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Empirical Study on the Influence of Nutrition Information Disseminators in the Mass Media and Their Relationship Network

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Abstract: Mass media is playing an increasingly important role in modern society. People can obtain relevant information through mass media, and can also provide a basis for people's behavioral decisions. All aspects of people's lives are affected by the mass media. In terms of obtaining nutrition information, people are gradually turning to online channels. Therefore, the influence of nutrition information disseminators in the mass media cannot be ignored. The main research is on the influence of nutrition information disseminators on the mass media and the empirical relationship network. Through sampling methods, 49% of the 50 medical and health information disseminated by the mass media are related to diet and nutrition. However, only 20% of the 50 pieces of information that ten experts agreed with the information disseminators, while the approval rate on diet and nutrition was 0 out of 38. The results show that the government and media users have a great influence on the users outside the nutritionist network. However, in the network, some academics, nutritionists and media users are the main communicators. They have close ties. Media users should disseminate high-quality nutritional information to the public through researchers, hospitals and nutritionists. And promote the second dissemination of government users.

1. Introduction

Nutrition information is the introduction of nutrition knowledge. The dissemination of nutrition information is the process of production, forwarding, circulation and exchange of nutrition information. It is one of the important methods to improve people's nutritional status and improve people's health. With the growth of Chinese people's demand for health, more and more people pay attention to nutrition information. In addition to traditional media such as television and books, today's mass media has become the main "battlefield" for the dissemination of nutrition

information.

The mass media has brought us into the era of "anyone can speak". The public has the dual identity of information consumers and information producers. On the one hand, the change of the main body of media communication has opened up new horizons for the public. The open and free information model has broken the narrow vision. The single narrative of the past gives us With more references and foundations, the sudden increase in communication problems also makes the development of information explosive and increases the difficulty of public control and judgment of the authenticity of information. The main body of mass media communication is no longer the elite class, and now the microphone is in everyone's hands. However, not every communicator has enough knowledge, cultural education and recognition ability to ensure the authenticity of the information provided. And the limited cognitive ability of the body may release or copy unproven information, which may lead to the dissemination of misinformation. Therefore, people question the authenticity and reliability of nutritional information, and question the effectiveness of nutritional information dissemination. . The mass media needs further improvement.

In-Hye Kim uses television, newspapers and social networking services (SNS) to develop a strategy for disseminating appropriate nutritional information. Eight quality evaluation items were used to evaluate 341 pieces of nutrition-related information provided by TV (TV), newspapers, and SNS. Statistical analysis uses SPSS software for analysis of variance and Duncan multi-interval test. It found that the evaluation scores of television media in providing scientific evidence ($p<0.01$), content clarity and specificity ($p<0.001$), and sufficient explanatory content ($p<0.05$) were significantly higher than other media ($p<0.05$). <0.05). In addition, newspapers and social networking sites have significantly higher evaluation scores on the consistency of article titles and content than TV ($p<0.01$), and there is no exaggeration or distortion in content ($p<0.001$). In social networking sites, the evaluation scores fully explained by professional terms are significantly lower than those of TV and newspapers ($p<0.001$). The project objectively evaluated the effect of the dissemination of nutritional information on social networks but did not indicate the strength of the dissemination [1]. Miranda SM proposed that mass media digitization is a developing phenomenon, which constitutes novel social opportunities and challenges that researchers are beginning to notice. They base on MIS research and extend it to process digitization, between digital and traditional communication media, to study how social media (a form of digital mass media) liberates and to what extent (ie, allows the public Participate extensively in public discourse and various forms of dissemination) viewpoints) and hegemonism (that is, help minority thought control). Although activists and scholars are eagerly concerned about this issue, due to the complexity of the concepts of emancipation and hegemonism, it is still very difficult to systematically study this issue. They used the method of case study and repeatedly processed data on the Stop Online Piracy Act (SOPA) and related literature to determine various aspects of the six explanatory media packages. However, due to the wide coverage of the mass media, the conclusions reached are one-sided [2]. Ghosh R believes that many popular metrics used in social network analysis (including centrality) are based on random walks. Random walk is a model of a random process in which one node interacts with another node at a time. However, random walk may not be suitable for modeling social phenomena including epidemics and information dissemination. In this phenomenon, a node may simultaneously (for example, by spreading viruses or information to its neighbors) and many other Nodes interact. But in order to produce meaningful results, social network analysis algorithms must consider the nature of the interaction between nodes [3].

The innovation of this paper is mainly to study the influence of nutrition information disseminators on the mass media through social network analysis and questionnaire surveys. Combining the results of centrality measurement and network cohesion analysis, it is known that the click frequency of nutrition information disseminators is equivalent Due to the speed of

information dissemination and the determination of the direction of dissemination, it is indirectly known that the government is now much more responsive than nutritionists and disseminators of nutrition institutions [4].

2. Analytical Method of Communicator's Influence in Mass Media

2.1. Analysis Method of Influence of Disseminators of Nutrition Information

(1) Analysis of influence indicators

In general, the more followers a communicator has, the more people who see the information, and the greater their influence. In the past, the influence of the communicator was mostly defined by the number of followers, but it was later pointed out that the second spread of information also played a very important role. Some studies have shown that the number of followers of a communicator is related to the number of comments and information being delivered. A questionnaire survey method can be used to construct an N network. The N network can be expressed as a matrix as follows:

$$\begin{bmatrix} X_{1,1} & \cdots & X_{1,300} \\ \mathrm{M} & \mathrm{O} & \mathrm{M} \\ X_{300,1} & \cdots & X_{300,300} \end{bmatrix} \tag{1}$$

In the formula, when nutrition information is propagated from user i to user j, $X_{i,j}=1$, which is equivalent to user j following user i; on the contrary, when user j does not follow user i, $X_{i,j}=0$; if i=j , $X_{i,j}=0$.

Use software to perform statistical analysis and calculation on the density, concentration, centrality and other parameters of the N network, meanwhile, perform mean analysis and network cohesion analysis of each group [5].

Density calculation refers to the ratio of the actual number of network connections to the maximum possible number of connections, and is the most common indicator used to measure the degree of network density. In the directed network N of this study, the density calculation formula is as follows:

$$D = \frac{L}{N(N-1)} \tag{2}$$

Among them, L is the actual number of rows (relationship) 895, and N is the number of points (research object) 300. The result shows that the network density N is 0.1850. This shows that the gathering of disseminators of nutrition information is due to the common theme of nutrition.

Centrality is also one of the important points in social network analysis, which is used to quantify the power of each participant in the network. Frequency centrality means that each point is directly connected to other points. The greater the center degree of the point frequency, the more the center of the point. The standardized calculation formula for the frequency center of point Xi is as follows:

$$C = \frac{d_{(X_i)}}{N-1} \tag{3}$$

Among them, the number of points directly related to point i is equal. In this study, each research object can be a publisher or receiver of information, so the concentration of disseminated

information and the amount of information collected are calculated separately.

The potential of the degree center is an indicator of the central tendency of the entire network. The formula is as follows:

$$C = \frac{\sum_{i=1}^{n}(C_{\max} - C_i)}{\max[\sum_{i=1}^{n}(C_{\max} - C_i)]} \tag{4}$$

Cmax is the maximum concentration of each point. The greater the potential of the center, the more concentrated the power of the network. The calculation results show that the capacity of the information center is 45% and the capacity of the information center is 42%, indicating the power to publish and receive information Relatively centralized, the centralized power to publish information is slightly higher than the power to receive [6].

The center degree is a measure of the function of each point in the network. In a directed network, the standard formula for calculating the center center of a point Xi is as follows:

$$C_B = \frac{\sum_{j<k} g_{jk}(X_i)/g_{jk}}{(N-1)(N-2)} \tag{5}$$

In the formula, gjk represents the number of the shortest path from point j to point k, and gjk is the number of point i in the shortest path from point j to point k. After calculation, the centrality of different types of communicators is very different (p=0.007).

The reachability probability from the source node s to the target node d is the probability that at least one route exists. It is represented by Pr(s, d). The influence of s and d is based on the fixed force of the influence of the user group, and in an independent cascade model, the user S group can represent the influence Inf(S, D) in the target set D, which can be expressed as:

$$Inf(S,D) = \sum_{d \in D} \Pr(S,d) \tag{6}$$

Assume that Rd1, Rd2,..., Rdm are all paths starting from a node in S and ending at d. Assume that Pr represents the probability that the route Rki and the route Rkj exist at the same time, so:

$$\Pr(S,d) = \Pr(\cup_{i=1}^{m(d)} R_{di}) \tag{7}$$

Therefore,

$$Inf(S) = \sum_{d \in v/S} \Pr(\cup_{i=1}^{m(d)} R_{di}) \tag{8}$$

2.2. Social Network Analysis

Social network analysis is an analysis method to solve network-related problems, which can be individuals, organizations or countries. The focus of social network analysis is the relationship between participants and the entire network structure. As a unique research method, social network analysis includes traditional qualitative or quantitative research, including points, lines, density, heart rate, heart rate, smallness, position and angle. The focus of social network analysis is the relationship between actors and actors. We can use quantitative research to help us analyze; quantitative research requires independent data and uses correspondence to analyze data; the concept of actors is not usually mentioned actor. The actors here describe people with practical

meaning, motivation and behavior. The research here tends to exaggerate the subjective initiative of these factors, which is easy to appear in the trend of socialization, because the individual has been integrated into the individual's social structure, and social behavior not only exists in the social structure, but also depends on individual characteristics influences. In order to avoid low-level social problems, social network analysis is the best way to solve this problem [7].

Once exposed to network information, students should evaluate the reliability and authenticity of the information based on experience, and determine whether to use the information through the evaluation results, but there is a difference between the reliability of the empirical evaluation information and the actual reliability of the information. The reliability of experience evaluation information is based on subjective perception of various information, media and information sources, which is obviously different from the actual reliability of information. In actual learning, when students realize what they know and need, they will retrieve new information to minimize the gap. In this case, the quality of the test information is very important, but in fact, due to the following reasons, the effectiveness of the quality of the information cannot be guaranteed; modern young people will get a lot of information about learning topics in the classroom, but there is no Ability to fully understand and select this information.

Learners do not choose information strictly according to network information evaluation standards, but choose information according to the design of the website. Therefore, teachers' attention to network information is often affected by the surface design of the website, but it has nothing to do with the content of the website. It does not mean that the reliability of the information is very high, but it may be related to the knowledge and experience that students already have. However, the understanding of network information requires students to use critical thinking to evaluate the reliability of network information.

3. Nutrition Information Dissemination Experiment

3.1. Questionnaire Survey

(1) Survey objects: A questionnaire survey was conducted on 50 followers from six different social groups. These followers released relevant nutrition information, including government, scholars (academicians, teachers from universities and colleges, research Institutional researchers), hospitals (hospital nutrition or nutrition physicians), nutritionists, media (media, media people, people dedicated to scientific communication and health education), others (users related to nutrition information, such as training Institutions, commercial organizations). Among the six types of users are not only researchers, hospitals and nutritionists with relatively high-quality information, but also governments and media that provide comprehensive information to cover as many nutritional information disseminators as possible[8]. Starting at 24:00 on July 21, 2020, 300 people have been selected as research subjects.

(2) Questionnaire design

In order to quantify the relevant factors of the model, this paper uses the scales and concepts of related research as references, redesigns the scales by comparing the dissemination of nutritional information and the differences between the recipients of the information, and verifies the logic of the questionnaire content. Before the formal survey, 30 questionnaires were conducted, and then the results of the questionnaire were discussed with experts in the relevant quantitative research field to review and adjust the content of the questionnaire. The questionnaire mainly solves two main problems: on the one hand, it collects the authenticity of nutrition information published by six different groups of people, and how the disseminators of these six different groups of people are in different social statuses.

(3) Data collection

The questionnaire was conducted in the form of mobile phones and the Internet. According to demographic characteristics, age and education level, 300 participants were randomly selected from six types of nutrition information providers, including followers, supporters and promoters. In this survey, the survey request email will be sent to the mobile phone of the selected person through the email broadcast port. This email explains the significance and purpose of this survey. If the recipient of the email wants to join, he/she can choose two ways to answer and provide feedback on the survey results. The system records the results directly in a computer database and performs tasks such as data viewing, calculation and analysis. According to the data recorded in the database, 254 people logged on to the first page of the questionnaire, and 210 questionnaire survey results were actually collected, with a response rate of 70%.

3.2. Build a Conceptual Model and Propose Hypotheses

(1) Basic theoretical model

With the popularity of mass media as a social behavior, the dissemination of nutritional information has been networked. From the perspective of social groups, the information they obtain from Internet media is usually incomplete and very inaccurate, so nutritional information dissemination People often face a certain degree of influence. However, the impact is also divided into two different directions. Therefore, we propose a theoretical framework that assumes that the nutritional information perceived by the public is divided into positive and negative aspects [9]. As one of the theoretical foundations of this research.

The quality of information refers to the accuracy and completeness of the information on a matter you specify; the quality of information in this study refers to the quality of the information provided by the information source; the information source refers to the person or person who disseminates information to the public media. The nutrition information public generally believes that high-quality information can help them make the right decision, so they are very concerned about the quality of the information. Through the provision of various media, the public will believe that high-quality media has a greater sense of responsibility and credibility, thereby enhancing the confidence of the media. Therefore, this article proposes a hypothesis.

Hypothesis 1: In the process of disseminating nutritional information, the public's perception of information quality is positively correlated with trust

Reliability of information sources Among the public, reputation is widely regarded as a key factor in effectively reducing risks and enhancing trust. This is mainly because reliability is always directly or indirectly related to the public's confidence in nutrition information. In order to make followers have more confidence in their nutritional information, communicators need to attract more followers and increase their influence while reflecting their own value. On this basis, this article puts forward a hypothesis.

Hypothesis 2: In the process of disseminating nutritional information, the reliability of the information source is positively correlated with trust

With the popularization of mass media, as a social behavior, the dissemination of nutrition information has been networked. From the perspective of social groups, the information they obtain from online media is often incomplete or even inaccurate. Therefore, disseminators of nutritional information often face some degree of influence. But the influence is also divided into two different directions. For this, we have proposed a set of theoretical frameworks. This framework assumes that the nutritional information perceived by the audience is divided into positive and negative aspects [10]. We take this theory as one of the theoretical foundations of this research.

4. Analysis on the Influence of Nutrition Information Dissemination

4.1. The Relationship between Different Communicators and Influence

According to the analysis results of influence indicators, there are significant differences in the number of fans (p=0.000) between different types of research subjects and the number of three-day disseminators' nutritional information reposted on the mass media (p=0.000). In terms of the influence of the number of fans, government users are significantly higher than media users, government and media users are significantly higher than the other four categories, and there is no significant difference between the other four categories of users. The top 10 users with fans include 5 government users, 3 media users, and 2 other authenticated users. In the last 10, there are 3 academic users, 5 hospital users and 2 nutritionist users. It can be seen that the number of fans of academics, hospitals, and nutritionists who have relatively high-quality nutritional information is not ideal. In the three days, the number of disseminators' nutrition information in the mass media was slightly different. Media users are significantly higher than others, and there is no significant difference among the other five types of users. Among the top 10, there are 5 media users, 2 official users, 2 academic users and 1 nutritionist user. Among the last 10, there are 5 unauthenticated users and 3 media users [11]. It can be seen that media users have strong fan influence and reposting influence at the same time, and they have an influence that cannot be ignored in the mass media. At the same time, government users have received widespread attention from many users, which may be based on their special identities, but they do not necessarily recognize the information they publish, as shown in Figure 1.

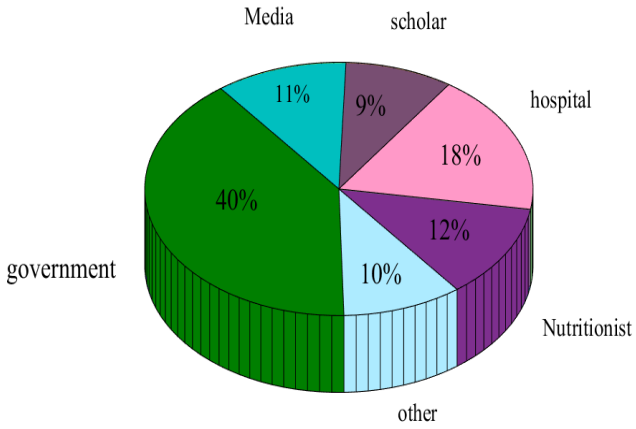

Figure 1. The influence of different categories on the dissemination of nutrition information

4.2. Social Network Analysis of Nutrition Information Disseminators

(1) Social network characteristics

If each research object is regarded as a "point", the relationship between the two research objects is represented by a line segment, and the arrow points to the direction of information flow, then the visualized image of the network N is shown in Figure 2.

It can be seen that there are 54 research subjects connected together. There are also 6 research subjects who exist in isolation and are not connected with other research subjects.

If the 6 types of research objects are constructed into 6 sub-networks, and their densities are

calculated respectively, there are D nutritionist (0.7667)>D scholar (0.7000)>D media (0.4111)>D government (0.3222)>D hospital (0.0778))>D other certification (0.0444) = D not certified (0.0444). It can be seen that although the public influence of scholars and nutritionist users is weaker than that of government and media users, they are closely connected and form a certain degree of community [12]. The comparison is shown in Figure 3.

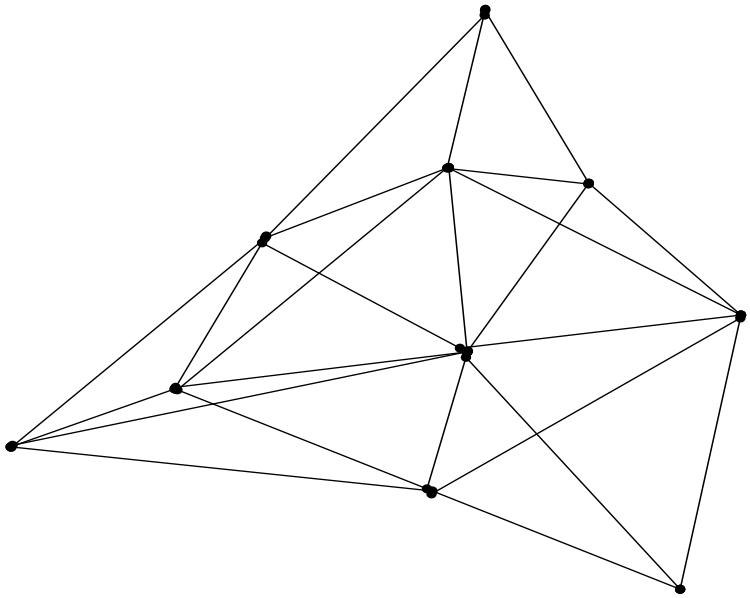

Figure 2. Nutrition information disseminator network

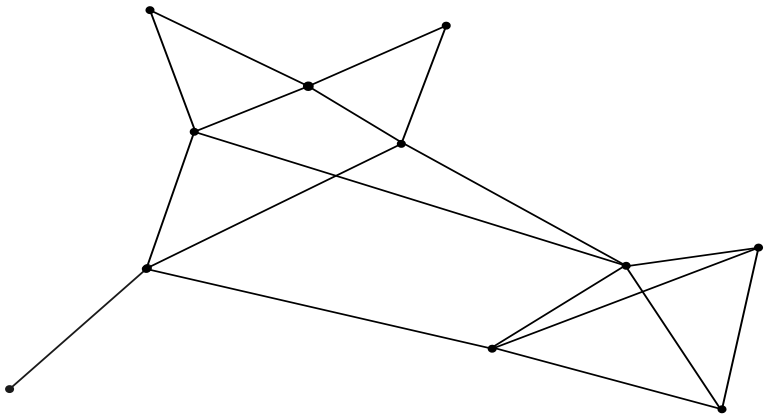

Figure 3. Nutritionist user network

(2) Network density and centrality analysis.

Density is the ratio of the actual number of connections to the number of possible connections in the network. The greater the network density, the smoother the flow of information resources within the department. The density comparison of the three types of networks in this department is shown in Figure 4. It can be seen from Figure 4 that the density of the complex network is 0.4503 higher than that of the formal network 0.2251 and the informal network is 0.3977, and the density of the informal network is higher than that of the formal network. This shows that the use of mass media in the department makes the density of informal networks higher than the density of formal networks, which in turn affects the density of complex networks [13]. The increase in network density has the following effects on the information dissemination within the enterprise. First, information sources have increased. The audience can get more intensive communication through

formal and informal networks, and the audience can choose the best information acquisition path, so as to obtain more comprehensive information faster. Second, the speed of information dissemination has accelerated. In dense networks, audiences are more closely connected, and the distance of information dissemination is smaller, so the dissemination speed is faster. Third, the accuracy of information is improved. In a complex network established through social media, due to the increase in information source channels and the speed of information dissemination, information recipients can compare information from different sources and identify the accuracy of the information in a relatively short period of time.

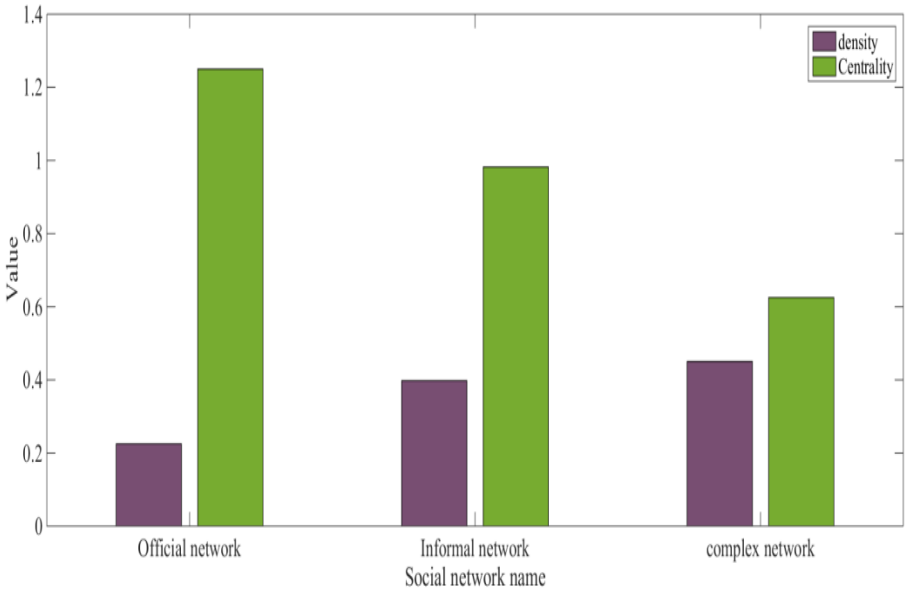

Figure 4. Comparison of density and centrality of three types of networks

Centrality is an indicator of the importance of individuals in social networks. Individuals with high centrality often occupy an important position in the network. There are many indicators of centrality. This article mainly selects the intermediary centrality, which represents a person's ability as a mediator, that is, a person who occupies an important position in the information dissemination path of the other two people, and the two cannot communicate without passing through this person[14]. After calculation, there are a few nodes with significantly high intermediary centrality in the formal network, that is, the connection between other people needs these key nodes as intermediaries to complete. Such a network is very unstable. Once these people in key positions leave, the entire network will be severely affected. In the informal network, the overall distribution of betweenness centrality is relatively balanced, and there are no nodes with extreme betweenness centrality in the formal network, which shows that in the informal network, departmental staff connections no longer depend on a few individuals. Due to the influence of the informal network, the intermediary centrality of the complex network of this sector is greatly reduced compared with the formal and informal networks, and the overall distribution is more balanced. This shows that social media has an impact on informal networks, and indirectly affects complex networks, and the intermediary centrality distribution of complex networks is more balanced due to the complementarity of formal and informal networks [15]. Since in a network with a more balanced betweenness centrality distribution, the status of each node is relatively equal, and the degree of control of the third party is greatly reduced. Therefore, the departure of individual nodes will not affect the connection of other nodes. Improve the stability of the network.

(3) Analysis of information relayers

In the information dissemination network, the publisher is important, but if the channel is not smooth, the information will eventually have difficulty reaching the target audience. Therefore, the transit person who controls the information channel between the two points, like a bridge, also has a power that cannot be ignored. The index to measure the role of the bridge at each point in the network is the centrality [16], as shown in Table 1.

(4) Analysis of network cohesion.

The clustering coefficient examines the local density of points. If the local density of each point in the overall network is very high, the distance from one point to another will be greatly reduced. On the contrary, the information between actors is less concerned by others, and the information transparency of this kind of network is generally low, and information asymmetry will occur in severe cases [17]. The clustering coefficients of formal, informal and complex networks are shown in Table 2, where Coef represents the clustering coefficient, nPairs represents the possible third-party relationship, taking A as an example, nPairs is 10, indicating that there may be 10 third-party relationships, Coef It is 0.600, indicating that 60% of the relationships are displayed in the network [18].

Table 1. The top 6 standardized median centrality

Rank	User name	Category	Standardized centrality (%)
1	Nutritionist Gu Zhongyi	Nutritionist	9.828
2	Heli nutrition	Scholar	5.617
3	Ma Guansheng	Scholar	5.602
4	Nutritionist Zheng Yulong	Nutritionist	5.140
5	Health Times	Media	4.170
6	Nutritionist Juanzi	Nutritionist	4.157

Table 2. Comparison of clustering coefficients of three types of networks

	Official network		Informal network		complex network	
member	Coef	nPairs	Coef	nPairs	Coef	nPairs
A	0.6	10	0.933	15	0.762	21
B	0.182	66	0.733	45	0.527	91
C	0.393	28	0.733	45	0.733	45
D	0	0	0.75	36	0.75	36
E	0.4	15	0	3	0.476	21
F	0.533	15	0.639	36	0.644	45

First, the potential sources of information increase. The average clustering coefficient of the entire network of the formal network is 0.523263, while the average density of the entire network of

the informal network and the complex network are 0.633316 and 0.642632, respectively. This shows that in the informal and complex networks after the use of social media, the information communication between the audience's communication objects, that is, the third-party relationship, is easier to form than formal networks, and becomes each other for each other. Potential source of information [19]. Second, the potential transmission paths have increased. In the formal network, the clustering coefficients of D, L, and Pare 0, and there is no third-party relationship around them, indicating that their relationship with other people in the formal network is very unstable. However, in complex networks, their Coef and nPairs values are both greater than 0, which shows that they interact with other colleagues frequently through social media, their relationship becomes stable, and the possibility of information dissemination between each other is increased. In a formal network, the values of Coef and nPairs of G, H, K, M, and Q are all 1, indicating that there are only two neighboring nodes connected to them, and there may be a third-party relationship, and in fact this relationship is also actual exist. In complex networks, their nPairs.

The value of Coef is increased, but the value of Coef is decreased. This means that there may be more third-party relationships, that is, more neighbors, and the coverage of communication partners who can become friends is wider. From this perspective, information dissemination and communication The path and frequency will be greatly improved [20],as shown in Figure 5.

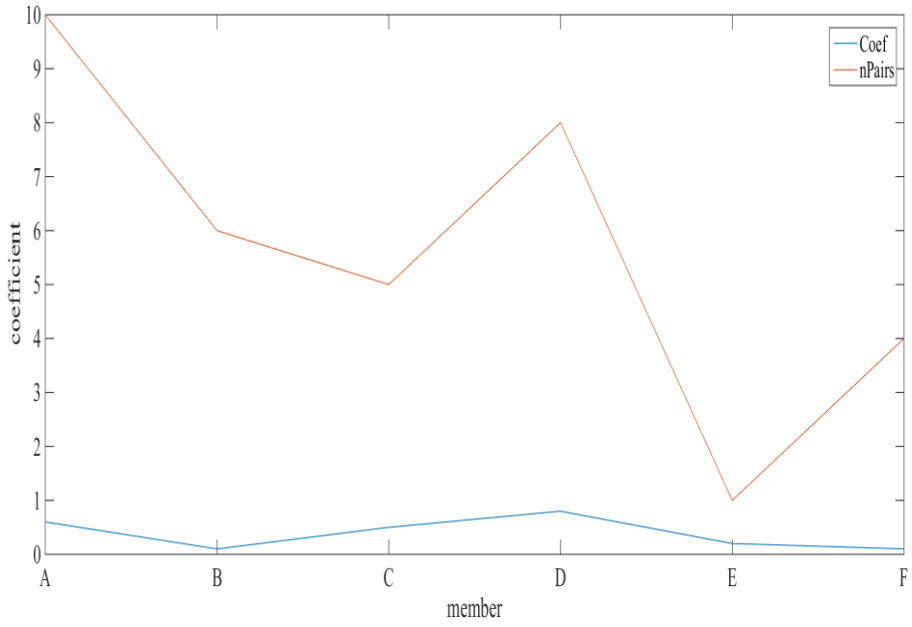

Figure 5. Trends of clustering coefficients of Coef and nPairs

(5) Analysis of network average distance

The average distance refers to the number of connections required to communicate between any two nodes in the network. The greater the average distance, the greater the span between nodes of the network, and the greater the cost of information dissemination between members of the network [21]. After calculation, the average distance of the formal network is 2.044, indicating that the members of the network can pass the message to another person through at least two intermediaries, while the average distance of the informal network is the shortest, indicating that the members of the informal network are all connected to each other. Other people have direct contact, and it also shows that the information dissemination through social media is rapid and direct, and the information can be directly transmitted, thus ensuring the quality of information dissemination and communication. The average distance of complex networks (1.626) is between formal and informal

networks, indicating that information dissemination in the department is affected by two network structures. The use of social media is very effective in shortening the average distance of the network. Employees can quickly find the right person and information through the network with the least cost and the most simplified process [22].

5. Conclusion

Mass media occurs with the advancement of human society and technology. Mass media is a process by which communication providers disseminate various knowledge or information to the public through various media. The mass media we are talking about now mainly involve the following mass communications. In the context of modern society, it refers to the process of disseminating or copying certain information to the public through certain communication methods (newspapers, magazines, radio, television, etc.). Mass media also conforms to the development trend of modern science and technology, and it is also a society The inevitable result of development [23].

Nowadays, people need to improve their health and enhance their immunity. The public not only get information from the traditional communication system, but the mass media is the first choice nowadays. It contains comprehensive information and is also chaotic. It needs the audience to identify. The authenticity and reliability of the information disseminated by the disseminators of nutrition information [24]. It is precisely because anyone can become a disseminator of information, so the public can obtain information more conveniently and quickly than traditional methods, thus ignoring the credibility of information.

The dissemination of nutrition information in the media is different. The government and media users have a strong influence on all media. However, in the dissemination of nutrition information, it is mainly scholars, nutritionists, media users and producers. Reposters and receivers are closely connected, forming a cohesive subgroup that affects the information flow of the network. Scholars, hospitals and nutritionists need to further improve the quality and quantity of nutrition information; media users should spread high-quality information to the public through dissemination Nutrition information and promote the secondary dissemination of government users. In addition, it is also very important to monitor the nutrition information released by mass communicators [25].

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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