Iron, Folate and Vitamin B_{12} Deficiencies among Different Age Groups of Females in Sri Lanka

Tharanga Thoradeniya and Sunethra Atukorala
Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka

Introduction

- Deficiencies of iron, folate & vitamin B_{12} are common problems among women in developing countries, including Sri Lanka
  - è More prevalent among low income groups due to their poor quality diets
  - è Affect health & well-being
  - è Lead to adverse pregnancy outcomes
  - è Vitamin B_{12} deficiency leads to neurological disorders in older women
- Studies on multiple micronutrient deficiencies among adolescent girls and women are limited
- Magnitude of deficiencies among different age groups of women need to be assessed
  - è to develop effective strategies to improve their micronutrient status

objectives

To study the
- prevalence of iron, folate and vitamin B_{12} deficiencies among adolescent girls and women
- effect of physiological status and food intake on the above micronutrient deficiencies

Methods

Subjects (N=660)

Clinically healthy subjects randomly selected from municipal area of Colombo

Low socio-economic classes -Monthly income < Rs. 10,000 (<US$ 100)

Adolescent girls	Young women	Older women
(N=277)	(N=275)	(N=108)
Mean age 16.9 ± 1.32 years	Mean age 22.3 ± 2.60 years	Mean age 51.3 ± 5.00 years
1ry/2ry education: 70.6%	No formal education: 1.8 %	No formal education: 2.8 %
Tertiary education: 28.6%	Tertiary education: 29.5%	Tertiary education: 28.6%
Unmarried: 96.4%	Married: 27.3%	Married: 79.4%
	Parous: 18.5%	Parous: 88.9%

Methodology

v Interviewer-administered pre-tested questionnaire
  - è information on socio-economic status
  - è past medical and obstetric history
v Food frequency questionnaire – designed for this population
  - è information on food intake.
  - è Frequency of intake of different food items were recalled & recorded as one of seven frequency categories (0- never/almost never to 6 - two or more times per day)
v Qualitative data on food habits and culinary practices were collected
v Anthropometric measurements
  - è Body Mass Index (BMI)
  - è Waist circumference

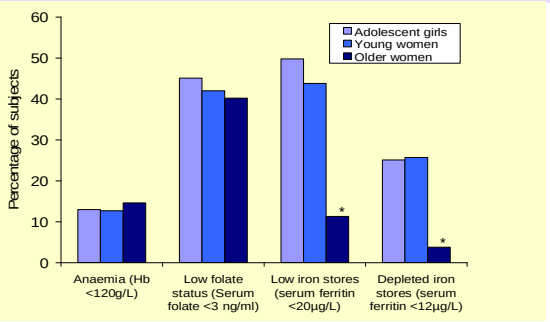
Non-fasting venous blood (10 ml) sample
- Haemoglobin (cyanmethhaemoglobin method, Randox Laboratories Ltd., Uk)
- Serum ferritin (IRMA method, Diagnostic Products Corporation, USA)
- Serum folic acid & vitamin B_{12} (RIA method, MP Biomedicals, Orangeburg, New York)

Statistical analyses - SPSS version 13.0 (SPSS Inc, Chicago)
Ethical approval- The Ethical Clearance Committee, Faculty of Medicine, Colombo

Results

Significantly higher ($P < 0.0001$) % of younger women were under weight (BMI < 18.5 kg/m²)
Significantly higher (P < 0.0001) % of older women were over weight BMI > 23.0 kg/m²
& had a waist circumference > 80 cm

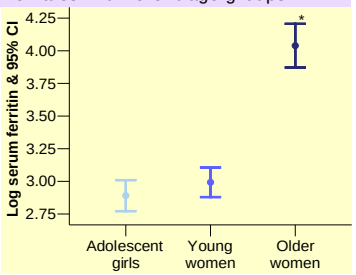
Anaemia, iron, folate and vitamin B_{12} status of females in different age groups



Prevalence of anaemia and low folate status were similar among different age groups
* Prevalence of low/depleted iron stores were significantly lower (P < 0.0001) among older women than in adolescent girls and young women

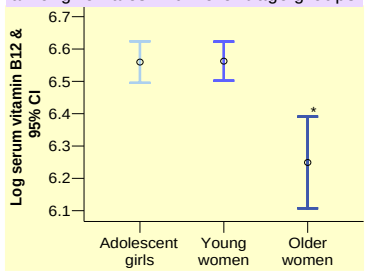
Only two adolescent girls and three older women had low vitamin B_{12} status

Distribution of serum ferritin among females in different age groups



*significantly higher (P < 0.0001) than in adolescent girls and young women

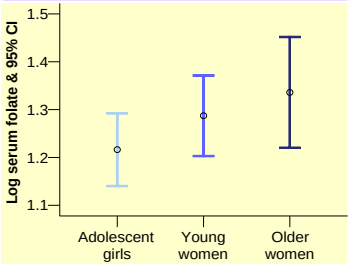
Distribution of serum vitamin B_{12} among females in different age groups



*significantly lower (P < 0.0001) than in adolescent girls and young women

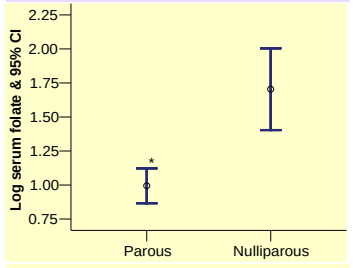
Serum ferritin concentrations decreased (P = 0.039) with increasing severity of bleeding among adolescent girls and young women
Serum ferritin concentrations were significantly higher (P = 0.011) among postmenopausal than in premenopausal, older women

Distribution of serum folate among females in different age groups



Mean serum folate concentrations were similar among different age groups

Serum folate status among parous and nulliparous women

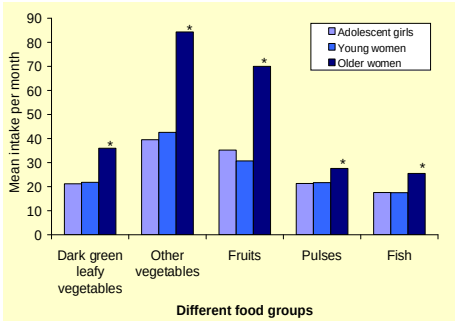


* significantly (P = 0.001) lower than in nulliparous women

Association of food intake with serum folate and ferritin concentrations in the whole population

Serum folate		
Food item	Correlation Coefficient (r)	P
Dark green leafy vegetables	0.09	0.029
Beans	0.116	0.005
Pulses	0.083	0.043
Yams	0.123	0.003
Serum ferritin		
Food item	Correlation Coefficient (r)	P
Citrus fruits	0.191	< 0.0001
Other fruits	0.168	< 0.0001
Dark green leafy vegetables	0.100	0.014
Other vegetables	0.229	< 0.0001

Food intake among females in different age groups



Intakes were *significantly (P < 0.05) higher than in adolescent girls and young women

Consumption of re-heated and over cooked foods were common practices in the whole population

Conclusions

- Multiple micronutrient deficiencies
- sub-clinical iron deficiency
- Low serum folate
  - è were major problems in this population

è Magnitude of the problems differ in different age groups

Contributing factors
- è inadequate food intake
- è improper culinary practices

Further
- è nutrition education is necessary to prevent multiple micronutrient deficiencies among women
- è physiological condition should be considered when developing strategies

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