

Investigation and Risk Identification of Sports Injury in the Elderly in Chengdu

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ABSTRACT. It is necessary to evaluate and analyze the factors of sports injury of the elderly in Chengdu and identify the risk in socialist mode of production. This paper investigated and analyzed the risk factors of sports injury of 60 ~ 80-year-old people in Chengdu City, such as organization management, participants, sports environment, etc. The index system of Sports Injury Risk Assessment for the elderly was constructed, and the risk type was identified and the injury risk grade was classified by means of fuzzy judgment. The results showed that the causes of sports injury in the elderly included error in judgment, risk-taking behavior and sports facilities. 80%, 15.10%, 14.60%; 45.50% of total risk factors. The main risk type of sports injury in the elderly is participant risk, which accounts for 63.96% of the total risk. Secondly, the risk of sports environment accounted for 39.70% of the total risk; finally, the organization manages risk, accounting for only 12.65% of total risk. The conclusion of the study suggests that the elderly should strengthen their skills, safety knowledge and risk judgment to prevent the occurrence of injury risk.

KEYWORDS: elderly, Sports injury, Risk identification

1. Introduction

Population Ageing has become the most basic national conditions for the future economic and social development. The physical health of the elderly and sports and fitness are the issues that society attaches importance to today. Sports fitness can prevent diseases and delay senility, improve the immunity and prevent diseases of the elderly, and is the most economical and convenient way to improve the health level of the elderly. However, the elderly exercise voluntary, voluntary high, low scientific coefficient and factor of safety, making the elderly exercise injury probability is also higher. In this paper, we try to evaluate and analyze all-round, scientific and effective factors of sports injury in the elderly, and adopt different risk coping measures according to different risk levels to prevent injury risk from the source, minimize the occurrence of injury, promote the scientific movement of the elderly, reasonable prevention of the elderly sports injury.

2. Analysis on the Causes of Sports Injury of the Elderly in Chengdu

Through the investigation and analysis of the causes of sports injury in the

elderly, it is found that the elderly in physical exercise, the potential risks of the environment, venues, equipment, physical fitness and sports skills of the elderly, sports knowledge, sports experience, sports events, etc. will become the old people in the sports injury safety hidden danger. In all the actual injury events, sports injury is not a simple cause, the psychological characteristics of athletes, physical fitness, sports environment, sports facilities, and other conditions are different, the injury factors are different. Among the causes of sports injury in the elderly, misjudgment, risk-taking behavior and sports facilities account for 15.80% , 15.10% , 14.60% ; 45.50% of total risk factors. The others are: 2.30% unscientific sports program, 3.30% unsuitable sports program, 7.40% carelessness of the instructor, safety and security, inadequate protection 6.70% , underlying disease 4.10%, poor physical fitness 3.90% , technical movement error 9.20%, too much exercise 8.60%, lack of knowledge or skills in safety sports 7.30% , the equipment is in disrepair or unqualified 6.50% , clothing, shoes, hats and other supplies are not suitable for 5.50%, weather factors such as high temperature, strong wind and cold 2.40% . The sports elderly in Chengdu have a weak sense of self-safety, lack of risk judgment, and the reasons of facilities, etc. , which are prone to sports injury accidents. Therefore, the reasonable cognition of these factors by the old people who take part in physical activities is helpful to prevent sports injury and promote the physical exercise of the old people.

3. Risk Identification of Sports Injury in the Elderly

4. 1. Risk Alert

By means of the elderly sports injury from 2016 to 2019, 63 cases of case analysis, the elderly sports injury risk types are divided into: B1 organization management risk factors (C1 exercise program (before motion targets, process, scheme), C2 sports events(ball games, martial arts, tai chi, a square dance, a long distance), C3 organization and management (sports organization, planning, guidance, etc.), C4 protection measures (risk when using various rescue, protection); B2 participants risk factors, C5 underlying diseases (exist in the body and are not easily detected), C6 body quality (weight, speed, stamina, agility, vital capacity and other impact on sports), C7 technology level (technology, skills of sports master degree), C8 exercise load (the rationality of the amount of exercise and intensity of movement), C9 safety knowledge (prevent and respond to injury risk cognition), C10 risk judgment (the ability to sense the risk of injury), C11 risk-taking (try to do some dangerous actions beyond their sports ability) and B3 environmental risk factors, C12 facilities (various project sports arena, stadium, gymnasium, square, park, etc.), C13 sports equipment (exercise using all kinds of equipment, supplies, etc.), C14 sports equipment (movement to use all kinds of products such as clothing, shoes and hats, etc.), C15 weather factors (temperature, humidity, climate change impact on sports) from three aspects, set up by the secondary indicators of the elderly sports injury risk index system.

4.1 Risk Assessment

The risk factors of sports injury in the elderly are many, complex and changeable, and sports injury is difficult to predict. By using the method of Fuzzy Synthetic Evaluation and Analytic Hierarchy Process(AHP), the risk index of sports injury is comprehensively evaluated and analyzed, and the risk order of injury is obtained according to the weight of index. To provide an effective theoretical basis for the prevention of injuries of the elderly, as far as possible to avoid the occurrence of injuries.

4.2 Determination of the Weight of Risk Indicators

After constructing the index system of sports injury risk assessment for the elderly, the process of establishing the weight distribution set of each factor is as follows. (1)3-level hierarchical structure of structural evaluation system. The 3-layer factors for establishing the risk assessment of sports injury in the elderly are as follows. Objective Layer: $U=(\text{Sports Injury Risk Assessment System for the elderly})$; FACTOR LAYER: $B_i= B_1, B_2, B_3)= (\text{Organization Management Risk, participants risk, sports environment risk})$; Sub Factor Layer: $C_{ij}= C_1, C_2, C_3, C_4\dots C_{15}, C_{ij}$ as shown in Table 2. (2)The weight distribution of the first-level risk factors can reflect the proportion of the risk index in the sports injury. According to the principle of analytic hierarchy process (AHP) , the opinions of experts, university teachers and instructors who are engaged in sports for the elderly were consulted. The importance of three first-level indicators,(B_1 organizational management risk, B_2 participant risk and B_3 sports environment risk) were judged, and the weight value of the first-level risk factor evaluation index was obtained, and the inconsistencies were tested , as shown in table 1.

Table 1 : a - B Modulus and Judgment Matrix

A	B1	B2	B3	Weights(W)
B1	1	1/3	1/2	0.1634
B2	3	1	2	0.5396
B3	2	1/2	1	0.2970

$W= 0.1634, 0.5396, 0.2970$, in which W represents the weight distribution set of B_1, B_2 , and B_3 3 factors relative to the evaluation system of sports injury risk in the target layer A . As can be seen from table 2, the main risk type of sports injury in the elderly is participant risk, accounting for about 63.96% of the total risk. Secondly, the risk of sports environment accounted for 39.70% of the total risk ; finally, the organization manages risk, accounting for only 12.65% of total risk. In view of this, the elderly should strengthen their own level of skills, safety knowledge, risk judgment ability to prevent the occurrence of injury risk.

Through the relevant experts, professors and coaches in the field of sports for the elderly to score the index of the risk factors of sports injury for the elderly, and then according to the analytic hierarchy process to divide the risk types of sports injury for the elderly, and calculate the weight value of the risk factors, at the same time,

the evaluation of the strength and weakness of various risk factors can serve as a warning to the organizers and participants. The older people get information about the facilities, the climate, and the program before they leave. On the basis of relevant information, the participants' basic conditions (physical quality, sports equipment, technical level of sports, etc.) are combined to analyze and judge the risk, and then take corresponding measures according to the risk to decide whether to participate or not. If you want to reduce the risk of this campaign, you need to carry out safety knowledge education, self-help and mutual rescue training, sports skills training, equipment adjustment, physical energy reserves and other measures, minimize and prevent the occurrence of sports injury accidents.

Table 2 : Judgment Matrix between B1 and Risk Factor C for Organizational Management Risk

B1	C1	C2	C3	C4	Weights(W)
CI	1	1/2	1/2	1/3	0.1223
C2	2	1	1	1/2	0.2276
C3	2	1	1	1/2	0.2276
C4	3	2	2	1	0.4321

5. Conclusions and Recommendations

5.1 Conclusion

(1) Through the weight of the index system, we can see that there is a certain gap in the weight of the first-level index in the management risk, the participant risk and the sports environment risk. The participant risk is the biggest, the environment risk is the second, and the organization management risk is the last.

(2) According to the weight of risk factors evaluation system, the main risk type of sports injury in the elderly is the risk of participants, which accounts for 63.96% of the total risk. When the middle-aged and old people in Chengdu participate in family sports, they do it spontaneously, but the number of people who accept the guidance of professional sports loving clubs and community sports organizations is less. The present situation of the family sports participation organization shows that the middle-aged and old people in Chengdu have higher sports spontaneity and randomness, lower science coefficient and factor of safety, so the probability of sports risk is higher.

(3) The middle-aged and old people in Chengdu have less training in family sports risk prevention and coping education, so they have less knowledge and lower ability to prevent and cope with sports risk. Moreover, the training and education activities aimed at the risk of family sports in Chengdu are of poor quality and unsatisfactory teaching results, and there are many middle-aged and old people who think that these education and training are of no practical use.

5.2 Advice

(1) To actively construct an early-warning platform for the sports injury of the elderly, which will collect and sort out information and data of the sports injury of the elderly, and make scientific, comprehensive and accurate assessment and analysis of the data; and the type of sports injury, the value of risk, the warning zone to do division. Through the platform information release, to enhance the sports safety awareness of the elderly sports fans, to minimize the occurrence of sports injuries.

(2) The government, communities and other grass-roots organizations can popularize knowledge and skills on sports safety for middle-aged and old people through early warning platform. We can carry out sports risk prevention education to the middle-aged and old people by means of broadcasting educational videos and publishing advertisement and propaganda information. The old people enter the early warning platform to understand the relevant information, according to their own physical condition, the comprehensive analysis of the risk; The movement time and the movement difficulty Coefficient are controlled in the reasonable scope, thus can avoid the unnecessary movement risk effectively.

(3) The middle-aged and elderly people should consciously accept regular physical examination, physical examination of various indicators, out of the source of hidden dangers. This can help the middle-aged and old people to choose the appropriate sports according to their physical quality, reduce the potential illness caused by sports injuries, sports risk control in the cradle. In addition, the middle-aged and elderly people in the greater risk of sports activities, it is best to wear protective gear to protect the joints.

(4) Calling upon the relevant responsible units of each venue to provide adequate safety protection facilities inside the venue to ensure the sports safety of middle-aged and elderly people, and to set up special administrative personnel to supervise people's sports behavior; In this way, some bad sports behaviors can be corrected and stopped in time, and sports injury events can be rescued in time. The venue shall be equipped with sufficient emergency medicine for sports medicine and shall display a sign detailing the place of storage and the method of use of emergency medicine so that people can find medicine and give help in the shortest time after a sports accident.

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