(41.5)	41(34.7)	14(11.9)	3(2.5)	118
*	2(1.7)	12(10.2)	46(39.0)	47(39.8)	9(7.6)	2(1.7)	118
Green leafy vegetable	67(56.8)	34(28.8)	12(10.2)	2(1.7)	2(1.7)	1(0.8)	118
*	61(51.7)	37(31.4)	16(13.6)	4(3.4)	0(0.0)	0(0.0)	118
Fruit	62(52.5)	29(24.6)	22(18.6)	2(1.7)	1(0.8)	2(1.7)	118
*	48(40.7)	43(36.4)	21(17.8)	3(2.5)	3(2.5)	0(0.0)	118
Tea/ Coffee	7(5.9)	6(5.1)	12(10.2)	34(28.8)	51(43.2)	8(6.8)	118
*	12(10.2)	6(5.1)	10(8.5)	17(14.4)	71(60.2)	2(1.7)	118
Milk*	5(4.2)	14(11.9)	22(18.6)	43(36.4)	31(26.3)	3(2.5)	118
	5(4.2)	19(16.1)	34(28.8)	30(25.4)	30(25.4)	0(0.0)	118
Carbonated drink	9(7.6)	8(6.8)	30(25.4)	45(38.1)	25(21.2)	1(0.8)	118
*	6(5.1)	5(4.2)	23(19.5)	4(36.4%)	36(30.5)	5(4.2)	118
Soya Milk	8(6.8)	10(8.5)	31(26.3)	43(36.4)	23(19.5)	3(2.5)	118
*	5(4.2)	11(9.3)	30(25.4)	44(37.3)	27(22.9)	1(0.8)	118

Table 9 Pre and post test and right answer of knowledge of iron-rich food

Food item	Pre test		Post test		Right Answer	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Pre n (%)	Post n (%)
Meat	67 (56.8)	51 (43.2)	96 (81.4)	22 (18.6)	67 (56.8)	96 (81.4)
Blood	68 (57.6)	50 (42.4)	100 (84.7)	18 (15.3)	68 (57.6)	100 (84.7)
Liver	95 (80.5)	23 (19.5)	111 (94.1)	7 (5.9)	95 (80.5)	111 (94.1)
Offal meat	71 (60.2)	47 (39.8)	88 (74.6)	30 (25.4)	71 (60.2)	88 (74.6)
Green leafy vegetable	58 (49.2)	59 (50.8)	95 (80.5)	23 (19.5)	58 (49.2)	95 (80.5)
Fruit	43 (36.8)	75 (63.2)	83 (70.3)	35 (29.7)	75 (63.2)	35 (29.7)
Tea	2 (1.7)	116 (98.3)	3 (2.5)	115 (97.5)	116 (98.3)	115 (97.5)
Milk	67 (56.8)	51 (43.2)	62 (52.5)	56 (47.5)	51 (43.2)	56 (47.5)
Carbonated drink	2 (1.7)	116 (98.3)	3 (2.5)	115 (97.5)	116 (98.3)	115 (97.5)
Soya Milk	52 (44.1)	66 (55.9)	58 (49.2)	60 (50.8)	66 (55.9)	60 (50.8)

Table 10 Pre and post test knowelege and practice on iron deficiency anemia

Knowledge /Practice	Pre test			Post test			Right Answer	
	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	Pre test n (%)	Post test n (%)
1 Iron is an important element in red blood cell	113 (95.8)	5 (4.2)	0 (0.0)	11 (94.1)	7 (5.9)	0 (0.0)	113 (95.8)	111 (94.1)
2 Red blood cell carries oxygen to every cell to give live	100 (84.7)	15 (12.7)	3 (2.5)	97 (82.2)	20 (16.9)	1 (0.8)	100 (84.7)	97 (82.2)
3 Prolong iron deficiency causes anemia	108 (91.5)	9 (7.6)	1 (0.8)	117 (99.2)	1 (0.8)	0 (0.0)	108 (91.5)	117 (99.2)
4 Iron deficiency is not clinically apparent	68 (57.6)	41 (34.7)	9 (7.6)	72 (61.0)	42 (35.6)	4 (3.4)	68 (57.6)	72 (61.0)
5 Iron deficiency anemia causes fatigue	96 (81.4)	21 (17.8)	1 (0.8)	95 (80.5)	20 (16.9)	3 (2.5)	96 (81.4)	95 (81.2)
6 Iron deficiency anemia increases respiratory tract infection	67 (56.8)	45 (38.1)	6 (5.1)	85 (72.0)	31 (26.3)	2 (1.7)	67 (56.8)	85 (72.0)
7 Iron deficiency anemia increases gastrointestinal tract infection	50 (42.4)	58 (49.2)	10 (8.5)	66 (55.9)	39 (33.1)	13 (11.0)	50 (42.4)	66 (55.9)

Table 10 Pre and post test knowelege and practice on iron deficiency anemia (continued)

Knowledge /Practice	Pre test			Post test			Right Answer	
	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	Pre test n (%)	Post test n (%)
8 Iron deficiency anemia can lower work productivity	94 (79.7)	24 (20.3)	0 (0.0)	83 (70.3)	27 (22.9)	8 (6.8)	94 (79.7)	83 (70.3)
9 Weekly iron tablet consumption is a preventtive procurement	65 (55.1)	53 (44.9)	113 (95.8)	106 (89.8)	10 (8.5)	2 (1.7)	65 (55.1)	106 (89.8)
10 According to your perception, you are going to take weekly iron tablet	61 (51.7)	47 (39.8)	10 (8.5)	104 (88.1)	11 (9.3)	3 (2.5)	61 (51.7)	104 (88.9)
11 Among other groups, pregnant women is the most important group for consuming iron tablet	108 (91.5)	10 (8.5)	0 (0.0)	100 (84.7)	11 (9.3)	7 (5.9)	108 (91.5)	100 (85.5)
12 Pregnant women is the most at risk group to be iron deficiency anemia	86 (72.9)	28 (23.7)	4 (3.4)	84 (71.2)	33 (28.0)	1 (0.8)	86 (72.9)	84 (71.2)

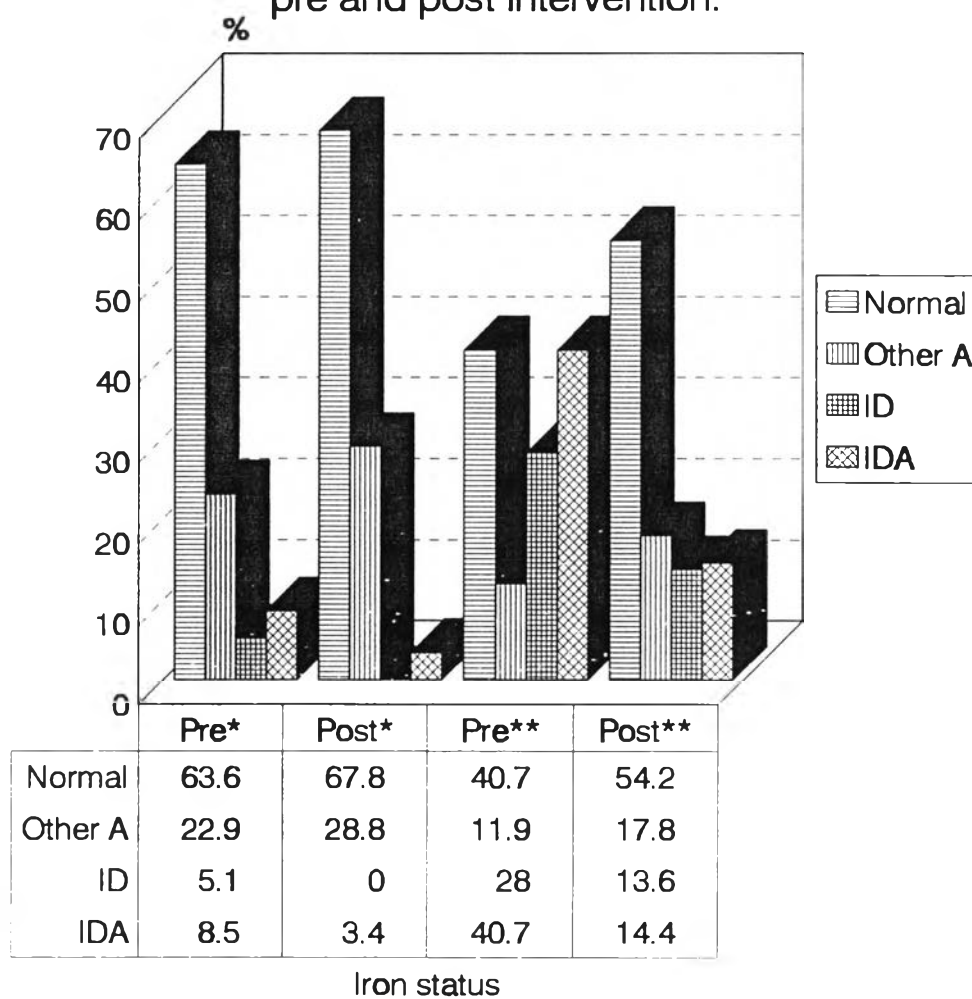
Table 10 Pre and post test knowlege and practice on iron deficiency anemia (continued)

Knowledge /Practice	Pre test			Post test			Right Answer	
	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	Pre test n (%)	Post test n (%)
13 Iron deficiency anemia pregnant women are at risk to abortion	75 (63.6)	39 (33.1)	4 (3.4)	76 (64.4)	40 (33.9)	2 (1.7)	75 (63.6)	76 (64.4)
14 Iron deficiency anemia pregnant women are at riska to deliver low birthweight newborns (<2,500 gms.)	73 (61.9)	44 (37.3)	1 (0.8)	80 (67.8)	35 (29.7)	3 (2.5)	73 (61.9)	80 (67.8)
15 Low birthweight newborns are prone to be unhealthy and more susceptibility to illness	99 (83.9)	16 (13.6)	3 (2.5)	93 (78.8)	20 (16.9)	5 (4.2)	99 (83.9)	93 (78.8)
16 Infants need iron to develop their brains	108 (91.5)	10 (8.5)	0 (0.0)	102 (86.4)	16 (13.6)	0 (0.0)	108 (91.5)	102 (86.4)

Table 10 Pre and post test knowlege and practice on iron deficiency anemia (continued)

Knowledge /Practice	Pre test			Post test			Right Answer	
	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	True/ Yes n (%)	Unsure n (%)	False/ No n (%)	Pre test n (%)	Post test n (%)
17 Women of reproductive age should prepare themselves for better iron storage for their later pregnancy	106 (89.8)	12 (10.2)	0 (0.0)	112 (94.9)	6 (5.1)	0 (0.0)	106 (89.8)	112 (94.9)
18 Women of reproductive age should consume weekly iron tablet	65 (55.1)	50 (42.4)	3 (2.5)	92 (78.0)	19 (16.1)	7 (5.9)	65 (55.1)	92 (78.0)
19 Iron tablet does not cause difficult deliverly due to big newborns	44 (37.3)	64 (54.2)	10 (8.5)	61 (51.7)	48 (40.7)	9 (7.6)	44 (37.3)	61 (51.7)
20 Have you consumed iron tablet during your last pregnancy ? (married women=43)	14 (32.6)	22 (51.2)	7 (16.3)	30 (69.8)	11 (25.6)	2 (4.7)	14 (32.6)	30 (69.8)

Figure 1 Iron status among the target women pre and post intervention.



* ID&IDA= SF < 30 mcg/dl, ** ID&IDA= SF < 60 mcg/dl

Figure 2 Distribution of Serum Ferritin (mcg/dl) of the target women.

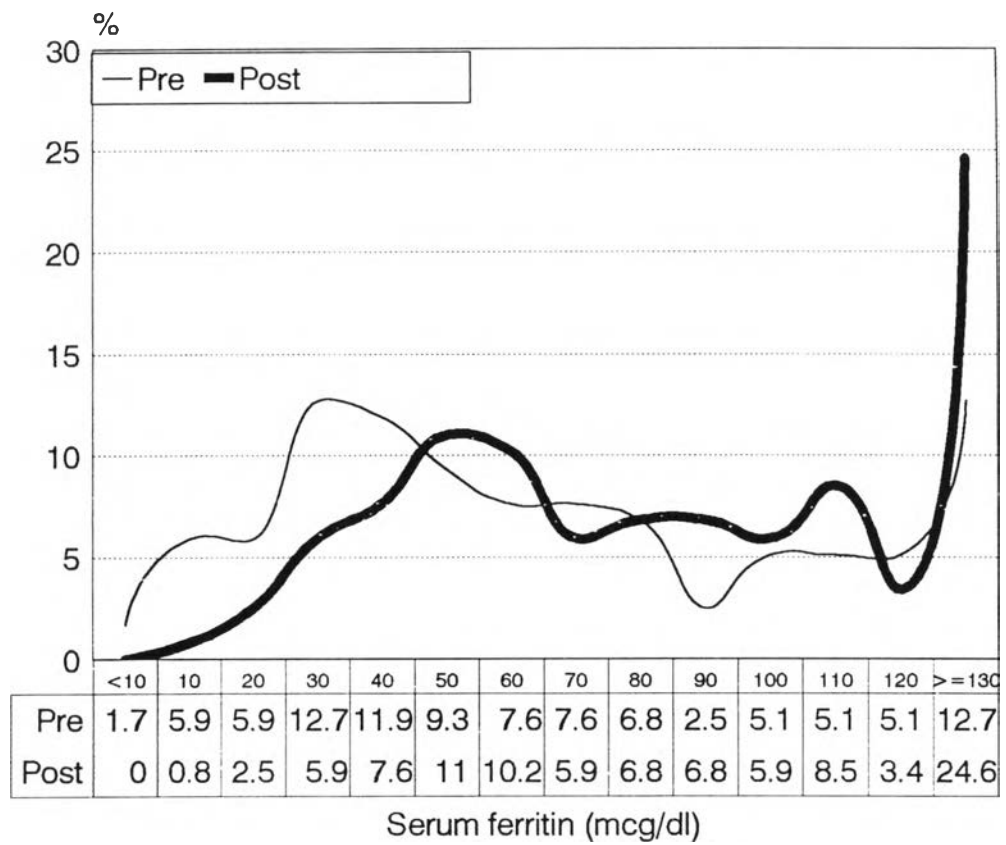


Figure 3 Distribution of pre and post hemoglobin of the target women.

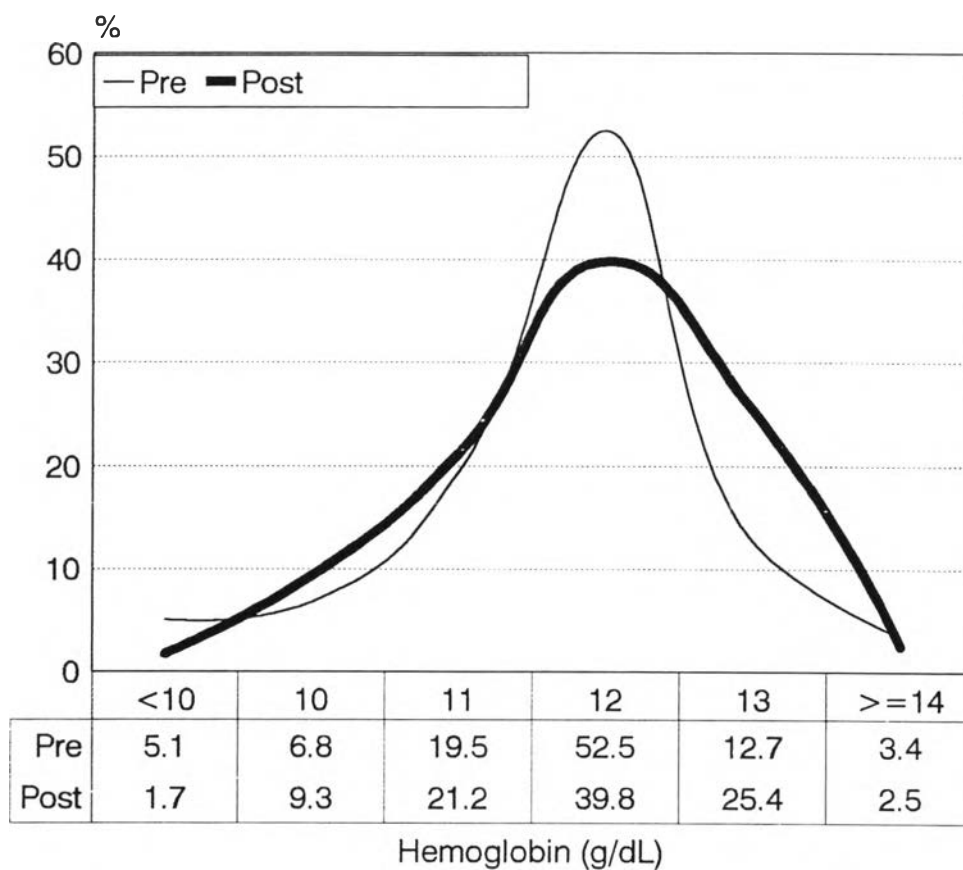


Figure 4 Distribution of pre and post score of correct practice on iron-rich food consumption of the target women

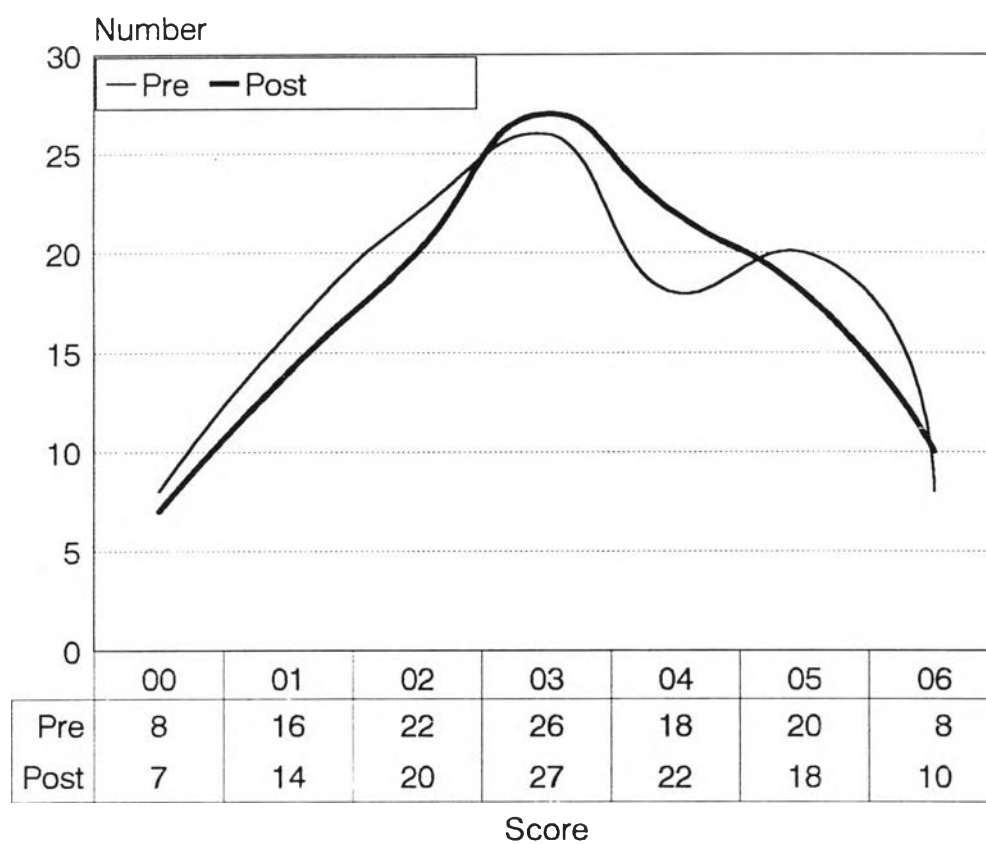


Figure 5 Distribution of pre and post score of Knowledge on iron-rich food of the target women

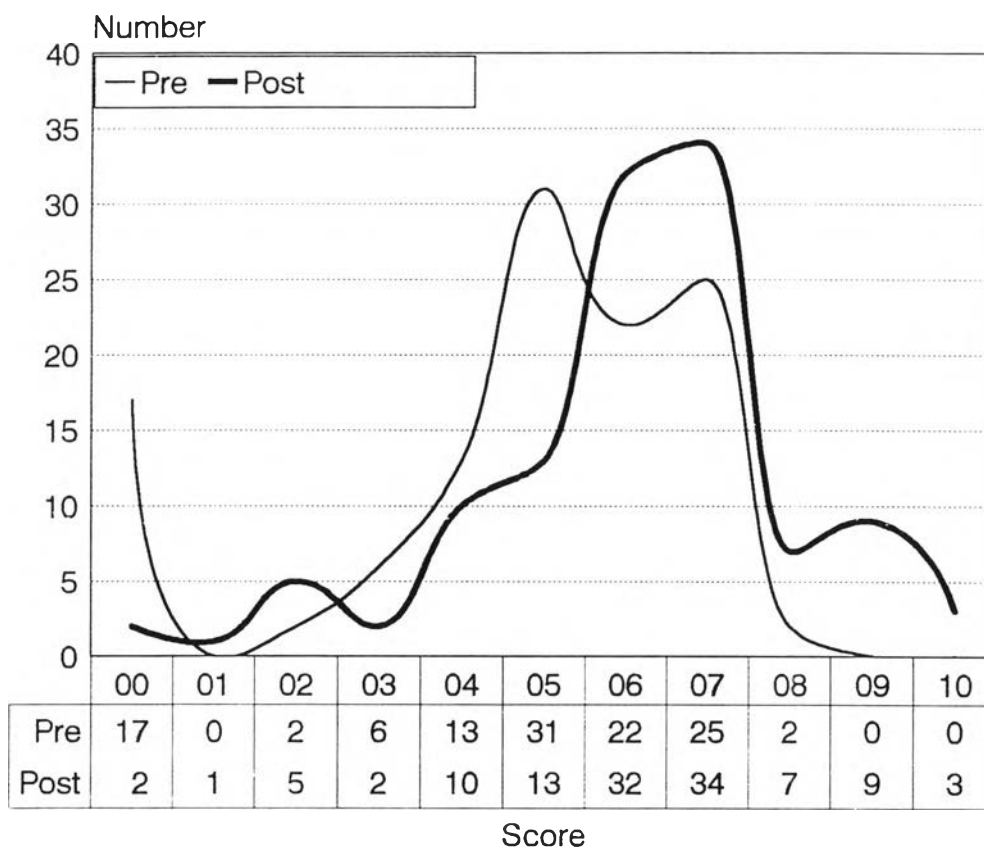
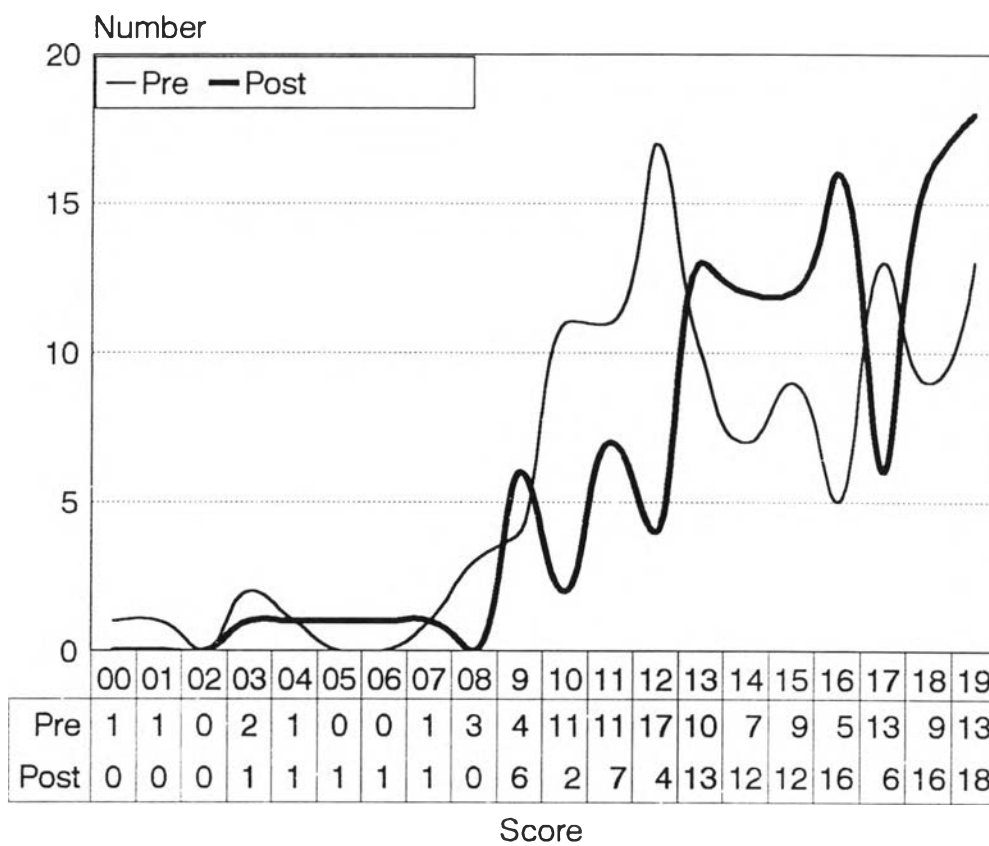


Figure 6 Distribution of pre and post score of correct knowledge of the target women



Appendices

Blood examination

Hemoglobin Determination

Hemoglobin is used to assess the presence and severity of anemia.

The degree of reliability varies with methods. The most reliable method is hemoglobincyanide method.

Serum Ferritin

Measurement of serum ferritin is widely used as a test for iron deficiency anemia and iron overload. A method based on immunoassay has been recommended by ICSH.

In normal adults the serum ferritin concentration is in the 15-300 mcg/L range. In an adult a level less than 15 mcg/L indicates an absence of storage iron.

Peripheral blood smear

The examination of the peripheral blood smear is one of the most important laboratory tests in the evaluation of the anemia. This simple test provides valuable information;

<u>Abnormal Rbc Morphology</u>	<u>Associated Clinical</u>
<u>Conditions</u>	
Macrocytes	Megaloblastic anemia (folate or Vitamin B12 deficiency), liver disease
Microcytes	Iron deficiency, thalassemia, sideroblastic
Hypochromia	Iron deficiency, thalassemia, sideroblastic anemia; sometimes in anemia of chronic inflammation

Questionnaire: Pre-test
An Action Research to Control and Prevent Iron Deficiency Anemia
In Women of Reproductive Age in a Factory in Chachengsao Province

Name of Factory **Chicony Electronics (Thailand) Co. LTD.** ID -----

1 Name Mrs Miss Family Name Income.....Baht/month.

2 Address..... 3 Province of Birth

4 Status 1 Single
 2 Marriage

1 No. of children

2 No. of abortion

3 Method of birth control

1 Permanent birth control

2 No birth control/temporary

5 Education level 1 Primary 2 Secondary 3 Technology
 4 Bachelor Degree 5 Higher than Bachelor Degree

6 Iron tablet consumption history

1 Never

2 Yes Time of last iron tablet taken -----day(s)month(s)year(s)

3 Not sure

7 During previous 5 months 1 Episode of fever (Catch cold, running nose etc.)

2 Episode of diarrhoea (>3 time/day)

8 Duration of Menstruation Day Duration of heavy blood loss menstruation Day(s)

9 Chronic blood loss at this moment 1 No 2 Yes, caused by

10 Worm infestation history 1 Yes, Hookworm 2 Yes, Unknown worm

3 No 4 Not sure

11 Deworming history 1 Never

2 Last time of deworming tablet consumptionday(s) month (s) year(s)

12 Please check \checkmark in the block of food frequency consumption according to your practice during last month and please check \checkmark in the block of iron rich food according to your knowledge

Food item	Food frequency consumption					Iron-rich food		
	Everyday	4-6/week	1-3/week	<1/week	Never	Yes	Not sure	No
Meat								
Blood								
Liver								
Offal meat								
Green leafy vegetable								
Fruit								
tea/coffee								
Fresh milk								
Carbonated drink								
Soya milk								

13 Please tick \checkmark in the block according to your knowledge and practice

Questionnaire	True/Yes	Unsure	False/No
1 Iron is an important element in red blood cell			
2 Red blood cell carries oxygen to every cell to give life			
3 Prolong iron deficiency causes anemia			
4 Iron deficiency is not clinically apparent			
5 Iron deficiency anemia causes fatigue			
6 Iron deficiency anemia increases respiratory tract infection			
7 Iron deficiency anemia increases gastrointestinal tract infection			
8 Iron deficiency anemia can lower work productivity			
9 Weekly iron tablet consumption is a preventive procurement			
10 As your perception, you are going to take weekly iron tablet			
11 Among other groups, pregnant women is the most important group for consuming iron tablet			
12 Pregnant women is the most at risk group to be iron deficiency anemia			
13 Iron deficiency anemia pregnant women are at risk to abortion			
14 Iron deficiency anemia pregnant women are at risk to deliver low birthweight newborns (<2,500 gms.)			
15 Low birthweight newborns are prone to be unhealthy and more susceptibility to illness			
16 Infants need iron to develop their brains			
17 Women of reproductive age should prepare themselves for better iron storage for their later pregnancy			
18 Women of reproductive age should consume weekly iron tablet			
19 Iron tablet does not cause difficult delivery due to big newborns			
20 Had you consumed iron tablet during your pregnancy ?			

**Questionnaire Post-test
An Action Research to Control and Prevent Iron Deficiency Anemia
In Women of Reproductive Age in a Factory in Chachengsao Province**

Name of Factory. **Chicony Electronics (Thailand) Co. LTD.** ID -----

- 1 Name Mrs Miss Family Name
- 2 Frequency of iron tablet consumption
 1 Once a week (weekly dose)
 2 Less than once a week Notify reason
- 3 During previous 5 months 1 Episode of fever (Catch cold, running nose etc.)
 2 Episode of diarrhoea (>3 time/day)
- 4 Duration of Menstruation Day Duration of heavy blood loss menstruation Day(s)
- 5 Chronic blood loss at this moment 1 No 2 Yes, caused by

6 Please check \checkmark in the block of food frequency consumption according to your practice during last month and please check \checkmark in the block of iron rich food according to your knowledge

Food item	Food frequency consumption					Iron-rich food		
	Everyday	4-6/week	1-3/week	<1/week	Never	Yes	Not sure	No
Meat								
Blood								
Liver								
Offal meat								
Green leafy vegetable								
Fruit								
tea/coffee								
Fresh milk								
Carbonated drink								
Soya milk								

11 Please tick \checkmark in the block according to your knowledge and practice

Questionnaire	True/Yes	Unsure	False/No
1 Iron is an important element in red blood cell			
2 Red blood cell carries oxygen to every cell to give live			
3 Prolong iron deficiency causes anemia			
4 Iron deficiency is not clinically apparent			
5 Iron deficiency anemia causes fatigue			
6 Iron deficiency anemia increases respiratory tract infection			
7 Iron deficiency anemia increases gastrointestinal tract infection			
8 Iron deficiency anemia can lower work productivity			
9 Weekly iron tablet consumption is a preventive procurement			
10 As your perception, you are going to take weekly iron tablet			
11 Among other groups, pregnant women is the most important group for consuming iron tablet			
12 Pregnant women is the most at risk group to be iron deficiency anemia			
13 Iron deficiency anemia pregnant women are at risk to abortion			
14 Iron deficiency anemia pregnant women are at risk to deliver low birthweight newborns (<2,500 gms.)			
15 Low birthweight newborns are prone to be unhealthy and more susceptibility to illness			
16 Infants need iron to develop their brains			
17 Women of reproductive age should prepare themselves for better iron storage for their later pregnancy			
18 Women of reproductive age should consume weekly iron tablet			
19 Iron tablet does not cause difficult delivery due to big newborns			
20 Had you consumed iron tablet during your pregnancy ?			

Curriculum Vitae

Name: Utoomporn Sittisingh

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Ministry of Public Health

Date of birth: 20 March 1949

Place of birth: Bangkok, Thailand

Citizenship: Thai

Religion: Buddhist

Marital status: Married

Education:

1984	Bachelor of Arts (English) Ramkamhaeng University, Bangkok, Thailand
1990	Bachelor of Education (Food & Nutrition) Rajchapat University (Suan Dusit Teaching College) Bangkok, Thailand
1993	MCN (Master of Community Nutrition) University of Queensland, Australia

Experience:

1991	Survey for the prevalence of iron deficiency anemia in preschool children in Thailand
1993	Survey for the prevalence of iron Deficiency anemia in pregnant women in Thailand
1994	Survey for the prevalence of iron Deficiency anemia in school children in Thailand
1995	Effectiveness and compliance on iron tablet supplementation in pregnant women
1996	Improve nutrition education at ANC clinics

- 1997 Iron supplementation, iron-rich food in school lunch programme and nutrition & health education among school children in a district in Chumporn province
- 1997 Empower health workers to control and Prevent iron deficiency anemia
- 1998 Create awareness among villagers to Control and prevent iron deficiency anemia
- 1999 Weekly iron tablet supplementation in Kanchanaburi, Rayong and Chachengsao Provinces
- 2000 Weekly iron tablet supplementation in adolescent girls in Chachengsao province
- 2001 Weekly iron tablet supplementation Among vegetarians in Bangkok Metropolitan