THE NEW ARMENIAN MEDICAL JOURNAL
Volume17 (2023), Issue 4, p.119-124

DOI: https://doi.org/10.56936/18290825-2023.17.f-119

ASSOCIATION BETWEEN CAFFEINE, ANXIETY AND THE OCCURRENCE OF APHTHOUS STOMATITIS IN THE ARMENIAN ETHNICITY

Absoian T.[1], Hameed Alwan M.[2]*

[1] Bachelor of Dental Surgery, College of Dentistry, Baghdad University, Iraq
[2] Department of Oral Diagnosis, College of Dentistry, Baghdad University, Iraq

Received 07.09.2023; Accepted for printing 08.10.2023

Abstract

Introduction: *Aphthous stomatitis is a recurring oral ulceration condition that affects a significant proportion of the population. While several factors have been proposed to contribute to its occurrence, the link between caffeine consumption, anxiety levels, and the development of aphthous stomatitis remains unknown. This survey-based study aimed to understand the association between coffee, anxiety, and the development of aphthous stomatitis in this specific demographic, which can provide useful insights for medical management as well as preventive strategies.*

Material and methods: *A structured online questionnaire was distributed via various social media platforms targeting a sample of the Armenian population. The questionnaire collected information on participants' demographics, coffee use patterns, anxiety levels as measured by perceived stress scales, and the occurrence of aphthous stomatitis. Statistical analyses, including Kendall's tau, were carried out to investigate the relationships.*

Results*: The results revealed a significant negative association between caffeine consumption and the occurrence of aphthous stomatitis among Armenian individuals Kendall's tau-b (τb) correlation - 240* ($p<0.05$). Participants who reported regular caffeine consumption, such as coffee, tea, and energy drinks, had a lesser prevalence of aphthous stomatitis than non-consumers. Furthermore, Armenians in the survey showed that the majority (83.5%) had a low to moderate stress level.*

Conclusion: *The data we collected in our research indicate that the prevalence of Recurrent Aphthous Stomatitis in the Armenian ethnicity was infrequent; over half of the participants didn't report Recurrent Aphthous Stomatitis in the past 12 months. Which may correlate to their caffeine consumption habits, which can lead to stress reduction.*

Keywords: *aphthous stomatitis, caffeine, anxiety, stress, Armenian ethnicity*

Introduction

Recurrent Aphthous Stomatitis (RAS) belongs to the group of chronic inflammatory diseases of the oral cavity, the characteristic feature of the disease is single or multiple shallow round ulcerations usually occurring in non-keratinized areas like the lips, ventral surface of the tongue, floor of the mouth, buccal mucosa and soft palate. The incidence of RAS ranges from 5% to 50% depending on the ethnic or socio-economic group [*Chattopadhyay A, Chatterjee S, 2007; Akintoye S, Greenberg M, 2014*].

Despite all the efforts, the exact aetiology of RAS is still ambiguous, and both genetic and environmental factors are thought to be implicated. the precipitating factors include stress, physical or chemical trauma, allergies, infection, drugs or nutritional deficiencies. Stress is believed to be a

Cite This Article as:
Absoian T., Hameed Alwan M (2023); Association between caffeine, anxiety and the occurrence of aphthous stomatitis in the Armenian ethnicity; The New Armenian Medical Journal, vol.17(3), p 119-124; DOI: https://doi.org/10.56936/18290825-2023.17.f-119

Address for Correspondence:
Maryam H. Alwan, M.Sc.
College of Dentistry, University of Baghdad
Babalmoadhum 1417, Baghdad
Tel.: (+964) 26-28-819
E-mail: maryam.h@codental.uobaghdad.edu.iq

major risk factor for RAS due to its effect on salivary cortisol levels, para-functional habits that lead to self-inflicted trauma and alterations to the immune system [*Albanidou F et al., 2008*].

Anxiety is known as the body's response to stress, and there is an ongoing debate over the effects that caffeine consumption has on anxiety since caffeine is known as the most widely consumed psychostimulant substance in the world [*Lara D, 2010; Al-Bazaz N, Radhi N, 2021*].

Many cited evidence has shown different results, some stated that there was no correlation between caffeine and stress or anxiety [*Hall S et al., 2015*], Other research stated that very high doses can increase stress levels while moderate to low doses helped in reducing stress levels [*McLellan T et al., 2016*]. Since stress is a multifactorial condition, it's better to research specific individuals with similar lifestyles to accurately measure their stress levels and caffeine habits, therefore in this paper, we will focus on the Armenian ethnicity, where genetics and cultural customs are shared between the subjects.

Coffee consumption is a popular cultural habit in Armenia, and some studies suggest that social factors and cultural norms may play a role in the high prevalence of coffee consumption among Armenians. For example, a study by Grigoryan et al. (2018) found that social interactions and traditions associated with drinking tea and coffee were important factors in the dietary patterns of the Armenian population. Daily consumption of coffee in various age groups is a practice that Armenians associate with their routine life, coffee is a must with company, celebrations and for a peaceful afternoon rest, therefore it is expected that the abovementioned effects of chronic caffeinating on the body to be vibrant in the Armenian ethnicity [*Aleksanyan A et al., 2020; Pipoyan D et al., 2023*].

Material and methods

Study design and sample preparation: The self-administered questionnaire was conducted using Google Forms and distributed to the participants via various social media platforms. The survey mainly targeted a sample of the Armenian population. Two online forms were created with identical questions but in different languages; the first form was in English and the second in Armenian, to accommodate the language preferences of the participants and make sure the questions were clear and understood by everyone. They were asked to participate voluntarily and comply with Baghdad University College of Dentistry's experimental ethical guidelines. All the participants were fully informed about the aims of the study and the confidentiality of the data, they were also assured that the data would be used only for research purposes and that no name or IP address was being recorded to protect their privacy and the confidentiality of their personal information. Table 1 summarises the elements of the questionnaire, which consists of three sections: Caffeine Consumption Assessment (Table 1a), Recurrent aphthous stomatitis frequency assessment (Table 1b) and Perceived Stress Scale (Table 1c).

Statistical analysis: Statistical analysis was conducted using the SPSS software, version 26. Descriptive statistics for frequency, mean, and standard deviation. Student T-test was used for comparisons between two independent groups. In addition, Kendall's tau-b (τb) correlation coefficient was applied to find the strength and direction of association that exists between the variables. The $p<0.05$ value was considered statistically significant.

Correlation between Variable: First and foremost, the amount of coffee consumed by each individual was calculated by multiplying the number of cups consumed by the frequency of consumption per day. Subsequently, to find the correlation between the two variables, the number of caffeinated drinks taken per day in ml and the occurrence of aphthous stomatitis, Kendall's tau-b (τb) correlation coefficient was applied.

Results

The questionnaire was found to be reliable; Cronbach's alpha coefficients for variables were 0.715 which is considered to have satisfactory internal consistency. A total of 97 answers were collected, with female participants accounting for 78.4% of the total and male participants accounting for 21.6%. The majority are in their twenties and thirties. 55.7% were university students or graduates, while 24.7% had postgraduate degrees, and 19.6% were high school students or lower. Table 2 summarises the demographic characteristics of the participants.

Recurrent aphthous stomatitis Questionnaire response: The study's main finding was that 70% of the participants had an ulcer six months to a year ago. 52.6% had only one frequency, 53.6% had them for 3-5 days, and 73.2% had minor or no pain. The response to the RAS questionnaire is summarized in table 3.

The Perceived Stress Scale response: *Evaluation Results of the Perceived Stress Scale:* The

Table 1a

The element of the questionnaire in English and Armenian language

Caffeine Consumption Assessment		
Questions	Select the answer and indicate	
Sources of caffeine	Coffee	√
	Tea	
	Caffeinated soft drinks	
	Energy Drinks	
	Chocolate	
	Others	
How often do you consume Caffeinated beverages?	Once a day	
	2-3 times daily	√
	4-5 times daily	
	More than 5 daily	
	1-3 times weekly	
	4-6 times weekly	
What time of the day do you usually consume caffeine?	Morning	
	Afternoon	√
	Evening	
When do you prefer to have caffeine?	Before eating	√
	While eating	
	After eating	
At what age did you start taking caffeine ?	13-17	
	8-12	
	Under 8	
	Over 18	
Caffeine makes me	Alert, energized and less sleepy	
	Think clearly, pay more attention and sharpen my memory	
	Relax, calm down, and improves my mood	
Cup Size	S (240 *ml*)	
	M (360 *ml*)	
	L (480 *ml*)	
	XL (600 *ml*)	

Table 1b

The element of the questionnaire in English and Armenian language

Recurrent aphthous stomatitis frequency assessment		
Questions	Select the answer and indicate	
Did you experience any type of mouth ulcer before?	Yes	
	No	√
When was the last time you experienced an ulcer ?	Currently have it	
	One month ago	
	6 months ago	√
	One year ago or more	
Frequency of Ulcer ?	1 time	
	2-3 times	√
	4 or more	
	None	
How long do they last? (Days)	0-2	
	3-5	√
	6 or more	
How painful is it ?	No pain	
	Slight pain	
	Moderate pain	√
	Severe pain	
Any treatment taken ?	No treatment	
	Topical gel or vitamins	√
	Home remedies	
Do you regularly eat food that is	Salty	
	Acidic	√
	Spicy	
	None	

Table 1c

The element of the questionnaire in English and Armenian language

Perceived Stress Scale	
F In the left column for each question., we use a scale ranging from (0-5) where 0 = never, 1 = almost, never, 2 = sometimes, 3 = fairly often and 4 = very often	
1. In the last month, how often have you been upset because of something that happened unexpectedly?	2
2. In the last month, how often have you felt that you were unable to control the important things in your life?	4
3. In the last month, how often have you felt nervous and stressed?	1
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	o
5. In the last month, how often have you felt that things were going your way?	5
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	2
7. In the last month, how often have you been able to control irritations in your life?	2
8. In the last month, how often have you felt that you were on top of things?	2
9. In the last month, how often have you been angered because of things that happened that were outside of your control?	3
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	4

stress levels of the 97 participants in the survey showed that the majority (83.5%) had a low to moderate stress level, which was distributed as low, moderate, or high, accounting for 24.74%, 58.76%, and 16.49%, respectively [*Cohen S et al., 1983; Siqueira Reis R et al., 2010*].

Caffeine Consumption Questionnaire and Response: The results of this section of the questionnaire revealed that 69.2% of respondents consume two or more sources of caffeine, 49.5% consume it more than three times per day, and 51.5% begin using caffeine before the age of eighteen (Table 4).

Moreover, when asked how caffeine makes them feel, 51.5 percent said to relax, calm down, and improve their mood, 38.1 percent said alert, energized, and less sleepy, and 10.3 percent said improves their mood. Think clearly, pay more attention, and sharpen the memory (Figure).

Correlation between Variable: Kendall's tau-b (τb) correlation coefficient was applied. The result is interpreted as follows: A correlation value of -.240* between two variables indicates that they have a significant and negative association. A negative correlation suggests that as the value of one-factor increases, the value of the other decreases (Table 5).

Table 2

Demographic characteristics of participants

Variable	Category	n (%)
Gender	Male	21 (21.6)
	Female	76 (78.4)
Age	<20	5 (5.2)
	20-40	77 (79.4)
	>40	15 (15.5)
Education	University student or graduate	54 (55.7)
	Postgraduate (Master's, Ph.D.)	24 (24.7)
	High school or less	19 (19.6)

Table 3

Recurrent aphthous stomatitis questionnaire and response

Questions	Answers	n (%)
Did You Experience Any Type of Mouth Ulcer Before?	Yes	80 (82.5)
	No	17 (17.5)
When Was the Last Time You Experienced an Ulcer	Currently Have It	5 (5.2)
	1 Month Ago,	23 (23.7)
	6 Months Ago,	17 (17.5)
	1 Year Ago, & More	52 (53.6)
Frequency Of Ulcer?	None	17 (17.5)
	Once	51 (52.6)
	2-3	23 (23.7)
	4 And more	6 (6.2)
How Long Do They Last? (Days)	0-2	31 (32)
	3-5	52 (53.6)
	6 And more	14 (14.4)
How Painful Is It?	No Pain	31 (32)
	Slight Pain	40 (41.2)
	Moderate Pain	24 (24.7)
	Severe Pain	2 (2.1)
Any Treatment Taken?	No Treatment	66 (68)
	Topical Gel or Vitamins	19 (19.6)
	Home Remedies	12 (12.4)
Do You Regularly Eat Food That Is	none	24 (24.7)
	Salty	21 (21.6)
	Acidic	7 (7.2)
	Spicy	17 (17.5)
	Acidic and salty	20 (20.6)
	spicy and salty	8 (8.2)

Table 4

Caffeine consumption questionnaire response

Questions	Answers	n (%)
Sources of caffeine	Coffee	18(18.5)
	Tea	8(8.2)
	Chocolate	3 (3.1)
	Energy Drinks	1 (1)
	two types	35(36.1)
	more than two types	32 (33.1)
How often do you consume Caffeinated beverages?	Once a day	28(28.9)
	2-3 times daily	43(44.3)
	4-5 times daily	5(5.2)
	More than 5 daily	2(2.1)
	1-3 times weekly	9 (9.3)
	4-6 times weekly	10 (10.3)
What time of the day do you usually consume caffeine?	Morning	28 (28.9)
	Afternoon	19 (19.6)
	Evening	15 (15.5)
	Morning and Evening	12 (12.4)
	Morning and Afternoon	23 (23.7)
When do you prefer to have caffeine?	Before eating	23 (23.7)
	While eating	16 (16.5)
	After eating	58 (59.8)
At what age did you start taking caffeine? (years)	8-12	8 (8.2)
	13-17	46 (47.4)
	Over 18	39 (40.2)
	Under 8	4 (4.1)
Cup Size (*ml*)	240	41 (42.3)
	360	39 (40.2)
	480	16 (16.5)
	600	1 (1)

Discussion

The impact of oral lesions such as RAS on the quality of life is considered very important as these lesions affect speech, nutrition and general comfort, and the incidence of this condition is found to be higher in individuals who experience high levels of

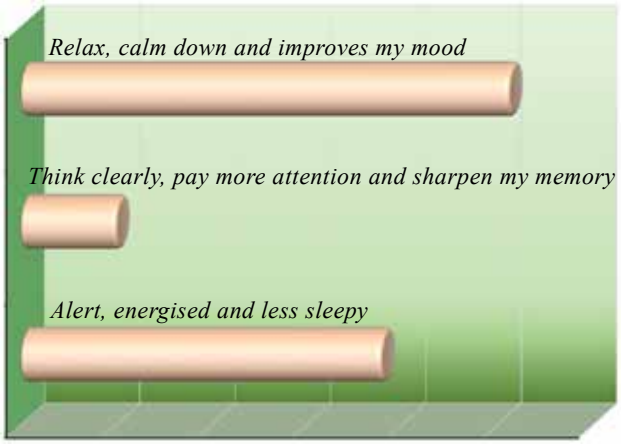

Figure. How the participant thinks caffeine makes them feel?

stress [*Thevara M et al., 2020*]. Caffeine being the most widely consumed psychostimulant substance has been reported to have beneficial effects on certain neurotransmitters such as dopamine and serotonin which in turn lead to mood improvements and feelings of wellbeing [*Singh K, 2016*].

In this study, questionnaires were collected from individuals of Armenian ethnicity to explore their caffeine habits, stress levels, and RAS history. And according to our data, it's been found that more than eighty percent of the participants had low to moderate stress levels, and fifty percent felt that coffee made them feel relaxed, calmed down, and improved their mood. These findings correlate with a previous study done by Haskell *et al.*, where they did a double-blind test to compare the effects of regular coffee, decaffeinated coffee, and placebo, it was found that regular coffee had an overall higher mood improvement and decreased mental fatigue [*Haskell R et al., 2018*].

Similar results were reported in previous literature. A study published in the Journal of Psychopharmacology noticed a reduction in stress levels in both men and women who consume caffeine [*Smith A, 2002; Heckman M et al., 2010; Socała K et al., 2020*].

The data also suggest that more than half of the participants haven't had RAS in the last twelve months, this may be associated with the low-stress levels which agrees with the results of the study done by Albanidou et al. (2008), who found a positive association between RAS and the participant's anxiety levels. While the direct relationship between coffee consumption and aphthous stomatitis has not been thoroughly investigated, there is evidence that stress reduction through coffee consumption may indirectly contribute to a decrease in its prevalence. A study by Altenburg et al. (2008) concluded that chronic stress suppresses the immune system and can result in inflammatory disorders such as aphthous stomatitis. Coffee consumption may help modify the body's immunological and inflammatory responses, potentially decreasing the occurrence of aphthous stomatitis, by lowering stress levels [*Altenburg A et al., 2008*].

Furthermore, an interesting study published in the Biomedical and Pharmacology Journal found that Methylxanthines are a kind of naturally occurring chemical present in coffee, tea, chocolate, and other foods. The only substances in therapeutic use are naturally occurring theophylline (1,3-dimethylxanthine) and its ester derivative aminophylline. They have a similar molecular structure to caffeine. It also has anti-inflammatory qualities by reducing cytokine synthesis and the action of cytokines on leukocytes. According to several studies, pentoxifylline is useful in avoiding aphthous ulcers [*Sridhar T et al., 2015; Alwan M, ghani B, 2020; Bondarev A et al., 2022*].

Due to the vague aetiology, even in the present-day research and studies on RAS continues to be noteworthy to be able to understand the condition more.

Table 5

Correlation between Variable. Kendall's tau-b (**τb**) correlation

	Kendall's tau_b	X (n=97)	*Y (n=97)*
X (n=97)	Correlation Coefficient	1.000	-0.240*
	Sig. (2-tailed)	0.0	0.015
Y (n=97)	Correlation Coefficient	-0.240*	1.000
	Sig. (2-tailed)	0.015	0.0

Note: ** Correlation is significant at the 0.05 level (2-tailed). Kendall's tau-b (τb) correlation representation in blue cells. The white cells represent the maximum values of Kendall's tau-b (τb) correlation, X -Experienced any type of mouth ulcer before?, Y-Amount of caffeinated taken per day in ml*

Conclusion

While there is little direct research on the relationship between coffee consumption, stress reduction, and the prevalence of aphthous stomatitis, the current data shows a possible indirect association. The data we collected in our research found that the prevalence of RAS in the Armenian ethnicity was infrequent, over half of the participants didn't get RAS in the past 12 months. Which may correlate with their caffeine consumption habits, which can lead to stress reduction. However, caution should be taken when consuming caffeine, as harmful effects are potential with large doses.

REFERENCES

1. *Akintoye S, Greenberg M. (2014).* Recurrent aphthous stomatitis. Dental Clinics. 58(2): 281-297 DOI: https: //doi.org/10.1016/j.cden.2013.12.002
2. *Albanidou F, Poulopoulos A, Epivatianos A, Farmakis K., et al (2008).* Increased anxiety level and high salivary and serum cortisol concentrations in patients with recurrent aphthous stomatitis. The Tohoku Journal of Experimental Medicine. 214(4): 291-296 DOI: https://doi.org/10.1620/tjem.214.291
3. *Al-Bazaz N, Radhi N. (2021).* Depression status in relation to dental caries and salivary C-Reactive Protein among 17 years old secondary school female in Baghdad City/Iraq. Journal of Baghdad College of Dentistry. 33(1): 6-11 DOI: https://doi.org/10.26477/jbcd.v33i1.2921
4. *Aleksanyan A, Biurrun I, Belonovskaya E, Cykowska-M., et al (2020).* Biodiversity of dry grasslands in Armenia: first results from the 13th EDGG Field Workshop in Armenia. Palaearctic Grasslands. 46: 12-51 DOI: https://doi.org/10.21256/zhaw-20293
5. *Altenburg A, Zouboulis C. (2008).* Current concepts in the treatment of recurrent aphthous stomatitis. Skin Therapy Lett. 13(7): 1-4
6. *Alwan M, Ghani B. (2020).* Immunohistochemical evaluation of epidermal growth factor expression in skin wound treated by capparis spinosa flavonoid extract in alloxan induced diabetes rats. 20(1): 893-899 DOI: 10.35124/bca.2020.20.1.893
7. *Bondarev A, Attwood M, Jonsson J, Chubarev V., et al (2022).* Recent developments of phosphodiesterase inhibitors: Clinical trials, emerging indications and novel molecules. Frontiers in Pharmacology. 13. DOI: 10.3389/fphar.2022.1057083
8. *Chattopadhyay A, Chatterjee S. (2007).* Risk indicators for recurrent aphthous ulcers among adults in the US. Community Dentistry and Oral Epidemiology. 35(2): 152-159 DOI: https://doi.org/10.1111/j.1600-0528.2007.00329.x
9. *Cohen S, Kamarck T, Mermelstein R. (1983).* A global measure of perceived stress. Journal of Health and Social Behavior. 24(4): 385-396
10. *Hall S, Desbrow B, Anoopkumar S, Davey A., et al (2015).* A review of the bioactivity of coffee, caffeine and key coffee constituents on inflammatory responses linked to depression. Food Research International. 76: 626-636 DOI: https://doi.org/10.1016/j.foodres.2015.07.027
11. *Haskell C, Jackson P, Forster J, Dodd F., et al (2018).* The acute effects of caffeinated black coffee on cognition and mood in healthy young and older adults. Nutrients. 10(10): 1386 DOI: https://doi.org/10.3390/nu10101386
12. *Heckman M, Weil J, De Mejia E. (2010).* Caffeine (1, 3, 7-trimethylxanthine) in foods: a comprehensive review on consumption, functionality, safety, and regulatory matters. Journal of Food Science. 75(3): R77-R87 DOI: https://doi.org/10.1111/j.1750-3841.2010.01561.x
13. *Lara D. (2010).* Caffeine, mental health, and psychiatric disorders. Journal of Alzheimer's Disease. 20(s1): S239-S248 DOI: 10.3233/JAD-2010-1378
14. *McLellan T, Caldwell J, Lieberman H. (2016).* A review of caffeine's effects on cognitive, physical and occupational performance. Neuroscience & Biobehavioral Reviews. 71: 294-312 DOI: https://doi.org/10.1016/j.neubiorev.2016.09.001
15. *Pipoyan D, Stepanyan S, Beglaryan M, Mantovani A. (2023).* Risk Characterization of the Armenian Population to Nickel: Application of Deterministic and Probabilistic Approaches to a Total Diet Study in Yerevan City. Biological Trace Element Research. 201(6): 2721-2732 DOI: https://doi.org/10.1007/s12011-022-03371-8
16. *Singh K. (2016).* Nutrient and stress management. J Nutr Food Sci. 6(4): 528
17. *Siqueira Reis R, Ferreira Hino AA, Romelio Rodriguez Anez C. (2010*). Perceived Stress Scale: Reliability and Validity Study in Brazil. Journal of Health Psychology. 15(1): 107-114 doi:10.1177/1359105309346343
18. *Smith A. (2002)*. Effects of caffeine on human behavior. Food and Chemical Toxicology. 40(9): 1243-1255 DOI: https://doi.org/10.1016/S0278-6915(02)00096-0
19. *Socała K, Szopa A, Serefko A, Poleszak E., et al (2020).* Neuroprotective effects of coffee bioactive compounds: a review. International Journal of Molecular Sciences. 22(1): 107 DOI: https://doi.org/10.3390/ijms22010107
20. *Sridhar T, Elumalai M, Karthika B. (2015).* Recurrent aphthous stomatitis: a review. Biomedical and Pharmacology Journal. 6(1): 17-22 DOI: http://biomedpharmajournal.org/?p=2594
21. *Thevara M, Shilpashree K, Murthy A, Madhusudha S., et al (2020).* Prevalence of recurrent apthous stomatitis and its association with stress among undergraduate students in a dental institution - a cross sectional study. Int J Appl Dent Sci. 6(03): 458-462

THE NEW ARMENIAN MEDICAL JOURNAL
Volume17 (2023). Issue 4

CONTENTS

THE NEW ARMENIAN MEDICAL JOURNAL

Volume17 (2023). Issue 4

The Journal is founded by
Yerevan State Medical
University after M. Heratsi.

Rector of YSMU

Armen A. Muradyan

Address for correspondence:

Yerevan State Medical University
2 Koryun Street, Yerevan 0025,
Republic of Armenia

Phones:

(+37410) 582532 YSMU
(+37493 588697 Editor-in-Chief
Fax: (+37410) 582532
E-mail:namj.ysmu@gmail.com, ysmiu@mail.ru
URL:http//www.ysmu.am

Our journal is registered in the databases of Scopus, EBSCO and Thomson Reuters (in the registration process)

SCOPUS EBSCO
REUTERS

Copy editor: Tatevik R. Movsisyan

Printed in "LAS Print" LLC
Director: Suren A. Simonyan
Armenia, 0023,Yerevan,
Acharyan St. 44 Bulding,
Phone: (+374 10) 62 76 12,
E-mail: las.print@yahoo.com