Peer Review File
Article Information: https://dx.doi.org/10.21037/apm-21-3072

This paper analyzed the physical characters of adiposity parameters in Chinese, and revealed the specific use of WHtR in men and VAI in women.
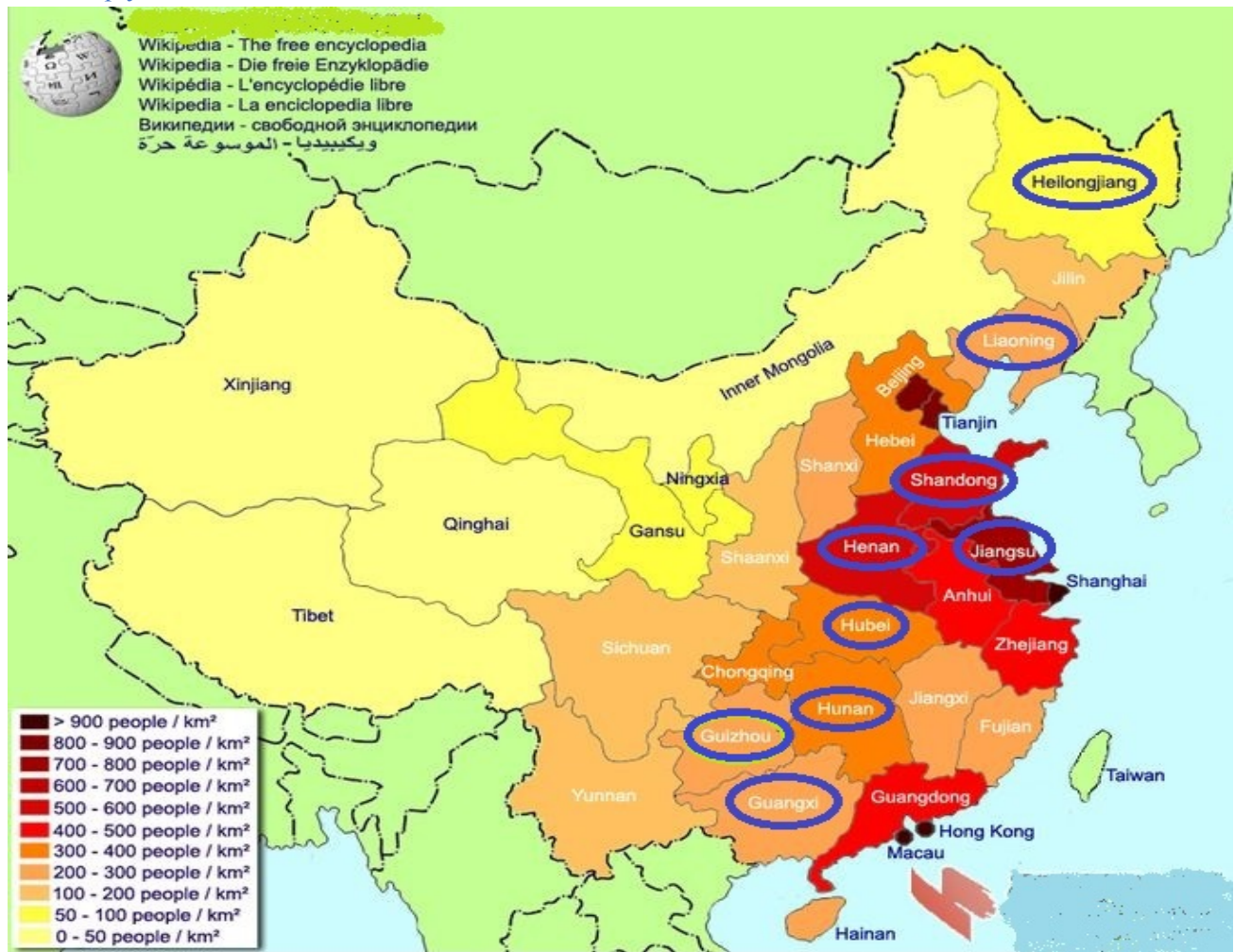
Comment 1: Authors stated that blood samples were only collected in 2009 and 2015. Is there any specific reason to use 2009 samoles, but not 2015 ones? Readers will think that 2015 data analysis is more close to 2021 reality than 2009.

Reply 1: It is really true as Reviewer suggested that 2015 data analysis is more close to 2021 reality than 2009. In official website (https://www.cpc.unc.edu/projects/china), biomarker data in 2009 and of most of data in 2015 are available. It's a pity that biomarker data in 2015 has not been open to public until now. Actually in 2015 data, self-reported diabetes can also be an important clinic diagnosis standard for disease diagnosis, while the absence of biomarker data may underestimate the occurrence of diabetes. This is really something we should explain clearly in the article.

Changes in the text: We have modified our text as advised (see Page 6, line 110-111). This paper used the cross-sectional data collected from 2009 CHNS(blood samples were only collected in 2009 and 2015 while only data in 2009 are available now).

Comment 2: The conclusion is that WHtR in men and VAI in women are better indicators for Chinese. The questions are: Does it fit for other provines in China? Is there any information for these two indicators to really apply more widely?

Reply 2:

Wikipedia - The free encyclopedia
Wikipedia - Die freie Enzyklopädie
Wikipédia - L'encyclopédie libre
Wikipedia - La enciclopedia libre
Википедии - свободной энциклопедии
ويكيبيديا – الموسوعة حرّة

Legend:
> 900 people / km²
800 - 900 people / km²
700 - 800 people / km²
600 - 700 people / km²
500 - 600 people / km²
400 - 500 people / km²
300 - 400 people / km²
200 - 300 people / km²
100 - 200 people / km²
50 - 100 people / km²
0 - 50 people / km²

(The picture is from Alan Mak, CC BY-SA 3.0, via Wikimedia Commons (https://creativecommons.org/licenses/by-sa/3.0/). In this website, we can remix, transform, and build upon the material for any purpose, even commercially.)

This map breaks down China's population density by region and province. In this map, the darker the color, the denser the population. The nine provinces including Heilongjiang, Liaoning, Shandong, Henan, Jiangsu, Hubei, Hunan, Guizhou, Guangxi in China Health and Nutrition Survey are circled with a blue brush. From the picture above, we believe that the sample is very representative in the population distribution from north to south. When talking about other provinces in China, some scholars thought BRI and WHtR should be considered the best anthropometric indices in predicting diabetes risk in Guangdong Province(*PMID: 34869638*). On the other hand, VAI was thought to be positively associated with the risk of increased incidence of new-onset type 2 diabetes in hypertensive patients in Anhui Province(*PMID:33844178*). These articles did not talk about the difference between men and women, which is precisely our advantage. In Taipei, VAI may serve as a perfect clinical indicator of diabetes among older adult Chinese, especially in women. Our research not only agreed with theirs, but also complement the features of young women(*PMID: 34563209*). In thus, we believe it fits for other provinces in China and many thanks for you to remind me to do more researches in other provinces in my next article.

Changes in the text: We have modified our text as advised (see Page 6, line 107-109, line111-112).

<mark>Reviewer B</mark>

The authors conduct a cross-sectional study and aimed to investigate the adiposity indicators in relation to diabetes among adults in China.

Comment 1: Prediction models: the adiposity indicators in relation to diabetes among adults were developed, maybe the prediction model fits the data well and can explain the greatest amount of variance in the outcome diabetes, suggesting an AUROC above 0.80 (means high classification accuracy, also see JAMA. 2007;298(20):2389-2398).

Reply 1: Thank you very much for your recommendation of the paper *(JAMA. 2007;298(20):2389-2398*) and we have studied it carefully. Absolutely, it's a good predictive model to predict the 5-year risk of hip fracture in postmenopausal women based on a Cox proportional hazards model. This article gave us a lot of inspiration and we drew an analogy with our research. Different from the article in JAMA, our study is a cross-sectional study and we can perform a clinical predictive model based on it. Next, we will take the women's group for example. Univariate and multivariate logistic regression models were constructed to explore the independent factors strongly associated with diabetes, based on which we constructed a prediction model(Table 1). We logically sift out six independent factors strongly associated with diabetes to establish the model, including age, hypertension (yes or no), TC, quartile of WC, quartile of VAI, quartile of BMI. Actually, the prediction model fits the data well and can explain the greatest amount of variance in the outcome diabetes, suggesting an AUROC is 0.799(Figure 1), which was greater than any other AUROC of adiposity indicators. In this manner, we can also perform a predictive model of males. We are very honored to have your guidance to perform a great predictive model. If we add these findings to our article, the title or purposes may need some modifications. The title "Predictive model based on clinical and laboratory indexes for predicting the risk of diabetes" may be more suitable. As a matter of fact, what we want to clarify in this article is the question of which one is the best indicator of obesity to predict diabetes and we also want to discuss the difference between adiposity indicators included BMI, WC, WHR, WHtR, VAI, respectively. We appreciate your recommendation very much because it's worth another article to talk about the clinical model for predicting the risk of diabetes, even though we can construct a nomogram and validate the performance of this model. We are now writing another article about the prediction models just like *Hepatology International (2020) 14:808–816.*

Changes in the text: As the above, we still hold the idea that the focus of this article is the difference between adiposity indicators because the question of which one is the best indicator of obesity to predict diabetes in China remains to be unclear, especially in men and women. We look up to you for guidance and advice. If you still hold the idea that the model above should be added to our article after reading our reply, we would be like to do it. So we did not modify our text this time.

TABLE 1

Univariate and multivariate analysis for the prediction of Diabetes

variables	Univariate			Multivariate		
	OR	95%CI	*P*-value	OR	95%CI	*P*-value
Age(years)	1.056	1.048–1.065	<0.001	1.042	1.032–1.052	<0.001
Hypertension (%)	4.035	3.201–5.087	<0.001	1.871	1.449–2.416	<0.001
WC1(cm)			Ref.			Ref.
WC2(cm)	1.469	0.979–2.205	0.063	0.829	0.529–1.300	0.415
WC3(cm)	2.405	1.656–3.494	<0.001	0.903	0.572–1.427	0.663
WC4(cm)	5.700	4.052–8.017	<0.001	1.382	0.860–2.221	0.181
BMI 1(kg/m2)			Ref.			Ref.
BMI 2(kg/m2)	1.370	0.926–2.027	0.115	1.057	0.684–1.634	0.803
BMI 3(kg/m2)	2.529	1.771–3.610	<0.001	1.488	0.959–2.308	0.076
BMI 4(kg/m2)	4.468	3.190–6.258	<0.001	1.828	1.144–2.919	0.012
VAI1			Ref.			Ref.
VAI2	1.304	0.846–2.010	0.229	0.934	0.596–1.463	0.766
VAI3	2.991	2.043–4.380	<0.001	1.646	1.096–2.471	0.016
VAI4	6.367	4.449–9.114	<0.001	2.748	1.854–4.073	<0.001
TC (mmol/L)	1.557	1.417–1.711	<0.001	1.217	1.103–1.343	<0.001

Figure 1
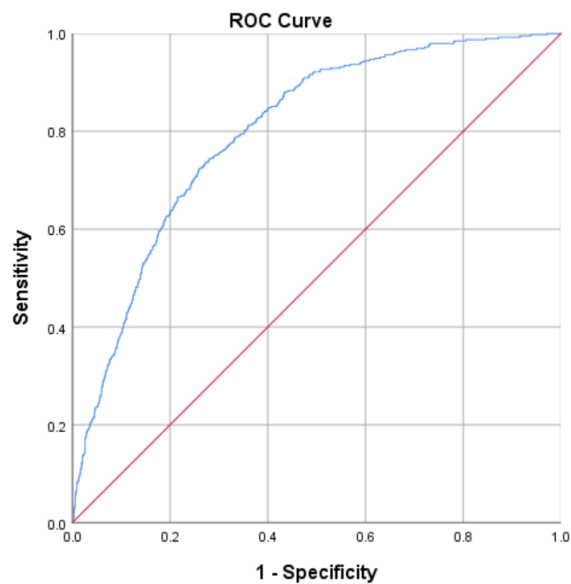
Comment 2: The adiposity indicators of WC, BMI, WHtR, WHR,VAI in relation to diabetes, maybe there was no new information in this study at its present presentation.

Reply 2: The adiposity indicators of WC, BMI, WHtR, WHR,VAI are really common during our clinical work. In other words, they are easily to be available. Even though there have been some studies to discuss the relationship between adiposity indicators and diabetes, the optimal cut-offs regarding diabetes may vary among different genders and regions. At the same time, there is still a lack of nationwide research in China to discuss the difference between adiposity indicators. Some scholars thought WHtR should be considered the best anthropometric indices in predicting diabetes risk(PMID: 34869638). VAI was thought to be positively associated with the risk of increased incidence of new-onset type 2 diabetes in hypertensive patients(PMID:33844178). These articles did not talk about the difference between men and women, which is precisely our advantage and new information. In Taipei, VAI may serve as a perfect clinical indicator of diabetes among older adult Chinese, especially in women. Our research not only agreed with theirs, but also complement the features of young women(PMID: 34563209). The sample in our article is thought to be representative in the population distribution from north to south of China. We have found some new information: the optimal cut-offs regarding diabetes in Chinese are WHtR$\geqslant$0.520 for men and VAI$\geqslant$1.878 for women.

Changes in the text: Actually, we would like to investigate it deeply and we are now writing another article about the prediction models. We shall contribute to your journal again when the new article finished. In thus, we did not add these in our article. We have supplemented and emphasized the new information in our article again(see Page 12, line 264-Page 13, line 271).

Comment 3: Combined adiposity indicators under an appropriate method in relation to diabetes might can be increased the c-index >80%.

Reply 3: Many thanks to give us inspirations to perform an appropriate method in relation to diabetes by combining adiposity indicators. As the reply 1, we took the women's group for example: we logically sift out six independent factors strongly associated with diabetes to establish the model, including age, hypertension (yes or no), TC, quartile of WC, quartile of VAI, quartile of BMI. Actually, the prediction model fits the data well and can explain the greatest amount of variance in the outcome diabetes, suggesting an AUROC is 0.799(Figure 1).

Changes in the text: We would like to investigate it deeply and we are writing another article about the prediction models. We shall contribute to your journal again when the new article finished. In thus, we did not modify our text this time. However, if you still hold the idea that the model above should be added to our article after reading our reply, we would be like to do it.