



# PROCEEDINGS

## The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

Cutting Edge Innovations for Sustainable Development Goals

Universitas Muhammadiyah Yogyakarta (Indonesia)

October 13 - 14 2020

<https://icosi.umy.ac.id/>

## Focal Conferences



- ✔ (ICPU) The 2nd International Conference on Pharmaceutical Updates
- ✔ (ICOMS) The 6th International Conference on Management Sciences
- ✔ (ICLAS) The 9th International Conference on Law and Society
- ✔ (ICMHS) The 4th International Conference Medical and Health Sciences
- ✔ (ICAF) The 6th International Conference for Accounting and Finance
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- ✔ (ICONURS) The 2nd International Conference on Nursing
- ✔ (ICITAMEE) The 1st International Conference on Information Technology, Advanced Mechanical and Electrical Engineering
- ✔ (IConARD) International Conference on Agribusiness and Rural Development
- ✔ (ISHERSS) The 2nd International Symposium on Social Humanities Education and Religious Sciences
- ✔ (ICONPO) The 10th International Conference on Public Organization
- ✔ (DREAM) The 5th Dental Research and Exhibition Meeting
- ✔ (ICHA) The 5th International Conference on Hospital Administration
- ✔ (ICOSA) The 3rd International Conference on Sustainable Agriculture





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## Preface by the Chairperson of the 4<sup>th</sup> ICoSI 2020



**Dr. Yeni Rosilawati, S.IP. S.E., MM.**

Assalamu'alaikum Wr. Wb.

All praise is due to Allah, the Almighty, on whom we depend for sustenance and guidance. Prayers and peace be upon our Prophet, Muhammad SAW, his family and all of his companions.

On behalf of the organizing committee, it is my pleasure and privilege to welcome the honourable guests, distinguished keynote & invited speakers, and all the participants.

With the main theme of “Cutting-Edge Innovations on Sustainable Development Goals (SDGs)”, the 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020 serves as a forum to facilitate scholars, policy makers, practitioners, and other interested parties at all levels from Indonesia and abroad to present their novel ideas, promote cutting-edge research, and to expand collaboration network. The conference has about 1373 participants participating from more than 8 countries 4 continents all over the world, making this conference a truly international conference in spirit.

This multidisciplinary conference was first held in 2012 and has undertaken various changes and adopted to the current technological trends of our education system. From having this conference with just 175 participants back in 2012 we have come a long way in making the conference a huge success with more than 1373 participants participating in this two-day conference.

Formerly, this conference consisted of only 9 (nine) focal conferences. This year, there are 14 focal conferences from various disciplines, namely: 1) The 2<sup>nd</sup> International Conference on Pharmaceutical Updates (ICPU), 2) The 6<sup>th</sup> International Conference on Management Sciences

(ICoMS), 3) The 9<sup>th</sup> International Conference on Law and Society (ICLAS), 4) The 4<sup>th</sup> International Conference Medical and Health Sciences (ICMHS), 5) The 6<sup>th</sup> International Conference for Accounting and Finance (ICAF), 6) The 2<sup>nd</sup> International Language and Education Conference (ILEC), 7) The 2<sup>nd</sup> International Conference on Nursing (ICONURS), 8) The International Conference on Information Technology, Advanced Mechanical and Electrical Engineering (ICITAMEE), 9) The 2<sup>nd</sup> International Conference of Agribusiness and Rural Development (IConARD), 10) The 10<sup>th</sup> International Conference on Public Organization (ICONPO), 11) The 2<sup>nd</sup> International Symposium on Social Humanities Education and Religious Sciences (ISHERSS), 12) The 5<sup>th</sup> Dental Research and Exhibition Meeting (DREAM), 13) The International Conference on Hospital Administration (ICHA), and 14) The 3<sup>rd</sup> International Conference on Sustainable Agriculture (ICoSA).

Accordingly, We are proud to announce that this year, the 4<sup>th</sup> ICoSI 2020 breaks the Museum Rekor-Dunia Indonesia (MURI) record as the Virtual Multidisciplinary Conference with the Largest Number of Area of Fields in Indonesia

In addition, this year, this conference holds special value since this is the first conference in the history of our university where the entire conference is taking place remotely on a digital platform through the use of advance technologies due to the Covid-19 Pandemic.

I would take this opportunity to express my highest respect to the Rector of Universitas Muhammadiyah Yogyakarta, Dr. Gunawan Budiyanto who gave approval and ensured the maximal support from all the faculty members of Universitas Muhammadiyah Yogyakarta (UMY) that made this event a big success. In addition, my appreciation goes to all the support teams who have provided their valuable support and advice from planning, designing and executing the program.

Let me conclude my speech by encouraging the delegates to participate with an increasing number in all the activities and discussions through the digital platforms for the next two days. I wish everyone a successful, safe, and fruitful conference.

Thank you!

Wassalamu'alaikum Wr. Wb.

Yogyakarta, Indonesia, 14 October 2020



The image shows a blue ink signature over a logo. The logo consists of a stylized blue 'S' shape above the text 'ICoSI' in a bold, blue, sans-serif font. To the right of 'ICoSI' is the text 'International Conference on Sustainable Innovation' in a smaller, blue, sans-serif font, arranged in three lines.



## Welcoming Remarks by the Rector of Universitas Muhammadiyah Yogyakarta



**Assoc. Prof. Dr. Gunawan Budiyanto**

Innovation is the beginning of the development of technology, and technology is a development machine that is expected to provide benefits to humans and provide the smallest possible impact on environmental quality. In the concept of sustainable development, development must improve the quality of human life without causing ecological damage and maintain the carrying capacity of natural resources.

International Conference on Sustainable Innovation (ICoSI) is an international conference which is an annual conference held by the University of Muhammadiyah Yogyakarta (UMY), Indonesia. In 2020 this raises the issue of "Cutting-Edge Innovations on Sustainable Development Goals." Therefore, on behalf of all UMY academics, I would like to congratulate you on joining the conference, hoping that during the Covid-19 Pandemic, we can still provide suggestions and frameworks for achieving sustainable development goals.

# About The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

## *Cutting Edge Innovations for Sustainable Development Goals*

The 2030 Agenda for Sustainable Development is enacted by the United Nations as a shared blueprint for peace and prosperity for people and the planet, now and into the future. It consists of strategies to improve health and education, reduce inequality, and spur economic growth while also conserving natures by 2030.

This year, however, at the first one-third of its timeline, the SDG Reports shows that the outbreak of COVID-19 did hinder the achievement, or at least decelerate the progress of achieving the 17 goals. In fact, according to the report, “some number of people suffering from food insecurity was on the rise and dramatic levels of inequality persisted in all regions. Change was still not happening at the speed or scale required”, accordingly.

Therefore, in this event of pandemic, the quantity and quality of research, innovation, and more importantly multi-disciplinary collaboration are indispensable. Furthermore, there needs to be clear ends of those works. That is how those research are applicable and benefits directly to the society. That is how those research is incorporated as the drivers of policy making, and used practically in the society. Hence, the stakeholders especially the triple helix of higher education institution, government, and industry must be re-comprehended and supported to reach the common goal of the SGD.

International Conference on Sustainable Innovation (ICoSI) has been essentially attempting to strengthen this regard since its first establishment. One of the goals of ICoSI is to provide primarily a platform where scholars, practitioners, and government could grasp the development and trends of research. Hopefully, meeting these actors altogether would result in stronger collaboration, sophisticated and advantageous research, and brighter ideas for further research. Based on these reasoning, this year, the 4th ICoSI 2020 UMY is themed ‘Cutting-edge Innovations for Sustainable Development Goals’.

Improving from last year conference which brought nine focal conference, this year ICoSI 2020 UMY brings 14 disciplines, from social sciences, natural sciences, and humanities. ICoSI 2020 received as much as 1005 papers. The paper works submitted in ICoSI 2020 UMY will be published in Atlantis Proceedings, IOP Proceedings, National/International Journals, and ICoSI ISBN-indexed Proceedings.

Nevertheless, ICoSI believes that publication is only the beginning of research dissemination. The publications will enhance the chance of the research known by wider audience, and then used, applied, and incorporated at either system, institutional, or personal level of human lives.



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# TRACK ECONOMICS, LAW, EDUCATION, SOCIAL, AND HUMANITIES



# Correlation between Dental Behavior and Dental Caries Status (DMF-T) of Pendul Community Sedayu District Bantul Yogyakarta

Novitasari Ratna Astuti<sup>1,\*</sup>

<sup>1</sup> Universitas Muhammadiyah Yogyakarta, Daerah Istimewa Yogyakarta, Indonesia

\* Corresponding Author. Email : [ovi\\_ummy@umy.ac.id](mailto:ovi_ummy@umy.ac.id)

## ABSTRACT

The maintenance of dental health is related to people's behavior. Behavior plays an essential role in high caries status in Indonesia. Tooth brushing habits, daily food consumption, and frequency of dental visits are dental health behaviors which could influence the caries status. Dental caries status is a condition that describes a person's experience of dental caries measured by the index DMF-T. This study aims to determine the relationship between dental behavior or habit of maintaining the teeth and dental caries status of Pendul communities in Yogyakarta. This study was an observational analytic study with a cross-sectional design. The samples were members who were  $\geq 5$  years old, with the number of 138 people using an accidental sampling technique. Data were collected by conducting teeth examination and questionnaire of dental behavior. The data were then analyzed using the Spearman correlation test. The result showed that there was a significant correlation between dental health behavior and caries status ( $p = 0.044$ ) with a correlation coefficient  $-0,172$  and the average score of DMF-T 7,9. There was a significant correlation between dental health behavior and dental caries status of Pendul communities in Yogyakarta.

**Keywords:** Dental Caries Status, Dental Health Behavior

## 1. INTRODUCTION

Dental and oral health has frequently been the umpteenth priority for some people until now, while teeth and mouth are the first pathways for the entry of germs and bacteria that can interfere with other bodily health. The problem related to cavities or dental caries is still widely complained by both children and adults. Dental caries can not be left severe because it will affect the quality of life and productivity [1].

Dental caries is a tooth decay process that starts from enamel and continues to dentin, which occurs due to multiple factors and interacts with each other. Oral factors that are directly related to the process of caries include the structure, morphology and composition of the teeth in the jaw, the degree of acidity (pH) of saliva, oral hygiene, the amount and frequency of eating cariogenic foods. There are several external factors as well as predisposing and inhibiting factors that are indirectly related to the caries process, including age, sex, economic level, social culture, as well as knowledge, attitudes, and behaviors towards the maintenance of dental health [2].

The DMF-T / def-t index is a description of the tooth decay severity. DMF-T / def-t is calculated through the addition of DT/-dt, MT/et, and FT/ft indices, which show how many tooth decay that a person has ever experienced; whether it is in the form of Decay / D (caries or cavities), Missing / M (tooth extracted), or Filling / F (tooth filling) [2].

According to Blum's theory, a person's or community's health status is influenced by four critical factors, including

genetic, environment (physical and social culture), health behavior, and health services. Environment and behavior are factors that play an essential role in influencing health status, especially dental caries [3].

One of the main factors that can affect oral health is behavior or habits. Behaviors can affect the development of dental caries include eating habits, such as eating fruits and vegetables, as well as maintaining oral hygiene, for example, by doing regular tooth brushing [4].

The essential components of behavior in maintaining oral hygiene and health is brushing teeth, flossing, and dentist professional prophylactic actions. The skills and methods of brushing teeth must be considered; thus, the brushing can be carried out correctly. Everyone should brush their teeth twice a day, after breakfast and before going to bed with toothpaste containing fluoride. Flossing is conducted to maintain the interdental hygiene of teeth, while professional prophylactic measures that can be performed by dentists are scaling and root planning [5].

Basic Health Research in 2018 showed that 94.7% of the majority of Indonesians who were 3 years old and older had a habit of brushing their teeth every day. However, only 2.8% brushed their teeth properly after breakfast and before going to bed at night [6].



## 2. RESEARCH METHOD

The research method used in this study was an analytic observational method with a cross-sectional design and was conducted in Pendul, Argorejo Village, Sedayu District. The research population was the residents of Dusun Pendul, who were 5 years old and older, with a total of 730 people.

The sampling method used was an accidental sampling of 138 people obtained from the calculation of the number of samples using the Slovin formula. The inclusion criteria in this study were citizens who were 5 years old and above in 2018 and were willing to be the subject of the research by filling out the informed consent. Meanwhile, the exclusion criteria in this study were non-cooperative citizens and residents who experienced edentulous. DMF-T as the representation of oral health status is very closely related to behavior of the dental and oral health maintenance.

The implementation of data collection of dental and oral health through interviews (for the behavior or habits) and observations (Index DMF-T) by using the mouth mirror instruments with the help of sunlight lighting (flashlight). Analysis technique was performed using Spearman Test.

## 3. RESULT

This study involved subjects from Dusun Pendul, Argorejo Village, Sedayu Subdistrict. The total of subjects with an age of more than 5 years old was 138 people.

Respondent characteristics in this study included gender, age, education level, and occupation with the average DMF-T / def-t score and behavior for each group. The presentation of data regarding the characteristics of

Table 5. Respondent’s Characteristic Distribution according to Gender, Age, Educational Level, and Occupation

Respondent's Characteristic	Frequency (f)	Percentage (%)	Average DMF-T/def-t	Average Behavior
<b>Gender</b>				
Male	57	41,3	7,72	4,60
Female	81	58,7	8,04	5,35
<b>Age</b>				
5 – 11 years old	32	23,2	4,72	4,97
12 – 25 years old	25	18,1	5,32	5,04
26 – 45 years old	27	19,6	7,41	5,07
46 – 65 years old	47	34,1	10,51	5,19
> 65 years old	7	5,1	16,00	4,14
<b>Educational Level</b>				
Not attending school	34	24,6	4,94	4,85
Elementary	50	36,2	9,76	4,84
Middle School	21	15,2	8,52	5,62
High School	31	22,5	8,10	5,10
College	2	1,4	2,00	6,00
<b>Occupation</b>				
Laborer	52	37,7	9,92	4,87
Self-employee	8	5,8	11,38	5,13
Private employee	5	3,6	3,80	5,40
Housewife	14	10,1	4,43	5,64
Others	5	3,6	8,86	5,60
Unemployed	54	39,1	11,20	4,94

respondents was carried out by using a frequency distribution table.

Table 1 shows that the majority of respondents were female (58.7%), who are 46 - 65 years old (34.1%), the last education level of the respondents is majorly elementary school level (36.2%), and the majority of the respondents are unemployed (39.1%). Based on gender, the mean value of the DMF-T / def-t score and the highest average value of behavior in this study were in the female gender group that was 8.04 and 5.35. Based on age, the highest average DMF-T / def-t score was 16.00 in the age group of > 65 years old, and the highest average value of behavior was 5.19 in the age group of 46 - 65 years old. Based on the education level, the highest average DMF-T / def-t score was 9.76 at the elementary school level, and the highest average behavioral score was 6.00 at the college level. Based on occupation, the highest average DMF-T / def-t score was 11.38 in the self-employed group, and the highest mean behavior was 5.64 in the housewife group.

Table 2 shows that the majority of respondents had a score of dental and oral health behavior of 5, with a percentage of 29.7%.

The highest average DMF-T / def-t score was 12.29 in behavior score 2, and the median value of community behavior in Dusun Pendul was 5.

Table 3 shows that the highest DMF-T / def-t index component is Decay (D / d-T), which is 64.40%. The average value of the DMF-T / def-t community of Dusun Pendul is 7.90.

Table 4 shows that by using the Spearman test, the results show significance values of 0.044 (p <0.05) with a Spearman correlation coefficient of -0.172.

Table 6. Distribution of Dental and Oral Health Behavior

Behavior Score	Frequency (f)	Percentage (%)	Average DMF-T/def-t	Average Behavior
2	7	5,1	12,29	5
3	14	10,1	9,43	
4	27	19,6	8,74	
5	41	29,7	7,29	
6	29	21,0	7,97	
7	11	8,0	7,36	
8	7	5,1	3,14	
9	1	0,7	0,00	
10	1	0,7	3,00	

Table 7. Distribution of Caries status (DMF-T/def-t)

Indices	Frequency (f)	Percentage (%)	Average
D-T/d-t	702	64,40	5,09
M-T	381	34,95	2,76
F-T/f-t	7	0,64	0,05
DMF-T/def-t	1090	100	7,90

Table 8. Correlation between Dental and Oral Health Behavior and Caries Status

	Spearman Test	Dental and Oral Health behavior
DMF-T/def-t	Correlation Coefficient	-0,172
	Sig. (two tailed)	0,044
	N	138

#### 4. DISCUSSION

This study involved respondents from the Village of Pendul, Argorejo Village, Sedayu Subdistrict, who were older than five years old, total 138 people. Children older than 5 years old must begin to be concerned with regard to the level of caries in deciduous teeth, which have a shorter change of period than permanent teeth in other age indices [7]. Table 1 shows the average value of the DMF-T / def-t score. The highest average value of behavior is in the female sex group that equals to 8.04 and 5.35. The mean DMF-T / def-t score that is higher in females than males can occur due to several caries risk factors that are owned by women [8]. The average value of women's behavior is also higher than men as women prioritize and have a high awareness of the appearance and maintenance of dental hygiene [9].

According to age, >65 years old population tend to have high DMF-T score. The number of lost (extracted) teeth (MT) as an indicator of the high loss of teeth was the biggest contributor responsible for the high values of the

DMFT index [10]. It is related to important factors that affect dental health at that age, namely reduced production of saliva and the habit of cleaning teeth and mouth [10]. The highest average value of behavior was in the group of 46 - 65-year-old respondents. Increasing age will result in a person's knowledge, becoming a better state of mental development to increase their motivation to behave properly [11].

The DMF-T/def-t score is high on the elementary school level is mainly due to the lack of awareness of the parents. Moreover, during mixed dentition there is a paradigm that deciduous teeth shouldn't be treated because it will be replaced by permanent teeth [12]. The higher the level of education, the easier it will be to absorb new information and innovations, including in terms of dental health [13].

Behavior score was high in the college group. Both of these things can happen because someone who has a higher level of knowledge also has a greater concern for dental health; in contrast, someone who has a less knowledge level has low dental attention and care [14].

The oral health status in self-employed was high due to people who had self-employed jobs also had a mean value of bad behavior. Bad maintenance of dental and oral hygiene behavior will increase the risk of caries 20 times greater [15]. The highest average value of behavior was in the workgroup of housewives. It can occur because working mothers will get more information than the ones who do not work or as housewives. However, working mothers tend to have a busy life; thus, they do not have time to care for and go (especially with their children) to the health service compared to the housewives [16].

Table 2 shows that the median value of Dusun Pendul community behavior is 5. The majority of respondents in this study (99.3%) used their toothbrush when they brushed their teeth, while 0.7% did not. Toothbrushes can be infected by microorganisms, especially Streptococci Mutans, within 24 hours [17]. The use of toothbrushes contaminated with bacteria by others will cause the transfer of microorganisms or germs to other people who use the same toothbrushes [18]. Based on the results of the study, only a small proportion of respondents did regular dental examinations every 6 months to the dentist with a total of 6.5%, while as many as 93.5% of respondents did not because of lack of motivation to visit the dentist every 6 months. The low level of dental visits indicates that prevention and curative measures are still low. Someone who regularly visits the dentist will have better oral health. The number of teeth lost due to caries will be less, and the average number of surface teeth experiencing caries will be lower too [19].

Based on WHO, the DMF-T / def-t score community in Dusun Pendul is in the very high category. The number of filled teeth (F-t / f-t) is still deficient. It indicates that the curative action is still low compared to the high number of teeth that have caries (D-T / d-t) or missing (M-T / d-t). Therefore, a program such as promotive and preventive care is needed to lower the score such as promotive and preventive care.

Based on the Spearman Correlation Test, the result

indicated the significance value of 0.044 ( $p < 0.05$ ), which showed that there was a relationship between dental and oral health behavior with caries status in the community of Dusun Pendul Argorejo Village Sedayu District. The Spearman correlation coefficient in this study was -0.172, which showed a negative correlation indicating that the higher the behavior score was, the lower the DMF-T / def-t score would be with a very weak correlation. A very weak correlation between dental and oral health behavior and caries status can occur because caries has a multifactorial etiology, while each factor has a different effect of strength on the occurrence of caries.

This study is in line with studies conducted by Suratri et al. (2018), revealing a relationship between healthy behavior and caries status ( $p < 0.05$ ). Respondents who have healthy behaviors have a lower incidence of caries compared to those who behave unhealthily. The behavior of maintaining dental hygiene has a significant relationship with dental caries. When dental hygiene is not maintained, it can contribute to the 1.43 times higher in dental caries experiences [20]. This study is also in line with research conducted by Pintauli (2010), showing that there was a significant relationship between dental and oral health maintenance behavior with DMF-T and OHI-S status. The study revealed that good behavior had low DMF-T and OHI-S scores [5]. Furthermore, this study is in line with research conducted by Khan et al. (2016), stated that there was a relationship between dental status (DMF) and dental and oral health behavior (HU-DBI). The total HU-DBI score correlated with a low D (Decay) value, which means that respondents with lower levels of dental disease have more positive dental/oral health attitudes/behaviors. Thus, special attention to dental and oral health education must be given to improve oral health attitudes and behaviors [21].

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