

## **CHAPTER 2**

### **LITERATURE REVIEW**

This study aims to study relationship between perceived fall risk factors and falls preventive behaviors among the elderly in community. The related literatures are reviewed as follows:

1. Falls in the elderly
  - Definition of falls in the elderly
  - Incidence of falls in the elderly
  - Consequences of falls in the elderly
2. Risk factors of falls in the elderly
3. Perceived fall risk factors in the elderly
4. Falls preventive behaviors in the elderly
5. Perceived fall risk factors and falls preventive behaviors among the elderly

#### **1. Falls in the elderly**

##### **- Definition of falls in the elderly**

Falls can be defined in various ways. Luukinen, et al. (1995) defined fall as an unexpected event wherein a person falls to the ground from an upper level or from the same level and includes falling upstairs and on to a piece of furniture. Fall is occurring when the person loses their balance causing them to hit the ground or other object at lower level for example; desk and excludes those resulted from overwhelming outside event, such as motor vehicle accidents or violence (Jitapunkul, et al., 1998). Fall

is also defined as a sudden, unintentional change in position causing an individual to land at a lower level, on an object, the floor, or the ground, rather than as a consequence of sudden onset of paralysis, epileptic seizure, or overwhelming external force by Feder, et al. (2000). Assantachai, et al (2002) defined fall in the elderly as the elderly lost their balance and any part of the body, except the feet, hit the ground regardless of any cause was reported initially. This definition is congruence with Jensen, Lundin-Olsson, Nyberg, & Gustafson (2002). Jensen and colleagues (2002) defined fall in elderly as an event in which the elderly unintentionally came to rest on the ground or floor, regardless of whether an injury in sustained. In summary, fall is an event that causes the elderly loses their balance or unintentional change in their position resulting in coming to rest or hit on the ground, floor, or other object at lower level.

#### **- Incidence of falls in the elderly**

Falls are a common health problem in the elderly population. This is because they have deterioration or dysfunction of organs (Hendrich, et al., 1995; MacAvoy, et al., 1996). In Thailand, falls are the most common kind of accident and cause of injury that lead to hospitalization among the elderly (Hanjangsit, 1994; Thosingha, et al., 1992; Tonmukayakul, 1983; Treyawuthiwat, 1990). In Asian countries approximately 17-28 % falls at least once in the previous year (Chan, et al., 1997; Yasumura, et al., 1994) and in Thailand about 19-20 % fall at least once in the past six months (Jitapunkul, et al., 1998). Many studies reported that the prevalence of falls was greater among females than in males. The overall ratio of female fallers to male fallers in Asian elder was 1.4-2.0:1 (Yasumura, et al., 1994) and in Thai elders was 1.5-2.0:1 (Jitapunkul, et al., 1998). The national survey study about falls in the Thai

elderly (Jitapunkul, et al., 1998) found that 65 % of falls occurred outdoors. They discussed that the elderly in Thai culture often sat on the floor and moved by creeping more than walking. In addition, the public environments in Thailand (such as a path, ditch, and street) were built inappropriately which could cause the elderly to fall easily. Consequently, fall rate in outdoors was higher. But the study of Lausawatchikul, et.al. (2000) in Thai elderly found that 79.6 % of falls occurred in and around elders' home while 20.4 % occurred outdoors. They discussed that the elderly with older were often at home and had less activities outside. Thus, they would have more probability of falls in the home.

#### **- Consequences of falls in the elderly**

Falls may lead to injury death and disabilities among older adult (Pierfitte, et al., 2001). Falling covers a wide range of problems, from evidently minor trips and slip to events that cause serious, and sometimes life threatening (Parry, et al., 2001). The importance of a fall lies in its effect on an older person's health, functioning and independence. Therefore, falls can have physical, psychosocial, and economic consequences (Parry, et al., 2001; Stone & Wyman, 1999)

**1. Physical consequences:** Injuries, death, long lies resulting from inability to get up from the ground or floor, and decreased activity and mobility are important potential physical consequences of falling (Parry, et al., 2001; Stone & Wyman, 1999). Approximately 30 to 55% of elders who fall suffer minor injuries such as bruises, lacerations, and abrasions (Resnick, 1999; Tinetti, 1997). About 2 to 20% have severe injuries that lead to fracture, pain, disability, and hospitalization, whereas 2.2 % die as a result of fall-related injury (O'Loughlin, et al., 1993). The most serious

fall injury is hip fracture (Pierfitte, et al., 2001). About 4 to 6 % of falls result in fractures, with less than 1 % being a hip fracture (Tinetti, et al., 1988). The mortality rate during hospitalization for hip fracture is 12%-67 % (Stone & Wyman, 1999). The injuries associated with a fall are exacerbated if the individual is living alone and is unable to get up after fall (Resnick, 1999). Inability to get up after falling is a dangerous consequence of falls. Wild, Nayak, & Isaacs (1981) studied how falls are dangerous in old people at home. They found that the older who fell in their own homes half of those who remained on floor for an hour or more died within the next six months. In addition, a study of Tinetti, Liu, & Claus (1993) found that 50% of the fallers were unable to get up with out help. The inability to get up after a fall may result in dehydration, hypothermia, pneumonia, pressure sores, and fear of falling. People who were unable to get up were likely to suffer a lasting decline in their activities of daily living, to be hospitalized, and to die than among those who were able to get up with out assistance (Resnick, 1999).

**2. Psychosocial consequences:** Psychosocial consequences of falls often result in fear of falling, anxiety, depression, loss of confidence, dependency, and social withdrawal (Arfken, et al., 1994; Kong, et al., 2002; Parry, et al., 2001). Fear of falling occurs in the elderly who fall as well as those who have never fallen (Resnick, 1999). Studies indicated that more than half (40-73%) of people who have fallen and about 20-60 % of those who have never fallen has fears of falling (Nevitt, et al., 1989; Tinetti, et al., 1988). Arfken and colleagues (1994) reported that the prevalence of the fear of falling was greater in women and was associated with increased age, decreased satisfaction with life, increased frailty and depressed mood. Additionally, Brummel-

Smith (1989) described how the fear of falling can lead to a vicious cycle in which the elderly person who has fallen begins to avoid previously performed activities, thus becoming deconditioned; this can then lead to losses in strength, flexibility, joint mobility, and righting reflexes. These losses can potentiate the risks of a more serious fall in the future (Brummel-Smith, 1989 cited in Stone & Wyman, 1999).

**3. Economic consequences:** Falls that result in injuries can be quite costly both in terms of functional loss or death and in the utilization of health care services (Oliver, et al., 1997). It is very difficult to estimate the cost to health care services of falls among the elderly (Downtown, 1993), since there are a number of components to the financial cost of falling, and information systems are incomplete and often inaccurate. Thus, the actual costs associated with fall are unknown. Falls are a contributory factor in 30 to 40% of admissions to nursing homes (King & Tinetti, 1995), account for nearly 70% of emergency room visits, and for the highest rate of acute care hospitalizations for injuries in the elderly (Stone & Wyman, 1999). The average length of hospital stay is 11.6 days, which is higher than for most other diagnostic-related groups (DRGs) (Sattin, et al., 1990). As a result, falling is a major public health problem among the elderly in terms of cost and mortality. The yearly cost of fall-related fractures, mainly hip fracture, to the health care system of the United States was estimated at nearly 10 billion dollar in 1995 (Dresner-Pollak, et al., 1996). While in Thailand, it is difficult to estimate the actual cost of caring for people who have fallen, acute care costs associated with fractures resulting from falls is about 12,334.6 baths per case (Tangjareonsatain, et al., 1994). When compare with average

income per month of Thai family as 7,026 Bath/month (National Statistic Office, 1995), the money spent on their care was excess their income.

## **2. Risk factors of falls in the elderly**

A review of fall literature confirms that many studies have looked at risk factors for falls in the elderly that have a potential to predict falls in the elderly population. As number of risk factors increases, the chance for a fall and injury also increase (Kempton, et al., 2000). Falls are not an inevitable part of the normal aging process (Ignatavicius, 2000), but are the result of the interaction of physiologic and environmental factors (Ryan, et al., 1993). Some falls have a single cause, but most falls by elderly persons are multifactorial in origin, resulting from an interaction between stability-impairing characteristics of the individual and hazards and demands of environment (Cannard, 1996; Fortin, et al., 1998). Therefore, the risk factors of falls among the elderly are commonly divided into two main groups (Stone & Chenitz, 1991): Intrinsic factors and Extrinsic factors as follows:

**2.1 Intrinsic factors:** Intrinsic factors are those which arise from within the patient, including

**2.1.1 Advanced age:** A review of previously published studies reveals conflicting conclusions regarding the correlation of advanced age and the risk of falls. Several studies of the community-dwelling suggested that advanced age increased the risk of falls age and the risk of falls (Chan, et al., 1997; Dolinis, et al., 1997). In the contrast in Thailand, Jitapunkul, et al. (1998) study in a population aged 60 or older also found no association between advanced age and the risk of falling because Thai elders tend to have lower level of activity, less autonomy and spend more time indoors as their

age increases. Although most comparable studies included age as a variable, only some studies found age to be a significant predictor because of the restricted age range studied.

**2.1.2 Female sex:** Many studies have found females to be more likely to fall than males. In Thailand, Jitapunkul and colleagues (1998) found that Thai elderly females showed a significantly higher rate of falls than males (21.5% VS 14.4%). Likewise, Lee and colleagues (2000) revealed that females in Korea were at increased risk of falls at a rate 2.67 times that of males.

**2.1.3 Visual impairment:** Vision is one of the three major mechanisms that contribute to maintenance of stable and upright posture. The disturbance of this mechanism therefore results in postural instability and falling (Yasumura, et al., 1994). Visual impairment is caused by ophthalmic diseases such as cataract, glaucoma, retinal degeneration, etc. This factor leads to falls because of the changes in depth perception, visual acuity and visual field that cause a limited vision and color discrimination (Craven & Bruno, 1986; Pasunan, et al., 1998).

**2.1.4 Decrease mental status or cognitive impairment:** The concept of mental status includes such aspects as level of orientation, affective states (confusion and depression), slowing of performance, judgment, memory, and dementia (Ross, et al., 1991). With either problem, hallucination, delusion, depression, and disorganized thinking are common and contribute to falls (Ignatavicius, 2000).

**2.1.5 Gait impairment:** Gait impairment was intrinsic factors of falls and injurious falls leading to minor or major injuries both among the total elderly population and separately among men and women in perspective study (Speechley &

Tinetti, 1991). With normal age-related changes, there is a reduction in limb coordination and in the movement of the pelvis toward the weight-bearing leg when walking. This allows the other leg to swing forward, but in elders, the swing may be too low to avoid an obstacle, causing them to trip (Kane, et al., 1984 cited in Stone & Chenitz, 1991).

**2.1.6 Balance impairment or postural control:** Posture control is determined by the integration of visual, proprioceptive, and vestibular input within the central nervous system to affect a motor response. Impaired sensory, integrative, or motor functioning will affect balance and potentially increase the risk of falling (King & Tinetti, 1995). Impaired balance is a cause of injurious falls (Speechley & Tinetti, 1991) and falls leading to minor injuries (Nevitt, et al., 1991). The elderly persons may have proprioception in the lower limbs, poor visual contrast sensitivity, less ankle dorsiflexion strength, decreased reaction time, and body sway that affects their postural control and may cause their falls (King & Tinetti, 1995; Lord, et al., 1991).

**2.1.7 Mobility impairment:** Mobility a central component of fall risks, but the relationship between mobility and falls may not be linear (Studenski, et al., 1994). While fit and bed-ridden elders are unlikely to fall, the highest risk for recurrent falls may occur in elders who are both mobile and unstable (Studenski, et al., 1994). Failure to go outdoors or to walk long distances may cause an old person to develop muscle weakness and loss of stability, and then consequently fall (Campbell, et al., 1989). The elderly who have impaired gait, musculoskeletal weakness or paralysis, and lower extremity dysfunction often have a fall risk. The greater extent of the deficit, the higher the falls risk (Ignatavicius, 2000).



**2.1.8 Chronic diseases:** Poor health status was clearly associated with falls (Jitapunkul, et al., 1998). It was found in many studies that the cumulative affect of chronic disease, especially that of stroke (Campbell, et al., 1989; O'Loughlin, et al., 1993), Parkinson's disease (Nevitt, et al., 1989) and hypertension (Dunn, et al., 1992; Jitapunkul, et al., 1998) lead to poor health status and impaired functioning. Likewise, Speechley & Tinetti (1991) reported that elder frail persons (99% of who were aged 80 and older) were more likely to falls, but vigorous persons (5% of who were aged 80 and older) were more likely to be injured if they did falls. These diseases may increase the fall risk because the falls as a result of the disease process such as hypoglycemia from Diabetic Mellitus, fatigue from heart disease and cancer, stroke from hypertension, and etc. The elderly may have some of these chronic diseases that contribute to the falls risk (Nitirungjarus, 2001).

**2.1.9 Medical use:** Medical use is potentially the most modifiable risk factor for falls. Specific medications, recent change in dose, and total number of prescriptions have been associated with an increased falls risk. The impairment of mental alertness due to long acting benzodiazepines, barbiturates, antidepressants, and neuroleptics increase the fall risk. Antihypertensives may increase the fall risk by causing postural hypotension or fatigue, leading to dizziness and confusion and diuretics may produce volume depletion or electrolyte imbalance (Fortin, et al., 1998; Ignatavicius, 2000; King & Tinetti, 1995; MacAvoy, et al., 1996). Some of these patients need to take medicine to treat their chronic diseases such as anti-hypertension and anti-diabetic that increase their fall risk. Polypharmacy is common among the elderly, and drug interactions and adverse reactions are likely to occur. The elderly who

take more than three medications are at the highest risk of falls (Fuller, 2000; Ignatavicius, 2000). Studies have indicated that elderly people on medication fall more often than those not on medications (Dresner-Pollak, et al., 1996).

**2.1.10 History of falls:** Many studies reported that a history of falls is a strong risk factor for falls. If these patients already have had one or more falls, the risk increases (Craven & Bruno, 1986; Ignatavicius, 2000; MacAvoy, et al., 1996). Among elder men and women who have fallen previously, Nevitt and colleagues (1989) found the increased odds of two or more falls for persons who had three or more falls during the previous year and a fall with injury during the previous year. Thus, this study concluded that multiple falls were more predictable than single falls. Multiple falls in the elderly were the action of possible underlying conditions that could increase the risk for functional dependency or death within the next few years (Nevitt, et al., 1989).

**2.1.11 Physical activity:** there are many mechanisms by which physical activity could influence the risk for falls. Physical activity, whether performed in form of programmed exercise, daily leisure, or household and occupational activities, exerts its effects in several ways. These include the amount of energy expenditure and cardio respiratory, musculoskeletal, and neuromuscular involvement. These attributes are influenced by the type of physical activity and specific factors such as the muscle groups involved, rate and intensity of muscular contraction, and the physical work and power generated by such behaviors (Gregg, et al., 2000). Several prospective studies evaluated an association of usual physical activity with falls. These studies showed that the most inactive and the most active persons might be at the highest falls (Graafmans, et al., 1996; O'Loughlin, et al., 1993; Tinetti, et al., 1988).

**2.2 Extrinsic factors:** Extrinsic factors are those in the environment which may cause a patient to fall. Extrinsic factors create challenges to balance that must be overcome to avoid falling. The degree to which they pose a threat depends on the vulnerability of the elderly person and the frequency of exposure to the potentially destabilizing situation (King & Tinetti, 1995). Extrinsic factors are felt to be responsible for 22% of falls, particularly those that occur in an unfamiliar environment. Falls in a familiar environment (e.g., at home) are more often related to intrinsic factors (Tibbitts, 1996). Extrinsic factors include poor lighting, objects on the floor (e.g., throw rugs or frayed carpet), unstable furniture, stairs with poor banister rails, and low beds or toilets. The evidence that environmental hazards increase the falls is meager (McMurdo, 2001). Northridge, Nevitt, Kelsey, & Link (1995) determined whether vigorous and frail older people who identify environmental hazards in their homes have an increased risk for falls. Subjects who were frail were more than twice as likely as the vigorous subjects to fall one or more times at home during the 52 weeks follow up period. Vigorous older persons with more home hazards, such as kitchen cabinets that were too high or too low, clutter on the floor, and rugs that could slip, were more likely to fall than vigorous participants who had few home hazards. They concluded that having multiple hazards in the home was associated with the risk of falls in active elderly but not in frail elderly.

In Thailand, three studies had been studied on the role of environmental hazards and falls. In a national survey, Jitapunkul and colleagues (1998) concluded that environment factors, which affected balance and gait such as Thai style house or hut, and a lack of electricity in house, were the main factors associated with falls as well as in intrinsic factors. The study of Pasunan, et al. (1998) found that there was significant

relationship between improper house ladder, lights, placing things and carpet that caused the fall accident among the elderly. In addition, the study of Boonrayong, et al. (2002) revealed that the risk of environment was found in every part of the home environment. The areas that were found in over fifty percent were ridges on doorway floor, no alarm bell or emergency telephone, no color contrast to distinguish the edges of step, unsuitable height and width of steps and stairs. In the lavatory, there were also slippery floors, Thai style lavatory pan that demands a squatting posture, no hand rails and the door must be pushed to open from outside. Regarding the community environment, the risk areas revealed that no footpath and no lines indicating a crossroad (Boonrayong, et al., 2002).

In summary, falls are one of the important warning symptoms of underlying serious illness among the elderly. The consequences of falls among the elderly are serious and many risk factors contribute to the high incidence of falls in the elderly. The identified risk factors of falls can be classified into intrinsic and extrinsic factors. Although current knowledge about falls in the elderly indicates that intrinsic factors are the most important risk of falls (Downtown, 1993), intrinsic and extrinsic factors have complex interaction, and thus, it is difficult to pinpoint the single cause of falls (King & Tinetti, 1995).

### **3. Perceived fall risk factors in the elderly**

Perceived of risk, which is also referred to as susceptibility or vulnerability, to a condition or disease is well known to be essential in motivating behaviors. In addition, it is one of the major concepts in the health belief model (Becker, 1974 cited in Pender, et al., 2002).

As a concept in the health belief model (Becker, et al., 1977 cited in Pender, et al., 2002), perceived susceptibility is correlated significantly with health – related behavior in many studies in various age groups, including the older population. Moreover, perceived susceptibility has also been an important predictor of preventive behaviors. It is very important to note that only perceived susceptibility to disease, rather than the whole model, is supported by research as relevant to designing health protective intervention.

Perceived susceptibility is individual's feeling of personal vulnerability to specific health problem (Pender, et al., 2002). An individual's perception of risk should be concordant with his or her actual risk if people do not perceive or underestimate a risk; they are not likely to adopt recommended behaviors. When a perception of risk is present, the reaction is generally avoidance of the situation. Behavioral change appears to follow the recognition of a health risk (Jeffery, 1989). Therefore, Perceived fall risk factors in the elderly are the elderly' perception of the falls risk factors consists of perceived intrinsic and extrinsic fall risk factors.

#### **4. Falls preventive behaviors in the elderly**

The key to preventing falls or to reduce the seriousness of fall consequences is understandable and early detection of risk and causes of falls (Lausawatchikul, et al., 2000). Most falls have many causes, only some of which are preventable (Rigler, 1999). If the elderly, family, community, and health care providers significantly concern and continue to prevent and reduce risk and causes of falls for the elderly, the incidence of falls will be decrease (Vatesatakakit, 2000). The strategic approach for prevent accident

from the opinion of the elderly is precautionary and conscious of the need to prevent accidents by avoiding risk or reduce causes of accident (Boonrayong, et al., 2002). This strategic is high efficiency and effectiveness to prevent falls in the elderly (Katepitchayawattana, 2001). Regarding this, elderly people should be performing falls preventive behaviors.

According to sociology concepts, behavior means the method that human being acting can be observed, explained and recorded. It also means things that human beings acting show out, respond with any event that can be observed, heard, counted and measured with an objective equipment either it will be showed inside or outside a body (Wilson & Kneist, 1996). The behavior showed out will be an effect from choosing the best responsible reaction to response to aspirations. Lives will improve their behaviors to correspond with environments when there is changing of environment and behaviors of lives will be changed too (Kreesaeng, 1977). The causes of behaviors come from various elements of internal factors, external factors or environment factors, and multiple factors (Trakulwong, 1987). Internal factors such as knowledge, belief, attitude, value, perception etc. External factors or environment factors such as political system, economical system, education, religion, element of population and geography that having influence to behaviors of people. Multiple factors occurred from internal and external factors such as the difficulties and easiness of accessing to the sanitary service, perspectives of disease, social element, social support, social network, etc.

Health behavior means operating or the show of person in acting or except acting in affecting to healthy base on knowledge, understandings, attitudes, and

operating the health involved suitably (Tunsakul, 2000) can be divided into three categories as follows:

- Preventive health behavior means behavior to protect diseases or dangers and effect good results to the health.
- Illness behavior means behaviors that people acted when their bodies had abnormal symptom or illness.
- Sick-role behavior means behaviors that people acted after knowing the result of disease diagnosis.

Therefore, falls preventive behaviors are a part of behaviors and health behaviors. Falls preventive behaviors means the actions of person to protect their health from falls with based on behaviors from incorporating factors including internal and external factors. The performance of their behaviors will base from the belief and feeling to protect fall. The falls preventive behaviors will cover the behaviors of avoiding or reducing risk and causes of falls. It will make the body keeping the balance and avoid actions leading to falls and managing with the environment factors may be leading to fall. Based on Pornputasa (1999), falls preventive behaviors in the elderly are divided into 2 aspects as follows:

**Falls preventive behaviors related to intrinsic factors are:**

1. Avoiding activities that must use a lot of energy in the weak physical condition without helping such as avoiding lifted a lot of things, or dividing things to make balance or ask someone help, if must be lifted a lot of things.
2. Avoiding being in a dangerous area such as areas with a lot of people, area with mechanisms using high speed, traffic area.

3. Enhancing the strength of body with exercise. It is importance to practice exercise, which increase lower body muscle strength and improve balance. General fitness is also important. Walking for 20-30 minutes at least 3 times per week is recommended.

4. Going to see the doctor to get physical check up regularly (yearly) or continue follow up when there is chronic disease or abnormal symptom from physiological changes such as balancing is not good, joint pain and abnormal diseases of systems of body such as often faint symptom, feel dizzy while changing position (postural hypotension), chest pain, palpitation, hypertension or hypotension, Parkinson disease, myositis, paralysis, diabetes mellitus, alcoholism, etc.

5. Going to see the ophthalmologist to get eye examination, if there is abnormal sights and should wear glasses.

6. Taking medication as the physician prescribed. The elderly should keep an up to date list of all medications and provide it to all doctors with whom you consult. Should observe side effect of medicine and consult a doctor after finding abnormality. Moreover, shouldn't buy medication without the physician prescribed, not stop taking and reducing doses of medicine by themselves.

7. Having a diet with adequate nutritional and fluid intake.

8. Having a sufficient rest. The elderly should sleep 6-8 hours per day. They should have social activities as sometime and hobby to relax.

9. Changing position slowly. When moving from on position to another such as either from the bed to sitting or from a chair to standing, the elderly



should pause for a couple of moments to let the blood pressure adjust and to orient to the new position, avoiding sudden turn, etc.

**Falls preventive behaviors related to extrinsic factors are:**

1. Observing dangerous environments inside and outside a house regularly (yearly) such as light in areas, path floor, room floors, stair, toilet and restroom, furniture, etc.

2. Modifying of the environmental hazard when they found that is dangerous area.

3. Setting and using suitable furniture such as chair should be 14-16 inches tall or lower than knee about 1 inch to enable to put feet sufficiently. The width of chair when elderly sit should have a size and bend hip joint not over 9°. Arm place should have the high in a level to put arms at ground level and there is more length than the chair rim about 1 inch to comfort in catching when get up and sit-down. Chair sofa should be thick and hard and the chair should have a steady base and not should have a leg part stretching over the rim of the width of chair. Bed should be tall when sit down already can put feet at ground level and the bed should be not too hard and for a cupboard and a shelf should have a level to enable to pick and catch things.

4. Using assistant equipment in moving such as canes, wheelchairs, walkers and crutches, if you are unsteady. In addition, assistant equipment in moving should think another thing that is a thing supporting weight such as in the case of using a chair without an arm putter should set the chair near a table or a cabinet, toilet or restroom should set a big jar near a bath seat, etc.

5. Using appropriate cloth, shoes, and glasses. Wearing cloth that fit you properly. Wearing properly fitting shoes with nonskid soles and avoiding high heels for better balance. Should wear glasses if you need them but remove reading glasses before you walk and should keep glasses clean all the time.

6. Setting proper lighting inside and outside a house, especially in hall, route between bedroom and the bathroom, stairway and where floor level change. Light switcher should be located conveniently.

7. Eliminating all tripping hazards in your home. Make sure walkways and floor areas are free from object such as electrical cord, furniture, clutter, etc. Avoid shiny floor having the appearance of being wet because they can cause unstable changes in the gait pattern and clean up immediately any liquids, grease, or food spills on the floor.

In summary falls preventive behaviors among the elderly are the actions or the methods that elderly use to avoiding or reducing intrinsic and extrinsic risk factors of falls. So, the elderly should perform these behaviors to prevent falls, and danger from falls. The actions or method that the elderly used to avoiding or reducing intrinsic factors such as get physical and eyes examination, maintain diet with adequate dietary, participate in an exercise, change position slowly and never quickly rise from the bed or a chair, sleep and rest at least 6-8 hours, take medication as physician prescribed etc. The actions or method that the elderly used to avoiding or reducing extrinsic factors such as home should be free of hazards and well lit, wear proper footwear, avoid clutter on floor surface, use a night-lights, wear prescription glasses, as appropriate, when out of bed etc.

## **5. Perceived fall risk factors and falls preventive behaviors among the elderly**

According to the health belief model, the likelihood of an individual engaging in a specific health action to prevent a health problem is a function of the individual's beliefs about the susceptibility and severity of health problem and the benefits and barriers of engaging in the health action. One of the major variables in the health belief model that has also been an important predictor of preventive behaviors is perceived susceptibility. It is very important to note that only perceived susceptibility to disease, rather than the whole model, is supported by research as relevant to designing health protective intervention (Becker, et al., 1977 cited in Pender, et al., 2002). An individual is more likely to engage in a specific health action or behaviors if the individual perceives greater susceptibility to the health problem. Health action is least likely to occur if the individual perceives little or no personal susceptibility to the health problem.

Perceived susceptibility or perceived of risk is correlated significantly with health-related behavior in many studies in various age groups including the older population (Pothiban, et al., 2000). Aho (1979) demonstrated the relationship between perceived susceptibility to swine flu and receiving a vaccination in 122 men and women over 60 years of age. Rundall and Wheeler (1979) and Larson, Oslen, Cole, and Shortell (1979) also reported the same result in 500 men and women 65 years of age and older. Braun (1998) studied about knowledge and perception of fall-related risk factors and fall-reduction techniques among community-Dwelling elderly individuals found that the community-dwelling elderly considered falling to be a preventable and understood the

importance of fall-related risk factors, but they didn't consider themselves to be susceptible to falling. Even though the literature review did not strongly support the significant relationship of perceived susceptibility to health-related behavior in the older population, perception of risk or susceptibility is an important variable which all health care professionals should be concerned about in planning an intervention for patient (Pothiban, et al., 2000).

From all the thinking processes mentioned, it helps to know that the perceived susceptibility or perceived risk of falls could reveal important factors for the elderly in learning how to have appropriate falls preventive behaviors. Therefore, the investigator is interested in studying the relationship between perceived fall risk factors and falls preventive behaviors among the elderly.