

Ageism Among Dentists in Greece. A Quantitative Survey

Polychronis Voultzos (✉ pvoultzos@auth.gr)

Aristotle University

Dimitra Tsiantou

Paediatric Dentist-Scientific Coordinator in Mytoothland Pediatric Dental Clinic

Fotios Chatzinikolaou

Aristotle University

Angeliki Papana

University of Macedonia

Aspasia Deliliga

AHEPA University Hospital

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Abstract

Aims and objectives

The phenomenon of ageism is a significant threat to elderly people's well-being. Ageism is a social determinant of their dental health. While a preliminary validation of the Greek version of the ageing scale for dental students has recently been made, there is a literature gap regarding the topic of ageism among dental professionals in Greece. This study aims to contribute to filling this gap.

Methods

A cross-sectional study was conducted. Purposive sampling was used to select participants. A recently validated in Greece 15-item ageism 6-point Likert-scale for dental students (ASDS) was anonymously administered to dentists. In addition, participants were asked to provide information regarding their socio-demographics.

Results

A total of 365 dentists responded to the questionnaire. As to the internal consistency of the scale, Cronbach's alpha found to be very low ($\alpha = 0.590$) to support the reliability of a total of 15 Likert-type questions (items) of the scale. However, the factor analysis resulted in three factors that achieved high reliability towards validity: Adherence of the elderly patient to the instructions of the dentist (factor 1), Dentist-elderly patient interaction (factor 2), and Values/ethics of dentists for elderly patients (factor 3). The demographic comparison with these factors and single items revealed statistically significant gender differences (with females appeared more ageist than men) in ageism and differences related to other socio-demographic factors, which however, were related to factors or items individually.

Conclusion

The study revealed that the Greek version of the ageism scale for dental students had not further validity and reliability among dentists. However, some items were distributed into three factors that presented significant validity and reliability. The demographic comparison with these factors and single items revealed interesting socio-demographics-related trends in ageism among dentists.

Background

The term "Age-ism" was introduced in the year 1969 by Robert Butler (in the USA) [1] who described it as "prejudice by one age group against another age group", namely, thus focusing on the generation gap [2, 3]. Ageism was defined as negative attitudes or prejudice toward older adults [4]. Later, the WHO (2015) provided a broader definition. WHO defined "ageism" as "the stereotyping and discrimination against individuals or groups on the basis of their age" [5].

The phenomenon of ageism is a significant threat to older people's well-being, which is highly prevalent and widespread across many cultures [6] and, may be more importantly, that this phenomenon may be socially acceptable [7]. Not surprisingly, ageism is often subtle [8]. However, Wyman et al. put it best in saying that older adults "tend to be negatively stereotyped in the media, which leads to mistreatment, loneliness, patronising speech, discrimination in the workplace and discrimination in the healthcare systems" [9].

Ageism is increasing, with the increasing ageing of populations worldwide [10]. Cultural factors may significantly influence the ageism rates in a population [3, 11]. There are differences across nations and cultures about the respect for the older adults and the value of their lives. The attitudes towards older people across different countries may be dependent on whether a country is high-income or low-income [12, 13]. World Values Survey found that in 57 countries 60% of the older people do not receive the respect they deserve [14]. It has long been argued that in Europe, ageism is more common than gender or race discrimination. Note, however, that there are differences across nations in Europe [15].

"Ageism is a multifaceted concept including three distinct dimensions: a cognitive (e.g., stereotypes, namely, beliefs about older people in general), an affective (e.g., prejudice) and a behavioural dimension (e.g., discrimination, namely, detrimental treatment of older people)" [16].

Self-directed type of ageism regards the beliefs held by older people about their own aging. It is argued that a variety of determinants contribute to other and self-directed types of ageism. Marques et al. identified a total of 14 possible determinants of ageism (13 related to other-directed ageism and only one related to self-directed ageism) [6]. Anxiety of ageing and fear of death are suggested to be determinants of ageism [6].

As regards other-directed ageism, contact with older people seems to be suggested to be the most important determinant at the interpersonal / intergroup levels (the greater the contact the lower the ageism rates), while scarcity of resources in society and the percentage of older people in the country are suggested to be important determinants at the institutional/cultural levels (tensions over resource allocation in a context of increasing percentage of older adults in the population increases the ageism rates) [6].

Recently, Chang et al. underscore ageism as a social determinant of health. They examined significant mediators between ageism and older persons' health drawing on stereotype embodiment theory. The authors suggest that three "distinct, yet interrelated", components of ageism (discrimination, negative stereotypes and self-directed ageism) can negatively impact health "through psychological, behavioral, and physiological pathways" [17].

Ageism among health professionals and students induces various "age biases" which may reflect society's negative stereotypes towards older adults [18, 19]. Health professionals' ageism may negatively impact on the older adults' health status assessment, the treatment decisions which may be based on patient's age alone (e.g., health professionals may restrict or discourage access to care or avoid shared decision making when it comes to older patients) [4, 5, 16, 20, 21]. The Royal College of Physicians stated

that the hospital care system “continues to treat older patients as a surprise, at best, or unwelcome, at worst” [22].

Dentists, by providing oral health care, make important contributions to the overall health and general well-being of older adults [23]. Inadequate oral health can negatively impact not only the patient’s oral health, but also their general health / well-being (quality of life), especially when it comes to multi-morbid care-dependent patients [4, 24, 25]. Moreover, as in elderly people systemic health problems and polypharmacy may often affect their oral health, dentists may identify problems that disturb systemic health [26]. Dental needs of elders may *vary considerably* from one *country* to another [10]. For instance, edentulism rates (tooth loss) have decreased significantly in the last decades in Finland, Sweden, England and Canada (though not in Brazil) [10].

Domiciliary dental care services are needed to be developed so that it can be provided oral health care for noninstitutionalized, disabled elderly people [27]. Note, however, that institutionalized care-dependent elderly people are more likely to be in need of daily oral health care than community-dwelling elderly people [11]. Indeed, maintaining effective oral hygiene routine for institutionalized care-dependent elderly people remains a perennial problem [11, 28–30]. Neglected oral health of institutionalized elders who are dependent for care is most likely to result in health complications such as pulmonary infections, aspiration pneumonia (due to dysphagia) and pneumonia-related deaths, bacterial septicemias or bacterial endocarditis [31–35]. Regular periodic oral health examinations of care-dependent elders could prevent medical emergencies [36]. Good oral health for institutionalized elders requires provision of routine dental health care services. However, many dentists are reluctant to visit these elderly people [37]. They consider this an unpleasant task [38, 39]. Furthermore, dentists often are reluctant to treat elderly people or prefer to perform conservative dental treatments rather than mutilating procedures [40, 41]. Note, however, that it is not certain whether this attitude is due to a lack of knowledge in geriatric dentistry or experience in managing the complex clinical problems in the field of Gerodontology, or just in ageism [42, 43]. Studies have suggested that “older dentists make more conservative treatment decisions”, which however, might be due to their better clinical judgments because of their work experience accumulated over years [44]. Note that it is argued that the number of young dentists in the workforce are at increase [45].

At any rate, it is argued that ageism may explain why few dental practitioners dedicate at least some of their time to providing dental care for frail older adults in settings other than conventional dental offices, such as in a patient's home and in nursing homes” [46]. It has long been argued that ageism has implications in dental care delivery [4].

Neither elderly patients nor dentists may be conscious of their own ageist attitude. However, it is argued that it is important that dentists recognize these attitudes as well as their possible implications [4].

Studies conducted in different places in the world found that many dentists have a low level of knowledge about Gerodontology and suffer from a lack of training in this field of Dentistry. This may further limit the possibility of providing effective oral health care [19, 37, 47, 48]. Importantly, it is argued

that “ageism may explain both why fewer dentists worldwide are choosing to pursue postgraduate studies or advanced training in geriatric dentistry” [49].

There have been developed different scales to assess ageism in healthcare professionals [50]. Note, however, that a systematic review revealed a “general lack of psychometric assessments of existing ageism scales” [51]. Moreover, the same review concluded the need for “the development and validation of a new ageism scale that covers all dimensions of ageism” [51].

Ageism among health professionals is a widely discussed topic. The attitudes of dentists towards the elderly people have been explored for the last 40 + years “showing modestly positive, moderate or in many cases negative attitudes” [10, 41, 52, 53, 54]. However, dentists’ negative attitudes towards older people (a vulnerable group of population) are an important issue of public health and medical ethics that remains to a large extent unexplored. Furthermore, a systematic review conducted by Ayalon et al. (2019) reveals a general lack of psychometric assessments of existing ageism scales, which moreover, fail to cover all dimensions of ageism [51]. The development of a universally accepted (tested in diverse populations) ageism scale that covers all dimensions of ageism, includes self- and other-regarding ageism, both positive and negative ageism, as well as explicit and implicit manifestations of ageism is desirable.

To our knowledge, there is a literature gap regarding the topic of ageism among dental professionals in Greece. We attempted to contribute to filling this gap.

Research questions

The primary research question that defined the focus of this study was as follows:

Is the Greek ageism scale for dental students (ASDS_Gr) applicable for use in assessing dentists’ attitudes towards elderly patients?

The secondary research questions were as follows:

- a. What is the current ageism score among dentists in Greece?
- b. How are the dentist ageism scores (total score and score for each item) associated with certain socio-demographics in Greece?

Method

Procedure

In this study we attempted to further test the Greek ageism scale for dental students (ASDS_Gr) in larger study groups consisted of dentists, as well as to provide reliable answers to the abovementioned research questions. An ageism scale for dental students (ASDS) included 27 items (that later produced a 5-item scale that achieved high reliability towards validity) has been developed by American and European Gerodontology teaching experts that achieved high reliability towards validity [2, 55]. Kossioni et al.

(2019) conducted a preliminary validation of Greek version of the above mentioned 27-item ageism scale for dental students (ASDS_Gr), administered to senior (8th- and 10th-semester) dental students in Athens, which produced a 15-item scale allocated into four factors with acceptable validity and reliability [50]. The scale was distributed into four factors, (considered accounted for 56.4%, of the total variance) as follows: values/ethics about older people (four items, $\alpha = 0.71$), patient compliance (four items, $\alpha = 0.72$), barriers to dental care (four items, $\alpha = 0.57$) and dentist-older patient interaction (three items, $\alpha = 0.64$) [50].

As the Greek ageism scale for dental students (ASDS_Gr) has been validated in the environment of senior dental students [50], we hypothesized that in all likelihood it also might be validated in the environment of dental professionals (dentists) provided that the items of the questionnaire were not specific for students. The design of the study was cross-sectional. The study of two months duration (from 24 February 2021 to 30 April 2021) took place in Greece and a new questionnaire was conducted in Google Forms and distributed to dentists via social media sites in which any given dentist working in Greece and using social media had an equal probability of maintaining a profile or being visitors. That is to say that the used sites were representative of the dentist population in Greece. In these sites All questionnaires were filled anonymously and the dentists consented to fill in the questionnaire before their participation. The participants in the study were informed about the purpose of the study before written consent was obtained. The researchers also guaranteed that the documents would be kept confidential. This study and consent procedure was approved and monitored by the Research Ethics Review Board of the School of Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, Greece (Decision Number: 5/23.2.2021)

Participants

The participants in our study were recruited from a facebook group of dentists that numbered 3578 members at the time of questionnaire administration. The only inclusion criteria for the research were participants to be Greek speakers working as a dentist in Greece. We used the purposeful (expert) sampling strategy for the identification and recruitment of sample of participants that represents a cross-section of the dentist population. The sample consisted of 365 dentists from a variety of areas around the country, who finally answered the questionnaire. None of the participants was excluded because of incomplete or wrongful filling in of the questionnaire.

The questionnaire

The questionnaire contained two sections: the first was about demographics and the second was the Greek version of ASDS Scale. Eighteen demographic questions included age, gender, marital status, economical and job status, education and clinical practice, past and present cohabitation with elderly people, Gerodontology training, religious status and finally the number of elderly patients treated per day in their practice. The second part of the questionnaire was consisted of 15 items (Table 1). This set of items was produced from the 27-item ASDS Scale and had previously been proved valid and reliable in Greek dental students [50]. A six-point Likert scale, with no neutral option (strongly disagree = 1, disagree

= 2, slightly disagree = 3, slightly agree = 4, agree = 5, strongly agree = 6), was used for answering each item.

Table 1
The fifteen questions of ASDS.

No	Question
1*	I tend to pay more attention toward my elderly patients than my younger patients.
2*	I tend to have more sympathy toward my elderly patients than my younger patients.
3*	In general, elderly people contribute a lot to society.
4	Elderly patients are better off in nursing homes.
5*	Elderly patients tend to be more appreciative of the dental care I provide than younger patients.
6	Elderly patients often won't accept recommended treatment plans.
7	Elderly patients have fixed ideas about what is proper dental treatment.
8	Elderly people do not take good care of their teeth.
9	Elderly patients do not usually comply with dental advice.
10	The elderly patient does not live long enough to make it worthwhile to invest time and effort in complex dental treatment.
11	The elderly patient does not live long enough to make it worthwhile to invest money in expensive dental treatment.
12	It is too costly to provide out of office dental care to homebound elderly patients.
13	Cost is a major barrier to many elderly patients seeking dental care.
14	It is normal for elderly people to have oral problems.
15	Elderly patients should be treated by a someone with advanced training in geriatric dentistry.
*	<i>Reverse question</i>

Statistical analysis

Descriptive statistics were used to summarize participant demographic characteristics, such as frequency distributions and percentages, while for the questions related to ageism, means and standard deviations are reported. Independence tests examined the association between the demographic characteristics, with Cramer's V correlation coefficient indicating the intensity of the association. The internal reliability of age discrimination questions was checked with Cronbach's α coefficient followed by factor analysis to categorize the initial questions into a smaller number of factors that reliably measure the same mental composition. The adequacy of the sample was tested with the Kaiser-Meyer-Olkin coefficient, while

Bartlett's Test of Sphericity coefficient was used to confirm that correlations between the variables allow the application of factor analysis. The existence of age discrimination based on the factors that emerged from the factor analysis was assessed cumulatively. Independent samples t-tests and Pearson's correlations were performed to investigate the discrimination between the subgroups of demographic characteristics and the factors items and the final total scores.

The statistical program SPSS 25.0 (Statistical Package for the Social Sciences) of IBM was used for the statistical processing of the results of the questionnaire.

Results

Demographics

A total of 365 out of 3578 (9.8 %) dentists finally filled in the questionnaire in a two month period, of whom 119 were men (32.6%) and 246 women (67.4%).

In majority, dentists were under 45 years old (39.2% aged 36–45 years and 32.6% up to 35 years), married/cohabited (65.8%) and parents (59.5%). Only 9.86% of the participants were older than 56 years. The majority of dentists live in Greece (89.9%), while 10.14% live abroad. Half of them lived in the largest cities of Greece (Athens and Thessaloniki, 51.5%) and only 18.9% in a small town (< 10.000 citizens). Most of them studied in Greece (87.4%) and the average of dental practice was 15.3 years.

Four out of 5 own their own practice (78.4%) mainly men (Pearson Chi-Square = 10.722, $p = 0.005$), 13.7% reported that they work in a dental polyclinic and only 3.3% work in the public sector. Almost half of the participants stated that they have financial comfort (42.5%), whereas only 4.7% were in financial difficulties. Mainly they treat on average 20% of elderly patients daily (65.21%), while only 1.92% have more than 70% of elderly patients per day.

As to Gerodontology, only 5.8% of the sample was fully trained in postgraduate studies, 35.3% in undergraduate studies, while 32.9% had never been trained at all.

Furthermore, most of the dentists declared religious (65.8%), half of them used to live with their grandparents in the same household for a long time, but nowadays only 26% live together with elderly people, and the vast majority (79.5%) have excellent relationships with their grandparents.

Statistical analysis of the Greek version of ASDS Scale

The responses in questions Q1 - Q3, Q5 are reversed so that for all the questions the value 1 indicates the lowest age discrimination value of the participants in relation to the elderly patients and the value 6 represents the maximum one.

The response in questions Q1-Q3, Q5 were reversed so that for all questions the value 1 indicated the lowest age discrimination value of the participants in relation to the elderly patients and the value 6

represents the maximum one. The descriptive statistics (mean and standard deviation) of each item are shown in Table 2.

Table 2
Descriptive statistics for Q1-Q15

Question	Mean	St. deviation
Q1	4.27	1.143
Q2	4.18	1.144
Q3	2.72	1.004
Q4	1.87	0.823
Q5	3.69	1.296
Q6	3.10	1.051
Q7	3.42	1.190
Q8	3.76	1.112
Q9	3.38	1.072
Q10	1.72	0.867
Q11	1.96	0.963
Q12	2.95	1.093
Q13	4.37	1.017
Q14	3.60	1.251
Q15	2.78	1.035

As shown in Table 2, the questions Q1, Q2 and Q13 received the highest ageism scores, while the questions Q4, Q10 and Q11 received the minimum ageism scores. That means that in general the participants do not tend to pay more attention and sympathy toward their elderly patients (Pearson's Correlation $p_{Q1-Q2}=0.000$) and believe that cost is a major barrier to many elderly patients seeking dental care (Q13). On the contrary, they believe that elderly patients are not better in nursing homes (Q4) and they deserve to invest time, effort and money in complex and expensive dental treatment (Q10, Q11). These items were also found to be statistically correlated when compared to each other (Pearson's Correlation $p_{Q4-Q10}=0.004$, $p_{Q4-Q11}=0.000$).

Cronbach's alpha is a measure of the internal consistency of the scale. Cronbach's alpha found to be very low ($\alpha = 0.590$) to support the reliability of a total of 15 Likert-type questions (items) of the scale. Cronbach's $\alpha > 0.7$ would support the reliability of the scale. Therefore, we conducted a factor analysis to

distribute the items into factors (Table 3). Based on the factor analysis and Cronbach's alpha we concluded the following three factors that met a sufficient Cronbach's alpha value: Factor 1: Adherence of the elderly patient to the instructions of the dentist (Q6-Q9), Factor 2: Dentist-elderly patient interaction (Q1, Q2, Q5), and Factor 3: Values/Ethics of dentists for elderly patients (Q10, Q11). Each factor's total score was the sum of the scores of its items and their means are shown in Table 3.

Table 3
Descriptives and Cronbach's coefficient α for the three factors (r=reverse rating)

Factors	Items	Range	Cronbach's coefficient α	Mean	St. deviation
Factor 1 <i>Adherence of the elderly patient to the instructions of the dentist</i>	Q6-Q9	4-24	0.773	13.67	3.415
Factor 2 <i>Dentist-elderly patient interaction</i>	Q1 ^r , Q2 ^r , Q5 ^r	3-18	0.714	12.13	2.862
Factor 3 <i>Values / ethics of dentists for elderly patients</i>	Q10, Q11	2-12	0.831	3.68	1.694

Regarding the three factors, independent t-tests and One-Way ANOVAs were utilized to compare the total average means by subgroups of demographic characteristics. It was found that residence and the financial status of the participants were statistically significantly correlated to Factor 1. The higher ageism ($p = 0.002$) was found among participants living in towns (14.07+3.573) and villages (16.75+2.659). It was found that the factor related to "Adherence of the elderly patient to the instructions of the dentist" had higher score values (more ageism) in participants who lived in towns and villages. Note, however, that this factor regards a mild manifestation of ageism. Furthermore, participants who reported to be in financial difficulties (14.705+3.368) were found to be more ageist when compared with the Factor 1 ($p = 0.021$) than those who were reported to be financially comfortable (13.232+3.543). In addition, it was found that men (12.62+3.028) presented more ageist attitudes ($p = 0.023$) than women (11.89+2.754) when compared with the Factor 2. Moreover, participants aged 56 years and older (11.03+2.903), as well as those who were living in the past with aged persons in their household (11.77+2.82) were less ageists than the other age groups ($p_1 = 0.026$, $p_2 = 0.020$) when compared to Factor 2, also. Finally, participants working as a dentist in the public sector were found to be more ageists (5.33+2.015) than those working in the private sector of health care when compared to the Factor 3 ($p = 0.025$).

In addition, mean comparisons were conducted for each item of the ASDS scale by subgroups of the demographics. A qualitative interpretation of the results is attempted in respect of the information that

individual items of the questionnaire carry in the context of ageism assessment.

The items Q2, Q3, Q12 and Q15 had lower mean ageism scores for women compared to men, i.e. women show more sympathy for elderly patients (Q2, $p = 0.008$), believe that elderly people contribute a lot to society, namely, play an important role in the local society (Q3, $p = 0.020$), deserve to invest money for an expensive dental care (Q12, $p = 0.005$), and should be treated by a dentist who specializes in Gerodontology (Q15, $p = 0.0004$).

Furthermore, the more the years of clinical practice, the more the dentists believe that elderly people contribute to the local society (Q3, $p = 0.020$) and the less they think that they have fixed ideas for treatment (Q7, $p = 0.001$). Importantly, it was found that marital status, employment status and number of elderly patients per day were not significantly associated with any individual item. Note, however, that dentists who are parents found to believe that elderly people contribute a lot to society (Q3, $p = 0.020$). Moreover, while the item Q6 received higher ageism scores ($p = 0.022$) among dentists who graduated from Aristotle University of Thessaloniki, compared to those graduated from the Kapodistrian University of Athens (indicating that they believe that elderly patients do not accept recommended treatment plans), the item Q10 received lower ageism score ($p = 0.011$) among dentists who graduated from Aristotle University of Thessaloniki compared to those graduated from the Kapodistrian University of Athens (indicating that they believe that elderly patients deserve to invest time and effort to a treatment).

In addition, those who stated high belief in God ($p = 0.0210$) and those who stated that currently live with elderly people in their household ($p = 0.039$) are opposite to the assumption that elderly people live better in nursing homes (Q4). Also, those who reported that are financially comfortable believe that elderly people do take good care of their teeth (Q8, $p = 0.015$) and that cost is not a barrier that keep elderly patients from seeking dental care (Q13, $p = 0.021$). Notwithstanding, older dentists believe that cost is a barrier that keep elderly patients from seeking dental care (Q13, $p = 0.001$).

Interestingly, the item Q3 received lower ageism scores among participants currently living with elderly people ($p = 0.019$), having lived with elderly people in the past ($p = 0.022$) or having excellent relationships with their grandparents ($p = 0.022$), compared to other participants. That is to say that these dentists believe that elderly people contribute a lot to society.

As to Gerodontology training, it was found that those who were trained in a full curriculum (i.e. having attended a postgraduate program) have less negative attitude towards elderly patients according to the item Q7 ($p = 0.028$) that regards the fixed ideas for proper dental treatment and believe that it is not normal for elderly people to have oral problems (Q14, $p = 0.000$).

Interesting enough is also the fact that those working in the public sector manifest high ageism in more items. They believe that the patients do not take good care of their teeth (Q8, $p = 0.039$) and have oral problems (Q14, $p = 0.013$) and do not comply with dental treatment (Q9, $p = 0.016$). Also, they believe that elderly patients do not deserve to invest money in expensive dental treatments (Q11, $p = 0.000$).

Discussion

The items Q8, Q9, Q10 and Q11 have already been validated in both the United States and Greece [50]. These items, as well as the factors “patient compliance” and “values/ethics about older people” in which these items are distributed, might be proved to be universally applicable if further tested across more cultures [50].

The findings of our study support the abovementioned assumption. Below, we discuss the findings of this study resulted from the comparison the demographics with each single factor (consisted of items) and each single item individually.

Contact with elderly people

Importantly, participants with history of living in the past with aged persons in their household were less ageists. Having older persons in the family and history of living with older people in the same household affected the score of the item Q3 and the factor 2.

Participants currently living or having lived with elderly people as well as those having excellent relationships with their grandparents were found to believe that elderly people contribute a lot to society. Note, however, that it is not clear whether their pre-existing personal values on ageing (developed within the family environment and the local culture) contributed to developing excellent relationships with their grandparents or the excellent relationships with their grandparents contributed to the development of positive attitudes towards elderly people in general. Furthermore, participants who stated that currently live with elderly people in their household were opposite to the assumption that elderly people live better in nursing homes. These findings are conclusive and indicate positive attitudes towards elderly people among participants who were in close contact with elderly people.

Marques et al. recently state that the contact with older individuals is sufficient to reduce ageism and this is commonly accepted [6]. “The quality of contact with older people and the positive or negative presentation of older people to others emerged as the most robust determinants of other-directed ageism” [6]. Spending sufficient clinical time with complicated frail older patient cases may significantly contribute to reducing ageism among dental students and make them feel confident providing treatment to elderly patients [52, 54]. Dental students need to gain structured knowledge and experiences (e.g., through supervised rotations, dealing with the biopsychosocial concerns of elderly patients), to address their anxieties about providing care for institutionalized elderly people [11, 56]. To reduce ageism among dental students it is necessary that their education includes exposure to care-dependent institutionalized elders with complex needs [37]. Dental students described positively their experiences with the elderly patients and regarded the rotations as emotionally challenging but worthwhile, enhancing their sense of professional responsibility [57]. Clinical rotations may help students to interact with elderly patients and gain more insights about their real-life experiences. While Veenstra et al. found no significant differences in ageism scores (among dental students) across many demographic factors, they found statistically significant lower ageism scores among students living with an older family member. The authors state

that this finding can be explained by the fact that there are families that still share close bonds [58]. Note, however, that a study conducted by Nochajski, et al. demonstrated that students' exposure to and interactions with older adults not outside the clinic but in a clinical setting seem to have a more crucial role in shaping students' positive attitudes towards older adults [59].

Note, however, that study with medical students showed that planned clinical exposures to older adults may not be sufficient to tackle the decline in positive attitudes towards elderly patients in the course of medical studies. Empathy-enhancing and social responsibility-enhancing strategies during medical studies may be promising [10, 60].

In Greece, despite the fact that in recent decades the traditional nuclear family structure has been changed (especially in urban areas), there are still strong bonds between the members of the same family. In Greece, Kossioni et al. (2019) [50] found that a total of 51.3% of the participants in their study (dental students) were currently living or had a history of living with older people in family, compared to 17.5% in the U.S [55]. Surprisingly, in the Greek study, history of living with older people did not affect the total scale score [50] similar to the U.S. study [55]. However, an Iranian study had previously found that history of living with older people and being connected with them may reduce the ageism levels [61].

Socio-demographic factors:

Recently, Veenstra et al. found no significant differences in ageism scores across demographic factors such as "sex, semester of study, urban or rural background, history of living with an older person or taking a gerodontology course" [58]. In a similar vein Kossioni et al. (2019) [50] found that the total scale score was not significantly affected by demographic factors, with the exemption of individual differences in a few factors and items. The authors state that this finding can be explained by the fact that ageism is a universal phenomenon [50, 58].

Gender

In addition, we found that men presented more ageist attitudes than women when compared with the Factor 2. More particularly, the factor related to "Dentist-elderly patient interaction" received lower score values (less ageism) in women than in men. This finding is consistent with the previous literature. Several studies have reported gender differences with men scoring significantly higher than women [8, 60]. This may be due to the fact that women seem to be much more empathetic than men [62, 63]. However, there have been noticed considerable differences between research studies on the impact of gender on ageism levels. Studies conducted with Brazilian dentists [10], German dental students [64], U.S. dental students [55] and Iranian dental students [61] found considerably less ageism among women. Notwithstanding, a U.S. study showed high ageism levels among female dental students [53], while an older U.K study had not found significant differences between male and female dental students [65]. The Greek study conducted by Kossioni et al. (2019) [50] resulted in inconclusive findings. The authors state: "Women tended to have more sympathy towards their elderly patients (item Q6), while men believed to a less extent that elderly patients do not usually comply with dental advice (item Q14)." Significant differences

between the methodologies used in different studies may give an explanation to the fact that the impact of gender on ageism levels is likely to differ between research studies [50].

Age

Age affected the score of the factor 2. The vast majority of participants in our study were younger than 50 years of age due to way by which potential respondents were contacted. Participants aged 56 years and older were found to be less ageist as compared with younger participants. Older participants were found to believe that cost is a barrier that keep elderly patients from seeking dental care. However, this finding might be not conclusive about their ageism because in our opinion this item carries low specific weight of in the context of ageism assessment. The older participants feel closer to the age of elderly people and therefore may be more empathetic towards them. Studies found that younger individuals had considerably higher ageism scores than older individuals [8, 60]. It is relevant to note, moreover, that a Greek study conducted by Kossioni et al. (2019) [50] found that age did not affect the total scale score, similar to the U.S. study [55].

Curriculum

As to training in Gerodontology, the items Q7 and Q14 received low ageism scores among dentist who were trained in a full Gerodontology curriculum. This finding is conclusive and indicates that training in Gerodontology is positively correlated with ageism. Among dentists who graduated from the Aristotle University of Thessaloniki, the item Q6 received higher ageism scores while the item Q10 received lower ageism scores compared to those graduated from the Kapodistrian University of Athens. These 'mixed' results do not identify any discernible pattern or trend and look at first blush inconclusive. However, given the truth of our assumption that the item Q10 carries more specific weight in the context of ageism assessment (in sense that indicates more disrespectful behavior towards elderly people) compared to the item Q6, participants graduated from Aristotle University of Thessaloniki might be regarded as showing more positive attitude towards elderly people. While Gerodontology is taught at the University of Athens as a compulsory discipline for approximately ten years, it is taught at the University of Thessaloniki as a compulsory discipline for fourteen years. Furthermore, a discipline that is strictly related to Gerodontology ("Prosthodontic Treatment Within Interdisciplinary Dental Care") is available as an optional subject at the University of Thessaloniki for more than ten years. This may be one explanation for the differences in ageism that we found between participants graduated from the University of Athens and participants who graduated from the University of Thessaloniki.

To reduce ageism among dental students it is necessary that their education includes a curriculum in geriatric dentistry (Hebling, Mugayar, Dias, 2007 [25, 66–68]. The majority of dental schools all over the world have done it, although with considerable differences in teaching methods [66, 69, 70]. Importantly, Veenstra et al. recently (2021) argue that further research is needed to determine the content and the methodology of dental training that might reduce ageism rates among dental students [58]. Hatami et al. found that "the majority of dental students had low to moderate levels of knowledge of geriatric dental care and attitudes toward elderly people" [61]. Dental students should be provided with necessary

education that addresses the oral health needs of persons across their lifespan [11]. However, it is arguably suggested that theoretical education (knowledge) alone, without exposure to older patients in clinical settings, cannot always improve attitudes, namely, is not always enough to prevent the high prevalence of ageism among dental students [10, 53]. Kossioni et al. (2019) state that greater amount and better type of training than the already offered to dental students of the University of Athens is necessary to improve their attitudes towards elderly patients [50]. Humanities curriculum may lead to ageism decline. Empathy and humanism are essential for dental management of the older population [71, 72]. Reducing dental students' ageism should be an important goal of dental education that can be pursued through targeted educational programs. It should be highlighted that there may be potential links between the hidden curriculum and ageism. This may be mediated by empathy given that there may be potential links between the so-called "hidden curriculum" and cynicism [73, 74].

Public/private sector

Besides, participants working as a dentist in the public sector were more ageists than those working in the private sector of health care when compared to the Factor 3. Interestingly, participants working in the public sector presented high ageism scores in four items (Q8, Q9, Q11 and Q14).

A possible explanation might be that due to economic crisis in Greece, when elderly people seek diagnosis and treatment for a dental problem, they visit the public healthcare sector rather than the private sector. Dentists working in the public sector may feel overwhelmed with their workload without receiving additional remuneration for this. The factor "Values / ethics of dentists for elderly patients" received higher ageism score among dentists working in the public sector than those working in the private health sector. These results in our opinion are conclusive and indicate high ageism among dentists working in the public healthcare sector.

Economic status

The higher ageism was found among participants living in towns and villages, as well as among participants in financial difficulties, when compared with the Factor 1. Participants who reported to be financially comfortable were of the opinion that elderly people do take good care of their teeth and that cost is not a barrier that keep elderly patients from seeking dental care. Although these results indicate low ageism among dentists who were better off, in our opinion are not conclusive due to the fact that the abovementioned items do not carry great specific weight in the context of ageism assessment. The same holds for the finding that the factor related to "Adherence of the elderly patient to the instructions of the dentist" had higher score values (more ageism) in participants who stated that were in financial difficulties.

Due to the serious financial crisis in Greece over the past ten years, pensions have noticeably been reduced. As dental care in Greece is mostly not funded by the state or social security out-of-pocket dental expenses were difficult to be funded by older persons' lower income. Therefore, items of the scale used in our study that are directly or indirectly related to dental care costs (e.g., "cost is a major barrier to many elderly patients seeking dental care" or "it is normal for elderly people to have oral problems") may not be

indicative of ageism [50]. Note, however, that in this connection it is crucial to bear in mind that (as mentioned above, Introduction section) the economic status of the citizens in a country may affect the ageism levels in this country [12, 13].

Trust to God

Participants who stated high belief in God found to be opposite to the assumption that elderly people live better in nursing homes (Q4). In our opinion this is conclusive and indicate that trust to God may be positively correlated to low ageism.

As religiosity underlines values such as altruism, sympathy and helping (and caring) for others irrespective of their age, we hypothesized that trust to God might be negatively correlated with ageism levels.

There is not a clear positive correlation between religiosity and ageism in the literature. Empathy might be a mediator between religiosity and ageism. Note, however, that while the research is not yet conclusive, recent data demonstrated an association between religiosity and empathy [63].

The role of culture

In the Greek study with dental students conducted by Kossioni et al. (2019) the factor “values/ethics about older people” received very low ageism score [50]. As this factor includes items that are largely related to the cultural context (Q1, Q2 and Q3), it may receive ageism score that is significantly affected by the cultural context [50].

Years of clinical practice

Furthermore, the years of professional (clinical) practice affected the score of the items Q3 and Q7. The more the years of clinical practice, the more the dentists believe that elderly people contribute to the local society and the less they think that they have fixed ideas for treatment. These results seem to be conclusive. The more the years of clinical practice, the less the dentists’ ageism. Indeed, the long-lasting career as a dentist goes with a significant clinical experience in treating and interact with elderly patients. This may be an explanation.

Importantly, marital status, employment status and the number of elderly patients per day did not affect not only the total scale score but also none of the items separately. In other words, these factors did not present statistically significant variation in relation to the total scale score or the score of any item. Note, however, that dentists who are parents were found to believe that elderly people contribute a lot to society. Perhaps these participants in reality highlight the role of elderly persons as grandparents. This might be a possible explanation.

Strengths And Limitations

The study sample consisted of 365 dentists from a variety of areas around the country, namely, it was a nationally representative sample of dentists. The national scope of this study might be regarded as a chief strength of this study. However, our study sample was somewhat biased towards dentists younger than 50 years of age. In majority, dentists were under 45 years old. Only 9.86% of the participants were older than 56 years. Provided that we explored ageism, the participants' age might have affected the results of the study. This might be regarded as a noteworthy limitation of the study. Furthermore, the Greek ageism scale for dental students (ASDS_Gr) found to have not further validity and reliability among dentists the Greek. As this scale has already been validated previously among senior dental students, we highlight the need for run the test of the ASDS_Gr (as a whole) for much larger groups of participants in order to further confirm this finding of our study. While the Greek ageism scale for dental students (ASDS_Gr) is not specifically addressed to students, it is true that has been originally designed to be used for students. Even if the Greek ageism scale for dental students (ASDS_Gr) is not applicable for professionals (dentists), the three factors that met a sufficient Cronbach's alpha value can be a first step in developing an ageism scale for dentists. Moreover, note that we only tested the (previously validated) Greek version of the scale (consisted of 15 items). The testing of the original version (developed in USA, consisted of 27 items) might lead to a different outcome. At any rate, future studies involving a diverse group of dentists from a nation-wide distribution will help provide more definitive results.

Conclusions

The present study revealed that the Greek version of the ageism scale for dental students had not further validity and reliability as a measure for assessing dentists' attitudes towards elderly patients. A reliable total ageism score was not identified. However, three factors were identified, which presented reliability and can indicate ageism trends among dentists in Greece. Furthermore, a demographic comparison was conducted.

In general, our survey did not provide conclusive results, indicating a clear trend in ageism among dentists in Greece. While the participants do not tend to pay more attention and sympathy toward their elderly patients and believe that cost is a major barrier to many elderly patients seeking dental care, they believe that elderly patients are not better off in nursing homes and they deserve to invest time, effort and money in complex and expensive dental treatment.

The findings of this survey appear to endorse a suggestion that there is a research gap in the hot topic of ageism in dental practice. Therefore, we endorse the suggestion that the development of a universally accepted (tested in diverse populations) ageism scale that covers all dimensions of ageism is desirable. In addition, we suggest that not only quantitative but also qualitative studies should be used to explore the complex topic of ageism among dentists. The sole quantifying of ageism cannot capture adequately the phenomenon.

The comparison of the demographics with each single item have provided statistically significant trends in ageism for many demographics. However, the demographic comparison yielded mixed (inconclusive)

results vis-à-vis certain demographic factors, with some items receiving low ageism scores and some receiving high ageism scores.

Abbreviations

ASDS_Gr = Greek ageism scale for dental students

WHO = World Health Organization

Declarations

Availability of data and materials

The authors declare that the data analyzed during the current study and supporting the findings of this study are available from the corresponding author on reasonable request.

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Contributions

PV developed the study concept and design. DT administered the questionnaires and collected the data. AP developed and performed the statistical analyses. PV analysed and interpreted the data. The authors PV, DT and FC was involved in the data analysis discussions and monitored the process of this study. AD participated in preparing the dataset and reviewing the manuscript. PV and DT drafted the manuscript, and all authors provided critical revisions for important intellectual content. The study was supervised by PV and DT. All authors read and approved the final manuscript.

Ethics declarations

Ethics approval and consent to participate

Written informed consent was obtained from participants. Before starting to fill out the questionnaire, each participant was given information on the study, placing great weight on the importance of maintaining confidentiality. This study and consent procedure was approved and monitored by the Research Ethics Review Board of the School of Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, Greece (Decision Number: 5/23.2.2021).

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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