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Path analysis of COVID-19 cognition, social support, and mental health of pregnant women with interventional prenatal diagnosis during the COVID-19 pandemic based on structural equation modeling

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Abstract

This study aims to investigate the relationship between Corona Virus Disease 2019 (COVID-19) cognition, social support, and mental health among pregnant women proposed for undergoing interventional prenatal diagnosis in Sichuan Province during the COVID-19 pandemic. A total of 2270 pregnant women (2232 valid) who were proposed to undergo interventional prenatal diagnosis at a tertiary hospital prenatal diagnosis center in Sichuan Province from January to December 2022 were selected by Convenience sampling and surveyed using a self-administered general information questionnaire, social support rating scale, mental health questionnaire (including: Self-Rating Anxiety Scale, Self-Rating Depression Scale), and self-administered COVID-19 cognition questionnaire. Structural equation modeling showed that social support negatively predicted anxiety ($\beta = -0.34$, $t = -14.98$, $P < .001$) and negatively predicted depressive status ($\beta = -0.21$, $t = -9.57$, $P < .001$); COVID-19 cognition negatively predicted anxiety ($\beta = -0.76$, $t = -5.34$, $P < .001$) and depression ($\beta = -0.40$, $t = -2.99$, $P < .01$); anxiety positively predicted anxiety ($\beta = 0.73$, $t = 37.34$, $P < .001$). The overall knowledge rate of COVID-19 cognition among 2232 pregnant women who were to undergo interventional prenatal diagnosis was 76.40%. The fit indices of the model were: CMIN/DF = 3.071, GFI = 0.999, AGFI = 0.993, CFI = 0.999, RMSEA = 0.030, NFI = 0.998, and TLI = 0.992, indicating that the model had a good fit and the model was scientifically valid. Pregnant women in Sichuan province who are to undergo prenatal interventional diagnosis have a medium level of COVID-19 awareness, and their level of COVID-19 awareness and social support will directly affect their anxiety and depression level, and their anxiety level will also affect their depression level. We should give more attention to pregnant women, especially those in particular situations such as advanced age, poor maternal history, family history of genetic disease, etc, they should be given adequate care and social support, and multiple channels and types of health education should be provided for the COVID-19 to improve the pregnant women's knowledge of COVID-19, which is important for improving the mental health of pregnant women.

Abbreviation: COVID-19 = Corona Virus Disease 2019, OS = objective support dimension, SAS = Self-rating Anxiety Scale, SDS = Self-rating Depression Scale, SSRS = Social Support Rating Scale.

Keywords: COVID-19, interventional prenatal diagnosis, mental health, pregnant women, social support, structural equation modeling

HY and XW contributed equally to this work.

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Ethical approval was taken from the Ethics Committee of West China Second University Hospital, Sichuan University. Informed consent was obtained from all the subjects. All methods carried out were in accordance with West China Second University Hospital, Sichuan University guidelines and regulations and in accordance with Declarations of Helsinki.

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1. Introduction

Corona Virus Disease 2019 (COVID-19) is a highly transmissible and universally susceptible infectious disease with a certain morbidity and mortality rate, and symptoms of respiratory disease are the main symptoms of infection with novel coronavirus and may be accompanied by acute respiratory distress syndrome, which may lead to death in severe cases,[1] however, COVID-19 health effects are not limited to respiratory disease, but COVID-19 infection has been reported to cause neurological symptoms as well.[2–5] The novel coronavirus has now caused widespread transmission worldwide and has become a globally recognized category of public health emergencies, seriously threatening the lives and health of people worldwide.[6] Pregnant women are a susceptible population to COVID-19, and cases of infection in pregnant women have been reported since the onset of the epidemic.[7] Previous studies have reported that pregnant women are at higher risk for complications and serious illness after coronavirus infection (including COVID-19, SARS, and Middle eastern respiratory syndrome (MERS)) compared to the general population.[8–11] In addition, extrapolation based on the impact of other viruses,[12] COVID-19 infection may lead to an increased risk of adverse pregnancy outcomes such as fetal growth restriction, preterm delivery, and perinatal mortality in pregnant women.[13]

At the same time, pregnancy itself is a type of stressful life event that brings about significant physiological changes and some psychological stress reactions in women.[14] Pregnant women in this stage are also psychologically susceptible to the influence of the external environment while experiencing dramatic changes in social roles and life circumstances, making them more prone to adverse emotions such as anxiety and depression. Some studies have shown that about 50% of women during pregnancy have varying degrees of psychological stress reactions, such as sleep disturbances, anxiety, and depression.[15] Among them, fear is one of the most common psychological stress reactions during pregnancy.[16,17] Foreign studies have shown that pregnancy-related anxiety is consistently and independently associated with spontaneous preterm birth[18] and is more predictive than general anxiety for birth outcomes and postpartum depression.[19,20] From the findings of Teixeira et al,[21] the prevalence of maternal anxiety was 15.0%, 12.3%, and 18.2% in early, mid, and late pregnancy, respectively; Fontein Kuipers et al conducted a survey of 458 pregnant women with maternity appointments, and the results showed that the prevalence of pregnancy-related anxiety among women during pregnancy was 11.8%.[22] In contrast, national scholars have suggested that pregnancy-related anxiety is a high-risk factor for preterm abortion[23] and is predictive of postpartum mood disorders.[24] Furthermore, a recent review showed that the prevalence of pregnancy depression is high globally, ranging between 15% and 65% in developed countries such as South Korea[25] and Australia,[26] where the prevalence of pregnancy depression was 14.2% and 7.3%, respectively, and developing countries such as South Africa,[27] Vietnam,[28] and Oman,[29] where the prevalence was 25%, 24.5%, and the prevalence of depression during pregnancy in Pakistan is as high as 42.7%,[30] and even more so, the risk of harming others and suicide may be present.

Although there is little evidence of the direct impact of COVID-19 on mental health, there are indications of increased levels of traumatic stress symptoms and depression following COVID-19 infection.[31] Regarding the indirect effects of COVID-19 on general mental health, there are also indications of increased depression and anxiety symptoms in the general population and negative effects on general mental health during the New Coronary Pneumonia epidemic.[31] In addition, for the specific group of pregnant women, the New Coronary Pneumonia epidemic has had varying degrees of psychological and physical effects. In a recent systematic review and meta-analysis, the population of pregnant women had an overall anxiety rate of 42% and an overall depression rate of 25% under the COVID-19 pandemic; the incidence of psychological problems among pregnant women was increased, which is consistent with what has been previously observed in epidemics of infectious diseases such as SARS.[32] In addition, the mixed prevalence of depression and anxiety was higher among pregnant women than among healthcare workers during the New Coronary Pneumonia epidemic.[33] In conclusion, COVID-19 has a significant impact on the mental health of pregnant women, which should be a priority concern for the state and society.

According to previous statistics, there are about 900,000 to 1200,000 new birth defects in China every year, and interventional prenatal diagnosis is a key link and an important method to prevent the birth of children with serious birth defects and improve the quality of the population.[34,35] As the same time, with the recognition of eugenics and the abundance and popularity of prenatal screening tools, the number of prenatal diagnoses of fetuses by interventional procedures has increased significantly.[36] Compared with common prenatal tests, invasive tests may cause different degrees of damage to the mother and infant, with risks of infection, amniotic fluid embolism, and even miscarriage,[37] and because of the uncertainty of the test results, pregnant women may bear more stress and be more prone to psychological problems such as anxiety and depression.

Therefore, in the context of the COVID-19 pandemic, pregnant women, as a special group, are already in a stressful situation, and in addition, they need to bear the risk and pressure brought by the interventional prenatal diagnosis, which may bring stronger psychological stress and psychological pressure. Therefore, in the special context of the ongoing COVID-19 pandemic, the mental health and social support status of this special group need to be paid attention to, and targeted suggestions should be given to provide data support and inspiration for subsequent studies. The results of the study are reported as follows.

2. Materials and methods

2.1. Study population

Convenience sampling was used to select 2270 pregnant women who were to undergo interventional prenatal diagnosis at a tertiary hospital prenatal diagnosis center in Sichuan Province from January to December 2022 as the study population, and their informed consent was obtained before completing the questionnaire. Inclusion criteria: ① pregnant women with indications for interventional prenatal diagnosis; ② residing in Sichuan province during the epidemic; ③ voluntarily cooperating to participate in the study. Exclusion criteria: ① unable to complete the questionnaire on their own; ② suffering from serious mental illness.

2.2. Research instruments

2.2.1. General information questionnaire. The researcher developed a general information questionnaire, which includes socio-demographic questions such as age, education level, place of residence, family economic status, medical insurance, and commercial insurance status.

2.2.2. Social Support Rating Scale. Social Support Rating Scale (SSRS)[38] was developed by Shuiyuan Xiao in 1994, there are 3 measuring dimensions, 10 questions totally, including ① objective support dimension (OS), ② subjective support dimension, and ③ Utilization of Social Support dimension. The total score of social support is the sum of these 10 questions, and the range of scores is between 11 and 62, and the higher the final score, the better the social support. The higher the level of social support. The total score between 45 and 66 are rated as a high level of social support, 23 to 44 scores rated as a medium level of social support, ≤22 rated as a low level of social support,

and the scale has good reliability and validity.[38] The Cronbach alpha coefficient of this scale in this study was 0.77, with good reliability.

2.2.3. Mental Health Questionnaire. The Mental Health Questionnaire is composed of the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS), which were developed by Zung in 1971 and 1965, respectively, to assess the anxiety and depression symptoms of the respondents in the past week, and both scales have good reliability and validity.

2.2.3.1. Self-rating Anxiety Scale. SAS[39] is used to evaluate anxiety symptoms in the last 1 week, and it was developed by Zung, a Chinese-American professor at Duke University, in 1971. Domestic and international studies generally agree that this scale can reflect the subjective feelings of anxious people more accurately, with a total of 20 questions, including 4 reverse scoring questions. The scoring rules: every question has 4 answers as follows: occasionally or not; sometimes; often; and almost always, and with 4-1 points in that order; the total score of 20 questions are multiplied by 2.25 to obtain the standard score, and the higher the standard score, the more severe the anxiety symptoms. The standard score higher than 50 is considered to be anxiety. The reliability of the scale is good,[39] and Cronbach alpha coefficient of the scale in this study is 0.76, with good reliability.

2.2.3.2. Self-rating Depression Scale. SDS is used to evaluate the depressive symptoms in the past 1 week. This scale was developed by Zung in 1965.[40] The scoring rules: every question has 4 answers as follows: occasionally or not; sometimes; often; and almost always, and with 4-1 points in that order; the standard score was obtained by multiplying the total scores of the 20 questions by 2.25, and the higher the standard score, the more severe the depressive symptoms. The reliability of the scale is good,[40] the Cronbach alpha coefficient of the scale in this study was 0.80, with good reliability.

2.2.4. COVID-19 Cognition Questionnaire. The researcher developed the COVID-19 cognitive questionnaire based on consultation with relevant experts and study on previous literature,[41,42] combined with COVID-19 characteristics including the disease etiology, epidemiology, transmission routes, symptoms, prevention, etc. The questionnaire contained 10 questions, all 10 questions classified 6 dimensions, including typical symptoms of COVID-19 infection, transmission route of COVID-19, incubation period/asymptomatic infection period, protective measures for COVID-19, susceptible population of COVID-19, treatment of COVID-19, and cleaning and disinfection. All questions were judgmental, with 1 point for a correct answer and no points for an incorrect answer, and the score range was 0 to 10.

2.3. Statistical methods

Data entry and statistical analysis were performed using SPSS22.0 and AMOS24.0. frequency, composition ratio, and mean ± standard deviation ($x \pm s$) were used to describe the general information of the study subjects; Pearson product–difference correlation was used to examine the correlation between the variables; to further investigate the relationship between COVID-19, SAS, SDS, and SSRS scores, and AMOS. To further investigate the relationship between COVID-19, SAS, SDS, and SSRS scores, structural equation modeling was established using AMOS 24.0, and the path coefficients were used to express the relationship between the variables, and $\alpha = 0.05$ was used as the criterion for a statistical test of significance, and $P < .05$ was used as the statistically significant difference.

3. Results

3.1. General information

A total of 2270 questionnaires were distributed in this study, and 2270 questionnaires were returned, with a 100% return rate; among them, 2232 questionnaires were valid, with a valid rate of 98.32%. Among the 2232 valid questionnaires, the average age of pregnant women was (31.61 ± 5.20) years and the average gestational week was (21.12 ± 3.19) weeks. The rest of the demographic information is detailed in Table 1.

3.2. Results of the COVID-19 cognitive survey

According to the results of the COVID-19 cognitive survey data of 2232 pregnant women to undergo interventional prenatal diagnosis questionnaire, the overall knowledge rate of 2232 pregnant women to undergo interventional prenatal diagnosis about COVID-19 cognition was 70.17%; among them, the dimensions involved in the last 5 entries of correctness, corresponding entries and corresponding correctness rates were, in order: prevention of COVID-19 (entry 9, 17.50%), treatment of COVID-19 (entry 7, 19.00%), cleaning and disinfection (entry 5, 30.10%), prevention of COVID-19 (entry 8, 62.00%), and susceptible population of COVID-19 (entry 6, 89.50%) (see Table 2 for details).

3.3. Descriptive statistics and correlation analysis of the scores of the scales

According to the results of each scale of the questionnaire survey of 2232 pregnant women to undergo interventional prenatal diagnosis, the SAS score (41.73 ± 7.64); SDS score (46.13 ± 9.17); COVID-19 score (7.64 ± 1.08); SSRS score (42.65 ± 6.75), where the 3 dimensions of social support scores were: OS score (9.5 ± 2.71), subjective support score (25.02 ± 4.35), and utilization of support score (8.13 ± 1.86). According to the results of the Person correlation analysis, the COVID-19 total score was negatively correlated with the SAS and SDS scores, while it was positively correlated with the OS dimension and the utilization of support dimension scores in the SSRS; there was a positive correlation between the SAS and SDS scores, as detailed in Table 3.

3.4. Structural equation modeling of COVID-19 cognition, social support, and mental health of pregnant women to undergo interventional prenatal diagnosis in Sichuan Province during the COVID-19 pandemic

To investigate the influence pathways between COVID-19 cognition, social support, and mental health status of pregnant women proposed for interventional prenatal diagnosis in Sichuan Province during the COVID-19 pandemic, structural equation models were constructed with COVID-19 cognition, social support status, and mental health status as variables. After several corrections, the best structural equation model was fitted, in which the fit indices of the model were: CMIN/DF = 3.071, GFI = 0.999, AGFI = 0.993, CFI = 0.999, RMSEA = 0.030, NFI = 0.998, TLI = 0.992, indicating that the model had a good fit and the model was scientifically valid.

According to the results of the structural equation model in Figure 1, the better the social support situation and COVID-19 cognitive situation, the fewer anxiety symptoms; the better the social support situation and COVID-19 cognitive situation, the less depressive symptoms; the fewer anxiety symptoms, the less depressive symptoms, and the specific path is shown in Figure 1. From Figure 1, it can be seen that: i) social support negatively predicted anxiety ($\beta = -0.34$, $t = -14.98$, $P < .001$)

Table 1

General information and the differences of SAS, SDS, SSRS, and COVID-19 scores of the study population.

				SAS		SDS		SSRS		COVID-19	
Item	**Classification**	**Frequency**	**Percentage**	**t/F**	***P* value**	**t/F**	***P* value**	**t/F**	***P* value**	**T/F**	***P* value**
Marital Status	Unmarried	57	2.60%	1.162	.219	0.857	.714	1.010	.453	0.959	.452
	Married (First Marriage)	1865	83.60%								
	Married (remarried)	310	13.80%								
Child status	No children yet	989	44.30%	1.292	.098	0.871	.691	1.110	.299	3.610	.001
	Have one child	1153	51.70%								
	Have 2 or more children	90	4.00%								
Whether living with children	No	1130	50.60%	0.845	.753	0.847	.730	1.086	.332	2.918	.008
	Living with one child	1065	47.70%								
	Live with 2 or more children	37	1.70%								
Whether living with the elderly	No	985	44.10%	0.749	.884	0.937	.578	1.022	.433	0.799	.571
	Live with one elderly person	403	18.10%								
	Live with 2 elderly people	781	35.00%								
	Live with 3 or more elderly people	63	2.80%								
Whether to live with a spouse for a long time	Yes	286	12.80%	1.195	.181	0.766	.845	0.925	.599	0.451	.845
	No	1946	87.20%								
Have social insurance or not	Yes	1775	79.50%	1.605	.008	1.376	.066	1.615	.011	2.583	.017
	No	457	20.50%								
Have commercial medical insurance or not	Yes	766	34.30%	1.120	.274	1.079	.343	1.420	.049	0.495	.812
	No	1466	65.70%								
Ethnicity	Han Chinese	2173	97.40%	0.736	.897	0.646	.952	1.049	.390	0.233	.966
	Ethnic Minority	59	2.60%								
Education level	High School and below	834	37.40%	1.634	.006	1.656	.008	0.877	.681	4.175	.000
	College/undergraduate	1266	56.70%								
	Postgraduate and above	132	5.90%								
Occupation	Working	1403	62.80%	1.795	.001	1.536	.021	2.008	.000	2.207	.040
	Farming	93	4.20%								
	unemployed	736	33.00%								
Whether the pregnancy is natural	Yes	2069	92.70%	1.069	.353	0.917	.613	1.164	.231	0.301	.937
	No	163	7.30%								
Monthly family income	≤9000	1338	59.90%	1.333	.073	1.485	.031	1.374	.067	3.706	.001
	9001–18,000	642	28.80%								
	≥18,001	252	11.30%								
Residence	City	1319	59.10%	1.347	.660	1.046	.394	0.785	.820	3.189	.004
	Township	573	25.70%								
	Rural	340	15.20%								

Table 2

The last 5 questions of the COVID-19 cognitive questionnaire in terms of correctness.

Ran-king	Dimension	Question No.	Correctness rate	Question
1	Prevention of COVID-19	9	17.50%	Wearing multi-layer skimmed cotton masks, N95 masks, and medical-surgical masks can prevent COVID-19
2	Treatment of COVID-19	7	19.00%	There is no vaccine or specific drug for COVID-19
3	Cleaning and disinfection	5	30.10%	High temperature, 95% ethanol, and chlorine disinfectant can eliminate COVID-19
4	Prevention of COVID-19	8	62.00%	Shuanghuanglian oral liquid and Lianhua Qingfei capsule can prevent COVID-19
5	Susceptible groups of COVID-19	6	89.50%	Only young and middle-aged people and the elderly are susceptible, children are not susceptible
Overall correctness Rate				70.17%

Table 3

Descriptive statistics and correlation matrix for each scale score (r).

Variables	SDS	SAS	SSRS	OS	SS	USS	COVID-19
SDS	1						
SAS	.664**	1					
SSRS	−.343**	−.304**	1				
OS	−.303**	−.273**	.692**	1			
SS	−.241**	−.209**	.861**	.318**	1		
USS	−.242**	−.218**	.608**	.311**	.322**	1	
COVID-19	−.125**	−.118**	0.037	.108**	−0.033	.054*	1

COVID-19 = COVID-19 Cognitive Questionnaire, OS = Objective Support dimension in SSRS, SAS = Self-rating Anxiety Scale, SDS = Self-rating Depression Scale, SS = Subjective Support dimension in SSRS, SSRS = Social Support Rating Scale, USS = Utilization of Social Support dimension in SSRS.

* $P < .05$.

** $P < .01$.

and negatively predicted depressive state (β = −0.21, t = −9.57, *P* < .001); (ii) COVID-19 cognition negatively predicted anxiety (β = −0.76, t = −5.34, *P* < .001) and depression (β = −0.40, t = −2.99, *P* < .01); (iii) anxiety positively predicted anxiety (β = 0.73, t = 37.34, *P* < .001).

4. Discussion

4.1. There are still some misconceptions about COVID-19 among pregnant women in Sichuan Province who intend to undergo interventional prenatal diagnosis

In the results of this survey, the correct rate of questions about COVID-19 perception was 76.40%, indicating that the perceptions of pregnant women in Sichuan province who were to undergo interventional prenatal diagnosis were at a moderate level, which was similar to the results of a study in Beijing University,[43] indicating that the respondents had misperceptions about some of the questions. As shown in Table 2, the vast majority of pregnant women (82.50%) believed that wearing multi-layer skimmed cotton masks can effectively prevent COVID-19, which is consistent with the current phenomenon that many people wear multi-layer skimmed cotton masks, disposable plain masks, and reusable cotton masks for daily COVID-19 protection; in addition, nearly 70% of pregnant women believed that 95% ethanol can effectively eliminate COVID-19. Secondly, nearly 80% of the respondents believe that there is a vaccine and special medicine for COVID-19 there is still no special medicine for the treatment of the COVID-19.

The reasons for the above results may be related to the following factors. First, pregnant women have limited access to scientific health education, and most of them get the information from their friends and relatives, and the information may have been changed during the process of repeated dissemination; second, the information disseminated on the Internet is of different quality, and some new media on the Internet deliberately exaggerate and exaggerate the output content to attract traffic, which has a large deviation from the actual situation; thirdly, some of the information exporters do not have medical and health backgrounds, and the health information they export is not scientific and rigorous enough. According to the "knowledge–attitudes-practices" theory proposed by Mayo, Mayo believes that healthcare knowledge and information are the basis for establishing positive and correct beliefs and attitudes and thus changing health-related behaviors, while beliefs and attitudes are the motivation for behavior change[44]: only when people understand health knowledge and establish positive and only when people understand health knowledge and establish positive and correct beliefs and attitudes, can they actively form healthful

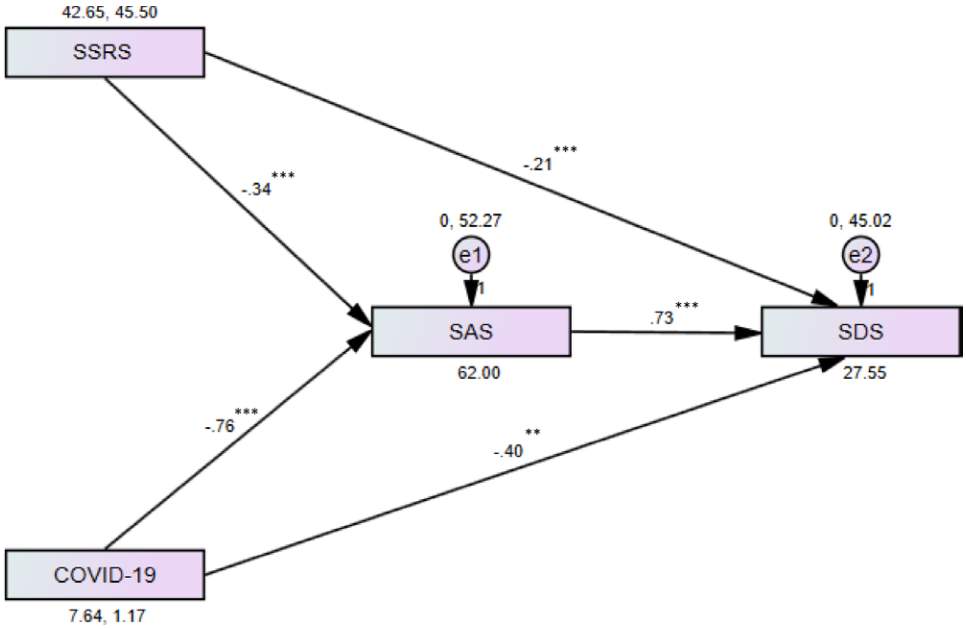

Figure 1. Structural equation modeling of COVID-19 cognition, social support, and mental health of pregnant women to undergo interventional prenatal diagnosis in Sichuan Province during the COVID-19 pandemic. It briefly shows structural equation modeling of COVID-19 cognition, social support, and mental health, and describes the relationship between COVID-19 cognition, social support, depression and anxiety of pregnant women to undergo interventional prenatal diagnosis in Sichuan Province during the COVID-19 pandemic.

behaviors. Therefore, the dissemination of scientific and effective health information can help to form health-promoting behaviors. We are prompted to use various means such as new media platforms, videos of popular science articles, and promotional brochures to disseminate targeted health information in the context of special times, in conjunction with the government, hospitals, and communities in many ways, to correct wrong perceptions and concepts promptly, to change behaviors that are detrimental to health caused by wrong perceptions and concepts, and to help them form correct health behaviors.

4.2. Exploration of the cognitive, social support, and anxiety–depression inter-symptom pathway for COVID-19

According to the results shown in the structural equation model in Figure 1, there are direct correlations between cognition (COVID-19), social support (SSRS), anxiety symptoms (SAS), and depressive symptoms (SDS) for COVID-19; also, there are direct correlations between cognition, social support, and anxiety for COVID-19. In the structural equation model, the largest positive direct effect value was found for anxiety symptoms for depressive symptoms, which may be related to the fact that anxiety and depression, as 2 types of negative emotions, often have complex psychological interactions that exacerbate symptoms[45]; in addition, the structural equation model also showed that the largest nagative direct effect value was found for COVID-19 cognition for anxiety symptoms. According to a study published by foreign scholars in 2016, negative psychology is associated with irrational beliefs.[46] Therefore, it is suggested that the group of pregnant women raising their cognition of COVID-19 can effectively help them to reduce negative psychology and avoid irrational beliefs, which can help pregnant women to promote their mental health.

The same structural equation model showed that social support harmed both anxiety symptoms and depressive symptoms, showing a negative prediction, which is similar to foreign studies on depression and anxiety both being negatively related to social support during the 2003 SARS pandemic.[47] Analyzing the reasons for this may be related to the fact that social support helps to alleviate negative emotions and generate positive emotions,[48,49] while social support is the degree to which individuals receive mental and use support from the social relationships around them, and when individuals suffer from a significant external adverse event, a short period often leads to a decrease in the level of evaluation or perception of available social support.[50] Thus, it is suggested that pregnant women with higher levels of social support have a positive facilitative effect on their mental health dimensions, which is consistent with previous research findings.[51] In addition, according to Zhang Jing et al's study, social support has a positive effect in relieving public psychological stress and reducing anxiety levels,[52] thus also suggesting that for pregnant women with negative emotions such as anxiety and depression, in addition to their subjective support, more objective social support should also be provided, and this objective social support can be from family, friends, neighbors, colleagues, social workers, and other relevant people.[53] These social supports can effectively synergize the relationships between organizations, families, and individuals to provide strong support to individuals and help pregnant women to channel and utilize the support around them, thus improving anxiety and depression symptoms[54] and promoting the alleviation of negative emotional symptoms in the context of the pandemic.

5. Conclusion

Our findings highlight the importance of social support and awareness of COVID-19 in the prevention and management of mental disorders by constructing structural equation models that reveal the intrinsic link between social support, COVID-19 awareness, and anxiety and depressive states. These findings suggest that to address such a global health crisis, we need to adopt a comprehensive approach that includes social, psychological, and medical interventions.

In the results of this study, our findings begin by highlighting the importance of social support. In the face of such unprecedented stress and uncertainty, support from family, friends, community, and government can provide an important psychological buffer.

This may be by providing emotional support, by providing useful information, or by helping individuals cope with the stresses and challenges of everyday life.[55] However, our study also reminds us that we cannot rely on social support alone to address mental disorders. We need to use a diverse range of interventions, including medication, psychotherapy, and lifestyle changes, to meet the specific needs of individuals.[56] Our findings also emphasize the importance of knowledge. Understanding the nature of the disease and how to prevent it can help individuals reduce fear and uncertainty, which may help alleviate mental stress.[57] This also means that we need to provide accurate, timely, and easily understood information to ensure that the public can make informed decisions and coping strategies. The role of government and public health agencies is crucial in this regard. They need to develop effective information dissemination strategies to prevent the spread of misinformation and rumors, which can trigger panic and confusion and exacerbate mental stress.[58] At the same time, our findings have important implications for public health policy development and implementation. First, policymakers need to ensure that social support systems are established and maintained to support those who are under mental stress due to the outbreak. Second, policymakers need to develop effective information dissemination strategies to ensure that the public can access accurate information. Finally, policymakers need to consider a comprehensive approach to mental disorders, including the provision of medication, psychotherapy, and lifestyle interventions.

Our study has several limitations. First, our study design was a cross-sectional study. Future studies need to use a longitudinal design to understand better the impact of social support and knowledge on mental disorders. Second, our study sample was from Sichuan Province, China, and therefore may not be representative of everyone's experience. Future studies need to be conducted in a broader geographic and cultural context to increase the generalizability of our findings.

Overall, our findings highlight the importance of social support and knowledge in the prevention and management of mental disorders. These findings provide new perspectives for understanding mental health issues and suggest the need for a comprehensive approach to address these issues. We hope that our research will contribute to the development and implementation of public health policies to better respond to the COVID-19 epidemic and possible future public health crises. This global health crisis has re-emphasized the importance of public health and the role of each of us in protecting and improving it. We hope that our research will remind everyone that we all have the responsibility and ability to protect our health and the health of others and that by working together we can overcome this crisis and build a healthier, stronger society.

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