

## Periconceptional Folic Acid Usage Pattern in Malaysian Women

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### ABSTRACT

**Aim:** This study aims to determine the knowledge, attitude and practice of Malaysian women towards periconceptional folate supplementation in prevention of neural tube defects.

**Methods:** The study group consisted of 400 Malaysian women attending their care at the Department of Obstetrics and Gynecology of Hospital Kuala Lumpur with a convenience sampling method. Data was collected by face to face interview, using a questionnaire, which included demographic details and knowledge, attitude and practice outcomes, to be filled with the assistance of the investigator. The data was analyzed by multiple logistic regression, Pearson's correlation and percent ratios with the significance level of  $P < 0.05$ .

**Results:** 88.3% of the respondents reported to have heard of folate, but only 8% were assessed with good knowledge. Majority (49.3%) were informed about folate by physicians or obstetricians; 42% expressed good perception towards folate use and only 11.8% were assessed to have good consumption practice. Educational level and household income are significantly predictive of good level of knowledge and practice. Higher educational qualification is also predictive of positive attitude towards folic acid use.

**Conclusion:** Educational level and household income are significantly predictive of knowledge, attitude and practice levels as these outcomes are reflective of better pressure in health evaluation and quality of life. Good awareness regarding folate use is not necessarily associated with optimal consumption. Thorough and effective interventions are needed to improve folate consumption, and to prevent neural tube defects.

**Keywords:** folic acid; knowledge, attitude and practice; Malaysia; neural tube defects; pregnancy

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### INTRODUCTION

Folic acid is a form of vitamin B9 that is available in various sources from natural food products to health dietary supplements. It functions as a co-enzyme essential to rapidly growing cells, especially in growth and reproduction processes<sup>1</sup>. Neural tube defects (NTDs) comprise a group of developmental abnormalities in the embryo mainly attributed to incomplete or underdeveloped closure of the embryonic neural tube, four weeks post-fertilization. NTDs may cause either death or various types of disabilities in newborns<sup>1-4</sup>.

Multiple studies dating back to the 1980s sufficiently established the role of folic acid in lowering the risk of NTDs, provided that it is taken at a daily dose of 400 µg at a regimen carried out periconceptionally, a period usually defined by one month prior to gestation until the end of the first trimester<sup>3-6</sup>. Such timing is allocated to facilitate the closure of neural tube at around fourth week of pregnancy, however many individuals are unaware of this due to lacking in signs as well as unplanned pregnancy; therefore it is highly important to assess the knowledge and practice of folic acid consumption by women within their childbearing age to effectively prevent NTDs<sup>5-7</sup>.

Periconceptional folic acid use has been assessed in several other countries yielding different outcomes on the level of understanding, perception and usage behavior in

association to different demographic and socioeconomic characteristics<sup>2,8-12</sup>. Such data, however is lacking in Malaysia to date.<sup>2,12</sup> This study aims to assess the knowledge, attitude and practice (KAP) of Malaysian women towards periconceptional folic use in the prevention of NTDs.

### MATERIALS AND METHODS

#### *Sampling and Settings*

This descriptive study was carried out in Obstetrics & Gynecology Clinic, Wards 1A, 2A and 3B of the Department of Obstetrics and Gynecology, Hospital Kuala Lumpur, Kuala Lumpur, Malaysia from July 2014 to August 2014. The mentioned establishment serves as a national referral center for obstetric and gynecologic (O&G) services of Malaysia. To achieve a margin of error of 0.049 at confidence interval of 95%, the sample size required for this study has been determined to be about 385 individuals. 400 respondents were recruited via convenience sampling method, which is consistent with the clinical setting of Hospital Kuala Lumpur.

#### *Study Questionnaire*

Participants were each administered a predesigned questionnaire, to be filled in the presence of investigator to ensure comprehension and completion. The questionnaire consists of 5 sections comprising informed consent letter,

Table 1: Distribution of Respondents via Socio-Demographic Characteristics

Characteristics	Number (n=400)	Percentage (%)
<b>Age group (years)</b>		
16-24	69	17.3
25-34	216	54.0
35-45	115	28.8
Mean = 30.81	SD = 7.127	Minimum = 16      Maximum = 45
<b>Pregnancy status</b>		
Negative	216	54.0
Positive	184	46.0
<b>Planned pregnancy (pregnant respondents, n= 184 )</b>		
No	118	64.1
Yes	66	35.9
<b>Parity</b>		
0	165	41.3
1	63	15.8
2	87	21.8
3	52	13.0
4	18	4.5
5	9	2.3
>5	6	1.5
Mean = 1.37	SD = 1.470	Minimum = 0      Maximum = 6
<b>Area of residence</b>		
Rural	95	23.8
Urban	305	76.3
<b>Household income per month (Ringgit Malaysia)</b>		
< 2000	172	43.0
2000 – 6000	196	49.0
> 6000	32	8.0
<b>Educational level</b>		
None attained	6	1.5
Primary education	20	5.0
Secondary education	167	41.8
High school education / Diploma	120	30.0
Undergraduate	74	18.5
Postgraduate	13	3.3

demographic characteristics followed by knowledge, attitude and practice (KAP) of Malaysian women in periconceptional folic acid use. The periconceptional period was defined as a timeframe from one month before conception towards the end of the first trimester, whereas folic acid awareness refers to having heard and known about the protective effect of folic acid<sup>2,12</sup>.

Additional information was carried out regarding the source of information about folic acid. The questionnaire was pre-tested for face validation with 15 women of childbearing ages (WOCBA) prior to the commencement of data collection. This was to ensure proper interpretation between languages and identification of possible oversights and grammatical mistakes.

#### Analysis

Statistical analyses were carried out with use of Statistical Package for the Social Sciences software (SPSS) Version

22. Demographic data were expressed in mean, standard deviation (SD), and percentage. Multiple logistic regressions were performed to examine variables contributing to optimal KAP in periconceptional folic acid use. Pearson's Correlation was conducted to determine the correlation between KAP outcomes. Independent variables in this case included age, parity, rural-urban difference, household income and educational level. Significance level of  $P < 0.05$  (95% CI) was adopted for all tests.

#### RESULTS

The mean age of the respondents was 31 years with a standard deviation of 7.127. Age group of 25-35 years shares the greatest distribution at 54% (n = 216). 184 out of 400 individuals were reported pregnant at the moment of interview, whereas 66 of them expressed planned pregnancy. 165 (41.3%) reported nulliparous, followed by

Table 2: Distribution of Knowledge, Attitude and Practice (KAP) According to Scores Gained by Respondents

	Number (n=400)	Percentage (%)
<b>Level of knowledge</b>		
Poor (0-4)	217	54.2
Moderate (5-6)	151	37.8
High (7-8)	32	8.0
Total	400	100.0
Mean = 3.60	SD = 2.289	Minimum = 0      Maximum = 8
<b>Level of attitude</b>		
Negative (0-3)	136	34.0
Neutral (4)	96	24.0
Positive (5-7)	168	42.0
Total	400	100.0
Mean = 3.99	SD = 1.642	Minimum = 0      Maximum = 7
<b>Level of practice</b>		
Poor (0-3)	286	71.5
Moderate (4)	67	16.8
Good (5-6)	47	11.8
Total	400	100.0
Mean = 2.04	SD = 1.930	Minimum = 0      Maximum = 6

Table 3: Sources of Information Contributing to Respondents' Knowledge on Folic Acid and Its Role

Source of information	Number (n=400)	Percentage (%)
Never been informed	49	12.3
Physician / Obstetrician	197	49.3
Nurses	20	5.0
Pharmacist	13	3.3
Mass media / Internet	45	11.3
Friends and relatives	26	6.5
Formal education	36	9.0
Previous experience	8	2.0
Others	6	1.5
Total	400	100.0

para 2 at 15.8% (n = 87). Majority of the respondents live in urban area, at 76.3% (n = 305), 43% of the population sharing household income of less than RM 2000 (US\$ 540). As for educational level, most (41.8%) of the respondents completed their secondary education (Table 1).

By evaluating responses given by respondents with the use of the questionnaire, 217 respondents (54.3%) are reported with poor level of folic knowledge with scores between 0-4, only 32 out of 400 respondents scored with good level (7-8) of knowledge, at 8%. The mean score was 4 with standard deviation of 2.289 for level of knowledge. For level of attitude, most of the respondents expressed positive view (5-7) towards folic acid use at 42% (n = 168), whereas 34% of the respondents expressed negative attitude (0-3) towards folic use. As for level of practice of respondents on folic acid use, majority of the respondents scored poorly (0.3) on the usage of folic acid at 71.5% (n = 286), followed by 16.8% scored moderate level (4), and

remaining 47 respondents with good level of practice (5-6) in periconceptional folic acid (Table 2). Majority of the respondents expressed to have been given knowledge by physicians or obstetricians (n=197) (Table 3), followed by 11.3% of that from mass media or internet involving both electronic and printed resources. On the other hand, out of 184 respondents in their pregnancies (Figure 1), administration of folic acid began largely on the first trimester (n = 92), whereas only 12.5% (n = 23) of the participants took folic acid periconceptionally. 13.6% of the respondents were not taking any folic acid at all, during the interview.

Multinomial logistic regression analyses were conducted to predict memberships between outcome variables (level of KAP) and independent variables (demographics). Table 4 indicates the educational level, followed by household income are significant predictive of good levels of KAP among respondents. Pearson's Correlation test (Table 5) is also indicative of positive correlations between KAP outcomes of recruited population.

## DISCUSSION

The role of folic acid in the prevention of neural tube defects (NTDs) is greatly established via multiple studies, provided it is administered in the correct method, dosage and frequency<sup>1,2,4,7</sup>. Malaysia currently observes a NTDs prevalence of 10 per 10000 births annually. Policies involving mass education, campaigning and folic fortification in food are widely implemented in various other nations<sup>13-15</sup>, and are observed to be effective against lowering of NTDs prevalence; however, such strategies should be justified with several research questions such as the baseline serum folate of certain population, their levels of knowledge, attitude and practice in folic administration<sup>13</sup>. Besides, there is a lacking in such information in Malaysia as reported by no previous study nor health and nutrition census carried out<sup>1,2</sup>. Close to 90%

Table 4: Variables Significantly Associated with Better KAP Outcomes on Periconceptual Folic Acid Use

	B (SE)	95% CI for Odds Ratio		
		Lower	Odds Ratio	Upper
Reference: poor level of knowledge				
Moderate level of knowledge vs. poor level of knowledge				
Household income	0.739 (0.202)***	1.410	2.904	3.110
Good level of knowledge vs. poor level of knowledge				
Educational level	1.087 (0.257)***	1.791	2.965	4.909
Reference: negative attitude				
Positive attitude vs. negative attitude				
Educational level	0.452 (0.143)**	1.186	1.571	2.082
Reference: Poor level of practice				
Moderate level of practice vs. poor level of practice				
Educational level	0.382 (0.166)*	1.059	1.465	2.027
Good level of practice vs. poor level of practice				
Household income	0.875 (0.301)**	1.329	2.398	4.327
Educational level	0.574 (0.2)**	1.199	1.775	2.627

Note: \*p < 0.05, \*\*p < 0.01, \*\*\* p < 0.001

Table 5: Correlation of Level of Respondents' KAP on Periconceptual Folic Acid Use

	Level of knowledge	Level of attitude	Level of practice
Level of knowledge	1.000	0.265**	0.301**
Level of attitude	400	1.000	0.315**
Level of practice	400	400	1.000

Ns = not significant (p > 0.05), \*p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

of the recruited respondents have heard of folic acid and its use, and almost half of the women interviewed understood the natural or supplemental sources of folic acid during pregnancy. Only 8% of the respondents are reported with "good" level of knowledge. 217 women scored "poor" (54.3%), and 37.8% reported with "moderate" level of knowledge on folic use. Such trend is similar to that being reported by Nawapun *et al.* and Hage *et al.*<sup>12,16</sup> Mean score of 3.6 denoting a majority low level of knowledge (54.3%) in the population, that may be contributed by lacking in exposure during formal education, campaign events promoting folic knowledge and use, as well as accessibility to maternity programmes.<sup>1,2</sup> Folic awareness refers to having heard and known about protective effect of folic acid<sup>12</sup>. In this study 48.5% of respondents expressed folate awareness, which is considered high within Southeast Asian region, compared to 24.4% in Thai women<sup>12</sup>, 14% in Lebanon and 15% in Northern China<sup>16,17</sup>.

The main source of information which recruited respondents came to know about folic acid and its use is by physician or obstetrician (49.3%), whereas formal education and mass media or internet fares similar share of 9% and 11.3%, respectively. The results are seen to be inconsistent of other studies, as mass media and formal education<sup>8,11,12</sup>, as well as previous experience(s) if not in majority<sup>16</sup>, are mostly attributable to the awareness and knowledge of surveyed women. Other healthcare professionals such as nurses and pharmacists share little

role in the contribution of information to the studied population. This may be due to the setting of investigation where respondents are largely patients attending their medical services. Also, folic acid supplementation is often advised and included as a care regimen by obstetricians.<sup>18</sup> Greater effort should be implemented to heighten the role of other healthcare professionals, such as nurses, dieticians and pharmacists in promotion of periconceptual folic use. Improvement should also be carried out for mass media and formal education in the dissemination of information to increase the awareness and knowledge of the public regarding the role and importance of folic acid.

About 80% of the respondents are reported with positive attitude towards role, safety and interest to be informed further regarding folic acid; and majority of them, at 42% are reported with "positive" attitude towards periconceptual administration of folic acid. A survey conducted in New Zealand revealed 87% of the respondents rated positively toward the role and importance of folic acid; and higher level of educational qualifications is the predictive of greater positivity in perception<sup>15</sup>; which is consistent with our study (Table 4). One is more likely to carry a positive attitude toward periconceptual folic use as predicted by a unit increase in educational level. Age, area of residence and parity does not carry significant association and membership in this section. An increase in parity has been suggested as a possible reason for promoting the attitude, due to repeated exposure to information and subsequent improved

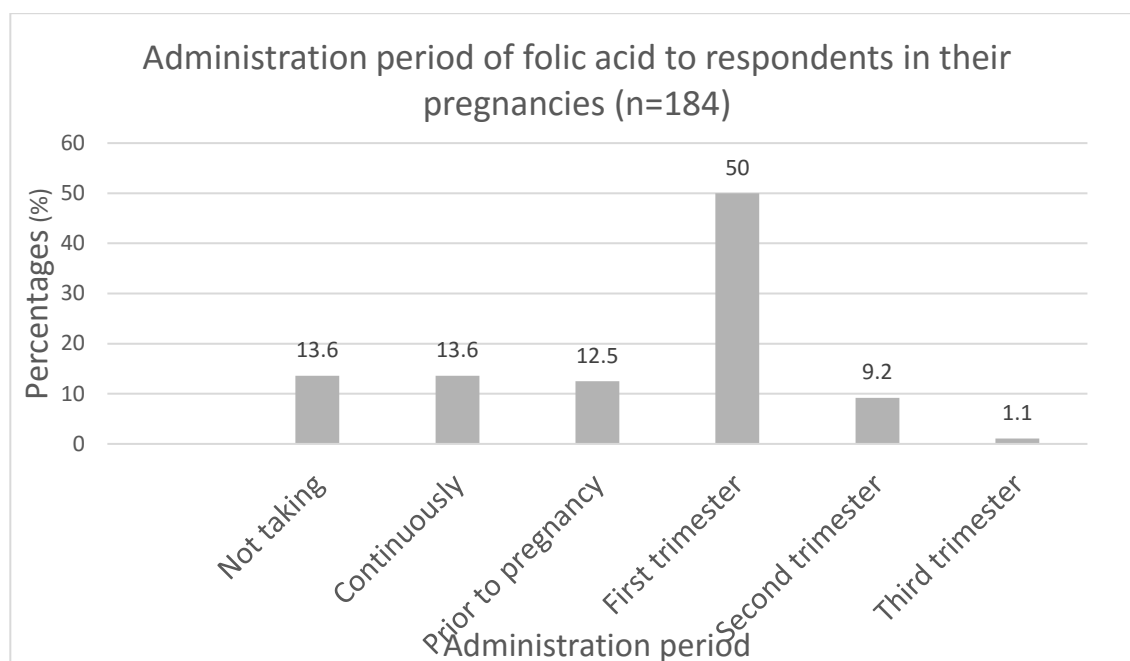


Figure 1: Administration Period of Folic Acid to Respondents Currently in Their Pregnancies

perception (Mashayekhi *et al.*<sup>11</sup>). However, this is not in accordance with the present survey findings. This might also be explainable with inadequate health awareness and literacy in Malaysia<sup>19</sup>, which affects the perception toward the importance of folic acid, and such is also observable during the investigation where respondents expressed misconceptions and disinterest regarding the medications they were prescribed to. One is expected to have a greater tendency to folic supplementation, provided having better knowledge regarding it, as suggested in Table 5.

Daily supplementation of folic acid at minimum 400 µg is recommended for women in their childbearing age, as it is evident of lowering risk and occurrence of NTDs<sup>4,5,7,20</sup>. 41.3% of the recruited respondents (n = 165) were taking folic acid supplements during the investigation, which is higher compared to that in Korea (10.3%)<sup>8</sup>, Thailand (9.7%)<sup>12</sup>, and the United States (32%)<sup>9</sup>; whereas lower than that observed in New Zealand (46%)<sup>15</sup> and Abu Dhabi (69.7%)<sup>10</sup>. In this study, 71.5% of the respondents are scored “poor” in the level of practice, which maybe contributed by lower consumption of foods containing folic acid (15%), and lower periconceptional administration of folic acid at 11.8% of the pregnant respondents during the investigation (Figure 1). In this study both household income and educational level, also serve as significant predictive factors leading to optimal behaviour of folic acid use in the participants, at  $p < 0.01$  (Table 4). Correlation studies also identified that the respondents’ awareness and perception levels are attributable to their folic usage (Table 5). Folic acid supplementation may be promoted and improved via various health education and campaigns to improve its awareness, and thus encouraging an optimal attitude and, followed by practice. Besides, drafting policies and protocols may encourage necessary folic acid prescribing and thus the overall practice<sup>18</sup>.

Only 12% of the recruited population were found to be taking folic acid periconceptionally. Late detection of pregnancy due to unplanned pregnancy may be one of the contributors of delayed supplementation. Problems with adherence and compliance to a long term daily dosing of folic acid may also impose a financial burden to some, especially for those who are not planning for pregnancy. The low turnout of such is also accompanied by 10.3% of that experienced by Korean population<sup>8</sup>, 9.7% in Thai population<sup>12</sup>, and 7.5% of surveyed population in Lebanon<sup>16</sup>. Pre-marital counselling and health education may be employed to improve this, whereas health care providers are also encouraged to make use of each encounter with woman of childbearing ages as an opportunity to promote preconceptional knowledge and awareness to improve practice<sup>9</sup>.

The strengths of this study include the establishing of some baseline information regarding KAP of Malaysian women, which has not been previously conducted and could be used as reference for rationalizing future interventions. For instance, the level of knowledge, as well as the source of knowledge, identified in this study can be used in future drafting of campaigns, policies, guidelines and protocols relating to antenatal care and birth defects prevention. The limitation of this study is represented by the location setting of the investigation. General Hospital of Kuala Lumpur is located in the capital city of Malaysia and the generalizability of these findings to the entire country is questionable.

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## DISCLOSURE

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