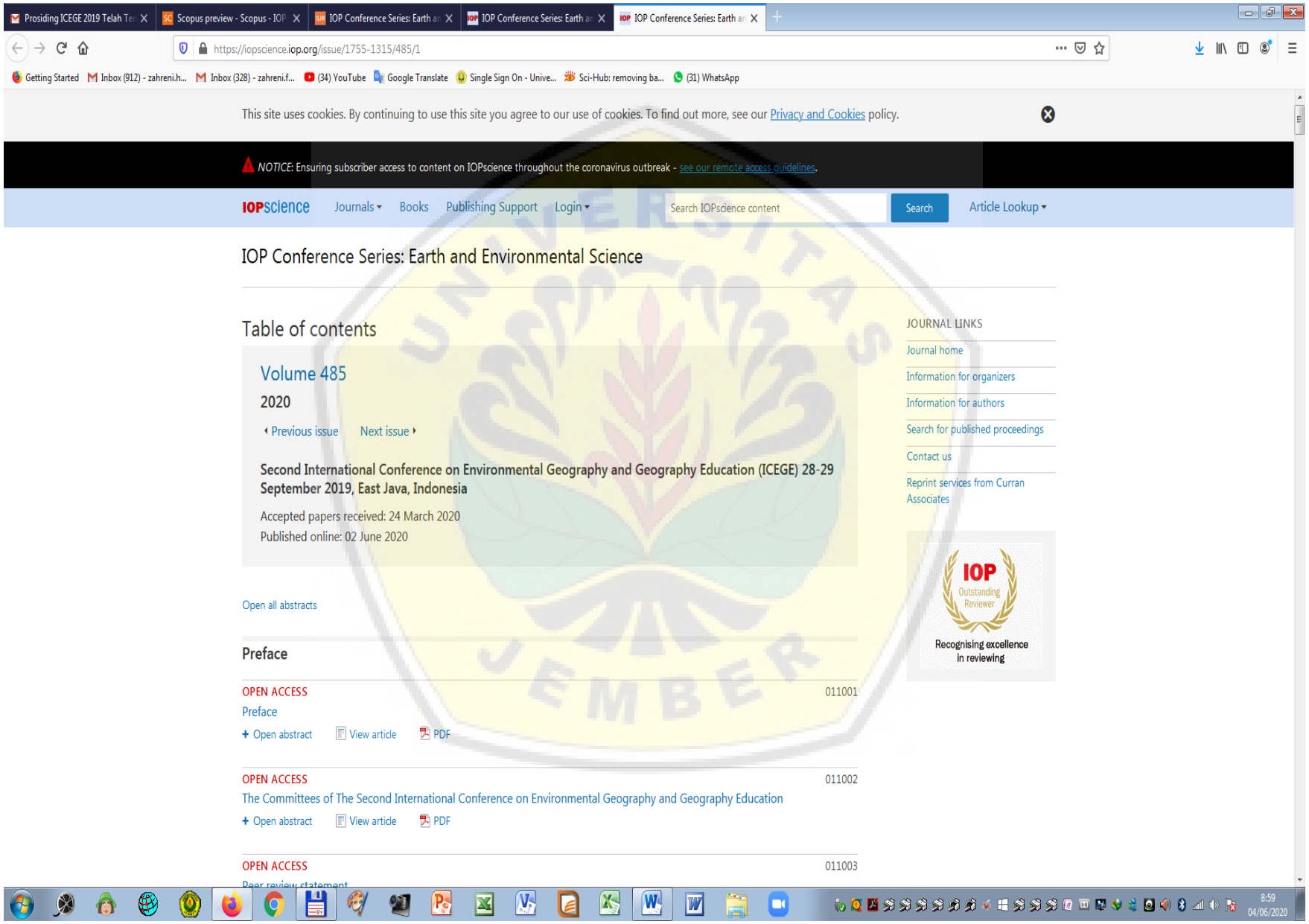

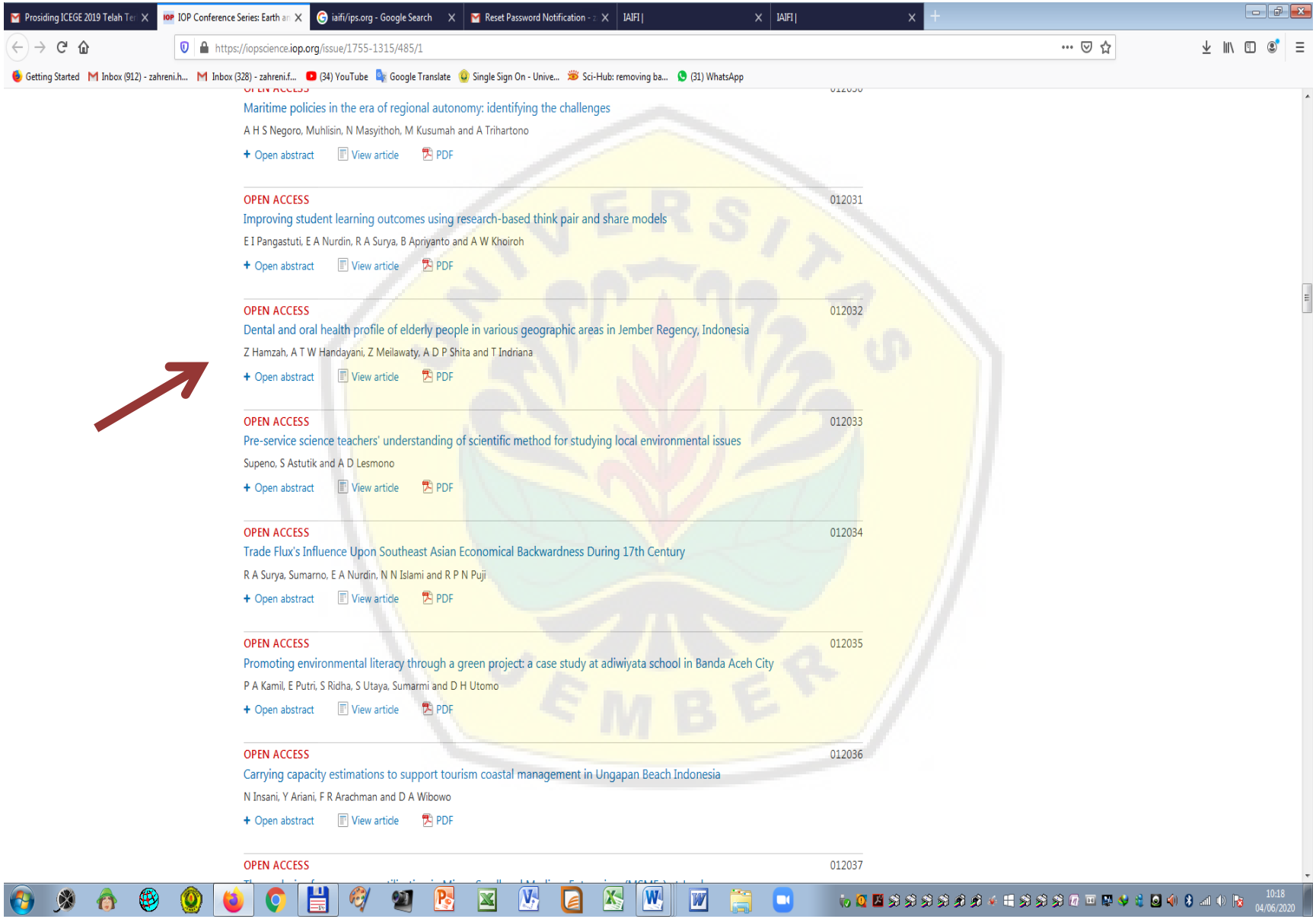

IOP Conference Series: Earth and Environmental Science

Country	United Kingdom - SIR Ranking of United Kingdom
Subject Area and Category	Earth and Planetary Sciences Earth and Planetary Sciences (miscellaneous) Environmental Science Environmental Science (miscellaneous)
Publisher	
Publication type	Conferences and Proceedings
ISSN	17551307, 17551315
Coverage	2011-ongoing
Scope	The open access IOP Conference Series: Earth and Environmental Science (EES) provides a fast, versatile and cost-effective proceedings publication service.

Homepage

How to publish in this journal

Contact

Join the conversation about this journal

14

H Index

PAPER • **OPEN ACCESS**

Dental and oral health profile of elderly people in various geographic areas in Jember Regency, Indonesia

To cite this article: Z Hamzah *et al* 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **485** 012032

Dental and oral health profile of elderly people in various geographic areas in Jember Regency, Indonesia

Z Hamzah[1*], A T W Handayani[2], Z Meilawaty[1], A D P Shita[1], T Indriana[1]
[1]Department of Biomedic,Faculty of Dentistry, Universitas of Jember, Jl. Kalimantan 37, Jember, East Java, Indonesia
[2] Department ofDental Public Health – Faculty of Dentistry, Universitas of Jember, Jl. Kalimantan 37, Jember, East Java, Indonesia

*E-mail: zahreni.fkg@unej.ac.id.

Abstract. People often adjust their behavioral pattern to the physical conditions of local environment, especially for elderly dental and oral health. Elderly is a population which is very vulnerable to environmental changes and diseases. Elderly people who have good oral health are expected to have good general health. This study focuses on dental and oral health profiles of elderly in the different residential location. Geographically, the locations of elderly resident are divided into 4 areas, i.e. urban, agricultural, highland/mountain and coastal areas. This research was carried out using a cross sectional approach. The research population was elderly aged more than 45 years. Research subjects were determined using cluster random sampling based on the geographic residential areas (n=229). Measurements of dental and oral health profile were based on the Decay-Missing-Filling-Teeth (DMF-T) indicators and the Simplified Oral Hygiene Index (OHI-S). 229 research subjects were analyzed using Kruskall Wallis tests. The results show that most of the elderly have poor dental and oral health profile. However, the elderly who live in the coastal area have better dental and oral health profile. Meanwhile, the elderly who live in the highland area have the worst profile of oral and dental health compared to the elderly who live in other areas.

1. Introduction

From time to time, the population of the elderly in Indonesia continues to increase. It is predicted that the number of elderlies in 2020 will reach 28.8 million people or 11.34 percent of the total population. Elderly people are known to have problems of decrease in the level of health, in terms of physiological, physical, mental and social disorders. It causes proportional increase in morbidity and disability [1,2]. Such conditions, of course, will result in an increase in the cost of health services, including dental and oral health.

In Indonesia, dental and oral health services for the elderly have been carried out based on dental and oral health services in general. They have not specifically paid attention to the characteristics of the elderly and considered the characteristics of the area of residence, such as: coastal, highland, or agricultural/plantation areas [3-4]. It is because not all disease problems can be cured in the same way. Therefore, in conducting health services for the elderly, it must be done with a holistic consideration in order to achieve excellent results, without burdening the cost of health services.

The oral and dental health profile in the elderly is generally determined based on the level of dental and oral hygiene, the degree of damage, restoration/filling, and tooth loss [5-8]. the elderly needs to be considered well, because it is known to be a predictor of the onset of disease which results an increase in morbidity and mortality for the elderly [9].

The profile of elderly dental and oral health in various geographical locations of residence need to be known by health workers, both nurses, doctors and policy makers, to obtain appropriate prevention and care to achieve optimal oral and dental health for the elderly, given oral health is an integral part of overall health. Moreover, the more teeth that was damaged and not well-treated, the more likely they were caused various diseases [10-12].

This study aims to analyze whether or not the geographical residence differences affect the profile of elderly oral and dental health. The results of this study are expected to be useful in developing a

strategy for good health management planning approaches to improve the dental and oral health in the elderly.

2. Methods

This research was a cross sectional study which records various information of oral and dental health profile in the elderly, consisting of OHI-S and DMF-T [13]. The research subjects were selected through cluster random sampling based on the location where the elderly live. The location of the elderly population was grouped into several residential areas based on geographical differences, namely in coastal, mountains/highland, agricultural, and urban areas, in Jember Regency, East Java, Indonesia.Research subjects consisted of 229 elderly people aged over 60 years, were willing to take part in this study as expressed in a written inform consent. This study has fulfilled the ethical eligibility requirements of the Ethics Commission of the Faculty of Dentistry, Universitas Jember No. 082/UN25.8/KEPK/DL/2018.

Dental and oral health profiles include cleanliness and damage to dental tissues and the oral cavity. The level of dental hygiene was calculated based on the indicators of the Oral Hygiene Index Simplified (OHI-S) introduced by Green and Vermillion (1964). This index was used to record dental hygiene. The cleanliness of the teeth and mouth was determined by the presence of plaque, debris and calculus. Meanwhile, the DMF-T index consists of three components, namely Decay (D), Missing (M), and Filling (F) Teeth. In this study, Decay (D) aspects in the elderly did not only count tooth decay due to caries as introduced by Client et al. (1938) [5], but also used modified DMF-T involving tooth decay caused by caries and non-caries causes (brittle, broken, worn out, etc.) which cannot be included in the Client's DMF-T index.

The DMF-T criteria based on WHO (2013) for adults are as follows: very low <5.0, low 5.0 - 8.9, medium 9.0 - 13.9, and high > 13.9. The OHI-S criteria are classified into 2 parts, namely as follows: Debris Index (DI) and Calculus Index (CI). The OHI-S calculation results are the sum of DI and CI. The OHI-S criteria are grouped into three levels, namely (0 - 1.2), medium (1.3 - 3.0) and bad (3.1 - 6.00).

Interviews were carried out using interview guides prepared by researchers from the Environment, Aging and Health Research Group from Universitas Jember referring to the WHO form, 2013 with some modifications. Meanwhile, clinical examination was carried out by dentists who are members of the Environment medical team, Aging and Health Research Group from Universitas Jember.

3. Results and Discussion

3.1. Results

Elderly who participated in this study were 229 people. Elderly distribution based on geographical differences in place of elder residence is described as Tabel 1 and Figure 1 below.

Table 1. The amount and percentage (%) of elderly people

Elderly Residence	**F**	**%**	**M**	**%**
Coastal area	50	22	12	5
Highland area	41	18	12	5
Agricultural area	30	13	23	10
Urban area	43	19	18	8
Total Elderly	164	72	85	28

Source: Primary data

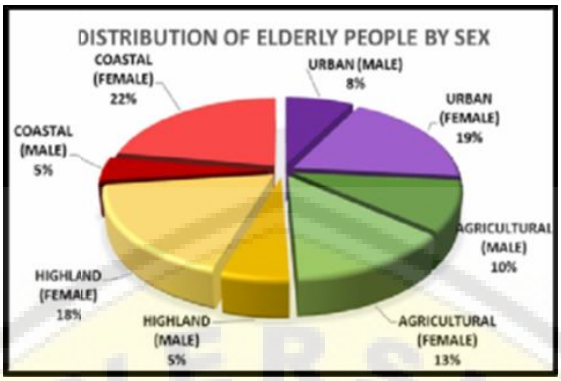

Figure 1. Distribution of dependent elderly residents based on age and gender

Table 1 and Figure 1 show in all location of this study, the total number of women's participation is more than men's participation, because the total elderly number of women is more than man. Generally, the man elderly people feels shy to be present at the elderly meeting because majority of attendance usually are women. In addition, another reason men did not come to the elderly meeting was because during the survey the elderly men were working.

The results of the intra oral examination obtained by OHI-S and DMF-T are summarized in Table 2.

Table 2. Locations of elderly residence and dental and oral health profiles

Elderly Residence	OHI-S	Criteria	DMF-T	Criteria
Coastal area	2.80 ± 1.29	moderate	13.39 ± 4.56	moderate
Highland area	3.69 ± 1.06	poor	14.98 ± 4.45	high
Agricultural area	3.67 ± 1.04	poor	12.05 ± 3.49	moderate
Urban area	4.54 ± 0.76	poor	13.75 ± 3.17	moderate

Source: Primary data

The OHI-S is obtained by the sum of Debris Index (DI) and Calculus Index (CI). This index is divided into three levels, good (0-1.2), moderate (1.3-3.0) and bad/poor (3.1-6.00). Based on Table 2, only elderly people in the Coastal area with moderate level of OHI-S, while the other 3 areas belong to poor level of OHI-S with the level of OHI-S in Urban area is the worst (4.54 ± 0.76).

DMF-T is the simplest measurement of dental hygiene, but its utilization needs to be adjusted to apply it in elderly people. Therefore, in this research DMF-T criteria for adults still be used, the criteria as follows: very low <5.0, low 5.0-8.9, medium 9.0-13.9 and high >13.9. In this research, the examination had been modified due to causal of the missing teeth are not only because of caries. In addition, the third molar (wisdom tooth) is excluded from the measurement because this tooth usually undergone abnormality and is predicted to be evolved.

Based on those criteria, DMF-T acquired in this study is as shown in Table 2. DMF-T level of elderly people in Highland area is the highest, followed by Urban area and Highland area. On the contrary, DMF-T level in Agricultural area is the lowest compare to the other three areas. There are aspects of missing teeth is the highest factor that determines the value of DMF-T in the elderly

The Older people who living in urban areas have the worst levels of initial hygiene, but in fact the elderly who live in the highlands have the highest tooth decay compared to the Coastal, Agricultural and Urban areas.

3.2. *Discussion*

The results obtained in this study indicate that older people who live in the coastal area have smaller dental and oral hygiene and tooth decay compared to the elderly who live in highland, agricultural and urban areas. This seems to be strongly related to eating and drinking patterns, the

content of groundwater contained in drinking water and the nutrients of plants consumed. The element of groundwater in coastal areas is very rich in calcium, magnesium, sodium, potassium, chlorine, bicarbonate, and sulfate. As is known, calcium is a basic component for living organisms that play an important role in bone and tooth formation [14]. In addition, free calcium ions in drinking water and fluoride can settle in the biofilm fluid on the surface of the tooth, so that it can prevent the process of caries. Fluoride can act by inhibiting bacterial metabolism in plaque [15].

A contradictory result was found in the elderly living in urban areas. Indeed, the elderly living in urban areas have access to health information and adequate care facilities, but the results of this study show that the elderly who live in urban areas have the worst dental and oral hygiene. This is thought to be due to the attitude of the elderly in urban areas who have not considered dental and oral health as a matter that really needs attention. In addition, the urban elderlies have relatively more activities so that they do not clean their teeth and mouth before going to bed. In addition, the types of food consumed by the elderly in urban areas are very diverse which allows sticky food on the surface of their teeth. This condition has resulted in worse dental and oral hygiene in the urban area compared to the elderly who live in other residential areas.

Elderly people in the agricultural and highland areas show that their oral hygiene was not much different. Even though it not as clean as the elderly who live in the coastal area, they have cleaner dental and oral hygiene than the elderly in the city area. This is allegedly because those who live in the agricultural area must go to the fields in the morning, and only return in the afternoon. These activities cause them not to have enough time to brush their teeth. In addition, the elderly who live in agricultural areas have not been 'dental minded' and many have the habit of chewing betel leaves [16].

In addition, the results of this study appear that the elderly who live in the highland have the highest level of damage. This is thought to be due to this area has less mineral content than in other regions; since minerals are carried away by water during the rainy season in this area. This causes the minerals contained in their teeth not as much as the elderly in other areas, so that their teeth are brittle and loose [16-19].

In addition, knowledge, attitudes and awareness in performing dental and oral health care are also important prerequisites for influencing changes in the health behavior of the elderly, including behaviors related to health and disease prevention [19]. Meanwhile, the severity of the disease in the elderly is influenced by dietary factors, diet, environment and culture, illiteracy, healthy living knowledge, health care seeking behavior, misunderstanding, income, family composition, social isolation, and dependence [20-23].

4. Conclusions

Most of the elderly have poor dental and oral health profile. However, the elderly who live in the coastal area have better dental and oral health profile, and the elderly who live in the highland area have the worst profile of oral and dental health compared to the elderly who live in other areas.

Acknowledgments

The authors would thank to the Rector of Universitas Jember and Head of Research and Community Service Board for supporting this research.

References

[1] Land K C, Lamb V L 2017 International Encyclopedia of Public Health Reference (Second Edition) Elsevier Inc
[2] Iqbal MH 2019 *J Mark Access Health Policy***7**(1): 1575683
[3] Ando A, Masaki O, Yumi Y, Kiyomi S, Kozo T, Toshiyuki O, Kazuyoshi I, Fumitaka T, Shinji M, Shinichi O, Kuniaki O, Akira O, Yasuhiro I, Toru K, Tomiko K, and Akira O 2013 *J Epidemiol***23**(4):301-306
[4] World Health Organization 2013 *Oral Health Surveys: Basic Methods*(Geneva: 5th Ed., WHO)
[5] Marya CM 2011 *A Textbook of public health dentistry* (New Delhi: Jaypee Brothers Medical Publishers)

[6] World Health Statistics 2014 *Regional strategy for healthy ageing (2013–2018), Regional Office for South-East Asia*. (New Delhi: SEARO Library WHO Regional Office for South-East Asia).
[7] Kirch W 2008 *Encyclopedia of Public Health*(Germany:Springer)
[8] Hamzah Z, Indartin D, dan Meilawaty Z 2016 *E-journal unej*, ICMHS 2016.
[9] Drinka PJ, El-Solh AA 2010 *J Am Med Dir Assoc***11**:465–467
[10] Spiropoulou A, Lagiou O, Lykouras D, Karkoulias K and Spiropoulos K 2017. *Insights into Various Aspects of Oral Health*http://dx.doi.org/10.5772/intechopen.69957
[11] Newman MG, Takel H H, dan Klokkevold PR 2015. Carranza's clinical periodontology(Canada: Elsevier)pp142
[12] Thomson W M 2014 *Gerodontology***31** Suppl 1:9-16.
[13] Petrovski M, Ivanovski K, and Minovski A 2015 *Balk J Dent Med*.**19**:21-25