Original Research

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Residents' KABP and Social Support Statuses Under Normalized COVID-19 Pandemic Prevention and Control: A Cross-Sectional Study

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Abstract

Objectives: To investigate the status quo of residents' knowledge, attitude, belief, and practice (KABP) and social support and the correlation of KABP with social support under normalized coronavirus disease (COVID-19) pandemic prevention and control.

Methods: A questionnaire was designed based on the KABP model, and an online survey was conducted among residents in September 2022. SPSS software (version 25.0) was used to analyze the data. Two independent sample t-tests, one-way analysis of variance (ANOVA), multivariate linear regression analysis, and Pearson's correlation analysis were conducted.

Results: In total, 326 valid questionnaires were obtained. The scoring rates of residents' KABP and social support were 68.1%, 92.2%, 89.3%, 75.3%, and 62.6%, respectively. Main factors influencing residents' knowledge included gender, nationality, education level, practice, and social support; those influencing attitude were belief and practice; those influencing belief were place of residence, attitude, and practice; those influencing practice were knowledge, attitude, belief, and social support; and those influencing social support were marital status, place of residence, knowledge, and practice. Social support was positively correlated with knowledge and practice.

Conclusions: This study provides a scientific foundation for the current normalized prevention and control of COVID-19 and is conducive to health managers to better carry out prevention and control related health education for specific groups.

Coronavirus disease (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[1] Since the emergence of COVID-19, the number of infected people has risen rapidly, and the fierce pandemic has brought great harm to public health and life. As of now, the weekly case incidence has continued to increase globally, with the following reasons: (1) Treatment measures are mostly symptomatic and supportive treatment[2,3]; (2) novel coronavirus variant strains appear frequently and have increased transmissibility[4]; and (3) the global supply of COVID-19 vaccines is insufficient and its distribution is unfair.[4] In China, although currently the pandemic has been effectively controlled, factors such as the spread of mutated strains with a higher infectivity, the large-scale movement of people throughout the country during holidays, and the vaccination rate, which has not yet reached the herd immunity threshold, have increased the risk of COVID-19 transmission, resulting in several provinces/streets across the country becoming medium/high-risk areas.[5,6] Therefore, the majority of the world's population remains at high risk of infection. This further indicates that vaccination and other epidemic prevention and control measures have a certain relationship with social and economic factors.

Literature Review

It is undeniable that the success of pandemic prevention and control depends on residents' past or existing social support, as well as their own behavior to a large extent. At present, most countries have formed a relative framework of government-led and diversified social support systems for pandemic prevention and control. Furthermore, globally promoted vaccination is now the routine way to prevent the spread of the pandemic within the framework of social support systems, but it will take time for global vaccination rates to reach collective immunization. According to the R0 value of the basic transmission coefficient of COVID-19,[7–10] 47% to 85% of the natural infection rate or vaccination rate is required to achieve the protective effect of herd immunization,[11] thus the current global population of about 7.6 billion people needs between 7.1 billion and 12.9 billion doses of COVID-19 vaccine based on 2 doses per person.[4] Meanwhile, the Boao Forum for Asia (BFA) launched "Report on the Global Use of COVID-19 Vaccines," which pointed out that there is a serious imbalance and fragmentation in

the international distribution of vaccines. Among countries with more than 30% of the population fully vaccinated, European and American countries account for the majority.[12] In contrast, vaccination rates in less developed countries and regions are generally low. For example, the vaccination rate of residents on the African continent is less than 2%.[12] Therefore, under the current background, controlling infectious sources and cutting off transmission routes are still important ways to control virus transmission. Continuous implementation of self-prevention and control measures, such as wearing a mask, handwashing, self-isolation, and keeping social distance among public residents, is fundamental to control the pandemic and prevent its recurrence.[13]

During the outbreak of COVID-19, a large number of scholars conducted research on residents' knowledge, attitude, belief, and practice (KABP) of pandemic prevention and control. A survey of Syrian residents showed that the knowledge, attitude, and practice mean scores toward COVID-19 were 3.54 (SD 1.20, range 0-6), 2.45 (SD 0.81, range 0-4), 5.90 (SD 1.52, range 0-8), respectively, and about 60% of residents had confidence that the COVID-19 pandemic will eventually be controlled.[14] Mohamed et al. found that the respondents had good knowledge (knowledge awareness rate was 91.3%) and attitude toward COVID-19 prevention and control, and the main information sources were official websites of the Ministry of Health and World Health Organization (WHO).[15] A survey conducted by Naser et al. showed that the knowledge level of COVID-19 among residents in the Middle East was relatively low, with an overall knowledge awareness rate of 66.1%, in particular, an awareness rate of 43.3% regarding the route of transmission.[16] Abdelhafiz et al. found that the mean score of Egyptian residents' knowledge on COVID-19 prevention and control was 16.39 (SD 2.63, range 7-22); residents mainly obtained knowledge through social media (66.9%) and the Internet (58.3%); and the knowledge level of low-education, low-income, older rural residents was significantly lower.[17] Zhang et al. found that the total KABP score of rural residents in Henan Province, China, was at a high level, with a mean sore of 100.35 (SD 14.92), in which the mean scores of knowledge, attitude, and practice were 3.97 (SD 0.77), 4.25 (SD 0.63), and 4.29 (SD 0.68), respectively.[18] Zhao et al. found that 65% of the residents in Shunyi District, Beijing, China, had a high cognitive level of COVID-19 knowledge, 52.4% had a positive attitude, and 87.3% had good practice level.[19] Chen et al. found that residents in Guangzhou, China, had a relatively high awareness rate of basic knowledge about COVID-19 prevention and control (70.73%–98.92%) and the implementation rate of personal protection practice (88.87%–98.30%).[20]

Although during the outbreak of the COVID-19 pandemic, the research on residents' KABP for pandemic prevention and control has promoted a large number of successful prevention and control measures, it is undeniable that in order to prevent the recurrence of the pandemic, the normalized prevention and control period of the pandemic is still particularly important, and there are differences between the normalization period and the outbreak period. Therefore, it is necessary to further explore the prevention and control status of residents in the normalization period, to provide a reference for the improvement of prevention and control measures. Based on this special period, we studied the current situation of residents' KABP and social support for pandemic prevention and control and explored the relationship between KABP and social support, in order to provide a scientific reference for the successful completion of pandemic prevention and control.

Purpose of the Study

This study aimed to explore the status quo of residents' knowledge, attitude, belief, and practice (KABP) and social support and the correlation of KABP with social support under normalized COVID-19 pandemic prevention and control, to provide a scientific basis for improving targeted education and action intervention aimed at improving residents' prevention and control capabilities and practice.

Methods

Design

The study was a cross-sectional electronic survey based on multiple network platforms.

Sample

This survey included 8 basic information items and 7 questionnaire dimensions, resulting in a total of 15 variables. The sample size was calculated according to the Kendall sample estimation method in multivariate analysis, that is, the sample required should be 10-20 times as high as the number of variables.[21] Calculated by 15 times, the minimum sample size was 225. The invalid sample size was increased by 20%, so that the sample size required for this study was 270.

Measures

Questionnaire
Based on the KABP model and guidelines or documents for COVID-19 prevention and control issued by the WHO,[22,23] the National Health Commission of the People's Republic of China (NHC),[24] the Chinese Center for Disease Control and Prevention (China CDC),[25] and the related literature,[26] this questionnaire titled, *Residents' Knowledge, Attitude, Belief, Practice, and Social Support for the COVID-19 Prevention and Control,* was designed. The questionnaire covered the following 7 parts:

Informed consent. Includes research introduction, voluntary, anonymous, and confidential nature of participation, guidelines for questionnaire filling, invitation to participate, and informed consent options. Only participants who select "agree to participate" option can continue to fill in the rest of the questionnaire.

Basic information. Includes 8 items: gender, age, nationality, marital status, education level, place of residence, length of work experience, and family economic level.

Knowledge. Includes 10 items: service time, disposal method, and type of mask, and disease-related knowledge (including duration of community quarantine, route of transmission, major symptom, safe social distance, acronym, time of medical observation, and incubation period). The answer option of each item was a single choice, each correct answer scored 1 point, and the total score ranged from 0 to 10 points, with a higher total score indicating a better mastery of knowledge.

Attitude. Includes 7 items: attitude toward the necessity of personal and community prevention for pandemic control, and attitude toward the cooperation for nucleic acid detection, knowledge dissemination, disease attentiveness, self reporting and isolation, and volunteer activities. Each item was rated on a 4-point Likert

scale, and the total score ranged from 7-28 points, with a higher total score indicating a more positive attitude.

Belief. Includes 4 items: confidence in national/departmental, regional/community, and individual pandemic prevention and-control, and confidence in the recovery of national economy in the severe disaster areas. Each item was rated on a 4-point Likert scale, and the total score ranged from 4-16 points, with a higher total score indicating better belief.

Practice. Includes 9 items: wearing a mask, preparing protective supplies, washing hands, enhancing ventilation, avoidance of parties/gatherings, observing social distancing measures, cleaning/disinfection frequency, using disposable tissues, frequency of receiving information. Each item was rated on a 4-point Likert scale, and the total score ranged from 9-36 points, with a higher total score indicating better practice.

Social support. Includes 10 items: The Social Support Rating Scale (SSRS) is a rating instrument for social support, with good reliability and validity, compiled by Xiao in 1986.[27] A modified and validated Chinese version of the SSRS with a Cronbach's α of 0.885 was used.[28] The scale consists of 10 items and includes objective support, subjective support, and availability of social support sub-dimensions. The answer options of items were a single choice or multiple choice, and after assignment, the total score of the scale ranged from 12 to 66 points and was interpreted as follows: low (total score $\leq$ 22), medium (total score = 23-44), and high (total score $\geq$ 45).

Validity and reliability

Six experts reviewed the online questionnaire (2 preventive medicine experts, 2 sociologists, and 2 nursing professors). The questionnaire had a good content validity index (CVI = 0.926). Before the formal survey, a pilot study among 30 residents was conducted to check the questionnaire's reliability. The internal consistency Cronbach's α coefficient for the questionnaire was 0.815.

Data collection

First, we uploaded the questionnaire to Wenjuanxing (https://www.wjx.cn), an online questionnaire system widely used in academic study in China. Then, our research team shared the questionnaire link generated by Wenjuanxing to their WeChat (https://weixin.qq.com), the largest Chinese social media platform, and invited people in their WeChat to fill in the questionnaire. The link was subsequently forwarded by these contacts to more people in their WeChat to fill in the questionnaire, and so on. We also posted the questionnaire link on other widely used social media platforms, including Sina Weibo (https://weibo.com) and QQ (https://www.qq.com) to reach as many residents as possible. IP address restriction technology was adopted to ensure users with the same IP address could complete the questionnaire only once. Finally, 2 independent researchers were downloaded and checked the questionnaire data, eliminated the unqualified questionnaires with invalid filling parts accounting for more than 20% of the whole questionnaire page. Any disagreements between 2 researchers were settled by reaching a consensus with a third researcher.

Analytic Strategy

The SPSS software (version 25.0; SPSS Inc., Chicago, IL, USA) was used for statistical analysis in this study. Continuous variables were described as means with standard deviations (SD), whereas categorical variables were presented as frequencies with percentages (%). The item scoring rate and the total scoring rate for KABP were calculated by dividing the actual score of an item or total items by the total item/items score and then multiplying by 100%. Two independent sample t-tests or one-way analysis of variance (ANOVA) was conducted to evaluate differences among respondents with different sociodemographic characteristics. Statistically significant variables identified in univariate analysis and those professionally considered as significant factors were screened as independent variables, which were then incorporated into the multivariate linear regression equation to further clarify factors influencing KABP and social support. Pearson's correlation analysis was carried out to examine relationships among KABP and social support. Two-tailed P values < 0.05 were considered statistically significant.

Ethical Standards

Permission for the study was granted by Chengdu University, Sichuan Province, China. Informed consent was obtained from each participant online who was assured of anonymity and confidentiality, their rights to withdraw from the study at any time, and that the data were collected for academic use only.

Results

Characteristics of Respondents

A total of 360 questionnaires were collected, in which 44 were invalid, as a result, and 326 valid questionnaires were finally obtained for data analysis (effective response rate was 90.6%). The main characteristics of respondents were female (190 [58.3%]), ages 21-25 years (183 [56.1%]), Han Chinese (312 [95.7%]), being unmarried (266 [81.6%]), having an undergraduate degree or higher (172 [52.8%]), living in urban locality (177 [54.3%]), having less than 2 years of working seniority (196 [60.1%]), and having a per capital monthly income of less than 2000 yuan (149 [45.7%]; see Table 3).

Scores of KABP and Social Support

The mean score of knowledge was 6.49 (SD 1.863, range 2-10), the total scoring rate was 68.1%, and the highest (service time of mask) and lowest (incubation period) item scoring rates were 95.7% and 12.9%, respectively. The mean score of attitudes was 25.40 (SD 3.501, range 14-28), the total scoring rate was 92.2%, and the highest (necessity of personal prevention for pandemic control) and lowest (willingness to engage in volunteer activities to combat the pandemic) item scoring rates were 95.0% and 89.6%, respectively. The mean score of belief was 13.44 (SD 3.011, range 6-16), the total scoring rate was 89.3%, and the highest (confidence in national/departmental pandemic prevention and control) and the lowest (confidence in regional/community pandemic prevention and control) item scoring rates were 92.7% and 88.7%, respectively. The mean score of practice was 24.19 (SD 5.256, range 17-36), the total scoring rate was 75.3%, and the highest (wearing a mask when going out) and the lowest (frequency of staying informed about pandemic-related information) item scoring rates were 93.3% and 63.3%, respectively. The results are shown in Table 1.

Table 1. Scores of residents' KABP on prevention and control of COVID-19 (N = 326)

Dimension	Item	Score range	Lowest score	Highest score	Mean (SD)	Scoring rate (%)
Knowledge	Service time of mask	0-1	0	1	0.96 (0.203)	95.7
	Disposal of discarded mask	0-1	0	1	0.89 (0.314)	89.0
	Duration of community quarantine	0-1	0	1	0.88 (0.321)	88.3
	Route of transmission	0-1	0	1	0.88 (0.325)	88.0
	Major symptom	0-1	0	1	0.87 (0.339)	86.8
	Mask type	0-1	0	1	0.74 (0.441)	73.6
	Safe social distance	0-1	0	1	0.70 (0.459)	69.9
	English abbreviations of coronavirus disease (COVID-19)	0-1	0	1	0.55 (0.499)	54.6
	Time of medical observation	0-1	0	1	0.44 (0.497)	44.2
	Incubation period	0-1	0	1	0.13 (0.336)	12.9
	Total	0-10	2	10	6.49 (1.863)	68.1
Attitude	Necessity of personal prevention for pandemic control	1-4	1	4	3.80 (0.458)	95.0
	Necessity of community prevention for pandemic control	1-4	1	4	3.80 (0.437)	95.0
	Cooperation for nucleic acid detection	1-4	1	4	3.69 (0.585)	92.3
	Explaining COVID-19 related knowledge to acquaintances and companions	1-4	1	4	3.55 (0.668)	91.7
	Family members' attentiveness to COVID-19	1-4	1	4	3.65 (0.583)	91.2
	Promptly report and self-isolate if experiencing suspected symptoms such as fever and cough	1-4	1	4	3.62 (0.573)	90.5
	Willingness to engage in volunteer activities to combat the pandemic	1-4	1	4	3.80 (0.416)	89.6
	Total	7-28	14	28	25.40 (3.501)	92.2
Belief	Confidence in national/departmental pandemic prevention and control	1-4	1	4	3.71 (0.530)	92.7
	Confidence in the recovery of national economy in severe disaster areas	1-4	1	4	3.65 (0.567)	91.2
	Confidence in individual pandemic prevention and control	1-4	1	4	3.58 (0.636)	89.5
	Confidence in regional/community pandemic prevention and control	1-4	1	4	3.55 (0.658)	88.7
	Total	4-16	6	16	13.44 (3.011)	89.3
Practice	Wearing a mask when going out	1-4	1	4	3.73 (0.539)	93.3
	Preparing protective supplies	1-4	1	4	3.42 (0.739)	85.6
	Washing hands while going back home	1-4	1	4	3.33 (0.769)	83.3
	Enhancing ventilation by opening windows	1-4	1	4	3.01 (0.961)	75.3
	Avoidance of parties/gatherings	1-4	1	4	2.98 (0.976)	74.4
	Observing social distancing measures	1-4	1	4	2.97 (0.901)	74.2
	Cleaning/disinfection frequency of living environments	1-4	1	4	2.77 (0.976)	69.2
	Using disposable tissues to clean public facilities, such as elevator buttons and door handles	1-4	1	4	2.75 (0.962)	68.8
	Frequency of staying informed about pandemic-related information	1-4	1	4	2.53 (0.829)	63.3
	Total	9-36	17	36	24.19 (5.256)	75.3

KABP, knowledge, attitude, belief, and practice; SD, standard deviation.

The mean score of social support was 34.15 (SD 6.463, range 12-50), the total scoring rate was 62.6%, and the highest ("the way I live in the past year") and the lowest ("the source of financial support or help when I have an emergency") item scoring rates were 84.7% and 41.6%, respectively. The mean scores of objective support, subjective support, and availability of social support sub-dimensions were 7.81 (SD 3.269, range 1-17), 18.90 (SD 4.240, range 8-30), and 7.44 (SD 2.154, range 3-12), respectively. The total scoring rates of those 3 sub-dimensions were 51.1%, 74.1%, and 78.5%, respectively. The results are depicted in Table 2.

Univariate and Multivariate Analyses of Factors Related to KABP and Social Support Scores

According to the results of 2 independent sample t-tests or one-way ANOVA, in terms of knowledge, differences in the mean scores between residents of different gender, nationality, education level, and family economic level were statistically significant (ie, female vs male: 7.93 vs 6.88, $P < 0.001$; Han Chinese vs other nationalities: 7.55 vs 6.14, $P < 0.01$; under-graduate degree or higher vs junior college vs high school and below: 7.69 vs 7.34 vs 7.12, $P < 0.001$; < 2000 yuan vs 2000-5000 yuan vs > 5000 yuan of family per capita monthly income: 6.95 vs 7.24 vs 7.38, $P < 0.05$). Regarding belief, significant difference was identified in the mean scores between residents of different place of residence (ie, urban vs rural: 13.54 vs 11.34, $P < 0.05$). As for social support, significant differences were identified in the mean scores between residents of different marital status and place of residence (ie, unmarried vs married: 20.73 vs 23.00, $P < 0.01$; urban vs rural: 22.69 vs 20.85, $P < 0.01$). Moreover, the results of attitude and practice showed that there were no significant

Table 2. Scores of residents' social support on prevention and control of COVID-19 (N = 326)

Dimension	Item	Score range	Lowest score	Highest score	Mean (SD)	Scoring rate (%)
Objective support	The way I lived in the past year	1-4	1	4	2.79 (1.068)	84.7
	The source of comfort and care when I have an emergency	0-9	0	9	2.62 (1.610)	44.1
	The source of financial support or help when I have an emergency	0-9	0	9	2.40 (1.551)	41.6
	Total	1-22	1	17	7.81 (3.269)	51.1
Subjective support	The number of close friends who can support and help me	1-4	1	4	2.70 (0.918)	82.6
	The relationship between my coworkers and me	1-4	1	4	2.59 (1.089)	79.6
	The relationship between my neighbors and me	1-4	1	4	2.04 (1.136)	65.9
	The support and care I receive from family members	5-20	5	20	11.58 (3.786)	61.6
	Total	8-32	8	30	18.90 (4.240)	74.1
Availability of social support	The way I ask for help when I'm in trouble	1-4	1	4	2.73 (1.009)	83.2
	The way I talk about my problems	1-4	1	4	2.42 (0.956)	75.4
	The frequency with which I participate in group activities	1-4	1	4	2.29 (0.829)	60.9
	Total	3-12	3	12	7.44 (2.154)	78.5
Total		12-66	12	50	34.15 (6.463)	62.6

SD, standard deviation.

differences in the mean scores between residents of different sociodemographic characteristics.

Based on the results of multivariate linear regression analysis, gender ($P = 0.006$), nationality ($P = 0.002$), education level ($P = 0.046$), practice ($P = 0.000$), and social support ($P = 0.000$) were the significant influencing factors of knowledge; belief ($P = 0.000$) and practice ($P = 0.000$) were significant positive predictors for attitude; place of residence ($P = 0.040$), attitude ($P = 0.000$), and practice ($P = 0.000$) were the significant influencing factors of belief; knowledge ($P = 0.000$), attitude ($P = 0.000$), belief ($P = 0.000$), and social support ($P = 0.012$) were significant positive predictors for practice; and marital status ($P = 0.006$), place of residence ($P = 0.021$), knowledge ($P = 0.000$), and practice ($P = 0.012$) were the significant influencing factors of social support. The results are depicted in Table 3.

Correlation Analysis Between KABP and Social Support

According to the results of correlation analysis, knowledge, attitude, belief, and practice were positively correlated with each other ($r = 0.212$-0.649; $P < 0.001$), and social support was positively correlated with knowledge ($r = 0.227$; $P < 0.01$) and practice ($r = 0.138$; $P < 0.05$). The results are shown in Table 4.

Discussion

KABP

Knowledge

The total scoring rate of knowledge was 68.1%. Among 10 investigated items of knowledge, 5 had an item scoring rate of over 85.0%, indicating that most residents had a better mastering of COVID-19 knowledge in the period of normalized prevention and control. The highest scoring rate of "service time of mask" item was 95.7%, indicating that masks have been popularized during the period of normalized prevention and control of COVID-19. The

lowest scoring rate of "incubation period" item was 12.9%, which is much lower than the rate reported by Nie et al.[29] The reasons for the difference might be that the incubation period of COVID-19 varies with the variation of SARS-CoV-2; besides, compared with the COVID-19 outbreak period, the reduction of residents' awareness of prevention and control during the normalized prevention and control period may lead to the reduction of active acquisition of the latest prevention and control knowledge. Moreover, compared with attitude, belief, and practice, the total scoring rate of knowledge was the lowest, suggesting that some residents had insufficient knowledge during this special period. On the one hand, Yang et al. found that mass media (such as WeChat and network news) was the primary source for residents to acquire knowledge, nevertheless, affected by age, social economy, residence, disability and other factors,[13] so the residents' network utilization rate may be limited.[30] On the other hand, with the progress of disease, the relevant prevention and control knowledge on the network is constantly updated, but some residents are not timely and sensitive to the acquisition of knowledge, suggesting that relevant departments should continue to strengthen knowledge publicity and guidance.

Regarding influencing factors, regression analysis found that gender, nationality, education level, practice, and social support were significant positive predictors for knowledge. The finding of significantly higher knowledge scores among females are in line with a previous study conducted by Li and Chen.[31] Studies have shown that females' cognitive ability is higher than that of males, which may be because females are more likely to engage in life and health conscious behaviors.[32] Compared with ethnic minority residents, the Han Chinese had a significantly higher knowledge score, which is similar to the findings of another study conducted by Kang.[33] Moreover, similar to the results of a study conducted by Chang et al., this study showed that the higher the education level of residents, the higher the knowledge score.[34] Therefore, it is essential for health educators to attach great importance to ethnic minorities and residents with low education level, and carry out

Table 3. Univariate and multivariate analyses of factors associated with residents' KABP and social support on prevention and control of COVID-19 (N = 326)

Variable		N (%)	Knowledge Mean (SD)	t/F	β	Attitude Mean (SD)	t/F	β	Belief Mean (SD)	t/F	β	Practice Mean (SD)	t/F	β	Social support Mean (SD)	t/F	β
Gender	Female	190 (58.3)	7.93 (1.817)	5.253***	−0.078**	25.63 (2.955)	1.408		13.34 (1.720)	−0.662		27.72 (4.136)	−1.934		20.92 (2.166)	1.498	
	Male	136 (41.7)	6.88 (1.753)			25.07 (4.136)			13.57 (2.381)			28.85 (4.369)			20.58 (2.220)		
Age (years)	> 25	75 (23.0)	7.49 (2.101)	0.635		25.23 (3.355)	1.113		13.24 (1.908)	0.757		27.91 (4.894)	1.435		20.93 (1.848)	0.840	
	21-25	183 (56.1)	7.49 (1.741)			25.48 (3.484)			13.51 (2.092)			28.31 (4.067)			20.61 (2.274)		
	18-20	68 (20.9)	7.49 (1.928)			25.37 (3.741)			13.44 (1.934)			28.18 (4.075)			21.04 (2.301)		
Nationality	Han	312 (95.7)	7.55 (1.858)	2.797**	−0.073**	25.45 (3.502)	1.292		13.94 (2.000)	1.555		28.38 (4.235)	−0.849		20.79 (2.217)	1.527	
	Others	14 (4.3)	6.14 (1.460)			24.21 (3.378)			12.21 (1.996)			29.36 (5.172)			20.57 (1.555)		
Marital status	Unmarried	266 (81.6)	7.51 (1.821)	0.417		25.53 (2.914)	−0.337		13.43 (2.025)	−0.041		28.09 (4.142)	−0.722		20.73 (2.214)	0.925**	0.923**
	Married	60 (18.4)	7.40 (2.052)			25.53 (2.914)			13.45 (1.971)			28.63 (4.758)			23.00 (2.091)		
Education level	Undergraduate degree or higher†	172 (52.8)	7.69 (1.623)	3.795***		25.34 (3.600)	1.154		13.59 (1.908)	0.986		28.31 (4.342)	0.787		20.98 (2.144)	1.116	
	Junior college	104 (31.9)	7.34 (1.979)		−0.089	25.30 (3.645)			13.27 (1.983)			27.76 (4.181)			20.41 (2.130)		
	High school and below	50 (15.3)	7.12 (2.291)		−0.111*	25.78 (2.823)			13.26 (2.427)			28.66 (4.153)			20.84 (2.430)		
Place of residence	Urban	177 (54.3)	7.58 (1.888)	0.963		25.44 (3.482)	0.221		13.54 (1.781)	0.594*	−0.078*	28.03 (3.973)	−0.085		22.69 (2.222)	0.377**	−0.852*
	Rural	149 (45.7)	7.38 (1.833)			25.35 (3.535)			11.34 (2.196)			28.38 (4.585)			20.85 (2.159)		
Length of work experience (years)	< 2	196 (60.1)	7.70 (1.723)	1.663		25.51 (3.465)	1.473		13.73 (1.668)	1.033		28.20 (4.298)	1.271		20.70 (2.238)	1.458	
	2-5	102 (30.3)	7.27 (1.996)			25.28 (3.654)			13.01 (2.335)			28.21 (4.008)			20.87 (2.133)		
	> 5	28 (8.6)	7.54 (1.863)			25.00 (3.255)			12.93 (2.641)			28.04 (4.997)			20.93 (2.124)		
Family economic level	Poor	149 (45.7)	6.95 (1.844)	1.151*		25.44 (3.515)	1.456		13.72 (1.778)	0.725		28.19 (4.247)	0.828		20.79 (2.247)	0.857	
	Medium	114 (30.0)	7.24 (1.896)			25.62 (3.075)			13.17 (2.088)			28.15 (4.028)			20.73 (2.023)		
	Good	63 (19.3)	7.38 (1.813)			24.87 (4.141)			13.25 (2.370)			28.25 (4.744)			21.84 (2.380)		
Knowledge														0.212***			0.227***
Attitude										0.311***				0.405***			
Belief								0.649***						0.311***			
Practice					0.212***			0.405***			0.311***						0.138*
Social support					0.227***									0.138*			

KABP, knowledge, attitude, belief, and practice; SD, standard deviation; β, standardized coefficient.
†Reference group; *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

Table 4. Correlation analysis of residents' KABP with social support on prevention and control of COVID-19 (N = 326)

Dimension	Knowledge	Attitude	Belief	Practice	Social support
Knowledge	–	0.048	0.018	0.212***	0.227**
Attitude	0.048	–	0.649***	0.405***	−0.039
Belief	0.018	0.649***	–	0.311***	0.024
Practice	0.212***	0.405***	0.311***	–	0.138*

KABP, knowledge, attitude, belief, and practice.
*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

multi-form and easy-to-understand popularization activities about COVID-19 prevention and control knowledge for them.

Attitude

The total scoring rate of attitude was 92.2% and all items were scored above 85%, revealing a positive attitude toward COVID-19 prevention and control, which was an important factor for controlling the pandemic. The scoring rates of items "necessity of personal prevention for pandemic control" and "necessity of community prevention for pandemic control" were highest, both of which were 95.0%, indicating that residents were aware of the equal importance of individual and community intervention in pandemic prevention and control. A study on COVID-19 and global governance reforms emphasized the importance of individual prevention and control.[35] In addition, some studies believed that the community is not only the front line on prevention and control of COVID-19 in a normalization period,[36] but also the most effective defense line for external defense input and internal defense rebound, which is essential for strictly controlling the increase of the pandemic.[37] Therefore, the complementarity of individual and community prevention and control can be conducive to the implementation of prevention and control measures and promote the continuous improvement of pandemic prevention and control situation. Although the scoring rate of "willingness to engage in volunteer activities to combat the pandemic" was the lowest among all items, it still achieved 89.6%, revealing that most residents were highly motivated to participate in pandemic prevention and control, which was inseparable from the strong responsibility and dedication of most residents.[35]

Belief

The total scoring rate of belief was 89.3%, all items were scored above 85%, and the highest scoring rate of item "confidence in national/departmental pandemic prevention and control" was 92.7%. Overall, residents in our study had a higher belief on COVID-19 prevention and control and had high confidence in overcoming the pandemic. The results also showed that residents had confidence not only in the prevention and control effect at the national/departmental level, but also in the individual and regional/community levels. Previous studies have shown that, according to the health belief model, the smooth progress of standardized prevention and control of COVID-19 requires not only strong and specific measures taken by the state, but also individual prevention awareness and community cooperation.[38–40] Based on the regression analysis results, only place of residence, attitude, and practice were the significant predictive factors for belief. Urban residents often have better social resources than rural residents, which contributes to the timeliness and effectiveness of pandemic prevention and control.[41] Therefore, it is inevitable to cause different changes in the belief level of urban and rural residents. The results of this study suggested that the interventions for COVID-19 preventive belief among rural residents should be strengthened.

Practice

The total scoring rate of practice was 75.3%, and among the 9 knowledge items, 33.3% (3 items) scored more than 80% and 66.7% (6 items) scored more than 70%. The highest scoring rate of item "wearing a mask when going out" was 93.3%. Similar results were found in the study of Wang et al.[42] The reason might be that the state/community continued to vigorously publicize and implement prevention and control measures to remind residents to pay attention to the use of masks during the normalization period, so that most residents formed good basic prevention and control behavior. On May 20, 2021, the chief epidemiologist of China CDC emphasized the importance of wearing a mask when going out and in places where people gather.[43] The lowest scoring rate of item "frequency of staying informed about pandemic-related information" was 63.3%, which might be attributed to the weakening of residents' awareness of prevention and control during the normalization period.[44] In addition, the scoring rate of practice was lower than that of attitude and belief, indicating that there is still a gap between attitude/belief formation and practice transformation, and more efforts are warranted to explore the mechanism between them and other possible factors affecting residents' practice transformation.[13]

Social Support

The total scoring rate of social support was 62.6%, and among 3 sub-dimensions, the objective support sub-dimension had the lowest scoring rate (51.1%). In the objective support sub-dimension, the item "living with classmates, colleagues or friends in the past year" had the highest scoring rate. The respondents in this survey were relatively young, most of whom had short working years and a weak economic foundation. Therefore, in order to reduce the cost of living, they often choose to live with classmates, colleagues, or friends. In the period of normalized pandemic prevention and control, shared renting can alleviate some economic pressure. It is worth mentioning that the item "the source of financial support or help when I have an emergency" had the lowest scoring rate of 41.6%. In this item, we found that residents had relatively few sources of help, of which 68.1% had 1 to 3 sources of help, whereas only 21.8% received more than 3 sources, and even 10.1% had no sources. Similar results were found in studies conducted by Guo et al.[45,46] This might be because most of our respondents were in the initial stage of personal development, were currently unmarried, and lacked social resources or the ability to use social resources. The results suggested that residents' work units, official or non-official organizations, should provide practical help in economic and other resources for residents in the special period of COVID-19 normalization prevention and control.

The total scoring rate of subjective support sub-dimension was 74.1%, and the item "the number of close friends who can support and help me" scored the highest (82.6%), indicating that most residents had more opportunities to get along with their friends and received social support from them. Among the 3 sub-dimensions of social support, the availability of social support dimension had the highest scoring rate (78.5%). In this sub-dimension, the item "the way I ask for help when I'm in trouble" had the highest scoring rate (83.2%); specifically, 71% of residents chose "not to seek help, or rarely/occasionally seek help." Relevant studies have shown that during the normalization period, most areas have resumed normal work and production, and the economy is gradually recovering.[47,48] Therefore, compared with the pandemic outbreak period, residents' economic difficulties and psychological pressure have been alleviated, and their self-support ability has been improved. In the availability of social support sub-dimension, the item "the frequency with which I participate in group activities" had the lowest scoring rate (60.9%). Specifically, 72% of residents chose "never or occasionally participate in group activities." The reason might be that due to the needs of pandemic prevention and control, the government and pandemic prevention departments advocate that residents should minimize public gatherings.[49]

Regression analysis revealed that the social support level of residents living in rural areas and unmarried residents was lower than those living in urban areas and married residents, which was similar to the findings of previous studies.[50,51] For unmarried residents, they may receive less social support due to the lack of social support supply sources, the absence of family functions, and the lack of functional support services such as consultation.[52,53] In addition, because the rural security system and health education system were not perfect, and the overall education level of rural residents was not high,[54] these residents' cognition and behavior tendency of the pandemic situation were in a relatively initial stage, which may lead to the very weak social support they can obtain. Thus, it is suggested to strengthen social support for unmarried residents and rural residents during the normalization period.

Correlation Between KABP and Social Support

The correlation analysis of KABP sub-dimensions showed that practice was the positive predictor for knowledge; belief and practice were the positive predictors for attitude; attitude and practice were the positive predictors for belief; and knowledge, attitude, and belief were the positive predictors for practice. The above results were in line with the KABP model.[22] Moreover, the results showed that social support was positively correlated with knowledge and practice. It might be that residents with high social support and often in a warm and harmonious environment could seek help from the society and could be more positive and optimistic in the face of the pandemic and take appropriate prevention and control measures.[55] Moreover, COVID-19 is a serious global public health event, which is easy to cause a series of adverse emotions among residents in the process of prevention and control.[56] It is far from enough to rely on individuals to fight the pandemic. We need the help of all aspects of society to provide relevant knowledge and emotional support, and guide residents to change their bad behaviors. The results suggested that seeking social support can increase residents' prevention and control knowledge and improve their self-management behavior, to achieve the purpose of effective pandemic control.

Limitations

This study had certain limitations. First, in order to ensure the effectiveness of the survey, we conducted a preliminary verification of the survey tool through expert review. Although its CVI coefficient was acceptable, further standard verification measures are required. Second, the study was carried out in China, which may limit the generalization of our findings to other countries. Third, this study was carried out at the normalized prevention and control stage of the pandemic, which may only reflect the KABP and social support of our participants on COVID-19 prevention and control during the questionnaire collection period.

Conclusions

This study preliminarily explored the current situation, influencing factors, and correlation of KABP and social support of residents on the normalized prevention and control of COVID-19. The results showed that residents had a positive attitude and belief in prevention and control, but there were certain deviations in the understanding of some important prevention and control knowledge and gaps in the transformation of knowledge into practice. At the same time, our research also showed that social support was also an important factor affecting residents' KABP, especially knowledge and practice. The findings of our study can provide scientific reference for decision makers in pandemic management and decision making and COVID-19 prevention and publicity in the normalized prevention and control period, especially for health educators to carry out demand-oriented and individualized targeted education programs for specific groups such as males, non-Han Chinese, rural residents, unmarried residents, and those with low education level or social support level.

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