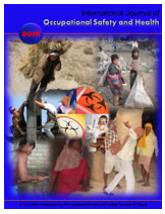

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Review

A Review on Mechanical & Physical Hazards at Domestic Kitchen.

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Abstract:

Kitchen is one of the most important aspects in our life. We wait eagerly for the delicious foodstuffs of our kitchenette. However, many simple but repetitive kitchen activities can be a threat to our health. Such as peeling potatoes, chopping, and picking up heavy pots and kettles, overstretching to reach to utensils or ingredients etc. can cause or aggravate pain & discomfort in hand, wrist, elbow, shoulder and neck (Physical hazards). Musculoskeletal problems are not only the one, but various accidents also happen in domestic kitchen (Mechanical Hazards). Traumatic and repetitive injuries related to kitchen tasks include lacerations, cut, slips & falls, tendonitis, carpal tunnel syndrome, thermal strains, burn etc. Those menaces generally occur due to poor ergonomics, as poor work practices, poor quality equipment and poorly maintained equipment.

Key Words: Domestic kitchen, physical hazards, mechanical hazards

Kitchen, "Meals & Memories are made here"; and definitely we expect beautiful memories to spark. But the numbers of hazards are significantly higher in the kitchen than in the other high-risk rooms [1]. Accidents in domestic kitchen happen generally due to poor ergonomics. Ergonomics is the relationship between you, the equipment and the environment for productive activity in daily living. The study of ergonomics involves formulation of several equipments essential for performing different tasks in our day to day lives. The idea behind the use of ergonomic is to prevent repetitive strains and injuries that can potentially develop while performing a particular task over a period of time [2]. It is necessary to take into consideration the ergonomic criteria of both planning and correcting the existing kitchen solutions [3].

As said before that poorly designed kitchen is one of the causes of various hazards; and in lots of houses women feel that either shelf are very high or very low but just ignores to do it proper. For example, among 240 Punjabi women, maximum respondents felt that highest shelf of dish stacking and kitchen storage was 'too high' for them and their lowest kitchen storage shelves to be 'too low' to handle. Few users (from short height category) agreed their sink to be 'too deep'. Some users from all height categories found their sink to be 'too wide', while on the other hand 20-40 per cent users from all height categories agreed to 'too congested' space on sink sides [4].

Many simple but repetitive kitchen activities can also aggravate pain in the hand, wrist, elbow, shoulder and neck. Peeling potatoes, chopping, and picking up heavy pots and kettles were determined to be some of the most stressful kitchen tasks. Traumatic and repetitive injuries related to kitchen tasks include lacerations, cut, wrist fractures from slips and falls due to spills, tendonitis, carpal tunnel syndrome, thermal strains and burn caused by poor work practices, poor quality equipment, and poorly maintained equipment [5].

Repetitive Strain Injuries

The injuries, which are caused due to repetitive movement of different body parts, are known as Repetitive Strain Injuries (RSI). Repetitiveness has been frequently cited as a risk factor

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associated with the development of upper extremity disorder [6]. There are many sites in the body at which repeated movement can occur, but Repetitive Strain Injuries (RSI) can generally be categorized in four main body areas: a) hand-wrist b) arm-elbow c) shoulder-neck d) leg-foot. Thus RSI relates to a range of musculoskeletal disorders that arise, in general through overuse of particular parts of the body [7]. Highly repetitive works may directly damage tendons through repeated stretching and elongation as well as increase the likelihood of fatigue and decrease the opportunity for tissue to recover [8]. The problems are caused or aggravated by repetitive motions including vibrations, sustained or constrained postures, and forceful movements [9]. At kitchen repetitive motions may occur due to repetitive bending while taking utensils or ingredient from lower shelf, movements of wrist while chopping, stretching to reach the articles or ingredients to cook, vibration with over use of mixer, sustained or constrained postures due to very high or low height of cooking area, forceful movement while carrying heavy loads as rice packets or while chopping meat etc. Two major problems may arise due to RSI are postural discomfort & cumulative trauma disorder.

a. Postural discomfort & musculoskeletal disorder:

Awkward postures include those which overload the muscles and tendons in an uneven way and those where a static posture is being held at the extreme of the range of movement, for example, with the arms outstretched or above the head, or with wrists bent to the maximum angle, or where we have reach behind our shoulder repeatedly. Bending & twisting, these two actions occur very frequently in kitchen. In hurry we just don't think about our posture. Bending is defined as flexion of the trunk, usually in the forward or lateral direction. Twisting refers to trunk rotation or torsion. Awkward postures include non-neutral trunk postures (related to bending and twisting) in extreme positions or at extreme angles. Several studies focus on substantial changes from non-natural postures. Risk is likely related to speed or changes and degree or deviation from non-natural position. Awkward postures also included kneeling, squatting, and stooping. Posture plays a significant role in the development of RSI. Where we have to adopt a static or awkward posture for long periods, the joints and muscles are put under severe pressure.

The musculoskeletal problems are considered to be the most prevalent and costly of all types of work related injuries even while working in kitchen. These problems are caused by over use or misuse of muscles, bones and nerves. The repetitive or prolonged exertion causes pain in the muscles, as a result causes weakness or spasm in the muscles. In a comparative study female industrial workers performing repetitive tasks to referents without such exposure, found significant associations ($p<0.05$) between neck and neck/shoulder diagnoses with time spent in neck flexion, with critical angles greater than 15°; and neck/ shoulder diagnoses and time spent with upper arm abduction greater than 60° [10].

Similarly 25% of all users among 240 Punjabi women felt pain while working on cooking center. In other hand all height users experienced stress in neck, upper and lower back, while working on lowest kitchen storage and dish stacking shelves. Many users from all height category felt stress in shoulder and in arms, while using highest dish stacking and kitchen storage shelf. They also felt stress in leg due to more height of cooking and kneading center [4]. Also it is evident among housewives in washing dishes, chopping, cooking cause's one side or both sides of the shoulder and neck stiffness associated with pain; mostly working with head down posture [11].

b. Cumulative trauma disorder:

Cumulative trauma disorder is a term used to describe a class of soft tissue injuries and disorders that are caused, precipitated or aggravated by a number of activities. These disorders are frequently observed among people who perform hand intensive jobs [12].

As in occupational exposures involving highly repetitive jobs with grasping of the hands, repetitive bending of the wrist, vibration and localized mechanical pressure are considered to be the contributing factors towards the occurrence of this disorder [13]. These types of activities are also quite prevalent in kitchen; as among 8801 eligible cases of surgical carpal tunnel syndrome were identified. A study on housewives in Tuscany, Italy found Age-standardized rates of surgical CTS were: "blue-collar women", 367.8; "white-collar women", 88.1; "housewives", 334.5. Compared with reference categories (same-sex white-collar workers): female blue-collar workers experienced a 4.2-fold higher standardized rate; housewives, a 3.8-fold excess ($p<0.001$). Housewives' rates were similar to those of blue-collar female workers up to 40-44 years of age, after which they were significantly lower ($p<0.002$). At all ages, housewives' rates were much higher ($p<0.001$) than those of white-collar women. The high rates for full-time housewives suggest that domestic chores should be investigated as a possible risk factor for CTS [14].

Slips and falls, strains and sprains, cuts and lacerations, and burns are the four leading categories of kitchen injuries. In a detailed analysis of injury causes, the 1994 BLS survey

documents that slip and falls accounted for 34% of all kitchen-injury cases. The most common type of injury is burns and the second most serious injury is slips and falls [15].

- **Burn**

I think all of us who have cooked ever in life, does not matter how much mild it is but have experienced burn at least once. It is very common hazard while cooking. It may be just a scalds or a severe burn. Kitchen is not only a cause of burn for adults but children, age's new born to two-years-old, are most frequently admitted for emergency burn care in a hospital. The kitchen is the most frequent area in the home where burn injuries occur for children new born to four [16]. Scalds are approximately twice as common as were thermal burns. Hot water was the chief causal agent for scalds. The 2 most common scald injury patterns were (a) the child reached up and pulled a pot of hot water off the stove or other elevated surface and (b) the child grabbed, overturned, or spilled a container of hot water onto him- or herself. One-year-olds were at highest risk for scalds and thermal burns. Scalds resulted in significantly more hospitalizations than did thermal burns. In nearly all injury patterns, more boys than girls were injured, but the ratio varied depending on the injury pattern [17].

Most common cause of kitchens fires is someone started heating fat or oil and forgot about it. The oil gets hotter and hotter, smokes a bit, and then bursts into flame, and it makes injuries. In addition to being fire hazards from the oil, deep fat fryers have other dangerous traits. Steam is often thought of as the cloud of visible vapour that comes out of a teapot. It can be highly pressurized and moving very fast, and is almost invisible as it escapes its confinement. It causes real nasty burns. Be particularly cautious of pressure cookers, steam pipes, water into superheated environments.

A police report stated that, women suffered with severe burns in kitchen fire. A Pebble Beach woman, 74, was severely burned after a fire started in her kitchen while she was cooking [18]. Another incidence stats that an 82-year-old Novato woman burned in kitchen fire dies at a San Francisco burn centre [19].

- **Slips and falls due to spills**

Slipping contributes to 40-85% of fall-related occupational injuries, depending on the work population studied [20]. In addition, slipping which does not result in a fall can still results in an injury from striking an object or from a muscular strain [21, 22]. These injuries resulted primarily from fall to floor; overexertion in lifting; slip or loss of balance, climbing and twisting. These injuries mostly affected the back, followed by the ankles and knee.

Slippery floors are the root of fall injury. Floor surface contamination is frequently reported when slips occur [23]. When the floor is wet during and after mopping, can also present a slipping hazard. Most floors only become slippery once they become contaminated. Contamination can be classed as anything that ends up on a floor e.g. oil, water split, food items (e.g., jam, sauce), dust etc. the list is endless. It can be a by-product of a work process or be due to adverse weather conditions.

Even kitchen accident may be a cause of death too. A woman died after she slipped in her kitchen and landed on knives lying upright in a dishwasher, police said. The freak accident happened in the 31-year-old's home in Dunrobin Road, Airdrie, Lanarkshire. The woman was taken to Monklands General Hospital in Airdrie, North Lanarkshire, but she died shortly after admission [24].

- **Cuts, lacerations and punctures**

Another common hazard in kitchen is cut & laceration. Knives and other cutting & slicing tools are essential in kitchen, which are potentially hazardous and injury factors. While peeling, mincing or slicing people are at risk of cut or injury. Approximately 45 % of kitchen injuries were from non- powered cutting hand tools, mostly knives. About 15 % are from power tools like slicers, grinders or mixers. Sometimes cut can be caused from broken glass, sharp edge of metal also. Major incidences related to cut at kitchen are affecting finger & hands [25].

Even a good utensil also may be a cause of hazard. A two year old child was presented in emergency with entrapped impacted right index finger in the narrow hole of a kitchen utensil having sharp margins. The finger of the child got accidentally entrapped in the central hole of an 'idly' (a South-Indian dish) making stainless steel plate while playing unattended in the kitchen [26].

Conclusion

While doing the review in this particular topic, it was found that lots of studies are available on industrial kitchen but very few studies have been done on domestic kitchen. Whereas domestic kitchen is definitely a potential area for accidents as lots of risk factors are found to cause mechanical & physical hazards. In maximum society domestic kitchen is the most important place

for home makers. But if that place will be a cause of hazards for them then it is really a threatening issue. Lots of areas are left for investigation in domestic kitchen, as how it can be ergonomically arranged in low cost model to give the opportunity to all economic level, what all the postures has to be maintained while cooking, chopping or lifting etc. Another important aspect of conducting research is anthropometrical variation in domestic kitchen. Providing safety & ergonomic tools is not only needed to the cooks at domestic kitchen, the challenge will be solved when the research can provide safety to the children, victimized at domestic kitchen. Whenever we think of kitchenette it reminds us some lovely sensed enjoyable dishes; certainly it should not be an origin of threats.

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