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Knowledge, Attitude and Practice regarding Iodine Deficiency Disorder among Pregnant Women at Srinagarind Hospital, Khon Kaen, Thailand

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ABSTRACT

Objectives: This study assessed the knowledge, attitude, and practice regarding iodine deficiency disorder (IDD) and supplementation among pregnant women at Srinagarind Hospital, Khon Kaen University, Thailand.

Materials and Methods: We performed a cross sectional study. A total of 363 first antenatal-visit pregnant women at Srinagarind Hospital, Khon Kaen University during October 2014 to April 2015 were included. Data was collected using self-administered semi-structured questionnaire and interview. Descriptive analysis was conducted and univariate and multiple logistic regression analyses were used to identify factors associated with practice regarding IDD.

Results: Among 363 pregnant women, only 121 (33.33%) participants had good knowledge, only 128 (35.26%) participants had good attitude regarding iodine deficiency, and only 86 (23.69%) participants reported good practice of iodine supplementation. There were 309 (85.12%) pregnant women received information regarding IDD. Pregnant women with good knowledge of IDD had significantly better practice (AOR = 2.34, 95% CI 1.09, 5.01). Women with good attitude toward IDD had significantly better practice (AOR = 5.41, 95% CI 1.53, 19.05). Also, receiving IDD information significantly associated with good practice (AOR = 5.61, 95% CI 1.29, 24.29).

Conclusion: Knowledge, attitude, and practices regarding IDD and supplementation among pregnant women were insufficient. Healthcare providers at all levels should put more intensive effort in addressing this very important health problem.

Keywords: iodine deficiency, pregnancy, knowledge, attitude, practice

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ความรู้ ทัศนคติ และพฤติกรรมเกี่ยวข้องกับการขาดสารไอโอดีนของหญิงตั้งครรภ์ ในโรงพยาบาลมหาวิทยาลัย จังหวัดขอนแก่น

จิตสุภา คำสิงห์นอก, โฉมพิลาศ จงสมชัย, ชูศรี คูชัยสิทธ์, ภิเศก ลุมพิกานนท์

บทคัดย่อ

วัตถุประสงค์: *เพื่อเปรียบเทียบผลการตั้งครรภ์และการคลอดของสตรีตั้งครรภ์วัยรุ่น (อายุน้อยกว่า 20 ปี) กับวัยผู้ใหญ่ (อายุ 20-34 ปี)*

วัสดุและวิธีการ: *งานวิจัยนี้เป็นการศึกษาแบบ retrospective cohort study โดยเก็บข้อมูลย้อนหลังเปรียบเทียบผลการตั้งครรภ์ และผลการคลอด (เฉพาะการคลอดครั้งแรก) ของหญิงตั้งครรภ์วัยรุ่นกับวัยผู้ใหญ่ ที่มาคลอดที่โรงพยาบาลพุทธชินราช พิษณุโลก ระหว่างเดือนมกราคม 2555 ถึงเดือนธันวาคม 2556*

ผลการศึกษา: *ความชุกของการตั้งครรภ์วัยรุ่นที่โรงพยาบาลพุทธชินราช พิษณุโลก คือ ร้อยละ 17 เมื่อเปรียบเทียบผลของการตั้งครรภ์ และการคลอดระหว่างวัยรุ่นกับวัยผู้ใหญ่ พบว่ามารดาตั้งครรภ์วัยรุ่นมีการฝากครรภ์น้อยกว่าวัยผู้ใหญ่ การตั้งครรภ์วัยรุ่นมีภาวะโลหิตจางของมารดาระยะก่อนคลอด, น้ำหนักทารกแรกคลอดน้อย และการคลอดก่อนครบกำหนดมากกว่าวัยผู้ใหญ่อย่างมีนัยสำคัญทางสถิติ การตั้งครรภ์วัยรุ่นพบความชุกของการทำสูติศาสตร์หัตถการ โดยเฉพาะอย่างยิ่งการผ่าตัดคลอดทางหน้าท้อง และภาวะตกเลือดหลังคลอดน้อยกว่าการตั้งครรภ์วัยผู้ใหญ่ ส่วนภาวะเบาหวานขณะตั้งครรภ์ และภาวะตกเลือดหลังคลอด ในกลุ่มตั้งครรภ์วัยรุ่นพบน้อยกว่า อย่างมีนัยสำคัญทางสถิติ ภาวะความดันโลหิตสูงขณะตั้งครรภ์ ภาวะโรคติดเชื้อ ภาวะทารกโตช้าในครรภ์ และภาวะขาดออกซิเจนของทารกแรกคลอดไม่มีความแตกต่างอย่างมีนัยสำคัญสถิติ*

สรุป: *การตั้งครรภ์วัยรุ่นมีผลการตั้งครรภ์และการคลอดที่ดีในด้านของช่องทางการคลอด และการตกเลือดหลังคลอด แต่พบภาวะแทรกซ้อนต่อทารกสูงกว่าการตั้งครรภ์ในวัยผู้ใหญ่*

Introduction

Iodine is an essential element for normal growth and development of human body. Normally 15-20 mg of iodine is contained in a body of healthy adult, of which 70-80% is found in the thyroid gland[1]. Iodine is commonly obtained via dietary and medical supplement. Iodine requirement in adulthood and adolescent is 150 μg/day. However, this amount is considerably increased to 200-250 μg/day in pregnant women and 250-270 μg/day during lactation[2, 3].

The increasing requirement of iodine during pregnancy is due to several factors. First, maternal thyroxine (T4) needs to be increased to maintain maternal euthyroid status. Second, maternal thyroxine is transferred to the fetus in the first trimester, while maternal iodine is transferred directly to the fetus for fetal thyroid function in the later trimesters. Last, the increased glomerular filtration rate during pregnancy decreases iodine level in blood circulation[4, 5]. Hence, maintaining level of maternal iodine is crucial for both maternal and fetal health.

The effect of insufficient iodine levels, called iodine deficiency disorder (IDD), during pregnancy to maternal health includes hypothyroidism and goiter. The effect on fetus includes cretinism, mental retardation, fetal growth restriction, low birth weight, abortion, stillbirth, impaired neurodevelopment, congenital anomaly, and fetal hypothyroidism[2, 4]. Even after birth, lower IQ, impaired reading accuracy, and lower reading comprehension ability were observed among children of women with IDD[6].

IDD is one of the most important preventable micronutrition deficiency problems globally, which affects nearly a billion people[2, 7]. In Thailand, IDD is considered a serious public health problem in the past 50 years, especially in pregnancy and young children. International council for the control of iodine deficiency disorders (ICCIDD) reported in 2009 that 61.2% of pregnant women had insufficient iodine based on the WHO recommended cut-off for pregnancy (iodine urine concentration < 150 μg/day)[8]. The severity of iodine insufficiency is especially accentuated in the Northeastern region, where only 22.6% of the population satisfied the adequate household iodized salt consumption compared to the 47.2% nationwide[8]. Poor health education regarding the impact of IDD was identified as one of the contributing factors toward low iodine level among population[8].

To assess the level of knowledge, attitude, and practice regarding the iodine deficiency, numerous studies have evaluated public awareness of IDD among pregnant women in terms of the level of knowledge, attitude, and practice toward iodine deficiency. According to the study by UNICEF in Albania, where IDD is considered endemic in some areas of the country, revealed a considerable gap in knowledge on IDD among Albanian women of reproductive age[9]. The knowledge level in the Albanian study was also linked to remote area and education level of the women, in which 51% of women 15-49 years old in Albania consumed insufficient amount of iodine while only half of them perceived it as a risk for themselves. In 2012, a study in Australia, a region reported with mild IDD during pregnancy, showed a low level of knowledge regarding IDD during pregnancy[2]. The authors also reported that only around half of pregnant and lactating women in their study take iodine-containing supplements even after an enactment of iodine fortification in dairy products. A qualitative study conducted in 2013 in Nepal showed the level of knowledge and practice of pregnant women regarding iodized salt was satisfactory although one fifth of pregnant women in that study still had insufficient iodine intake[7].

In Thailand, the study of knowledge attitude and practice for preventing IDD of pregnant women was first conducted in 1998 by Kalajuk in district hospitals in Yasothon province[10]. The study result showed that although the majority of participated women had poor knowledge and poor practice regarding iodine deficiency, they had relatively positive attitude. The study also revealed the association between the receiving of IDD information and good preventive behavior[10].

The aim of this study was to explore the current level of knowledge, attitude and practice regarding IDD among pregnant women to identify the magnitude of

problems and develop the appropriate communication strategy to eliminate IDD in pregnancy.

Materials and Methods

Study design and setting

The cross sectional study was conducted from October 2014 to April 2015 among pregnant women who attended the first antenatal service at Srinagarind Hospital, Khon Kaen University. Khon Kaen University is located in Khon Kaen province in the north-eastern region of Thailand (449 kilometers from Bangkok). Khon Kaen has total population of 1,790,049, of which 905,227 (50.57%) are female based on the demographic survey published by National Statistic Office of Thailand in 2014[11].

Population and sampling

All first antenatal-visit pregnant women at Srinagarind Hospital during October 2014 to April 2015 were included in the study. The exclusion criterion was the refusal to participate. Written informed consents were obtained from all participants prior to data collection.

Sample size calculation

The sample size was calculated assuming proportion of good practice and good knowledge population toward iodine deficiency of 23% and 43%, respectively, based on the previous study by Kalajuk in 1998 in Thailand[10]. The margin of error was determined at 20% of target population percentage with Z-score of 1.96 for the confidential interval of 95%. The calculated sample size was 322. After considering a non-response rate of 10%, thus a sample size of 355 was needed in our study.

Data collection

The questionnaire was developed based on the questionnaire from Department of Health, Ministry of Public Health, 2013[12]. The preliminary structured questionnaire was obtained for content validation and reliability test (alpha = 0.7675) so that the actual questionnaire could be modified in accordance with the reliability test result. The questionnaire included socio-demographic data, IDD information received, knowledge, attitude, and practice questions about IDD.

Data were acquired from the participants using a self-administered questionnaire performed at their first antenatal visit. An information leaflet regarding IDD was given to the participant after the questionnaire was collected. A subsequent phone call was made to each participant one month after the first visit regarding their consumption behavior of iodine supplementation during pregnancy. This was performed to fulfill a part of the practice section of the questionnaire. Data was collected by three nurses who were clarified, standardized and familiarized with the questionnaire and data collecting process.

Ethical approval for the study was obtained from Office of The Khon Kaen University Ethics Committee in Human Research. All participants were informed about the study objectives and their rights to participate or leave the study at any time without any consequence. The consent was obtained from both participant and their guardian for participants whose age was younger than 18 years old. Only data collectors and researchers were involved in the anonymous data collection form and supervision process to ensure confidentiality.

Assessment of knowledge regarding IDD

Ten questions were used to measure knowledge of the participants on IDD with three-choice answer includes yes, no and not know. The right answer was counted as 1 score, while the wrong answer and "not know" was counted as 0 score. Knowledge section was scored in the range of 0 to 10. The participants who scored in the range of 8-10, 6-7, and 0-5 were considered to have good, fair, and poor knowledge about the IDD, respectively.

Assessment of attitude regarding IDD

There were 10 questions evaluating attitude of the participants on IDD with four-scale-choice answer includes most agree, highly agree, less agree, and least agree. Attitude was scored ranging from 0 to 30. Score of 3 was given for each "most in favor" answer for IDD, while 2 for highly in favor, 1 for less in favor, and 0 for least in favor of IDD. Participants who scored between

24 and 30 were considered as good attitude, scores between 18 and 23 as fair attitude, and scores between 0 and 17 as poor attitude.

Assessment of practice regarding IDD

There were 9 practice indicators used to evaluate the participants. Four questions were about supplying of iodized food and ingredients for household consumption. The next four questions were about consumption of iodized food and ingredients. For these eight questions, three-scale-choice answer was used to evaluate the frequency of each behavior. The score of 2 was given for "frequently" (> 50%), score of 1 for "sometimes" (< 50%), and score 0 for "never". The last question was used to evaluate iodized supplements consumption during pregnancy. If the participants choose "frequently consume" or "consume iodized oil (2 tablet/1 year)," score of 2 was given. If the participants choose "sometimes consume" it was counted as 1 score. If the participants choose "never consume" it was counted as 0 score. The practice section was scored between 0 and 18. Participants who scored in the ranges of 15-18 were considered to have good practice, and less than 15 as poor practice regarding IDD

Data analysis

Descriptive analysis was conducted. Analytical analysis using Stata version 10 was first performed based on univariate analysis to determine factors associated with good practice regarding iodine deficiency and supplementation including odds ratios (ORs) and 95% confidence interval (CI). To adjust the confounding factors, backward elimination model was applied to include only relevant variables before a multiple logistic regression analysis was performed to obtain adjusted odds ratios (AORs) and their corresponding 95% CI.

Results

Socio-demographic characteristics of study population

A total of 363 pregnant women who first-antenatal-visited at Srinagarind Hospital were included in the study. Among all the included participants, 93.11% completed the questionnaire in all sections, while the remaining 6.89% completed knowledge, attitude, and practice sections with partially completed socio-demographic section. The age ranges of the participants were 14 and 44 years (mean ± SD = 28.47 ± 5.94), of which 6.89% were teenage pregnancy. Among the participants, 181 (49.86%) were multigravida while 175 (48.21%) had her first pregnancy when participated in this study. Regarding the educational status, 52.07% completed less than bachelor degree, 38.29% completed bachelor degree, and 8.82% completed above bachelor degree. There were 62.26% of the participants had household income ranged between 10,000 and 29,999 baht per month (Table 1).

Table 1. Socio-demographic characteristics of study population.

Group	n	%
Age		
< 20	25	6.89
≥ 20	338	93.11
Occupations		
Labor	99	27.27
Government officer	83	22.87
Private business	66	18.18
Unemployed	45	12.39
Others (private employee, student, farmer)	70	19.28

Table 1. Socio-demographic characteristics of study population. (Cont.)

Group	n	%
Household income per month (Baht)		
< 10,000	55	15.15
10,000 - 29,999	226	62.26
≥ 30,000	57	15.7
Highest level of education		
Below bachelor degree	189	52.07
Bachelor degree	139	38.29
Above bachelor degree	32	8.82
Gravidity		
Primigravida	175	48.21
Multigravida	181	49.86
Gestational age (weeks)		
< 14	148	40.77
15-28	99	27.27
> 28	98	26.99

IDD information received

Regarding IDD information received among the participants, 309 (85.12%) received information at least from one source regarding the iodine deficiency. The majority of information sources of IDD were from television (57.58%), health care providers (48.21%), and the Internet (44.35%) (Table 2).

Knowledge, attitude, and practice regarding iodine deficiency

Knowledge

Knowledge scores ranged between 0 and 10 with mean ± SD = 6.40 ± 2.16. Based on the results, the scaled-group of knowledge towards IDD showed that the participants with good and fair knowledge were 121 (33.33%) and 139 (38.29%), respectively. Apart from that, 103 (28.37%) participants had poor knowledge (Table 3).

Attitude

Attitude scores ranged between 15 and 30 (mean ± SD = 21.87 ± 3.99). The scaled-group of attitude assessment regarding IDD showed that 128 (35.26%) had good attitude, 183 (50.41%) had fair attitude, and 52 (14.33%) had poor attitude (Table 3).

Practice

Practice scores ranged between 4 and 18 (mean ± SD = 12.01 ± 3.29). The results showed that 277 (76.31%) had poor practice regarding iodine deficiency, while only 86 (23.69%) had good practice. In terms of iodized supplement consumption during pregnancy assessed via a phone call one month after the first antenatal visit, only 109 participants (30.36%) consumed iodized supplement frequently, while 153 participants (42.62%) moderately consumed iodized supplement, and 88 participants (24.51%) had never consumed iodized supplement during their pregnancy (Table 3).

Based on univariate analyses, factors found to be associated with good practice of iodine supplementation included household income per month of 30,000 baht or more (OR = 3.42, 95% CI 1.36, 8.62), bachelor degree education level (OR = 1.76, 95% CI 1.04, 2.98), above bachelor degree education level (OR = 2.71, 95% CI 1.21, 6.08) multigravida (OR = 1.87, 95% CI 1.13, 3.10), received information regarding IDD (OR = 9.70, 95% CI 2.31, 40.73), fair and good knowledge

(OR = 2.44, 95% CI 1.20, 5.02) and (OR = 3.74, 95% CI 1.83, 7.62) respectively, fair and good attitude (OR = 3.72 95% CI 1.09, 12.67) and (OR = 10.13, 95% CI 2.99, 34.27) respectively (Table 4).

Table 2. IDD information received.

IDD information received	n	%
Never received	54	14.88
Received	309	85.12
Source of information (can be ≥ 1 choices)		
Television	209	57.58
Health care provider	175	48.21
Internet	161	44.35
Poster	98	27.00
Newspaper	96	26.45
Radio	52	14.33
Local broadcast	34	9.37

Table 3. Knowledge, attitude, and practice regarding IDD.

KAP Level	Knowledge		Attitude		Practice	
	n	%	n	%	n	%
Good	121	33.33	128	35.26	86	23.69
Fair	139	38.29	183	50.41	-	-
Poor	103	28.37	52	14.33	277	76.31
Total	363	100	363	100	363	100

Table 4. Association between potential factors and practice regarding IDD.

Group	Level of practice		OR (95% CI)	p value
	Good	Poor		
Age				
< 20	2	23	1	
≥ 20	84	254	3.80 (0.87, 16.47)	0.074
Household income per month (Baht)				
< 10,000	8	47	1	
10,000 - 29,999	54	172	1.84 (0.82, 4.14)	0.138
≥ 30,000	21	36	3.42 (1.36, 8.62)	0.009
Highest level of education				
Below bachelor degree	34	154	1	
Bachelor degree	39	100	1.76 (1.04, 2.98)	0.033
Above bachelor degree	12	20	2.71 (1.21, 6.08)	0.015

Table 4. Association between potential factors and practice regarding IDD. (Cont.)

Group	Level of practice		OR (95% CI)	p value
	Good	Poor		
Highest level of education				
Below bachelor degree	34	154	1	
Bachelor degree	39	100	1.76 (1.04, 2.98)	0.033
Above bachelor degree	12	20	2.71 (1.21, 6.08)	0.015
Gravidity				
Primigravida	31	144	1	
Multigravida	52	129	1.87 (1.13, 3.10)	0.015
IDD information received				
Never received	2	52	1	
Received	84	225	9.70 (2.31, 40.73)	0.002
Level of knowledge				
Poor	12	91	1	
Fair	34	105	2.44 (1.20, 5.02)	0.014
Good	40	81	3.74 (1.83, 7.62)	< 0.001
Level of attitude				
Poor	3	49	1	
Fair	34	149	3.72 (1.09, 12.67)	0.035
Good	49	79	10.13 (2.99, 34.27)	< 0.001

Table 5. Factors associated with good practice regarding IDD by multiple logistic regression analysis.

Group	AOR (95% CI)	p value
IDD information received		
Never received	1	
Received	5.61 (1.29, 24.29)	0.021
Level of knowledge		
Poor	1	
Fair	2.10 (0.99, 4.45)	0.052
Good	2.34 (1.09, 5.01)	0.028

After adjustment for confounding factors, the remaining factors that significantly associated with good practice regarding IDD were IDD information received (AOR = 5.61, 95% CI 1.29, 24.29), good knowledge regarding IDD (AOR = 2.34, 95% CI 1.09, 5.01), and good attitude toward IDD (AOR = 5.41, 95% CI 1.53, 19.05) (Table 5).

Discussion

About 85% of pregnant women received information regarding IDD. The three most popular sources of information regarding IDD were television, healthcare providers, and the Internet.

Only one-third of pregnant women had good knowledge and good attitude, and only one-fourth had

good practices regarding IDD and supplementation. High level of knowledge and good attitude were significantly associated with good practice.

These findings are in agreement with the recent study performed in Australia[2]. Despite that Australia was a developed country, knowledge and practice regarding IDD in some areas were also inadequate. Also, a study performed among reproductive age women by UNICEF in Albania revealed poor knowledge, awareness, and practice toward iodine deficiency among population[9].

These findings are in contrast with a study from Nepal, where around 20% of study population had IDD[7]. Their knowledge, attitude, and practice regarding IDD were satisfactory which indicated the less severity of this nutrition problem in their study.

When compared with the previous study conducted in Thailand (1998), our results were similar except for lower attitude outcome in our study[10]. Lack of continuous assessment and monitoring limits the capacity to identify the cause of drastic change in attitude during the past 17 years.

Strength

This study addresses the very important but neglected Thai health problem. Low iodine level during pregnancy was clearly associated with low IQ and reading ability[6]. We used standardized, pretested questionnaire with content validation and reliability test for collecting information.

Limitation

Our study was limited to the current knowledge, attitude, and practice regarding IDD among pregnant women in Northeastern region of Thailand that may not be generalized to other regions of the country.

Implication

Policy makers and healthcare providers should take the problem of IDD urgently and seriously, especially among pregnant women. More effective dissemination of the important of IDD during pregnancy and its consequences should be urgently, widely and continuously implemented using various media including television, the internet and other social media targeting at pregnant and reproductive age women

Conclusion

This study indicated that pregnant women's knowledge towards IDD were insufficient, their attitude were not positive and their practices were not good. Good knowledge and positive attitude were associated with better practices. Policy makers and health care providers should take this issue as a very serious health problem and take urgent actions in solving this important but silent problem.

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Potential conflcts of interest

The authors declare no conflct of interest.

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