UNIVERSITI PUTRA MALAYSIA

FOOD SECURITY, AND HEALTH AND NUTRITIONAL STATUS OF INDIAN WOMEN FROM OIL PALM PLANTATIONS IN NEGERI SEMBILAN, MALAYSIA

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FPSK(M) 2007 5
30 MAY 2008

FOOD SECURITY, AND HEALTH AND NUTRITIONAL STATUS OF INDIAN WOMEN FROM OIL PALM PLANTATIONS IN NEGERI SEMBILAN, MALAYSIA

By

MASOUMEH MOHAMADPOUR KLDEH

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

February 2007
DEDICATION

To my most beloved husband, Mehran
For all his understanding, patience, encouragement and support during
all difficulties of my study

To my dearest parents,
For their true love, favour, effort and principle guide and
encouragement since my childhood

To my dear children, Romina, Amir Mahdi and Amir Ali
For making everything worthwhile
A cross sectional study was conducted to determine the relationship between food security and health and nutritional status among 169 Indian women (19-49 years, non-pregnant and non-lactating) from selected oil palm plantations in Negeri Sembilan. The women were interviewed for socio-economic, demographic, physical activity, household food security and dietary intake information and measured for weight, height, waist circumference and blood pressure. Blood samples were collected from 147 women and analyzed for total cholesterol (TC), high-density lipoprotein-cholesterol (HDL-C), low-density lipoprotein-cholesterol (LDL-C), triglyceride (TG) and plasma glucose (FPG) levels. For data analysis, descriptive statistics, ANOVA and logistic regression were conducted. Using the Radimer/Cornell Hunger and Food Insecurity Instrument, a majority of the households experienced household insecurity (24.9%), individual insecurity (19.5%) or child hunger (40.8%). About 39.1% and 26.0% of the women were overweight and obese, respectively. More than half (68.6%) of the women had at risk waist circumference.
circumference (≥ 88 cm). While 70.4% of the women were in the highly active category, 29.6% were either sufficiently active or insufficiently active. The mean intake of energy and most nutrients were lower than the recommended values. Similarly, the mean number of servings for all food groups was less than the recommended servings. The mean diet diversity score was 10.10 ± 10.00 (maximum=29) with most women (89.4%) had diet diversity less than 10. The percentages of women with TG≥2.3 mmol/L, TC≥ 6.2 mmol/L, LDL-C>4.1 mmol/L, HDL-C<1.03 mmol/L, FPG≥6.1 mmol/L and BP≥130/85 mmHg were 14.3%, 2.8%, 12.2%, 32%, 12.9% and 19.7%, respectively. There were significantly decreasing patterns in mean household income, income per capita, year of schooling, diet diversity, vitamin A intake and number of serving from meat/fish/legumes and increasing patterns in mean number of children and prevalence of women with at risk waist circumferences with severity of food insecurity (p<0.05). For physical activity, women experiencing household food insecurity significantly spent higher minutes/day (333.13 ± 178.36) for moderate activities than women in food secure and child hunger households. In addition, women experiencing household food insecurity significantly spent higher minutes/day (343.70 ± 185.65) for vigorous activities than child hunger households (p<0.05). There was no significant difference in TG, HDL-C, FPG and blood pressure by food security levels. The mean number of health risks was significantly higher in child hunger (2.27 ± 1.20) than in individual food insecure (1.48 ± 1.05) groups. While the prevalence of people with more than 3 health risks was highest in child hunger group (42.9%), a majority (82.4%) of food secure women had less than 3 health risks. The logistic regression showed that housewives,
higher age, higher waist circumference, lower years of education and lower duration of physical activity significantly increased the risk for the women to have health problems. In addition, women who had higher intake of milk and dairy products, meat/fish/poultry/legumes and higher diet diversity were more likely to be protected against health problems. In the present study, the effect of food insecurity on health risks is through dietary intakes, which may have impact on waist circumference. As households become food insecure, the ability to obtain variety of foods will be compromised and consequently put the women at risk of having high waist circumference and other health problems. The present study showed that food insecurity among the Indian women from selected palm plantations is indirectly associated with poor health and nutritional status. Therefore, appropriate community-based intervention programs should be developed and implemented to address the problem of food insecurity and possible health and nutritional outcomes.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

JAMINAN KEDAPATAN MAKANAN SERTA STATUS KESIHATAN DAN PEMAKANAN DI KALANGAN WANITA INDIA DI ESTET KELAPA SAWIT DI NEGERI SEMBILAN, MALAYSIA

Oleh

MASOUMEH MOHAMADPOUR KLDEH

Februari 2007

Pengerusi: Associate Professor Zalilah Mohd Shariff, PhD
Fakulti: Perubatan dan Sains Kesihatan

Satu kajian keratan rentas telah dijalankan untuk menentukan perkaitan di antara tiada jaminan kedapatan makanan, status kesihatan dan pemakanan di kalangan 169 wanita India (19-49 tahun, tidak hamil dan tidak menyusukan anak) dari estet kelapa sawit yang terpilih di Negeri Sembilan. Wanita-wanita tersebut telah ditemuramah untuk mendapatkan maklumat sosio-ekonomi, demografi, aktiviti fizikal, tiada jaminan kedapatan makanan isirumah dan pengambilan diet, serta diukur untuk berat, tinggi, lilitan pinggang dan tekanan darah. Sampel darah telah dikumpulkan daripada 147 wanita dan dianalisis untuk mendapatkan paras jumlah kolesterol (TC), lipoprotein-kolesterol ketumpatan tinggi (HDL-C), lipoprotein-kolesterol ketumpatan rendah (LDL-C), trigliserida (TG) dan plasma glukosa. Bagi analisis data, statistik deskriptif, ANOVA dan ujian regresi logistik telah dijalankan. Dengan menggunakan Radimer/Cornell Hunger and Food Insecurity Instrument, sebahagian besar isi rumah didapati mengalami sama ada tiada jaminan
kedapatan makanan peringkat isirumah (24.9%), peringkat individu (19.5%) atau kelaparan kanak-kanak (40.8%). Lebih kurang 39.1% dan 26.0% daripada wanita masing-masing mengalami masalah berlebihan berat badan dan obesiti. Lebih separuh (68.6%) daripada wanita berkenaan mempunyai lilitan pinggang berisiko (≧ 88 cm). Sementara itu, 70.4% daripada wanita ini tergolong dalam kumpulan sangat aktif manakala sebanyak 29.6% pula adalah cukup aktif atau tidak cukup aktif. Min pengambilan tenaga dan kebanyakan nutrien adalah lebih rendah daripada nilai yang dicadangkan. Begitu juga dengan min bilangan sajian bagi kesemua kumpulan makanan adalah lebih rendah daripada bilangan sajian yang dicadangkan. Min bagi skor kepelbagaian makanan adalah sebanyak 10.10 ± 10.00 (maksimum=29) dengan kebanyakan wanita (89.4%) mempunyai kepelbagaian makanan lebih rendah daripada 10. Peratus wanita yang mempunyai paras TG ≥ 2.3 mmol/L, TC ≥ 6.2mmol/L, LDL-C > 4.1mmol/L, HDL-C < 1.03 mmol/L, FPG ≥ 6.1 mmol/L dan BP ≥ 130/85 mmHg adalah sebanyak 14.3%, 2.8%, 12.2%, 32%, 12.9% dan 19.7%, masing-masing. Terdapat penurunan yang signifikan dalam min pendapatan isi rumah, pendapatan per kapita, bilangan tahun persekolahan, kepelbagaian makanan, pengambilan vitamin A dan bilangan sajian daripada kumpulan daging/ikan/ kekaeang. Peningkatan yang signifikan pula dapat dilihat bagi min bilangan anak dan prevalens wanita dengan lilitan pinggang berisiko, dengan keterukan tiada jaminan kedapatan makanan (p<0.05). Bagi aktiviti fizikal, wanita yang mengalami tiada jaminan kedapatan makanan peringkat isirumah menghabiskan lebih banyak masa (333.13 ± 178.36 minit/hari) untuk aktiviti sederhana berbanding wanita dalam isirumah yang mengalami tiada jaminan kedapatan makanan dan
kelaparan kanak-kanak. Tambahan pula, wanita yang mengalami tiada jaminan kedapatan makanan peringkat isi rumah, secara signifikannya menghabiskan lebih banyak masa (343.70 ± 185.65 minit/hari) untuk melakukan aktiviti-aktiviti berat berbanding isi rumah yang mengalami kelaparan kanak-kanak (p<0.05). Tiada perbezaan yang signifikan untuk TG, HDL-C, FPG dan tekanan darah di antara paras tiada jaminan kedapatan makanan. Min bilangan risiko kesihatan lebih tinggi secara signifikan pada peringkat kelaparan kanak-kanak (2.27 ± 1.20) berbanding tiada jaminan kedapatan makanan isirumah (1.48 ± 1.05). Prevalens individu dengan ≥3 risiko kesihatan adalah paling tinggi dalam kumpulan kelaparan kanak-kanak (42.9%) sementara sebahagian besar (82.4%) daripada golongan wanita yang mengalami sekuriti makanan mempunyai <3 risiko kesihatan. Ujian regresi logistik menunjukkan bahawa surirumah, umur yang meningkat, lilitan pinggang yang besar, bilangan tahun persekolahan yang rendah dan aktiviti fizikal yang kurang secara signifikan meningkatkan lagi risiko golongan wanita mengalami masalah kesihatan. Sebaliknya, golongan wanita yang mengambil susu dan produk tenusu serta mengambilan daging/ikan/ayam/kekacang yang tinggi dan mempunyai kepelbagaian diet yang lebih tinggi adalah lebih berkemungkinan untuk dilindungi daripada masalah kesihatan. Dalam kajian ini, kesan tiada jaminan kedapatan makanan ke atas risiko kesihatan adalah menerusi pengambilan makanan yang mungkin memberikan impak ke atas lilitan pinggang. Apabila makanan isi rumah tidak mencukupi, kebolehan untuk mendapatkan makanan yang pelbagai akan terjejas dan seterusnya meletakkan golongan wanita berisiko mempunyai lilitan pinggang yang lebih besar dan mengalami masalah...
kesihatan yang lain. Kajian ini menunjukkan bahawa tiada jaminan kedapatan makanan di kalangan wanita India dari estet kelapa sawit yang terpilih mempunyai perkaitan secara tidak langsung dengan status kesihatan dan pemakanan yang kurang baik. Oleh itu, program-program intervensi peringkat komuniti yang bersesuaian perlu dibentuk dan diimplementasikan untuk mengatasi masalah tiada jaminan kedapatan makanan yang mungkin boleh menjejaskan status kesihatan dan pemakanan.
ACKNOWLEDGEMENTS

First and foremost, I want to thank Dr. Zalilah Mohd Shariff, chairman of my advisory committee, for providing me with a wonderful opportunity to complete my master studies under her exceptional guidance. This work would not have been possible without her patience, constant encouragement, guidance and knowledge. Through frequent meetings and her open door policy, Dr. Zalilah made an immense contribution to this thesis and my academic growth, as well as my professional and personal life.

My sincerest appreciation is also extended to Associate Professor Dr. Mimalini Kandiah and Dr. Chan Yoke Mun, who are members of my supervisory committee, for their constructive suggestions and guidance during the study period. I am also grateful for their willingness to serve on my committee, provide me assistance whenever required, and for reviewing this thesis. I would like also to extend my most sincere gratitude and thanks to Professor Dr. Khor Geok Lin who provided me guidance and knowledge during the course of the study. I am also appreciative towards Professor Dr. Bahaman B Abdul Samah, Associate Professor Dr. Saidi B Moin and Mr Hazizi for their guidance in statistical analysis.

I would also like to extend my appreciation and thanks to:

- My friends and course mates, Ms Sarina Sariman, Ms Azizah Mat Hussin, Mrs Nurhasmah Sulaiman, Ms Ng Won Chi and Mrs Haslinah Abdullah for their supportive and understanding. Without them, I could not handle
the problems occurred during the process of study. I am also appreciate to Mrs Siti Sabariah and Indian enumerators which were my great companions throughout the data collection period.

- I would like to thank Mrs Safarina Bte Ismuddin and Mr Quek Poh Boo who were laboratory staffs of Faculty of Medicine and Health Science for their technical help.

- I am appreciate to all the officials specially Kumpulan Guthrie Berhad as well as Estate Manager which were very helpful in giving us permission, direction to our subject’s house.

- I would like to thank all the staffs from Faculty of Medicine and Health Science and others whose names are not mentioned.

- My family for their understanding, encouragement and moral support towards this achievement.

- Above all, to GOD almighty for making this study possible.
I certify that an Examination Committee has met on 14th February 2007 to conduct the final examination of Masoumeh Mohamadpour Kideh on her Master of Science thesis entitled "Food Security, and Health and Nutritional Status of Indian Women from Oil Palm Plantations in Negeri Sembilan, Malaysia" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows:

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Date: 14 June 2007
DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

MASOUMEH MOHAMADPOUR KLDEH

Date: 15 May 2007
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<td>FS</td>
<td>Food Security</td>
</tr>
<tr>
<td>FSCM</td>
<td>Food Security Core Module</td>
</tr>
<tr>
<td>JNC</td>
<td>Joint National Committee</td>
</tr>
<tr>
<td>HDL-C</td>
<td>High Density Lipoproteins Cholesterol</td>
</tr>
<tr>
<td>HIS</td>
<td>Household Insecure</td>
</tr>
<tr>
<td>IIS</td>
<td>Individual Insecure</td>
</tr>
<tr>
<td>IPAQ</td>
<td>International Physical Activity Questionnaires</td>
</tr>
<tr>
<td>ISH</td>
<td>International Society of Hypertension</td>
</tr>
<tr>
<td>LDL-C</td>
<td>Low Density Lipoproteins Cholesterol</td>
</tr>
<tr>
<td>NCCFN</td>
<td>National Coordinating Committee on Food and Nutrition</td>
</tr>
<tr>
<td>NCEP ATP III</td>
<td>National Cholesterol Education Program Adult Treatment Panel III</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
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</tr>
<tr>
<td>NHLBI</td>
<td>National Health Lung and Blood Institute</td>
</tr>
<tr>
<td>NHMS I</td>
<td>National Health and Morbidity Survey I</td>
</tr>
<tr>
<td>NHMS II</td>
<td>National Health and Morbidity Survey II</td>
</tr>
<tr>
<td>NIH</td>
<td>National Institute of Health</td>
</tr>
<tr>
<td>OR</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>RDA</td>
<td>Recommended Dietary Allowance</td>
</tr>
<tr>
<td>RNI</td>
<td>Recommended Nutrient Intake</td>
</tr>
<tr>
<td>S.D</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>TC</td>
<td>Total cholesterol</td>
</tr>
<tr>
<td>TG</td>
<td>Triglyceride</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>WC</td>
<td>Waist Circumference</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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</table>
CHAPTER 1

INTRODUCTION

1.1 Background of Study

Food insecurity is a worldwide problem with 852 million food insecure and undernourished people in the world. This figure includes 9 million in the industrialized countries, 28 million in countries in transition and 815 million in developing countries (FAO, 2004). Food insecurity is not just a problem in the developing countries but also in developed countries. A high prevalence of food insecurity (94.2%) was reported in a survey of 1423 mothers with children <5 years old in East Java, Indonesia (Studdert et al., 2001). The prevalence of food insecurity in a sample of 199 households was 55.8% compared to 44.2% food secure in Thailand (Piaseu and Mitchell, 2004). The prevalence of food insecurity in the rural households of Sabak Bernam was 58% (Zalilah and Khor, 2004). Olson and Holben (2002) reported that more than 33 million people in the United States (10% of population) experienced food insecurity. About 1 in 10 or 3 million people in Canada lived in food insecure households in 1999 (Che and Chen, 2003).

Food security is defined as access by all people, at all times to sufficient food for an active and healthy life (World Bank, 1986). Access to food includes the ready availability of nutritionally adequate safe foods and the assured ability to acquire them in socially acceptable ways (Life Science Research Office, 1990). However, the definition of food security should not only relate to food supply at global, regional, national, community, household or individual levels
but also encompasses accessibility, adequacy, stability and sustainability of
the food supply (Gittelsohn et al., 1998).

At the micro level, food security is concerned with food availability and
access by households and individuals. The ability of households to access
food is determined by household income that includes the value of goods
produced (e.g. food) and services provided (e.g. child care) that do not enter
to the market, as well as in-kind transfers of goods and services. Access to
food may be gained through production or gathering of food, purchase of
food from the market with cash income and receipts of in-kind transfer
(whether from private citizens, national or foreign government). At the
individual level, food security is defined as an individual’s access to a
nutritionally adequate diet for physical work, disease prevention, adequate
growth and during pregnancy and lactation (Frankenberger et al., 1997a;
Frankenberger et al., 1997b).

Global and national food availability stands at the most macro level of food
security. While global food availability is determined by the total world food
production, national food availability is influenced by the country’s own food
production, food stocks, net food imports (imports minus exports) and food
aids. However, even if national food security is achieved, food insecurity may
still occur at the household and individual levels (Savage-King and Burgess,
1993; Frankenberger et al., 1997a; Frankenberger et al., 1997b).