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Numerical analysis-based Chinese community Wushu fitness development research

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ABSTRACT

With Wushu becoming a kind of special sports form, China has increased attention and input on Wushu fitness, which lets Chinese Wushu fitness to get further development. The paper analyzes contemporary Chinese Wushu fitness concrete status by numeric values and graphics analysis method, it finds that due to Chinese Wushu fitness starts late, nation input on Wushu fitness is not enough, lack of faculty, which leads to many residents in China still don't know benefits of Wushu fitness, they haven't recognized importance of Wushu fitness, which is shortcoming of Chinese Wushu fitness. Secondly, on the basis of correlation analysis, it analyzes Wushu fitness and residents' physical and psychological health, cultural life, self-defense and other aspects relations, and then gets that Wushu fitness is closely bound to residents' physical and psychological health, cultural life, and self-defense, but Wushu fitness upmost functions are not only strengthening exercisers' physical quality, enriching cultural life, but also meanwhile have certain effects on Chinese excellent Wushu cultural inheritance, it provides supports for contemporary cultural integration, and also provides orientations for future Chinese Wushu fitness.

KEYWORDS

Wushu fitness; Physical and psychological health; Numerical analysis; Comprehensive evaluation; Community sports.



INTRODUCTION

With further promotion of China attention on national physical quality, it propels to national fitness to move forward again, Wushu fitness as Chinese fitness important part should be further researched and developed.

Liu Jian in the article “Urumchi city Wushu fitness activity status investigation and research”, by researching on Urumchi city Wushu fitness activities’ different groups of people, finally got conclusions: contemporarily, Chinese Wushu fitness activities confronted main difficulties were : lacking of sports fields facilities, lacking of professional teachers’ guidance, lacking of input and publicity on Wushu fitness undertakings. The article provided theoretical guarantee for Chinese Wushu fitness undertakings future development, and meanwhile propelled to China’s development of building harmonious society with Chinese characteristics.

Liu Zhou in the article “ Xian city Wushu fitness activities current status investigation and research”, took contemporary residents physical health as research objects, pointed out Chinese Wushu fitness philosophy was extensive and profound, it not only could enrich fitness activities, let Chinese Wushu profound culture to be perpetual spread, but also could improve contemporary people living quality, improve old people flexibility and body coordination, Wushu fitness was not limited by age, gender, sites, only if you fell well, Wushu fitness activities could be taken at any time.

Wang Zi-Mei in the article “Wuhan city Wushu fitness activity status investigation and research”, took residents’ physical quality as perspective, explored different residents selection status on different Wushu fitness, and then pointed out when contemporary residents selected Wushu fitness, they more tended to select Taijiquan that technical contents were not so high, action was not so big as main Wushu fitness event, which provided direction for Chinese future Wushu fitness development.

The paper combines with formers research experiences, on this basis, utilizes correlation analysis and fuzzy comprehensive evaluation method, makes quantitative analysis of Wushu fitness impacts on people physical health, and puts forward that China should more focus on Chinese Wushu fitness publicity among residents.

WUSHU FITNESS STATUS

Chinese community Wushu fitness status

Chinese community fitness activities have various forms, residents life is relative abundant, in the following, it makes statistical analysis of Wushu fitness status that occupied larger proportions in Chinese fitness undertakings.

TABLE 1 : Chinese residents’ participation in Wushu fitness table

	Participate in Wushu fitness	Haven’t participated in Wushu fitness
Number of people	182 people	298people
Percentage	37.9%	62.1%

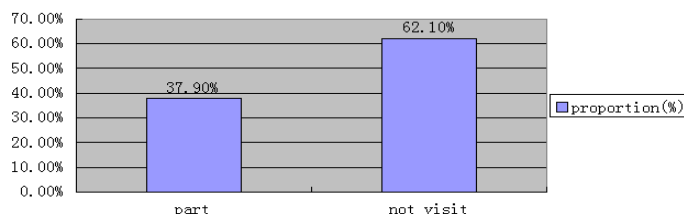


Figure 1 : Our people visit Wushu sports list

TABLE 2 : Chinese community has /hasn’t Wushu fitness organizations table

Yes	No	Don’t know
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Number of people	43people	359people	78people
Percentage	8.9%	74.8%	16.3%

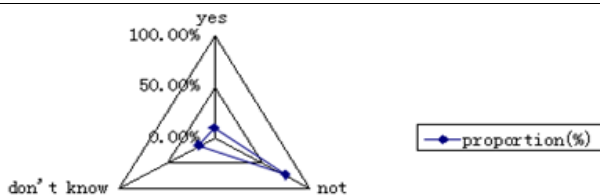


Figure 2 : Our people have or not take part in Wushu sport

TABLE 3 : Chinese community has /hasn't organized Wushu coaching activities table

	Have	Have not	Don't know
Number of people	108 people	318 people	54 people
Percentage	22.5%	66.2%	11.3%

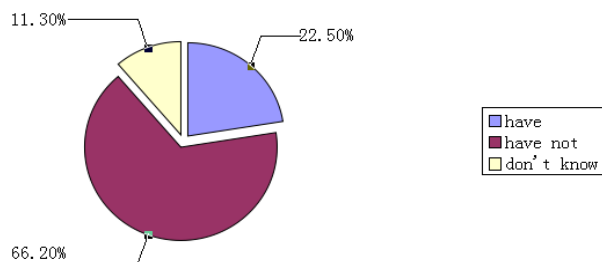


Figure 3 : Our people go on with Wushu learning

According to above three TABLE 1-3 and relative statistical Figure 1-3, it can get that 65% in Chinese residents haven't participated in Wushu fitness, 75% in community haven't organized publicity on Wushu fitness, and communities that carry on Wushu fitness training of communities haven't occupied 20%, which reflects contemporary China's Wushu fitness publicity strength, organizing Wushu training strength are not enough that leads to Chinese many residents don't know Wushu fitness.

Different residents' evaluation on Wushu fitness and participation status

By interviewing and investigating, practically go to some communities to collect most reliable data, make Wushu fitness attitudes statistics on Chinese residents of different ages, different genders, and different education background.

TABLE 4 : Different age groups community residents' attitudes toward Wushu

	16-30 years old	31-44 years old	45-60 years old	Above 60 years old
Very like	8.7%	8.8%	14.5%	30.8%
Like	34.8%	20.9%	36.2%	48.6%
General	43.5%	52.7%	36.8%	15.4%
Dislike	13%	17.6%	12.5%	5.1%

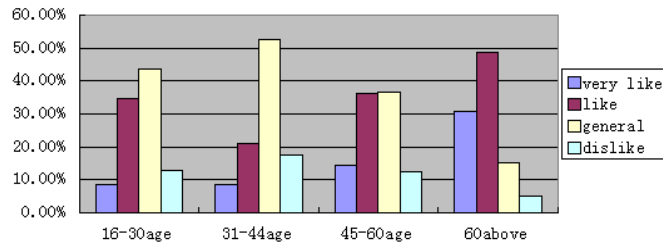


Figure 4 : Different age of our sport people

TABLE 5 : Different genders community residents' attitudes toward Wushu

	Very like	Like	General	Dislike
Man	17.5%	42.2%	28%	12.3%
Woman	22.7%	36.1%	32.7%	8.6%

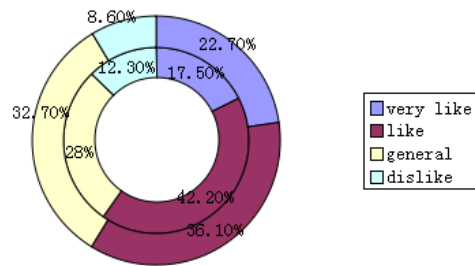


Figure 5 : Our country in four years jack sex ratio of the number

TABLE 6 : Different education background community residents' attitudes toward Wushu

	Very like	Like	General	Dislike
Primary school	11%	45%	29%	15%
Middle school	22%	38%	30%	20%
Technical secondary school and high school	17%	41%	25%	16%
Junior college, university and above	8%	50%	30%	12%

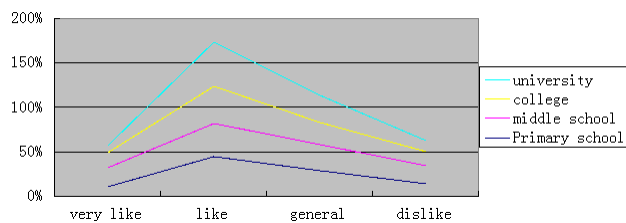


Figure 6 : Different education background of our sport people

From above TABLE 4-6 and bar Figure 4 ring Figure 5 and broken line Figure 6analysis, it summarizes that in Chinese residents, the old that above 60 years old recognition degree on Wushu fitness is higher, which is related to their plentiful leisure time; With respect to men, women more favored in participating in Wushu fitness activities; with increasing of education background, people acceptance degree on Wushu fitness has strengthened, known its special benefits, therefore people that fond of it are more.

Community residents to Wushu functions cognitive research

Due to different residents' physical status, hobbies, geographical environment, training extent and other factors differences, it leads to residents' cognition on Wushu fitness functions to be different.

TABLE 7 : Community residents to Wushu functions cognitive research

Item	Frequency number	Percentage (%)	Rank	Average selective coefficient
Body building	437	91.1%	1	7.3
Pass time and entertainment	369	63.5%	2	5.1
Self-defense	247	51.5%	3	4.1
Enrich life	198	41.2%	4	3.3
Temper oneself	162	33.85	5	2.7
Carry forward national spirits	144	30.0%	6	2.4
Relieve pressure	123	25.2%	7	2.0
No effects	13	2.7%	8	0.2

By above residents' cognition statistical TABLE 7, it is clear that around 91.1% residents think Wushu fitness can be more helpful for body building, strengthen their physical quality. It shows people lack of cognition on some of Wushu fitness functions, China should increase Wushu fitness other aspects functions publicity.

Research on Wushu consumption participation status

Except by Chinese residents to Wushu functions cognitive statistical analysis, residents' Wushu consumption participation status can also reflect Chinese residents' Wushu fitness status.

TABLE 8 : Community residents' Wushu consumption participation status research

	Wushu books	Clothes shoes	Wushu apparatus	Audio-visual products	Wushu training	Wushu fields	Others
Number of people	109	565	327	248	76	56	64
Percentage (%)	11%	57.9%	33.5%	25.4%	7.8%	5.7%	6.6%

In order to let readers to further understand Chinese Wushu consumption status, according to TABLE 8, it specially draws following broken line statistical Figure 8:

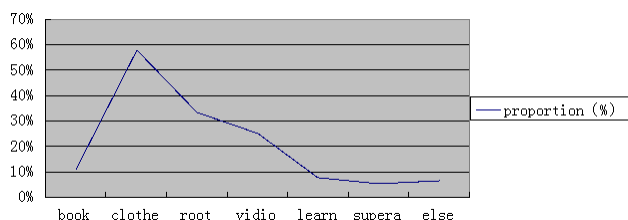


Figure 8 : The influence factors of Wushu pay

From above broken line Figure 8, it is clear that Chinese residents mainly participate in Wushu clothes, shoes, Wushu apparatus, invisible products purchasing, by watching audio-visual products, they understand Wushu fitness, learn Wushu fitness actions, through communicating with other neighborhood, normalize their Wushu fitness conducts.

FUZZY COMPREHENSIVE EVALUATION METHOD-BASED WUSHU FITNESS IMPACTS ON RESIDENTS' HEALTH

Wushu fitness has decisive effects on ensuring Chinese residents' physical and psychological health undertakings, Wushu fitness not only can propel to Chinese excellent traditional cultural inheritance and development, but also plays propelling roles in promoting Chinese spiritual civilization construction and material civilization construction.

Define evaluation indicator set

According to:

$$U = \{u_1, u_2, \dots, u_m\}, m = 1, 2, 3, 4$$

Evaluation indicator set is = {Physical and psychological health, release of mood, self-defense, enrich life}.

Define evaluation grade set

For systematic evaluation grade, mainly determination method is expert evaluation method. In Wushu fitness exercising to residents' different impacts evaluation grade set is as following, according to

$$V = \{v_1, v_2, \dots, v_n\}, n = 1, 2, 3, 4$$

Curative effects evaluation grade set is = {Very good, good, normal, bad}.

Define each evaluation indicator weight

Weight mainly expression method is:

$$w = \{\mu_1, \mu_2, \dots, \mu_m\}, m = 1, 2, 3, 4$$

$$\text{Among them: } \sum_{m=1}^6 \mu_m = 1$$

Define evaluation grade indicator weights methods are mainly analytic hierarchy process and normalization method, from which normalization formula is as following:

$$w_i = \frac{\frac{C_i}{S_i}}{\sum_{i=1}^n \frac{C_i}{S_i}}, (i = 1, 2, \dots, m)$$

Among them, w_i is evaluation parameter i monitoring value; $\overline{S_i}$ is evaluation parameter i standard arithmetic mean value of m grade, then weight set is:

$$w = \{w_1, w_2, \dots, w_m\}.$$

Here, apply normalization method to calculate weight, result is :

$$w_1 = \{0.35, 0.11, 0.21, 0.33\}$$

Define evaluation matrix

Comprehensive evaluation matrix R evaluation method is mainly experts' evaluation method, analytic hierarchy process, membership function method.

Here use membership function method, define fuzzy relation matrix R , from which:

$$R = (R_1, R_2, R_3, R_4)^T$$

First design membership function
 Evaluation grade on the 1 grade

$$\mu_{i1}(u_i) = \begin{cases} 0 & u_i \geq v_{i2} \\ -\frac{u_i - v_{i2}}{v_{i2} - v_{i1}} & v_{i1} < u_i < v_{i2} \\ 1 & u_i \leq v_{i1} \end{cases}$$

Evaluation grade on the j grade

$$\mu_{ij}(u_i) = \begin{cases} 0 & u_i \leq v_{ij-1} \text{ 或 } u_i \geq v_{ij+1} \\ \frac{u_i - v_{ij-1}}{v_{ij} - v_{ij-1}} & v_{ij-1} < u_i < v_{ij} \\ -\frac{u_i - v_{ij+1}}{v_{ij+1} - v_{ij}} & v_{ij} \leq u_i < v_{ij+1} \end{cases}$$

Evaluation grade on the n grade

$$\mu_{in}(u_i) = \begin{cases} 0 & u_i \leq v_{in-1} \\ \frac{u_i - v_{in-1}}{v_{in} - v_{in-1}} & v_{in-1} < u_i < v_{in} \\ 1 & u_i \geq v_{in} \end{cases}$$

Input data into above each parameter's each grade standard membership function formula, it can solve each evaluation parameter membership to each evaluation grade, and then construct fuzzy relation matrix R .

By calculation, it can solve:

$$R_1 = \begin{pmatrix} 0.5 \\ 0.1 \\ 0.1 \\ 0.3 \end{pmatrix}; R_2 = \begin{pmatrix} 0.4 \\ 0.1 \\ 0.2 \\ 0.3 \end{pmatrix}; R_3 = \begin{pmatrix} 0.5 \\ 0.05 \\ 0.2 \\ 0.25 \end{pmatrix}; R_4 = \begin{pmatrix} 0.45 \\ 0.05 \\ 0.1 \\ 0.4 \end{pmatrix};$$

And then by $R = (R_1, R_2, R_3, R_4, R_5, R_6)^T$ it can get comprehensive evaluation matrix as following :

$$R_1 = \begin{pmatrix} 0.5 & 0.4 & 0.5 & 0.45 \\ 0.1 & 0.1 & 0.05 & 0.05 \\ 0.1 & 0.2 & 0.2 & 0.1 \\ 0.3 & 0.3 & 0.25 & 0.4 \end{pmatrix}$$

Carry on comprehensive evaluation

Known $W = (\mu_j)_{1 \times m}$, $R = (r_{ji})_{m \times n}$, by

$$S = w \circ R = (\mu_1, \mu_2, \dots, \mu_m) \circ \begin{pmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{pmatrix} = (s_1, s_2, \dots, s_n)$$

It can get fuzzy evaluation set S , from which “ \circ ” is fuzzy composition operator. For fuzzy operator, it mainly has following kinds, as TABLE 9:

TABLE 9 : Fuzzy operator

Feature	Operator			
	$M(\wedge, \vee)$	$M(\cdot, \vee)$	$M(\wedge, \oplus)$	$M(\cdot, \oplus)$
Reflect weights function	Not obvious	Obvious	Not obvious	Obvious
Comprehensive extent	Weak	Weak	Strong	Strong
Utilize R information	Insufficient	Insufficient	Relative sufficient	Sufficient
Type	Principal component prominent type	Principal component prominent type	Weighted average type	Weighted average type

Here take fuzzy operator as $M(\cdot, \oplus)$ operator, that:

$$s_k = \min \left(1, \sum_{j=1}^m \mu_j r_{jk} \right), k = 1, 2, \dots, n$$

Input above computation result into above formula and can get:

$$S_1' = (0.431, 0.136, 0.298, 0.321)$$

Get results

By fuzzy evaluation vector S analysis, it makes comprehensive conclusion. Generally, it can adopt maximum membership principle, weighted average principle, fuzzy vector uniformization, and here applies maximum membership principle.

For maximum membership principle, if given fuzzy evaluation set $S = (S_1, S_2, \dots, S_n)$, (from which S_i is grade v_i membership to fuzzy evaluation set), $M = \max(S_1, S_2, \dots, S_n)$, M corresponding element is evaluation result of comprehensive evaluation.

By $S_1' = (0.431, 0.136, 0.298, 0.321)$, it is clear:

$$M_1 = \max(S_1, S_2, \dots, S_n) = 0.431$$

Wushu fitness to several residents' health effects evaluation

Follow above analysis process, it can get:

Each evaluation indicator weight is:

$$w_2 = \{0.43, 0.23, 0.18, 0.23\}$$

By calculation, it can get:

$$R_1 = \begin{pmatrix} 0.44 \\ 0.11 \\ 0.12 \\ 0.32 \end{pmatrix}; R_2 = \begin{pmatrix} 0.23 \\ 0.14 \\ 0.21 \\ 0.33 \end{pmatrix}; R_3 = \begin{pmatrix} 0.45 \\ 0.1 \\ 0.2 \\ 0.25 \end{pmatrix}; R_4 = \begin{pmatrix} 0.43 \\ 0.12 \\ 0.12 \\ 0.35 \end{pmatrix};$$

And then by $R = (R_1, R_2, R_3, R_4, R_5, R_6)^T$ it can get comprehensive evaluation matrix as following :

$$R_2' = \begin{pmatrix} 0.44 & 0.23 & 0.42 & 0.43 \\ 0.11 & 0.14 & 0.13 & 0.12 \\ 0.12 & 0.21 & 0.24 & 0.1 \\ 0.32 & 0.33 & 0.23 & 0.35 \end{pmatrix}$$

Fuzzy evaluation vector $S_2' = (0.412, 0.125, 0.169, 0.211)$, and it has:

$$M_2 = \max(S_1, S_2, \dots, S_n) = 0.413$$

From above analysis calculation result, it is clear that on a whole Wushu fitness mainly is for strengthening physical and psychological health, it enriches residents' spare time life and meanwhile meets residents' spiritual life, strengthening residents' immunity; at the same time, Wushu fitness plays crucial roles in strengthening self-defense ability aspect. Make concrete analysis of four kinds of effects, the conclusion conforms to Wushu fitness professional investigation conclusion, and then proves the conclusion accuracy, authenticity, which provides foundation for future Chinese Wushu fitness development.

CONCLUSION

The paper firstly makes analysis of Chinese Wushu fitness status, points out that due to Chinese publicity strength is not enough, fewer investment on organizing Wushu fitness activities, lacking of faculty and other factors, it leads to Chinese residents' deficient understanding on Wushu fitness cognition, it lets China to have fewer group of people to build body by Wushu, the paper makes concrete analysis of stumbling blocks that hinder Chinese Wushu undertakings development, and puts forward that China should increase investment publicity on Wushu fitness benefits aspect, let residents to further understand Wushu fitness, and meanwhile cultivate a group of professional faculty, regular walk into community, and carry out technical guidance and advertising.

Besides, on the basis of numerical analysis, utilize fuzzy comprehensive evaluation method, analyze Wushu fitness effects on people physical and psychological health, relieving pressure, enriching life, self-defense four aspects, by comparing the two fuzzy evaluation vectors, and then get that Wushu fitness utmost effect is ensuring people physical and psychological health, promote people physical health, which provides supports for China building socialism harmonious society, and meanwhile

enriching the old leisure life, spreading Chinese excellent traditional culture, letting it to get further inheritance.

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