Slips, Trips, Falls (STF) and Injuries

Description of the Problem

Slips, trips and falls (STF) globally represent the third leading cause of disability[1] and 15% of all accidental deaths, second only to automobile fatalities in the United States.[2] In the United States, STF represent the majority of work related accidents across all industries. STF can cause back injuries, sprains, contusions, fractures, severe head injuries, paralysis, and fatalities.[3] Proper selection and maintenance of floor materials are preventive strategies to minimize the risk of STF and the associated injuries.

What is the difference between a slip, a trip or a fall? Not much if you are injured and suffering pain. However, in reality, there are some pretty significant differences. A slip occurs when there is too little friction between your feet and the floor surface resulting in a loss of balance. Wet surfaces are a common example of cause and effect. Trips occur when one's foot strikes an object and the momentum throws the person off balance; for instance, tripping over an electrical cord. The act of falling is defined as a move downward, typically rapidly and freely without control.[4] However, a fall is also defined by the Centers for Medicare and Medicaid Services (CMS) as unintentionally coming to rest on the ground, floor, or a lower level,[5] with no consideration for speed and distance.

Falls are serious and costly. One out of five falls causes a serious injury, such as broken bones or head injuries. In fact, falls are the most common cause of traumatic brain injuries (TBI).[6] Each year, over 700,000 people are hospitalized because of a fall injury, most often from a head injury or hip fracture.[7] Adjusted for inflation, the direct medical costs for fall injuries are $34 billion each year,[6] with hospital costs accounting for two-thirds of the total costs.

For the faller, costs are not limited to dollars. Depending on the severity of the injury from a fall, quality of life may be impacted by pain, temporary or permanent disability, depression and death[6]. Financially, fallers may have lost wages, out-of-pocket expenses, and health and rehabilitation expenses not covered by insurance. For employers, there may be a loss of productivity, increased insurance premiums, and the cost associated with replacing and training the injured employee – all affecting the bottom line.

Hazards & Risk Assessment

There are common factors that contribute to slips, trips and falls leading to injuries.[3]

Individual factors are:

- Age
- Physical condition and fatigue
- Stress or illness
- Failing eyesight
- Wearing inappropriate, loose, or poor-fitting footwear
- The effects of medications

Behavioral factors that contribute to increased risk for falling are:

- Carrying or moving cumbersome objects (or too many objects at one time)
- Not paying attention to surroundings or distracted while walking
- Being in a hurry and rushing

Environmental conditions that increase risk of slips and trips are:

- Poor lighting
- Glare and shadows
- Noise

Floors and flooring materials contribute directly to more than two million fall injuries each year, according to the Consumer Product Safety Commission (CPSC). The National Floor Safety Institute (NFSI) report that 55% of slips, trips and falls are attributed to walking surfaces. Factors related to flooring include:[8]

- Contaminants on the floor (water, grease, oil, fluid, food)
- Changes in floor levels
- Transitions in same level flooring
- Improper use of floor mats and runners
- Damaged warped, buckled and uneven flooring surfaces

Industry Impacts

The business case for safety in the workplace is compelling. Twenty percent of all workplace injuries are caused slips, trips, and falls.[2] In 2015, more than 6,500 employees were injured in the workplace by slips, trips, and falls. Though not a primary cause of fatal occupational injuries, STF does represent the primary cause of lost days from work. Office workers are 2.5 times more likely to suffer a disabling injury from a fall than non-office workers. STF injuries that cause an employee to miss six or more days of work are second only to overexertion injuries and cost employers $11.36B annually.

The number of healthcare employees injured due to an STF was 90% greater than the average rate for all other private industries combined,[1] resulting in lost workdays, reduced productivity, worker compensation claims, and diminished ability to care for patients. Compared to other injuries, STFs accounted for the largest proportion of lost time injuries to healthcare workers (21%) with falling being the most common type of accident.[9,10]

A patient fall is considered to be “never event,” an event that should never occur that is serious and usually preventable. CMS no longer reimburses the costs of a fall in a healthcare facility, so the burden falls to the hospital organization. Patient falls are high-cost and high-volume, accounting for at least 70% of hospital patient accidents, and result in higher-paying diagnosis related group (DRG) designation.

Between 3%-20% of inpatients fall at least once during their hospital stay, resulting in injuries, increased length of stay, malpractice lawsuits, and more than $4,000 in excess charges per hospitalization.[5] The total average healthcare cost for a fall injury is about $20,000, excluding physician services and litigation.[11] One lawsuit is filed for every[7,6] hospital injuries.[12] Patients who fall may require extended stays, more tests, additional procedures, and extra monitoring.[13]

Falls are a major problem in frail older people aging in place or residing in senior living facilities, often resulting in serious injuries, such as hip fractures and head traumas; and may influence the life expectancy of the faller.[14] One in every 3 adults age 65 and older falls annually.[15] Fifty percent of long-term care residents experience at least one fall per year.[16] The average total paid for a fall, including indemnity and other expenses, is about $180,000; death, the most common injury, occurred in 37.2% of claims associated with falls in assisted living facilities. Many conditions in older people contribute to falling. Risk factors include lower body weakness, vitamin D deficiency, difficulties with walking and balance, use of medications, vision limitations, and foot pain.[14] Multiple factors contribute to fall rates in senior living residents, requiring a multifaceted fall prevention program.[17]

Every day, about 8,000 children are treated in U.S. emergency rooms for fall-related injuries. This accounts for almost 2.8 million children each year.[18] Slips and falls are the leading cause of non-fatal injuries for all children under the age of 19, accounting for 43% of all injuries due to accidents at school[19]. In a study that compared the demographic and injury characteristics of children occurring at school and outside of school, the researchers concluded that a significant proportion of injuries to school-aged children occur at school. The nature of the injuries varied by age group and included violent (11%), nonviolent (36%), and sports related (53%).[20]

Falls of patients and residents are among the most common injury incidents reported in hospitals and long-term care facilities. Healthcare employees are at greater risk for a STF than employees in all other industries, but still, falls are a significant cause of injury and subsequent lost days from work and productivity. Thirty-six percent of school-age children falls are nonviolent and non-sports related.

- Clutter and other tripping hazards
- Sources contributing to contaminants on the floor Falls are a major problem in frail older people aging in age age of 19, accounting for 43% of all injuries due to accidents at school.[19] In a study that compared the demographic and injury characteristics of children occurring at school and outside of school, the researchers concluded that a significant proportion of injuries to school-aged children occur at school. The nature of the injuries varied by age group and included violent (11%), nonviolent (36%), and sports related (53%).[20]

Falls of patients and residents are among the most common injury incidents reported in hospitals and long-term care facilities. Healthcare employees are at greater risk for a STF than employees in all other industries, but still, falls are a significant cause of injury and subsequent lost days from work and productivity. Thirty-six percent of school-age children falls are nonviolent and non-sports related. Flooring is a contributing factor in preventing falls and reducing severity of injuries due to falls. Flooring stiffness contributes to the effect of the impact force of a fall, and surface compliance may vary up to 15%.[21] In a study that investigated whether the type of flooring affected the risk of hip fracture, the researchers found that falls were less likely to occur and that risk of fracture was significantly lower on a carpeted floor with a lower impact force.[22] A simulation study designed to test the measurement of impact force during a fall found that the thicker the floor covering, the lower the impact force across a variety of floor types.[23]

Recommendations

Many STF incidents can be prevented. Flooring choice may reduce the risk of falling and contribute to minimizing the severity of injury.[24] Studies focused on flooring impact forces found that carpet (with and without a pad) significantly contributed to reducing risk by:

- Increasing surface traction to minimize the risk of falling;
- Acting as a shock absorber to decrease fall impact forces; and by
- Changing gait and postural stability.

Recommendations fall into three categories –behavioral, housekeeping and environmental.

Behavioral

- Take your time and pay attention to where you are going
- Adjust stride to a pace that is suitable for the condition of the walking surface
- Keep walking areas clear of clutter and other obstructions
- Make sure that objects you are carrying or pushing do not prevent you from seeing obstructions or wet floors
- Train employees to identify STF hazards and how to prevent STFs
- Ensure that spills are reported, warning signs posted, and cleaned up immediately

Housekeeping

- Routinely clean floors as specified by the flooring type and manufacturer recommendations
- Provide access to clean-up materials in convenient locations within the facility
- Remove debris from floors
- Spot clean wet floors as soon as it becomes a known problem
- Place warning signs in wet areas and remove the signage once the floor is clean and dry

• Use cleaning protocols and materials that will not leave a slippery residue

Environmental

- Provide proper lighting in all areas to reduce shadows, dark areas, and glare so that potential trip hazards are clearly visible (surface irregularities, transitions, changes in level)
- Work with manufacturers that have test data to support the specification requirements needed for a specific application
- Select appropriate flooring for the application, but consider other factors that contribute to STF
- When appropriate, select resilient and cushioned flooring to reduce foot fatigue, risk of slipping, and severity of injury
- Keep floors clean and dry
- Repair and maintain flooring
- Secure mats, rugs and carpets (tacking, taping, etc.) and maintain in good condition

Design for safety to reduce STF and injuries will have a meaningful impact for occupants in the built environment. Recovery from a STF injury and the costs associated is significant to the individual and the organization. An evaluation of the current conditions to identify and address STF risk areas will inform good decisions on appropriate flooring options to minimize STF accidents and provide a safe environment across different kinds of buildings, like schools, hospitals, long-term care facilities, and the work place.

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