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Research Article

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Exploring the Mediating Role of Shame in the Link between Oral Health and Psychopathology in Older Adults

Christos Tsironis[1], Stefanos Mantzoukas[2], Fotios Tatsis[1], Michael Kourakos[1], Epaminondas Diamantopoulos[1], Elena Dragioti[1] and Mary Gouva[1]*

[1]Research Laboratory Psychology of Patients Families and Health Professionals, University of Ioannina Greece

[2]Research Laboratory of Integrated Health, Care and Well-being, University of Ioannina, Greece

***Corresponding Author**
Mary Gouva, Research Laboratory Psychology of Patients Families and Health Professionals, University of Ioannina Greece.

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Abstract

Aim: *The objective of this study is to explore whether shame mediates the relationship between oral health and psychopathology among elder individuals.*

Methods: *The findings of this cross-sectional study are derived from data collected from a sample of 204 patients, including 120 females and 84 males, aged between 60 and 92 years, with an average age of 74.2 years (SD = 7.1). Participants completed a sociodemographic questionnaire, the 12-item GOHAI scale, the Experiential Shame Scale (ESS), the Other as Shamer Scale (OAS), and the Symptom Checklist-90 (SCL-90). Path analysis was applied in order to test the model that was theoretically developed. In the examined path model, age, gender, medication, oral health (GOHAI) and shame (OAS, ESS), were regressed on psychopathology (GSI), while shame was positioned as mediator in the relation between oral health and psychopathology.*

Results: *Oral health found to have a significant negative effect on both external and internal shame. In turn, both flavours of shame were significant regressors of psychopathology. A noteworthy indirect impact of age on both forms of shame through oral health was also reported as well as an indirect effect of oral health on psychopathology through both internal and external shame. Thus, the relationship between oral health and psychopathology is fully mediated by both internal and external shame. Specifically, as oral health improves, lower levels of external and internal shame are expected to induce a more favorable mental state.*

Conclusions: *As individual's age and their oral health declines, they become more susceptible to feelings of shame, which, in turn, can have profound implications for their psychological well-being. The importance of considering oral health as an integral component of overall well-being is emphasized and its relevance in the context of mental health is highlighted.*

Keywords: Oral Health Status, Shame, Psychopathology

1. Introduction

Oral health status and psychopathology share an intricate connection that extends beyond the confines of mere dental care. Emerging research highlights the well-established fact that individuals with mental illnesses are more likely to experience suboptimal oral health [1-4]. Among the general population, it is also widely recognized that compromised oral health is strongly associated with significant mental health consequences [5-7].

In the existing literature, several variables have been identified as confounding factors in the relationship between oral health status and psychopathology, as is the educational level, the socioeconomic status, or even various maladaptive behaviors as is the alcohol abuse, or poor dietary habits [8-11]. Furthermore, plethora of medications and medical conditions has been reported also to be related with oral problems among elder [12-14]. In an attempt to elucidate this comorbidity, some researchers have highlighted compelling confounding biological factors, such as an

imbalance in stimulated cytokine production or salivary cortisol levels [15,16]. However, the precise nature of the relationship between oral health and mental health status is still not fully understood, which underscores the need for further investigation.

In research endeavors seeking a more comprehensive understanding of the interplay between oral and mental well-being, shame is frequently cited as a factor leading to psychological distress [17,18]. Shame is a profound and highly self-conscious emotion that exerts a substantial influence on an individual's sense of self, overall well-being, and their susceptibility to various forms of psychopathology [19]. This distress in turn has adverse effects, such as fostering fear and avoidance behaviors related to seeking dental care [20]. That is, a broad-reaching impact across multiple domains of mental health is induced, including depression, anxiety, paranoia, post-traumatic stress disorder, eating disorders, and personality disorders [21-29]. These consequences are even more recognized among older individuals, where declining oral health and tooth loss often lead to limited social interaction and diminished self-esteem [30-32].

Multiple theoretical perspectives align in suggesting that shame is a complex self-aware emotion associated with a self-evaluative experience with a negative self-focus [24,33]. Nonetheless, it is important to recognize that shame fundamentally revolves around social awareness, involving the exposure of negative aspects of the self and a profound sense of being negatively perceived and judged by others [34,35]. Since the human mouth, with its complex amalgamation of teeth, gums, and oral tissues, is not only an entry point for sustenance but also a crucial element of communication, self-esteem, and social interactions, it is worth noting that shame did not yet been studied as a mediator in the relationship between oral health and psychopathology. This perspective can shed light on the psychological processes that underlie this complex interaction and offer effective support and interventions for individuals grappling with these complex emotional and mental health challenges.

In light of these considerations, the present study seeks to fill this research gap, by investigating the mediating role of shame in the relationship between oral health and psychopathology. Within this context, since elder individuals often consume many medications which can naturally lead to lower oral health, it is essential to control for medication use when testing the model [36]. Furthermore, it is both pertinent and justified to incorporate sociodemographic factors that affects the constructs of the model. However, due to sample size limitations, only age and gender were included in the model to ensure robust and reliable analysis. First and foremost, age emerges as a pivotal determinant shaping an individual's oral health status. Various age groups exhibit distinctive patterns of dental care habits, experience the natural wear and tear of teeth and oral tissues differently, and encounter distinct oral health conditions that evolve with the passage of time [37,38]. Moreover, the experience of shame on mental health do not remain static throughout a person's lifespan. Instead, they tend to evolve, with younger and older individuals potentially responding differently to the challenges posed by oral health issues [39].

In parallel, societal expectations, cultural norms, and gender-specific roles significantly influence how individuals perceive their oral health. These external influences create a substantial gender gap that has been extensively documented in the relative literature [40-42]. Hence, by accounting for gender as a potential factor, a deeper understanding of the complex interplay between societal constructs and psychosocial experiences related to oral health can be achieved.

2. Aim of this Study

The intricate network of teeth, jaws, and facial muscles plays a central role in human life. It serves as the primary hub where the facial expressions, which shapes an individual's distinct identity, comes to life. Beyond its role in essential functions such as chewing and speech, this system substantially contributes to the non-verbal language of the face. A multitude of smiles, frowns, smirks, and grins, each conveying a diverse range of emotions and intentions, find their origins in the seamless interactions within this facial structure.

Numerous studies have explored the connection between oral health and feelings of shame in various specific contexts [43-45]. The objective of this study is to provide evidence regarding the intricate interplay between oral health, the experience of shame, and the presence of psychopathological symptoms within the elderly population. That is, within the framework of our model, we aim to assess the potential mediating role of shame in the relationship between oral health and psychopathological symptoms, controlling for age, gender and medication (Figure 1).

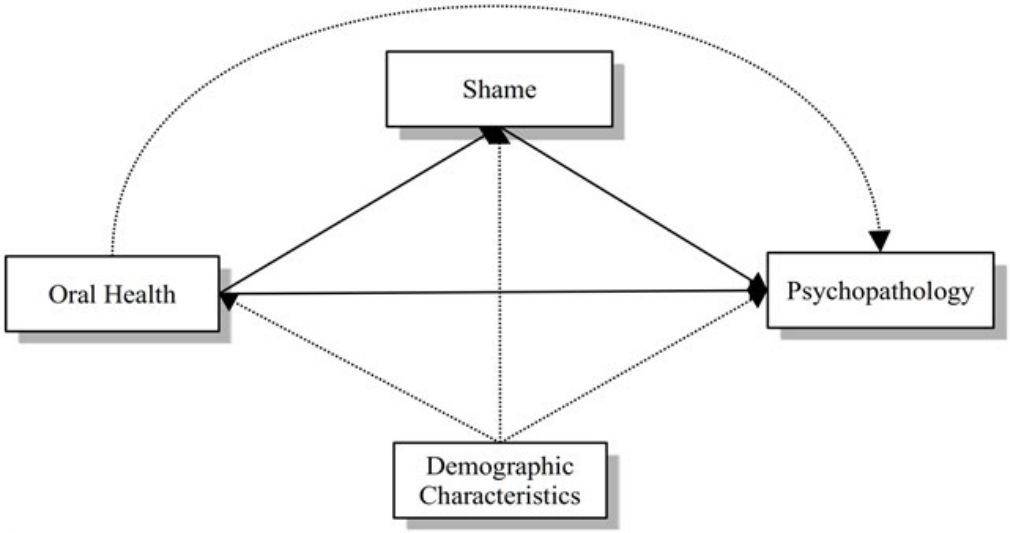

Figure 1: The Conceptual Model

In the context of our model, it's essential to distinguish between two dimensions of shame: internal and external. External shame pertains to an individual's perception of negative judgments about themselves in the minds of others. Internal shame, on the other hand, refers to a deeply ingrained and intensely emotional experience characterized by a profound sense of personal inadequacy, unworthiness, and self-disgust.

To summarize, our study seeks to explain the association between oral health and psychopathology, under the assumption that oral health has an impact on the experience of shame among older individuals, and subsequently, this experience of shame influences the presence of psychopathological symptoms. We aim to achieve this while taking into account the potential influences of age, gender and medication on these relationships.

3. Method

3.1 Participants and Study Design

The study was conducted in the Psychology Research Lab for Patients, Families, and Health Professionals at the University of Ioannina in 2023. The participants consisted of individuals who were currently under the medical care of the primary researcher, without any recognized diagnosis of psychiatric illness and who had scheduled routine dental appointments. The study's participant pool comprised a total of 204 patients, consisting of 120 females and 84 males, with ages spanning from 60 to 92 years, and an average age of 74.2 years (SD = 7.1).

The majority of the participants (N = 129, 63.2%) resided in small villages and had completed their education up to the primary school level (130 participants, 63.7%). A substantial proportion of the participants were married (110 participants, 53.9%), and the majority of them were pensioners (186 participants, 91.2%). In terms of living arrangements, a significant portion of the participants lived either alone (72 participants, 35.3%) or with a partner (104 participants, 51%).

The survey questionnaire was personally administered by the primary researcher. This method was selected to address potential concerns related to reports suggesting that individuals with lower levels of education might encounter challenges in understanding the intended direction of the answers, as indicated in previous studies [46].

3.2 Measurements and Statistical Analysis

3.2.1 Questionnaire

Each respondent completed a questionnaire designed to record their socio-demographic characteristics, including medication use, the Experiential Shame Scale (ESS), the Other as Shamer Scale (OAS), the Symptom Checklist-90 (SCL-90), and the 12-item GOHAI scale.

The Experiential Shame Scale (ESS), is a psychological instrument utilized to measure and evaluate an individual's personal experiences of shame, by assessing the frequency and the intensity of shame feelings and their impact on an individual's well-being and behavior [47]. The Other As Shamer Scale (OAS), is a psychological assessment tool used to measure and evaluate an individual's tendency to engage in the process of projecting shame onto others [48]. This scale is designed to assess how people externalize their own feelings of shame by unfairly attributing or imposing shame on other individuals or groups.

The OAS and the ESS scales are two distinct psychological assessment tools used to explore the complex emotion of shame, but they differ in their primary focus and purpose. While the OAS assesses the external social aspect of shame, the ESS delves into the internal emotional landscape of the individual, making them both valuable tools for understanding shame from different angles in psychological research and clinical applications.

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General mental health was assessed using The Symptom Checklist-90 (SCL-90) [49]. SCL-90 is a widely used psychological assessment tool designed to measure a broad range of psychological symptoms and distress in individuals. This self-report questionnaire consists of 90 items that cover various aspects of mental health, including symptoms of anxiety, depression, somatization, and interpersonal sensitivity, among others. The Global Severity Index (GSI) score in the SCL-90 is a summary measure that provides an overall assessment of an individual's psychological distress and symptom severity. It is derived from the responses to all 90 items in the SCL-90 questionnaire. Higher GSI scores indicate greater psychological distress and suggest a need for further evaluation or intervention, while lower scores suggest milder symptomatology or better psychological well-being.

3.3 Statistical Analysis

Path analysis was applied in order to test the examine the model that was theoretically developed. Age, gender, medication use, oral health (GOHAI) and shame (OAS, ESS),were regressed on psychopathology (GSI), oral health was positioned as mediator between demographic characteristics and shame, while shame was positioned as mediator in the relation between oral health and psychopathology. Maximum likelihood estimation method was used in order to compute the path model coefficients.

The analysis assessed:

- The effect of oral health, shame, demographic characteristics on psychopathology.
- The mediation effect of shame on the relation between oral health and psychopathology.
- The effect of demographic characteristics on psychopathology, attributed to oral health and shame.

All data were analysed using the R statistical language equipped with lavaan package [50-52].

3.4 Causal Assumptions

According to Baron and Kenny the validity of a mediational model is subject to the assumption that there is no confounding

between the exposure, the mediator and the outcome variable of the model [53,54]. In the context of the tested model, validity of the tested model is based on the assumption that the direction of the relationship is from oral health to shame, and from shame to psychopathology, rather than the opposite.

The oral health and shame relation is well established in the relative literature. First, theoretical foundations indicate that poor oral health, being highly visible, can lead to embarrassment, fostering feelings of shame [17,55]. Additionally, longitudinal studies and developmental considerations reveal that deteriorating oral health typically precedes the onset of shame, not the reverse [56]. Psychological mechanisms also highlight that shame is a reaction to social judgments related to appearance, which is directly impacted by oral health [57].

The direction of the relationship from shame to psychopathology is also clearly validated in the literature. Specifically, shame is typically generated by social events in which a personal status or feeling of inadequacy and rejection is sensed, leading to feelings of worthlessness and negative self-evaluation [24]. In that context, empirical evidence indicates that high levels of shame predict later development of psychopathology [58].

Concerning the relation between oral health and psychopathology among elder individuals, the association is firmly confirmed in the literature [4,45,59-61]. Regarding temporal precedence, some studies suggest a longitudinal effect of psychopathology on oral health, while others indicate that deteriorating oral health is associated with severe psychopathological conditions such as major depressive disorder [62-67]. Additionally, there is evidence supporting the temporal precedence of both conditions relative to each other [68].

The above considerations, suggests a plausible pathway within non-psychiatric population, where poor oral health initiates a chain reaction leading to shame and subsequent psychopathology. Thus, testing the mediation model from oral health to psychopathology through shame can provide valuable insights into one possible pathway. Establishing this pathway is crucial for understanding the specific roles and mechanisms through which oral health impacts psychological well-being, particularly given the social and visible nature of oral health issues.

4. Results

		N	Oral Health (GOHAI)	Other As Shamer (OAS)	Experience of Shame (ESS)	General Symptom Index (GSI)
Reliability			0,868	0.869	0.826	0.937
Total		200	37.3 (11.5)	18,3 (13,0)	50,2 (16,6)	1,07 (0,7)
Gender	Female	121	37.3 (11.4)	18,6 (13,0)	52,0 (16,8)	1,19 (0,6)
	Male	79	37.2 (11.6)	17,9 (13,3)	47,5 (16,1)	0,88 (0,6)
Medication	Yes	174	36.6 (11.7)	18.7 (13.5)	51.2 (16.8)	1.12 (0.62)
	No	26	41.9 (8.28)	16.0 (9.7)	43.9 (14.4)	0.70 (0.52)
Age			-0,321**	-0,001	-0,011	0,114
Oral Health (GOHAI)				-0,215**	-0,267**	-0,246**
Other As Shamer (OAS)					0,432**	0,587**
Experience of Shame (ESS)						0,511**

** Correlation Significant at 0.01 level.

Table 1: Reliability, Descriptive Statistics (M (SD)) and Correlation Among the Model Variables

The mean score, the internal consistency and the Pearson correlation coefficient of the model variables are presented in Table 1. Oral health was negatively correlated with age ($r(201) = -0.321$, $p < 0.001$), the external shame ($r(204) = -0.215$, $p = 0.002$), the internal shame ($r(203) = -0.267$, $p < 0.001$) and the general symptom index ($r(204) = -0.246$, $p < 0.001$). The maximum likelihood procedure ended normally after 38 iterations. The results of the mediation model are presented in Table 2.

4.1 Demographic Characteristics Direct Effects on Oral Health, Shame and Psychopathology

	b	SE	z	p	95% C.I.		Std(*)	R^2
					Lower	Upper		
GOHAI								0.110
Age	**-0.486**	**0.114**	**-4.270**	**0.000**	**-0.709**	**-0.263**	**-0.300**	
Gender	-0.361	1.548	-0.233	0.816	-3.396	2.674	-0.015	
Medication	2.937	1.923	1.528	0.127	-0.831	6.705	0.086	
OAS								0.057
Age	direct	-0.161	0.171	-0.942	0.346	-0.496	0.174	-0.087
	indirect	**0.133**	**0.051**	**2.630**	**0.009**	**0.034**	**0.233**	0.072
Gender	-0.646	1.846	-0.350	0.726	-4.264	2.971	-0.024	
Medication	-1.891	2.126	-0.889	0.374	-6.058	2.276	-0.049	
GOHAI	**-0.275**	**0.090**	**-3.062**	**0.002**	**-0.450**	**-0.099**	**-0.240**	
ESS								0.124
Age	**direct**	**-0.332**	**0.167**	**-1.985**	**0.047**	**-0.660**	**-0.004**	-0.141
	indirect	**0.218**	**0.068**	**3.190**	**0.001**	**0.084**	**0.352**	0.093
Gender	-4.291	2.217	-1.935	0.053	-8.637	0.055	-0.126	
Medication	**-6.004**	**3.047**	**-1.970**	**0.049**	**-11.976**	**-0.031**	**-0.122**	
GOHAI	**-0.449**	**0.102**	**-4.398**	**0.000**	**-0.648**	**-0.249**	**-0.309**	
GSI								0.495
Age	direct	0.007	0.004	1.573	0.116	-0.002	0.015	0.078
	indirect	-0.006	0.005	-1.206	0.228	-0.015	0.004	-0.067
Gender		-0.227	0.069	-3.306	0.001	-0.361	-0.092	-0.179
Medication	direct	-0.215	0.097	-2.212	0.027	-0.406	-0.024	-0.117
	indirect	-0.107	0.067	-1.606	0.108	-0.238	0.024	-0.058
GOHAI	direct	-0.002	0.003	-0.709	0.478	-0.007	0.003	-0.036
	indirect	**-0.010**	**0.003**	**-3.700**	**0.000**	**-0.016**	**-0.005**	**-0.192**
OAS		**0.022**	**0.003**	**6.531**	**0.000**	**0.015**	**0.028**	**0.453**
ESS		**0.010**	**0.002**	**4.365**	**0.000**	**0.006**	**0.015**	**0.270**

(*) Completely standardized solution

Table 2: Path Analysis Model Results

The analysis revealed a significant age effect on oral health (b = -0.486, p < 0.001) and internal shame (b = - 0.332, p = 0.047), indicating that increasing age is related to worsen oral health and improved inner shame. Furthermore, a significant gender gap was reported for psychopathology (b = -0.227, p = 0.001), indicating a favourable position of women compared to men (0.88 vs 1.19). Medication was found to be related with a smaller score for internal shame (b = -6.004, p = 0.049) and psychopathology (b = -0.215, p = 0.027).

4.2 Oral Health, Shame and Psychopathology Relations

Oral health found to have a significant negative effect on both external (bOAS = -0.275, p = 0.002) and internal shame (bESS = -0.449, p < 0.001).In turn, both flavours of shame were significant regressors of psychopathology as reflected on the general symptom index (bOAS = 0.022, p <0.001 and bESS = 0.010, p <0.001, resp.).On the other hand, no significant direct effect of oral health on psychopathology was reported.

4.3 Indirect Effects in the Context of the Examined Model

The analysis unveiled a significant indirect effect of age through oral health on both forms of shame ($b_{OAS, indir}$ = 0.133, p = 0.009and $b_{ESS, indir}$ = 0.218, p = 0.001 respectively), suggesting that the de-cline in oral health status with increasing age ultimately manifests in the experience of shame feel-ings.

Furthermore, an indirect oral health effect on psychopathology through both internal and external shame was reported ($b = -0.010$, $p < 0.001$), a result that indicates that the manifested correlation of oral health and psychopathology ($r(204) = -0.246$, $p < 0.001$) is interpreted by the indirect oral health effect through both internal and external shame. Specifically, as oral health is improved, low-er levels of external and internal shame contribute to a more favorable mental status.

5. Discussion

5.1 Age Effect on Oral Health, Shame and Psychopathology

The results of this study confirm the significant negative impact of age on oral health, a trend that is commonly reported in the existing literature [37,38]. Additionally, our findings indicate that age exerts a direct negative influence on psychopathology, a result that confirms analogous reports in samples of elder individuals across countries of analogous cultural environment and emphasizes the difference with countries of significant cultural differences as is the northern European countries, where no such a relation is observed [69,70].

Moreover, our findings suggest that age is indirectly related to heightened feelings of shame through its impact on oral health. As individuals grow older, there is a significant increase in shame associated with their oral health status. However, oral health itself has an even larger direct negative impact on both forms of shame, indicating that the age-related indirect effect is overshadowed by the condition of one's oral health. This underscores the importance of actively pursuing improved oral health, particularly in later years of life and underlines the oral health as a leading overall health indicator [71-74].

5.2 The Role of Shame in the Context of the Tested Model

The absence of an indirect age-related effect on psychopathology through shame and oral health indicates that, in the presence of shame, the natural deterioration of oral health as individual's age does not impose an additional mental burden. Instead, our study confirms the established relationship between shame and psychopathology, a connection frequently documented in the existing literature [75,76]. Even more, it unveils that oral health status has a notable indirect impact on psychopathology through the conduit of shame. Specifically, better oral health is expected to be related with a better individual's perception of negative judgments about themselves and a nicer emotional experience of personal worth, that is expected to be reflected on a better mental health status. This discovery offers a novel perspective on the documented phenomenon where individuals with suboptimal oral health tend to be characterized by higher mental health stress [77]. In particular, it underscores the role of shame as a substantial contributor to the additional mental burden experienced by older individuals as a result of their deteriorating oral health.

Therefore, our findings shed new light on the prevalent experience of shame among older individuals regarding their oral health and the appearance of their teeth [78]. In essence, this study demonstrates that efforts aimed at maintaining better oral health have the potential to reduce feelings of shame among the elderly, and the overall mental health status, leading to a better behaviors related to oral hygiene maintenance and a better overall quality of life [79-81].

5. Conclusion

Oral health plays a pivotal role in shaping an individual's experiences of both external and internal shame. As oral health improves, there is a notable decrease in levels of shame, ultimately contributing to a more favorable mental state. It is suggested that interventions and initiatives aimed at enhancing oral health could hold the potential to alleviate feelings of shame and, consequently, mitigate the risk of psychopathological conditions. This is more evident to the even older individuals since as age increase and oral health declines, individuals become more susceptible to feelings of shame, which, in turn, creates profound implications for their psychological well-being.

6. Limitations

It is essential to acknowledge certain limitations in the interpretation and generalization of the study's findings. First and foremost, it is crucial to acknowledge that our results are derived from a sample of elderly individuals from Greece. Consequently, while these findings may offer valuable insights for populations with similar cultural backgrounds, such as Mediterranean countries, it would be inappropriate to presume that these outcomes can be universally applied to regions with markedly distinct social structures, such as Northern European countries.

Secondly, the results of this study are derived with the method of path analysis that based on the assumption that there is a linear assumption between the model variables, an assumption that is rarely reflective of real-world complexities, particularly when dealing with psychological phenom-ena. Furthermore, the results are constrained by the specific pathways and variables within this model. While our study provides valuable insights into these particular associations, it does not cap-ture the entirety of the complex interactions between oral health and psychopathology. Other unex-plored variables and pathways may exist, and the extent to which our findings can be extrapolated to a broader context may be limited. Therefore, future research should consider additional factors and pathways to gain a more comprehensive understanding of the complex relationship between oral health, shame, and psychopathology.

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Conflict of Interest Statement

The authors have no conflict of interest to declare.

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