

Prevalence of and independent risk factors for metabolic syndrome in adults: a population-based, cross-sectional, epidemiological survey in Jiangxi province, China

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Abstract

Background Metabolic syndrome (MS) has abruptly increased in China in the past two decades, gradually representing an important public health threat over the years. Here, we firstly reported the prevalence of and independent risk factors for metabolic syndrome in Jiangxi province, China. Methods A population-based cross-sectional survey was performed in Jiangxi province, China, from April to August 2015. MS was diagnosed by International Diabetes Federation (IDF) and Chinese Diabetes Society (CDS) criteria, respectively. Independent risk factors for MS were investigated by multivariate logistic regression. Results A total of 2665 residents aged over 18 years were enrolled, and 2580 effectively participated. According to IDF and CDS criteria, age-standardized prevalence rates of MS were 21.1% and 15.2% in all participants, respectively; prevalence rates were 19.6% and 17.1% in men, and 22.7% or 13.0% in women, based on these respective criteria. Rural participants had a significantly higher prevalence than urban individuals, so did rural females. Prevalence in males did not differ between rural and urban participants. Furthermore, both low education level and menopausal state were independent risk factors for MS in adults. Conclusions MS is highly prevalent in adults in Jiangxi province, China. Low education level and menopausal state are independent risk factors for MS.

Background

Metabolic syndrome (MS) is a constellation of interrelated metabolic disturbances based on insulin resistance, including visceral adiposity, atherogenic dyslipidemia, elevations of blood pressure (BP) and glucose, endothelial dysfunction, prothrombotic and proinflammatory states; it is associated with greatly increased morbidity and mortality of cardiovascular disease (CVD) and type 2 diabetes mellitus (T2DM)[1-5]. In the global context of urbanization and the spread of unhealthy life-style, the high prevalence of MS gradually overburdens public health[6].

Interestingly, different MS prevalence rates have been presented in published studies assessing the Chinese population[7-15]. MS prevalence was reported at 13.3% in 2001, rapidly rising to 18.2% in 2009 in China Health and Nutrition Survey, according to the Chinese Diabetes Society (CDS) criteria[7, 14]. Paradoxically, a prevalence of 9.82% found in 2014 was lower than that of 2009 by the same criteria[15]. To the best of our knowledge, at least two reasons may explain these results. Firstly, diverse dietary habits in different regions could represent an important cause of the disparate prevalence of MS. The MS prevalence rates in Jilin province and the Yan-an region of Shanxi province were 22.4% and 26.4% according to International Diabetes Federation (IDF) criteria, respectively[10, 13]. Secondly, different diagnosis criteria also could contribute to these differences. As shown previously, MS prevalence was 12.6% by the CDS criteria in the Hangzhou region of Zhejiang province, and 7.3% by IDF criteria in Guangdong province[11, 12].

Both IDF and CDS criteria for MS are two widely used criteria for clinical and research purposes[9, 14]. Most components of MS are similar between IDF and CDS criteria, although some slight differences remain. IDF criteria emphasize on central obesity evaluated by waist circumference (WC), while CDS criteria stressed on overall body obesity evaluated by body mass index (BMI). Besides, IDF criteria consider central obesity as prerequisite, and have stricter cut-offs for blood pressure and blood glucose levels.

Jiangxi province is an under-developed province in central China, with 45 million Han Chinese or so. With sustained economic growth, the Western lifestyle in local populations has been developed in the past two

decades. Unfortunately, although many studies of MS have been performed in other regions of China, little information is available for Jiangxi province. In the present study, we investigated MS prevalence based on the IDF and CDS criteria in Jiangxi province, in a cross-section survey sponsored by the TIDE (Thyroid disorders, Iodine status and Diabetes: a national Epidemiological survey) study group. Independent risk factors for MS were subsequently determined.

Materials And Methods

Study design and population

The current data originated from the epidemiological data collected by the TIDE. This population-based, cross-sectional, epidemiological survey was performed in Jiangxi province from April to August in 2015. The participants were restricted to local residents who had been living at the study sites for at least five years. Pregnant women were excluded.

In this study, the cluster sampling method was adopted. Briefly, according to economic development levels provided by the Statistical Bureau of Jiangxi province, communities in cities and villages in counties were classified into 3 levels, including well-developed, moderately developed and underdeveloped regions. Based on data from Statistical Bureau, moderately developed regions were included, and well-developed and underdeveloped regions excluded. Afterwards, 1 community (Qingyunpu) in Nanchang city and 4 villages (Diaozechong, Yincheng, Raoer and Huangbai) in Dexing County were randomly selected as representative study sites. According to residential registration, all adults were invited to participate in this survey. Totally, 2665 adults were invited and 2580 effectively attended, giving a response rate of 96.8% (Figure 1). Data collection was performed by trained medical professionals at the Second Affiliated Hospital of Nanchang University. Data analysis was limited to individuals who had completed all procedures, comprising 1322 (51.2%) males and 1258 (48.8%) females; 1360 (52.7%) participants lived in urban areas, and 1220 (47.3%) in rural regions.

Questionnaire, anthropometric measurements and blood sample investigation

Firstly, individual demographic characteristics and disease history questionnaire were completed. Demographic and clinical information included age, sex, level of education, marital status, menstrual condition, family annual income, occupational status, smoking, history of diseases such as diabetes, hypertension, dyslipidemia and hyperuricemia, medications for diseases and family history of diabetes. In multiple logistic regression analysis, age was classified into 3 groups, including ≤ 40 , 41-65 and ≥ 66 years old. Education was classified into 3 levels, including primary school and below, middle and high school, and college and above. Family annual income was graded into 4 levels: (1) $< 30,000$; (2) $30,000\sim 50,000$; (3) $50,000\sim 100,000$; (4) $> 100,000$ Chinese yuan (100 CNY= 14.56USD). Occupational status was categorized into student, worker (farmer), house worker (retired), clerk and others. Smoking was defined as at least 100 cigarettes consumed prior to the survey. Amenorrhea was defined as not having a period for at least 6 months or 3 menstrual cycles.

Anthropometric data, including blood pressure, heart rate (HR), WC, height and body weight, were measured by recommended standard procedures. In brief, BP and HR were average values of two separate measurements taken at 5-minute intervals. Weight and height were measured without shoes or heavy garments. BMI (kg/m²) was determined by dividing the weight (kg) by height (m) squared. WC was measured in the erect position at the middle of the lowest rib and the superior border of the iliac crest.

Blood samples were obtained after at least 10 hours of fasting to determine fasting blood chemistry parameters. Afterward, all subjects were given a standard 2 hour-75g oral glucose tolerance test (OGTT). All serum parameters were detected on a Mindray (Mindray Medical International Limited, China) automatic biochemistry analyzer. Serum total cholesterol (TC) and triglyceride (TG) levels were determined by enzymatic methods. Serum low density lipoprotein cholesterol (LDL-C) and high density lipoprotein cholesterol (HDL-C) amounts were measured by the direct method. Serum uric acid (UA) content was measured by the uric acid enzyme-peroxide enzyme coupling method. Fasting plasma glucose (FPG) and OGTT-2h plasma glucose (2h PG) were determined by the glucose oxidase method. Glycosylated hemoglobin A1c (HbA1c) was measured by high pressure liquid chromatography. All the procedures were executed by experienced laboratory technicians.

Diagnosis of metabolic syndrome

MS was diagnosed based on IDF or CDS criteria (Chinese specific)[9, 14]. These two criteria are described in Supplementary Table 1.

Statistical Analyses

An EpiData (EpiData Association, Odense, Denmark) database was established, and all data were analyzed by SPSS (Statistical Program for Social Sciences, version 20.0). Continuous variables were described as mean (standard error, SE) and analyzed by univariate analysis. Categorical variables are presented as number and percentage, and analyzed by the Chi-square test. The official 2010 census data of China was used to determine age-standardized ratios. Multivariate logistic regression was used to investigate the independent risk factors for MS.

Results

Characteristics of the survey population

A total of 1322 adult males and 1258 adult females were finally included and evaluated in this cross-sectional study. The characteristics of these individuals are shown in Table 1. No significant differences were found in age, 2h PG, TG and TC between men and women. Except for HR and HDL-C, other anthropometric values and blood chemistry parameters were significantly higher in men compared with women. In contrast, women had greater levels of HDL-C and HR. Height, HbA1c and HR were higher in urban than rural participants, but TG was lower in urban individuals. Rural women had higher BMI, WC, BP, TG, TC, HDL-C, LDL-C and UA compared with urban females. Besides, urban women had delayed menopause compared with their rural counterparts. Men

had higher education and income levels, especially in urban areas. The smoking rate was nearly 40% in men and was significantly higher than that of women. Meanwhile, more women performed housework than men.

MS prevalence rates based on different criteria

The prevalence rates of MS are displayed in Table 2. Of the 2580 subjects, 542 (21.0%) were diagnosed with MS based on IDF criteria. The age-adjusted prevalence was 21.1% for the whole population, with 22.6% and 19.6% in females and men, respectively. With population aging, MS prevalence increased (Figure 2). No significant gender differences were observed in total prevalence, but women had higher prevalence in elderly groups than men (47.9% vs 27.6% and 41.1% vs 20.4%, in 60-69 and >60 years, respectively, $p < 0.01$). In peri-menopausal women groups, MS rates in rural areas were significantly higher compared with those of urban regions (32.6% vs 14.3% and 47.8% vs 28.4%, in 40-49 and 50-59 years, respectively, $p < 0.01$). Besides, such difference was also found in 18-29 years females (7.3% vs 1.1%, respectively, $p < 0.01$). However, no significant difference was observed in males between rural and urban areas.

Of the 2580 subjects, 390 (15.1%) were diagnosed with MS by CDS criteria. The age-adjusted prevalence was 15.2% for the whole population, including 17.1% in men and 13.0% in women. Similarly, there was a significant age-related increase in MS prevalence (Figure 2). MS prevalence was significantly higher in men compared with women ($p < 0.01$), especially in the 30-39 (14.0% vs 7.8%, $p < 0.05$) and 40-49 (21.1% vs 10.2%, $p < 0.05$) years age groups. In peri-menopausal women, MS prevalence rates in rural areas were significantly higher than those of urban regions (14.1% vs 6.4% and 28.9% vs 14.7% in the 40-49 and 50-59 years age groups, respectively, $p < 0.05$). No significant difference was observed in males.

Independent risk factors for MS

Overall, the multivariate adjusted OR for MS in CDS criteria continually decreased with increasing education level, from 0.851 (0.645-1.123) in the middle or high school group to 0.670 (0.512-0.877) in the college and above group. Education level was independently associated with MS in men from urban regions. Higher education level did not protect women from MS in urban areas (CDS criterion), but the OR decreased by about 50% in middle and high school groups of women (IDF criteria) in rural areas. Compared with non-menopausal women, menopausal females had a higher risk of developing MS, by about 1.5-fold (CDS criterion). Occupation, living area, elderly age, family annual income, smoking and family history of T2DM were not independently associated with MS in either gender.

Discussion

In this population-based, cross-sectional, epidemiological survey, we found that overall age-adjusted prevalence rates of MS were 21.1% and 15.2%, according to IDF and CDS criteria, respectively. MS prevalence gradually increased with age. Rural individuals, especially females, had higher prevalence of MS, irrespective of the diagnostic criteria used (IDF or CDS criteria). However, different diagnostic criteria revealed opposite outcomes regarding sex prevalence. Moreover, low education level and the menopausal state could be independent risk factors for MS.

MS increases the risk of T2DM, CVD and cancer in the general population, resulting in an enormous economic burden for the society[1, 5]. MS prevalence rates were 19.85% and 9.95% in 2013 in Jiangxi province based on IDF and CDS criteria, respectively, as reported by Cheng et al.[16]. After two years, a significant increase was observed in this survey. This terrible phenomenon suggests that effective prevention measures should be taken immediately.

A higher prevalence of MS for the elderly has been observed in worldwide surveys[5, 6, 17-19]. With increased population aging in China, MS-related economic burden would challenge medical workers and public health. In this study, MS prevalence increased with age and reached a peak in 60-69 years old individuals diagnosed by both criteria. However, according to IDF criteria, the male prevalence rate peaked at 50-59 years old. These trends were also reported by Li et al.[13] in the Yan-an region. In contrast, peak ages were reduced than those of Chen's[20] study in Shanghai. For preventing morbidity and mortality of MS related diseases, more attention should be focused on individuals 65 years old or so in Jiangxi province.

A difference in MS prevalence may exist due to diverse living areas from north to south China. Though close crude prevalence rates were shown between our results and 2013 data in the Chinese population, a higher MS prevalence was reported in northern China, for example in the Yan-an and Jilin regions[10, 13, 15]. Besides, a more rapid economic development compared with the national average in Jiangxi in recent years has contributed to the MS prevalence rising to near that of Shanghai[20]. Worldwide, diverse races and diet cultures might be associated with MS prevalence. Based on the IDF definition, MS prevalence rates were reported to be 31.4% in India, 27.5% in Malaysia, and 32.8% in Mongolia, which were higher than the corresponding values in China and Jiangxi province[17, 19, 21].

More participants were inclined to be diagnosed with MS by the IDF criteria. Both diagnostic criteria have different cutoffs for BP, TC and glucose levels. Besides, IDF criteria rely on WC to define central obesity as a preliminary condition for diagnosing MS, while CDS criteria are based on BMI. This discrepancy might also lead to the opposite outcome of prevalence observed between genders. In this study, we found that about 20% women had low BMI ($<25 \text{ kg/m}^2$) with over 80 cm WC, while 8% men had low BMI ($<25 \text{ kg/m}^2$) with over 90 cm WC. On the other hand, over 23% men had higher BMI ($>25 \text{ kg/m}^2$) with smaller WC ($<90 \text{ cm}$), and 7% women had higher BMI ($>25 \text{ kg/m}^2$) with smaller WC ($<80 \text{ cm}$). In other words, females had higher WC with lower BMI, while males had higher BMI with lower WC. Similar results were reported in the Chinese population between 2010 and 2013, but not in Gu's study performed in 2005[8, 15, 22]. This suggests that sex-specific criteria need to be considered in diagnosing MS.

The risk factors for MS were evaluated by multiple logistic regression analysis in this study. Low education and the menopausal state were independent risk factors for adults in Jiangxi province. As shown above, individuals with low education had a higher risk of developing MS diagnosed by IDF and CDS criteria. We assumed that urban residents had higher odds of getting education resources, and received more information about balanced diet. As a tradition, the diet habit in Jiangxi province is fatty and salty. Blood TG levels, closely related to diet, were higher in rural individuals, suggesting the traditional diet habit is more common in rural areas of Jiangxi province. Therefore, a higher prevalence of MS in rural areas was observed in this study, regardless of the diagnostic criteria. Hence, a healthy diet should be recommended in rural areas of Jiangxi province. Similar to a

previous study[23], a significant negative association of non-menopausal state with MS prevalence was shown in women. This association is likely mediated by the testosterone/estradiol ratio[23].

The definition of MS remains controversial. It was reported that IDF and ATP III criteria have good consistency[18]. Here, we compared two other systems, including IDF and CDS criteria. It is well-known that China is a large population country, with the geography, climate, living conditions and diet varying from south to north. Identical MS criteria may not be suitable for different people. To the best of our knowledge, IDF criteria are more suitable to northwest Chinese individuals who have elevated WC compared with the others[13]. Besides, different criteria have distinct predictive values in prognosis. The IDF criteria have a reduced value for predicting all-cause mortality in T2DM patients, though it is better than ATP-III criteria[24].

This study had several strengths. Firstly, rigorous training was performed for all study staff before survey initiation. Secondly, detailed information about medications for metabolic disorders were collected. In several previous national or regional studies reporting high MS prevalence in the Chinese population, medications for lipid-, glucose- or blood pressure-lowering were not documented[14]. Therefore, the actual prevalence of MS could have been underestimated. As an epidemiological survey, this study also had limitations. Since only one urban community and four rural villages were included, the sample was small and only partially representative. Furthermore, the occurrence of negative outcome correlated with MS was not predicted, and further investigation is required for clarification.

Conclusions

In conclusion, MS prevalence is high in Jiangxi province. Considering the unhealthy lifestyle, education is urgently needed to prevent the rapid increase of MS prevalence.

Abbreviations

MS: Metabolic Syndrome BP: Blood Pressure HR: Heart Rate WC: Waist Circumstance

CVD: Cardiovascular Disease T2DM: Type 2 Diabetes BMI: Body Mass Index

CDS: Chinese Diabetes Society IDF: International Diabetes Federation

SE: Standard Error UA: Uric Acid HbA1c: Glycosylated Hemoglobin A1c

Declarations

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Availability of data and material

The dataset of the current study is available from the corresponding author upon reasonable request.

Authors' contributions

Primary data collection for the study was performed by LiTing WU, YunFeng SHEN, Lei HU, MeiYing ZHANG and XiaoYang LAI. The secondary data analyses were designed and performed by LiTing WU and YunFeng SHEN. The manuscript was written by LiTing WU and YunFeng SHEN. The final version was reviewed by MeiYing ZHANG and XiaoYang LAI. All authors have read and approved the manuscript.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of the First Affiliated Hospital of China Medical University. Informed written consent was obtained from all participants before data collection.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Tables

Table 1. Characteristics of the survey population

	Men			Women		
	Total	Urban	Rural	Total	Urban	Rural
No. %	1322	698 (52.80)	624 (47.20)	1258	662 (52.62)	596 (47.38)
Age (years)	41.83 (0.47)	41.92 (0.64)	41.73 (0.67)	41.88 (0.47)	41.34 (0.65)	42.48 (0.68)
Height (cm)	168.30 (0.17) *	169.94 (0.24) **	166.46 (0.25)	156.37 (0.18)	158.30 (0.24) **	154.22 (0.26)
Weight (kg)	66.79 (0.28) *	67.54 (0.38)	65.96 (0.40)	55.76 (0.28)	55.70 (0.39)	55.83 (0.41)
Body mass index (kg/m ²)	23.56 (0.10) *	23.28 (0.13)	23.77 (0.14)	22.82 (0.10)	22.25 (0.14) **	23.46 (0.14)
Waist circumference (cm)	83.35 (0.28) *	83.59 (0.38)	83.09 (0.40)	77.18 (0.28)	75.33 (0.39) **	79.23 (0.41)
Systolic blood pressure (mmHg)	126.35 (0.49) *	125.86 (0.67)	126.90 (0.71)	119.10 (0.50)	116.82 (0.69) **	121.63 (0.73)
Diastolic blood pressure (mmHg)	75.08 (0.30) *	75.55 (0.41)	74.56 (0.44)	70.93 (0.31)	70.46 (0.42)	71.45 (0.45)
Heart rate (bpm)	79.59 (0.33) *	82.11 (0.46) **	76.78 (0.48)	82.92 (0.34)	84.15 (0.47) **	81.56 (0.49)
Fasting blood glucose (mmol/L)	5.58 (0.03) *	5.54 (0.05)	5.63 (0.05)	5.38 (0.04)	5.35 (0.05)	5.41 (0.05)
OGTT-2h BG (mmol/L)	6.98 (0.72)	7.13 (0.10)	6.81 (0.10)	6.71 (0.07)	6.78 (0.10)	6.64 (0.11)
Serum triglycerides (mmol/L)	1.99 (0.04)	1.78 (0.06) **	2.23 (0.06)	1.94 (0.04)	1.50 (0.06) **	2.43 (0.06)
Serum total cholesterol (mmol/L)	4.47 (0.03)	4.48 (0.04)	4.45 (0.04)	4.47 (0.03)	4.59 (0.04) **	4.35 (0.04)
HDL cholesterol (mmol/L)	1.28 (0.01) *	1.26 (0.01)	1.30 (0.01)	1.45 (0.01)	1.48 (0.01) **	1.42 (0.01)
LDL cholesterol (mmol/L)	2.65 (0.02) *	2.67 (0.03)	2.63 (0.03)	2.56 (0.21)	2.64 (0.03) **	2.48 (0.03)
Serum uric acid (mmol/L)	374.02(2.18) *	378.79(2.99)	368.69(3.17)	274.90 (2.23)	281.58 (3.08) **	267.49 (3.24)
HbA1c (%)	5.88 (0.02) *	5.96 (0.03) **	5.80 (0.04)	5.74 (0.03)	5.83 (0.03) **	5.64 (0.04)
Menses condition in 40-49 years old women, no. (%)						
un-menopausal state	---	---	---	231 (18.36)	125 (18.88) **	106 (17.78)
menopausal state	---	---	---	44 (3.50)	15 (2.27)	29 (4.87)

						**	
Menses condition in 50-59 years old women, no. (%)							
un-menopausal state	---	---	---	24 (1.91)	18 (2.72) **	6 (1.01)	
menopausal state	---	---	---	168 (13.35)	84 (12.69) **	84 (14.09)	
Education level, no. (%)							
middle school or below	410 (31.0) *	92 (22.4) **	318 (77.6)	574 (45.6)	141 (24.6) **	433 (75.4)	
high school	268 (20.3) *	209 (78.0) **	59 (22)	193 (15.3)	148 (76.7) **	45 (23.3)	
college or above	644 (48.7) *	397 (61.6) **	247 (38.4)	491 (39.0)	373 (76.0) **	118 (24.0)	
Smoking, no. (%)							
no smoking	772 (58.4) *	428 (55.4)	344 (44.6)	1248 (99.2)	659 (52.8)	589 (47.2)	
less than 1 cigarette/day	26 (2.0) *	14 (53.8)	12 (46.2)	1 (0.1)	0 (0.0)	1 (100)	
more than 1 cigarette/day	524 (39.6) *	268 (51.1)	256 (48.9)	9 (0.7)	3 (33.3)	6 (66.7)	
Family annual income (CNY/year), no. (%)							
≤30000	311 (23.5) *	119 (38.3) **	192 (67.1)	400 (31.8)	148 (37) **	252 (63)	
30000-50000	432 (32.7) *	254 (58.8) **	178 (41.2)	379 (30.1)	206 (54.4) **	173 (45.6)	
50000-100000	428 (32.4) *	251 (58.6) **	177 (41.4)	363 (28.9)	234 (64.5) **	129 (35.5)	
≥100000	151 (11.4) *	74 (49.0) **	77 (51.0)	116 (9.2)	74 (63.8) **	42 (36.2)	
Occupation, no. (%)							
student	313 (23.7) *	169 (54.0) **	144 (46.0)	272 (21.3)	174 (64.0) **	98 (36)	
clerk	181 (13.7) *	104 (57.5) **	77 (42.5)	184 (14.4)	132 (71.7) **	52 (28.3)	
Worker	528 (39.9) *	301 (57) **	227 (43)	345 (27.0)	148 (42.9) **	197 (57.1)	
worker	House	199 (15.1) *	115 (57.8) **	84 (42.2)	398 (31.2)	195 (49.0) **	203 (51.0)
others	101 (7.6) *	9 (8.9) **	92 (91.9)	78 (6.1)	32 (42.0) **	46 (58.0)	

Data are mean (SE) or no. (%) as appropriate; * p < 0.05 for men vs women; ** p < 0.05 for urban vs rural for the same gender.

HDL cholesterol, high density lipoprotein cholesterol; LDL cholesterol, low density lipoprotein cholesterol; OGTT-2h BG, blood glucose of 2 hours oral glucose tolerance test.

Table 2. Age- and sex-specific prevalence rates (%) of MS based on different definitions

		IDF			CDS		
		Men	Women	Total	Men	Women	Total
Urban							
	18-29	3.4	1.1 **	2.3 **	1.1	0	0.6
	30-39	19.9	15.6	17.8	12.8	8.9	10.9
	40-49	22.7	14.3 **	18.7 **	19.5*	6.4 **	13.3
	50-59	26.4	28.4 **	27.4 **	24.5	14.7 **	19.7 **
	60-69	30.9	46.2	38.4	32.4	40.0	36.1
	≥70	26.0	38.6	31.9	30.0	20.5	25.5
	Total, crude	18.8	18.0 **	18.5 **	16.2 *	10.7 **	13.5 **
Rural							
	18-29	5.5	7.3	6.4	1.8	0.7	1.3
	30-39	22.0	16.7	19.3	15.4 *	6.7	11.1
	40-49	27.9	32.6	30.2	22.9	14.1	18.5
	50-59	33.7	47.8	40.5	30.5	28.9	29.7
	60-69	23.7 *	50.0	36.3	30.5	37.0	33.6
	≥70	14.0 *	43.5	29.2	27.9	41.3	34.8
	Total, crude	20.4 *	27.7	23.9	18.1	15.6	16.9
total population							
	18-29	4.4	4.0	4.2	1.5	0.3	0.9
	30-39	20.8	16.1	18.5	14.0 *	7.8	11.0
	40-49	25.2	23.3	24.3	21.1 *	10.2	15.8
	50-59	29.9	37.5	33.6	27.4	21.4	24.4
	60-69	27.6 *	47.9	37.4	31.5	38.7	35.0
	≥70	20.4*	41.1	30.6	29.0	31.1	30.1
	Age-standardized	19.6	22.7	21.1	17.1*	13.0	15.2

* p < 0.05 for men vs women; ** p < 0.05 for urban vs rural.

Figures

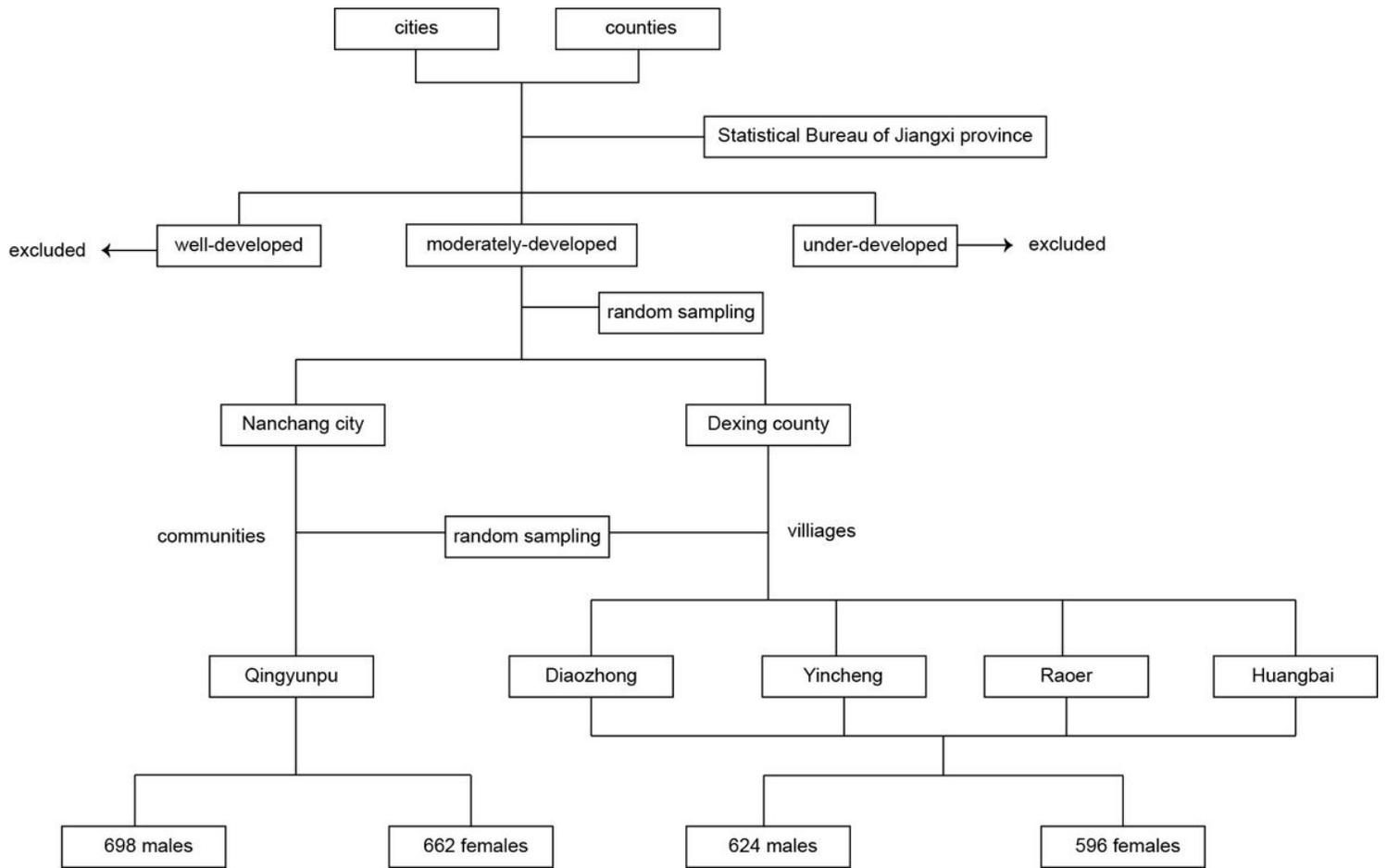


Figure 1

Flow chart of the cluster sampling process.

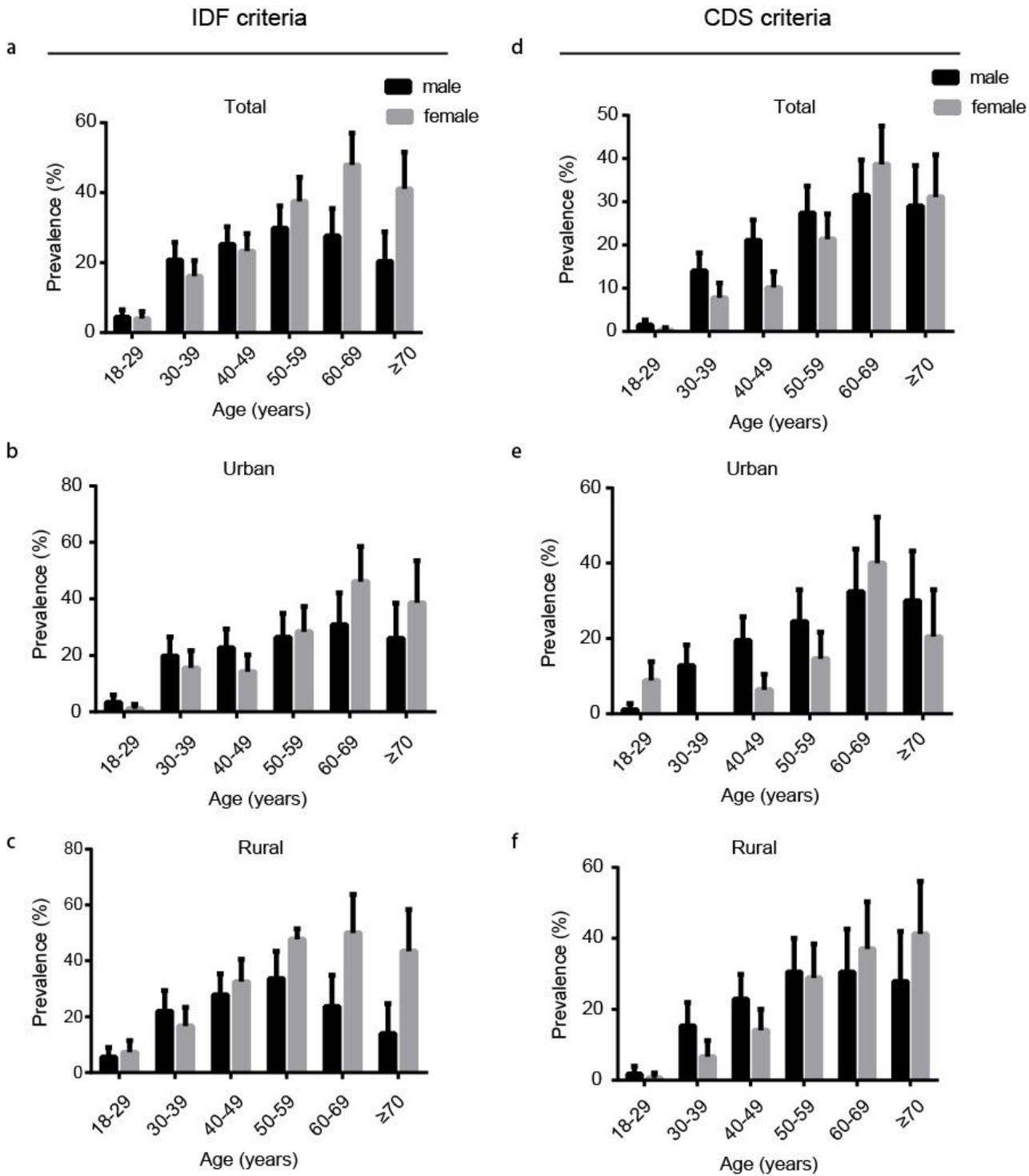


Figure 2

Age-specific and age-standardized prevalence rates of MS in Jiangxi Province in 2015, based on IDF (a-c) and CDS (d-e) criteria, respectively. Error bars indicate 95% confidence intervals.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [supplement1.docx](#)