

Association Between Second Hand Smoke (SHS) Exposure In Pregnant Women And Their Socioeconomic Status (SES) And Its Interaction With Age: A Cross-Sectional Study In Urban Areas

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Abstract

Background: The high rate of second hand smoke (SHS) exposure puts pregnant women at risk of various harms and identify relevant influence factors are vital for primary prevention. The study aimed to explore the effect of individual socioeconomic status (SES) on exposure to SHS exposure among pregnant women.

Methods: A total of 678 non-smoker pregnant women from 14 communities of Hengyang city, Hunan province of China were recruited in this survey. A self-designed structural questionnaire was used to collect variables. Exposure to SHS was defined as self-reported smoking habit of spouse/partner. The individual SES consisted of marital status, educational attainment, employment and per-capita monthly income.

Results: There were 238 (35.1%) participants suffered from SHS exposure during pregnancy. After adjusted for confounding variables, compared to the pregnant women who were employed, others were unemployed were more likely to suffer from SHS exposure (OR= 1.697; 95%CI: 1.102-2.614). Similarly, those women who had high school or technical secondary school education level were associated with SHS exposure compared with college or above education attachment (OR: 1.577, 95%CI: 1.020-2.437). The interaction effects between age and junior middle school or below educational attainment (OR: 1.131, 95%CI: 1.015-1.261), unstable marriage (OR: 1.380, 95%CI: 1.075-1.772) on SHS exposure was detected.

Conclusion: Exposure to SHS was very common among pregnant women. Those pregnant women of low level of SES should considered as key population to implement public health intervention. Pregnant women of unstable marital status with older age were more likely to SHS exposure.

Background

The most well-known unhealthy habits -smoking is common among adults especially male, in most countries, overall, there were 50% and 35% of male had smoking habit in developing and developed countries, respectively [1]. Namely, there would be a big number of female suffered from second-hand smoke (SHS) exposure, especially those women who experiencing pregnancy. Over the past few decades, lots of epidemiological studies also suggested that pregnant women were exposure to second-hand smoke (SHS) sources from their partner was very common during pregnancy, although they were non-smokers [2–4]. Previous studies have shown that exposure to SHS is more serious than active smoking [5–7] because it measured as 3 to 4 times more damaging per gram of particulate matter than smoke directly inhaled by the smoker [8]. Increasing number of studies indicated as exposure to SHS that affected almost every phase of adverse pregnancy outcomes, such as depression disorder, low level of health-related quality of life, preterm labor, rupture of membranes, fetal weight loss, and so on [6, 9, 10].

Socioeconomic status (SES) which considered as a construct, mainly involved such factors like educational attainment, occupational status, income and wealth [11]. SES represented a person's

capacity of resources and it was associated with health behavior, attitude and outcomes [12]. Previous studies indicated that individual characteristic of socioeconomic status (SES) not only affected active smoking behavior but also links with SHS exposure [13–15]. Whereas, whether or not SES affected SHS exposure during pregnancy was debatable. For instance, Madureira et al, reported that duration of educational attainment over 13 years was a protective factor for reducing environmental tobacco exposure during pregnancy [15], which was similar to other studies [2, 16, 17]. The probability of daily SHS exposure in home was negative associated with household income and family wealth of pregnant women [2, 16]. Yet, despite researcher found occupation was significantly associated with active smoking and SHS exposure during pregnancy [18, 19], Reece and colleagues did not identified this association [2]. Moreover, many of researchers have found marital functioning is consequential for health and considered it as a positive indicator linked to reduce harmful exposure and engage health behavior [20], but statistical significance was not reported in two studies focused on the links between marital status and SHS exposure during pregnancy [21, 22]. Besides, the magnitude of SHS exposure and its association with SES could vary by regions, as previous study showed huge heterogeneity in cultural background, tobacco use and attitude across countries [4, 21]. Which means the conclusions drawn from different countries may not reflect the same situation in other country. Some conclusions are expected to be updated when sufficient evidences from new research conducted in populations becomes available.

In additional, pregnant women's age was also considered as another indicator to predict the SHS exposure during pregnancy and it was positive associated with SHS exposure [21, 23, 24]. The accumulation hypothesis showed the level of SES-based health advantage progressively decline as age [25]. That might suggest an age interaction with SES. Meanwhile, age is an important risk factor for pregnant women because the older the women, the higher risk of death or injury fo fetus. Thus, the effect of age and SES on SHS exposure is of particular interest, but present literature is not clear on its connection.

In summary, the current study relied on a community-based sample to reflect the association between individual SES and SHS exposure among pregnant women as well as explored the interaction between age and SES on SHS exposure. It of great importance to greatly facilitate the design and implementation of effective public prevention programs and policies.

Method

Study design and participants

Data was derided from a cross-sectional study based on community investigation conducted in Hengyang city, Hunan province of China during July to September 2019. The Hengyang city is a typical industrial city located in central China. The survey use a stratified random sampling strategy, with districts as the primary sampling unit. First, 5 streets were randomly selected from 5 districts of Hengyang city. Then, communities were selected randomly based on a community and a streets at a ratio of 3 : 1. Finally, 4 communities of Zhengxiang street, 3 communities of Qingshan street, 3 communities of

Baishazhou street, 2 communities of Guangdong road street and 2 communities of Zhurong street with a total of 819 pregnant women in the third trimester were recruited in this study. Inclusion criterion: 1) aged over 18 years; 2) volunteer to the project; 3) the participant has come to pregnancy registration in the community health centers and living in the community for more than 6 months; 4) non-smokers during pregnancy; 5) living with spouse/partner during pregnancy. Out of the recruited women, 6 participants were excluded given the missing information in smoking habits and exposure, 135 participants were excluded due to not met the inclusion criterion. A total of 678 pregnant women at 3rd trimester were included in analysis. All of the participants were asked to receive an interview for twenty minutes and completed a structured questionnaire to collect information of them. Meanwhile, the participants were signed informed consent. The study has been approved by the Ethics Committee of the Xiangya school of Public Health, Central South University on 15, July, 2019 (XYGW-2019-056). The flow chart of this study is present in figure 1.

Assessment Of Exposure To Passive Shs Exposure

According to the definition in the Global Adult Tobacco Survey 2010, secondhand smoke exposure (SHS), all of pregnant women were asked to response a question “Whether your spouse/partner smoking in home at least 1 day per week while you’re pregnant ?” assessed by a specific questionnaire. Those who responded “yes” and “always” were considered to be exposed to secondhand smoke in home during pregnancy.

Assessment Of Individual Socioeconomic Status (Ses)

In the light of the social age concept, the individual socioeconomic status was measured by asking individual educational level, employment status, marital status and per-capita monthly income. Among them, educational level was categorized as junior middle school or below, high school or technical secondary school and college or above, employment status was categorized as yes and no, marital status was classified as single/divorced or married. Besides, person income per month was divided into three groups including ≤ 3000 RMB, 3001-7999 RMB and ≥ 8000 RMB.

Covariates

Several variables were considered as covariates put into analysis involved: age and the household registration status (hukou) (rural areas and urban areas). Behavioral lifestyle of the participants included: smoking habit (never and former), exercising at the present (yes and no) and drinking at the present (yes and no). Family related factors included: educational attainment of spouse/partner (junior middle school or below, high school or technical secondary school and college or above), drinking habit of spouse/partner in the last year (yes and no) and living with aunt/uncle after get married (yes and no) .

Statistics Analysis

The characteristics of the participants were presented as means and standard deviations for continue variables met normal distribution, or median and inter-quartile range for continue variables not met normal distribution, or as number and percentages for categorized variables. The difference of exposure to passive SHS according to demographic characteristic, SES and family factors was examined using the chi-square test. The difference of age of SHS exposure was analyzed using non-parametric Kruskal–Wallis test since the age was not confirmed as normal distribution. The binary logistic regression analysis with enter method was applied to explore the association between SES and exposure to passive SHS in the 3rd trimester among pregnant women after controlling age, ethnic, the household registration status, smoking habit, exercising and drinking at the present, employment of spouse/partner, educational attainment of spouse/partner, drinking habit of spouse/partner in the last year, living with aunt/uncle after get married, regular antenatal examination and complications of pregnancy. The model 1 was multivariate logistic regression model only included educational attainment, martial status, employment and per-capita monthly income. The model 2 was multivariate logistic regression model after adjusted for covariates. Lastly, we conducted a product term into the multivariate logistic regression model to examine the effects of age and SES on SHS exposure. Associations were presented as crude and adjusted odds ratio (OR) with 95% confidence intervals (95% CI). All of analyses were conducted using the R v4.0.5. A p-value<0.05 was considered statistically significant.

Results

Demographic of study sample

Table 1 shows the individual demographic and the difference comparison of respondents. Overall, of the 678 pregnant women based on this community-base survey, 35.1% (238) of them had SHS exposure in home. The mean age of the participants was 29.1 years (SD=4.6). 97.8% of them were Han ethnic with urban household registration status (73.2%). 95.4% of the women were married and living with partner/spouse together and employed (74.9%). The proportion of the participants with were junior middle school or below, high school or technical secondary school and college or above educational attainment were 19.5%, 23.7% and 56.8%, respectively. There were 8.8%, 71.1% and 20.1% of them with person income per month less than 3000 RMB, between 3001-7999 RMB and more than 8000 RMB, respectively. Only 4.3% and 9.7 of them reported they had smoking habit before pregnancy and drinking at the present. Regarded to the characteristic of spouse/partner, over half of spouse/partner had employed and college or above educational attainment as well as drinking habit in the last year. There were 64.0% of the participants living with aunt/uncle after get married. The percentages of regular antenatal examination and complication of pregnancy were 91.6% and 10.5%, respectively.

Table 1
 Characteristics of the pregnant women at 3rd trimester according to exposure to SHS

Characteristic	Total n=678	Never exposure to SHS during pregnancy n=440	Current exposure to SHS during pregnancy n=238	<i>p</i> Value
Age	29.1 (4.60)	29.2 (4.67)	28.8 (4.48)	0.310
Ethnic				
Han	663 (97.8)	427 (97.0)	236 (99.2)	0.074
Minority	15.0 (2.2)	13.0 (3.0)	2.00 (0.8)	
The household registration status(hukou)				
Rural areas	182 (26.8)	115 (26.1)	67.0 (28.2)	0.572
Urban areas	496 (73.2)	325 (73.9)	171 (71.8)	
Individual SES				
Marital Status				
Married and living together	647 (95.4)	417 (94.8)	230 (96.6)	0.267
Divorced but living together/Cohabiting relationship	31.0 (4.6)	23.0 (5.2)	8.00 (3.4)	
Employment				
Yes	508 (74.9)	346 (78.6)	162 (68.1)	0.002
No	170 (25.1)	94.0 (21.4)	76.0 (31.9)	
Educational attainment				
Junior middle school or below	132 (19.5)	82.0 (18.6)	50.0 (21.0)	0.129
High school or technical secondary school	161 (23.7)	96.0 (21.8)	65.0 (27.3)	
College or above	385 (56.8)	262 (59.5)	123 (51.7)	

Characteristic	Total n=678	Never exposure to SHS during pregnancy n=440	Current exposure to SHS during pregnancy n=238	<i>p</i> Value
Per-capita monthly income,RMB				
≤3000	60.0 (8.8)	40.0 (9.1)	20.0 (8.4)	0.878
3001-7999	482 (71.1)	314 (71.4)	168 (70.6)	
≥8000	136 (20.1)	86.0 (19.5)	50.0 (21.0)	
Smoking habit				
Never	649 (95.7)	419 (95.2)	230 (96.6)	0.386
Former	29.0 (4.3)	21.0 (4.8)	8.00 (3.4)	
Exercising at the present				
Yes	620 (91.4)	399 (90.7)	221 (92.9)	0.334
No	58.0 (8.6)	41.0 (9.3)	17.0 (7.1)	
Drinking at the present				
No	612 (90.3)	408 (92.7)	204 (85.7)	0.003
Yes	66.0 (9.7)	32.0 (7.3)	34.0 (14.3)	
Educational attainment of spouse/partner				
Junior middle school or below	94.0 (13.9)	66.0 (15.0)	28.0 (11.8)	0.218
High school or technical secondary school	172 (25.4)	117 (26.6)	55.0 (23.1)	
College or above	412 (60.8)	257 (58.4)	155 (65.1)	
Employment of spouse/partner				

Characteristic	Total n=678	Never exposure to SHS during pregnancy n=440	Current exposure to SHS during pregnancy n=238	p Value
Yes	665 (98.1)	431 (98.0)	234 (98.3)	0.741
No	13.0 (1.9)	9.00 (2.0)	4.00 (1.7)	
Drinking habit of spouse/partner in the last year				
No	252 (37.2)	119 (27.0)	133 (55.9)	<0.001
Yes	426 (62.8)	321 (73.0)	105 (44.1)	
Living with aunt/uncle after get married				
No	244 (36.0)	177 (40.2)	67.0 (28.2)	0.002
Yes	434 (64.0)	263 (59.8)	171 (71.8)	
Regular antenatal examination				
Yes	621 (91.6)	392 (89.1)	229 (96.2)	0.001
No	57.0 (8.4)	48.0 (10.9)	9.00 (3.8)	
Complications of pregnancy				
No	607 (89.5)	391 (88.9)	216 (90.8)	0.442
Yes	71.0 (10.5)	49.0 (11.1)	22.0 (9.2)	

After analyzed the difference under different demographic characteristic conditions, we observed significantly differed in employment ($p=0.002$), drinking at the present ($p=0.003$), drinking habit of spouse/partner in the last year ($p<0.001$), living with aunt/uncle after get married ($p=0.002$) and regular antenatal examination ($p=0.001$) (Table 1).

The association between SES and SHS exposure among pregnant women at 3rd trimester

We used binary logistic regression analysis to explore the association between SES and SHS exposure among those women. Model 1 and 2 are summarized in Table 2. Model 1 was the base model that only educational attainment, employment, marital status and person income per month involved, which showed the participants who was unemployed (OR:1.658, 95%CI: 1.126-2.441) was more likely to exposure to SHS in home. After controlling the covariates included age, ethnic, the household registration status, smoking habit, exercising and drinking at the present, employment of spouse/partner, educational attainment of spouse/partner, drinking habit of spouse/partner in the last year, living with aunt/uncle after get married, regular antenatal examination and complications of pregnancy, Model 2 showed those unemployed women (OR:1.697, 95%CI: 1.102-2.614) had increased risk for exposure to SHS than employed women. Participants of high school or technical secondary school educational attainment were more likely to exposure to SHS than these women of college or above educational attainment (OR:1.577, 95%CI: 1.020-2.437).

Table 2 Binary logistic regression models for the association between SES and SHS among pregnant women at 3rd trimester

	Model 1	OR(95%CI)	Model 2	OR(95%CI)
Marital Status				
Divorced but living together/Cohabiting relationship	0.537	0.232-1.244	0.562	0.227-1.390
Married and living together	1		1	
Employment				
No	1.658	1.126-2.441	1.697	1.102-2.614
Yes	1		1	
Educational attainment				
Junior middle school or below	1.161	0.739-1.824	1.311	0.797-2.157
High school or technical secondary school	1.317	0.879-1.972	1.577	1.020-2.437
College or above	1		1	
Person income per month,RMB				
≤3000	0.759	0.392-1.469	0.896	0.442-1.816
3001-7999	0.864	0.576-1.295	0.955	0.619-1.472
≥8000	1		1	

Model 1: included marital status, employment, educational attainment and person income per month.

Model 2: model 1+adjusted for age,ethnic, the household registration status , smoking habit, exercising and drinking at the present, employment of spouse/partner, educational attainment of spouse/partner, drinking habit of spouse/partner in the last year, living with aunt/uncle after get married, regular antenatal examination and complications of pregnancy.

The interaction effect between SES and age on SHS exposure

Table 3 indicated the interaction effect between age and SES on SHS among pregnant women at 3rd trimester. In Model 2, we observed after controlling for covariates, those women of divorced but living together/cohabiting relationship (OR:1.380, 95%CI: 1.075-1.772) had increased risk for exposure to SHS with age. The participants of junior middle school or below educational attainment were more likely to exposure to SHS with age (OR:1.131, 95%CI: 1.015-1.261).

Table 3
The interaction effect between age and SES on SHS among pregnant women at 3rd trimester

	Model 1	OR(95%CI)	Model 2	OR(95%CI)
Marital Status				
Divorced but living together/Cohabiting relationship*age	1.301	1.055-1.605	1.380	1.075-1.772
Married and living together*age	1		1	
Employment				
No*age	0.985	0.904-1.073	1.012	0.920-1.114
Yes*age	1		1	
Educational attainment				
Junior middle school or below*age	1.097	0.994-1.211	1.131	1.015-1.261
High school or technical secondary school*age	1.073	0.991-1.163	1.074	0.978-1.180
College or above*age	1		1	
Person income per month,RMB				
≤3000*age	0.924	0.812-1.052	0.884	0.754-1.037
3001-7999*age	0.927	0.874-0.983	0.927	0.833-1.031
≥8000*age	1		1	
Model 1: included marital status, employment, educational attainment and person income per month.				
Model 2: model 1+adjusted for age,ethnic, the household registration status, smoking habit, exercising and drinking at the present, employment of spouse/partner, educational attainment of spouse/partner, drinking habit of spouse/partner in the last year, living with aunt/uncle after get married, regular antenatal examination and complications of pregnancy.				

Discussion

To the best of our knowledge, there was a dearth of studies on the relationship between individual SES and SHS exposure in home among pregnant women at 3rd trimester in China. The study not only provided insight in the status of SHS exposure but also examined this relationship with SES. Unemployment and high school or technical secondary school educational attainment were significant effects on SHS exposure. In present study, we found that unstable marriage (cohabiting relationship) and junior middle school or below educational attainment were associated with elevated risk of SHS exposure enhanced by age.

The finding showed the current SHS exposure prevalence from this study was 35.1% which was lower than the previous national-level study from 2013 (47.2%) [26]. The prevalence of SHS exposure in this paper also lower than prior population-based studies conducted in Henan Province and Sichuan Province reported, there were 60–70% of pregnant women experienced SHS exposure overall and 75.1% of non-smoking pregnant women suffered from chronic SHS exposure of respective spouses, respectively [4, 27]. As previous study reported, the higher probabilities of SHS exposure was occurred in low and mid-income countries [2]. It could be perceived that the rate of SHS exposure among pregnant women varied from regions, with some locations having a high level of exposure but other regions were not. China is a most country of tobacco production and consumer in the world, about 47.2% of male had smoking habit in a investigation conducted in 2013 [26]. Tobacco plays an very important role in China economics and culture. The government has calls up adults away from tobacco, there were still great number of male had smoking habit in China. Overall, smoking was a widely acceptable behavior in China, although SHS has become a major public health problem and has caused heavy burden of disease worldwide [28]. Exposure to SHS during pregnancy was common in pregnant women population.

Our results are in line with prior studies [15, 29] that women's higher educational attainment was independent protective factor for reducing SHS exposure. Education is one aspect of the basic drivers of human behaviour that can promote healthy behavior and keep individual away from harmful exposure [30]. Generally, pregnant women who were more educated had more active enhance the awareness of tobacco, reduce exposure. Meanwhile, the availability of various medical and economic resources may depend on educational attainment. Thus, educational attainment can be regarded as a vital determinant of SHS exposure. In our study, we also confirmed those participants were unemployed had greater risk for SHS exposure. Employment and education were strongly associated, both has impacts on household income and social conditions of resources. Previous studies had showed unemployment or manual working status were predictors of maternal SHS exposure during pregnancy [24, 31, 32]. Participants who being more educated were more likely to have steady job, that increased the likelihood of engaging health behavior and active away from harmful exposure [33]. Conversely, those unemployed women have limited health education resources, weak awareness of the harms of exposure to SHS and self-perception of relatively low status within the family, increasing the possibility of being SHS exposure. Interestingly, we found lower person income per month might be considered as protective factor for SES exposure, it might reflect a shift in the association between income and SHS exposure. These observations supported that of previous studies conducted by Recea et al and Mahmoodabad et al [2, 19], but contradicted by the evidences from Yang and colleague [27]. Nevertheless, as far as we are concerned, after adjustment for related background variables, there was no significant association between income and SHS exposure. The reason behind that whether the highly income greater the risk of SHS exposure among pregnant women still undetermined, and further research will be needed to explain the phenomenon. The significant results in our findings indicated that those women be exposure to SHS were often with lower education and unemployed.

Notably, age has influence on the relationship between lower level of educational attainment and unstable marriage status. Those women of above characteristics were related to higher risk of SHS

exposure with age. Previous studies have indicated, younger age of women were more likely to be exposure to SHS [17, 34–36], but in the study of St Helen et al, indicated that women aged over 35 years had higher level of UC (urinary cotinine) due to SHS exposure in home [37]. Moreover, number of evidences showed that the older age of spouse/partner was a risk risk for SES exposure [19]. Link and Phelan explained that SES is fundamental causes of disease due to the closely associated with access to important resources, affect multiple disease outcomes through multiple mechanisms [38]. However, their capacity to use resources to gain a health advantage is more and more weak in these population located in relatively low level of SES with age. In particular, women were expected to obedient to their spouse in family of traditional Chinese culture background. It could be speculated that pregnant women of lower level of educational attainment and unstable marriage were less likely to change smoking behavior of their spouse/partner, exposure to SHS might more frequent occur.

Avoiding SHS exposure during pregnancy is an important health priorities for healthcare professionals and policy-makers. However, researchers stated that it was still hard to eliminate SHS exposure during pregnancy in LMICs, China included. First, the awareness of harmful outcomes attributed by SHS exposure was lower in that LMICs [39]. Second, the pregnant women may not argue with male due to the existence of male-dominated ideology, even though they have already realized the risk of SHS exposure [40]. Importantly, despite the smoker tried to avoid directly contact with pregnant women, SHS was much difficult be avoided. One important reason was that the hidden demon called as “third-hand smoke (THS)” still staying in environment especially skin and clothes, which posed new threat to pregnant women, nonetheless, the risk of THS is scanty known by pregnant women and their family member [41]. In addition, family’s consensus on smoking ban may be an effective strategy [23], as in the pregnancy women are well protected in family, particularly their spouse/partner value their advice. In a word, it is imperative for both pregnant women and their spouse/partner to be included in interventions for tobacco control and ongoing implementation of preconception and pregnancy health education.

Some limitation of this study should be recognized. First, the status of exposure to SHS was determined using participants’ self-reported, this might have led to an recalling bias of the measurement effect of SHS, to some extent. However, prior investigations found measuring SHS exposure by self-reported still a satisfied and acceptable approach of SHS exposure and widely used in increasing number of studies [42]. The cross-sectional study had practical limitations in causal inference. The longitudinal and qualitative research are needed to help identify the association between SHS exposure and SES. In addition, spouse/partner’s SES also partially explained the association between SHS exposure and social status [19]. However, no significant differences were observed between these SES variables of spouse/partner in terms of group comparison analysis. Lastly, we only taken spouse/partner as an account for sources of SHS exposure. Whereas, we considered that the contribution of other sources of SHS such as workplace and restaurant was negligible, given that pregnant women general spend most of their time with spouse/partner during pregnancy.

In summary, the risk perceptions and communication were related with SES [43], which could suggest that SES may have practical applied to smoking cessation implementation. Pregnant women are an key

sub-population that should be implement tobacco control efforts for their spouse/partner because both cigarettes and smokeless tobacco pose serious threat to mother and fetus. This paper results indicated that, to a certain extent, a lower level of SES leading to a higher likelihood of the SHS exposure. Intensified spouse's behavior change their smoking behavior and protect the health of pregnant women

Conclusion

In conclusion, our findings showed the SHS exposure still a challenge for pregnant women health. Provide preventative strategies for passive smoking and focus on such vulnerable population of low level of SES and pregnant woman of advanced age when targeting future smoking cessation interventions among them as well as among others who plan to become pregnant.

Abbreviations

SHS: Second hand smoke ;SES: Socioeconomic status

Declarations

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Availability of data and materials

The data from which this manuscript was developed are available on request from the corresponding author.

Authors' Contributions

Wensu Zhou, Baohua Zhen, Yunhan Yu, Xidi Zhu, Zhao Hu: Collect data; Wensu Zhou, Xidi Zhu, Zhao Hu: Conceptualization; Wensu Zhou, Xiyue Xiong: Data curation, Writing, Original draft preparation, Methodology, Software, Reviewing; Wensu Zhou, Xidi Zhu, Zhao Hu, Li Shaojie: Visualization, Investigation. Xidi Zhu, Zhao Hu, Li Shaojie, , Xu Huilan, Xiyue Xiong: Supervision.

Competing interest

The authors declare that they have no competing interests.

Consent to publish

The participants gave consent for the findings of the study to be published.

Ethics approval and consent to participate

The study has been approved by the Ethics Committee of the Xiangya school of Public Health, Central South University on 15, July, 2019 (XYGW-2019-056). Written informed consent was obtained from participants before interview. The authors confirmed that all methods were carried out in accordance with relevant guidelines and regulations

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Figures

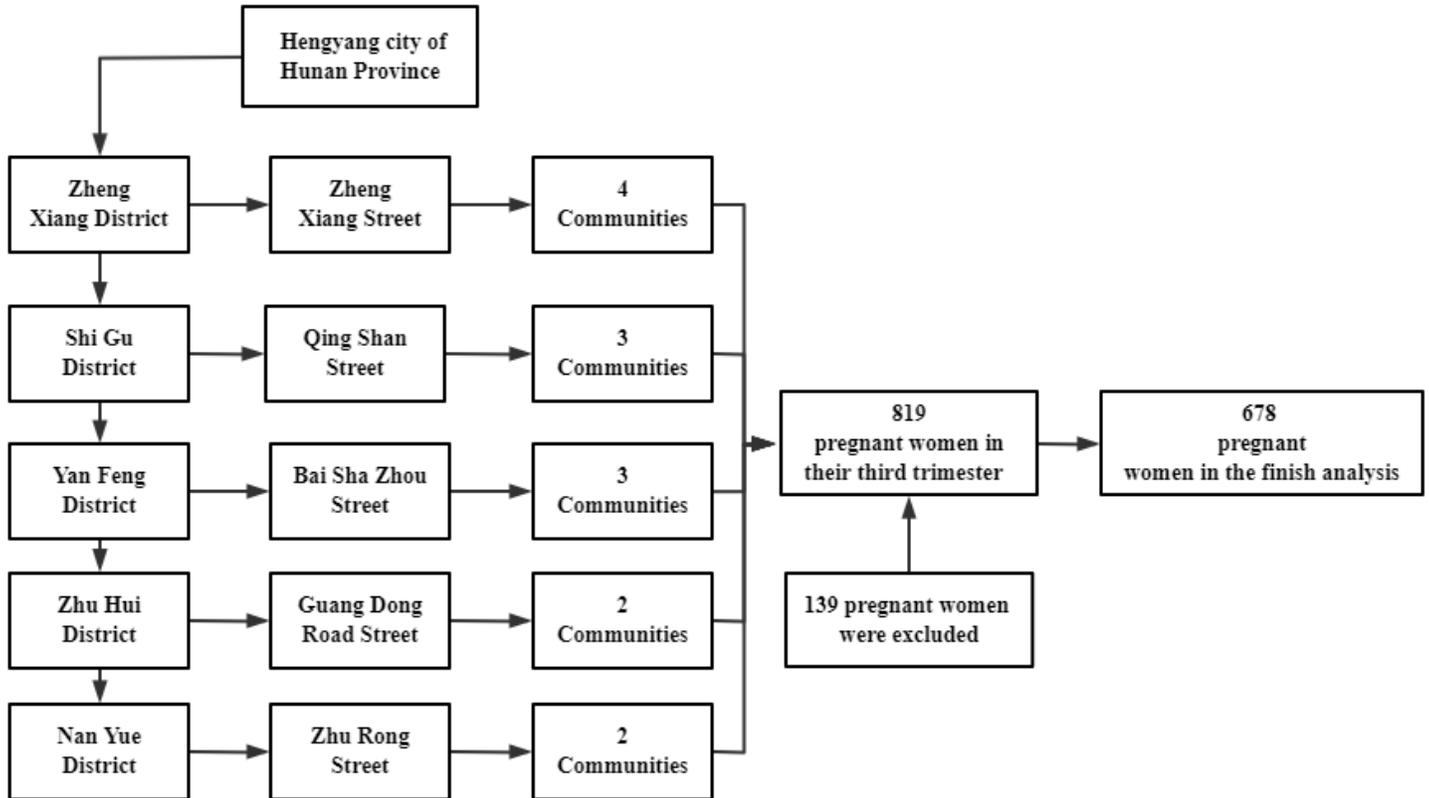


Figure 1

The study strategy of the study