

Dental utilization disparities in a Jewish context: reasons and potential solutions

Z. Lazarus¹, S. Pirutinsky^{2,3}, M. Korbman³ and D.H. Rosmarin^{3,4}

¹Harvard School of Dental Medicine, USA; ²Department of Psychology, Teachers' College, Columbia University, USA; ³Center for Anxiety, New York, USA; ⁴Department of Psychiatry, McLean Hospital/Harvard Medical School, USA

Demographic discrepancies in dental healthcare utilization and access to care have historically been studied and attributed to such factors as socioeconomic status, race, and ethnicity. Such potential discrepancies and contributing factors amongst the Jewish population have been little explored. **Objective:** To examine the frequency of dental visits among Jewish subgroups and explored possible explanatory factors for differences in dental healthcare utilization, such as financial constraints, dental anxiety, religious perspectives on health, lack of perceived need, poor accessibility, and scheduling conflicts. **Basic research design:** Cross-sectional study. **Participants:** A religiously diverse non-clinical sample of 169 Jews completed measures on demographics, dental visit frequency, dental anxiety, and general religiousness. **Results:** On average, Orthodox Jews visit the dentist less often than non-Orthodox Jews (OR=0.43) and Ultra-Orthodox Jews markedly less (OR=0.23). Moreover, differences between these groups in dental visits were largely mediated by differences in dental anxiety, poor accessibility, lack of perceived need and scheduling conflicts. **Conclusion:** These results identify a population that is at risk for poor oral health and suggests possible preventive and corrective interventions.

Key words: utilization of care, social support, community dentistry, culture, Jewish, USA

Introduction

To remain current the dental profession must adapt to changing demographics by evaluating where and how services are used to meet the needs of diverse populations. Unfortunately, sub-groups of our population are often overlooked with profound detrimental consequences in oral health and systemic health (Flores and Lin, 2013; Guarnizo-Herreño and Wehby, 2012) as well as placing unnecessary financial burdens on health care systems (Nalliah and Allareddy, 2012). Previous research highlights racial and ethnic disparities in oral health, access to care, and use of services with, for example, White individuals utilizing more care than non-Whites (Flores and Lin, 2013). Although several studies have demonstrated a narrowing of disparities between African American and White children in recent years, many key differences still exist (Flores and Lin, 2013), and it remains the case that native English speakers and economic status are predictors of greater access to and utilization of US dental care (Guarnizo-Herreño and Wehby, 2012). However, the aforementioned studies do not address religious affiliation as variables.

Older research has demonstrated that religion is an important factor affecting preventive health care utilization, including dental care (Wan and Yates, 1975), with Jews being higher utilizers than non-Jews (Schiller and Levin, 1998). Similarly, a more recent study found women who attend religious services more frequently utilized routine preventive health services and those of mainstream Protestant or Jewish denominations utilize certain preventive services more than Evangelical Protestants (Benjamins, 2006). Other research though found mixed results for

correlations between religious affiliation and access to or utilization of health care (Gillum, *et al.*, 2009).

One particular Israeli study demonstrated decreased preventive care amongst the more religious (Muhsen *et al.*, 2012) i.e. lower routine childhood vaccination rates amongst Ultra-Orthodox Jews and those rates were related to large family size, low levels of maternal education, parental religious beliefs against vaccination, and low perceived risk of vaccine-preventable diseases. We were aware of anecdotal evidence of Ultra-Orthodox Jews making fewer dental visits and this being attributed to demographic, cultural and religious differences between Jewish subgroups.

Orthodox Judaism covers a spectrum of cultural and religious groups that share a value system posited on belief in God, unconditional acceptance of Torah's (Jewish Bible) divine origination and strict adherence to Talmudic law (Schnall, 2006). Our primary focus was the key distinction that can be made within Orthodox Judaism, between the more moderate Modern Orthodox and the more religiously traditional Ultra-Orthodox, (Loewenthal and Rogers, 2004). Ultra-Orthodox Jews are at one end of the spectrum and many have distinctive appearance or dress, stringent observance of Jewish laws and practices, stricter geographic segregation, greater insularity and strictly imposed limits on exposure to the media (Baskin, 2011; Helmreich, 2000). They also tend to live in larger households (UJAF, 2013) and limit their secular education to regulatory minima even at the expense of compromising future income. On the other hand, Modern Orthodox Jews typically have more secular education, higher incomes, see instrumental value in that education as preparation for functioning in the wider society and maintain weaker segregation.

All of the aforementioned factors may contribute to discrepancies in healthcare utilization. Besides socioeconomic status, large household size can also contribute to lower uptake of services (Muhsen *et al.*, 2012) perhaps due to time limitations on parental oversight and stretched financial resources. Limited secular education can also decrease healthcare utilization by limiting healthcare knowledge and literacy. Limiting exposure to media can further limit awareness, knowledge and learning regarding healthcare through, for example, use of the internet for information gathering. Geographic segregation can also limit access to care. Religious views and spirituality may also affect access though evidence regarding healthcare utilization is inconsistent (Benjamins, 2006; Gillum *et al.*, 2009; Muhsen *et al.*, 2012; Schiller and Levin, 1998; Wan and Yates, 1975) with both positive and negative correlations (Holt *et al.*, 2003; Zini *et al.*, 2012). The religious differences amongst these groups may thus contribute towards differences in outlooks towards preventive healthcare. Furthermore, given that religion and spirituality are factors in psychological health, distress, and treatment (Lucchetti *et al.*, 2012), and that anxiety discourages dental visits (Hakeberg *et al.*, 1992), the possibility exists that religion and religious affiliation may indirectly reduce dental attendance.

This study sought to investigate the extent the Jewish communities participate in dental care via the following research questions: Are there differences in adherence to recommended dental care between sub-groups of the Jewish population (Orthodox vs. non-Orthodox, and Modern Orthodox vs. Ultra-Orthodox)? Can any such differences be explained by demographic factors (e.g., income, family size, education, marital status) or attitudinal factors? We hypothesized that dental service utilization would vary by religious affiliation, with Ultra-Orthodox Jews participating less, and that economic and access factors would account for these effects.

Methods

Participation in the study was by an anonymous survey (see online-only Appendix 1) after recruitment via email messages distributed to Jewish organizations and community sites and other social media outlets, as well as advertisements on Jewish websites, through community-based organizations and by word-of-mouth. Participants completed an informed consent form providing basic information about the study before enrollment. This study was approved by the Institutional Review Board of Partners Healthcare (Boston, MA).

Demographics measures included race, ethnicity, gender, income, education level, religious affiliation, employment and household size. The Dental Visit Frequency question measured adherence to twice yearly dental visits and, if applicable, reasons for non-adherence categorized as finances, lack of perceived need, inaccessibility, dental anxiety, schedule conflicts, dissatisfaction with care, and poor relationship with provider, and other with applicable reasons being ranked. The Modified Dental Anxiety Scale (Humphris *et al.*, 1995) assessed dental anxiety via five questions regarding certain dental scenarios then scored on a five-point ordered categorical scale. A final measure assessed general religiousness and spirituality by asking 14 questions with closed ordinal responses: e.g. How religious do you consider yourself? How often do you have heartfelt prayer? To what extent do you believe in God? Items were summed and subjected to principal component

factor analysis, which revealed a single factor solution with an eigenvalue of 4.14, accounting for 59% of scale variance. Coefficient alpha for the resulting measure was 0.88, suggesting a high degree of internal consistency.

Results

Participants were 169 Jews of diverse religious denominations (Table 1). This included Modern Orthodox (29.6%), Ultra-Orthodox (23.1%), Conservative (14.2%), Reform (27.8%), Reconstructionist (1.8%), Jewish Renewal (4%), and Humanistic (1.2%) Jews. Given the study's primary focus on Orthodox Jews, and small numbers of participants in some non-Orthodox categories, all these affiliations were grouped into a single non-Orthodox category. The sample's mean age was 38 years (range 18-77) and 70% were female.

Table 1. Sample demographics and religious characteristics

		n	%
Gender	Male	50	29.6
	Female	119	70.4
Marital Status	Single	5	32.5
	Married/Cohabiting	95	56.3
	Other	19	11.3
Income	\$0-\$50,000	60	35.5
	\$50,000-100,000	50	29.5
	>\$100,000	59	35.0
Religious Affiliation	Ultra-Orthodox	39	23.1
	Modern-Orthodox	50	29.6
	Non-Orthodox	80	47.3
Age (years)	mean 38.1, SD 15.5, range 18-77		

Other marital status includes divorced, widowed and separated; Ultra-Orthodox includes Hassidic, Chabad/Lubavitch and Yeshiva Orthodox; Non-Orthodox includes Reform, Conservative, Traditional, Reconstructionist, Jewish Renewal and Humanistic.

To assess the hypothesis that Orthodox Jewish participants would be less likely to access dental care, we populated a succession of logistic regression models predicting twice yearly dental visits (see Table 2). Model 1 included demographic (control) variables such as income, education, marital status, and household size. Results indicated that this model did not explain a significant proportion of the variance in compliance overall, with no individual coefficients reaching significance ($p > 0.05$ for all variables). Model 2 added religious affiliation, which indicated that, overall, Orthodox Jewish participants were indeed less likely to make twice yearly dental visits ($B = -0.45$, $SE = 0.19$, $eB = 0.63$, $p = 0.02$, 95%CI: -0.82, -0.08), but that this was particularly true of Ultra-Orthodox participants ($B = -0.66$, $SE = 0.26$, $eB = 0.51$, $p = 0.01$, 95%CI: -1.17, -0.15). Thus, Orthodox Jews visit a dentist less often, on average, than non-Orthodox Jews ($OR = 0.43$), and Ultra-Orthodox Jews markedly less than both non-Orthodox ($OR = 0.23$), and Modern Orthodox Jews ($OR = 0.32$). Examination of raw percentages indicated that 66.3% of non-Orthodox and 58% of Modern Orthodox reported twice-yearly dental visits, while only 31% of Ultra-Orthodox did so.

Table 2. Summary of final logistic regression model for variables predicting adherence to twice yearly dental visits, controlling for background variables

	<i>B</i>	<i>SE B</i>	<i>e^B</i>	<i>95%CI</i>	<i>z</i>	<i>P</i>
Orthodox Jewish	-0.83	0.55	0.44	-1.91, 0.25	-1.51	0.13
Ultra-Orthodox	-0.97	0.54	0.38	-2.03, 0.09	-1.80	0.07
General Religiousness	0.08	0.08	1.09	-0.08, 0.24	1.07	0.29
Dental Anxiety	-0.19	0.09	0.83	-0.37, -0.01	-2.04	0.04
Finances	-4.50	1.41	0.01	-7.26, -1.74	-3.19	<0.01
Lack of perceived need	-3.47	1.18	0.03	-5.78, -1.16	-2.93	<0.01
Dental anxiety	-0.25	1.41	0.78	-3.01, 2.51	-0.18	0.86
Inaccessibility	-0.07	0.71	0.93	-1.46, 1.32	-0.10	0.92
Schedule conflicts	-1.72	0.74	0.18	-3.17, -0.27	-2.32	0.02
Dissatisfaction with care	0.04	0.99	1.04	-1.9, 1.98	0.04	0.97
Poor relationship with provider	0.92	1.13	2.52	-1.29, 3.13	0.82	0.41

Controls variables were education, income, marital status and household size (omitted from the table).

Table 3. Model comparisons for predictors of compliance with twice yearly dental visits

<i>Unconditional models</i>	Δdf	<i>AIC¹</i>	<i>BIC²</i>	<i>Resid. Dev.</i>	<i>X²</i>	<i>p</i>
Control Variables ³	8	246	277	187	12.67	0.18
Religious Affiliation	2	197	229	175	12.12	0.002
General Religiousness	1	198	234	174	0.44	0.51
Dental Anxiety	1	196	234	170	4.60	0.03
Specific Concerns	6	101	157	63	106.82	<0.001

¹AIC, Akaike information criteria; ²BIC, Bayesian information criteria; ³Control variables were income, education, marital status and household size and this model was testing against a baseline null model

To explore the mediating (explanatory) factors for this difference, we applied the Barron and Kenny (1986) criteria for mediation. Specifically, mediation would be established if religious affiliation is significantly related to the proposed mediator, and when addition of the mediator to a regression model reduces or eliminates the effect of religious affiliation on the outcome – adherence to twice yearly dental visits. A series of one-way ANOVA's indicated that general religiousness ($f(2,166)=75.58, p<0.001$), lack of perceived need ($f(2,166)=3.27, p=0.04$), inaccessibility ($f(2,166)=3.35, p=0.04$), and schedule conflicts ($f(2,166)=8.13, p<0.001$), were significantly related to religious affiliation, and that dental anxiety was marginally related to affiliation with Orthodox Jews reporting greater anxiety than non-Orthodox Jews ($f(2,166)=2.78, p=0.07$). Thus, we entered these variables into a succession of logistic regressions (Table 3). Results indicated that general religiousness was not a moderator (Model 3). However, the addition of dental anxiety (Model 4) explained a significant proportion of variance above the effects of control variables, religious affiliation, and general religiousness. Examination of the coefficients for Model 4 indicated that those with greater dental anxiety were significantly less likely to make twice yearly dental visits ($B=-0.09, SE=0.04, eB=0.91, p=0.04, 95\%CI: -0.17, -0.01$) and that the difference between Orthodox and non-Orthodox participants was now insignificant

($B=-0.40, SE=0.26, eB=0.67, p=0.13, 95\%CI: -0.91, 0.11$). However, Modern Orthodox Jews were still significantly more likely to report twice yearly visits than the Ultra-Orthodox ($B=-0.72, SE=0.28, eB=0.48, p=0.01, 95\%CI: -1.27, -0.17$), suggesting that dental anxiety did not fully mediate this relationship. Consequently, we populated Model 5 which included several specific concerns listed in the questionnaire, and this explained a significant proportion of the variance in adherence. Coefficients for this final model revealed that those with higher levels of lack of perceived need, inaccessibility and schedule conflicts were less likely to attend twice yearly. Moreover, the difference between Modern Orthodox and Ultra-Orthodox was no longer significant suggesting that it is fully mediated by these three factors. An additional analysis testing if these findings differed between males and females indicated that the addition of gender and interaction terms marginally improved absolute model fit ($X^2(20)=40.33, p=0.005$). However, chi-square test tends to be overly sensitive (Kline, 2011), and consistently, comparison of Akaike and Bayesian information criteria statistics between this model and Model 6 suggested that this was due to over-parametrization of the model ($AIC=101, BIC=220$). Similarly, inspection of individual coefficients for gender and associated interactions revealed that none were significant ($p>0.85$). Thus, it appears that there was no variation by gender.

Discussion

Our results demonstrated that Orthodox Jews visit a dentist less often, on average, than non-Orthodox Jews (OR=0.43), and that this effect was mediated by dental anxiety. Further, we found that Ultra-Orthodox Jews visit the dentist markedly less than both non-Orthodox (OR=0.23), and Modern Orthodox Jews (OR=0.32), and that this was mediated by three factors: lack of perceived need, inability to access dental care (including lack of financial resources) and schedule conflicts. Without regular dental visits, community members are unlikely to fully benefit from the proven utility of preventive care and dental health education (ADA, 2006; Ramos-Gomez *et al.*, 2007), leaving individuals susceptible to suboptimal oral health and all the consequences of poor oral health including lower quality of life (Naito *et al.*, 2006), general health concerns, and financial burdens (Nalliah and Allareddy, 2012, Oriol *et al.*, 2009).

The primary limitation of this study is that it lacks random sampling. Our study population is limited to those individuals willing to complete our survey, and our results may not represent the entire Jewish population. Our selection approach (using online resources) also incorporated a potential selection bias for the more moderate individuals within the Ultra-Orthodox sector, however if anything this provided a more conservative set of estimates by recruiting less cloistered Ultra-Orthodox Jews, in which case our findings may underestimate the true extent of under-utilization of dental healthcare in the Ultra-Orthodox Jewish community. However, Internet use is becoming more common across the gamut of Jewish religious observance, and therefore we believe our results are an accurate estimate of current trends within the communities under study. In addition, females comprised the majority of our sample; however our analyses revealed that findings were independent of gender. Additionally, this study was done with cross sectional data and further longitudinal research is necessary in this area. Also, although simulation studies suggest that our sample was large enough to detect medium sized mediation effects with 80% power, replication in a larger sample would be advantageous given the small mediation effects observed and the large number of variables that did not reach significance in this study. Lastly, our study is limited by our selection of a dental frequency measure. We based our measure on the common and literature-supported practice of twice yearly dental visits (Diehl *et al.*, 2015) seeking yes/no responses regarding adherence to that standard which does not allow quantification of how often, if at all, they visit the dentist. Future studies should capture exact frequency of participants' dental visits.

The primary reasons why Ultra-Orthodox Jews fail to visit the dentist: lack of perceived need, poor accessibility and scheduling conflicts suggest some possible solutions to address dental disparities in a Jewish context. First, measures could be taken to increase oral health awareness in this community. Clearly, dental visits are not the appropriate channel for raising awareness. One potential route is by introducing oral health education into the Jewish day schools (Scambler *et al.*, 2010), attended by 93% of Orthodox and almost all Ultra-Orthodox Jewish children (UJAF, 2013). The Ultra-Orthodox community

has a large and rapidly growing young population (Pew Forum, 2013; UJAF, 2013). By educating Ultra-Orthodox Jews about oral health within the school system, we could not only be preventing oral disease in that immediate population, but also be positively affecting how they subsequently raise the next generation. In time this might benefit the entire community's perception of oral health. Giving youths an understanding of the general etiology of caries and periodontal disease may modify their behavior to prevent oral disease including making regular dental visits.

More importantly, access to care continues to be a barrier to sufficient care in many areas. Supporting evidence for this is that certain New York enclaves of Ultra-Orthodoxy have been designated Dental Health Professional Shortage Areas on account of the population's unusually high dental needs and their ratio of 20 dental practitioners per 100,000 residents (USDHHS, 1992), about a quarter of the state average with nearly 90% of the state's dentists being in private practice, over half having no Medicaid patients and only 10% reporting caseloads of 60% or more Medicaid patients. A large proportion of the Ultra-Orthodox Jewish population is below the poverty line and receives government aid for its healthcare (UJAF, 2013). Thus, objectively speaking, there is a severe shortage of dental practitioners servicing this population and a clear need for more dentists in the public health sector and those that accept government insurances to increase this population's access to care.

Scheduling conflicts were also reported as a deterrent to dental visits among Ultra-Orthodox Jews. This can perhaps be due to the logistical problems of Ultra-Orthodox Jews' large family size and the demands of work and family making dental visits difficult to fit in. One possible solution would be to offer family dental visits. In this approach, exams and oral health counseling would be done with the entire family at once in a larger room. Any subsequent treatment can be performed in a conventional manner. This not only saves time, but also helps engage the entire family to modify their oral health practices as a unit and there is anecdotal evidence of increased efficiency and success in reducing scheduling problems for families.

To summarize, this study suggests that Ultra-Orthodox Jews visit dental practitioners less often than the general population, and non-Orthodox or Modern Orthodox Jews in particular. Based on self-report, this is primarily due to lack of perceived need, poor accessibility, and scheduling conflicts. This suggests potential interventions to address this inequality amongst this rapidly growing sector of society through a push for oral health education in the community, more dental providers serving this community, and more accommodating appointment schedules.

References

- American Dental Association Council on Scientific Affairs (2006): Professionally applied topical fluoride: Evidence-based clinical recommendations. *Journal of the American Dental Association* **137**, 1151-1159.
- Baron, R.M. and Kenny, D.A. (1986): The moderator-mediator distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51**, 1173-1182.

- Baskin, J.R., (Ed.) (2011): *The Cambridge Dictionary of Judaism and Jewish Culture*. Cambridge, NY: Cambridge University Press.
- Benjamins, M.R. (2006): Religious influences on preventive health care use in a nationally representative sample of middle-age women. *International Journal of Behavioral Medicine* **29**, 1-16.
- Diehl, S.R., Kuo, F. and Hart, T.C. (2015): Interleukin 1 genetic tests provide no support for reduction of preventive dental care. *The Journal of the American Dental Association*, **146**, 164-173.
- Flores, G. and Lin, H. (2013): Trends in racial/ethnic disparities in medical and oral health, access to care and use of services in US children: Has anything changed over the years. *International Journal for Equity in Health* **12**, 10.
- Gillum, R.F., Jarrett, N. and Obisesan, T.O. (2009): Access to health care and religion among young American men. *International Journal of Environmental Research and Public Health* **6**, 3225-3234.
- Guarnizo-Herreño, C.C. and Wehby, G.L. (2012): Explaining racial/ethnic disparities in children's dental health: A decomposition analysis. *American Journal of Public Health* **102**, 859-866.
- Hakeberg, M., Berggren, U. and Carlsson, S.G. (1992): Prevalence of dental anxiety in an adult population in a major urban area in Sweden. *Community Dental and Oral Epidemiology* **20**, 97-101
- Helmreich, W. (2000): *The world of the Yeshiva: an intimate portrait of orthodox jewry*. Hoboken, NJ: Ktav Publishing House.
- Holt, C.L., Lukwago, S.N. and Kreuter, M.W. (2003): Spirituality, breast cancer beliefs and mammography utilization among urban African American women. *Journal of Health Psychology* **8**, 383-396.
- Humphris, G.M., Dyer, T.A. and Robinson, P.G. (2009): The modified dental anxiety scale: UK general public population norms in 2008 with further psychometrics and effects of age. *BioMed Central Oral Health* **9**, 20.
- Humphris, G.M., Morrison, T. and Lindsay, S.J. (1995): The Modified Dental Anxiety Scale: validation and United Kingdom norms. *Community Dental Health* **12**, 143-150.
- Kline, R.B. (2011): *Principles and practice of structural equation modeling*, 3rd edn. New York: Guilford Press.
- Loewenthal, K.M. and Rogers, M.B. (2004): Culture-sensitive counseling, psychotherapy and support groups in the orthodox-Jewish community: How they work and how they are experienced. *International Journal of Social Psychiatry* **50**, 227-240.
- Lucchetti, G., de Almeida, L.G. and Lucchetti, A.L. (2012): Religiousness, mental health, and quality of life in Brazilian dialysis patients. *Hemodialysis International* **16**, 89-94.
- Muhsen, K., El-Hai, R.A., Amit-Aharon, A., Nehama, H., Gondia, M., Davidovitch, N. and Cohen, D. (2012): Risk factors of underutilization of childhood immunizations in ultraorthodox Jewish communities in Israel despite high access to health care services. *Vaccine* **30**, 2109-2115.
- Naito, M., Yuasa, H., Nomura, Y., Nakayama, T., Hamajima, N. and Hanada, N. (2006): Oral health status and health-related quality of life: A systematic review. *Journal of Oral Science* **48**, 1-7.
- Nalliah, R.P. and Allareddy, V. (2012): Emergency department visits for dental conditions. *Medscape Dental and Oral Health*. http://www.medscape.com/viewarticle/760206_1
- Oriol, N.E., Cote, P.J., Vavasis, A.P., Bennet, J., DeLorenzo, D., Blanc, P. and Kohane, I. (2009): Calculating the return on investment of mobile healthcare. *BioMed Central Medicine*, **7**, 27.
- Pew Forum (2013): Chapter 2: Inter-marriage and other demographics. In, *A Portrait of Jewish Americans*. Washington DC: Pew Research: Religious and Public Life Project. www.pewforum.org/2013/10/01/chapter-2-intermarriage-and-other-demographics
- Ramos-Gomez, F.J., Crall, J., Gansky, S.A., Slayton, R.L. and Featherstone, J.D. (2007): Caries risk assessment appropriate for the age 1 visit (infants and toddlers). *Journal of the California Dental Association* **35**, 687-702.
- Scambler, S., Klass, C., Desmond Wright, D. and Gallagher, J.E. (2010): Insights into the oral health beliefs and practices of mothers from a north London Orthodox Jewish community. *BMC Oral Health* **10**, 14.
- Schiller, P.L. and Levin, J.S. (1998): Is there a religious factor in health care utilization: A review. *Social Science & Medicine*, **27**, 1369-1379.
- Schnall, E. (2006): Multicultural counseling and the Orthodox Jew. *Journal of Counseling and Development* **84**, 276-292.
- U.S. Department of Health and Human Services (1992): *Dental HPSA designation criteria*. Health Resources and Service Administration (HRSA).
- United Jewish Appeal Federation of New York, UJAF (2013): *Jewish Community Study of New York: 2011*. Ch5: Jewish families and Jewish education. New York: UJAF, pp165-191. www.ujafedny.org/who-we-are/our-mission/jewish-community-study-of-new-york-2011
- Wan, T.T. and Yates, A.S. (1975): Prediction of dental services utilization: A multivariate approach. *Inquiry*, **12**, 143-156.
- Zini, A., Sgan-Cohen, H.D. and Marcenes, W. (2012): Is religiosity related to periodontal health among the adult Jewish population in Jerusalem? *Journal of Periodontal Research* **14**, 418-425.