Community-wide Interventions to Prevent Skin Cancer

Two Community Guide Systematic Reviews

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Context: Skin cancer is a preventable and commonly diagnosed cancer in the U.S. Excessive ultraviolet radiation exposure is a known cause of skin cancer. This article presents updated results of two types of interventions evaluated in a previously published Community Guide systematic review: multicomponent community-wide interventions and mass media interventions when used alone.

Evidence acquisition: Studies assessing multicomponent community-wide and mass media interventions to prevent skin cancer by reducing ultraviolet radiation exposure were evaluated using Community Guide systematic review methods. Relevant studies published between 1966 and 2013 were included and analyzed for this review.

Evidence synthesis: Seven studies evaluating the effectiveness of multicomponent community-wide interventions showed a median increase in sunscreen use of 10.8 (interquartile interval=7.3, 23.2) percentage points, a small decrease in ultraviolet radiation exposure, a decrease in indoor tanning device use of 4.0 (95% CI=2.5, 5.5) percentage points, and mixed results for other protective behaviors. Four studies evaluating the effectiveness of mass media interventions found that they generally led to improved ultraviolet protection behaviors among children and adults.

Conclusions: The available evidence showed that multicomponent community-wide interventions are effective in reducing the deleterious effects of ultraviolet radiation exposure by increasing sunscreen use. There was, however, insufficient evidence to determine the effectiveness of mass media interventions alone in reducing ultraviolet radiation exposure and increasing ultraviolet protection behaviors, indicating a continuing need for more research in this field to improve assessment of effectiveness.

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Context

In the Call to Action to Prevent Skin Cancer,[1] the U.S. Surgeon General identified skin cancer as a serious public health concern. Each year, nearly 5 million U.S. adults are treated for skin cancer at an annual cost of $8.1 billion.[2] The three most common types of skin cancer are basal cell carcinoma, squamous cell carcinoma, and melanoma.[3] Melanoma accounts for most skin cancer deaths and is the fifth and sixth most common cancer in white men and white women, respectively.[4] Of the estimated $8.1 billion associated with skin cancer treatment in the U.S., $4.8 billion is attributable to the treatment of basal cell carcinoma and squamous cell carcinoma, with $3.3 billion for melanoma.[5] Although skin cancer incidence rates have

continued to rise among Americans in recent years, most cases are preventable.[6–9]

Ultraviolet radiation (UVR) exposure from the sun and from indoor tanning devices is considered a major contributing factor and the most preventable risk factor for developing skin cancer. Genetic risk factors for skin cancer include having fair skin, blue or green eyes, blond or red hair,[10–12] a high prevalence of benign pigmented nevi (moles),[13,14] and a personal or family history of skin cancer.[15] Excessive exposure of skin to UVR often results in suntan or sunburn, with changes in skin coloration proportional to the intensity of sun exposure and severity of damage to skin cells.[16] Environmental factors affecting the intensity of UVR that an individual receives include latitude, time of day, season, altitude, and temperature.[17,18]

To minimize the harmful effects of UVR exposure, agencies including the Centers for Disease Control and Prevention (CDC) and the International Agency for Research on Cancer promote effective UVR protection, including seeking shade, especially during midday hours; wearing a hat with a wide brim to shade the face, head, ears, and neck; wearing clothing to protect exposed skin; wearing protective sunglasses; using sunscreen with sun protective factor 15 or higher and both UVA and UVB (broad spectrum) protection; and avoiding indoor tanning.[19–21] National surveillance data indicate that use of UVR protection remains low in the U.S., and sunburn and indoor tanning remain common among certain groups.[22–25]

In 2000, the Community Guide conducted several systematic reviews on the effectiveness of community-based interventions to prevent skin cancer.[22] To reflect the most recent evidence, this article reports on updates of two interventions included in those systematic reviews: multicomponent community-wide (MCCW) interventions and mass media (MM) interventions when used alone.

Evidence Acquisition

The Community Guide systematic review process has been described in detail elsewhere.[26,27] In brief, the process includes forming a coordination team (the team) of systematic review scientists and research fellows from CDC's Community Guide Branch, who collaborate with subject matter experts and consultants on skin cancer prevention from CDC and other agencies, organizations, and academic institutions, with oversight from the Community Preventive Services Task Force (Task Force).

Definitions

To prevent skin cancer by reducing exposure to UVR, MM interventions use communication channels such as print media (e.g., newspapers, magazines); broadcast media (e.g., radio, TV); billboards; or the Internet to disseminate information, behavioral guidance, or a combination of these. Messages may target specific audiences, although interventions typically rely on broad distribution channels. Some interventions provide up-to-date information about the intensity of the sun's rays (UV index), with the goal of raising awareness and prompting UVR protection measures. Others use techniques that provide information on the dangers of UVR exposure to promote change in knowledge, attitudes, beliefs, intentions, and UVR protective behaviors.

Included interventions could also incorporate small media (e.g., brochures, fliers, newsletters) or promotional products to increase awareness of campaign messages in addition to mass media.

Since 2000, when the original Community Guide reviews were conducted, technologic advances have spawned new approaches to disseminating information to the public through media, particularly the Internet and social media. Therefore, for this update, studies using new media (i.e., Internet and social media) were also included, as long as the messages were distributed to a large audience and were received passively.

To prevent skin cancer, MCCW interventions combine individually directed strategies (e.g., educational); MM campaigns (see definition above); and environmental and policy changes (e.g., creating shade areas, distributing sunscreen, using school-based policies to restrict outdoor activities during peak UVR hours) in multiple settings within a defined geographic area (i.e., city, state, province, or country) in an integrated effort to influence UVR protective behaviors. They are usually delivered with a defined theme, name, logo, and set of messages. Programs vary substantially, however, in duration (e.g., months to years) and number of components/strategies used.

Conceptual Approach and Analytic Framework

The team developed analytic frameworks to describe the overall conceptual approach to preventing skin cancer by reducing UVR exposure. Figure 1 shows the relationship of MCCW and MM interventions to the relevant intermediate outcomes (e.g., knowledge, attitudes, intentions); key UVR protective behaviors to decrease excessive UVR exposure or mitigate the effects of UVR exposure (e.g., increased use of sunscreen, protective clothing, hats, and sunglasses, seeking shade, avoidance of indoor tanning); selected health outcomes (e.g., sunburn); and, ultimately, skin cancer prevention.

An MCCW intervention may include different combinations of the individually directed, environmental and policy, and MM components, whereas an MM intervention uses only mass media channels. All of these components may influence UVR protection and exposure by changing knowledge, attitudes, and social norms. In addition, environmental or policy components can lead more directly to changes in UVR protection. The analytic framework also addresses the possibility of harms such as vitamin D deficiency and a decrease in physical activity because of decreased outdoor activity.

Inclusion and Exclusion Criteria

The inclusion criteria for this review were adapted from the prior review, with minor revisions. In the prior review, although factors like sunscreen use (by itself) and exposure to indoor UVR (e.g., indoor tanning) were assumed to be associated with preventing skin cancer, they were not considered proxies for health outcomes. However, increased sunscreen use was considered part of the composite UVR protective behaviors in many included programs.