

Assessment of Reading Level and Content Adequacy of Oral Cancer Educational Materials from USAF Dental Clinics

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Abstract—*Background.* The threat of oral cancer has generated growing concern among the military health community that its beneficiaries have access to appropriate printed health materials. This study addresses the reading level and content adequacy of printed oral cancer literature collected from 82 United States Air Force (USAF) dental clinics. *Methods.* Materials were subjected to a readability formula and information content analysis. *Results.* Readability ranged from 7th to 13th grade, consistent with the lowest grade level (high school) required for USAF personnel. Adequacy of the content of materials was highly variable. *Conclusion.* Few oral cancer items were retrieved, most were old, and many included misleading or incorrect information. *J Cancer Educ.* 2004; 19: 29-36.

Health literacy is often defined as the “degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”¹ Health literacy is important not only for improving patients’ health care compliance and health outcomes but also for preventing many diseases and conditions that affect our society today.² Individuals with low or limited health literacy are less likely to make use of known preventive measures and health screenings, have poorer overall health, and present for health care in later stages of their disease.² Consequently, they are more likely to be hospitalized and make greater use of more expensive health services. In addition, patients with low or limited literacy may exacerbate their poor health status because they have lower adherence to medical regimens secondary to their poorer understanding of their treatment.^{1,2}

One of the critical areas pertaining to health literacy concerns oral and pharyngeal cancer referred to in this article as “oral cancer.” Oral cancer is one of the most debilitating and disfiguring of all cancers, affecting not only quality of life such as social-interactive capabilities but also nutrition, speech, and mental well-being. An estimated 7,200 deaths will be attributed to oral cancer, with nearly 27,700 new cases appearing in the United States in 2003.³ Major risk factors are use of tobacco and alcohol.⁴⁻⁶ In addition, low consumption of fruits

and vegetables, human papillomavirus, and marijuana have been associated with oral cancer.⁷⁻⁹

Minorities, especially African Americans, are more at risk than whites for this type of cancer. The relative 5-year oral cancer survival rates between 1992 and 1998 were 59% for whites and 35% for blacks, with an overall rate of 56% for all races.³ Moreover, in the past 25 years, there have been no notable improvements in the survival rates from oral malignancies.^{5,10} Late diagnosis plays a significant role in these poor outcomes by contributing to poor prognoses and low survival rates.¹⁰ Unlike other cancer sites that are not readily accessible for examination, oral cancer lesions can be identified during an oral exam and either biopsied or referred for biopsy. Yet, national data indicate that U.S. adults are ill informed about oral cancer’s signs, symptoms, and risk factors and about the need for regular oral cancer screening examinations as recommended by the American Cancer Society.¹¹⁻¹⁵

Particularly troubling are the disparities in the likelihood of having an oral cancer exam. Hispanics, African Americans, those 65 years of age or older, those with a low level of education, and a low level of knowledge about risk factors for oral cancer were less likely to have had an oral cancer examination for the same period.^{13,14} Information from the 1998 National Health Interview Survey of 12,190 adults 40 years of age and over found that persons with education levels of less than 12th grade were 5.6 times less likely to have had an oral cancer examination than were persons with doctorate degrees.¹⁵

Also important is whether the educational materials are compatible with the cultural background, practices, and educational (reading comprehension) level of the patient. To evaluate whether health education materials are well suited, appropriate, and meet the needs of an audience, the

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extent to which the materials match the profile of the intended audience must be assessed. Determining the reading level is one way to evaluate the appropriateness of patient-education materials.

Nearly 50% of U.S. adults have low or limited literacy skills.¹⁶ Low literacy not only limits a person's ability to perform life-sustaining tasks such as communicating, using mass transit, shopping, and managing money; it also affects a person's health.² Literacy-related barriers could affect any of the steps necessary to participate in staying healthy and navigating a health care system. These steps include awareness, access, entry, process, and follow-up.¹⁷ Individuals with inadequate reading skills may not be aware of available prevention and treatment practices for their health problems. They may find it difficult to access health care or enter and process through a health care facility for treatment. Poor reading skills may even deter the completion of necessary follow-up care.¹⁷

At the national level, the critical need for health literacy and specifically oral health literacy recently has been identified in Healthy People 2010¹ and Oral Health in America: A Report of the Surgeon General, respectively.¹⁸ The former identifies health communication as a focus area for meeting the goals of increased quality and years of life and eliminating health disparities.³ Objectives relevant to this manuscript are shown in Figure 1.

Oral Health in America: A Report of the Surgeon General defines oral health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic oral and craniofacial health information and services needed to make appropriate health decisions."¹⁸ The changing population demographics—social, economic, and cultural—affect how health services are used and consequently how well people care for themselves and family members.

Populations who are at highest risk for oral cancer include those who use tobacco and alcohol products. The U.S. military population faces job stresses unlike the U.S. civilian population; global deployments and high anxiety wartime missions promote lifestyles encompassing the use of tobacco and alcohol. Indeed, surveys of military personnel indicate that the overall trends of tobacco and alcohol use remain problematic (Table 1).¹⁹ Currently, there are no data available on the incidence or prevalence of oral cancer in the U.S. military population. This lack of data is understandable

<p>HP2010 Objectives for Improving Health</p> <p>3-6 <i>Reduce the oropharyngeal cancer death rate</i></p> <p>21-6 <i>Increase the proportion of oral and pharyngeal cancers detected at the earliest stage.</i></p> <p>21-7 <i>Increase the proportion of adults who, in the past 12 months, report having had an examination to detect oral and pharyngeal cancers.</i></p> <p>HP2010 Objective for Health Communication</p> <p>11-2 <i>(Developmental) Improve the health literacy of persons with inadequate or marginal literacy skills.</i></p>

FIGURE 1. Healthy People 2010 relevant objectives.¹

because most oral cancers are diagnosed among those persons who are 60 years of age or older. However, the 1994 Tri-Service Comprehensive Oral Health Survey reported 6.2% of the active duty (AD) personnel and 1.4% of recruits presented with "tobacco lesions."^{20,21} Given the fact that tobacco and alcohol work synergistically to contribute to 75% to 90% of all oral and pharyngeal cancers in the United States,^{6,22} the continued high prevalence of alcohol and tobacco use in the military is cause for concern.

During Fiscal Year 2001 (FY01), Active Duty Air Force (ADAF) personnel totaled 347,782—67,371 (19.4%) of whom are officers and the remaining 280,411 (80.6%) are enlisted (Tables 2 and 3).²³ The population served by the USAF Dental and Medical Corps encompasses all ages, both sexes, and numerous cultural/ethnic and educational backgrounds.

The purpose of this study was to assess the adequacy of printed oral cancer educational materials currently distributed by USAF Dental Clinics to patients in the Continental US (CONUS) and Outside of the CONUS (OCONUS) and to determine whether readability might pose a barrier to obtaining appropriate information about oral cancer.

MATERIALS AND METHODS

All printed oral health education materials concerning oral health were requested from CONUS and OCONUS USAF Dental Clinics between March and June 2002 using a worldwide directory of USAF Dental Clinics to identify the major clinics and associated USAF bases. The initial letter of request was sent electronically to each clinic's Commanding Officer and designated Preventive Dental Health Officer. Follow-up contact began by e-mail and telephone 1 month following the initial request in March 2002. The request was for each clinic to send to the primary author one copy of all written oral health material used in their clinic.

The authors independently evaluated both the readability level and adequacy of the contents of the oral cancer materials. The SMOG Readability Formula was used to estimate the readability level of each item by extracting three sets of 10 sentences; the first 10, a middle set of 10, and the last 10.²⁴⁻²⁸ If the publication was 30 or less sentences, then all sentences were used. In each set of 10 sentences, the number of words having three or more syllables, including repetitions of the same word, were highlighted or circled. The square root of the total number of circled polysyllabic words was then obtained, and a constant of three was added, giving the reading grade level required for a person to be able to read the text. A SMOG conversion table was used for items with educational materials that contained 30 or more sentences.²⁴

To determine the adequacy of the materials, an oral cancer information content checklist developed by National Institute of Dental and Craniofacial Research (NIDCR) staff was used.²⁹⁻³¹ The contents of each publication were read and assessed in terms of whether it correctly addressed oral cancer risk factors/predictors; signs and symptoms of oral cancer; methods for preventing oral cancer; the anatomic lo-

TABLE 1. Current Tobacco Use Status (Fiscal Year 2001) of US Air Force Active Duty Personnel by Gender, Age, Rank, Race-Ethnicity, and Education*

Variable	Smoking Status									
	Nonsmoker		Smoker		Smokeless Tobacco User		Both		Surveyed Total	
	N	%	N	%	N	%	N	%	N	%
Gender										
Female	39,556	80.5	9243	18.8	286	0.6	28	0.1	49,113	19
Male	150,567	71.6	47,994	22.8	10,131	4.8	1709	0.8	210,401	81
Age										
<20	7710	64.2	3747	31.2	358	3.0	193	1.6	12,008	5
20-24	45,434	64.9	21,092	30.1	2642	3.8	798	1.1	69,966	27
25-29	37,585	73.5	10,930	21.4	2343	4.6	298	0.6	51,156	20
30-34	33,858	77.5	7312	16.7	2284	5.2	223	0.5	43,677	17
35-39	38,066	77.3	8909	18.1	2098	4.3	167	0.3	49,240	19
40-44	19,607	80.1	4256	17.4	577	2.4	48	0.2	24,488	9
≥45	7863	87.6	991	11.0	115	1.3	10	0.1	6979	3
Race-Ethnicity										
American Indian/Alaskan	901	73.0	277	22.4	50	4.1	6	0.5	1234	0
Asian Pacific Islander	5022	74.8	1550	23.1	112	1.7	27	0.4	6711	3
Black Non-Hispanic	34,409	82.4	6850	16.4	449	1.1	56	0.1	41,764	16
Hispanic	10,186	78.9	2457	19.0	226	1.8	37	0.3	12,906	5
White Non-Hispanic	135,757	70.7	45,243	23.6	9482	4.9	1587	0.8	192,069	74
Other/Unknown	3848	79.7	860	17.8	98	2.0	24	0.5	4830	2
Total	190,123	73.3	57,237	22.1	10,417	4.0	1737	0.7	259,514	100.0
Highest Level of Education										
High School	6443	2.6	3390	1.4	401	0.2	162	0.1	10,396	4.1
Some College	124,976	49.6	47,836	19.0	8307	3.3	1403	0.6	182,522	72.5
≥College	53,112	21.1	4336	1.7	1418	0.6	127	0.1	58,993	23.4
Total	184,531	73.3	55,562	22.1	10,126	4.0	1692	0.7	251,911	100.0

*Source: Air Force Personnel Center; Personnel Data Systems.

cations of oral cancer lesions; the components of a clinical oral cancer examination; and the components of an oral cancer self-examination. Additional note was made whether the material included the importance of early detection, the inclusion of statistics regarding oral cancer, whether there was incorrect information given, and if Healthy People 2000 or Healthy People 2010 were cited. Descriptive measures (means and percentages) were used in the analysis to assess and compare readability and accuracy/comprehensiveness.

To describe the demographic characteristics of USAF AD personnel who were eligible to receive services in USAF dental clinics, data were obtained from the USAF Personnel Data System (PDS) and Interactive Demographic Assessment System (IDEAS) at the Air Force Personnel Center (AFPC) web site for FY01 (Tables 2 and 3).³²

RESULTS

Sixty-two facilities replied, resulting in an overall response rate of 76%. Of these, 40 (66%) submitted no oral cancer educational materials. There was a dearth of oral can-

cer educational materials (N = 20). Of the 1,751 pieces of literature received, 44 items (2.5%) directly addressed oral cancer and an additional 143 items (8.2%) mentioned or referred to oral cancer but provided insufficient detail. Of the 143 pieces, 39 items could have included some or more specific information about oral cancer. The total percentage of both groups of items related to oral cancer (11.3%) was less than the percentages of items received for periodontal (13.9%) and general oral health (17.8%) literature. Of the 187 unique pieces of literature received from participating Dental Treatment Facilities (DTFs) that mentioned oral cancer in any way, only 20 were oral cancer specific (10.9%). Most publications originated from dental organizations and government agencies and consisted of pamphlets, brochures, handouts, and bookmarks or wallet cards.

The readability of the 20 oral cancer materials ranged from 7th to 13th grade, with an overall mean SMOG score of 11th grade (Table 4). This score is commensurate with the lowest educational level attained for ADAF, which is a General Equivalency Degree (GED), a High School (HS) Diploma/Certificate or the equivalent, accounting for 11% of

TABLE 2. Demographics of US Air Force Enlisted Personnel (Fiscal Year 2001): Airman Extract, September 2001*

Demographic	Total Number of Enlisted Personnel (N = 280,411)	Total Percent of Enlisted Personnel (N = 100.0%)
Gender		
Female	54,879	19.6
Male	225,532	80.4
Age Group		
17-24	113,512	40.5
25-34	91,656	32.7
35-44	71,298	25.4
45+	3943	1.4
Unavailable	2	0.0
Race-Ethnicity		
American Indian/Alaskan	1292	0.5
Asian/Pacific Islander	7458	2.7
Black Non-Hispanic	51,778	18.5
Hispanic	15,604	5.6
Other/Unknown	4056	1.4
White Non-Hispanic	200,223	71.4
Highest Level of Education [†]		
No High School (Ex HS Sen)	4	0.0
High School or Equivalent	31,495	11.0
Some College (1-3 yr, 1-4 yr, AA/AS)	228,748	81.6
BA/BS	12,163	4.3
MA/MS	1809	0.6
PhD/Professional Degree	21	0.0
Unknown	6171	2.2

*Source: Air Force Personnel Center; Personnel Statistics; Interactive Demographics Assessment System.

[†]Education Level: No High School (Ex HS Sen)—Less than a high school completion (excludes high school seniors). Also no certificate diploma or GED equivalency; GED—Successfully completed high school-level GED battery but does not have a high school diploma or certificate of equivalency; HS Dipl/Cert—Awarded either a high school diploma or certificate of equivalency; Some College—1-3 yr (15-89 SH)—Completed between 15 and 89 semester hours or 22 and 134 quarter hours of post-secondary education; 3-4 yr (90+ SH)—Completed 90 or more semester hours or 135 or more quarter hours but has not been awarded a Baccalaureate Degree; AA/AS—Awarded an Associate of Arts/Science Degree; BA/BS—Awarded a Bachelor of Arts/Science Degree; MA/MS—Awarded a Masters of Arts/Science Degree; PhD—Doctorate; Professional Degree—Professional Degree (Medical, Legal, etc).

the ADAF enlisted population according to USAF Demographics for FY01.

The adequacy of the literature also was assessed, which involved accuracy and comprehensiveness of the oral cancer information provided in the educational materials. For tobacco risk factors, over half of the materials addressed com-

TABLE 3. Demographics of US Air Force Commissioned Personnel (Fiscal Year 2001): Officer Extract, September 2001*

Demographic	Total Number of Commissioned Personnel (N = 67,371)	Total Percent of Commissioned Personnel (N = 100.0%)
Gender		
Female	11,736	17.4
Male	55,633	82.6
Unknown	2	0.0
Age Group		
17-24	6383	9.5
25-34	28,796	42.7
35-44	24,213	35.9
45+	7977	11.8
Unavailable	2	0.0
Race-Ethnicity		
American Indian/Alaskan	330	0.5
Asian/Pacific Islander	1592	2.4
Black Non-Hispanic	4409	6.5
Hispanic	1624	2.4
Other/Unknown	2329	3.5
White Non-Hispanic	57,087	84.7
Highest Level of Education [†]		
BA/BS	29,888	44.4
MA/MS	28,740	42.7
PhD	958	1.4
Professional Degree	5951	8.8
Unknown	1834	2.7

*Source: Air Force Personnel Center; Personnel Statistics; Interactive Demographics Assessment System.

[†]Education Level: No High School (Ex HS Sen)—Less than a high school completion (excludes high school seniors). Also no certificate diploma or GED equivalency; GED—Successfully completed high school-level GED battery but does not have a high school diploma or certificate of equivalency; HS Dipl/Cert—Awarded either a high school diploma or certificate of equivalency; Some College—1-3 yr (15-89 SH)—Completed between 15 and 89 semester hours or 22 and 134 quarter hours of post-secondary education; 3-4 yr (90+ SH)—Completed 90 or more semester hours or 135 or more quarter hours but has not been awarded a Baccalaureate Degree; AA/AS—Awarded an Associate of Arts/Science Degree; BA/BS—Awarded a Bachelor of Arts/Science Degree; MA/MS—Awarded a Masters of Arts/Science Degree; PhD—Doctorate; Professional Degree—Professional Degree (Medical, Legal, etc).

mon tobacco concerns from smoking to chewing tobacco; however, none mentioned other tobacco products such as paan or bidis, and only one mentioned betel nut. Although chewing (smokeless) tobacco is a risk factor for oral cancer, the primary culprit is smoking cigarettes; yet 70% of the sources collected cited smokeless tobacco as the major tobacco risk factor. As for other risk factors/predictors, 50% to 70% of the items reviewed cited alcohol alone (65%), to-

TABLE 4. SMOG Score According to Publication Date and Source*

Literature Title	Publication Date	SMOG Grade Reading Level	Source
<i>Word of Mouth</i>	1976, revised August 1976	10	American Cancer Society (ACS)
<i>Word of Mouth</i>	1976, revised March 1986	10	ACS
<i>Facts on Oral Cancer</i>	1978, revised April 1986	12	ACS
<i>Facts on Oral Cancer</i>	1983, revised November 1995	10	ACS
<i>Oral Health—Your Key to Reduced Oral Cancer Risk</i>	August 1989	9	ACS
<i>Stop, Look, Feel</i>	February 1992	8	ACS
<i>Smoking and Oral Cancer</i>	1986	10	American Dental Association (ADA)
<i>What You Should Know About Oral Cancer</i>	1994	12	ADA
<i>What You Should Know About Oral Cancer</i>	2000	13	ADA
<i>Some Important Facts About Oral Cancer</i>	2001	11	ADA
<i>Oral Cancer—AGD Fact Sheet</i>	1990, 1994, 1995, 1996	12	Academy of General Dentistry (AGD)
<i>What You Need to Know About Cancer of the Mouth</i>	October 1987	12	National Cancer Institute (NCI)
<i>What You Need to Know About Oral Cancer</i>	Revised June 1989	10	NCI
<i>What You Need to Know About Oral Cancer</i>	Revised April 1993	11	NCI
<i>What You Need to Know about Oral Cancer</i>	Revised November 1996	12	NCI
<i>Oral Cancer</i>	May 1999; February 2001	9	National Oral Health Information Clearinghouse (NOHIC)
<i>Oral Lesions Precancerous and Cancerous Growths</i>	2000/2001	9	The Stay Well Company
<i>Oral Cancer Update—36th Dental Flight</i>	2001	10	36th Dental Flight, Andersen AFB, Guam
<i>Warning</i>	None Identified	7	Unknown

*Source: USAF Assessment of Oral Cancer Educational Materials, 2002.

bacco and alcohol (70%), age (50%), and sun exposure (70%) as major risk factors/predictors. However, none mentioned marijuana or viruses.

Between 5% and 20% of the items reviewed identified the remaining currently known risk predictors such as gender, race, genetics, or other risk factors such as low intake of fruits and vegetables and previous history of oral cancer.

For warning signs and symptoms of oral cancer, 55% to 100% of the literature cited all of the warning signs and symptoms on the checklist ranging from sustained sign (a lesion that persists beyond 10 days to 2 weeks) to hoarseness (Figure 2). Conversely, the reporting of numbness, a lump, bleeding, difficulty swallowing/chewing, and pain as warning signs was mentioned in 60% to 85% of the literature, while 25% to 45% identified altered sensation or pain, discomfort wearing dentures, discomfort in the throat, asymptomatic (early) lesion, and hoarseness as symptoms (Figure 2). Finally, for early detection and disease prevention measures, 85% of the sources cited a need for early detection and/or oral cancer exam, and 55% discussed smoking cessation and tobacco cessation as preventive measures. In contrast, less than half of the literature mentioned decreasing alcohol intake, using sun protection (lip sunscreen, wide-brim hats), and increasing consumption of fruits and vegetables as important preventive measures (Figure 3).

The adequacy of the content of the educational materials was variable, with the accuracy of the information increas-

ing in direct relation to the recency of the date of publication for the most part. Only one of the more recent publications had incorrect information. Publication dates of the materials varied widely from 1976 to 2001. Almost two thirds of printed materials were more than 5 years old.

Misinformation regarding incorrect risk factors was notable. The top three "incorrect risk factors" contained in the educational materials, in order of frequency, were ill-fitting dentures, jagged or broken teeth, and poor oral hygiene. Other incorrect risk factors less frequently cited included extreme heat from tobacco products, over exposure to wind, piping hot foods and scalding hot drinks, and use of smokeless tobacco as a greater risk than other risk factors. Although not as frequently cited as were the incorrect risk factors, other erroneous information or "misinformation" about oral cancer facts and related health behavior was found. These include early oral lesions are highly visible, chronic irritations from projecting fillings cause oral cancer, and that alcohol use alone does not cause oral cancer.

DISCUSSION

One of the limitations of the study is that it is not known whether samples of all educational materials provided to patients were received; thus, it is possible that other materials are being used in USAF dental clinics. For the items received, the reading levels exceeded the reading level recom-

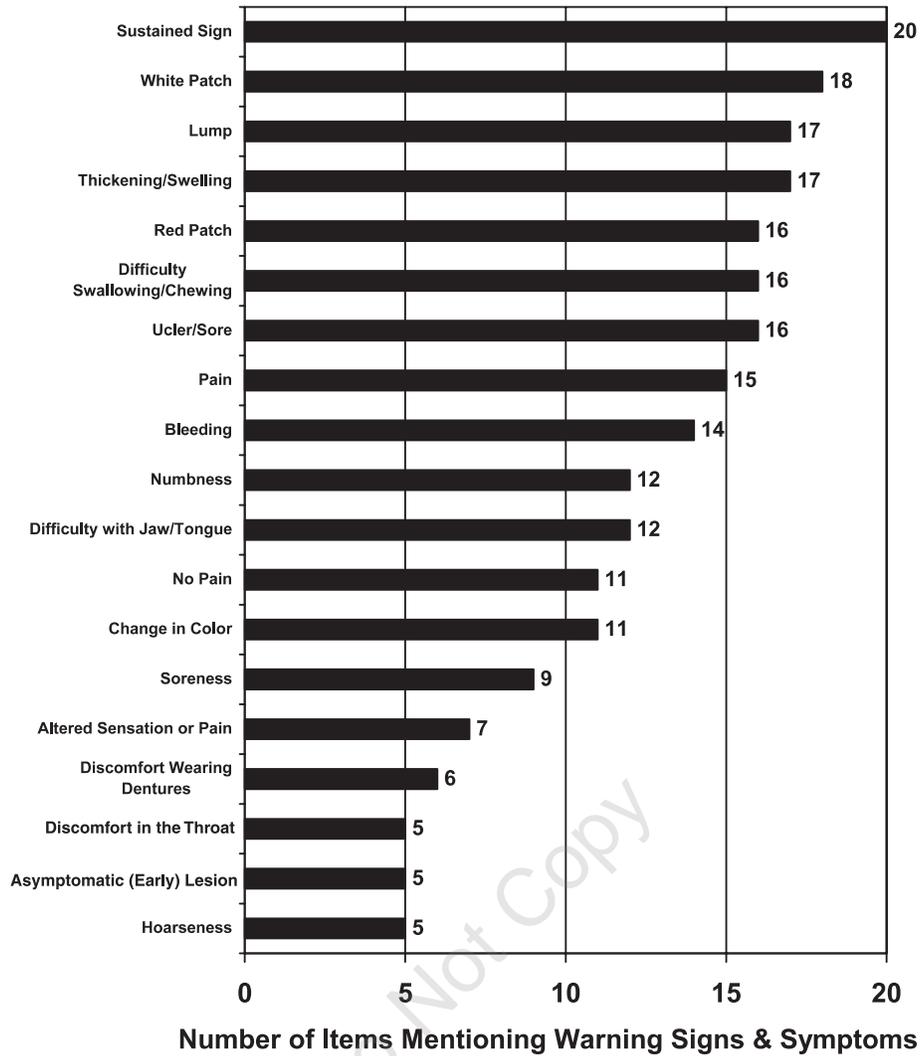


FIGURE 2. Warning signs and symptoms. *Source:* USAF Assessment of Oral Cancer Educational Materials, 2002.

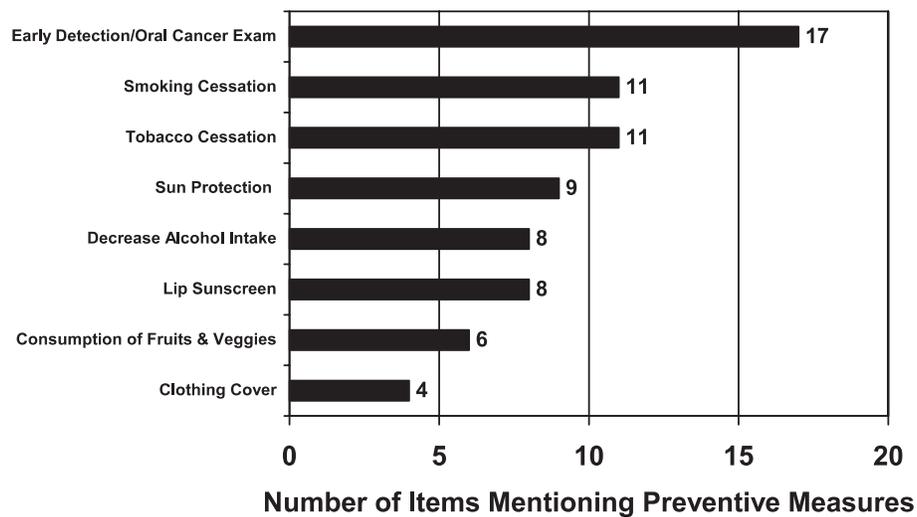


FIGURE 3. Disease preventive measures. *Source:* USAF Assessment of Oral Cancer Educational Materials, 2002.

mended for the general public (4th–6th grade reading level), as the mean SMOG score for the oral cancer literature tested was the 11th grade reading level.

Reading level of educational materials is important because nonofficer candidates are accepted into the AF depending on the composite scores of four aptitude tests given (General, Administrative, Mechanical, and Electronic) and the minimum scores acceptable for a particular job title, even if they may be designated as Alternate Credential Holders or High School Diploma/Certificate or GED holders. The tests may be given at local schools or at the nearest Military Entrance Processing Station. Tests administered at local schools are calibrated to an 11th grade reading comprehension level (Z. Long, TSgt, USAF Recruiter, Waldorf, MD, personal communication, July 2002). Passing composite scores may be as low as 31 out of a possible 99. For example, a situation might occur when a student scores high in the Electronics section and low in other testing areas possibly because English is his/her second language. If the Air Force needs Electronics specialists, the overall low score could be waived in order to fill the job position. Therefore, although the lowest level of American education accepted by the USAF is generally thought to be the 12th grade, it is possible that there are ADAF personnel who cannot read and comprehend printed English literature developed at the 11th- or 12th-grade levels of education.³²

Another contributing factor to possible inflation of the overall educational level (which may be different from actual reading comprehension capabilities) is the fact that the Community College of the Air Force awards college credits upon completion of technical school following military basic training (personal communications with USAF Education Office, Andrews AFB, MD, July 2002; guidance under auspices of the Community College of the AF [<http://www.au.af.mil/au/ccaf>], American Council of Education [<http://www.acenet.edu/>], and the Southern Association of Schools and Colleges [<http://www.sacscoc.org/index.asp>]). Thus, some ADAF with only a GED or high school degree are recorded as having some college education.

To evaluate whether health education materials are well suited, appropriate, and meet the needs of an audience, one needs to assess the extent to which the materials match the profile of the intended audience. In communicating health education, the ideal is to tailor materials to the individual. When this is not possible, the next best thing is to do what is realistic—consider the overall demographics of the population served and develop health education materials suitable to the broad target audience, particularly those that are at greatest risk.

Misinformation regarding incorrect risk factors was surprisingly high (55%). Of interest was the citing of poor oral hygiene as a cause of oral cancer in the 1991 NCI Oral Cancer Research Report. A unique citation in this pre-1995 group was a reference to patients delaying medical treatment as a risk factor for oral cancer (*Facts on Oral Cancer*, rev 6/86). Interestingly, the literature printed from 1995 to 2001 ceased citing excessive heat from tobacco products,

overexposure to wind, and hot foods and/or scalding hot drinks as causes of oral cancer but continued to identify poor oral hygiene, jagged teeth, and ill-fitting dentures as risk factors. The single reference to smokeless tobacco as a greater risk than smoking (*What You Need to Know About Oral Cancer*, Nov 96) was seen as a deviation from the post-1995 pattern and therefore an indication that old information was still in use.

Three implications can be made from these observations. First, an inordinate amount of the printed oral health literature focused on non-life-threatening oral diseases and conditions. Second, a significant amount of the general oral health literature distributed or made available to patients did not address oral cancer in any way. Finally, the target audience of four of the oral cancer items was focused on oral cancer patients rather than for the general public regarding oral cancer prevention and early detection.

CONCLUSIONS

The reading level of most of the oral cancer-related materials received was beyond that recommended for the general public (4th- to 6th-grade level). Even though the minimum readability testing level for entrance into the USAF is 11th grade, it is important to consider the non-AD patient population served as well. Over one third of the items were above the 11th-grade level, and all were above the 4th- to 6th-grade levels, with the lowest level being 7th grade.

If the small number of printed materials devoted to oral cancer that were received for this study is any indication of the number available for our USAF patients—many of whom practice risky behaviors—this is a serious concern, considering that oral cancer is a life-threatening disease that is often disfiguring and debilitating. Other studies^{29,30} also have shown that limited information about oral cancer is a widespread problem and not only confined to the USAF Military Health System. When taken in consideration with the limited diversity in USAF Dental Treatment Facilities' educational materials' selection, style, and presentation of oral cancer, in comparison to other oral health issues, the disparity is even more apparent. In other words, oral cancer-related materials were not only few in number but also were more limited in terms of selection for diverse groups, variety of style, and presentation compared to materials dealing with other oral health concerns.

Older publications generally contained conflicting as well as inaccurate information and data. Conversely, the more current the publication, the more varied the style and the focus as was evident in the materials for such special needs patients as pregnant and teenage tobacco users. More attention is needed in providing oral cancer prevention information to patients who have not been affected by the disease as opposed to distributing materials targeted to patients with oral cancer.

Several practical actions should be taken within the dental treatment facilities of the USAF. First, all out-of-date publications should be purged and replaced with the most

current literature. Next, a proactive approach is necessary in selecting publications appropriate to the personnel makeup of the base population, such as having current information on the signs and symptoms of oral cancer, self-examination, etc. Further, audience testing and readability testing of the publications should be carried out on samples of the materials before purchasing by the unit's Preventive Dentistry Health Officer to determine the appropriateness of the literature being used for the educational level of the base enlisted population, for example, younger age-oriented material for training bases such as Lackland AFB, TX versus literature for more mature audiences at higher Headquarters bases such as Randolph AFB, TX. A mixture of both age-appropriate materials is needed at OCONUS bases where family members are treated. Moreover, the Air Force needs to explore the potential need for oral health educational materials in languages other than English. A principal second language would be Spanish given that a high proportion (8.8%) of current AD personnel identify themselves as Hispanic or non-white Hispanic. Finally, smaller quantities should be purchased to preclude distribution of outdated literature.

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