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A Cross-sectional Study of Health-related Behaviors in Rural Eastern China

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Objective This study examined the status of health-related behaviors among rural residents and the factors influencing the practice of such behaviors. **Methods** One thousand and ninety subjects aged 15 years or over in a rural community, Anhui Province, China were surveyed. A questionnaire was used to collect information on the health knowledge, attitude and behavior of the subjects. Information on health behavior included smoking, drinking, dietary habits, regular exercises, sleeping pattern and oral health behavior. **Results** The prevalence of smoking and drinking in the male subjects was 46.5% and 46.9%, respectively. There was a positive significant association between smoking and drinking. Only 8.3% of all subjects ate three regular meals a day regularly. Among subjects who ate two meals a day, 89.7% did not have breakfast. Only 1.7% of subjects took part in regular exercise. About 85% of subjects slept 6 to 8 h per day. Only 38.4 % of the respondents had the habit of hand washing before eating and after using the lavatory. 79.3% of the subjects brushed their teeth every day, and among them, only 10.6 percent brushed their teeth twice a day. Further analyses showed that 64.8% of subjects had 3-5 items of positive health behaviors out of 8 items and only 16.9% had six or more items. Logistical regression analyses suggested that better health behavior was affected by sex, age, years of education, income and health knowledge. **Conclusion** The status of health behaviors among rural residents was generally poor. It is thus urgent to reinforce health education in rural communities in China.

Key words: Health behavior; Epidemiology; Rural community; China

INTRODUCTION

The relationship between health habits and health status has gained attention in recent decades[1-6]. It has been increasingly recognized that health policy should place a high priority on activities to change people's life-styles in a manner conducive to improve population health[2]. Life-style interventions appeared to have great potential benefits[3,6]. In some instances, modest change in behavior of populations may produce tremendous health

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gains[3,6-8]. We all know now that abstaining from smoking would lower the incidence of lung cancer and cardiovascular diseases; leisure physical activity or exercise can lower the level of blood pressure, serum lipids and the incidence of cardiovascular diseases in the population, and can also improve the prognosis of diabetes mellitus. However, we have noticed that unhealthy behaviors and life-styles, such as frequent smoking, indulgence in alcohol, irregular meals, infrequent physical exercise, drinking untreated natural water, not brushing teeth daily and so on, are very common in China, especially in the rural areas. No systematic data are available on the pattern of health behaviors of the huge rural populations in China, although many behavioral epidemiological researches have been conducted in other countries and settings[1,4,9-15].

The current study examined the epidemiology of health behaviors in rural eastern China and assessed the factors that contributed to good health practices in order to provide guidance for the development of rural health strategies.

METHODS

The study was conducted in Wuwei County, which is situated along the north bank of the Yangtze River in the central region of Anhui Province in eastern China. The target population were peasants engaged in agriculture production in five administration villages (Qingshan, Yangjiang, Qiangang, Dayao and Minquan). A total of 1 200 residents aged 15 or over were present in the villages at the time of the survey and all were invited to participate in this study.

Trained interviewers from the Anhui Medical University conducted face-to-face interviews of all subjects using a standard questionnaire at the local health clinic. Data collected included information on cigarette smoking, alcohol drinking, physical exercise, eating pattern, drinking of un-boiled (untreated) water, sleeping habit, oral health behavior and personal hygiene habits (washing hands before eating and after using the lavatory); attitudes towards smoking, drinking and physical exercise; health knowledge and socio-demographic characteristics.

A smoker was defined as someone who smoked at least one cigarette every day for one year or more. A alcohol drinker was defined as someone who drank 50 grams of Chinese liquor wine (around 50% V/V) at least 2 times every month for one year or more. Frequency of drinking was classified as never/rare, 2-4 times a month, 2-3 times a week, and almost every day.

Attitude towards smoking was classified into three types: supporting and encouraging smoking as a social need; neutral; and against smoking. Attitude towards drinking was classified into three types: harmful to health, not harmful to health if drinking a little, beneficial to health. Attitude towards physical exercise was also classified into three groups: good for health, not necessary and not good for health.

Positive health behaviors consisted of 8 items: never/rarely smoking, never/rarely drinking, eating regularly (three meals every day), 6-8 h of sleep daily, regular exercises (>=3 times per week), drinking boiled (treated) water, washing hands before eating and after using the lavatory, and brushing teeth every day. According to the number of items of positive health behaviors, participants were classified into two groups: the group with poor health behavior had 4 or less items of positive health behaviors and the group with better health behavior had 5 or more items.

The Epi-Info software was used to design the data-entry form. Cleaning procedures were created in Epi-Info to check for entry errors. Chi-squared test were used to examine the

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associations between individual positive health behaviors and demographic characteristics. Multiple logistic regression analysis was used to identify factors contributing to better health behavior, defined as having 5 or more of the 8 items of positive health behavior. Covariates entered into the regression model included sex (female vs. male), age (in years), years of formal education, income (in 5 categories: lowest=1, highest=5), and health knowledge (in 3 levels: lowest=1, highest=3). SPSS 9.0 and Epi-Info software were used for all data analysis.

RESULTS

One thousand and ninety subjects were successfully interviewed giving a response rate of 90.8%. There were slightly more males than females (561:529). Over 75% of the subjects were below the age of 45.

Smoking

The smoking prevalence in males and females was 46.5% (95% CI: 42.4%-50.7%) and 0.6% (95% CI: 0.1%-1.6%) respectively, and obviously, there was a significant difference. The distribution of smoking prevalence by age and sex is shown in Table 1. Smoking prevalence was significantly different in different age groups in males ($P<0.01$, Chi-squared test) and the highest smoking prevalence occurred in the 35-44 age group. The majority of smokers started smoking at the age of 15-25 years. The amount of smoking varied mostly between 10 and 20 cigarettes a day. Non-smokers were significantly more likely to be against smoking (Table 2).

TABLE 1

Prevalence of Smoking by Age and Sex

Age (years)	Male			Female			Total		
	No. of Subjects	No. of Smokers	Smoking Prevalence (%)	No. of Subjects	No. of Smokers	Smoking Prevalence (%)	No. of Subjects	No. of Smokers	Smoking Prevalence (%)
15-24	109	26	23.9	146	1	0.7	255	27	10.6
25-34	187	87	46.5	191	0	0	378	87	23.0
35-44	109	65	59.6	91	0	0	200	65	32.5
45-54	75	40	53.3	60	0	0	135	40	29.6
55-64	53	28	52.8	27	0	0	80	28	35.0
65-	28	15	53.6	14	2	14.3	42	17	40.5
Total	561	261	46.5	529	3	0.6	1 090	264	24.2

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TABLE 2

Attitude Towards Smoking Among Non-smokers and Smokers

Attitude	Non-smokers		Smokers		*P* value for Chi-square
	No.	%	No.	%	
Support and Encourage Smoking as A Social Need	43	5.2	43	16.3	
Neutral	486	58.8	168	63.6	<0.01
Against Smoking	297	36.0	53	20.1	
Total	826	100.0	264	100.0	

Drinking

The prevalence of drinking in male and female was 46.9% (95% CI: 42.7%-51.0%) and 2.7% (95% CI: 1.5%-4.4%) respectively, and again there was a significant difference. The distribution of drinking prevalence by age and sex is shown in Table 3. Drinking prevalence was significantly different in different age groups in males ($P<0.01$, Chi-squared test) and the highest drinking prevalence occurred in the 65 and above age group. About half (139/277) of the drinkers drank almost every day, 24% (66/277) drank 2-3 times every week and 26% (72/277) drank 2-4 times every month. The majority (182/277) of the drinkers drank 100 grams or more every time. Non-drinkers were obviously more likely to think that drinking was harmful (Table 4). Table 5 shows a positive association between drinking and smoking. The frequent drinkers were more likely to smoke. Chi-square for trend was 239.3 ($P<0.01$).

Eating Habits

Only 8.3% (90/1 090) of subjects ate regularly, that is, three meals on time every day. The majority of subjects (81.9%) ate three meals a day but irregularly and 9.8% (107/1 090) only ate two meals a day. Among people who ate two meals a day, most of them (96/107, 89.7%) did not have breakfast. Around 78% of subjects never or rarely ate snacks.

TABLE 3

Prevalence of Alcohol Drinking by Age and Sex

Age (Years)	Male		Female		Total	
	No. of Drinkers	Drinking Prevalence (%)	No. of Drinkers	Drinking Prevalence (%)	No. of Drinkers	Drinking Prevalence (%)
15-24	26	23.9	2	1.4	28	11.0
25-34	86	46.0	2	1.1	88	23.3
35-44	60	55.1	5	5.5	65	32.5
45-54	48	64.0	4	6.7	52	38.5
55-64	25	47.2	0	0	25	31.3
65-	18	64.3	1	7.1	19	45.2
Total	263	46.9	14	2.7	277	25.4

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TABLE 4

Attitude Towards Drinking Among Non-drinkers and Drinkers

Attitude	Non-drinkers		Drinkers		*P* value for Chi-square
	No.	%	No.	%	
Harmful	379	46.6	57	20.6	
Beneficial	107	13.2	76	27.4	<0.01
Not harmful If Drinking a Little	327	40.2	144	52.0	
Total	813	100.0	277	100.0	

TABLE 5

Relationship Between Drinking and Smoking

Smoking	Drinking				Total
	Never/rarely (%)	2-4 times A Month(%)	2-3 times A Week (%)	Almost Everyday (%)	
Never/rarely	717 (88.2)	30 (45.5)	30 (41.7)	51 (36.7)	828 (76.0)
Often	96 (11.8)	36 (54.5)	42 (58.3)	88 (63.3)	262 (24.0)
Total	813 (100)	66 (100)	72 (100)	139 (100)	1 090 (100)

Exercise

Only 1.7% (18/1 090) did exercise regularly, which included walking, running, swimming and others. The duration of exercise was mostly about an hour (72.2%, 13/18). Half of the subjects thought that exercise was good for health and could help prevent many diseases. 37.0% of them thought that it was not necessary to do exercise.

Sleep

43.5% (474/1 090) of subjects claimed that they could go to bed and get up on time. The majority could sleep for 6 to 8 h everyday on average. Table 6 displays the distribution of average daily duration of sleep.

TABLE 6

Duration of Daily Sleep Among the Rural Population

Duration (h)	No.	Proportion (%)
< 6	133	12.2
6-	416	38.2
7-	371	34.0
8-	143	13.1
≥9	27	2.5
Total	1 090	100.0

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Other Health Behaviors

38.4% (419/1 090) of subjects had the regular habits of washing hands before eating and after using the lavatory, while 35.8% (390/1 090) of subjects never did so. 52.6% (573/1 090) of respondents often drank boiled water, while 42.8% (467/1 090) of respondents usually drank un-boiled or untreated water (from well or pond). 79.3% (864/1 090) of subjects brushed their teeth every day, but 11.0% (120/1 090) never brushed their teeth. Among people who brushed teeth, 84.7% (732/864) brushed their teeth only in the morning, 10.6% (92/864) brushed their teeth both in the morning and at night, and only 4.6% (40/864) brushed their teeth three times or more every day.

Multiple Positive Health Behaviors

Table 7 shows the frequencies of having multiple positive health behaviors among rural residents. The majority had 3 to 5 items of positive health behaviors only and the mean number of items was 3.9. Only 11 subjects had all the 8 items.

TABLE 7

Positive Health Behaviors Among Rural Residents

No. of Positive Health Behaviors	No. of Subjects	Proportion (%)
0	6	0.6
1	70	6.4
2	124	11.4
3	267	24.5
4	262	24.0
5	177	16.2
6	125	11.5
7	48	4.4
8	11	1.0
Total	1 090	100.0

TABLE 8

Logistic Regression Analysis on Determinants of Better Health Behavior[a]

	β	S.E.	*P* value	Exp(β)	95% CI
Sex (female)	1.088	0.149	<0.001	2.970	2.217–3.975
Years of Education	0.293	0.090	0.001	1.340	1.124–1.599
Income (5 Categories)	0.383	0.085	<0.001	1.467	1.242–1.733
Health Knowledge (3 Levels)	0.385	0.204	0.060	1.469	0.985–2.192
Age	−0.020	0.006	0.001	0.980	0.969–0.992
Constant	−3.095	0.552	<0.001	0.045	

Note. CI=confidence interval; [a]Better health behavior means having 5 or more items of positive health behaviors.

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Factors Affecting Better Health Behavior

Better health behavior (with 5 or more items of positive health behaviors) was significantly positively related to female sex, longer years of education and higher income, and negatively associated with age (Table 8). Health knowledge was positively associated but only of borderline statistical significance.

DISCUSSION

This is the first study specifically looking into a wide range of health or lifestyle behaviors among rural residents in Mainland China. The prevalence of smoking among males was quite high (46.5%) when compared to American men[9, 10], but was lower than the 70% prevalence among men living in urban areas in China[15]. Few women in our sample smoked and the prevalence was much lower than that found in the U.S[10] and the mean 4%-6% among city dwellers in China[15].

We defined one who drank 50 grams of Chinese liquor as a drinker. Chinese liquor of 50 grams is equal to about 25 grams alcohol. Nearly half of the male residents had drinking habits, and the prevalence was higher than the national mean level of 37.7%[16]. The female prevalence of 2.7% was also higher than the national mean level of 2.2%. The male prevalence was also higher than that in the U.S, whereas that for the females was lower[14]. There was a positive association between smoking and drinking. This implies that any effort to reduce smoking and drinking should go hand in hand to maximize the effects. It is interesting to note that many people thought that drinking a little would not do any harm to health and might be beneficial to health.

Ballweg and Li[10] found that 25.2% of civilians and 31.0% of military personnel rarely or never had breakfast in the United States. In rural China, missing breakfast was less common (8.8%), although the meal times could be irregular. It has been suggested that persons who skipped breakfast had poorer health than those who had breakfast daily[1,12]. In China, the peasant's characteristic of occupation is engaged in seasonal farming and at the other time their workload is not high. Very few rural residents exercised regularly and most of them might not be able to benefit from regular physical activities that could contribute to the prevention and control of coronary heart disease and several other diseases, e.g. hypertension, diabetes mellitus and osteoporosis[7,8,13]. Schoenborn found that more than three-quarters of civilian men and women slept more than 6 h per night in the U.S.[9], and the proportion was higher among rural adult residents in the present study. Belloc and Breslow[1] indicated that men and women who slept 6 h or less per night were less healthy than those who reported longer sleeping hours.

A mass campaign known as "LOVE TEETH DAY" has been launched nationwide each year in China since 1989. In general, improvements in tooth-brushing behavior were observed[17] after launching the campaign, but the rural population was still not performing well in this aspect. There was also room for improvement for the other personal hygiene behaviors. A majority of the rural resident did not have the habit of washing hands before eating or after using the lavatory, and many of them had the habit of drinking unsafe water. Both could have led to the occurrence of epidemics of infectious diarrhea in rural areas.

Our survey suggested that health behaviors were in general not well practiced among rural residents, especially those related to personal hygiene. Only 16.9% of residents had 6-8items of positive health behaviors. The findings of logistic regression analysis showed that those with better health behaviors were more likely to be females, younger, people who had more years of education and had a higher income. The level of knowledge on health was

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important but only of borderline statistical significance in this study. As economic development in the rural areas begins to bloom in the new millennium, people will receive more education and have a high income, and it is expected that the health behaviors will be improved. Strengthening health education and health promotion activities in the rural areas is important as 80% of the population in China are in the countryside, and such public health interventions, which can be actively pursued, are expected to back up the ongoing economic development and in turn to bring better health behaviors and better health status among the rural population in China.

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