

Subjective and objective social status: associations with psychosocial predictors and oral health

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Objective: While social status and health have been investigated, there is less focus on the effects of objective and subjective social status and psychosocial factors. This study aimed to investigate oral health impacts by subjective social status (SSS) and psychosocial predictors stratified by subjective social status. **Methods:** A random cross-sectional sample of 45-54-year old South Australians was surveyed in 2004-05. Oral health impact was assessed using OHIP-14. Socio-economic status was determined using objective (income) and subjective (McArthur scale) measures. Psychosocial variables comprised social support, health self-efficacy, coping and affectivity. **Results:** Responses were collected from 986 persons (response rate=44.4%). Lower SSS was more frequently observed in the low (70.2%) than high-income group (28.5%). Lower SSS was associated ($p<0.05$) with lower education, social support, health competence, and coping, but higher negative affect within income groups. The interaction of SSS and income showed OHIP was consistently lower at high SSS regardless of higher or lower income, but at low SSS, OHIP was higher ($p<0.05$) in the lower than higher income group. **Conclusions:** SSS was associated with income. Their interaction indicated low SSS in combination with low income was associated with higher oral health impacts.

Keywords: *Quality of life, oral health, socioeconomic status, psychosocial, subjective social status*

Introduction

Socioeconomic status (SES) has been associated with many health conditions (Marmot *et al.*, 2005). SES is also related to oral conditions such as dental caries, periodontal disease and tooth loss (Duijster *et al.*, 2017). SES is typically measured using income-based approaches such as annual household income. These well-established income-based approaches are considered objective SES measures. In addition to objective measures there has been interest in subjective social status (Adler *et al.*, 2000).

Subjective social status (SSS) captures perceived social position using a ladder-based self-report of where a person feels they fit within society (Euteneuer, 2014). SSS has been associated with medical conditions such as angina, diabetes and respiratory illness (Singh-Manoux *et al.*, 2003). The roles of objective and subjective social status have been compared. For example, one study suggested SSS was a better predictor of health status in middle-aged adults (Singh-Manoux *et al.*, 2005), reflecting the broader perception of SES that SSS is considered to capture.

The biopsychosocial model of health gives a more holistic perspective than the biomedical model (Borrell-Carrio *et al.*, 2004). This includes recognition of psychosocial factors, such as stress, as determinants of health (Fava and Sonino, 2017). Psychosocial factors have also been investigated in relation to SSS, suggesting that SSS does not reflect psychological bias (Demakakos *et al.*, 2008). While related to negative affect, SSS had independent associations with physical and psychological outcomes (Adler *et al.*, 2000), and negative affect was not found to confound the SSS and health relationship (Operario *et al.*, 2004).

While social status has been investigated as a predictor of health, and independent roles of objective and subjective social status evaluated, there has been less focus on objective and subjective social status adjusted for psychosocial factors. There is a need to investigate whether SSS status plays a modification role of the association between income on oral health. Oral health and general health have been associated with objective SES and subjective SES, showing subjective measures were not more likely to be associated than objective ones (Brennan *et al.*, 2019). This study aims to investigate the oral health impacts of income and psychosocial predictors stratified by subjective social status, and test whether SSS modified the effect of objective social status on oral health impact. Further, we explored the associations of demographic and psychosocial factors with levels of SSS and income.

Methods

A random cross-sectional sample was taken from the electoral roll of 2,469 45-54-year olds in Adelaide, South Australia during 2004-05. Data were collected by questionnaires with up to four follow-up mailings (Brennan *et al.*, 2011). The outcome, OHIP-14, uses 14 items to capture oral health impacts in the preceding 12 months (Slade, 1997). Responses were summed across items, with higher scores indicating more frequent impacts. OHIP-14 has demonstrated reliability, validity and precision (Slade, 1997; Brennan 2013).

SES was assessed using subjective and objective measures. Subjective SES was measured by asking participants to rate how they stand in society in comparison

to their acquaintances on a ladder from 0 to 10 rungs, where higher rungs indicate being better off in terms of education, money and jobs (Adler *et al.*, 2000). Objective SES was assessed using annual household income in 9 categories from 'up to AUD \$12,000' to 'more than AUD \$80,000'.

Psychosocial variables included social support, health self-efficacy, coping and affectivity. The Multidimensional Scale of Perceived Social Support uses a 12-item, 5-point Likert-type scale (Dahlem *et al.*, 1991) with higher scores indicating receipt of higher social support. Health self-efficacy was assessed using the Perceived Health Competence scale, comprising 8 items on a 5-point Likert scale (Smith *et al.*, 1995) with higher scores indicating more capability to control health. Coping was measured from the Perceived Stress Scale (PSS) (Cohen *et al.*, 1983, Sanders *et al.*, 2007). Items were coded on a 5-point scale and summed. Negative affectivity (NA) was measured using 9 items that asked how often each item occurred over the previous year. NA items were summed to produce the scale, with higher scores equating to greater negative affectivity (Warr *et al.*, 1983).

Sex was coded as 'male' or 'female', place of birth as 'Australia' or 'overseas', and education as tertiary 'Degree or diploma' or 'non-tertiary'. Income and SSS were coded into approximately equal lower and higher categories. These comprised 'up to \$60,000' and '\$60,001 or more' for annual household income, and rungs '1 to 6' (less well off) and '7 to 9' (better off) for SSS.

Income and SSS were cross-tabulated, and bivariate associations of sociodemographic and psychosocial variables with SSS assessed. Associations were assessed between the dependent variable (OHIP-14) and main explanatory variables using general linear models. Interaction of income and SSS was analysed in a single general linear model of OHIP-14 where both income strata were combined. Explanatory variables were entered either as indicator variables with levels coded as 1 or 0 (reference category), or as continuous variables for the psychosocial scales.

All procedures were in accordance with the World Medical Association Declaration of Helsinki principles. Ethics clearance was provided by the Human Research Ethics Committee of the University of Adelaide (H-74-2002).

Results

A total of 986 persons responded (response rate: 44.4%). Around half were male (47.2%), most were Australian born (71.6%) and 39.3% were tertiary educated. Approximately half had higher income (43.8) and 47.8% were in the higher SSS category. The mean (Std Dev) responses were 6.8 (8.5) for OHIP. For the psychosocial variables the responses were 47.6 (9.0) for social support, 3.7 (0.6) for health self-efficacy, 17.5 (4.1) for coping and 16.6 (5.7) for NA. Cronbach alpha values were 0.95 (social support), 0.85 (health self-efficacy), 0.83 (coping), and 0.85 (NA).

Income and SSS showed a positive correlation (Cramer's $V=0.415$), with higher proportions on the diagonal cells (Table 1). Within each income level there was variation in SSS. The smallest proportions for the high SSS group were in the low-income group and for the low SSS group in the high-income group.

Table 1. Distribution of income by subjective social status (row %)

Income	Subjective social status	
	Low	High
Low	70.2	29.8
High	28.5	71.5

Table Chi-square: $p<0.0001$
Cramer's $V = 0.415$

Among sociodemographic characteristics the only significant difference by SSS within income was for education (Table 2). While the proportion with tertiary education was higher at higher income, tertiary education was consistently lower for the low SSS group within income groups. All psychosocial variables varied significantly by SSS within income groups. Social support, health self-efficacy, and coping were consistently higher across low to high SSS within income groups, while NA was consistently lower.

Oral health impact was lower ($p<0.05$) for the higher income group (-2.6, $se=1.0$) with low SSS, as shown in the adjusted models (Table 3). When SSS strata were combined, the interaction of SSS and income was statistically significant ($p<0.05$). OHIP was consistently lower (i.e. fewer impacts) in the high-SSS strata regardless of income (adjusted means=5.2 and 4.7) but within the low-SSS strata OHIP was higher for those in the lower (mean=9.5) than higher (mean=6.8) income group.

Discussion

This study explored subjective and objective social status while accounting for psychological factors on oral health impacts and whether SSS had an effect modification on income and oral health impact. The findings showed at lower SSS, higher income along with more social support were associated with lower oral health impact. Common risk predictors for oral health impact within both low- and high-SSS strata were place of birth, health self-efficacy and negative affectivity. Health self-efficacy and non-overseas place of birth were associated with lower oral health impact, and negative affectivity was associated with higher impact.

High income within the low SSS strata was associated with less impact on oral health, but not within the high SSS strata which was indicative of effect modification. Low SSS in combination with low income was associated with more oral health impact. This suggests income alone may not determine oral impacts, but SSS is also important. According to a cultural sociological approach, subjective status is not necessarily influenced by material or objective status but may impact on the relationship between objective status and health as people adapt to expectations of their perceived social position. In this view, SSS may moderate the role of objective social status with better health outcomes within an objective social class when subjective status is higher, and worse health outcomes within an objective social class when subjective status is lower (D'Hooge *et al.*, 2018).

Table 2. Bivariate associations with income stratified by subjective social status

<i>Income</i>	<i>Subjective social status</i>		<i>P value</i>
	<i>Low</i>	<i>High</i>	
	Male: %	Male: %	
Low	44.7	44.9	ns
High	48.7	52.7	ns
	Australian born: %	Australian born: %	
Low	73.7	72.8	ns
High	66.7	70.3	ns
	Tertiary educated: %	Tertiary educated: %	
Low	22.7	38.1	<0.01
High	37.8	61.5	<0.01
	Social support: mean (se)	Social support: mean (se)	
Low	45.1 (0.5)	47.2 (0.7)	<0.05
High	48.3 (0.8)	50.3 (0.4)	<0.05
	Health competence: mean (se)	Health competence: mean (se)	
Low	3.4 (0.04)	3.8 (0.05)	<0.05
High	3.7 (0.05)	3.9 (0.03)	<0.05
	Coping: mean (se)	Coping: mean (se)	
Low	15.9 (0.2)	18.3 (0.3)	<0.05
High	17.2 (0.4)	19.3 (0.2)	<0.05
	Negative affectivity: mean (se)	Negative affectivity: mean (se)	
Low	18.6 (0.3)	15.6 (0.4)	<0.05
High	17.1 (0.5)	14.5 (0.3)	<0.05

The study findings are consistent with the medical field. For example, in an older ethnic Chinese population, subjective ranking of position in the social hierarchy was associated with self-rated health and physical functional status, independently of objective SES measures such as education, income, and occupation (Hu *et al.*, 2005). Hu *et al.*, (2005) concluded that while subjective and objective SES were related, they were not interchangeable, each having independent contributions to health risks. Another study found lower SSS associated with coronary artery disease, hypertension, diabetes and dyslipidaemia (Tang *et al.*, 2016). They concluded perception of position in the social hierarchy has health effects beyond income, occupation and education. A cross-national comparison study found a positive effect of subjective SES on health and wellbeing, controlling for objective SES markers such as income, education, and occupation (Prag *et al.*, 2016). They concluded this indicated harm caused by cognitive and emotional reactions to lower status positions, not due to objective SES indicators. A prospective study of oral health-related quality of life (OHQoL) found that while subjective SES was not related to OHQoL, objective SES measures predicted OHQoL through psychosocial pathways such as sense of coherence, social support and stress (Gupta *et al.*, 2015).

The present study showed SSS was moderately correlated with income. Over a quarter were either classed in the high SSS group at lower income, or in the low SSS group at higher income. Education and psychosocial variables were related to SSS by income level. For example, those reporting higher SSS were more likely

to have tertiary education for both lower and higher income groups. Those self-reporting higher SSS had higher social support, perceived health competency and coping but lower negative affect than lower SSS within each income group. While SSS was related to income, socio-demographic and psychosocial variables, they did not fully explain the association with oral health impact as indicated by the adjusted analyses.

Research of how people perceive their SSS has considered social structural location and psychological processes, and concluded it involves cognitive averaging of standard markers of socioeconomic position (Singh-Manoux *et al.*, 2003). However, education as an aspect of past achievement was considered important, along with current and future prospects. While SSS partially overlaps wealth, as an indicator of life-time achievement and cumulative SES, SSS is also a means through which education and occupation influence health (Demakakos *et al.*, 2008). By incorporating experiences of deprivation and perceptions of social status, SSS adds social meaningfulness to the association between SES and health (Nock and Rossi, 1979). While SSS may incorporate cognitive averaging of objective SES, people may use information known only to them. This could include past or future prospects and subjective assessments of their capabilities. SSS may be downstream in the achievement process, reflecting occupation and earnings, as well as their determinants. It appears when rating SSS, people use information about their own education, current financial position and job experience but give less weight to averages for education and income related to their occupation (Neilsen *et al.*, 2015).

Table 3. Regression models of OHIP by subjective social status and income controlling for demographic and psychosocial characteristics

	Subjective social status		
	Low Coeff (se)	High Coeff (se)	All Coeff (se)
Intercept	24.9 (4.4)	7.5 (3.3)	17.8 (2.7)
Sex			
Male	0.1 (0.9)	0.7 (0.6)	0.4 (0.5)
Place of birth			
Australia	* -2.2 (1.0)	* -1.5 (0.6)	* -1.8 (0.6)
Education level			
Tertiary	-1.2 (1.0)	0.01 (0.6)	-0.3 (0.6)
Social support			
PSS scale	* -0.1 (0.5)	-0.04 (0.04)	* -0.1 (0.03)
Health self-efficacy			
PHC scale	* -4.5 (0.8)	* -1.9 (0.6)	* -3.3 (0.5)
Coping			
Coping subscale	0.1 (0.1)	0.07 (0.1)	0.1 (0.1)
Negative affectivity			
NA scale	* 0.3 (0.1)	* 0.4 (0.1)	* 0.3 (0.1)
Income			
Higher income	* -2.6 (1.0)	-0.5 (0.6)	* -3.1 (0.8)
Subjective Social Status			
Higher social status	-	-	* -2.3 (0.8)
Interaction			
Income by Social Status	-	-	* 2.9 (1.1)
Model R-sq:	22.0%	16.1%	23.4%

Reference categories: female sex, overseas place of birth, non-tertiary education level, low income, low subjective social status.
*p<0.05

Study limitations include the cross-sectional design, which precludes causal interpretations, with further research required to establish temporal aspects. While the response rate was lower than anticipated, some key demographic indicators (i.e., percentage female, Australian-born and Indigenous) from the Census restricted to 45-54 year-old Adelaide residents resembled the study sample. In addition, other population data showed a number of mainly small differences, with the main difference observed being the slightly higher percentage who spoke English and were concession card holders (Singh *et al*, 2015). The study has the strength of adding to knowledge of how income was associated with oral health within subjective SES levels.

Conclusions

Subjective measures of social status seem not just to be a proxy for objective SES, as they were not strongly correlated. It also appeared that subjective and objective measures were not just independent risk predictors, as income was a predictor of oral health impact at low SSS. Subjective and objective SES measures interacted to exacerbate the impact of oral health problems as an effect modifier. This was significant after controlling for education and psychosocial factors, suggesting these interaction effects were not strongly confounded by these factors.

Acknowledgements

Funded by a National Health and Medical Research Council project grant (250316) and CRE (1031310). The contents are solely the responsibility of the administering institution and authors and do not reflect the views of NHMRC.

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