Stress-related suicide by dentists and other health care workers

Fact or folklore?

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ABSTRACT

Background. The media repeatedly portrays dentists and other health professionals as being at risk of committing suicide. While this message often is accepted without question, there are little reliable data available that verifies this alleged risk. The relationship between professional stress and suicide, if any, has not been substantiated or quantified.

Types of Studies Reviewed. The author evaluated the contemporary literature on stress and suicide in health professionals in an effort to verify or refute the widely held belief that dentists and other health care professionals are at higher risk of committing stress-related suicide. The author also surveyed dental schools to determine what efforts were being made to provide students with stress-management skills.

Results. The author found that there is little valid evidence that dentists are more prone to suicide than the general population, although some related data suggest that female dentists may be more vulnerable. Large-scale studies are needed before firmer conclusions can be reached. The author's survey shows that dental students generally receive some education on stress management, but many dental hygiene and graduate students do not. The author makes several recommendations for future research.

Clinical Implications. Although some dentists leave the profession by way of suicide or career change at a time when their careers should be the most rewarding, available data on stress and its impact on suicide incidence are inconclusive and flawed. The profession needs to identify the causes of stress-related suicides and provide assistance to those people who are affected by stress.

During presentations on professional stress, I often am asked about dentists and their frequently stated, alleged tendency to commit suicide. Since 1933, both the lay public and professional media repeatedly have portrayed dentists as being suicide-prone, and both the medical and dental professions constantly are referenced as groups of health care workers who are at high risk of committing suicide. This message is repeated casually and accepted without supporting data, and there have been few formal attempts over the last two decades to statistically verify or quantify this alleged risk on a national basis. Additionally, there are allegations that dentists have a disproportionately high incidence of alcoholism, drug abuse and divorce. Articles in the literature rarely cite reliable data regarding these "labels," as they are repeatedly and casually cast on the profession.

Is dentists' widely held suicide label factual or simply a product of media hype?

Dental practice can be stressful at times, and stress can be a significant contributing factor for suicide. In this article, I examine the factors surrounding these issues in an attempt to determine whether this widely held suicide label is factual or simply a product of media hype. Furthermore, I explore the following questions:

- Are the stressors that dentists and other health care workers are exposed to significant enough to lead them to contemplate or attempt suicide at a rate greater than that

of the general population?
- Is the incidence of divorce or alcoholism a significant factor in dentists' suicides?
- Do the health care professions tend to attract people who are inherently more vulnerable to suicidal ideation?
- If the data do confirm there is a problem, is the profession providing sufficient resources to recognize and deal with the problem?

LITERATURE REVIEW ON DENTISTS AND SUICIDE

Suicide was the seventh leading cause of death in the United States in 1997 (11.6 deaths per 100,000 population).[1] According to the National Center for Health Statistics, an estimated 31,000 Americans—including health care workers—died in 1996 from self-inflicted injuries (suicide).[1] There are no reliable, current global data on the prevalence of dentists' suicides alone. Suicide in the general population is underreported by as much as 33 percent owing to the stigma associated with it, especially in certain cultures.[2,3] It is estimated that for every physician's suicide there have been at least eight to 10 failed suicide attempts made by physicians,[4] but it is not known if this incidence extends to dentistry. Lang-Runtz[5] said that the numerical equivalent of one large dental school class is lost each year to suicide but does not cite the origins of the data. Similar generalizations have been cited for medicine.[6]

In the general population, whites commit suicide at a higher rate than do nonwhites (2.7:1) and males at a greater rate than females (4:1).[1,7] As of 1996, the states experiencing the greatest number of suicides per 1,000 population were Nevada, Arkansas, Montana, New Mexico, Wyoming and Colorado, although more populous states obviously rank higher in total numbers.[1]

Bers[8] said that the contemporary statistical origins of the belief that dentists commit suicide at a higher rate than the general population seemed to have occurred in the 1960s; he based this opinion on articles that appeared at that time. Over the years, several articles have suggested that dentists, attorneys and physicians have 2.5 to 5.5 times the overall suicide rate of other white-collar workers or matched general population groups.[2,7,8]

These assertions were not questioned closely until 1975, when the American Dental Association published a study showing that data from 31 states (from which data were available) did not support the conclusion that dentists commit suicide at higher rates than the general population.[9] Between 1975 and the mid-1980s, additional articles also appeared to refute the relationship.[3,7,10,11] A review of 8,945 American and Canadian dentists' death certificates was published in 1976, revealing that male dentists actually had a lower suicide-specific death rate from 1960-1965 than did the general, white male population.[7] Arnetz and colleagues wrote an article that supports this view.[12] Forrest[13] evaluated the varying factors related to dental stress, but noted that a national conference convened by the ADA in 1977 concluded that the suicide rate of dentists was exaggerated.[14] Revicki and May[11] reported only 10 dentist suicides per 100,000 population per year in North Carolina from 1978-1982, the lowest rate among all major health care professions.

Two articles suggest that dentists who are members of organized dentistry have a lower suicide rate than do dentists who are not members of organized dentistry[2,8]; however, the reason was unclear in the articles, and I am unaware of any follow-up studies. Simpson and colleagues[2] retrospectively analyzed dentist suicides in Iowa over a 13-year period and concluded that the suicide rate for younger dentists (aged 24-44 years) was 2.6 times that of the matched national male population. While they found that the suicide rate for older dentists (ages 45-64 years) was lower than that of the younger dentists, they found another increased incidence spike after age 65 years. Overall, they found a prevalence of 9.7 suicides per 100,000 population compared with 8.98 per 100,000 for the general U.S. population. They cautioned that the small sample size could have resulted in statistical artifacts. Citing interviews they conducted with 25 dentists, sociologists Hilliard-Lysen and Riemer[15] published an article in 1986 that presented dentists in a negative light and stated that dentists were suicide-, divorce- and drug and alcohol abuse–prone.

In 1984, Dental Management, a national dental magazine, surveyed a random sample of 2,500 dentists, with a 40.7 percent response rate.[16] Results showed that 6.7 percent of the responding dentists admitted that they had considered suicide at some time in their careers, while 16.1 percent rated dentistry as "extremely stressful."

A detailed evaluation in an article by Stack[7] was the first to attempt to sort through the conflicting data and arrive at some reasoned conclu-

sions. Unfortunately, his analyses were flawed by the use of hearsay, public perceptions, assumptions and currently outdated practice information that may no longer be applicable. Using U.S. Public Health Service data from 21 states, Stack alleged a significant relationship between dentists and suicides, which he theorized might be the result of occupational stress. Given the article's weaknesses, however, I believe the conclusions are questionable.

Stack's study is typical of many that are based on regional or localized data collected over brief periods that may or may not be representative of the long-term national prevalence. The data in many studies are suggestive rather than definitive.[8,17] The ADA last reported nationwide data on dentists' mortality for the period of 1968-1972.[9] The adjusted average age of death for dentists with "mental, psychoneurotic and personality disorders" during this period was lower than that of the overall white male population of the United States older than 24 years of age. The ADA's data did not support the premise that dentists end their lives prematurely through suicide in numbers greater than do the general public. In fact, when all causes of death were considered, dentists had an average life span that exceeded that of the general population by 2.8 years.[9]

There are no reliable, current global data on the prevalence of dentists' suicides alone.

SUICIDE IN OTHER HEALTH CARE PROFESSIONS

Because of the many parallels with dentistry, it is relevant to examine suicide in other health care professions.

Medicine. Three percent of all reported physician deaths reportedly are suicides; it is estimated that up to 5 percent more are not reported.[18] The suicide rate for female physicians is three to four times higher than that of the general population, and the suicide rate for male physicians is 1.15 to three times higher than that of the general population.[18-21] It has been suggested that many professionals who commit suicide are alcoholics or have a primary affective disorder (such as unipolar or bipolar [manic-depressive] disorder) that manifest itself clinically as anxiety, irritability and depression.[12,22] Up to two-thirds of female physicians are alleged to have affective disorders.[17] If this is correct, many physicians' suicides can be viewed as outcomes of pre-existing disorders in people who selected medicine as a career.[12,18,20] To the best of my knowledge, this relationship has never been explored in dentists.

Over a two-year period (1965-1967), the American Medical Association, or AMA, reported that 2.61 percent of male physicians' deaths and 5.72 percent of female physicians' deaths were classified as suicides.[20] One study speculated that female physicians are more suicide-prone at the beginning of their careers and in midlife, which suggests a problematic relationship with their "dual-role responsibilities" as family providers and health care providers.[23] Another study hypothesized that prejudices against women may cause them to perform under higher competitive pressures, which may contribute to their distress.[21] Yet other authors argue that the increased female incidence is a statistical artifact owing to unusually low suicide rates in other female populations.[23] We do not know, however, if these concepts apply to our growing population of female dentists. Reliable contemporary studies are needed.

The mode of most female physicians' suicides is drug ingestion, while male physicians' suicides are divided evenly between drug ingestion and violent causes (for example, gunshot wounds, hanging, jumping).[12,24] Physicians' spouses are alleged to have a higher suicide rate than the general population, but reliable data are lacking.[18,25,26] Comparable dental data also are lacking.

Nursing. Although earlier articles suggested that nurses were prone to depression, Trinkoff and colleagues[27] did not find that nurses were any more likely to suffer from depression than were matched nonnurse controls. Hawton and Vislisel[28] cite seven studies[29-35] that support a significantly increased incidence of suicide in female nurses, but I believe the data suffer from the same inadequacies as I noted previously. There are few published articles relating to suicide in nurses, but three have raised some interesting questions that have not yet been addressed.[28,36,37] Citing a 1990 Japanese study of medical students and caffeine,[36] Hawton and Vislisel[28] also mention that caffeine may somehow protect females against depression and suicide (but not males).

Another study draws an interesting correlation

between smoking and suicide in nurses.[37] In a study of more than 121,000 mostly white, middle-aged, female registered nurses over a 12-year period, researchers found that nurses who smoked were at two to four times higher risk of committing suicide than were nonsmokers. Those who smoked 25 or more cigarettes per day had the highest risk. That article also states that up to 20 percent of all nurses who commit suicide are alcoholics.[37] I was not, however, able to identify any further studies that had been published in this area.

Dental auxiliaries. My electronic database searches failed to find any major studies regarding occupational stress and suicide in American dental auxiliaries. Dental staff members' stress allegedly has been a significant factor in practices, but there are no supporting data that correlate the work environment with suicides or suicidal attempts by dental assistants, hygienists and other auxiliary personnel.

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SUICIDE DATABASE DEFICIENCIES

The few statistical studies that are available on health care workers' suicide trends are replete with problems, including the following:

- The majority of published data involve white males in a practice environment different from that experienced today. With more women and ethnic minorities now in the dental profession and a change in practice patterns, there is a need for newer studies to update the older data.
- Most studies are based on small, regional samples that can lead to statistical bias and may not be representative of the profession as a whole. In one article, for example, all studied dentists were undergoing psychiatric treatment as inpatients.[15] A broader national data collection effort with variables controlled seems to be needed.
- Many cited articles are anecdotal and have little scientific foundation. Some cite unsupported "facts" without identifying the validity of their sources.[5]
- Statistics regarding suicide in the health care professions may be higher because physicians and dentists may be more successful at killing themselves than the lay public because of their knowledge or access. Furthermore, suicide mortality data do not include unsuccessful attempted suicides and suicidal gestures (an attempt at suicide performed to gain attention, but without intent to kill oneself; for example, shallow slitting of the wrists). Rothman[3] expresses the view that people who attempt suicide are wrongly thought to have not intended the act when, in fact, most are deliberate acts of self-damage that are not accompanied with a certainty of survival. Medical examiners, however, may be inclined to give cases the benefit of the doubt and not report them as suicides and may err on the side of caution because of the stigma attached to suicide, the legal ramifications and insurance claims implications.[2,10]
- Suicides tend to be underreported because suicide has an associated stigma of shame and religious implications. Many families or reporting agencies may not identify a suicide as such,[3,8,10] and the true cause of death may be cloaked in other diagnoses (such as "gunshot" instead of "self-inflicted shotgun wounds") or is suggested to be "accidental."[10,12,18,19]
- Data from retired and inactive dentists can be included, leading to distortions in the data relative to those currently in practice.
- There can be professional practice changes over time, and data reported from earlier studies then can become statistical artifacts in later periods.

In 1977, the ADA's Bureau of Economic Research and Statistics (now the Survey Center) evaluated available research data (as opposed to subjective review articles) and attempted to determine whether there are atypical, unique working conditions in dentistry that lead to suicide, and if so, to what extent.[17] They concluded that dentists have an overall death rate from all causes that is lower than the white, male population of equivalent ages, and 73 percent of dentists actually live to be 64 years of age or older. No data were found that suggest excessive death rates from occupational exposure hazards, such as mercury as was alleged in one article.[15] In fact, the Bureau of Economic Research and Statistics found very little information on any possible causes of suicide.[17] The ADA does not have any formal program for collecting and analyzing data related to suicides and suicide attempts of member dentists, comparable to the AMA's surveillance program that was in place until 1999 (Linda Kittelson, M.S., R.N., C.S.A.D.C., man-

ager, Dentist Well-Being Programs, ADA Council on Dental Practice, personal communication, 1999).

IS THERE A RELATIONSHIP BETWEEN SUICIDE AND PROFESSIONAL STRESS?

Several authors suggest that many common stressors in dentists' professional lives allegedly serve as potential risk factors for suicide. Most of those stressors appear to be subjective, not factual.[10,13,37]

- Although the profession is changing, many dentists still work in relative isolation, without daily peer interactions, and this is alleged to be a factor for stress, suicide or both.[7] Considering that physicians also are at risk of committing suicide and often have more opportunities for intraprofessional sharing, I believe it can be argued that this is of minor relevance, if any.
- It has been alleged that the many personality traits that characterize a good dentist also can predispose them to depression.[10,15] Dentists allegedly are "perfectionists" who become frustrated when cases do not turn out perfectly and are frustrated with patients' lack of motivation to pursue idealistic treatment goals. There are few reliable data to support these hypotheses,[17] and frustration is not unique to dentistry. Other common traits—control of emotional expression, compulsive attention to details, conscientiousness, deferral of gratification—also have been reported.[10]
- Some patient interactions reportedly are characterized by terms like frustration, apprehension, discomfort, fear and hostility.[7,15,16] In one study of 133 recent graduates, 73 percent of the dentists identified stressors such as patients' missed appointments, fears, dissatisfaction with treatment, payment problems and insurance companies, as well as discrepancies between the dentists' high ideals and the realities of day-to-day practice.[38] These findings were consistent with findings in at least one other survey.[39]
- Some dentists allegedly perceive themselves as second-class providers in the health world and sense that they do not have the same prestige and status as physicians.[7,38] This, however, has not been well-studied.
- Dentists may encounter repeated "conversational garbage" from patients, social contacts and the public at large.[10,15] This is defined as comments like "I was fine until I came here," "I hate dentists" or "Are you a doctor or a dentist?"[10] There are no data to quantify this, however, or to prove a causative link with suicidal thoughts. Considering that other professionals (such as police officers, attorneys and politicians) face similar "trash talk," I believe this argument is speculative and lacks credibility.
- Many dentists reportedly do not take advantage of quiet time (such as lunch hours), take vacations to relax or find ways to release their stress. Data collected by University of Illinois at Chicago psychiatrist Debra L. Klamen, M.D., show that physicians and dentists do not take care of themselves very well, and the data are even worse for interns and residents.[40] Only a few dental schools and graduate programs reportedly teach students how to buffer themselves against stress; and students allegedly take their psychological vulnerabilities with them into private practice after graduation.[16,38]

A full understanding of dentists' suicides incidence, causes and prevention still eludes us.

- The recent growth of large managed health care delivery systems has hurt many physicians and dentists financially, and many health care workers experience economic losses or business failures.[7,15,39] The impact of this stress on dentists has not been studied.
- Increasing scrutiny of dental practices and encroachment of governmental agencies, such as the Occupational Safety and Health Administration and Equal Employment Opportunity Commission, has been characterized as stressful,[41] but the end effect is unknown.
- Authors have speculated that inhalation of mercury vapors may cause mercury poisoning and, thus, lead to depression, irritability and insomnia, and finally suicide.[15,39] This theory has no published scientific data to support it.
- Although Stack[7] alleged that there is a high divorce rate among dentists, he cited an unreferenced newspaper article as his basis for that conclusion. A large-scale review by the ADA noted that dentists actually have low divorce rates.[17] Dentists reportedly do not become divorced more often than do other professionals, but divorced dentists and physicians are, respectively, three times and 13 times more likely to commit suicide than are divorced people in the general population.[6,10] Many dentists marry while still attending dental school, and the stresses of education and setting up a new practice may strain emerging relationships.[10]

HOW DO DENTISTS BUFFER STRESS?

Since the stressors of dental practice are not likely to go away, analyzing what dentists reportedly do to buffer against stress becomes relevant. Surveys suggest that few dentists do anything to increase their protection against stress. In one study, 24 percent of the dentists surveyed said they did nothing, 32 percent said they used physical activity, and 13 percent reported they just "coped."[41] Only 10 percent said they took any time off from practice, and only 6 percent had a hobby.

WHAT DO DENTAL SCHOOLS TEACH ABOUT STRESS AND SUICIDE?

I sent an informal survey to 54 accredited dental schools in the United States in September 1999. I conducted this survey to gather information on what programs are being offered to dental students, dental hygiene students and dental graduate students about stress recognition and management and professional suicide. I also wanted to determine what philosophies are shaping these programs. Thirty schools (55.6 percent) responded.

Of the responding schools, 27 (90.0 percent) offered predoctoral students at least some lectures on professional stress, but only seven (23.3 percent) taught dental hygiene students about stress, and only four (13.3 percent) offered any lectures to graduate students. The number of predoctoral lecture hours on stress varied widely, from 0.5 to 13.0 hours (mean, 4.15 hours), while the range of hours for graduate lectures varied from one to three hours (mean, 1.8 hours). Even fewer dental schools offered information on suicide awareness: nine (30.0 percent) to dental students, one (3.3 percent) to dental hygiene students and two (6.7 percent) to graduate students.

Nineteen schools (63.3 percent) offered lectures on stress during the first year of dental school, 10 (33.3 percent) during the second year, 13 (43.3 percent) during the third year and four (13.3) during the fourth year. Some schools reported offering lectures at more than one point in the students' curriculum. Four schools (13.3 percent) used outside consultants for the training, while 16 (53.3 percent) used internal faculty (for example, a psychologist or behavioral specialist). Eleven schools (36.6 percent) used partially trained faculty, whose primary positions were not in the area of behavioral management or psychology.

AVAILABILITY OF COUNSELING SERVICES

In my survey, I asked schools if they had a structured stress counseling program available for students who self-report having stress-related difficulties. Twenty-four of the 30 responding dental schools (80 percent) indicated they have such resources available. Three schools (10.0 percent) indicated they have plans to add such resources in the future.

I asked dental schools if there have been any student suicides or suicide attempts in the past decade. Seven schools (23.3 percent) with annual class sizes of 54 to 89 students had had a total of eight predoctoral cases of suicide attempt, and one school had had one suicide, committed by a graduate student.

Some schools offered comments. One indicated that it had found a high rate of depression among dental students, as measured by testing (no data provided). Several offered the opinion that professional stress is a factor of concern, but suicide risk is not.

DISCUSSION

Reviewing the past three decades of literature on professional stress and its relationship, if any, with dentists' suicides confirms that a full understanding of suicide's incidence, causes and prevention still eludes us. There is a body of evidence that health care professionals, including dentists, may be subject to stress, depression, disillusionment and vulnerability to suicidal ideation. There is, however, no conclusive evidence that they act on it any more often than any other matched group in our society.

Do we really believe that dentists are more stressed than police officers, emergency department health care workers or paramedics? In reality, there is no compelling evidence they are.

I requested current data on the incidence of dentists' suicide from the ADA, the American Association of Oral and Maxillofacial Surgeons, the American Insurance Institute and 11 of the largest life insurance companies in the United States. All reported that they do not collect such data.

There are few data in the literature to support or refute an alleged high burn-out rate among dentists. Bilodeau and colleagues[42] published a study in 1983 in which 28 U.S. Army dentists were monitored during a dental working day. There were no significant changes in heart rate or

ventricular rhythms noted when they treated difficult patients, and no unusual apprehension was evident. It is by no means clear that dentists burn out to any greater extent than any other professional group, but it would be helpful to have data to evaluate that aspect.

We still have little idea how best to implement prevention programs. Dental students experience stress before they attend dental school, experience stress in school and take their perceptions of stress with them as they enter the profession after graduation. Rarely during the journey from student to professional are students given the tools to buffer themselves against stress or made aware of programs to turn to if professional stress pushes them too far. Studies of U.S. medical students find that suicide is the second most common cause of death in medical school.[23,25] Stress does not appear to be any higher in that group than in dental or law students, however.[24]

In a study of 71 percent of the medical interns starting their training at a medical center, Clark and colleagues[43] reported that a significant percentage of interns came from families with histories of physical and chemical abuse, depression and schizophrenia. The authors cautioned, however, that the sample was too small from which to draw firm conclusions. Interns with family histories of depression experienced a higher incidence of depression. In 1987, the councils of scientific affairs at the AMA and the American Psychiatric Association confirmed many of these findings.[23] Are there parallels in dentistry? We do not know.

Where do potentially suicidal, distressed dentists turn to for help? A German study noted that more than one-half of the physicians who committed suicide had mentioned their intention to end their lives to others; however, less than one-half left suicide notes.[21] Their colleagues were either uninformed about the signs and symptoms of suicidal ideation or chose to ignore them. The symptoms of a professional who is becoming suicidal generally are noticeable months ahead of the event and are described in detail by Desjardins[19] (Box, "Early Signs of Suicidal Ideation").

Dentists may feel that repercussions, such as loss of their licenses, practices or prestige, will result if they openly seek psychiatric care or counseling. In some cases, I believe American dentists may not be confident that self-referral into treatment programs will be greeted with understanding and helpfulness, as physicians experience in Canada.[24] The few lectures on stress

EARLY SIGNS OF SUICIDAL IDEATION.*

- Alcohol and/or substance abuse or addiction
- Adverse changes in personality or behavior
- Signs of depression
- Recent adverse life event (for example, death or divorce)
- Loss of confidence and working longer hours with decreased productivity
- Decreased interest in anything outside the office, including family (social withdrawal)
- Postponing vacations
- Excess interest in prestige and power
- Atypical aggressiveness and hostility
- Vigorous denial and rationalization
- New lack of organization
- Use of expressions such as "ending it all."

* Based on Desjardins.[19]

education and management that are offered at continuing education meetings are sparsely attended by dentists, perhaps, in some cases, because they are in denial. If a stressed practitioner has cancer, a world of assistance becomes available; however, often little assistance is offered for professional stress and suicidal ideation, and even less is said about it. Increasing isolation then may fuel the stress and push the practitioner closer to a decision to attempt suicide.

We also need to understand more about whether professional stress contributes to incidence of malpractice, divorce, and alcohol or drug abuse.

Much of the stress that dentists experience is self-inflicted and a product of acting out their personal strivings and ambitions.[41] In other words, dentists themselves often are the source of most of the stress they experience. The literature is unclear whether the suicides in dentistry are the result of occupational stress or other factors such as malpractice, divorce, alcohol abuse, unfulfilled expectations or depression.[7]

RECOMMENDATIONS

Dentistry clearly needs more up-to-date data on and a better understanding of the causes of stress-related suicide before solutions can be proposed and to determine whether solutions are even necessary. In this article, I have identified several questions that I believe need to be clarified in future studies.

- Has the incidence of dental suicides changed over time since the number of female and ethnic minority dentists has increased as the character

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of dental practice changed in recent years?

- Are female dentists more susceptible to stress-related suicide, as female physicians appear to be?[10,17-19]
- Are dentists' suicides causally related in any way to personal or practice stressors such as divorce or malpractice suits?
- Is there a definable relationship between smoking, caffeine intake or both and suicide, as studies in the nursing literature suggest?[28,29,37] If so, do they affect men and women equally?
- Are the personalities of those who are drawn to dentistry more susceptible to suicidal ideation than those of professionals in other white-collar occupations, as suggested by some physician studies?[12,18,20]
- Do ADA or Academy of General Dentistry members really have lower suicide rates than nonmembers, as suggested in two studies?[2,8] If so, can a cause be determined?

Early education and prevention efforts need to be intensified. Dental schools, as well as dental hygiene and graduate student programs, need to incorporate contemporary stress management lectures in their curricula, so students can learn the skills necessary to buffer stress early in their careers and take those skills into their practices. In fact, such programs also might help identify stress-prone people early in their careers and help them develop effective coping skills.[22]

CONCLUSIONS

There is no consistent statistical evidence available to prove that dentists are suicide-prone, and most reliable data suggest the opposite. Nevertheless, even if dentists' suicide rates are lower than those of the general public, the profession should be encouraged to openly and frankly discuss stress and suicidal ideation with colleagues who are at risk when their symptoms are noted. As is recommended by the medical profession,[25] the warning signs and symptoms of a suicide-prone practitioner should be as widely publicized as those of chemical abuse. New, updated, national suicide data collection efforts need to be widely encouraged. ■

1. United States Bureau of the Census, U.S. Department of Commerce. Statistical Abstract of the United States, 1999. 119th ed. Washington: U.S. Government Printing Office; 1999:100-1,103,837.
2. Simpson R, Beck J, Jakobsen J, Simpson J. Suicide statistics of dentists in Iowa, 1968 to 1980. JADA 1983;107(3):441-3.
3. Rothman MA. Suicide: not for dentists only. J Mo Dent Assoc 1981;61(1):26-7.
4. Mareth TR. Suicide and the family physician: clinical assessment of suicide risk. Tex Med 1977;73(10):57-63.
5. Lang-Runtz H. Stress in dentistry: it can kill you. J Can Dent Assoc 1984;50(7):539-41.
6. Shankle RJ. Suicide, divorce, and alcoholism among dentists, fact or myth? N C Dent J 1977;60(2):12-5.
7. Stack S. Suicide risk among dentists: a multivariate analysis. Deviant Behav 1996;17:107-18.
8. Bers GS. Dentist suicide: a problem? J Okla Dent Assoc 1980;71(1):14,21.
9. ADA Bureau of Economic Research and Statistics. Mortality of dentists, 1968 to 1972. JADA 1975;90:195-8.
10. Orner G, Mumma RD Jr. Mortality study of dentists: final report, December 30, 1976. Philadelphia: Temple University; 1976.
11. Revicki DA, May HJ. Physician suicide in North Carolina. South Med J 1985;78(10):1205-7.
12. Arnetz BB, Hörte LG, Hedberg A, Theorell T, Allander E, Malker H. Suicide patterns among physicians related to other academics as well as to the general population: results from a national long-term prospective study and a retrospective study. Acta Psychiatr Scand 1987;75:139-43.
13. Forrest WR. Stresses and self-destructive behaviors of dentists. Dent Clin North Am 1978;22(3):361-71.
14. Temple University School of Dentistry study of dentist suicide rates (press release). Chicago: ADA Bureau of Public Information; Jan. 31, 1977.
15. Hilliard-Lysen J, Riemer JW. Occupational stress and suicide among dentists. Deviant Behav 1988;9:333-46.
16. Wilson B. Stress in dentistry: national survey. Dent Management 1984;24:14-9.
17. ADA Bureau of Economic Research and Statistics. The occupation of dentistry: its relation to illness and death—a review of and comment on published research. JADA 1977;95:606-13.
18. Pitts FN Jr., Schuller AB, Rich CL, Pitts AF. Suicide among U.S. women physicians, 1967-1972. Am J Psychiatry 1979;136(5):694-6.
19. Desjardins M. Physician suicide: can something be done? Can Fam Physician 1997;43:1900-1.
20. Craig AG, Pitts FN Jr. Suicide by physicians. Dis Nerv Syst 1968;29(11):763-72.
21. Simon W. Suicide among physicians: prevention and postvention. Crisis 1986;7(1):1-13.
22. Robins E, Murphy GE, Wilkinson RH, Gasner S, Kayes J. Some clinical considerations in the prevention of suicide based on a study of 134 successful suicides. Am J Public Health 1959;49:888-99.
23. Results and implications of the AMA-APA Physician Mortality Project, Stage II: Council on Scientific Affairs. JAMA 1987;257:2949-53.
24. Johnston C. Suicide totals for MDs sad reminder of stresses facing medicine, conference told. CMA J 1996;155(1):109-11.
25. Roy A. Suicide in doctors. Psychiatr Clin North Am 1985;8(2):377-87.
26. Sakinofsky I. Suicide in physicians. Br J Psychiatry 1987;150:267-8.
27. Trinkoff AM, Eaton WW, Anthony JC. The prevalence of substance abuse among registered nurses. Nurs Res 1991;40(3):172-5.
28. Hawton K, Vislisel L. Suicide in nurses. Suicide Life Threat Behav 1999;29(1):86-95.
29. Katz RM. Causes of death among registered nurses. J Occup Med 1983;25(10):760-2.
30. Kelly S, Charlton J, Jenkins R. Suicide deaths in England and Wales 1982-92: the contribution of occupation and geography. Popul Trends 1995;80:16-25.
31. Roman E, Beral V, Inskip H. Occupational mortality among women in England and Wales. Br Med J 1985;291:194-6.
32. Powell EH. Occupation, status, and suicide: toward a redefinition of anomie. Am Sociol Rev 1958;23:131-9.
33. Doebbert G, Riedmiller KR, Kizer KW. Occupational mortality of California women, 1979-1981. West J Med 1988;149:734-40.
34. King AS, Threlfall WJ, Band PR, Gallagher RP. Mortality among female registered nurses and school teachers in British Columbia. Am J Ind Med 1994;26:125-32.
35. Gunnarsdottir H, Rafnsson V. Mortality among Icelandic nurses. Scand J Work Environ Health 1995;21:24-9.
36. Mino Y, Yasuda N, Fujimura T, Ohara H. Caffeine consumption

and anxiety and depressive symptomatology among medical students. Arukoru Kenkyuto Yakubutsu Ison 1990;25:486-96. Cited by Hawton K, Vislisel L. Suicide in nurses. Suicide Life Threat Behav 1999;29(1):86-95.

37. Hemenway D, Solnick SJ, Colditz GA. Smoking and suicide among nurses. Am J Public Health 1993;83:249-51.

38. Godwin WC, Starks DD, Green TG, Koran A. Identification of sources of stress in practice by recent dental graduates. J Dent Educ 1981;45(4):220-1.

39. Kent G. Stress amongst dentists. In: Paynes R, Firth-Cozens J, eds. Stress in health professionals. New York: Wiley; 1987:127-49.

40. Klamen DL. Stress management for the health care worker. Presented at: American Association of Oral and Maxillofacial Surgeons meeting; Feb. 6, 1998; Phoenix.

41. O'Shea RM, Corah NL, Ayer WA. Sources of dentists' stress. JADA 1984;109(1):48-51.

42. Bilodeau LP, Moody JM, Rathbun JD, Kraut RA. Evaluation of ECG changes in dentists treating awake patients. Anesth Prog 1983;30:193-6.

43. Clark DC, Salazar-Grueso E, Grabler P, Fawcett J. Predictors of depression during the first 6 months of internship. Am J Psychiatry 1984;141(9):1095-8.