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Brief Report

Religious Involvement and Psychological Stress as Predictors of Dental Health

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Abstract

Religious involvement has been linked to many indicators of health, including longevity. Previous research has identified psychological stress as a possible mediator for the positive effects of religion on health. Fewer studies have investigated the potential relationship between these psychosocial factors and dental health. This study examined religious involvement, stress, and dental health in a community sample. Participants included 150 community residents who received dental care as part of the study. Results indicated a significant positive association between religiousness and dental health, and a negative association between stress and dental health. These findings encourage further research on religion, stress, and dental health, as well as possible mechanisms for these associations.

Keywords: Religiousness; Religious Involvement; Perceived Stress; Dental Health

Introduction

In recent years, religion has received attention as a psychosocial factor that may exert a positive influence on physical health outcomes [1]. Religion comprises a broad domain that includes affiliations with religious denominations, ties to a particular religious congregation, involvement in religious practices such as private prayer and attendance at services, and various beliefs, values, and sentiments. A meta-analysis has suggested that indicators of religious involvement, or degree of religiousness, are associated with lower risk of all-cause mortality in large population-based studies [2]. Fewer studies, however, have examined the potential association between religion and dental health. One purpose of the current study was to investigate the possible association between religion and indicators of dental health.

Previous research has identified both health-related behaviors, and pathways involving the modulation of physiologic processes associated with psychological stress [3] as possible mechanisms for the salutary effects of religion on health. The association between psychological stress and physical health has been well documented over the previous decades. Perceived stress, subjective and psychological in nature, has been thought to affect health largely through physiological and behavioral pathways [4]. The experience of stress activates the sympathetic nervous system and is associated with cardiovascular [5], endocrinological [6], and immune [7] changes in the body. More recently, psychological stress has been reported to be associated with various measures of dental health, from plaque buildup to pocket depth and tooth loss [8]. Specifically, results from previous studies have shown evidence in support of stress contributing to the development of periodontal disease, through its effects on immune system function and chronic inflammation, as well as maladaptive health behavior [9]. Less research though, has been done to evaluate the effects of stress on broader indicators of dental health, such as fillings, cavities, or crowns. Another purpose of the current study was to examine the potential association between psychological stress and general dental health. In addition, this study would investigate potential interactive effects of religion and psychological stress on dental health.

Methods

Participants

Participants were community residents receiving dental care from the Dental Hygiene Department at New York City College of Technology. The final sample consisted of 150 participants: 59 men (39.3%) and 91 women (60.7%). Their average age was 35.68 years (*SD* = 14.16). Participants indicated their ethnic/racial group membership as follows: White/Caucasian, 52 (34.7%); Black/African American, 43 (28.7%); Hispanic/Latino, 27 (18%); Asian/Pacific Islander, 16 (10.6%); Others, 12 (8%).

Procedure

After obtaining approval from the Internal Review Board of New York City College of Technology, we began recruiting participants for this study in the Dental Hygiene Department. Patients who visited the dental hygiene clinic for the first time were introduced to the study and those who agreed to participate signed a consent form. Participants then proceeded to complete a dental history and background questionnaire, before receiving a dental examination from senior dental hygiene students. Examination by students were checked and confirmed by supervising clinical professors. Finally, participants would complete a psychosocial questionnaire before the end of their visit.

Measures

Psychological stress

The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was used to assess psychological stress. The PSS is also a well-validated, 14-item measure of subjective stress level. Participants rate their experience of stress in the last month on a 5-point frequency, where 1 = "*Never*" and 5 = "*Very* often". Sample items are "how often have you felt nervous and "stressed" and "how often have you been able to control irritations in your life". A total score is derived by summing responses to all items. In the current sample α = .85.

Religiousness

Religiousness was assessed using single-item measures of attendance, prayer, self-rated religiousness, and the degree of strength and comfort derived from religion. Responses to the attendance item were made on a 0-to-4 scale (Never, several times/year, several times/month, 1 time/week, and more than 1 time/week). Responses to the prayer measure were made on a 0-to-4 scale (Never, occasionally, several times/week, 1 time/day, and more than once/day). Responses to the self-rated religiousness item were made on a 0-to-3 scale (Not at all religious, slightly religious, fairly religious, and deeply religious). Responses to the strength and comfort measure were made on a 0-to-3 scale (None at all, a little, a moderate amount, and a great deal). Measures such as these have been linked to mortality in previous research [2]. To increase reliability, they were used to create a 4-item scale in the present study. To evaluate this measurement approach, responses to the 4 items were subjected to a principal axis factor analysis with oblique (Promax) rotation. Examination of the scree plot revealed a one-factor solution (eigenvalue = 2.66). Cronbach's alpha (α) for the 4-item religiousness scale = .90. Responses to the 4 items were therefore recoded into a single response scale before averaging them to create a measure of overall religiousness, with higher numbers indicating more religiousness.

Dental health

A dental health index was created by summing up the number of teeth with various dental conditions. Specifically, the dental conditions included in this study are: Cavity, filling, crown, missing, abrasion, abfraction, attrition, and erosion. Higher scores on this measure would indicate worse dental health.

Demographics and Background

Participants indicated their age, gender, ethnicity, and tobacco use history.

Results

Associations Among Psychosocial Factors

As expected, a significant positive correlation was found between age and religiousness, $r = .28$, $p < .01$. Age was positively associated with levels of religiousness. Also, a significant inverse correlation was found between age and PSS, $r = -.20$, $p < .05$. Age was negatively associated with perceived stress. No other significant correlations were found for the remaining psychosocial variables.

Main Effects Analysis

Effects of psychosocial variables on dental health were examined using multiple regression analysis. The main effects model included age, gender, and tobacco use as controlling variables, and psychological stress, and religiousness as predictor variables. This model accounted for a statistically significant portion of the variance ($R^2 = .44$, $p < .01$). Results indicated that age, religiousness, and perceived stress were significantly associated with dental health index. Older age was associated with worse dental health, $\beta = .45$, squared semi-partial correlation (sr^2) = .33, $p < .001$. Higher levels of religiousness was associated with better dental health (i.e., lower scores on the measure), $\beta = -.28$, squared semi-partial correlation (sr^2) = .11, $p < .05$. Higher levels of perceived stress was associated with worse dental health (i.e., higher scores on the measure),

β = .42, squared semi-partial correlation (sr^2) = .12, $p < .05$. There were no significant effects for any of the remaining predictors (*ps* > .17).

Moderation Analysis

Analyses involving product terms were added in a second Step to examine possible interactions among predictors included in Step 1 of the main effects analysis described above. No significant interactions were among predictors included in Step 1 on dental health index (*ps* > .38).

Discussions

The current study examined the associations among religiousness, psychological stress, and dental health. The positive association between age and religiousness, as well as age and perceived stress, appear to be consistent with previous studies. Individuals have been found to increase in levels of religiousness as they age [10, 11]. Older adults have also been found to report less stress and higher levels of life satisfaction and happiness than their younger counterparts [12, 13].

The study also found religiousness to be associated with dental health, in the expected direction. Religiousness, defined here as the degree to which individuals engage in religious activities, has been reported to be related to many indicators of health, including longevity [14, 15]. Previous studies have reported findings that point to an inverse relationship between religious involvement and hypertension, cardiovascular disease, as well as positive associations with immune and endocrine functions [16]. One possible mechanism that may account for the protective effects of religiousness on health is health behavior. Individuals who are high on religiousness may be instructed to and therefore more likely than less religious people, to engage in health promoting, as oppose to health compromising behaviors. Previous research has found evidence that support this possibility [9, 17, 18].The current study was the first we are aware of that examined the relationship between religiousness and dental health. It is possible that similar mechanisms are operating here, as ones that contribute to the association between religion and other measures of physical health. Future studies may assess and test health behavior as a potential mediator for the positive effects of religiousness on dental health. Finally, results from this study also showed a significant negative association between stress and dental health. High levels of stress were associated with poor dental health. Previous research has also found an inverse association between psychological stress and measures of general health, including dental health. Specifically, stress has been reported to be associated with indicators of periodontal health [9]. Results from this line of research have pointed to inflammation and immune function as possible pathways for these associations [19, 20]. This study attempted to investigate the relationship between stress and a broader indicator of dental health, as measured by a composite score derived from the sum of cavity, filling, crown, missing, abrasion, abfraction, attrition, and erosion. Lower scores on this measure would indicate better dental health. This initial finding presents the possibility that stress may affect dental health on a broader spectrum and more basic level than previously considered. Contrary to the relationship between religiousness and health behavior, stress has been found to be associated with health damaging behavior [4]. Therefore, health behavior may also play a role in clarifying the association between stress and broad indicators of dental health.

Limitations

Despite of these initial findings, caution is called for in drawing conclusions from this study. As already discussed, this was the first study we are aware of that investigated the relationship between religiousness and dental health. Therefore, replications of the study are needed in order to confirm these findings. Also, religiousness is only one dimension of the multifaceted construct of religion or spirituality. The use of additional scales or assessments would provide a more comprehensive account of the relationship between religion and dental health. Finally, the current study employed a cross-sectional design, which provided a limited view on the topic under investigation. Future studies using a longitudinal design, examining changes in religiousness, as well as changes in dental health, may contribute to establishing a causal relationship between the two.

Conclusions

Both religion and psychological stress have been found to be associated with various indicators of health. Fewer studies, however, have examined the relationship between these constructs and dental health. This study utilized a broad and basic measure of dental health, using a composite score obtained during dental checkup in a community sample. Controlling for demographic variables and other covariates, results from the study showed a positive association between religiousness and dental health, and a negative association between stress and dental health. These findings have implications in program design for interventions aimed at increasing dental health.

References:

1. Koenig, H. G, McCullough, M. E, Larson, D. B. Handbook of religion and health. New York: Oxford University Press. 2001.

2. McCullough M. E, Hoyt W. T, Larson D. B, Koenig H. G, Thoresen C. Religious involvement and mortality: A meta-analytic review. Health Psychology. 2000, 19(3): 211-222.

3. Seeman, T. E., Dubin, L. F., & Seeman, M. Religiosity/spirituality and health: A critical review of the evidence for biological pathways. American Psychologist. 2003, 58(1): 53-63.

4. Baum A, Posluszny D. M. Health psychology: Mapping biobe-

havioral contributions to health and illness. Annual Review of Psychology. 1999, 50: 137-163.

5. Creaven AM, Hughes B. M. Cardiovascular responses to mental activation of social support schemas. International Journal of Psychophysiology. 2012, 84(2): 113-119.

6. Charmandari E, Tsigos C, Chrousos, G. Endocrinology of the stress response. Annual Review of Physiology. 2005, 67: 259-284.

7. Segerstrom, S. C, Miller G. E. Psychological Stress and the Human Immune System: A Meta-Analytic Study of 30 Years of Inquiry. Psychological Bulletin. 2004, 130(4): 601-630.

8. Iacopino A. M. Relationship between stress, depression and periodontal disease. Journal Canadian Dental Association. 2009, 75(5): 329-330.

9. Peruzzo D. C, Benatti B. B, Ambrosano G. M. B, Nogueira-Filho G. R, Sallum E. A, et al. A systematic review of stress and psychological factors as possible risk factors for periodontal disease. Journal of Periodontology. 2007, 78(8): 1491-1504.

10. Argue A, Johnson D. R, White L. K. Age and religiosity: Evidence from a three-wave panel analysis. Journal for the Scientific Study of Religion. 1999, 38(3): 423-435.

11. Brown I. T, Chen T, Gehlert N. C, Piedmont R. L. Age and gender effects on the Assessment of Spirituality and Religious Sentiments (ASPIRES) scale: A cross-sectional analysis. Psychology of Religion and Spirituality. 2013, 5(2): 90-98.

12. Hamarat E, Thompson D, Zabrucky K. M, Steele D, Matheny K. B. Perceived stress and coping resource availability as predictors of life satisfaction in young, middle-aged, and older adults. Experimental Aging Research. 2001, 27(2): 181-196.

13. Singer J, Rexhaj B, Baddeley J. Older, wiser, and happier? Comparing older adults' and college students' self-defining memories. Memory. 2007, 15(8): 886-898.

14. Jarvis G. K, Northcott H. C. Religion and differences in morbidity and mortality. Social Science Medicine. 1987, 25(7): 813-824.

15. Strawbridge W. J, Cohen R. D, Shema S. J, Kaplan G. A. Frequent attendance at religious services and mortality over 28 years. American Journal of Public Health. 1997, 87(6): 957-961.

16. Koenig H. G, King D. E, CarsonV. B. Handbook of religion and health (2nd ed.). New York, NY US: Oxford University Press. 2012.

17. Ellison C. G, Levin J. S. The religion-health connection: Evidence, theory, and future directions. Health Education & Behavior. 1998, 25(6): 700-720.

18. Idehen E. E, Kehinde O. A. Religiosity and the preventive health behaviour of young adults. IFE Psychologia: An International Journal. 2010, 18(1): 224-231.

19. Rai B, Kaur J, Anand S. C, Jacobs R. Salivary stress markers, stress, and periodontitis: a pilot study. Journal of Periodontology. 2011, 82(2): 287-292.

20. Wimmer G, Bratschko R. O. Stress, Coping, and Periodontal Disease. In D. I. Mostofsky, A. G. Forgione & D. B. Giddon (Eds.), Behavioral dentistry. (pp. 139-148). Malden: Blackwell Publishing. 2006.