



ระดับของกรดโฟลิกในเม็ดเลือดแดง ในผู้ป่วยจิตเวชผู้สูงอายุ

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บทคัดย่อ

วัตถุประสงค์ เพื่อศึกษาความชุกของการมีระดับกรดโฟลิกในเม็ดเลือดแดงต่ำในผู้ป่วยจิตเวชสูงอายุของโรงพยาบาลสมเด็จพระเจ้าพระยา

วิธีการ การศึกษาย้อนหลังรายงานผู้ป่วยที่รับไว้ในแผนกผู้ป่วยจิตเวชผู้สูงอายุ และมาที่คลินิกผู้สูงอายุ

ผลการศึกษา ในจำนวนผู้ป่วย 342 ราย พบว่าความชุกของระดับกรดโฟลิกต่ำเท่ากับร้อยละ 21.6 และระดับที่ต่ำมากเท่ากับร้อยละ 25.9 ผู้ป่วยกลุ่มอาการทางสมองมีความชุกสูงสุดของกลุ่มที่มีกรดโฟลิกต่ำและต่ำมาก ผู้ป่วยที่ติดสุราพบว่ามีค่าเฉลี่ยของระดับกรดโฟลิกในเม็ดเลือดแดงต่ำที่สุด ผู้ป่วยที่ขาดกรดโฟลิกพบว่ามีภาวะโลหิตจางร่วมด้วย โดยครึ่งหนึ่งของผู้ป่วยที่มีระดับกรดโฟลิกต่ำมาก และเกือบครึ่งหนึ่งของผู้ป่วยที่มีระดับกรดโฟลิกต่ำมีภาวะโลหิตจางสรุป ระดับกรดโฟลิกในเม็ดเลือดแดงต่ำเป็นปัญหาที่พบได้บ่อยในผู้ป่วยจิตเวชสูงอายุที่มาารับการรักษาที่โรงพยาบาลสมเด็จพระเจ้าพระยา วารสารสมาคมจิตแพทย์แห่งประเทศไทย 2545; 47(2):135-143.

คำสำคัญ กรดโฟลิกในเม็ดเลือดแดง ผู้ป่วยจิตเวชผู้สูงอายุ ระดับกรดโฟลิก

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Folic acid (also known as folacin, folate, pteroylglutamic acid, and PGA) is one among 13 vitamins now known: vitamin A, vitamin B1, vitamin B2, niacin, vitamin B6, vitamin B12, folic acid, pantothenic acid, biotin, vitamin C, vitamin D, vitamin E, and vitamin K¹. This vitamin which is essential to life performs a lot of vital tasks in the body.

The clinical consequences of a low folate status may include increased coronary heart disease and cancer risk, and an association between folate deficiency and neuropsychiatric illness has been reported².

There were many reports indicating that neuropsychiatric diseases secondary to folate deficiency might include dementia, schizophrenia-like syndromes, insomnia, irritability, forgetfulness, endogenous depression, organic psychosis, peripheral neuropathy, myelopathy, and restless legs syndrome³.

The largest group of studies dealt with the prevalence of folate deficiency in various types of psychiatric and geropsychiatric patients. These studies were summarized in Table 1⁴⁻¹⁹. The prevalence of serum folate deficiency in psychiatric patients is from 0-49%^{4-9,11-14,18}, while those with low red cell folate ranges from 3-100%^{10,12,13,15,17-19}. Among Thai elderly in the community, the prevalence of folate deficiency is 20.6%¹⁴, while that of low red cell folate is as low as 3.3-8.2%^{12,15}. There is evidence of high^{6,8,16} and low prevalence^{9,18} of folate deficiency among psychiatric patients, especially those suffering from a depressive illness.

Hassing et al reported that subjects with low folic acid levels showed impairment in both word

recall and object recall and concluded that his study replicated and extended previous findings that folic acid may be more critical than B12 to memory functioning in late life²⁰. However, Assantachai et al. reported no association between low folate status and mental function among Thai elderly¹⁵. Textbooks list deficiency in folate as possible causes of depression and dementia²¹.

Most of the previous studies used serum folate concentrations; however, red cell folate ones are now a more valid and reliable measure²².

This retrospective chart review studied the prevalence of low red cell folate concentrations among geropsychiatric patients-both in-patient and out-patient population.

Methods

A retrospective chart review of 342 cases (159 men and 183 women), both in-patients and out-patients admitted at the Geropsychiatric Department of Somdet Chaopraya Hospital and who attended the Geropsychiatric clinic between January 1996 and May 2000 was studied.

There were seven main groups of patients as categorized based on their symptoms: major depression, bipolar disorder, schizophrenia, schizoaffective disorder, dementia, alcohol dependence, other organic brain syndromes (OBS) and others (Table 3).

Red cell folate levels of all patients were determined by the Microbioassay technique. The normal range of RBC folate is 221-1113 ng/ml. Values between 150-200 ng/ml indicate a low value, and values < 150 ng/ml indicate severe deficiency¹⁰.

Blood samples of 303 patients (88.6%) were taken to do a complete blood count (CBC). Anemia was defined based on the criteria provided by World Health Organization (WHO): Hb < 12 g/dl for women and < 13 g/dl for men²³.

The data were statistically analyzed using the SPSS statistical package to calculate mean values \pm SD.

Results

Table 2 describes the sociodemographic characteristics of the patients. Of 342 patients, 88.6% were Thai, and 11.1% were Chinese. About three-quarters (74%) lived in Bangkok and its vicinity, while 26% lived in upcountry. As for education, about half of the patients (50.3%) finished primary school, 26.3% were illiterate, and 17% finished secondary school and higher. The majority of the patients (70.8%) were unemployed, and 84.8% were poor without savings.

Table 3 shows the high percentages of patients with 'low folate' and 'folate deficiency' in our psychogeriatric population. The cut-off point of <200 ng/ml for low folate and <150 ng/ml for folate deficiency was used¹⁰. Thus, of 342 patients, there were 74 (21.6%) with low folate and 87 (25.4%) with folate deficiency.

The groups of other OBS had the highest prevalence of folate deficiency and low folate, followed by those with dementia, alcohol dependence, and major depression (Table 3).

The mean RBC folate values for the various diagnoses are shown in Table 3. The lowest red cell folate levels were reported in alcohol dependence followed by other OBS, others, and major

depression, respectively.

Three-hundred and three patients (88.6%) had their complete blood count (CBC) studied. The normal limits for haemoglobin are 12 g/dl in females and 13 g/dl in males. In the present study, 27 of the 67 subjects (40.3%) in the low folate group, 41 of 78 (52.6%) in the folate deficiency group, and 83 of 158 (52.6%) in the normal group fell below these limits (Table 4).

Discussion

Estimates of the overall prevalence of low folate and folate deficiency vary widely depending on the population studied and the methods used to measure folate levels. For instance, estimates of low folate range from 3.5-8.2% in community elderly surveys^{12,15} to as low as 1.3% in geropsychiatric in-patients⁽¹¹⁾. However, in the present study, it was found that the prevalence of low red cell folate and folate deficiency was as high as 21.6% and 25.4%, respectively. These findings substantiated the results of the study by Carney *et al* which found the prevalence of low red cell folate and folate deficiency among 285 psychiatric in- and out-patients to be 31% and 12%, respectively¹⁰.

The results of this paper suggested that the most common diagnoses of folate deficiency and low folate were other organic brain syndromes and dementia. Third came alcohol dependence, followed by major depression. However, Carney *et al* pointed out that the highest proportion of patients with folate levels below 200 ng/ml (low level) and 150 ng/ml (folate deficiency) were found in depressive and alcoholic groups¹⁰.

Furthermore, in the present study, alcoholic

Table 1 Prevalence studies of folate deficiency among psychiatric patients during the period 1967-1998⁴⁻¹⁹

Reference	Country	Type of patient	N		%with low SF		%with low RCF		Definition of low folate
			Patients	controls	Patients	controls	Patients	controls	
● Hunter et al (1967)	UK	Psychiatric in-patients	75		49				< 6.8 nmol/L
● Carney & Sheffield (1970)	UK	Acute psychiatric admission	423	62	22	9.6			< 2 ng/ml
● Reynolds et al (1970)	UK	Depressed in-patients	91		24				< 2.5 ng/ml
● Carney & Sheffield (1978)	UK	Acute psychiatric admission	272		21				< 2 ng/ml
● Abou-Saleh & Coppen (1989)	UK	Depressed in-patients	95	60	13	2			< 2.5 ng/ml
● Levitt & Joffe (1989)	Canada	Depressed out-patients	44		2				< 2 nmol/L
● Carney et al (1990)	UK	Psychiatric in-patients out-patients	285				31		< 200 ng/ml < 150 ng/ml
● Bell et al (1990)	USA	Acute geropsychiatric admission	102		1.3		12		< 2 µg/ml
● Hanger et al (1991)	Newzealand	Community elderly	204		1		3.3		< 4.3 nmol/L < 279 nmol/L
● Levitt & Karlinsky (1992)	Canada	Patients with Alzheimer's admission	40		3		8		≤ 4.5 nmol/L ≤ 270 nmol/L
● Prayurahong et al (1993)	Thailand	Geriatric screening clinic patients	147		20.6				< 3.0 ng/ml
● Assantachai et al (1997)	Thailand	Community elderly	203				82		< 221 ng/ml
● Fava et al (1997)	USA	Depressed out-patients	213		19				< 2.5 ng/ml
● Hasanah et al (1997)	Malaysia	Manic in-patients	45	33			100	0	< 532 nmol/L
● Lee et al (1998)	Hong Kong	Depressed in-patients	117	72	0		3.4	8.3	< 7 nmol/L
● Skerritt (1998)	Republic of Ireland	Psychiatric in-patients	28		0		3.5		< 2 ng/ml ¹ < 110 ng/ml ¹

SF Serum folate

RCF Red cell folate

Table 2 Sociodemographic characteristics (N = 342)

Characteristics	Red cell folate			
	< 150 ng/ml n	< 200 ng/ml n	Normal ^a n	Total N(%)
1. Sex				
Male	43	33	83	159 (46.5)
Female	44	41	98	183 (53.5)
2. Age (mean±SD) (years)	70.8±7.6	69.6±6.8	69.3±7.3	69.8±7.3
3. Education				
Illiterate	27	24	39	90 (26.3)
Primary school	46	35	91	172 (50.3)
Secondary school & higher	12	7	3	58 (17.0)
Unknown	2	8	12	22 (6.4)
4. Race				
Thai	78	59	166	303 (88.6)
Chinese	9	15	14	38 (11.1)
Other	-	-	1	1 (0.3)
5. Occupation				
Unemployed	65	53	124	242 (70.8)
Employed	20	18	52	90 (26.3)
Other	2	3	5	10 (2.9)
6. Residence				
Bangkok & vicinity	67	55	131	253 (74)
Upcountry	20	19	50	89 (26)
7. Financial status				
Very poor	7	10	24	41 (12.0)
Poor without savings	79	63	148	290 (84.8)
With some savings	1	1	9	11 (3.2)

^a 221-1113 ng/ml

Table 3 Red cell folate level across diagnostic groups

Types of psychiatric disorders	Red cell folate level				
	mean SD (ng/ml)	< 150 ng/ml ^a n(%)	< 200 ng/ml ^b n(%)	Normal ^c n(%)	N
1. Major depression	230.9 ± 122.9	21 (24.1)	23 (26.4)	43 (49.4)	87
2. Bipolar disorder	261.6 ± 152.6	15 (25.4)	8 (13.5)	36 (61.0)	59
3. Schizophrenia & Schizoaffective disorder	291.4 ± 153.8	9 (20.0)	6 (13.3)	30 (66.6)	45
4. Alcohol dependence	196.4 ± 70.8	6 (21.0)	7 (28.0)	12 (48.0)	25
5. Dementia	242.3 ± 149.2	19 (19.2)	13 (20.0)	33 (50.7)	65
6. Other OBS	207.8 ± 105.8	12 (35.2)	10 (29.4)	12 (35.2)	34
7. Others	219.5 ± 92.4	5 (18.5)	7 (25.9)	15 (55.5)	27
Total		87 (25.4)	74 (21.6)	181 (52.9)	342

OBS, organic brain syndromes

^a severe deficiency

^b low level

^c 221-1113 ng/ml

Table 4 Prevalence of anemia by red cell folate levels

Presence of anemia	Red cell folate level			
	< 150 ng/ml n(%)	< 200 ng/ml n(%)	Normal n(%)	Total N
1. Non-anemia	37(47.4)	40(59.7)	75(47.4)	152(50.2)
2. Anemia	41(52.6)	27(40.3)	83(52.6)	151(49.8)
Total	78	67	158	303

patients were found to have the lowest red cell folate levels, while depressive and demented patients had the lowest levels similar to those in Carney et al's and Sneath et al's studies, respectively^{10,24}.

Carney et al and Sheffield et al reported that the main associations of folate deficiency were chronic psychiatric illness, physical illness, psychotropic drug therapy, and malnutrition⁵. In

addition, low folate levels could be the result of inadequate dietary intake, diminished absorption from the gastrointestinal tract, or increased utilization²⁵. Diminished absorption of folate from the gastrointestinal tract could be caused by drugs, especially anticonvulsants and alcohol²⁵. However, the cause of folate deficiency in psychiatric patients is unknown even though it is

suspected that inadequate dietary intake probably plays some role²⁵.

The subjects who took part in this study were of low socioeconomic status; 96.8% were poor. The results of the present study suggested a high prevalence of anemia among this group of population. Half of the patients in the folate deficiency group and almost half of those in the low folate group were anemic. However, the anemia problem among these groups of patients may or may not be related to folate deficiency. In general, anemia among the Thai people is more or less related to iron deficiency and/or malnutrition. Prayurahong *et al*¹⁴ reported that they found the prevalence of anemia among Geriatric Screening Clinic patients at Rajvithi Hospital to be 15%. However, Suwannuruks *et al*²⁶ and Chaisiripoomkere *et al*²⁷ found no prevalence of anemia among the Thai elderly who attended the Geriatric Screening Clinic at Ramathibodi and Pramongkutklao Hospitals, respectively.

The limitation of this study was that the group of elderly patients could not be considered representatives of the elderly patients as a whole because the present study was a retrospective study and folate levels of all elderly patients were not studied. Besides, most of the patients in this study (96.8 %) were from the low socioeconomic class. Folate is present in fresh fruits, green leafy vegetables, and animal liver²⁸. Apart from low socioeconomic status, geriatric patients also have difficulties in mastication due to dental losses. This could be one reason to explain why the prevalence of low folate and folate deficiency was high in the present study.

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Red Cell Folate Levels in Psychogeriatric Patients

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Abstract

Objective To determine the prevalence of low red cell folate levels among elderly psychogeriatric patients of Somdet Chaopraya Hospital.

Method The present study was a retrospective study investigating the medical records of 342 patients who either were admitted into the Geropsychiatric Department or sought treatment at the Geropsychiatric Clinic of Somdet Chaopraya Hospital from 1996 to 2000.

Results Of the total subjects, 21.6% had red cell folate at the low level, or lower than 200 ng/ml, while 25.9% had red cell folate at the very low level, or lower than 150 ng/ml. Besides, the largest groups of patients with other organic brain syndrome also had either low or very low red cell folate. In addition, alcoholic patients had the lowest mean of red cell folate level among all groups of patients investigated. It is also worth noting that folate deficiency generally occurred simultaneously with a low level of hemoglobin as half of the patients with very low red cell folate and almost half of the patients with low red cell folate were anemic.

Conclusions Low level of red cell folate was common in elderly patients treated in Somdet Chaopraya Hospital. **J Psychiatr Assoc Thailand 2001; 47(2):135-143.**

Key words: red cell folate, psychogeriatric patients, folate level

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