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Original Article

Accuracy of Self-Reported Hypertension, Diabetes, and Hyperlipidemia among Adults of Liwan, Guangzhou, China

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Abstract

Background: We aimed to determine the accuracy of self-reported diabetes, hypertension, and hyperlipidemia in Chinese adults and examine factors that affect the accuracy of self-reports.

Methods: This representative cross-sectional survey was conducted in Liwan District, Guangzhou City, Southeast China. Self-reported data were collected using a structured questionnaire. Biometrical data were recorded, including blood lipid, blood glucose and arterial blood pressure levels. Sensitivity, specificity, and $\varkappa$ values of self-reports were used as measurements of accuracy or agreements. The Robust Poisson-GEE was applied to determine the association of participants' characteristics with the accuracy of self-reports.

Results: Self-reported and biometrical data of 1278 residents aged 18 yr and older (693 women and 585 men) were used to calculate three measures of agreement. The agreement between self-reports and biomedical measurements was substantial for both hypertension and diabetes ($\varkappa$=0.77 and 0.76), but only slight for hyperlipidemia ($\varkappa$=0.06). Similarly, the sensitivity was higher for hypertension and diabetes (72.3% and 71.2%) than for hyperlipidemia (6.8%), while the specificity was high overall (≥98%). The factors associated with an accurate self-reported diagnosis in respondents with disease included having undergone blood pressure measurement (for hypertension) or blood glucose measurement (for diabetes) in the past 6 month, having attended health knowledge lectures in the past year and having social health insurances (for hypertension), and having undergone physical discomfort in the past 2 weeks (for hypertension and diabetes).

Conclusion: The accuracy of self-reported hypertension and diabetes was high, whereas that of self-reported hyperlipidemia was lower among the population.

Keywords: Hypertension; Diabetes; Hyperlipidemia; Self-reported accuracy

Introduction

In epidemiological surveys, information on the prevalence of diseases in a target population is commonly obtained via self-reports using questionnaires or telephone or personal interviews (1). Although the method is relatively inexpensive, convenient, and efficient compared to physical examinations and biometrical analyses, the validity of self-reported data is often questioned due to measurement error (1, 2). The rate of incorrect reporting, and therefore misclassification, can be

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considerable and vary according to the nature and severity of the disease, characteristics of the population, and socioeconomic status of the country (1-11). Furthermore, self-report data tend to underestimate disease prevalence (1).

Cardiovascular disease (CVD) is a leading cause of morbidity and mortality worldwide. Cardio metabolic risk factors, such as hypertension, diabetes, and hyperlipidemia, result in a substantially increased risk of CVD and mortality (12). Therefore, an accurate report on the prevalence of these chronic conditions is critical for disease management and the validity of self-reports is an important issue. However, although several studies have attempted to validate the accuracy of self-reported diagnosis of diabetes and hypertension, the majority of them were conducted in Europe and America (1,2,6,8,9,11,13). In a recent systematic review (14) of 22 validation studies of self-reported hypertension, only one of the included studies was conducted in China (3). Additionally, this study from China was restricted to the elderly subgroup (3). Although health interview surveys have become critical sources of data in China, information on the accuracy of self-reported these conditions (i.e., hypertension, diabetes, and hyperlipidemia) is limited.

Previous studies have aimed to determine the correlation between patient characteristics and the accuracy of self-reported chronic diseases, but the results were contradictory (1-8). For example, higher education level was associated with greater accuracy of self-reported hypertension in one study (3) and decreased accuracy in the other (2). Remarkably, whether the access to health education and having health insurance plays a role in the increased accuracy of self-reports remains unknown (3, 14).

We aimed to evaluate the accuracy of self-reported hypertension, diabetes, and hyperlipidemia as compared to that diagnosed via biomedical measurements in a regionally representative sample of 1278 Chinese adult individuals. Furthermore, factors that affected the accuracy of self-reports were explored.

Materials and Methods

Study design

This was a population-based study using data from the Guangzhou Liwan, China Comprehensive Survey of Chronic Disease Prevention and Control, which was conducted by the local center for Disease Control and Prevention in 2013.

Participants were selected via a two-stage random sampling method. Seven communities in Liwan District were randomly selected, and participants were randomly selected in the 7 chosen communities. The sample size in each community was determined according to the proportion of the registered population in the 7 chosen communities. Data were collected in the participants' homes between Apr and Jun 2013 using a two-step method: participants were asked to (i) answer a questionnaire that contains detailed questions on basic demographic characteristics, physical and mental health, health-related behaviors, and household composition and (ii) then they underwent a physical examination performed by interviewers and provide blood specimens (12-hour fast). The interviewers were trained in standard procedures for data collection, and the measurement equipment was previously calibrated.

Ethical approval of the study protocol was obtained from the Ethics Committee of Guangdong Pharmaceutical University, and written informed consent was obtained from each participant.

Data

The self-reported information on chronic conditions was based on a series of questions: (i) "Has a doctor ever told you that you have high blood pressure/high blood sugar or that you are hypertensive/diabetic?," (ii) "Have you ever been told that you have hyperlipidemia?". Blood pressure was measured twice (approximately 60 seconds apart) on a single occasion using a digital sphygmomanometer. In addition, a third measurement was conducted if the difference between the two measurements in systolic or diastolic pressures was >4 mmHg. The average of these readings was used to determine blood pressure levels. Hypertension was defined as a systolic BP ≥140 mmHg and/or diastolic BP ≥90 mm Hg and/or use of antihypertensive medication (3,15). Fasting blood glucose and blood lipid levels were estimated using a hexokinase and an enzymatic method, respectively. Diabetes was defined as a fasting blood glucose level ≥126 mg/dL or the current use of antidiabetic drugs (1,15). Hyperlipidemia was defined as a total cholesterol level ≥240 mg/dL, triglyceride level ≥200 mg/dL, low-density lipoprotein (LDL) level ≥160 mg/dL, or high-density lipoprotein (HDL) level <40 mg/dL (16). Biometrical measurements corrected for the current use of medication are further referred to as biometrical measurements/data.

Statistical methods

To assess the difference in prevalence estimates according to data collection method, the prevalence of these conditions was calculated separately based on self-reported and biometrical data. The participants were confirmed to have hypertension, hyperlipidemia, or diabetes if they met the corresponding criteria based on biometric measurements. To assess the accuracy of the self-reports, the following three measures of agreement were calculated with the results of the biometrical measurements as the reference standard: (i) sensitivity (i.e., the percentage of participants with a diagnosis, based on the biometrical data, who reported to have the condition in the questionnaire, (ii) specificity (i.e., the percentage of participants without a diagnosis, who reported not to have the condition), and (ii) Cohen's kappa ($\varkappa$) (i.e., a more robust measure to estimate the degree of overall agreement between self-reported data and biometrical measurements). In terms of the $\varkappa$ value, the level of agreement was considered to be: slight to fair (≤0.40), moderate (0.41-0.60), substantial (0.61-0.80), or excellent (≥0.81) (3). Robust Poisson-generalized estimating equations (GEE) models were established separately for these conditions to determine the factors associated with the likelihood that participants with a condition provided accurate reports of the corresponding condition. Notably, the specificity for all three conditions showed a high accuracy of ≥98% in our study, indicating that only few participants without these conditions provided inaccurate reports, so there was no adequate sample to allow multivariate analysis to determine the factors associated with the specificity. The GEE based on Robust Poisson regression model, which is suitable for estimating relative risk or prevalence ratio (PR) for common outcome data with the intra-class correlation (17,18), was applied for our multivariate analyses because a positive correlation of awareness and knowledge of these conditions existed between different members in one family and the self-reported data are non-independent data with intra-class correlation.

The decision regarding the set of adjustment variables were based on the restriction of limited sample size and consistency in the literature. Variables in the multivariate models included demographic characteristics (age, sex, and body mass index), socioeconomic factors (level of education and types of health insurance), behavioral factors (smoking habit and alcohol consumption), health status (hospital admission and perceived physical discomfort), self-care behaviors (timing of the most recent health examination, blood pressure measurement and blood glucose measurement), and access to health education. Participants with missing or unknown data in any of the variables considered were excluded only from those analyses involving that variable. Statistical analyses were performed using SAS software (version 9.2), and the probability of error was set at 5% (α=0.05).

Results

General characteristics

Of the 1500 inhabitants invited, 1423 gave informed consent. Among them, 1278 adult participants were enrolled for this study; of them, 1271 underwent physical examination (99.5%), and 1207 provided blood specimens (95.0%). More than half of the participants were women, with the majority aged >39 yr. Majority were nonsmokers, non-drinkers, secondary education, and had a health insurance. One-third of the participants were overweight or obese, and approximately one-fourth of the participants perceived physical discomfort within the past 30 days, while less than a one-tenth of participants were hospitalized within the past year. More than two-thirds of the participants had self-care behaviors, such as health examination and blood pressure measurement; however, only one-half had their blood glucose measured previously. Remarkably, approximately 73% of the participants had never attended a health knowledge lecture during the past year (Table 1).

Table 1: General characteristics of the participants and determinants of accurate self-report for hypertension, diabetes and hyperlipidemia in a sample of Chinese adults

Variables	*Total, N (%)*	*Hypertension*		*Diabetes*		*Hyperlipidemia*	
		Sensitivity, % (95%CI)	*PR(95%CI)*	*Sensitivity, % (95%CI)*	*PR(95%CI)*	*Sensitivity, % (95%CI)*	*PR(95%CI)*
Sex							
Women	693 (54.2)	72.7(69.5,78.9)	1	68.8(58.6, 79.0)	1	9.3(5.4, 13.2)	1
Man	585 (45.8)	71.8(71.6,72.0)	1.114(0.933, 1.330)	75.0(63.2, 86.8)	1.046(0.715, 1.530)	4.6(1.8, 7.4)	3.185(0.629, 16.130)
Age (yr)							
18-39	258 (20.2)	33.3(4.0,78.0)	1	50.0(10.0, 90.0)	1	2.1(0.1, 4.1)	1
40-59	493 (38.6)	64.4(55.2,73.6)	1.277(0.623, 2.621)	62.2(46.6, 77.8)	1.011(0.142, 7.193)	7.3(3.3, 11.3)	0.377(0.033, 4.167)
≥60	527 (41.2)	76.1(71.1,81.1)	1.456(0.707, 2.996)	75.3(66.5, 84.1)	1.095(0.162, 7.389)	8.2(4.6, 11.8)	0.573(0.049, 6.649)
Education							
No formal education	39 (3.1)	78.9(72.4, 85.4)	1	80.0(62.1, 97.9)	1	7.0(0.6, 13.4)	1
Primary education	220 (17.2)	77.8(75.0, 80.6)	1.073(0.814, 1.416)	71.9(64.0, 79.8)	0.769(0.538, 1.099)	8.3(4.7, 11.9)	1.071(0.815, 1.409)
Secondary education	840 (65.7)	66.8(65.2, 68.4)	0.990(0.760, 1.309)	69.7(64.0, 75.4)	0.797(0.583, 1.090)	7.3(5.6, 9.0)	1.074(0.816, 1.412)
Higher education	179 (14.0)	75.0(71.8, 78.2)	0.889(0.640, 1.235)	81.8(77.1, 86.5)	0.927(0.659, 1.304)	10.4(6.0, 14.8)	1.886(0.634, 5.611)
Health insurance							
Without Insurance	84 (6.6)	83.9(79.9, 87.9)	1	50.0(25.0, 75.0)	1	13.0(6.0, 20.0)	1
Social health insurance	1046 (81.8)	85.4(84.3, 86.5)	1.127(1.105, 1.150)	74.8(70.7, 78.9)	1.582(0.882, 2.839)	7.3(5.9, 8.7)	1.234(0.959, 1.587)
Commercial health insurance	148 (11.6)	70.4(66.6, 74.2)	0.840(0.664, 1.061)	52.9(40.8, 65.0)	1.523(0.791, 2.931)	9.0(2.1, 11.3)	1.056(0.950, 1.172)
BMI (kg/m²)							
Lean/normal(≤24.9)	718 (66.9)	70.1(63.2, 77.0)	1	69.8(58.5, 81.1)	1	5.4(2.4, 8.4)	1
Overweight(25-29.9)	299 (27.8)	76.9(69.0, 84.8)	0.840(0.664, 1.061)	71.9(56.3, 87.5)	0.849(0.629, 1.144)	10.2(4.7, 15.7)	1.003(0.303, 3.318)
Obese (≥30)	57 (5.3)	66.7(49.8, 83.6)	1.066(0.936, 1.294)	88.9(78.8, 99.0)	1.103(0.809, 1.503)	4.5(0.1, 8.9)	0.616(0.049, 7.705)
Smoking habit							
Non-smoker	998 (78.6)	74.2(69.1, 79.3)	1	72.7(64.4, 81.0)	1	8.1(5.1, 11.1)	1
Former smoker	68 (5.4)	86.1(74.8, 97.4)	1.017(0.794, 1.302)	66.7(30.0, 93.0)	1.002(0.686, 1.464)	6.2(1.0, 21.0)	0.432(0.039, 4.798)
Smoker	204 (16.1)	56.7(44.8, 68.6)	0.814(0.602, 1.102)	61.5(32.0, 86.0)	0.952(0.545, 1.663)	3.3(1.4, 5.2)	1.164(0.143, 9.480)
Alcohol consumption within the past 30 days							
No	1036 (81.6)	74.1(69.2, 79.0)	1	70.4(62.1, 78.7)	1	6.5(3.9, 9.1)	1
Yes	234 (18.4)	64.4(53.4, 75.4)	0.917(0.714, 1.177)	76.5(56.3, 96.7)	0.957(0.636, 1.440)	8.5(2.9, 14.1)	0.355(0.085, 1.484)

Perceived physical discomfort within the past two weeks							
No	919 (71.9)	56.3(49.1, 63.5)	1	53.0(41.0, 65.0)	1	4.7(2.2, 7.2)	1
Yes	359 (28.1)	86.7(82.0, 91.4)	1.431(1.191, 1.719)	89.4(82.0, 96.8)	1.328(1.016, 1.736)	11.1(6.1, 16.1)	0.347(0.104, 1.161)
Hospital admission within the past year							
No	1127 (92.6)	70.0(65.0, 75.0)	1	67.0(58.2, 75.8)	1	6.2(3.8, 8.6)	1
Yes	90 (7.4)	88.9(80.5, 97.3)	1.011(0.843, 1.213)	95.2(90.5, 99.9)	1.079(0.804, 1.447)	17.5(7.0, 33.0)	0.502(0.092, 2.744)
Timing of the most recent health exam							
Never having	389 (31.6)	60.7(51.4, 70.0)	1	77.1(60.0, 90.0)	1	3.4(0.1, 6.7)	1
More than 12 months	174 (14.1)	69.2(56.7, 81.7)	0.982(0.753, 1.280)	46.7(21.0, 73.0)	0.857(0.507, 1.451)	4.2(1.8, 6.6)	1.461(0.138, 15.492)
Within the past year	668 (54.3)	77.5(72.0, 83.0)	1.060(0.851, 1.319)	73.8(64.2, 83.4)	0.955(0.747, 1.221)	10.0(6.1, 13.9)	0.365(0.060, 2.231)
Timing of the most recent blood pressure measurement							
Never having	238 (18.7)	31.4(16.0, 46.8)	1	66.7(22.0, 96.0)	1	2.8(1.4, 4.2)	1
More than 12 months	202 (15.9)	57.6(40.7, 74.5)	2.423(0.953, 6.161)	66.7(41.0, 87.0)	1.488(0.410, 5.403)	8.5(1.4, 15.6)	0.478(0.035, 6.541)
In the past 7-12 months	142 (11.2)	59.1(38.6, 79.6)	2.582(0.988, 6.746)	66.7(30.0, 93.0)	2.214(0.610, 8.032)	2.5(0.1, 4.9)	0.730(0.030, 17.870)
In the past 1-6 months	323 (25.4)	64.0(54.6, 73.4)	2.503(1.031, 6.079)	67.6(49.0, 83.0)	1.556(0.435, 5.566)	8.0(3.0, 13.0)	0.594(0.042, 8.371)
Within the past 30 days	367 (28.9)	87.6(83.0, 92.2)	3.689(1.533, 8.879)	75.4(64.9, 85.9)	1.590(0.445, 5.685)	8.8(4.2, 13.4)	1.036(0.074, 14.514)
Timing of the most recent blood glucose detection							
Never having	608 (47.8)	61.9(53.8, 67.0)	1	25.9(11.0, 46.0)	1	4.8(1.7, 7.9)	1
More than 12 months	200 (15.7)	68.9(57.3, 80.5)	1.001(0.768, 1.303)	60.0(26.0, 94.0)	5.950(0.720, 49.141)	6.6(1.0, 12.2)	0.574(0.103, 3.202)
In the past 7-12 months	118 (9.3)	82.1(67.9, 96.3)	1.066(0.842, 1.349)	50.0(12.0, 88.0)	6.150(0.926, 40.842)	9.1(2.0, 24.0)	2.022(0.148, 27.586)
In the past 1-6 months	214 (16.8)	77.3(68.5, 86.1)	0.970(0.774, 1.216)	74.3(57.0, 91.6)	8.360(1.333, 52.415)	8.2(2.4, 14.0)	1.349(0.239, 7.617)
Within the past 30 days	132 (10.4)	85.1(76.6, 93.6)	0.986(0.810, 1.201)	96.3(93.7, 98.9)	9.773(1.452, 65.772)	12.0(3.0, 21.0)	1.107(0.163, 7.543)
Had you attended health knowledge lectures within the past year?							
No	925 (72.7)	68.4(63.0, 73.8)	1	72.2(63.3, 81.1)	1	8.0(5.0, 11.0)	1
Yes	347 (27.3)	82.2(74.7, 89.7)	1.289(1.104, 1.505)	68.6(51.0, 83.0)	1.175(0.867, 1.593)	4.2(0.6, 7.8)	1.815(0.383, 8.593)

PR: prevalence ratio; CI: confidence interval

Prevalence, sensitivity, specificity, and ϰ coefficient

Based on the biometrical data, the prevalence of diabetes was 10.9%, whereas that of hypertension (30.4%) and hyperlipidemia (36.3%) was much higher. Self-reported data underestimated the prevalence of hyperlipidemia by >10-fold. The prevalence based on the self-reported data lead to an underestimation of 25% for hypertension and 18% for diabetes compared with the reference standard (Table 2).

The sensitivity was relatively high for self-reported hypertension (72.3%) and diabetes (71.2%), while it was extremely low for hyperlipidemia (6.8%). The specificity was high overall (≥98%), and it was again higher for hypertension (99.1%) and diabetes (98.7%). Furthermore, when the agreement between self-report for hyperlipidemia and each lipid profile was separately calculated, the sensitivity was higher in participants with hypercholesterolemia and hypertriglyceridemia than in those with low HDL and high LDL levels (7.2% and 7.3% vs. 2.2% and 3.5%).

According to the ϰ values, the overall agreement between self-reported data and biometrical measurements was substantial for hypertension (ϰ=0.77) and diabetes (ϰ=0.76), while it was only minimal (ϰ=0.06) for hyperlipidemia (Table 2).

Table 2: Measures of agreement of self-reported chronic conditions in the study sample

	biometrical measurement					
	Hypertension (N=1271)		*Diabetes (N=1214)*		*Hyperlipidemia (N=1207)*	
	Yes	*No*	*Yes*	*No*	*Yes*	*No*
Self-report						
Yes	279	8	94	14	30	16
No	107	877	38	1068	408	753
Prevalence by self-report, % (95% CI)	22.6 (20.3, 24.9)		8.9 (7.3, 10.5)		3.8 (2.7, 4.9)	
Prevalence by biometrical measurement, % (95% CI)	30.4 (27.9, 32.9)		10.9 (9.1, 12.7)		36.3 (34.9, 37.7)	
Sensitivity, % (95% CI)	72.3 (67.8, 76.8)		71.2 (63.5, 78.9)		6.8 (5.6, 8.0)	
Specificity, % (95% CI)	99.1 (98.5, 99.7)		98.7 (98.0, 99.4)		97.9 (97.4, 98.4)	
ϰ (95% CI)	0.77 (0.73, 0.81)		0.76 (0.70, 0.82)		0.06 (0.03, 0.09)	

ϰ: Cohen's kappa; CI: confidence interval

Factors associated with an accurate self-reported diagnosis in participants with disease

Table 1 shows the results of multivariate Robust Poisson-GEE models. Participants with a social health insurance were more likely to report hypertension correctly than those without. Participants with hypertension who attended health knowledge lectures during the past year were more likely to provide accurate reports. Additionally, participants with perceived physical discomfort in the past 2 weeks were more likely to report hypertension and diabetes correctly. Self-reports on hypertension/diabetes were more accurate if the blood pressure/blood glucose were measured during the past 6 months.

The sensitivity and specificity of self-reports for every combination of chronic conditions are shown in Fig. 1. For the combination of diabetes and hypertension, the percentage of participants with chronic conditions who reported it correctly was higher when reporting only one condition. However, in every combination containing hyperlipidemia, a higher percentage of accurate reports was noted in participants with chronic conditions than those with only hyperlipidemia. In general, the specificity of self-reports minimally changed before and after combining.

Discussion

This study assessed the degree of overall consistency between self-reported diagnosis and biometrical data on three chronic conditions. Among adults residing in Liwan District of Guangzhou City, China, we found "substantial" consistency for diabetes and hypertension and only "slight" for hyperlipidemia. Several validation studies on the accuracy of self-reported these conditions have been conducted, though few of them was carried out in China (1-4,6,8,9,11,13). It is important to consider the heterogeneity in design, validation criteria, and participant characteristics among these studies when comparing their findings to those of our study.

Our study found a considerably higher accuracy of self-reported hypertension compared with that in a previous study (3), which used data from the China Health and Retirement Longitudinal Study (CHARLS, 2011–2012) (sensitivity: 72.3% vs. 56.3%; specificity: 99.1% vs. 96.3%; ϰ: 0.77 vs. 0.57). Furthermore, the accuracy of self-reported diabetes in our study was higher than that in the CHARLS (sensitivity: 71.2% vs. 61.5%; specificity: 98.7% vs. 98.3%; ϰ: 0.76 vs. 0.65) (3). Notably, the CHARLS is a nationwide survey aimed at both urban and rural residents, while our study was regionally based and aimed at urban adults only. Additionally, the results of CHARLS show that the accuracy of self-reported hypertension and diabetes in the urban was higher than that in the rural area.

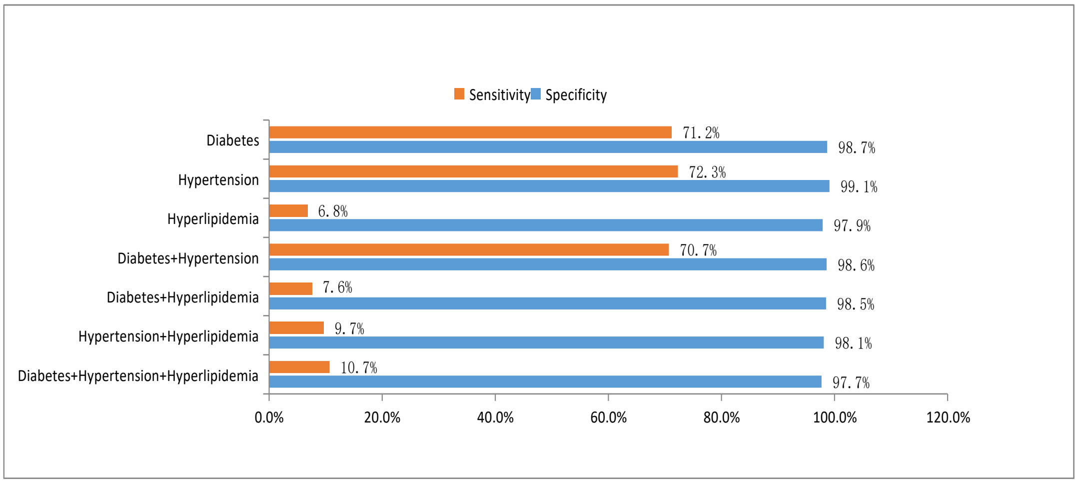

Fig. 1: Sensitivity and specificity of self-reports compared with biomedical data in participants with combination of these chronic conditions (participants with two or more chronic disease)

Thus, the differences between our results and those of the CHARLS may be partly explained by the urban-rural differences. It is worth mentioning that the diagnostic criterion for diabetes in our study was defined as fasting blood glucose levels ≥126 mg/dL, while it was HbA1c ≥6.5% in the study based on CHARLS. HbA1c, a mid-term index of exposure to high blood glucose levels, is a reliable measure of blood glucose levels (5). When the criterion of HbA1c values ≥6.5% was used in our study, the sensitivity and specificity of the self-reported diabetes were almost unchanged (71.0% and 98.5%, respectively). In studies from other countries, the accuracy of self-reported hypertension varied in sensitivity from 13.0% to 92.0% and in specificity from 72.0% to 98.8% (14). Similarly, these indices values of diabetes were from 63.3% to 83.9% and from 96.0% to 99.6% (1,2,4,5,19,20). The accuracy of self-reported hypertension and diabetes in roughly the same levels in our study was high than in most of these studies. Meanwhile, the sensitivity of self-reported hyperlipidemia in our study (6.8%) is the lowest among published data (34.5% in Spanish (1) and 46.7% in Koreans (4)). This may be explained as follows: (i) As a leading cause of death and disability in China, the management of hypertension and diabetes has become the focus of health educational and screening programs in recent years and (ii) Local government-led health promotion programs aimed at preventing chronic diseases, such as hypertension and diabetes, have been implemented in Guangzhou, China for over 15 yr, but hyperlipidemia is not included (21). The sensitivity of self-reported hyperlipidemia was higher in participant with hypercholesterolemia and hypertriglyceridemia than in those with low HDL and high LDL in our study. This result suggested that awareness and concern regarding low HDL and high LDL are much lower than those regarding hypercholesterolemia and hypertriglyceridemia in the study population.

The accuracy of self-reports was determined by the reporter's understanding and awareness of these conditions, their ability to recall it, and willingness to report it (5). Interestingly, the multivariate analysis showed that participants with hypertension and diabetes who perceived physical discomfort within the past 2 weeks were more likely to report the conditions correctly. The results are consistent with those of a previous study in Korea (4). A probable explanation may be that the perceived physical discomfort increases their willingness to report the conditions. Moreover, hypertensive participants with a social health insurance were much more likely to correctly self-report their condition than those without. This may be because patients with a social health insurance tend to have more frequent contacts with healthcare systems, along with a greater health consciousness. As expected, hypertensive participants who attended health knowledge lectures during the past year were more likely to provide accurate reports, which support the hypothesis that access to health education is directly associated with the awareness and understanding about disease condition. Our results support the findings of a previous study indicating that individuals with recent self-care behaviors are more likely to self-report their condition correctly (1). Having blood pressure/blood glucose measured within the past 6 months significantly increased the accuracy of self-reported hypertension/diabetes. However, the poor values of self-reported hyperlipidemia were evenly distributed across categories of variables considered, reflecting the widespread lack of understanding and poor awareness of hyperlipidemia among the population in the sampled area. The self-reported accuracy for the combination of hyperlipidemia and hypertension or diabetes was higher than that of hyperlipidemia alone, suggesting the significance of comprehensive intervention aimed at these conditions.

This study is limited by the fact that biometrical data obtained during a single examination may be insufficient to identify all the participants affected by a disease. Nonetheless, the present study also has important strengths. First, the analyses were based on a large and regionally representative sample, and the response rate was high. Second, the use of the Robust Poisson-GEE model, a proper statistical model for our data, strengthens the stability of the results in factor analysis. Finally, this study provides additional data on the accuracy of self-reported chronic conditions, particularly hyperlipidemia, in the Chinese population, for which research is limited.

Conclusion

Substantial consistency was found for self-reported and biologically assessed hypertension and diabetes in a sample of adults from Southeast China. Meanwhile, the level of consistency was extremely low for hyperlipidemia, for which self-reports are not valid estimates of disease prevalence. Further efforts to improve awareness of hypertension and diabetes by organizing health lectures, advocating for regular blood pressure/glucose measurement, and researching on measures to increase awareness on hyperlipidemia are warranted.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors have no conflict of interest to disclose.

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