行政院國家科學委員會專題研究計畫　成果報告

社區流行病學與預防醫學研究—肥胖與第二型糖尿病相關之探討

計畫類別：個別型計畫
計畫編號：NSC91-2320-B-002-171-
執行期間：91 年 08 月 01 日至 92 年 07 月 31 日
執行單位：國立臺灣大學公共衛生學院預防醫學研究所

計畫主持人：林瑞雄

計畫參與人員：林喜碧

報告類型：精簡報告

處理方式：本計畫可公開查詢

中　華　民　國 92 年 11 月 3 日

行政院國家科學委員會補助專題研究計畫成果報告

※※※※※※※※※※※※※※※※※※※※※※※※※
※　　　　　　　　　　　　　　　　　　　　　　　　※
※　社區流行病學與預防醫學研究─肥胖與第二型糖尿　※
※　　　　　　　　病相關之探討　　　　　　　　　　※
※　　　　　　　　　　　　　　　　　　　　　　　　※
※※※※※※※※※※※※※※※※※※※※※※※※※

計畫類別：☑ 個別型計畫　　□整合型計畫

計畫編號：NSC 91-2320-B-002-171-

執行期間：91 年 08 月 01 日至 92 年 07 月 31 日

計畫主持人：林瑞雄　國立台灣大學公共衛生學院

共同主持人：陳秀熙

計畫參與人員：許芸瑄、黃志忠、吳慧敏

本成果報告包括以下應繳交之附件：

□赴國外出差或研習心得報告一份

□赴大陸地區出差或研習心得報告一份

□出席國際學術會議心得報告及發表之論文各一份

□國際合作研究計畫國外研究報告書一份

執行單位：國立台灣大學公共衛生學院

中　華　民　國九十二年　十　月三十一日

行政院國家科學委員會專題研究計畫成果報告
計畫名稱：社區流行病學與預防醫學研究─肥胖與第二型糖尿病相關之探討
計畫編號：NSC 91-2320-B-002-171
執行期限：91 年月 08 月 01 日至 92 年 07 月 31 日
主持人：林瑞雄　國立台灣大學公共衛生學院
共同主持人：陳秀熙
計畫參與人員：許芸瑄、吳慧敏、黃志忠

摘要

目的

藉由社區研究估計第二型糖尿病患者其肥胖的盛行率，並找出高血壓與其他疾病的共病率(co-morbidity rate)。

方法

基隆社區整合式篩檢(KCIS)是以社區為基礎的整合式篩檢。2001 年至 2002 年間共有 43,158 名 20 歲以上民眾參與基隆社區整合式篩檢。除了與第二型糖尿病、肥胖及其他疾病相關的結果外，並由問卷中收集了其他相關因子。包括生活型態(抽煙、喝酒及飲食習慣)、癌症及慢性病的家族疾病史、個人疾病史、生產經歷及月經史。

結果

第二型糖尿病盛行率依 BMI<25 kg/m^2，25≦BMI<30 kg/m^2 及 BMI≧30 kg/m^2 三組分別為 6.6%，12.5%及 18.8%。第二型糖尿病與其他疾病的共病率，包含高尿酸血症、高血壓及高血脂症。第二型糖尿病患者其高血壓的共病率依 BMI<25 kg/m^2，25≦BMI<30 kg/m^2 及 BMI≧30 kg/m^2 三組分別為 3.7%，8.3%及 13.5%。第二型糖尿病患者其高血脂症的共病率依 BMI<25 kg/m^2，25≦BMI<30 kg/m^2 及 BMI≧30 kg/m^2 三組分別為 4.3%，9.0%及 14.1%。第二型糖尿病患者其高尿酸血症的共病率依 BMI<25 kg/m^2，25≦BMI<30 kg/m^2 及 BMI≧30 kg/m^2 三組分別為 5.6%，11.4%及 17.8%。

討論

1. 本研究中過重及肥胖盛行率高於台灣地區第三次全國性營養調查。
2. 本研究第二型糖尿病盛行率高於其他台灣地區的社區研究。
3. 隨著 BMI 的增加，第二型糖尿病盛行率也增加。高血壓、高尿酸血症及高血脂症等共病率也隨之增加。

關鍵字：第二型糖尿病、肥胖、社區性研究

Abstract

Objectives

A community-based study was designed to estimate the prevalence of obesity among type 2 diabetes and to find the co-morbidity rates of hypertension and other diseases.

Methods

A community-based integrated screening was performed, called Keelung community-based integrated screening (KCIS). A total of 43,158 subjects aged older than 20 years old participated in the KCIS program between 2001 and 2002. In addition to outcome measurements related to type 2 diabetes, obesity, and other biochemical factors. Other relevant factors are collected from questionnaire. These include life-style variables (smoking, drinking, dietary factor), family history of cancer and chronic disease, personal disease, reproductive factors, menstrual factors.

Results

The prevalence of type 2 diabetes by BMI group were 6.6%,12.5%,18.8% in BMI<25 kg/m^2, 25≦BMI<30 kg/m^2 and BMI≧30 kg/m^2 group, respectively. The co-mobility rate of type 2 diabetes and other diseases were estimated including hyperuricemia, hypertension and hyperlipidemia in our study.

The co-morbidity rate of hypertension among type 2 diabetes by BMI group were 3.7% in BMI ＜ 25kg/m^2, 8.3% in 25≤BMI≤30kg/m^2 and 13.5% in BMI≥30 kg/m^2.The co-morbidity rate of hyperlipidemia among type 2 diabetes by BMI group were 4.3% in BMI＜25kg/m^2, 9.0% in 25≤BMI≤30kg/m^2 and 14.1% in BMI≥30 kg/m^2. The co-morbidity prevalence of hyperuricemia and type 2 diabetes among different BMI group were 5.6% in BMI＜25kg/m^2, 11.4% in 25≤BMI ≤30kg/m^2 and 17.8% in BMI≥30 kg/m^2.

Conclusions

1. The prevalence of overweight and obesity in the present study were higher than Third National Nutrition Survey in Taiwan between 1993 and 1996.

2. The prevalence of type 2 diabetes in our study was higher than other community-based studies in Taiwan.

3. The prevalence of type 2 diabetes increased with high level of BMI group. We also found an increased trend among these three co-morbid disease (including hypertension, hyperlipidemia and hyperuricemia) with type 2 diabetes among BMI group.

Keywords ： Type 2 diabetes, obesity, community-based study

一、 Introduction

Obesity has been regarded as one of the most influential risk factors and treatment determinant for type 2 diabetes. The close relationship between obesity and type 2 diabetes can be addressed from several aspects. It has been long recognized that obesity may worsen insulin resistance that is one of primary causes of type 2 diabetes. Epidemiological studies revealed that the risk of type 2 diabetes associated with body mass index (BMI) shows an exponential relationship. Obese subjects (BMI ≥ 40kg/m^2) have 80-fold risk for developing type2 diabetes as compared with individuals with BMI of＜22 kg/m^2. From the viewpoint of treatment, obesity has been reckoned as an obstacle to the management of type 2 diabetes. In addition, obesity may account for excessive morbidity and mortality among type 2 diabetes.

To the best of our knowledge, there is lacking of large community-based studies addressing the association between obesity and type 2 diabetes. A community-based study was designed to estimate the prevalence of obesity among type 2 diabetes and to find the co-morbidity rates of hypertension and other diseases. screening project.

二、Material and Methods

A community-based screening program was conducted in Keelung city in Taiwan between 2001and 2002.

(A) Target population

The Keelung City, located at northernmost Taiwan, has a population of around 390,000 residents. There are 286,184 residents aged above 20 years old.A community-based integrated screening was performed, called Keelung community-based integrated screening (KCIS). The details of study design were described in full elsewhere. In brief, a total of 43,158 subjects aged older than 20 years old participated in the KCIS program between 2001 and 2002.

(B) Data collection: In addition to outcome measurements related to type 2 diabetes, obesity, and other biochemical factors. Other relevant factors are collected from questionnaire. These include life-style variables (smoking, drinking, dietary factor), family history of cancer and chronic disease, personal disease, reproductive factors, menstrual factors.

(C) Statistical analysis: Multiple logistic regression is used to estimate the magnitude of a variety of associations between obesity and type 2 diabetes after adjustment for confounding factors. The relationship between obesity and type 2 diabetes is measured by correlation coefficient.

三、Results

Of 43,158 subjects, 16,411 (38.0%) were male and 26,747 (62.0%) were female. The overall coverage rate of the screening project was 15.1%. The coverage rates were 11.3% and 19.0%. The prevalence of overweight(25≦BMI<30 kg/m^2) was 39.6% for male and 29.0% for female. The prevalence of obesity(BMI≧30kg/m^2) was 6.7% in male and 8.1% in female.

There were 4,032 subjects defined as type 2 diabetes including 1756 male and 2276 female. The overall prevalence of type 2 diabetes in Keelung above 20 years old were 9.3%, 10.7% in male and 8.5% in female.

The prevalence of type 2 diabetes by BMI group were 6.6%,12.5%,18.8% in BMI<25 kg/m^2, 25≦BMI<30 kg/m^2 and BMI≧30 kg/m^2 group, respectively.

The co-mobility rate of type 2 diabetes and other diseases were estimated including hyperuricemia, hypertension and hyperlipidemia in our study.

The co-morbidity rate of hypertension among type 2 diabetes by BMI group were 3.7% in BMI ＜ 25kg/m^2, 8.3% in 25≤BMI≤30kg/m^2 and 13.5% in BMI≥30 kg/m^2.

The co-morbidity rate of hyperlipidemia among type 2 diabetes by BMI group were 4.3% in BMI＜25kg/m^2, 9.0% in 25≤BMI≤30kg/m^2 and 14.1% in BMI≥30 kg/m^2.

The co-morbidity prevalence of hyperuricemia and type 2 diabetes among different BMI group were 5.6% in BMI＜25kg/m^2, 11.4% in 25≤BMI ≤30kg/m^2 and 17.8% in BMI≥30 kg/m^2.

四、Conclusions

1. The prevalence of overweight and obesity in the present study were higher than Third National Nutrition Survey in Taiwan between 1993 and 1996.

2. The prevalence of type 2 diabetes in our

study was higher than other community-based studies in Taiwan.

3. The prevalence of type 2 diabetes mellitus increased with high level of BMI group. We also found an increased trend among these three co-morbid disease (including hypertension, hyperlipidemia and hyperuricemia) with type 2 diabetes among BMI group.

五、Reference

1. Albu J, Konnarides C, Pi-Sunyer FX. 1995. Metabolic and cardiovascular effects. Diabetes Rev 3：335-347.

2. Barbara A. Ramlo-Halsted, MD, and Steven V. Edelman, MD. 1999.12. The Natural History of Type 2 Diabetes. Volume 26.Number4. ： 771-789.

3. Carol A. Maggio. Xavier Pi-Sunyer. 1997.11. The Prevention and Treatment of Obesity. Diabetes Care, volume 20 Number 11 ： 1744-1765.

4. Eriksson K-F, Lindgarde F. 1991. Prevention of type 2 (non-insulin-dependent) diabetes mellitus by diet and physical exercise. Diabetologia 34：891-898.

5. Ferrannini E, Buzzigoli G, Bonadonna R, Giorico MA, Oleggini M, Graziadei L, Pedrinelli R, Brandia L, Bevilacqua S. 1987. Insulin resistance in essential hyperension. N Engl J Med.1987;317：350-357.

6. Galloway JA. 1990. Treatment of NIDDM with insulin agonists or substitutes. Diabetes Care 13：1209-1239.

7. Genuth JF. 1990. Insulin use in NIDDM. Diabetes Care 13：1240-1264.

8. Goya S. Wannamethee, Gerald Shaper A.. 1999.8. Weight Change and Duration of Overweight and Obesity in the Incidence of Type 2 Diabetes. Diabetes Care, Volume22 ： 1266-1272.

9. Gumbiner Barry, MD. 1999.12. The Treatment of Obestity in Type 2 Diabetes Mellitus. Valume 26.Number4. ：869-883.

10. Haffner SM. 2000. Sex hormones, obesity, fat distribution, type2 diabetes and insulin resistance ： epidemiological and clinical correlation. International Journal of Obesity(2000) 24, Suppl 2 , S56-S58.

11. Hamilton CC, Geil PB, Anderson JW. 1992. Management of obesity in diabetes mellitus. Diabetes Educ 18：407-410.

12. Henry RR, Gumbiner B. 1991. Benefits and limitations of very-low-calorie therapy in obese NIDDM. Diabetes Care 14：802-823.

13. Hillier TA. Pedula KL. 2001 Sep Characteristics of an adult population with newly diagnosed type 2 diabetes: the relation of obesity and age of onset. Diabetes Care. 24(9):1522-7.

14. HoImang A, Svedberg J, Jennische E, Bjorntorp P. 1990. Effects of testosterone on muscle insulin sensitivity and morphology in female rats. Ann J Phys 1990;259：E555-E560.

15. HoImang A, Bjorntorp P. 1992. The effects of testosterone on insulin sensitivity in male rats. Acta Physiol Scand 1992;146：505-510.

16. Iasahiko Ishikawa, M. Lourdes Pruneda, Beverley Adams-Huet, and Philp Raskin. 1998.8. Obesity-Independent Hyperinsulinemia in Nondiabetic First-Degree Relatives of Individuals With Type 2 Diabetes. Dlabetes, Vol.47：788-792.

17. Ishikawa Masahiko, Pruneda M. Lourdes Beverley Adams-Huet, Raskin Philip. 1998 Obesity-Independent Hyperinsulinemia in Nondiabetic First-Degree Relatives of Individuals With Type 2 Diabetes. Diabetes, Volume 47: 788-792.

18. Jeffery RW. 1995. Community programs for obesity prevention. Obesity Res 3 (Suppl. 2)： 283_S-288_S.

19. Ludvik B, Nolan JJ, Baloga J, Sacks D, Olefsky J. 1995. Effect of obesity on insulin resistance in normal subjects and patients with NIDDM. Diabetes 44：1121-1125.

20. Maggie C.Y. Ng , Shao-Chin Lee, Gary T.C.KO, June K.Y. Li, Wing-Yee So, Yasmeen Hashim, Anthony H. Barnett, Ian R. Mackay, Julian A.J.H. Critchley, Clive S. Cockarm, Juliana C.N. Chan. 2001.4. Familial Early-Onset Type 2 Diabetes in Chinese Patients. Diabetes Care, Volume24：663-671.

21. Modan M, Karasik A, Halkin H, Fuchs Z, Lusky A, Shitrit A, Modan B. 1986.Effect of past and concurrent body mass index on prevalence of glucose intolerance and type 2 (non-insulin-dependent)diabetes and on insulin response. Obesity and hypertension Diabetologia 29：82-89.

22. National Heart, Lung, and Blood Institute. 1998. NHLBI Obesity Education Panel ： Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. The evidence report 1-228.

23. Olefsky JM, Kolterman OG, Scarlett JA. 1982. Insulin action and resistance in obesity and noninsulin-dependent type Ⅱ diabetes mellitus. J Physiol 243：E15-E30.