The invisible risk of Ultraviolet rays at outdoor workplaces
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ABSTRACT

The exposure to the Sun’s Ultra violet rays when increased to a high level is responsible for causing serious health problems incl. cancer in multiple geographical locations around the world. It is a major issue and responsible for the death of millions every year. Excess levels of Sun’s ultraviolet rays can be extremely dangerous to the skin and are responsible for sunburn, premature aging and other types of serious skin damage. Skin cancer is the most common type of cancer in the United States. In summers, outdoor workers have high levels of exposure to ultraviolet radiation and the associated increased risk of skin cancer. It is estimated that more than 8% of the US National workforce (over 9 million workers) primarily work outdoors. High rate of non-melanoma (basal cell and squamous cell) skin cancer has been found among occupational groups that work outdoors, though fatal cases associated with melanoma deaths are also significant. These high rates of skin cancer among outdoor work population have found to be significantly associated with cumulative UV exposure. This paper gives an overview of the significance of workplace interventions in order to educate workforce and modify their work environments to reduce incidents of cancer.

Keywords: Ultraviolet rays, Outdoor workers, Skin Cancer, Workplace intervention

1. Introduction

The Sun contains 99.85% of the mass in the solar system and is the star that is the source of light and heat for the planets in the universe. The life on earth shares a special relationship with this largest object in the solar system, which is around 4.5 billion years old. The sun not only provides us warmth but our earth sustains and enriches itself with the help of its glinting rays. However, as we suspire the sun's heat and light, there is a dark side to that light which can be fatally harmful as we are busy earning our livelihoods. The sun sheds invisible ultraviolet rays which can be extremely dangerous to the skin and are responsible for
sunburn, premature aging and other types of skin damage including cancer (Fig 1). Skin cancer is the most common type of cancer in the United States [Greenlee,2000]. In 2006, more than one million people were diagnosed as having basal cell carcinoma or squamous cell carcinoma, resulting in approximately 2200 deaths from both cancers combined. Melanoma, the third and most often fatal type of skin cancer, was diagnosed in approximately 59,940 people and accounted for about 8110 deaths in 2007. Between 1975 and 2004, the annual age-adjusted incidence rate for melanoma (new cases diagnosed per 100,000 people) nearly tripled, from 6.8 to 18.5 cases per 100,000. The rate of deaths attributed to melanoma also increased by about 60%, from 1.6 to 2.6 per 100,000 people. [SEER,1999]. High levels of exposure to ultraviolet (UV) radiation increase the risk of all three common forms of skin cancer, and approximately 65%-90% of melanomas are caused by exposure to UV radiation [Armstrong,2004]. In summers, outdoor workers have high levels of exposure to ultraviolet radiation and the associated increased risk of skin cancer. It is estimated that more than 8% of the US. National workforce (over 9 million workers) primarily work outdoors. High rates of non-melanoma (basal cell and squamous cell) skin cancer have been found among occupational groups that work outdoors, and rates for non-melanoma skin cancer among outdoor workers are significantly associated with cumulative UV exposure [Gruber, 2006].

![Figure 2: Outdoor workers in California](image)

2. Sun exposure of outdoor workers

There are studies on outdoor workers which demonstrate that they experience a substantial amount of sun exposure on a daily basis, as shown below (Figure 3). In a national population survey of residents in Canada, respondents who worked outdoors reported receiving on average two or more hours sun exposure per day [Shoveller,2000] . Half of the outdoor workers interviewed in Malta said they worked in the sun for more than 3 hours per day [Scerri,2002] . Likewise, sun exposure of farmers was an estimated 4.15 hours in a survey of Wisconsin farmers [Marlenga,1995] and more than 75% of the time spent on the job in a survey of California farmers [Schenke,2002].
A Danish study that used time-stamped personal dosimeter readings found that gardeners (Figure 2) received most of their Ultraviolet Rays (UVR) dose on working days [Thieden, 2004]. Construction workers, transportation workers, and mail carriers in the United States also spent a large amount of time working outdoors in their jobs (7.9 hours, 7.0 hours, and 5.1 hours per day, respectively) (Figure 3) [Stepanski, 1998].

3. Workplace intervention by Employers

Despite the large amount of daily sun exposure, studies show that some workers are taking precautions due to the effective workplace policies. About two-thirds of transportation workers in USA compared to approximately 40% of construction workers and mail carriers were observed to be wearing adequate sun protection as measured by the extent to which various body areas were covered. [Stepanski, 1998] The between-group differences were likely due to required clothing policies that were enforced by the workplaces. [Stepanski, 1998] Surveys of a larger sample of postal workers in Southern California revealed that only about one-quarter of letter carriers wore sunscreen and the same proportion wore a wide-brimmed hat while at work [Lewis, 2006].

4. Inadequate knowledge about UV Radiation

Several of the studies examined outdoor worker’s knowledge and attitudes related to sun exposure, skin cancer, and sun protection; specifically their perceived susceptibility and severity to skin cancer and barriers to sun protection behaviors. In Canada, Ontario farmers felt that sun safety was an important but not well recognized health issue among farmers [Ing, 2002]. In USA, fewer than 10% of Michigan farmers and their spouses surveyed felt it was very likely that they would develop skin cancer [Rosenman, 1995] but 43% of Wisconsin dairy farmers and 66% of Georgia farmers believed they would get skin cancer [Marlenga, 1995] [Parrott, 1996]. Most of the Wisconsin and Georgia farmers also felt they were more likely to get skin cancer than the average person as a result of their occupation. Perceived severity of skin cancer was moderate.
among the Wisconsin and Georgia farmers. While nearly all felt it was serious, almost as many did not expect it to affect their ability to continue farming [Marlenga,1995][ Parrott,1996]. It was ranked as a "top five" health problems among farmers, but behind accidents/injuries, stress/depression, arthritis, and lung disease.

Figure 4: A farmer at a Cattle farm in Wisconsin

Wisconsin, Georgia and Michigan farmers (Figure 4) expressed beliefs that prevention strategies were efficacious. A large majority of Wisconsin and Georgia farmers felt that daily protection and/or typically recommended protection strategies would reduce the risk of skin cancer . [Marlenga,1995][Parrott, 1996]. Likewise, most Michigan farmers and their spouses believed that early detection would increase the chances of skin cancer being cured and decrease how long a person had to worry about skin cancer [Rosenman,1995] . Wisconsin and Georgia farmers were well informed about skin cancer with 70% correctly responding to a skin cancer knowledge assessment [Marlenga,1995][ Parrott,1996]. Several barriers to sun protection were reported by outdoor workers. Canadian outdoor workers and Georgia farmers said that they did not practice sun safety because they forget, it was inconvenient, they wanted to get tan, and/or they were unconcerned about sun exposure[Parrott,1996][Shoveller,2000]. The belief that one looks better with a tan was also expressed by just over half of the Wisconsin farmers [Marlenga,1995]. Postal workers in California reported that very few received encouragement from either a co-worker or a household member to wear a hat or sunscreen [Lewis,2006]. Further, the most frequently expressed barrier to sun protection was that it was too hot to wear protective clothing such as hats, long-sleeved shirts, long pants, and work gloves. Georgia farmers also expressed concerns that it was too hot to wear protective clothing [Steiner,1996]. These barriers may keep outdoor workers from practicing protection despite moderate concerns about skin cancer and strong beliefs that they are capable of taking adequate precautions. Therefore, it is extremely important to consider workplace policies that should be effective in implementation despite individual employee’s lack of knowledge and interest about UV Radiations.

4.1 What should be done

Thus, it is quite evident that despite of lack of knowledge, the issue of UV radiation safety can be dealt with using firm and effective workplace policies. There is a considerable room for improvement in occupational sun protection. Some workers take precautions while working outdoors in the sun, but the vast majority of outdoor workers do not practice adequate or any sun safety. Sun protection may not yet be a priority in most outdoor work environments but changes are beginning to occur in American policies, as indicated by the recent provision in California state law to provide lifeguards who get skin cancer with worker’s compensation benefits [State of
California]. Several major unions and employers have developed sun protection guidelines and brochures that can serve as models to other workplaces.

To make it effective, workplace intervention policies should be aimed at both the outdoor workers as well as their employers, in terms of risk management. When considering a comprehensive approach to workplace safety, several issues should be considered: seasonal outdoor workers who may be at higher risk because of little organizing capacity, workers in unions vs. non-unions, workers in Federal agencies, and self-employed workers such as those on small farms. Employees who work primarily indoors should not be overlooked. These efforts should be carefully evaluated so that other occupational health and cancer prevention experts can be sure the most effective approaches are adopted and used widely, to achieve the greatest public health benefit.

5. Conclusion

Because outdoor workers receive intense and prolonged exposure to the sun and are at increased risk of developing skin cancers, workplace interventions that educate these workers and modify their work environments could provide substantial benefit. Behaviors that can help and reduce skin cancer risk include limiting or minimizing exposure to the sun during midday hours when UV radiation peaks (10 am to 4 pm); wearing protective clothing; and using appropriate sunscreen protection. Thus, it is extremely significant for workplaces to increase awareness among the outdoor workforce, provide knowledge and implement effective intervention policies for skin cancer prevention in outdoor workplaces. With the high statistics of non-melanoma and melanoma cancers, it is evident that outdoor workers are at great risk. Thus, it is extremely important to create awareness, impart knowledge as well as modify the workplace policies in order to achieve behavioral changes in the workforce as well as employers to deal effectively with this INVISIBLE RISK.

6. References


