Analysis of the Involution Community Management in Emergency Public Health Event based on an Evaluation Index Establishment and Experimental Date Processing

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Abstract: Though investigating the process of emergency prevention and control of public health emergencies in community C of city R, province G during COVID-19 in 2020, the article overviews emergency management in community C of city R, province G. The article identifies key elements in emergency government and combines related elements to build an index system to evaluate the rationality and effectiveness of emergency management in community C based on analytic hierarchy process. The article then collects data through questionnaires in Likert 5-point scale from residents and conduct data processing in Spss software[c] to analyse the emergency government. Through systematic evaluation and analysis, the article points out the existence of involution of emergency management in the community governance caused by a combination of regular management vulnerability and pressure for pandemic prevention and control.

1 INTRODUCTION

After the outbreak of the new crown pneumonia epidemic, Community C, City R, G Province worked overtime to ensure pandemic prevention and control work. However, trapped by the poor local development situation, imperfect governance system, and the tight schedule of the epidemic prevention and control task, the community's good anti-epidemic effect is based on high load, high pressure, high cost, and low efficiency. On the surface, although it has a certain effect, it is actually a kind of undeveloped growth, that is, it has fallen into the predicament of the involution of emergency management in the prevention and control of public health emergencies.

2 RESEARCH REVIEW

2.1 Involution

"Involution" refers to the process in which an organization is constrained by external expansion conditions, but has neither mutational nor incremental growth, and the internal system continues to become more complex. The direct consequence is organizational decline or organizational ineffectiveness. The "involution" of an organization's governance often manifests itself in the form of a high pressure on the organization's staff due to the fine structure and functional stability (Liu, Qiu 2004).

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[c] IBM® SPSS® Statistics is a powerful statistical software platform. It offers a user-friendly interface and a robust set of features that lets your organization quickly extract actionable insights from your data.

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3 MATERIALS AND METHODS

3.1 Sources of Materials

The purpose of this paper is to explore the dilemma of involution of community emergency management under public safety emergencies by taking the practice of emergency management in Community C as a cut-off point. In order to gain insight into the situation of community C's epidemic prevention and control work, this paper, on the one hand, based on volunteer practice, records and analyzes the community C's pandemic prevention and control work from December 2019 to May 2020 in R city, G province, and conducts semi-structured interviews with community workers.

3.2 Assessment of Emergency Management of Community C

3.2.1 Study Assumptions

As far as this study is concerned, the target is the community residents, so the residents can be regarded as the "customers" of the community for epidemic prevention and control, and satisfaction is the attitude and psychological experience of the customers who are satisfied with all aspects of the service after comparing the gap between the actual value and demand or expectation according to the cognitive evaluation of the community epidemic prevention and control. Thus, we can evaluate the implementation effect of community outbreak prevention and control services from the perspective of customer satisfaction. The level of resident satisfaction directly affects the effectiveness of epidemic prevention and control. High-quality community epidemic prevention and control services can achieve a reasonable allocation of limited resources, improve the efficiency of resource utilization, and maximize the effect of epidemic prevention and control. In this paper, the CSI method is used to evaluate the fullness of farmers' policies, but two assumptions need to be determined.

a) Community outbreak prevention and control services are felt and perceived by residents (Wang, Luo 2010).

b) Residents are free to express their judgment in their entirety. That is, strategic behavior has less impact on the CSI approach (in line with the Brookshire fascite) through proper design of the problem. It is also said that the resident's answers to each question are consistent with the cumulative normal distribution function.

3.2.2 Model Selection

An important objective of the resident satisfaction survey is to measure the current level of satisfaction of the rural residents. This article is rated using the Likert 5-point scale and calculated using arithmetic weighted average (Liu 2004):

$$CSI = \sum_{i=1}^{n} W_i X_i \quad (1)$$

CSI in the formula: customer (residents) satisfaction index;

$W_{i:}$ Weight of the first measurement indicator;

X_i: Customer (Residents) evaluation of the ith satisfaction indicator.

3.2.3 Weight Design of Indicators under Analytic Hierarchy Process

According to customer satisfaction, emergency management and other related theories, from the community epidemic prevention measures, the physical and mental health of residents, residents of epidemic prevention activities, three aspects to build residents' satisfaction evaluation of community epidemic prevention services, see Table 1(Peng 2018). The evaluation section uses Likert 5-point scale to score.

In this paper, based on the index system of related studies, the hierarchical analysis method is used to construct an index system for evaluating the residents' satisfaction of community pandemic prevention and control in community C. The analytic hierarchy process, proposed by Saaty, an American operations researcher, is a decision making method that decomposes the elements related to decision making into levels such as objectives, criteria and programs, on the basis of which qualitative and quantitative analysis is carried out (Wang 2003). There are four calculation methods i thins method, and considering the realistic operability and data characteristics, this study selects the arithmetic average method (summation method) for the calculation of questionnaire index weights, and the calculation steps are: ① normalize the elements of the judgment matrix by column; ② add the normalized columns; ③ divide the summed vector by n to obtain the weight vector(Deng, Zeng, Chen, Zhao 2012).

Step 1: through two comparisons, to determine the relative importance between the secondary indicators,

this paper refers to the 3/3 to 9/1 scale system to determine the corresponding a_{ij} value, to the second-level indicator of the ratio of the more decisive moment array, recorded as A,

namely:

$$A=\begin{array}{c} \begin{matrix} A_1 & A_2 & A_3 \end{matrix} \\ \begin{bmatrix} 1 & 3 & 5 \\ 1/3 & 1 & 3 \\ 1/5 & 1/3 & 1 \end{bmatrix} \end{array} \begin{matrix} A_1 \\ A_2 \\ A_3 \end{matrix} \tag{2}$$

The implication of a_{ij} is that the weight of the i indicator is a multiple of the importance of the j indicator.

Step 2: Solve the weight w according to the A matrix, remember $\omega=(\omega_1\ \omega_2\ \omega_3\ \ldots\ \omega_n)^T$

$$A=\begin{array}{c} \begin{matrix} A_1 & A_2 & A_3 \end{matrix} \\ \begin{bmatrix} 1 & 3 & 5 \\ 1/3 & 1 & 3 \\ 1/5 & 1/3 & 1 \end{bmatrix} \end{array} \begin{matrix} A_1 \\ A_2 \\ A_3 \end{matrix} \tag{2}$$

Calculate geometric mean

$$\begin{bmatrix} 0.6333 \\ 0.2604 \\ 0.1062 \end{bmatrix}$$

Normalize by column

$$\begin{bmatrix} 0.6370 \\ 0.2583 \\ 0.1047 \end{bmatrix}$$

Applying Row geometry mean and Normalization right to A, identity $\lambda_{max.}$

$$\begin{bmatrix} 1 & 3 & 5 \\ 1/3 & 1 & 3 \\ 1/5 & 1/3 & 1 \end{bmatrix} \begin{bmatrix} 0.637 \\ 0.258 \\ 0.105 \end{bmatrix}$$

$$= \begin{bmatrix} 1.9355 \\ 0.7848 \\ 0.3182 \end{bmatrix}$$

$$\lambda_{\max}=\frac{1}{n}\sum_{i=1}^{n}\frac{(Aw)_i}{nw_i}=3.0385 \tag{3}$$

Step 3：Calculate the consistency ratio CR to check the rationality of the constructed judgment matrix A and the weight vector derived from it.

$$\mathrm{CR}=\frac{CI}{RI} \tag{4}$$

$$\mathrm{CI}=\frac{\lambda_{\max}-n}{\mathrm{n\text{-}1}}=\frac{3.0385-3}{3-1}=0.0193 \tag{5}$$

$$\mathrm{CR}=\frac{CI}{RI}=\frac{0.0193}{0.52}=0.037<0.1 \tag{6}$$

Therefore, the degree of consistency of A is relatively high, and the weight of the structure is reasonable.

Similarly, the weight of the three-level indicator can be set, the specific weight value is shown in Table 1.

Residents are the service objects of the community. Their evaluation and perception of community anti-pandemic work are important indicators to measure the effectiveness of community prevention and control. The perceptibility of community pandemic prevention is based on community residents' perceptions and satisfaction with the various pandemic prevention activities in the community, and the secondary indicators are embedded in the three perspectives of emergency management theory: prevention beforehand, handling during the event, and evaluation afterwards, and are assigned to different pandemic prevention activities in the community. The physical and mental health is based on the self-assessment of community residents' physical and mental health in the absence of confirmed or meaningful patients in the community. The secondary indicators are weighted according to physical and psychological categories. The pandemic prevention behavior is the self-measurement of the residents' self-prevention behavior in the community activities based on the classification of the pandemic prevention activities according to the emergency management theory, and according to the coverage

and importance of the indicators in the situation of the whole community against the pandemic. The secondary indicators of pandemic prevention behaviors and pandemic prevention concerns are assigned weight. The weights of specific indicators is shown in the table below.

Table 1 Weight of indicators at each level of the questionnaire

First level evaluation index	Second level evaluation index	Weights	Third level evaluation index	Weights
Satisfaction	Pandemic prevention efforts	0.637	Publicity	0.111
			Screening residents	0.435
			Prevention work attitudes	0.103
			Residents' normal service	0.043
			Information disclosure	0.043
			Community hygiene	0.205
			Care for the vulnerable	0.043
	Physical and mental health situation	0.258	Physical health	0.5
			Mental health	0.5
	Residents' pandemic prevention behavior	0.105	Anti-pandemic behavior	0.75
			Concerns about the pandemic	0.25

4 RESULTS & DISCUSSIONS

4.1 Description of Emergency Management of Community C

Community C has management challenges due to its own characteristics. It has five resident groups under its jurisdiction, and each resident group has a group cadre for full-time integrated management. The community also has a complex demographic composition, with three ethnic groups living there, making it difficult to manage. In terms of the management of institutional mechanism, the low incentive personnel management system caused by low salary, low welfare and low threshold is difficult to enhance stickiness to their own jobs among social workers, thus threatening the effectiveness of community governance. At the same time, the lack of assessment mechanism will inevitably have a negative impact on the effectiveness of community prevention and control to a certain extent.

In addition, the COVID-19 led to high-volume, high-stress epidemic prevention work of community C: ① Suspected person identification ② Full information collection③ Resumption of work and schooling④Routine check of prevention⑤Normal work.

4.2 Assessment of Emergency Management of Community C

4.2.1 Data Source and Statistical Analysis

A total of 250 questionnaires were distributed to residents in this survey, and 195 valid questionnaires were recovered. The Likert's pentameter technique and incorporating the indicator weighting system, a five-level evaluation subset is used in the statistics of scores. Date collected are processed by SPSS software.

The scores assigned to the questionnaire secondary indicators and questionnaire questions were calculated to yield the primary indicators and overall questionnaire scores as shown in Figure 1.

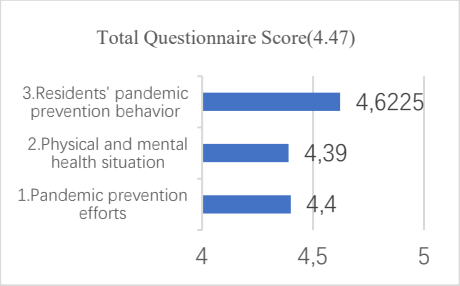

Figure 1: Overall questionnaire and Tier 1 indicator scores.

Referring to the literature, we choose 4 as the high and low score boundary of this research, and we can conclude that “Community pandemic prevention efforts", "Physical and mental health situation" and "Pandemic prevention behaviour" (He 2013). These three first indicators have high scores, and the overall score of the questionnaire is 4.47, which also belongs to the high score range. This good score indicates that the residents of Community C generally approve of the anti-pandemic work of the social workers and that the community anti-pandemic work has achieved achievements.

4.2.2 Analysis of the Scores of Second Level Evaluation Index under the Primary Indicator

a) Community pandemic prevention efforts

The survey on residents’ perceptibility of community pandemic prevention efforts was mainly evaluated in seven dimensions, including publicity, screening residents, prevention work attitudes, residents’ normal service, information disclosure, community hygiene, care for the vulnerable etc. The indicator aims to directly analyse the effectiveness of community prevention and control work, and the specific scores are shown in Figure 2.

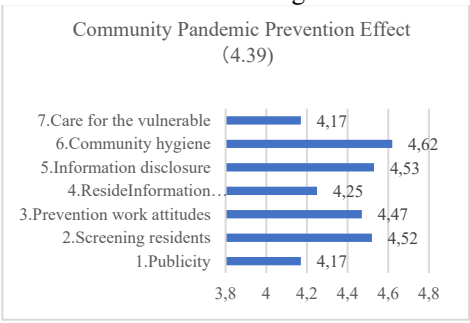

Figure 2: Scores for Second level evaluation index the Community Community prevention efforts.

From this figure, it can be seen that the scores of the above seven dimensions are all good, and the residents of Community C highly approve of the work of social workers in these aspects.

b) Physical and mental health

The survey on the physical and mental health of the residents was conducted mainly in two aspects: physical health and mental health. The long period of closed homes during the pandemic had a negative impact on the physical and mental health of residents, so how to guide residents to maintain good physical and mental health is also one of the important indicators to examine the effectiveness of community governance. As shown in Figure 3, the physical health score of residents in Community C during the pandemic was 4.41, and the mental health score was 4.37, which is a good score, and this good result could not be achieved without the guidance of social workers.

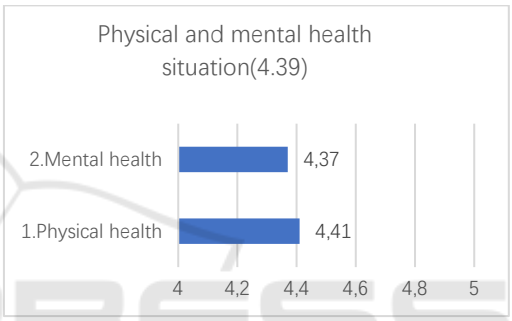

Figure 3: Scores for second level evaluation index Physical and Mental Health Indicators of the Population.

c) Pandemic prevention behaviour

This indicator was established mainly to examine whether residents have formed scientific and reasonable pandemic prevention behaviors under the guidance of community propaganda, including insisting on wearing masks and opening windows for ventilation, etc. In addition, it can also explore whether residents pay attention to the pandemic development situation in their own community, which is a key cut-off point to measure the residents' integration and sense of responsibility to the community. From the analysis of the data, it is clear that most of the residents in Community C said that they insisted on scientific pandemic prevention without the guidance of social workers, and it has become a normal life style for the residents in the community to pay close attention to the pandemic development situation in their community.

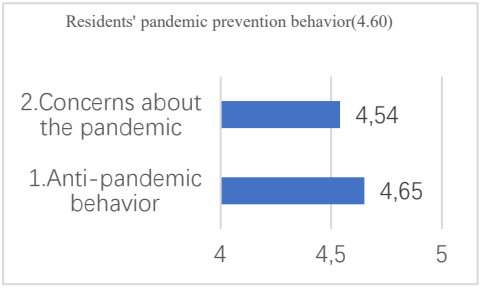

Figure 4: Scores for Second level evaluation index Pandemic prevention behaviour.

d) Summary of the results of the questionnaire
According to the analysis of the questionnaire data, we can see that the pandemic prevention and control work in Community C is recognized by the majority of the residents, and the pandemic prevention and control in Community C has achieved achievements in this dimension. However, when combined with the above, it is easy to see that behind this good result is inefficiency and overload, and thus a clear dilemma of involution, which is mainly due to the combination of daily management system loopholes and emergency pressure of public health emergencies.

5 CONCLUSIONS

However, due to the loopholes in the community management system and the lack of capacity of the social work team represented by the community secretary, the community was unable to effectively take time out from the increasingly heavy workload to think about and improve the inefficient and unreasonable work processes, and the work pressure could not be effectively transformed into governance performance. Therefore, even though the community achieved remarkable governance performance, the result was more based on the reverse incentive of the institutional space rather than the community's own spontaneous governance effectiveness, and such a pushed anti-epidemic model was doomed to high load, high pressure and low efficiency.

The logic behind the involution of community epidemic fighting also creates a vicious circle in the management system of Community C. Due to the backward economic development and unsound institutional environment, there is an obvious mismatch between the incentive mechanism and work pressure in Community C. The motivation and initiative of social workers cannot be effectively mobilized. The excessive pressure caused by the tedious tasks in the public health emergencies and the inefficient working methods of the actors made this problem even more exposed, and when the pressure gradually accumulated, the fatigue of the social workers who were already lacking passion for their work became more prominent, and the effectiveness of governance further decreased. When the pressure reaches a certain stage, the role of incentive mechanism will be further weakened and the enthusiasm of social workers will be further weakened, and the inwardly-rolled dilemma will come back again with a higher profile.

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