



DUCS 2.0: exploring new frontiers in research

Research and Innovation Division,
Universiti Teknologi MARA (UiTM) Selangor,
Puncak Alam Campus

**DUCS 2.0 : EXPLORING NEW FRONTIERS IN
RESEARCH**

**UNIVERSITI TEKNOLOGI MARA SELANGOR,
PUNCAK ALAM CAMPUS**
Research and Innovation Division

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For inquiries:

*Research & Innovation Division
Universiti Teknologi MARA (UiTM)
Selangor,
42300 Bandar Puncak Alam,
Selangor, Malaysia*

E-mel:

bpiselangor@uitm.edu.my

FOREWORD

We begin by expressing our utmost gratitude to Allah SWT, whose blessings and grace have enabled the successful publication of this book.

Our heartfelt appreciation goes to the Rector of Universiti Teknologi MARA (UiTM) Cawangan Selangor, Professor Dr. Ahmad Taufek Abdul Rahman, for his unwavering support and trust in the realisation of this publication. We also extend our deepest thanks to the Deputy Rector (Research and Innovation), UiTM Selangor, Professor Ir. Ts. Dr. Mohamad Hafiz Mamat and former Deputy Rector (Research and Innovation), UiTM Selangor, Professor Ts. Dr. Asmah Awal, whose vision and encouragement served as a catalyst for this writing endeavour.

This book would not have been possible without the dedication and contributions of the authors; comprising researchers across various disciplines, the Research and Innovation Division, the editorial team, and the leadership of UiTM Selangor.

More than just a compilation of scholarly writings, this publication reflects the vibrant spirit of knowledge, creativity, and innovation thriving within the university's academic ecosystem. We hope it will serve as a valuable reference and a source of inspiration for readers, while contributing to the advancement of knowledge and technology.

Finally, we wish to convey our sincerest appreciation to all who have supported this endeavour, whether directly or indirectly. May this book be a meaningful contribution to the academic community and society at large.

Happy reading.

Editorial Board

Message from the Rector



Assalamualaikum Warahmatullahi Wabarakatuh and warm greetings.

All praise and gratitude be to Allah SWT for His abundant blessings and guidance, through which this book has been successfully compiled and published for the benefit of readers. This publication is a testament to the dedication, perseverance, and collaborative spirit of our researchers alongside the leadership of the Research and Innovation Division(BPI), UiTM Selangor.

I am immensely proud and would like to extend my highest appreciation to all parties who have contributed to the success of this publication. This book is not merely a collection of scholarly works, but also a reflection of the intellectual vigour, creativity, and innovation that continue to flourish within the academic ecosystem of UiTM Selangor.

This initiative by BPI, UiTM Selangor, aims to provide a platform for engagement and knowledge-sharing among researchers from various fields of expertise. The primary objectives are to foster research collaboration, strengthen grant proposal writing, and stimulate high-impact publications in targeted research areas. The publication of high-quality research outcomes through this effort is hoped to elevate the expertise and visibility of our researchers at both national and international levels.

In line with UiTM's aspirations to strengthen its position as a leading university, we are also advancing the agenda of Reset, Recover, and Restore to ensure the sustainability of UiTM Selangor's strategic plan towards realising a more competitive, realistic, and meaningful Research Campus.

I would also like to express my sincere appreciation to the entire editorial committee for their hard work, dedication, and commitment, which have enabled this book to be published successfully. May all these efforts be blessed and rewarded by Allah SWT.

In closing, I wish you an insightful reading experience. May this book bring immense benefit to its readers and serve as a source of inspiration to continue empowering a culture of research and innovation at UiTM.

Wassalamu 'alaikum Warahmatullahi Wabarakatuh.

Professor Dr. Ahmad Taufek Abdul Rahman
Rector, UiTM Cawangan Selangor

Message from the Deputy Rector



In the Name of Allah, the Most Gracious, the Most Merciful

Assalamualaikum Warahmatullahi Wabarakatuh and warm greetings.

First and foremost, I express my highest gratitude to Allah SWT, and send peace and salutations upon the beloved Prophet Muhammad SAW, for the abundant blessings, guidance, and grace bestowed upon us all.

With His permission and divine guidance, this book has been successfully completed and published for readers' benefit. On this meaningful occasion, I wish to extend my heartfelt appreciation and congratulations to the entire editorial team for their tireless efforts and unwavering dedication in ensuring the successful realisation of this publication.

This book compiles research papers from diverse fields of knowledge, contributed by researchers from UiTM Selangor. It is our hope that this research compilation will serve as a valuable and impactful reference for both the academic community and the nation.

I also sincerely hope that this book will provide significant benefits and serve as a source of inspiration for researchers, particularly within UiTM Selangor, to continue strengthening the culture of research, scholarly writing, and knowledge sharing in a sustainable manner.

In conclusion, I once again convey my deepest appreciation and gratitude to all who have contributed their ideas, time, and effort to make this publication a success. May all the sacrifices and dedication be blessed and rewarded by Allah SWT.

Wassalamu'alaikum Warahmatullahi Wabarakatuh.

Professor Ir. Ts. Dr. Mohamad Hafiz Mamat
Deputy Rector (Research and Innovation)

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PRELIMINARY STUDY ON MICRONUTRIENTS DIETARY INTAKE PATTERN AMONG EXCLUSIVELY BREASTFEEDING MOTHERS IN MALAYSIA

Tengku Norbaya Tengku Azhar^{1*}, Malissa Mohamed¹, Siti Noorfahana Mohd Idris¹, Norhafizah Mohd Zazi¹, Muhamad Rahimi Che Hassan¹, Umi Shakina Haridan¹, Radiah Abd Ghani².

¹Centre Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor, Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia

²Kulliyah of Allied Health Sciences, International Islamic University Malaysia (IIUM), Jalan Sultan Ahmad Shah, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia

ABSTRACT

Human milk is the first source of exogenous micronutrients among breastfeeding infants. Thus, maternal food intake is important in determining the level of micronutrients in human milk. The purpose of this study is to ascertain the pattern of fluid, iron, calcium, and fiber intake among mothers in Malaysia who are exclusively breastfeeding. A total of n=36 of exclusively breastfeeding mothers was recruited in the study from December 2018 until March 2019. Mothers underwent a survey on anthropometry and demographic factors using a constructed questionnaire. The dietary intake of the mother was collected as data and was analyzed using Nutritionist Pro. Software. Data was analyzed using SPSS software over the lactating stage of the mothers. For iron, the highest mean of intake occurred during fifth to sixth months of lactation period with, 729.07±539.65 mg per day. In addition, the highest mean of intake occurred during the third to fourth months of lactation period with, 729.07±539.65 mg per day while for fiber intake, the highest mean occurred during fifth to sixth months of lactation period with, 6.83±2.53 g per day. For fluid dietary intake, the highest mean occurred during the third to fourth months of lactation period with 2150±783.51ml per day. Overall, the intake for iron and fluid among exclusively breastfeeding mothers were reported to be higher than recommended RNI (2017) value over lactating period. However, calcium and fiber intake reported to be below RNI requirement. Overall, during the postpartum and nursing periods, the mothers' dietary regimen and lifestyle vary dramatically, potentially affecting their nutritional consumption.

Keywords: Maternal, dietary, micronutrient, exclusively breastfeeding

INTRODUCTION

In Malaysia, iron deficiency was synonymous with anemia episodes among pregnant women. This issue continues until the postpartum period and causes challenging health problems as it relates to the high risk of iron deficiency among infants [1]. One study in Nepal determined that withholding certain iron-rich food such as meat, fish, poultry or eggs could lead to the low intake of iron during the postpartum period [1]. Malaysia is abundant with food that is rich with calcium besides milk and dairy products, such as fish with edible bones like canned sardines and anchovies, beans and bean products including yellow dhal, tofu and tempeh (fermented soybeans), locally processed foods such as shrimp paste, cincalok and budu, as well as vegetables like spinach, watercress, mustard leaves, cekur manis, tapioca leaves, kai-lan and broccoli [2]. However, similar iron, calcium intake is also subjected to the efficiency of absorption. According to [3], even though the knowledge of Malaysians towards the health benefits of dietary fibre was sufficient, most respondents were not aware about the recommended value and portion of fruits and vegetables intake as suggested in the food pyramid. Besides, only 69.2% of respondents reported consuming fruits and vegetables in their daily meals. Earlier studies also reported that the intake of fluid was relatively low in Malaysia [4]. It was supported in another recent study by [5][6] specific to lactating mother that lower amount of fluid intake which ranged from 727.4 ± 144.7 to 1019.3 ± 153.3ml/day along the six months of lactation period.

MATERIAL AND METHOD

This observational, cross-sectional study is a preliminary study that assesses the pattern on maternal dietary intake of several micronutrients including calcium, iron, fibers and fluid. n=36 of exclusively breastfeeding mothers was recruited in the study which was carried out in Central Research Animal Facility (CREAM) and Laboratory at International Islamic University Malaysia (IIUM), Kuantan. Ethical approval for this study was obtained from IIUM Research Ethics Committee (IREC-2019/011). This study was conducted in Kuantan, Pahang and Dengkil, Selangor. The inclusion criteria were as follows: (1) Mother aged between 18–39 years, (2) Full term birth ((birth at gestational age 37 to 42 weeks) without any health complications, (3) Singleton pregnancy at 32 weeks onwards and (4) exclusively breastfeed their baby (0-6 months old). All the participants signed an informed consent form prior to their participation in the study.

The maternal dietary intake assessment was conducted with the help of certified dietitians. A 24-hour dietary recall (24HR) is a structured interview which is used to capture detailed information about all food and beverages consumed by the respondents in the past 24 hours [7]. In-depth face to face or phone interviews were carried out among the study participants to recall their dietary intake information within the previous 24 hours. A day before the interview, the mothers were reminded to record and note all their food and beverages to avoid recall biases. Detailed data about food preparation methods, ingredients used in mixed dishes, and the brand name of commercial or supplement products and amounts of each food consumed are estimated using common household utensils such as spoons, bowls, cups, and glasses. Interviews were usually done at night after the mothers had had their last meal or before the sample collection on the next day. The collected data which demonstrates the macronutrients intake per mother was analyzed using the Nutritionist Pro. (NP) software. All statistical analysis was performed using the SPSS Statistical Software (Version 20) for windows. The significance level was set at 95% ($p < 0.05$) confidence interval.

RESULTS AND DISCUSSION

Figures 1.0 to 4.0 represented the intake of iron, calcium, fiber, and fluid within the lactation period. For iron, the highest mean of intake occurred during the fifth to sixth months of the lactation period with, 729.07 ± 539.65 mg per day followed with 18.52 ± 10.25 during third to fourth months and 15.04 ± 6.86 , which was the lowest during the first two months. All mean values exceeded the recommended value by RNI (2017). 60%, 90% and 93.8% of respondents had iron intake above RNI value during the first two months, third to fourth months and fifth to sixth months, respectively. Overall, there was a significant difference of all means dietary intake of iron over the six months of lactation as compared to RNI value since $p < 0.005$.

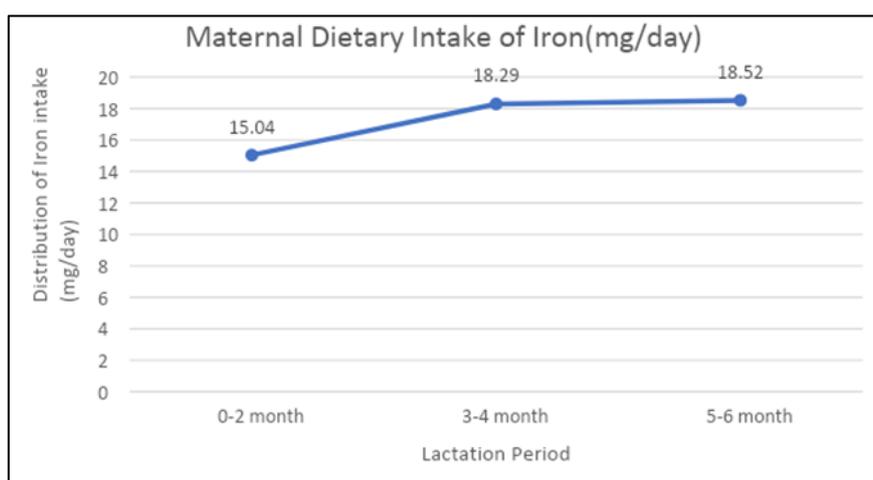


Figure 1.0: The pattern of maternal Iron intake in daily basis over 6 months of breastfeeding period (n=36)

On the other hand, Figure 2.0 for calcium showed that the highest mean of intake occurred during the third to fourth months of lactation period with, 729.07 ± 539.65 mg per day followed with

488.78 ± 263.26 during five to six months and 355.92 ± 191.49 during the first two months, which was the lowest. All mean values were below the recommended value by RNI (2017). 100% of respondents had calcium intake below the RNI value during the first two months and fifth to sixth months of the lactating period. 70% of them also had the same average intake during the third to fourth months. Overall, the means intake of calcium for the first two months and five to six months of lactation were significant since $p < 0.005$ as compared to RNI value [8]. The intake of calcium changes due to the changes pattern of dietary intake after the postpartum period.

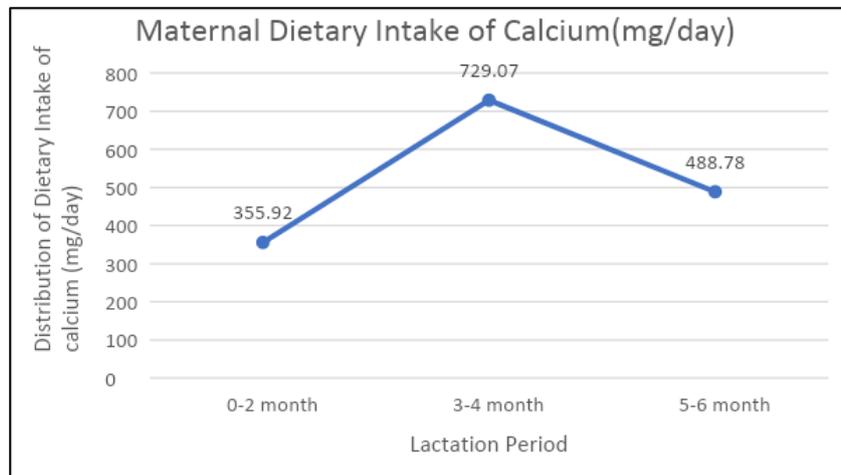


Figure 2.0: The pattern of maternal calcium intake in daily basis over 6 months of breastfeeding period (n=36)

As presented in Table 3.0, the highest mean intake of fiber occurred during the fifth to sixth months of lactation period with 6.83 ± 2.53 g per day followed by 6.58 ± 4.67 during third to fourth months. The lowest intake occurs with 5.92 ± 2.60 within the first two months. All mean values were below the daily recommended value by RNI (2017) and 100% of respondents at each lactation period had fiber intake below that. Overall, all the means intake of fiber during zero to six months of lactation were significant since $p < 0.005$ as compared to RNI value. For maternal fluid dietary intake in Table 4.0, the intake gradually increases until the third to fourth months of lactation period. However, from this point, the intake decreased steeply towards the end of the lactation period. The choice of food among mothers within particular period of lactation affects the level of fiber intake especially when mothers tend to dine outside rather than home cook when they are working.

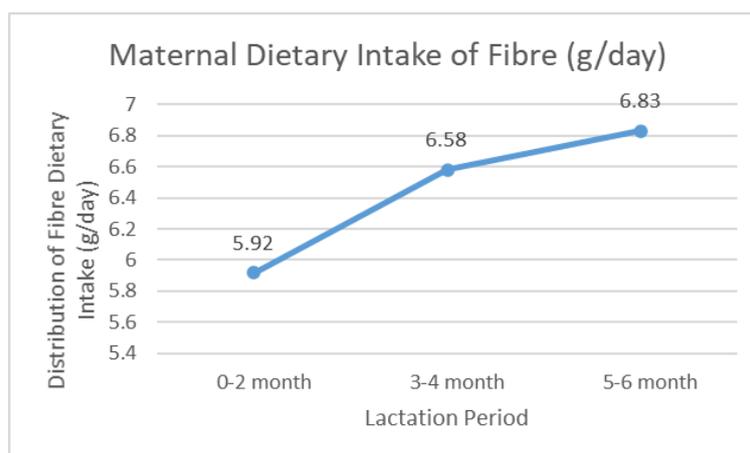


Figure 3.0: The pattern of maternal fiber intake in daily basis over 6 months of breastfeeding period (n=36)

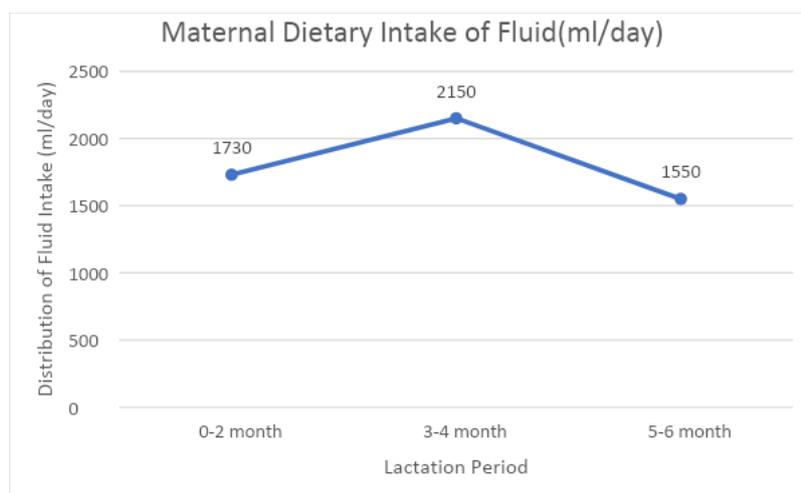


Figure 4.0: The pattern of maternal fluid intake on daily basis over 6 months of breastfeeding period (n=36)

CONCLUSION

Overall, the maternal lifestyle and food habits change significantly during the postpartum and nursing phases, which may have an impact on how much nutrition they consume. At this moment, their food intake is always affected by the period of postpartum. As most Malaysian mothers practice the confinement period, some of the food intake may reflect several traditional beliefs. Activities such as postpartum class as example aimed at educating nursing women about a balanced diet would raise their concern for maintaining a healthy diet both before and after childbirth. Low intake of micronutrients affects severely to successful of breastfeeding rate and infant's nutrient requirement.

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Research and Innovation Division,
Universiti Teknologi MARA (UiTM) Selangor,
Puncak Alam Campus,
42300 Bandar Puncak Alam,
Selangor Darul Ehsan.

☎ : +603-3258 4000
✉ : bpiselangor@uitm.edu.my

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