

# The role of occupational stress in the maladaptive use of alcohol by dentists: A study of South Australian general dental practitioners

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## Abstract

**Background:** It is well recognized that dentistry is a stressful profession. However, there are conflicting views about the extent to which such stress contributes to hazardous drinking among dentists. In addition, the relative contributions of stress and pre-existing vulnerability in predicting alcohol problems among dentists generally (and Australian dentists in particular) have yet to be determined.

**Methods:** The levels of stress and alcohol consumption of 312 South Australian dentists were measured. Factors known to mediate vulnerability to alcohol disorders were also assessed with appropriate psychometric instruments.

**Results:** High levels of stress/burnout, consistent with other studies of dentists' stress, were recorded. Hazardous levels of alcohol consumption, which were between two and four times higher than the normative South Australian population, were also reported, particularly among males and rural dentists.

**Conclusions:** To a significant extent, stress and hazardous alcohol consumption are both present among South Australian dentists. However, compared with work stress/burnout, existing personal vulnerability factors are much stronger predictors of such hazardous alcohol consumption. We suggest that professional dental bodies, and state Dental Boards, may play a role in ensuring stress inoculation and guidance on safe limits of alcohol consumption for dentists-in-training; and in creating appropriate mechanisms for assisting dentists who experience alcohol related difficulties.

**Key words:** Alcohol abuse, burnout, dentists, stress.

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nurses and dentists<sup>1-9</sup> and also to students of those professions.<sup>10-15</sup> However, different authorities appear to have come to different conclusions on the actual prevalence of AUD among such health professionals. Some researchers have placed the figure as high as 20 per cent.<sup>16-17</sup> In contrast, it has been reported that British doctors and nurses are less likely than the normative population to abuse alcohol<sup>18</sup> and Weir discounts the notion that Canadian physicians are more at risk of AUD than the normative population.<sup>19</sup> Among American dentists, the Percent Prevalence Estimates (PPE) of AUD<sup>20</sup> has been recorded to be as low as 1.5 per cent.<sup>21</sup> This figure is significantly lower than for all labour force categories combined and compares with a PPE of 6.6 per cent for dental nurses. This would suggest that dentists are at minimal risk for AUD.

Although the prevalence rate of AUD in dentists is reported to be low, dental practice is reported to rank highly as a stressful occupation. High levels of stress/burnout have been reported in both British<sup>22</sup> and Canadian dentists<sup>23</sup> and one local study (unpublished) has shown significant stress/high burnout affecting at least 14 per cent of South Australian dentists overall, with higher stress levels amongst general rather than specialist dentists, and higher levels for identifiable groups such as rural private practitioners.<sup>24</sup> Given this high stress of dental practice, a low prevalence rate of AUD among dentists is somewhat surprising, since high stress is reported by several authorities to predict AUD in both animal experiments and human subjects, though some variability in results has been noted.<sup>25,26</sup> This view is supported by one authority who considers dentists to be disproportionately at risk of addiction and emotional disorders. This is said to be because of their frequent involvement with anxious patients, tedious work, and their isolated work environment, all of which are said predispose them to substance abuse and mental health problems.<sup>16</sup>

However, more broadly, stress is only one of several risk factors for AUD. An additional well recognized risk factor is 'personal vulnerability' encompassing temperament, motivation, trait disposition, genetic predisposition, and 'coping' mechanisms.<sup>16</sup> However, what remains unclear are the relative contributions of

## INTRODUCTION

The abuse of alcohol by health professionals has been well documented. Studies throughout the world have identified Alcohol Use Disorder (AUD) to be a problem for physicians, psychiatrists, psychologists,

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stress and personal vulnerabilities as mediators of AUD. Therefore, in order to further our understanding of AUD among health professionals in general (and dentists in particular) it was considered instructive to examine the relative contribution of all these factors in an appropriate population of dentists. It was theorized that the presence of positive traits that reduce personal vulnerability (for example) might explain the reported low prevalence rate of AUD among dentists despite their generally high stress levels.

In summary, this study sought to identify the extent of AUD in a sample of South Australian general dentists, and to determine the relative contributions of professional stress and personal (and pre-existing) characteristics as predictors of maladaptive alcohol use among them.

## MATERIALS AND METHODS

### Participants

The names of the 830 general dentists registered with the South Australian Dental Board on 1 May 2001 were imported into SPSS version 9.5 statistical software (Statistical Package for the Social Sciences 2000, Chicago, USA), and 520 names (the number being dictated by available resources) were randomly selected using the 'select cases' function. Each of these practitioners was invited to take part in the study by mail, and 312 returned usable questionnaires, resulting in an effective total response rate of 63.5 per cent.

The final sample comprised 312 South Australian general dental practitioners of mean age 43.1 years, standard deviation (SD) 11.28 years. The type of dental practice in which participants were employed was: private practice (n=223); public practice (n=58); academic (n=15); and health fund (n=15). Respondents identified as 228 (73 per cent) male and 84 (27 per cent) female. This compares with the normative population of South Australian general dentists of 79 per cent male and 21 per cent female.<sup>27</sup> Participant's professional experience was identified as: 1-5 years 15 per cent; 6-10 years 12 per cent; 11-20 years 26 per cent; 21-30 years 33 per cent; and 30+ years 14 per cent. Full-time participants numbered 85 per cent, the remaining 15 per cent identified as being part-time employed (less than 20 hours per week).

### Measurement scale

The following scales were used to measure stress, AUD and associated moderating and mediating variables.

### Stress

Stress/burnout was measured with the Copenhagen Burnout Inventory (CBI).<sup>28</sup> The CBI comprises three subscales: personal, work, and patient burnout. These separate subscales seek to identify and measure stress according to the life domain from which it arises: the personal domain, the work domain (in general), or working with patients (specific work) domain. This

scale is believed to measure a realistic conceptualization of stress/burnout.

Typical items are: 'How often do you feel tired?', 'Do you find it hard to work with patients?' and 'Do you feel burnt out because of your work?' All items are straightforward and relate to the relevant subscale readily. These subscales appear to measure an overarching concept of emotional exhaustion according to its source and causality.

### Alcohol Use Disorder

Alcohol Use Disorder levels among participants were measured using the Alcohol Use Disorder Indicator Test (AUDIT) developed by Babor and Higgins-Biddle for the World Health Organization.<sup>29,30</sup> In comparison to alternative scales it has been shown to possess consistently higher discriminant validity in measuring the presence of alcohol abuse, validated cross-nationally, and its sensitivity (92 per cent) and specificity (93 per cent) are similar across disparate cultures. It appears that the total score on the AUDIT reflects the extent of alcohol involvement along a broad continuum of severity. In scoring the AUDIT scale, a cut-off score of eight is recommended to identify alcohol disorders as defined by the International classification of disease and related health problems and the Diagnostic and statistical manual of mental disorders.<sup>31-34</sup> In general, the likelihood of alcohol dependence increases in certainty with higher AUDIT scores, with scores in the range 16-20 indicating the existence of definite problems, not merely risk (Babor T, personal communication, August 2001).

Accordingly, the following AUDIT cut-off scores were adopted and are quoted in this study: 0-4=nil concern; 5-7=moderate use; 8-14=hazardous use; 15-19=dangerous use; and 20+=dependence.

### Mediating or moderation variables

The literature on occupational stress and addiction suggest that there are personal variables that can both mediate and moderate the individual experience of stress and AUD. These include:

### Coping strategies

Cooper *et al.* developed the Occupational Stress Indicator (OSI) as a multidimensional measure of the major aspects of work based stressor/strain relationships.<sup>35</sup> For the purpose of this study, only the coping strategies subscale (OSI-CS) was used as a measure of the mediating/moderating effects of coping strategies in the aetiology of stress/burnout experience. This scale comprises 28 items forming six subscales: strategies, logic, involvement, social support, time management and relationships.

### State-Trait Anxiety

The short form of the State-Trait Anxiety Inventory for adults (STAIS) was used to assess each respondent's dispositional proneness to anxiety. Its 10 questions

form two subscales of trait and state (anxiety). High levels of trait anxiety lead to chronic anxiety, which may in turn, lead to emotional exhaustion and (potentially) seeking of artificial relief from that state by use of alcohol. This scale has demonstrated high reliability and was included to assess dispositional anxiety proneness.<sup>36</sup>

### **Physical health**

Physical health of participants was broadly assessed by the inclusion in the study questionnaire of the OSI (physical health) (OSI-PH) subscale of the OSI scale. This subscale is reported to have a high correlation with the Crown Crisp Experiential Index,<sup>37</sup> which suggests that the OSI-PH may be conceptualized as a measure of psychosomatic symptoms<sup>38</sup> and was thus appropriate for this study.

### **Personal vulnerability**

The literature on addiction studies has pointed to the presence of five frequently observed personality factors in AUD affected professionals. These are: a persistent low self-esteem, a dysfunctional family background, family history of AUD, a personal history of AUD, and excessively high ambition for (or expectation of) professional status (to overcome a dysfunctional family history, and self-esteem concerns).<sup>39</sup> No single scale currently exists for the measurement of all of these factors. Accordingly, a new scale was developed for this study, the Alcohol Use Disorder Vulnerability scale (AUDV). This 14-item scale comprised five subscales: genetic, dysfunctional (family), esteem, ambition and habit. Three of the items concern the tendency of any of the respondents' direct family back as far as grandparents to use alcohol excessively (genetic) and two of the items concern the tendency of the respondent to drink excessively at an undergraduate level (habit) also suggesting a biological disposition towards AUD. Three items sought information on aspects of family background, in particular, the experience of chronic insecurity and anxiety in company with physical discipline methods (dysfunctional family). Three items sought information about self-confidence from early childhood through to tertiary level. High scores on these items were taken as being indicative of high levels of self-esteem (esteem). Three further items inquired about unrealistic ambition identified by Coombes<sup>17</sup> as leading to inevitable disappointment, frustration and AUD (ambition).

Typical questions included: 'How often does either of your parents drink excessively now?', 'How frequently did you feel happy and secure during your childhood?', 'How frequently did you feel confident about yourself and your future as a child?', 'How often were you motivated to get a "better life" for yourself by being successful?', 'How often did you tend to drink excessively at Dental School?'

### **Mail survey methodology**

The methodology used in this study was based on the Total Design Method (TDM) suggested by Dillman.<sup>40</sup> The study was piloted by 10 members of the profession and some modifications made to improve its ease of completion and consequent response rate. In view of the personal nature of some of the information sought, especial care was taken to ensure that the confidential nature of the survey was emphasized. Space was allowed for respondents to make personal comments at appropriate points. It was estimated that time for completion would be approximately 20 minutes. The study was approved by the Ethics Committee of the University of South Australia. Each questionnaire was accompanied by a personalized cover letter in which several key points about the research were emphasized, in particular the anonymous nature of the study. A pre-paid return envelope was included with each questionnaire for its return.

Although Dillman recommends a further mail out to each respondent who does not reply to the initial mailing or reminder, time constraints precluded this.

### **RESULTS**

Where possible, missing values within continuous variables were replaced by the mean score.

The means, standard deviations, and distribution characteristics of scores recorded on various scales and subscales are reported in Table 1. Significant skewness was evident in the distribution of scores on the AUDIT scale. An examination of raw data identified four significant outlier scores. These were eliminated from the data set, which reduced the skewness of this variable to an acceptable level (<1) and reduced the population's size from 312 to 308 for statistical regression analysis.

### **Burnout**

The means and standard deviations of scores recorded on the three CBI subscale are reported in Table 1.

The levels of burnout recorded by dentists in the study were analyzed. A two-groups *t* test comparison was made, which indicated that dentists in the present study reported significantly higher levels of burnout on all three subscales compared with the values reported in the Project on Burnout, Motivation and Job Satisfaction (PUMA) study of Danish human service workers (social workers, hospital prison and chronic handicapped care staff, and home helpers):<sup>41</sup> mean (SD) personal burnout=40.9 (19.8),  $t(308)=4.57$ ,  $p<.001$ ; work burnout=36.6 (20.3),  $t(308)=3.13$ ,  $p<.01$ ; and patient burnout=33.3, (19.9),  $t(308)=2.96$ ,  $p<.01$ .

The levels of burnout on the CBI subscales recorded as percentage of the study population are reported in Table 2.

**Table 1. Means and standard deviations of scale and subscale scores**

Scale	(Subscale)	Mean	SD
Copenhagen Burnout Inventory	(personal)	40.9	19.8
	(work)	36.6	20.3
	(patients)	33.3	19.9
Alcohol Use Disorder Vulnerability	(ambition)	8.5	2.4
	(dysfunctional family)	12.4	3.8
	(genetic)	3.8	1.5
	(habit)	3.1	1.3
Spielberger	(state)	8.3	2.8
	(trait)	8.7	2.7
Occupational Stress Inventory: Health		38.6	12.5
Occupational Stress Inventory: Coping Strategies	(logic)	15.4	2.6
	(relationships)	17.5	3.4
	(time management)	20.1	2.9
	(involvement)	13.6	3.6
	(social support)	14.3	3.7
	(denial)	9.6	2.5
Alcohol Use Disorder Indicator Test		4.0	3.0

**Alcohol use level**

Variations in respondents' alcohol use level according to practice location (separated into 'urban' and 'non-urban' (rural), practice type (separated into 'privately paid and publicly paid'), career stage (categorized as 'early', 'mid' and 'late' career) and gender are shown in Table 3.

A significant difference was observed in AUDIT scores between male [mean (SD)=4.57 (3.1), n=213], and female [2.41 (2.0), n=82] [t(222)=-6.97, p<.0001] dentists and, likewise, between privately [4.4 (3.1), n=231] compared to publicly paid [2.6 (2.3), n=72] [t(159)=5.31, p<.0001] dentists. By contrast, no significant differences were observed in AUDIT scores for practice location (urban and non-urban).

A one-way ANOVA indicated a statistically significant difference between the AUDIT scores according to age. Bonferroni *post hoc* tests revealed that the scores of older adults (41-50 years) were significantly higher than those of younger and middle

**Table 2. Percentage distribution of burnout on the Copenhagen Burnout Inventory (CBI) subscales**

Frequency	CBI personal	CBI work	CBI patients
Nil	18.6	29.8	33.3
Low	45.5	40.4	43.6
Moderate	17.0	13.8	7.1
High	<b>10.9</b>	<b>7.9</b>	<b>8.3</b>
Very High	<b>6.3</b>	<b>7.4</b>	<b>6.6</b>

Note: Figures of high and very high burnout are shown in bold

adults (21-30 and 31-40 years), but not senior adults (51+ years), p<.05.

**Multiple regression analysis of AUDIT scores**

Table 4 indicates the Pearson correlation between AUDIT scores and predictors formed from other scales and subscales used in the study.

In order to understand the relative contribution of different factors in predicting alcohol disorder within the study population, the study results were subjected to hierarchical statistical regression analysis. Predictors were chosen for entry into the regression equation if their Pearson correlation with AUDIT scores was significant at the .05 level, or higher.

Accordingly, the following predictors were selected (in order of entry into the equation): gender, practice type (privately or publicly paid), OSI coping (involvement), CBI (work), CBI (patients), trait (anxiety), AUDV (habit) and (genetic).

Separate analyses were carried out on the whole population, and the subgroups of: male/female, urban/rural, and mid/early or late career respondents. The total amount of variance of AUDIT scores explained in the whole population was 32 per cent.

We also examined which source of stress, i.e., personal, work or patient was more predictive of alcohol consumption. The notable feature of these analyses was that, within the total population, work stress accounted for only a small percentage (2.4 per cent) of the variance of AUDIT scores, whilst personal and patient stress failed to contribute anything at all to the variance explained. This contrasted with

**Table 3. Percentage (number) alcohol use by respondents according to practice type, location, stage of career and gender**

Alcohol use	Location		Practice type		Career stage			Gender	
	Urban (n=254)	Rural (n=49)	Private (n=236)	Public (n=73)	Early career (0-10 yrs) (n=86)	Mid career (11-20 yrs) (n=80)	Late career (21+ yrs) (n=144)	Male (n=219)	Female (n=81)
Nil concern	87.1 (222)	78.4 (40)	82.2 (194)	94.5 (69)	94.2 (81)	85 (68)	79.9 (115)	80.8 (117)	98.8 (80)
Hazardous level	<b>11.4 (29)</b>	<b>15.7 (8)</b>	<b>15.7 (37)</b>	<b>4.1 (3)</b>	<b>5.8 (5)</b>	<b>12.5 (10)</b>	<b>17.4 (25)</b>	<b>16.4 (36)</b>	<b>1.2 (1)</b>
Harmful level	.4 (1)	2.0 (1)	.4 (1)	1.4 (1)	-	1.3 (1)	.7 (1)	.9 (2)	-
Dependence level	.8 (2)	3.9 (2)	1.7 (4)	-	-	1.3 (1)	2.1 (3)	1.8 (4)	-
Total	100 (254)	100 (49)	100 (236)	100 (73)	100 (86)	100 (80)	100 (144)	100 (219)	100 (81)
Total % of clinical concern	<b>12.9</b>	<b>21.4</b>	<b>13.0</b>	<b>5.5</b>	<b>5.8</b>	<b>15.1</b>	<b>20.2</b>	<b>19.1</b>	<b>1.2</b>

Notes: Percentage alcohol use at levels of clinical concern is shown in bold

Actual numbers of cases are shown in parenthesis

Total n in any one category may not equal study total because of missing values

Normative Values for South Australia are 'Hazardous Use' and above=5.8 per cent (using a conservative measure)<sup>66</sup>

Outlier scores, which were removed from general analyses, but which are important to this distribution table, are included in it

**Table 4. Matrix of correlations of audit score with other predictors**

	Audit	Gender	Location	Career stage	Payment type	OSiCo strategy	OSiCo logi	OSiCo relations	OSiCo time man involvement	OSiCo soc supp	OSiCo denial	OSi health	CBI personal	CBI work	CBI patients	Spillberger State	Spillberger trait	AUDV ambition	AUDV dysfunct fam	AUDV genetic	AUDV habit	AUDV esteem	
Audit total score	1																						
Gender	-.32**	1																					
Location	-.02	.00	1																				
Career stage	-.02	.08	.01	1																			
Payment type	-.25**	.19	.01	.01	1																		
OSiCo strategies	.02	-.04	.01	-.15	.03	1																	
OSiCo logic	.07	.05	.05	-.17	.02	.40	1																
OSiCo relations	-.01	.05	-.05	.04	-.09	.41	.19	1															
OSiCo timeman	.01	.03	.08	-.03	-.03	.32	.46	.20	1														
OSiCo involvmen	.14**	-.07	-.06	.10	-.02	.06	.03	.13	.08	1													
OSiCo socsupp	-.04	.09	.00	-.29	-.08	.49	.39	.04	-.20	-.05	1												
OSiCo denial	-.02	-.05	.06	.11	.07	-.02	-.06	.01	-.02	.39	.15	1											
OSi health	.78	.08	.03	.08	.00	-.02	-.01	.03	-.01	-.07	.06	.72	1										
CBI persona	.05	.05	.06	.08	.03	-.09	-.05	-.03	.05	-.11	.06	.82	.82	1									
CBI work	.19**	-.07	.03	.05	.00	-.11	-.03	-.07	.01	-.15	.06	.65	.65	.82	1								
CBI patients	.18**	-.14	-.05	.03	-.04	-.11	-.03	-.11	-.05	-.16	.04	.56	.56	.78	.78	1							
Spillberger state	.09	-.02	-.08	.03	-.04	-.01	.01	.02	.09	-.01	.08	.50	.50	.54	.59	.59	1						
Spillberger trait	.11*	.06	-.04	.04	-.04	-.02	.01	-.02	.07	-.01	.01	.58	.58	.60	.60	.82	.82	1					
AUDV ambition	-.05	.05	.10	-.04	-.04	-.02	.01	-.03	.04	-.01	-.09	.13	.16	.15	.09	.09	.09	.09	1				
AUDV dysfunct fam	.09	-.07	-.03	-.00	-.01	.02	.01	-.05	.05	-.06	.03	.23	.22	.25	.26	.40	.39	-.02	.02	1			
AUDV genetic	.16**	-.04	.07	.04	-.01	-.05	-.05	-.05	.02	.05	.01	.14	.14	.13	.09	.14	.18	.07	.14	.19	1		
AUDV habit	.49**	-.27	.04	-.04	-.13	.00	.09	-.01	.05	-.09	-.01	.17	.15	.15	.15	.11	.20	.09	.15	.16	.16	1	
AUDV esteem	.01	-.07	-.01	-.01	.02	-.03	.03	-.11	-.04	-.08	-.02	.16**	.15**	.19**	.25**	.33**	.30**	-.11	.00	.09	.10	.10	1

Notes: \*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

vulnerability factors, which explained 16.5 per cent of variance. Inspection revealed that gender (male) was also a significant predictor, accounting for 10.9 per cent of the variance explained. The only other predictive factor of significance was practice type, with private practice being more predictive of AUDIT scores (3.5 per cent) than public practice.

Within the subgroups examined separately, the total variance of AUDIT scores explained ranged from 23.4 per cent (males) to 44.8 per cent within the rural subgroup. The amount of variance explained by stress alone varied between 1.2 per cent (late career subgroup) and 8.8 per cent (females). In contrast, the variance explained by vulnerability factors ranged from 15.9 per cent (late career) to 30.1 per cent within the rural subgroup. Among females, vulnerability factors explained 21.1 per cent.

Of the various vulnerability factors, habit (the tendency to drink excessively prior to graduation) was the most consistently strong predictor of hazardous level drinking contributing between 7.9 per cent (rural) and 15.6 per cent (males and early career groups) of variance explained. Other vulnerability factors of significance were genetic, which contributed between 2 per cent (males) and 16 per cent (late career), and trait (anxiety) which contributed between 6.1 per cent of variance in female AUDIT scores, and 16 per cent in the late career scores.

The remaining factor of predictive significance was gender (male), which explained between 6.1 per cent (mid career) and 15.6 per cent (late career).

## DISCUSSION

The levels of burnout recorded by dentists in this study are consistent with those which have been noted in other studies of Australian dentists.<sup>24</sup> Some 16 per cent of respondents overall were identified as having 'high' to 'very high' burnout on one or other of the CBI subscales. Some 8 per cent demonstrated 'very high' burnout on one or other of the subscales. This figure is significantly higher than that reported in the PUMA study undertaken by the CBI scale's authors.<sup>44</sup> The present findings confirm that dentistry is a stressful profession, capable of taking its toll on the individual practitioner.

Alcohol consumption at a level regarded as hazardous (or worse) is shown to be a feature of between 15 and 20 per cent for South Australian dentists in mid and late career, and in excess of 20 per cent for rural dentists. Such consumption is nearly four times the normative South Australian population on a conservative measure.<sup>42</sup> This finding is clearly at variance with the observations of Stinson<sup>21</sup> and others<sup>18,20</sup> that dentists (and other health professionals) are at no greater risk for AUD than normative populations. It is acknowledged that the extent to which self-reports of alcohol and drug use may be regarded as reliable is debatable. Some authorities<sup>43,44</sup> suggest that self-reports are surprisingly honest and

accurate. Other workers have suggested that self-reports consistently under-report alcohol use compared with other assessment forms, such as personal interviews.<sup>45-47</sup> Whatever the definitive answer to this question might be, there is little doubt that *over-reporting* is unlikely to be a problem associated with self-report studies, including this study. Hence the figures of alcohol consumption by dentists reported in this study should be regarded as minima.

The varying use of alcohol at different stages in dentists' careers shown in Table 3, suggests that alcohol consumption tends to increase with age and years of experience. The consumption of alcohol by older dentists in the group was significantly higher than younger groups, and this trend is different from that noted in other studies of (largely) non-professional respondents in whom higher consumption is generally a feature of youth.

Alcohol Use Disorder is recognized to be of multifactorial origin. In view of the limited variance (of alcohol use) that any combination of predictors used in the study explained, it is not possible to suggest any comprehensive explanation of the construct within this group. *Whatever* the reasons for it may be, the actual levels of consumption (notably amongst rural practitioners, males, and in mid and late career) *are* significant.

It is notable that stress, as measured on the CBI (personal) subscale, did not reach significance in *any* prediction equation of alcohol use for *any* group or subgroup of the study population. The CBI (work) found modest significance in all analyses and the (patients) subscale was of minimal significance in only two subgroups. However, the highest amount of variance of AUDIT score explained by stress predictors alone was 8.8 per cent in the female subgroup. In all other subgroups the variance explained was 5 per cent.

Taken together, this suggests that occupational stress, of itself, does not play a major role in the alcohol use level of South Australian general dentists.

It is notable that the 'vulnerability' predictor of AUDV (habit) was a consistently high contributor to all the regression equations in the population and all subpopulations. This suggests that individuals who have developed a pattern of high alcohol consumption by their student days (for whatever combination of reasons that are not clearly elucidated by this study) take this tendency with them into their postgraduate life. It has been suggested that individuals with dysfunctional backgrounds, and personal characteristics (such as low self-esteem) are more at risk of AUD.<sup>16</sup> The observation that the highest and most common predictors of AUD in the study were the personal vulnerability predictors of AUDV (habit) and (genetic), and Spielberger (trait) suggests some support for a 'personal vulnerability' explanation of AUD within the study population, particularly since these predictors explained the highest amount of variance of

AUDIT scores in those subgroups who manifested the highest proportion of hazardous level (and above) alcohol consumption: non-urban (rural) and late career. This observation is highlighted with the caveat that the (Cronbach's) Alpha value for the AUDV scale used in the study (.54) was less than optimal.

## CONCLUSIONS

This study indicates that professional stress/burnout and maladaptive use of alcohol are issues of significance amongst South Australian general dental practitioners. Whilst the role of occupational stress as a mediator of AUD has drawn different conclusions from different authorities,<sup>16,19,23</sup> in this study these two epiphenomena were not shown to be causally linked.

The high levels of hazardous (or worse) consumption amongst non-urban (rural) dentists are of particular concern. Amongst the many difficulties faced by rural colleagues (who, anecdotally, generally receive disproportionately less professional and peer support than urban dentists), maladaptive alcohol use could be viewed as an issue worthy of an effort to address.

Observations overseas (and anecdotal evidence provided in comments made by respondents on returned questionnaires) suggest that, in company with other professionals, many dentists consider that drinking wine with meals on a regular basis (for example) is a natural part of the 'good life' for which they work hard, and come to enjoy. The increasing levels of hazardous level drinking with career stage, noted in this study, would seem to support such a suggestion. Whilst such behaviour might be sufficiently commonplace within their socio-economic group to be a norm, the physiological reality of its potential adverse health affects is incontrovertible. A study by Conigrave<sup>48</sup> highlights the fact that subjects identified as consuming at a 'hazardous' level show a six-fold greater likelihood of experiencing a drink related adverse social or health event within 2-3 years compared with those consuming at a 'non-hazardous' level.

This study suggests no evidence of a 'culture' of excessive drinking among dentists, such as has been associated with other occupational groups such as miners and law enforcement personnel.<sup>49,50</sup> Nevertheless, it is evident that not less than 4 per cent of the South Australian dental community has a serious drinking problem. Whilst this may not translate into large absolute numbers, their situation might be considered in the light that they may have a disproportionately high public profile.

Dentists continue to enjoy a generally high standing in the community.<sup>51</sup> In the interests of ensuring a preservation of this deserved status, it may be considered appropriate that the potential for alcohol disorders among them (particularly those arising principally from 'lifestyle' choices) be addressed by professional dental bodies (and state Dental Boards) providing appropriate advice to members on the

recognized safe limits of regular alcohol consumption. Notwithstanding the great media focus on opiate based drugs, there is agreement among authorities on addiction that legally available alcohol is a greater source of damage to individuals and communities alike by some orders of magnitude. Anecdotally, health professionals do not seek help for their own stress and personal frailty readily, thus the development of effective mechanisms for ensuring appropriate support to those experiencing difficulties with alcohol would seem desirable.

A larger study, which included practitioners in other States and in larger numbers, would be needed to confirm these observations and determine if they are applicable generally.

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## REFERENCES

1. Anna DJ. Assisting the military impaired health-care provider: an Advocacy program developed by the Army Medical Department. *Issues Ment Health Nurs* 1988;9:201-210.
2. Fowle DG. The misuse of alcohol and other drugs by doctors: a UK report and one region's response. *Alcohol Alcohol* 1999;34:666-671.
3. Galanter M, Talbott D, Gellegos K, Rubenstone E. Combined Alcoholics Anonymous and professional care for addicted physicians. *Am J Psychiatry* 1990;147:64-68.
4. Good GE, Thoreson P, Shaughnessy P. Substance abuse, confrontation of impaired colleagues and psychological functioning among counseling psychologists: A national survey. *Couns Psychol* 1995;23:703-721.
5. Lapham SC, Chang I, Gregory C. Substance abuse intervention for health care workers: a preliminary report. *J Behav Health Serv Res* 2000;27:131-143.
6. McCrady BS. The distressed or impaired professional: From retribution to rehabilitation. *J Drug Issues* 1989;19:337-349.
7. Nace EP. *Achievement and Addiction: A guide to the treatment of professionals*. New York: Brunner/Mazel Inc, 1995.
8. Pauwels JA, Benzer DG. The impaired health care professional. *J Fam Pract* 1989;29:477-482.
9. Swearingen C. The impaired psychiatrist. *Psychiatr Clin North Am* 1990;13:1-11.
10. Baldwin DC, Hughes PH, Conrad SE, Storr C, Sheehan D. Substance use amongst senior medical students: a survey of 23 medical schools. *JAMA* 1991;265:2074-2078.
11. Engs RC, Hanson DJ. Alcohol knowledge and drinking patterns of nursing students over time. *Education* 1989;110:179-188.
12. Mangus RS, Hawkins CE, Miller MJ. Tobacco and alcohol use among 1996 medical school graduates. *JAMA* 1998;280:1192-1193.
13. Newbury-Birch D, White M, Karmali F. Factors influencing alcohol and illegal drug use among medical students. *Drug Alcohol Depen* 2000;59:125-130.
14. Pickard M, Bates L, Dorian M. Alcohol and drug use in second-year medical students at the University of Leeds. *Med Educ* 2000;34:148-150.
15. Tyssen R, Vaglum P, Aasland OP, Gronvold N, Ekeberg O. Use of alcohol to cope with tension, and its relation to gender, years in medical school and hazardous drinking: a study of nation-wide Norwegian samples of medical students. *Addiction* 1998;93:1341-1349.
16. Coombs RH. *Drug-Impaired Professionals*. Cambridge, MA: Harvard University Press, 1997.
17. Hughes PH, Brandenburg N, Baldwin DC, et al. Prevalence of substance use among US physicians. *JAMA* 1992;267:2333-2339.
18. Elliott R. Smoking, Drinking and Occupation. In: *Occupational Health*, Ch 12. HMSO, 1995.
19. Weir E. Substance abuse among physicians. *CMAJ* 2000;162:1730-1732.
20. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders (3rd edn, revised)*. Washington DC: American Psychiatric Association, 1987.
21. Stinson FS, DeBakey SF, Steffens RA. Prevalence of DSM-III-R alcohol abuse and/or dependence among selected occupations: United States, 1988. *Alcohol Health Res World* 1992;16:165-173.
22. Osborne D, Croucher R. Levels of burnout in general dental practitioners in the south-east of England. *Br Dent J* 1994;177:372-377.
23. St Yves A, Freeston MH, Godbout F, Poulin L, St-Armand C, Verret M. Externality and burnout among dentists. *Psychol Rep* 1989;65:755-758.
24. Bevan AHJ. *Occupational stress in South Australian Dentists*. Adelaide, The University of Adelaide, 1999. BSc (Hons) thesis.
25. Pohorecky LA. Stress and alcohol interaction: an update of human research. *Alcohol Clin Exp Res* 1991;15:438-459.
26. Brady KT, Sonne SC. The role of stress in alcohol use, alcoholism treatment, and relapse. *Alcohol Res Health* 1999;23:263-271.
27. AIHW (DSRU). *Dental Practitioner Statistics, SA, 1995*. AIHW Dental Statistics and Research Unit. AIHW Cat. No. Den 21, 1995.
28. Borritz M, Kristensen T. *Copenhagen Burnout Inventory (1st edn)*. Copenhagen, Denmark: National Institute of Occupational Health, 1999a.
29. Barbor TF, Higgins-Biddle JC. *The Alcohol Use Disorders Identification Test: Guidelines for use in Primary Health Care (2nd edn)*. World Health Organization, 2001 (in press).
30. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the alcohol use disorders identification test (AUDIT). WHO collaborative project on early detection of persons with harmful alcohol consumption. II. *Addiction* 1993;88:791-804.
31. Conigrave KM, Hall WD, Saunders JB. The AUDIT questionnaire: choosing a cut-off score. *Alcohol Use Disorder Identification Test*. *Addiction* 1995;90:1349-1356.
32. Hays RD, Mertz JF, Nicholas R. Response burden, reliability and validity of the CAGE, short MAST, and the AUDIT screening measures. *Behavioural Research Methods, Instruments and Computers* 1995;27:277-280.
33. World Health Organization. *International classification of disease and related health problems*. 10th edn. Geneva: World Health Organization, 1992.
34. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th edn. Washington DC: American Psychiatric Association, 1994.
35. Cooper CL, Sloan SJ, Williams S. *Occupational Stress Indicator Guide*. Windsor, England: NFER-Nelson, 1988.
36. Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs JA. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press, 1983.
37. Robertson IT, Cooper CL, Williams J. The validity of the occupational stress indicator. *Work Stress* 1990;4:29-39.
38. Indik B, Seashore SE, Slesinger J. Demographic correlates of psychological strain. *J Abnorm Soc Psych* 1964;69:26-38.
39. Williams AF. The alcoholic personality. In Kissin B, Begleiter H, eds. *The Biology of Alcoholism*. New York: Plenum, 1976.
40. Dillman DA. *Mail and telephone surveys: the total design method*. New York: Wiley, 2000.

41. Borritz M, Kristensen T. PUMA (Study on Personal Burnout, Work Burnout and Client Burnout). Copenhagen, Denmark: National Institute of Occupational Health, 1999b.
42. Miller M, Draper G. Statistics on drug use in Australia 2000. AIHW cat.no. PHE 30. Canberra: AIHW (Drug series no. 8), 2001.
43. Adair EBG, Craddock SG, Miller HG, Turner CF. Quality of treatment data: Reliability over time of self-reports given by clients in treatment for substance abuse. *J Subst Abuse Treat* 1996;13:145-149.
44. Babor TF, Steinberg K, Anton R, Del Bosca F. Talk is cheap: measuring drinking outcomes in clinical trials. *J Stud Alcohol* 2000;61:55-63.
45. Strunin L. Assessing alcohol consumption: developments from qualitative research methods. *Soc Sci Med* 2001;53:215-226.
46. Lemmens P, Knibbe RA, Tan F. Weekly recall and diary estimates of alcohol consumption in a general population survey. *J Stud Alcohol* 1988;49:131-135.
47. Sobell LC, Toneatto T, Sobell MB, Leo GI, Johnson L. Alcohol abusers' perceptions of the accuracy of their self-reports of drinking: implications for treatment. *Addict Behav* 1992;17:507-511.
48. Conigrave KM, Saunders JB, Reznik RB. Predictive capacity of the AUDIT questionnaire for alcohol-related harm. *Addiction* 1995;90:1479-1485.
49. Davey JD, Obst PL, Sheehan MC. The use of AUDIT as a screening tool for alcohol use in the police work place. *Drug Alcohol Rev* 2000;19:49-54.
50. Lennings CJ, Feeney GF, Sheehan M, Young RM, McPherson A, Tucker J. Work-place screening of mine employees using the Alcohol Use Disorders Indicator Test (AUDIT) and alcohol breathalyzation. *Drug Alcohol Rev* 1997;16:357-363.
51. Stevens RE, Lawrence LW, Loudon D. The public's image of doctors, dentists, and pharmacists. *Health Mark Q* 1991;9:97-105.

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