PREVALENCE OF NEWLY DIAGNOSED PREDIABETES, DIABETES MELLITUS AMONG THE OFFICERS FROM PHUOC LONG DISTRICT OF BINH PHUOC PROVINCE

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ABSTRACT

Prevalence of newly diagnosed prediabetes, diabetes mellitus among the civil servant from Phuoc Long district of Binh Phuoc province

Objective: To evaluate the prevalence of newly diagnosed prediabetes, diabetes mellitus among the officers from Phuoc Long district of Binh Phuoc province. **Subjects and methods:** 268 personals communications service was examined the impaired fasting glucose (G₀); impaired glucose tolerance (G₂) and HbA_{1c}. **Results:** Prevalence of prediabetes, type 2 diabetes mellitus by G₀, G₂, HbA_{1c} as follows 16,0%; 13,1%; 17,9% and 3,8%; 6,7%; 2,2%. Common prevalence of prediabetes in 26,9%; type 2 diabetes mellitus in 7,1%. **Conclusion:** Personal communications service from Phuoc Long district have percentage of prediabetes higher compared to type 2 diabetes mellitus which of prediabetes was diagnosed by HbA_{1c} which takes up the highest percentage; diabetes mellitus was diagnosed by G₂ which takes up the highest percentage.

Keywords: Prediabetes, type 2 diabetes mellitus, impaired glucose tolerance.

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INTRODUCTION

The rates of diabetes and prediabetes are increasing rapidly in the community, belonging to different age groups and subjects. In general, about 50% of patients with type 2 diabetes are diagnosed in their late stage, it is likely to be much higher when

it comes to prediabetes. In the early stage of most diabetes and prediabetes cases, there is no complication, silent manifestations make it difficult for both patients and healthcare providers to detect the disease in time. In the community, there are many subjects at high risk to diabetes and prediabetes, including officers with related characteristics. Screening for diabetes, prediabetes in the community can be based on three methods including fasting blood glucose test, second hour blood glucose of oral glucose tolerance test and HbA_{1c}. Each indicator gives a different result, either alone or in combination. Our research target is: *to assess the prevalence of prediabetes and type 2 diabetes which are first diagnosed by fasting glucose level, oral glucose tolerance test and HbA_{1c} among officers of Phuoc Long district.*

1. STUDY SUBJECTS AND METHODS

1.1. Subjects: 268 officers from different departments of Phuoc Long district who had their health followed up at Medical centers are the study subjects selected according to descriptive epidemiological formula.

1.1.1. Selection criteria

+ Officers in different age groups are working in different departments of the district.

+ Both women and men are acceptable

+ Selected randomly from all officers of the district.

+ Agree to participate in the research

1.1.2. Exclusion criteria

+ Subjects who had been diagnosed with prediabetes, type 2 diabetes or other type of diabetes before.

+ Subjects with current acute diseases

+ Subjects who suffer from chronic

diseases such as cirrhosis, kidney failure, hypothyroidism, current or previously use of corticoids, chronic pancreatic disease.

1.2. Methods

+ Study design: prospective, descriptive, cross-sectional.

+ Location and time conducted: Phuoc Long district medical center, from August 2017 to March 2018.

1.2.1. Research steps

+ Step 1: Organizing activities. Based on the list of officers from district departments to randomly select research subjects.

+ Step 2: Organize training and guidance for healthcare providers to participate in screening

1.2.3. Research diagnostic criteria

activities related to the implementation.

+ Step 3: Notify to-be-screened subjects about the preparation, time, location.

+ Step 4: Organize the implementation at the medical center.

+ Step 5: Summarize and analyze the data

1.2.2. Research content

+ Ask for general health history, measure height, weight, calculate body mass index.

+ Test for fasting venous glucose level and HbA_{1c} then perform oral glucose tolerance test with 75g of anhydride sugar mixed with 250 ml of cool boiled water, drink in 5 minutes. Re-test for the venous glucose level after 2 hours.

Table 1.1. Research diagnostic criteria for prediabetes and type 2 diabetes

Diagnosis		Timepoint	Glucose (mmol/l)
Diabetes		Fasting	≥ 7
		Random or 2-h PG during OGTT	≥ 11.1
		HbA _{1c}	$\geq 6.5\%$
Prediabetes	Impaired glucose tolerance (IGT)	- Fasting - 2-h PG during OGTT	< 5.6 7.8 – 11.0
	Impaired fasting glucose (IFG)	- Fasting - 2-h PG during OGTT	5.6 – 6.9 < 7.8
	HbA _{1c}		5.7 – 6.4%
	Combination of IGT, IFG and HbA _{1c}	- Fasting - 2-h PG during OGTT - HbA _{1c}	5.6 – 6.9 7.8 – 11.0 5.7 – 6.4%

Data was processed by PSS 17.0. Research content did meet any criteria of medical ethics.

2. RESULTS

Table 2.1. Age and gender proportion (n = 268)

Age (Years)	Number (n)	Proportion
< 40	140	52.2
40- 49	50	18.7
50 -59	71	26.5
≥ 60	7	2.6
Male	111	41.5
Female	157	58.5

+ Subjects below 40 years old take up the highest proportion.

+ Subjects older than 60 account for the smallest proportion.

+ Females make up for a larger proportion than males

Table 2.2. Proportion based on laboratory indicators (n=268)

	G₀	G₂	HbA_{1c}
Normal	215 (80.2%)	215 (80.2%)	214 (79.9%)
Prediabetes	43 (16.0%)	35 (13.1%)	48 (17.9%)
Type 2 Diabetes	10 (3.8%)	18 (6.7%)	6 (2.2%)

+ Subjects diagnosed with prediabetes by HbA1C has the highest proportion.

+ Subjects diagnosed with type 2 diabetes by G2 accounts for the largest proportion.

Table 2.3. Proportion based on glucose level and HbA1C (n=268)

	Number (n)	Proportion (%)
Normal	177	60.0
Prediabetes	72	26.9
Type 2 Diabetes	19	7.1

The rate of prediabetes is higher than type 2 diabetes.

Table 2.4. Number of diagnostic criteria for prediabetes and type 2 diabetes

Number of diagnostic criteria	Prediabetes (n=72)	Type 2 diabetes (n=19)
1	40 (55.6%)	7 (36.8%)
2	25 (34.7%)	9 (47.4%)
3	7 (9.7%)	3 (15.8%)

+ Subjects with 1 criterion for prediabetes account for the largest proportion.

+ Subjects with 2 criteria for type 2 diabetes account for the largest proportion.

3. DISCUSSIONS

Based on the results, it was found that among the screening subjects, 7.1% of cases were first diagnosed with diabetes. These are clearly cases of early diagnosis. Prediabetes manifests 26.9% of the diagnostic criteria. In fact, if we only consider the proportion of type 2 diabetes which is diagnosed for the first time by screening among officers from different age groups, mainly below 60, this is a high proportion. Even the proportion of prediabetes (26.9%) is not a low rate. However, in comparison with other researchs on the rate of first diagnosed prediabetes and type 2 diabetes, it is not easy to determine whether this is a high or low rate as the subjects range among researchs. There is scarcely any writer who had similar subjects to ours. Most recent epidemiologic researches have studied concurrently on the rate of both diabetes and prediabetes in the community, to reflect the cause and effect relationships. Phan Hường Dương et al. who investigated in a number of districts in Hai Phom from 2012

to 2014 showed the rate of 5.2% for type 2 diabetes and 26.8% for prediabetes [3]. Trần Ngọc Thanh who studied on prediabetes among students and Ho Chi Minh university of Pharmacy showed that: 1.7% cases were type 2 diabetes, 16.1% were increased fasting glucose level, impaired glucose tolerance took up 23.4% [7]. Phan Long Nhon et al. found that in Bong Son hospital (Binh Dinh), up to 53.38% prediabetes cases had not been [6]. Nguyễn Văn Lành in 2014 showed that the rate of type 2 diabetes in Khmer people older in Hau Giang province was 17.91% and 11.91% [4]. Nguyễn Thy Khuê et al who studied on epidemiologic characteristics of glucose disorders in officers of district 10 in Ho Chi Minh city in reported a rather high rate, with 5.3% for type 2 diabetes, 9.2% for IFG, 48.2% of which were firstly diagnosed [5]. In 2001, In a large scale research on epidemiology of diabetes in Viet Nam according to international criteria, national hospital of endocrinology conducted surveys on subjects aged between 30 and 64 in 4 big

cities: Ha Noi, Hai Phong, Da Nang and Ho Chi Minh.

The result showed that the rate of impaired glucose tolerance was 5.1%. In 2002, national hospital of endocrinology conducted a nationwide survey and the result showed that the rates of impaired glucose level and impaired fasting glucose were 7.3% and 1.9% respectively, these rates in the mountainous areas are 7.1% and the plain: 7.0% and 1.4%, the midlands and coastal areas: 8.3% and 2.4% and the city : 6.5% và 1.8% [2]. In a study of 2700 people aged 30-64 years old in Kien Giang province in 2004, the results showed that the prevalence of IFG was 4.1% and that of IGT was 10.7%. The rate of impaired glucose tolerance in women is 12.1%, higher than that of male at 8.3% but it is not statistically significant with $p > 0.05$ [1]. As mentioned above, screening and diagnosis of diabetes and pre-diabetes include 3 forms: basing on fasting blood glucose, glucose tolerance test and HbA_{1c}. Each of these measures has its own diagnostic criteria, which are equivalent to each other, although it can be said that the oral glucose tolerance test seems to give more objective results.

Therefore, even if the subject only meets at least one corresponding standard, it has been identified as pre-diabetes or diabetes. Analysis of cases diagnosed with prediabetes, type 2 diabetes shows that: subjects diagnosed with prediabetes by one criterion accounts for the highest percentage, followed by 2 criteria. There are 7 cases that simultaneously met all 3 criteria. Among subjects diagnosed with type 2 diabetes, the number of cases satisfying 2 criteria accounted for the highest rate, followed by the satisfaction of 1 criterion. Subjects with type 2 diabetes meeting all the 3 criteria were seen in 15.8% cases.

Diagnostic criteria differs as the standards of different association range. The World Health Organization mainly promotes the diagnosis of pre-diabetes and type 2 diabetes based on fasting glucose test and oral glucose tolerance test.

4. CONCLUSION

+ The rate of diabetes was 7.1%; prediabetes was 26.9%.

+ Type 2 diabetes diagnosis was predominantly based on G2

+ Prediabetes diagnosis was predominantly based on HbA_{1c}

+ Prediabetes satisfying 1 diagnostic criterion accounted for the largest proportion

+ Type 2 diabetes meeting 2 diagnostic criteria made up for the largest proportion.

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