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Risk factors for accidental falls in the elderly and intervention strategy

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Abstract

As the population ages, older people's health and quality of life are becoming a matter of public concern increasingly. Through review of the literatures and analysis of the reasons for falls in older people, we worked out some measures to cope with such a situation, provided the self-care knowledge of falls prevention for older people and improved the quality life of older persons. The recovery process is long, if the old people fall down, which brings a lot of inconvenience to individuals and families, and it can also cause a lot of complications. If wary of fall risk factors, the quality of life of older persons can be improved. According to the different conditions of the elderly, we should take effective measures to create suitable living environment for senior citizens, and propagandize the knowledge of the old people's health care, which has the great significance in preventing the elderly's fall, and improving their living quality.

Keywords: Elderly people; Fall; Risk factors; Prevention

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1. Introduction

One of the important reasons for old people's disability and death is falls. According to the data of U.S. Centers for Disease Control and Prevention released in 2006, about 30% people above 65 years fell down each year in America.

The medical expense of accidental falls is more than 20 billion U.S. dollars each year, and the estimated total medical cost of falling will be over 32 billion dollars in 2020. Our country has entered the aging society, and the over 65-years-old people have reached 150 million. According to the incidence of 30% estimated each year, more than 4000 elderly fall at least. In 2006, the data concerning death cause monitoring reported by the National Disease Surveillance System showed that in our country the mortality rates of over 65-years-old people from falling in males was 49.56/10 million, and in women 52.80/10 million. The accidental fall has caused a serious threat to the elderly people's physical and mental health, activities of daily living and independent living ability; it has also increased the burden of family and society. The domestic and international research showed that the elderly fall is a common injury, is a main reason of old people "accidental" injuries and a cause of death, and greatly threat the health and life of the elderly; In our country falling is the first hurt of 65-years-old people or older; the preliminary investigation of the community revealed that community-dwelling elderly falling is the first injury, with the incidence rate of 10.46% [1];

Prevention and control of falling among the elderly has become a public health problem. Reliable evidences showed that more than 1/3 of falls and injuries can be prevented through being careful of the defined risk factors. In this paper, we aim at enhancing falling consciousness, effectively preventing falls in elderly people and improve their quality of life through cognitive behavior management and intervention.

2. Risk factors of falling in old people

2.1. Physiological factors

2.1.1. Gait and balance functions

The main reason causing falls in elderly people is declined gait stability and balance function impairment. Such characteristics as gait height, length, continuity, linearity or stability have a close correlation to elderly falling risks. To compensate for the decline in the ability of activities, they walk more slowly and cautiously. But their steps are shorter and discontinuous, and feet cannot lift to a suitable height, which may increase the risk of falling. On the other hand, the older's central control ability has been waning, the contrast feeling reducing, and drive swing is bigger, reaction ability has been dropping

and reaction time extending, the ability of balance and synergy sports reducing, which lead to the increased risk for falling.

2.1.2. Sensory system

Sensory system includes vision, hearing, touch, vestibular and somesthetic sensibility. It affects the body balance function by the afferent nervous system information. The elderly usually suffer from the degeneration in eyesight, visual resolution, visual spatial/depth sense and visual acuity with aging, thereby increasing the risk for falling. Senile conductive hearing loss, presbycusis even earwax accumulation can also affect hearing, and hearing problems among older people is so serious that they can not hear about fall risk warning, or they may hear the sound, but they can not react in time because of the prolonged reaction time.

2.1.3. Central nervous system

Degeneration of the central nervous system often affect intelligence, muscle strength, muscle tone, feeling, reaction ability, reaction time, balance, gait and collaborative exercise capacity, thereby increasing the risk of falling. For example, the body vibration of ankle joint and ankle reflexes are reduced because of the worse thumb position sensation and result in poor balance abilities.

2.1.4. Musculoskeletal system

The common cause of falling is the old bones, joints, ligaments and muscle structure, and the damage and degeneration of function.

Functional degradation of the musculoskeletal system affects the activities of the elderly, the agility, strength and endurance of the gait, which makes old people walk slowly with lower and instabile steps. The elderly have weakened strength of quadriceps femoris that has the significant association with falling. The osteoporosis of the old people is a critical risk for fractures when falling, especially hip fracture.

2.2. Pathological factors

A lot of diseases contribute to the falling and related injuries. (1) Nervous system diseases: apoplexy, Parkinson disease, spinal disease, cerebella diseases, vestibular disease, and peripheral nervous system diseases. (2) Cardiovascular diseases: orthostatic hypotension, cerebral infarction, ischemic small vessel lesions. (3) Ocular diseases influencing vision: cataract, hemianopia, glaucoma and macular degeneration. (4) Psychological and cognitive factors: dementia (especially the Alzheimer), depression. (5) Others: vertigo, syncope, seizures, hemiparesis, foot disease and foot or toe deformity affect the balance function of the body, stability, coordination, and result in prolonged reflex time and gait disturbance. Infections, pneumonia and other respiratory diseases, lack of oxygen, anemia, dehydration, and electrolyte balance disorders may lead to a lack of the body’s metabolic capacity and make the body's stability

ability impaired temporarily. The elderly with urologic diseases, micturition syncope or others accompanied by the symptomes like concomitant urinary frequency, urgency, incontinence have a high risk for falling when they hurry to the restroom.

2.3. Pharmaceutical factors

Medication, medication dose, and compound medicines may cause falling in the elderly, since many drugs can affect the mind, spirit, vision, gait, balance and other aspects. The drugs which are prone to cause falling are listed as followings:

(1) Psychological drugs: antidepressant, anxiolytic, hypnotic, anticonvulsant, valium. (2) Cardiovascular drugs: antihypertensive agents, diuretics, vasodilators. (3) others: non-steroid anti-inflammatory drug, pain-killers, dopaminergic drugs, antiparkinsonism drugs.

2.4. Psychological factors

Depression, anxiety, bad mood and resulted social isolation, all may increase the risk for falling. Depression may distract the elderly people's attention. The disturbance in the potential psychological state is also related to the frustration. All of these lead to poor perception and reaction ability in the elderly to the environmental risk factors. In addition, the fear of falling may reduce their behavioral capacity and restrict their movement, thus affecting the gait and balance ability and increasing the risk of falling.

2.5. Environmental factors

Dim light, slippery, uneven pavement, obstacles in walking way, unsuitable furniture height and position, no railing on stairs or no handle in toilet, may increase the risk of falling. Improper shoes and walking auxiliary tool are also associated with falling. Outdoor risk factors include the deficient repair on steps and pavement, which may lead to falling in elderly people.

2.6. *Social factors*

Geriatric education and income level, health care, social services and health services, safety design of outdoor environment, as well as the elderly living alone, and social contacts and contact extent can affect the incidence of falling.

3. Measures of preventing falls in elderly people

Falling occurrs as a result of the combination of various factors, and the more risk factors involve, the more likely the elderly falls[2]. The most effective intervention is diversified and individualized. In the implementation of intervention, we found that the

integrated management mode like the two combinations (enhanced elderly fall prevention awareness and the improvement of community family environment, combining the group health education and individualized instruction combined), can effectively raise the consciousness of the community-dwelling old people to prevent falls.

Comprehensive and diversified measures can produce good synergistic effect in effectively reducing the incidence of falling in the elderly. These measures include acute and chronic disease prevention and treatment, rational drug use, the living environment improvement, physical exercise enhancement, health education, community support, family services, reasonable use of auxiliary equipment and so on.

3.1. Enhance the consciousness of preventing accidental falls among the aged.

Unconscious, restless patients have a restraint belt and other protective measures, therefore is not easy to bed fall or tumble, but the nurses and families are more numb, so sudden accident may occurred in the aged [3]. The solitary elderly is extremely vulnerable groups, and therefore they should be more cared, they have more self-care activities relatively, so we should give them miscellaneous help and care to reduce the incidence of falls. To the elderly and those who walk unconveniently, we should always be around them to take care to prevent fall down when they walk, get up, go to toilet and have a washing; the old people with weak eyes or poor hearing must be accompanied. Meanwhile, it should be noted that if the other members of the family, neighbors and related social organizations, have enough awareness on preventing falls in old people, and must be paid more attention to it. Obviously, the prevention of falls in the aged is a comprehensive, long and hard way, but also it is the responsibility of the whole society, it need people to take seriously, and take effective intervention measures, and ultimately improve the quality of life for the aged [4].

3.2. Advocates to the aged people correct and reasonable use medicine

To the aged who suffer from dizziness, headache, weakness of legs with cerebral vascular disease high blood pressure, diabetes, blood glucose instability; to such patients who falls caused by hemiplegic, osteoarthritis or balance dysfunction, we should treat or manage them dividual. Give the correct guidance to the aged to take medicine, to taking sedative hypnotics people, persuade they don’t ambulate until fully awake; to taking antihypertensive and hypoglycemic patients, they should be taken under the supervision of doctor, and pay attention to them after they take the medicine.

To outpatient service and emergency elderly patients, we should be patient and careful to tell them how to take different medicine.

3.3. Improving elderly people's particular living environment

The elderly livingroom should be rational layout, safety and bright, avoid lamplight point-blank, it should be have night lamp preferably and the power supply is easily to touch. The ground should be flat, keep dry, and wooden floor preferably. The article is put orderly and channel without obstacles. Sofa can't too soft and sag; chair should be high, so that they can easy to stand up. Their shoes should be appropriate, preferably the tread should be glial or cloth, the cloth and paths avoid too big or too long. The corridor, stair, toilet and bathroom must be set armrest, especially if there is no people around when accident happened, the armrest can play a necessary support role. It had better to setting a lifting toilet to prevent patient falls tumble, and remove unnecessary door and threshold.

3.4. Fostering good living habits

①To the unstable walking aged, use the "tripod rod", "a forearm support cane" and other suitable cane, put it in accessible place, so that they use it in any time. ②The old man moved or shift active should not be too anxious, should be slow, and don't call them suddenly when they are walking, others also do not go in front of the elderly or brushed. ③ To the old people who stand or walk barely, we should pay special attention to aviod they has no support to stand and walk. ④To tell the aged when they after shit, get out of bed or urinate in the night, bent down to pick up things and other movements must be slow, steady, so as to avoid accidents. To some aged out of action, suggested that put a urinal to pee on the bedside in the night, reduced to the toilet multiple times, than lead to fall. Pay attention to the daily protection, as much as possible to take action that avoid doing something hurriedly. When the aged wake up in the night or early morning, they should pay attention to "3.5 minutes": don't get up immediately when wake up, lying half a minute, sit for half a minute, two legs down on the edge of bed, than wait half a minute, to prevent cerebral ischemia caused to tumble. ⑤The aged use vitamin D for fortified to prevent tumble. To supply vitamin D and calcium, it has better effect on prevent tumble.

3.5. Conducting regular safety education

To print and distribute the fall prevention manual, post the poseter on the board and front the building, to organizate the aged to learn knowelage of how to prevent tumble, improve the cognitive function of the aged. Take some necessary measures,

like health care knowledge lectures, consulting, issue date, the regular physical examination and other forms to help the aged adjust state of mind and change the bad habits; explain the consequences of falls and preventive measures to high-risk groups[5]. To the aged of the understanding and memory deteriorated, character and stubborn, we should tell them trouble safety education again and again, explain with demonstration, give feedback at any times, and constantly strengthen. Tell the aged who has poor self-care ability, don't be shy to ask the help of others, they should tell others what they need, in order to obtain help timely. To the frail, living alone elderly, we should provide community support and family health services,make them keep a better health condition and higher quality of life. To organize the aged to communicate regular, to provide a platform for the aged to exchange the learning the knowledge of prevent tumble and the experiences [6].

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