

## Prevalence and Periodontal Treatment Needs of Aggressive Periodontitis, in Students of Specific part of Iran

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### Abstract

Aggressive periodontitis (AGP) often affects systematically healthy individuals under 30 years of age with onset around puberty and is associated with progressive bone loss. This study sought to assess the prevalence of AGP and periodontal treatment needs in high school students in Specific area of Iran.

A total of 1,068 students in the age range of 15-17 years from different parts of Sabzevar city were evaluated in this study.

Basic research design an organized checklist of demographic information was filled out for all participants. Clinical examination was carried out by a periodontist. Students suspected for AGP with periodontal pockets deeper than 4mm were referred to the periodontal clinic for more detailed clinical and radiographic examination.

Statistical analysis used: The data were analysed using t-test. Eight (0.7%) participants showed clinical manifestations of AGP (one female and seven males). The mean DMFT index of patients was  $2.83 \pm 1.6$ . In assessment of CPITN in eight patients with AGP, two patients had code 4, five had code 3 and one had code 2. Of eight patients with AGP, six required plaque control, elimination of plaque retention factors and scaling and root planning while the remaining two required complex periodontal treatments

The results of this study indicated higher prevalence of AGP in this part compared to other parts of Iran.

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### Introduction

Aggressive periodontitis, formerly known as juvenile periodontitis (before 1999), is a periodontal condition, which usually affects systematically healthy individuals younger than 30 years with onset around puberty. Despite the presence of deep periodontal pockets in the initial phases of disease, clinical signs and symptoms of inflammation do not exist.<sup>1</sup> Distalabial migration of the maxillary incisors, diastema, tooth mobility, dull, deep and radiating

pain and sensitivity to thermal stimuli are among the major complaints of patients in advanced stages of disease.<sup>2</sup>

Low age of onset, fast and aggressive progression of disease, familial inheritance, change in host immune responses and a characteristic microbial flora are among the main characteristics of AGP. The major risk factors include genetics and microbiological, immunological and environmental parameters. This disease is classified into three categories of localized AGP, generalized AGP and rapidly progressive periodontitis.<sup>3,4</sup>

Several epidemiologic studies have assessed the prevalence of AGP in different geographical locations worldwide and in populations with different genetic backgrounds. In previous studies, the severity of AGP has been assessed using several gingival and periodontal

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indexes. In general, the prevalence of localized AGP has been estimated to be less than 1%; however, higher and lower prevalence rates have also been reported in some areas.<sup>5-11</sup> This condition affects both males and females with variable ratios in different geographical locations.<sup>12,13</sup>

Occurrence of dental caries in patients with AGP in different geographical locations is still a matter of debate. However, some high-quality studies have pointed to an inverse correlation between AGP and dental caries.<sup>14-17</sup>

Considering the high prevalence of AGP in some areas and periodontal treatment needs of patients is a research priority.<sup>18,19</sup> This study aimed to evaluate prevalence, caries level and periodontal treatment needs of AGP patients in a specific part of Iran and compare with the other evaluated parts of world.

## Materials and methods

### Study population:

In this cross-sectional study, number of 15,16 and 17 year-old high school students in three age groups was found to be 9,273 individuals according to the records of the Office of Education of Sabzevar city; out of which, 5,070 were females and 4,203 were males.

Our study was approved in the ethics committee of our university (cod IR.MEDSAB.REC. 1397.074)

The participants were selected using systematic cluster sampling. Sample size was calculated according to a study by Albandar et al, in 2002 in Uganda.<sup>20</sup> A total of 1,068 students were included in the study; out of which, 476 were females and 592 were males. The participants were selected from five girls-only and five boys-only high schools in north, south, east, west and central areas of Sabzevar city (designated by the Office of Education).

### Clinical examination:

First, the students filled out an anonymous checklist asking for their age, sex, oral hygiene status in terms of the frequency of tooth brushing and dental flossing, socioeconomic status of their parents, presence of a family history of gum disease in their family members and history of other systemic conditions. Students were first briefed about how

to fill out the checklist and were then subjected to clinical oral examination.

The exclusion criteria were presence of a systemic disease, bone loss due to traumatic occlusion or chronic periodontal disease and causes of bone loss other than AGP such as presence of over-contoured restorations, severe class II caries, restoration over-hang, removable or fixed orthodontic appliances, inadequate prosthetic crown or crowding.

Clinical oral examination was carried out as recommended by Baer in 1971 for cross-sectional studies as follows:<sup>5</sup>

1. Patients had to be healthy with no systemic condition in their medical history.
2. Connective tissue attachment loss by 4mm or more around a minimum of two permanent teeth (one of which had to be a permanent first molar tooth) and bone loss by 2mm or more (6-11) around the affected teeth.
3. Discrepancy between the existing local stimuli and the extent of bone loss and connective tissue attachment loss, which was determined by calculating the plaque index, the severity of calculus and their discrepancy with GI.

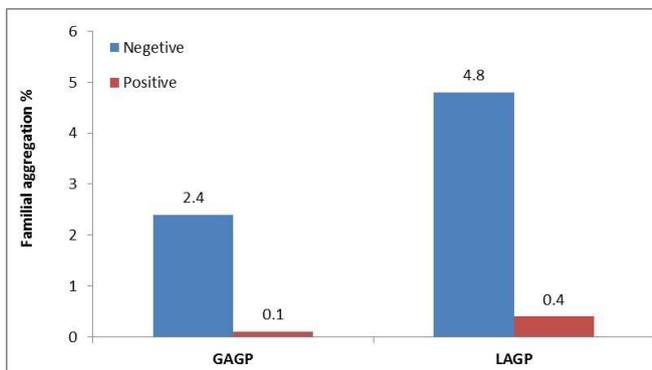
All clinical examinations were carried out by a periodontist in a classroom under adequate daylight using a dental mirror and Williams probe. Pocket depth was measured at the mesiobuccal, mesiolingual, distobuccal, distolingual, buccal and lingual areas of maxillary and mandibular first molars and incisors using a Williams probe. Periodontal pocket depth was measured from the gingival margin to the probing depth (floor of the pocket). Students suspected for AGP with a pocket depth over 4mm around each of the examined teeth were referred to the professional dental clinic of university. Attachment loss (from the cemento-enamel junction to the pocket depth) around all teeth was assessed as well. The participants were also subjected to radiographic examination Simplified Oral Hygiene Index (OHI-S), Gingival index (GI), DMFT and The community periodontal index of treatment needs (CPITN) were calculated as well. For radiographic examination, bilateral bitewing radiographs were taken of the molar areas and parallel periapical radiographs were also taken from the anterior maxilla and mandible. The radiographs were evaluated by a periodontist on a negatoscope. Based on the patient's general

health status and disease characteristics, students with localized or generalized AGP were diagnosed. The data were analysed using t-test.

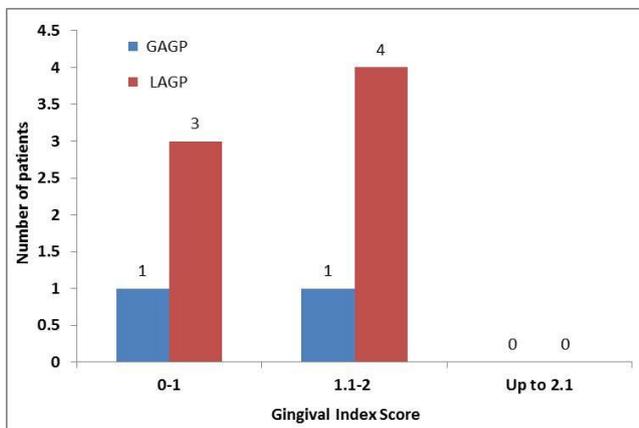
### Results

Of a total of 1,068 students examined, 476 were females and 592 were males; out of which, eight were diagnosed with AGP. Of eight patients with AGP, six were diagnosed with localized and two were diagnosed with generalized AGP; due to small number of patients, the difference was not statistically significant.

No significant difference was found among the three age groups in terms of prevalence of AGP. In terms of socioeconomic status, the majority of patients and healthy students were from a low socioeconomic class; although the difference in this regard was not statistically significant. A significant association was found in terms of presence of a positive family history in the patient group ( $P < 0.001$ ) (Fig 1).

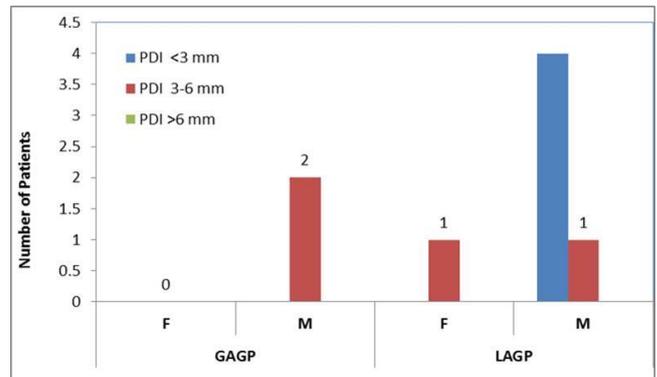


**Figure 1.** Frequency of having Familial aggregation.

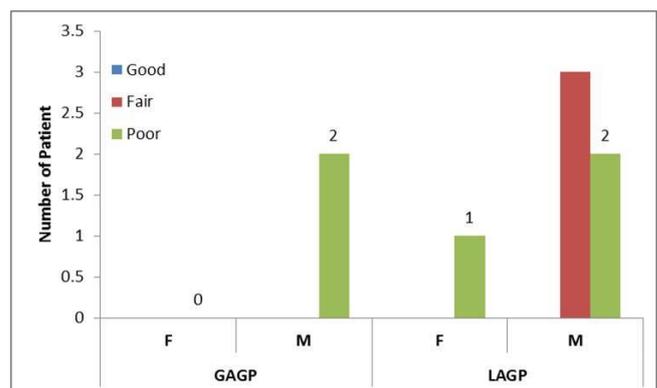


**Figure 2.** Gingival Index score in Aggressive periodontitis patients.

Assessment of GI in the patient group revealed that most patients had mild inflammation (Fig 2). Assessment of PDI revealed that most patients had attachment loss less than 3mm or between 3-6mm; although this association was not statistically significant (Fig 3).



**Figure 3.** PDI score in Aggressive periodontitis patients.



**Figure 4.** OHI-S score in Aggressive periodontitis patients.

In terms of the OHI-S, AGP patients had fair to poor oral hygiene and the mean Calculus index (CI) and Debrise index (DI) was reported to be  $1.49 \pm 0.5$  and  $1.12 \pm 0.6$ , respectively (Fig 4). Assessment of DMFT (Decay/Missing/Filling Tooth) index revealed a mean score of  $2.83 \pm 1.6$  in the localized and  $2.5 \pm 2.12$  in the generalized AGP group. In general, the mean DMFT score was  $2.75 \pm 1.58$  in patients with AGP (Table 1). In assessment of CPITN, one patient had code 2, five patients had code 3 and two patients had code 4. Those with codes 2 and 3 required calculus and plaque removal and elimination of plaque retention factors as well as scaling and root planning; thus, they were categorized as

(Treatment Need) TN:2. Patients with code 4 required complex periodontal treatments and were categorized as TN:3 .

A total of potentially relevant titles were found during electronic searches with the application of the eligibility criteria, 36 were remain by the title.

	AGP		Total
	GAGP	LAGP	
Maximum	4	4	4
Minimum	1	0	0
Average	2.50± 2.12	2.83± 1.60	2.75±1.58

**Table 1.** Average DMFT in aggressive periodontitis patients.

## Discussion

The prevalence of AGP disease was done in the different parts of the world.(Fig 5) In current study we assessed the prevalence of AGP disease that it seems high in this part of Iran country .Then, In the relationship consideration of caries level and prevalence in AGP patient, our result compared to the results of other researches.

A total of 1,068 high school students in Sabzevar were evaluated to assess the prevalence of AGP; out of which, eight were found to have AGP. Two of eight patients were suffering from generalized and the remaining six were suffering from localized AGP. The results of previous studies regarding the distribution of AGP in males and females are controversial. Cogen and Wright in 1992 reported that the female/male ratio of patients with AGP was 4/1 among the Caucasians and 1/1 among the black people. <sup>21</sup> However, Loe et al, in 1986-1987 reported a higher prevalence rate in males; although this difference was not statistically significant. <sup>9</sup>In the current study, the prevalence of AGP was higher in males than in females; however, due to small number of patients, this difference did not reach statistical significance. With regard to the association of AGP with age, a higher prevalence was not seen in a specific age group in our study. Different age groups have

been assessed in previous studies and the results regarding the higher prevalence of AGP in a specific age range have been variable. In the total assessment of previous study <sup>7, 11, 18-20, 22-33</sup> the relation between three parameters of average age, female/male ratio and prevalence which derived from previous studies were evaluated that shows in Fig. 6.as contour plot. It can be seen that the prevalence decrease with an increasing female/male ratio, whereas in female/ratio of 1.5 and higher values the prevalence is fewer than 5%. It means previous researches show this disease is more common in males than females all over the world.

As shown in contour by moving from blue to red area means that the prevalence is greater. There is two critical red areas in contour about 15-16 and 18-19 ages that indicate this disease reveal in this two Ages which could help to its diagnosis.

The association between the presence of a familial aggregation of periodontal disease and occurrence of AGP was significant in the patient group in our study. This parameter hasn't evaluated in another studies with prevalence evaluation, up to now, that can explain the presence of genetic background in this disease.

The prevalence of AGP in our study was reported to be 0.7%. The localized form had a prevalence of 0.5% and the generalized type had a prevalence of 0.2%. Other studies have reported the prevalence of AGP to be 28.8% in Uganda , <sup>20</sup> 1.66% in Sao Paulo, <sup>28</sup> 38.4% in Israel,<sup>26</sup> 0.42% in Saudi Arabia<sup>30</sup> 0.32% in Santiago (Chili),<sup>22</sup> 0.8% in Nigeria, <sup>19</sup> 0.36% in Mangalore city,<sup>27</sup> 0.3% in Tehran,<sup>23</sup> 0.6% in Turkey,<sup>18</sup> 1.8% in Iraq,<sup>25</sup> 3.7% in Brazil <sup>34</sup>and 6.8% in India. <sup>24</sup> It appears that black people are at higher risk of AGP. <sup>10, 11, 35</sup> Evidence shows variable prevalence of AGP in different geographical locations and communities, which highlights the role of genetic factors in occurrence of AGP. Genetic factors have been mentioned as one of the major risk factors for development of AGP.<sup>3</sup> Studies on the familial pattern of alveolar bone loss also point to the role of genetic factors in occurrence of AGP <sup>6, 36, 37</sup>

Variable distribution of involved genes in different communities results in different susceptibility of individuals to AGP. <sup>1</sup> Radiographic examinations and clinical probing are often used for detection of AGP patients. <sup>38</sup> In

the current study, PDI, measurement of attachment loss and radiographic examinations were used to confirm the diagnosis of AGP in suspected cases. In the current study, gingival inflammation was assessed using the GI, and oral hygiene status was assessed using the OHI-S.<sup>36</sup> Poor oral hygiene is among the most important factors responsible for replacement of normally a virulent bacteria with pathogenic species in periodontal pockets and occurrence of attachment loss. Thus, the variability in prevalence rates of AGP in different communities may be attributed to differences in the criteria and indexes used for periodontal assessment, use of different classifications for periodontal diseases, methodology of studies and different age range of participants. According to Saxby, the prevalence of AGP in the Asian and non-industrialized countries is higher than that in the European and industrialized countries.<sup>11</sup> Thus, the prevalence of AGP in Iran is expected to be higher than that in the European countries. Our current findings confirmed this statement; however, the results of previous studies conducted in other parts of Iran did not find a significant difference in prevalence of AGP in Iran and the European countries.<sup>23</sup> Such a difference in results may be due to the evaluation of different ethnic groups. In our study, the majority of patients and healthy individuals belonged to the low socioeconomic class; thus, no association was found between socioeconomic status and AGP. The results of previous studies in this regard have been controversial. Lopez et al, in 1991, Nordeyd et al, in 1999 and Gjermo et al, in 1984 reported that AGP had a higher prevalence among low socioeconomic classes.<sup>34, 39, 40</sup> Albandar et al, in Uganda did not find a significant association between AGP and socioeconomic status;<sup>20</sup> but they explained that this finding was probably due to the presence of a large number of high school students with low socioeconomic status in their study. Similarly, the majority of high school students in our study belonged to low socioeconomic classes and thus, a definite conclusion regarding presence or absence of a significant association between AGP and socioeconomic status could not be drawn. Our study was conducted in public schools of Sabzevar city and students from higher socioeconomic levels often go to private schools.

The PDI was used for assessment of

attachment loss in our study, which revealed that half the patients with AGP in our study had a score of 3-6; the most commonly involved teeth in these patients were the mandibular central incisors and maxillary molar teeth. Type of teeth with attachment loss over 5 has been variable in previous studies.<sup>9, 13, 35, 41</sup> The OHI-S was used in the current study to determine the amount of plaque and calculus, which revealed that most patients had fair to poor oral hygiene. Although in AGP the amount of plaque is not proportionate to the level of attachment loss, it does not mean that patients with AGP always have good oral hygiene. In patients with poor oral hygiene, destruction occurs with a faster pace. Considering the low socioeconomic state of most participants in the current study and their lack of knowledge about the plaque control measures, poor oral hygiene in them was somehow expected. Poor oral hygiene can aggravate the intensity of disease and attachment loss in patients with AGP but cannot result in misdiagnosis of AGP because AGP has a pathognomonic pattern of bone loss and specific teeth are often involved in this condition. The prevalence of dental caries in participants was also evaluated in the current study using the DMFT index. The results of previous studies in this respect have been widely variable.<sup>41</sup> Some studies have reported lower prevalence of dental caries in patients with AGP compared to healthy individuals.<sup>16,17</sup> while Albandar et al. reported higher rate of caries in AGP patients,<sup>42</sup> which was mainly due to the number of missing teeth. A few studies compared the prevalence of caries in AGP and chronic periodontitis patients and stated that rate of caries in AGP patients was lower than that in chronic periodontitis patients<sup>14,15,43</sup>

## Conclusions

In the current study, the mean DMFT index was found to be  $2.75 \pm 1.5$  in AGP patients, which was relatively high; however, considering the poor oral hygiene of patients, this finding was not far from expectation. The controversy between our findings and those of previous studies reporting lower rate of caries in patients with AGP may be due to poor oral hygiene of patients in our study. In the current study, CPITN was used to assess the periodontal treatment

needs of participants. Considering the poor oral hygiene of patients in our study, the two patients with generalized AGP (CPITN code 4) required complex periodontal treatment (TN4). Among patients with localized AGP, one patient with code 2 and five patients with code 3 required scaling and root planning, oral hygiene instruction and elimination of plaque retention factors (TN3).

### Acknowledgements

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### Declaration of Interest

The authors report no conflicts of interest related to this study.

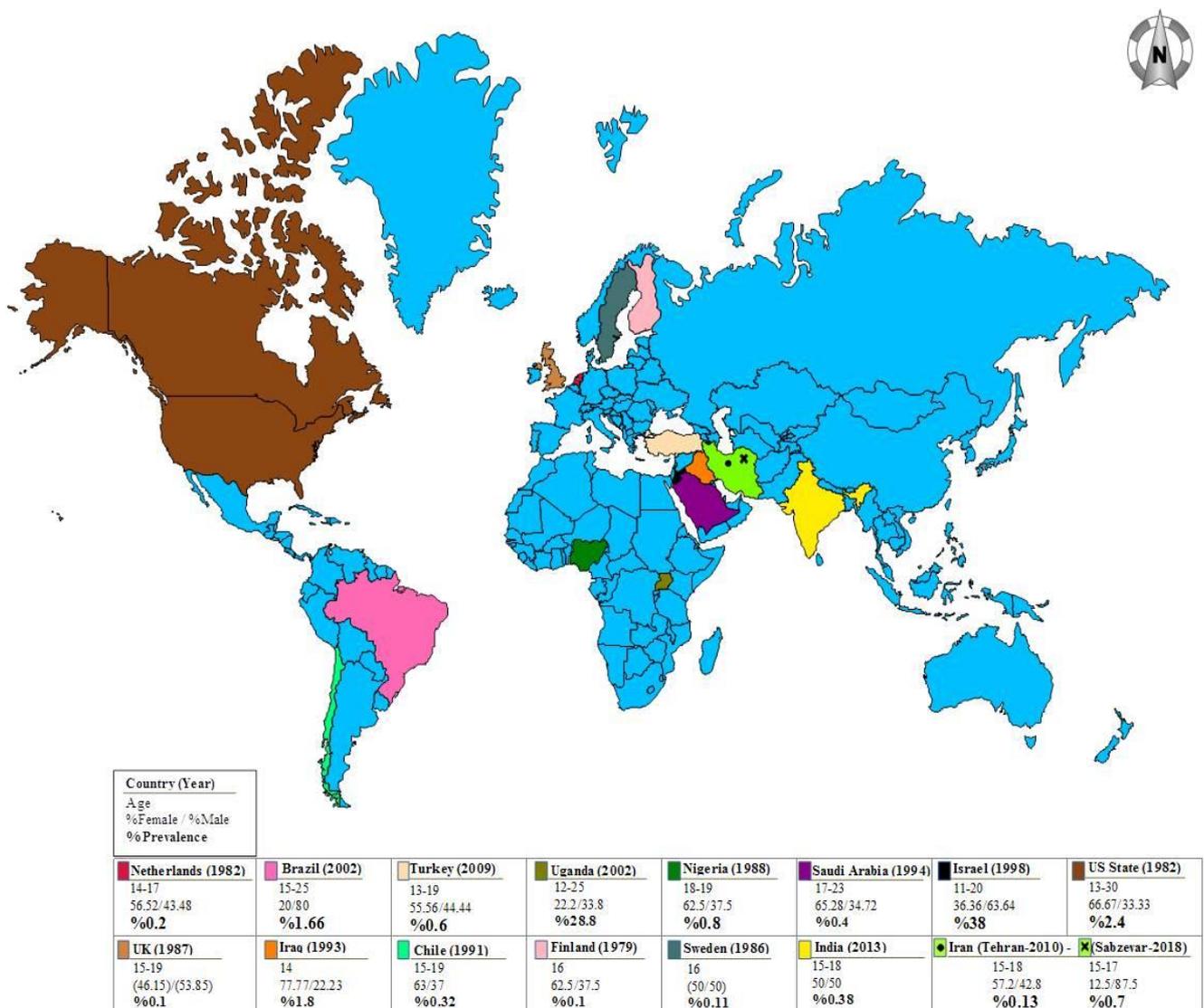
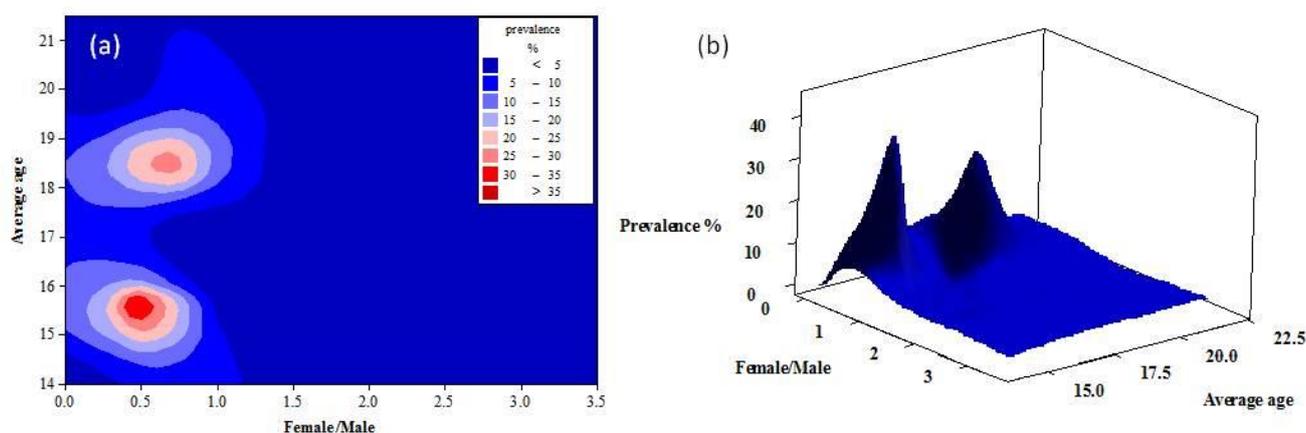


Figure 5. Worldwide representation of AGP prevalence.



**Figure 6.** Relation between three parameters of average age, female/male ratio and prevalence.

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