



QUALITY IMPROVEMENT IN DENTAL AND MEDICAL KNOWLEDGE, RESEARCH, SKILLS AND ETHICS FACING GLOBAL CHALLENGES

Edited by
Armelia Sari Widyarman, Muhammad Ihsan Rizal,
Moehammad Orliando Roeslan & Carolina Damayanti Marpaung



CRC Press
Taylor & Francis Group

QUALITY IMPROVEMENT IN DENTAL AND MEDICAL KNOWLEDGE, RESEARCH, SKILLS AND ETHICS FACING GLOBAL CHALLENGES

The proceedings of FORIL XIII 2022 Scientific Forum Usakti conjunction with International Conference on Technology of Dental and Medical Sciences (ICTDMS) include selected full papers that have been peer-reviewed and satisfy the conference's criteria. All studies on health, ethics, and social issues in the field of dentistry and medicine have been presented at the conference alongside clinical and technical presentations. The twelve primary themes that make up its framework include the following: behavioral epidemiologic, and health services, conservative dentistry, dental materials, dento-maxillofacial radiology, medical sciences and technology, oral and maxillofacial surgery, oral biology, oral medicine and pathology, orthodontics, pediatrics dentistry, periodontology, and prosthodontics. This proceeding will be beneficial in keeping dental and medical professionals apprised of the most recent scientific developments.



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON TECHNOLOGY OF DENTAL
AND MEDICAL SCIENCES (ICTDMS 2022), JAKARTA, INDONESIA, 8–10 DECEMBER 2022

Quality Improvement in Dental and Medical Knowledge, Research, Skills and Ethics Facing Global Challenges

Edited by

Armelia Sari Widyarman, Muhammad Ihsan Rizal,
Moehammad Orliando Roeslan and Carolina
Damayanti Marpaung
Universitas Trisakti, Indonesia



CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

A BALKEMA BOOK

First published 2023
by CRC Press/Balkema
4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

and by CRC Press/Balkema
2385 NW Executive Center Drive, Suite 320, Boca Raton FL 33431

CRC Press/Balkema is an imprint of the Taylor & Francis Group, an informa business

© 2024 selection and editorial matter Armelia Sari Widyarman, Muhammad Ihsan Rizal, Moehammad Orliando Roeslan & Carolina Damayanti Marpaung; individual chapters, the contributors

The right of Armelia Sari Widyarman, Muhammad Ihsan Rizal, Moehammad Orliando Roeslan & Carolina Damayanti Marpaung to be identified as the author[s] of the editorial material, and of the authors for their individual chapters, has been asserted in accordance with sections 77 and 78 of the Copyright, Designs and Patents Act 1988.

Although all care is taken to ensure integrity and the quality of this publication and the information herein, no responsibility is assumed by the publishers nor the author for any damage to the property or persons as a result of operation or use of this publication and/or the information contained herein.

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record has been requested for this book

ISBN: 978-1-032-51441-3 (hbk)
ISBN: 978-1-032-51466-6 (pbk)
ISBN: 978-1-003-40237-4 (ebk)

DOI: 10.1201/9781003402374

Typeset in Times New Roman
by MPS Limited, Chennai, India

Table of Contents

<i>Preface</i>	xiii
<i>Acknowledgements</i>	xv
<i>Committee Members</i>	xvii
<i>Behavioral, epidemiologic and health services</i>	
Characteristics of knowledge and attitude of Indonesian professional healthcare students toward Basic Life Support (BLS) courses <i>I. Gunardi, A. Subrata, A.J. Sidharta, L.H. Andayani, W. Poedjiastoeti & S. Suebnukarn</i>	3
Bibliometric analysis of <i>imperata cylindrica</i> papers in Scopus database (2012–2021) <i>M.O. Roeslan, S. Wulansari & P. Monthanapisut</i>	9
Development and validation of Indonesian version of OHIP-49 questionnaire using Rasch model <i>F.K. Hartanto, I. Gunardi, A. Kurniawan, A.J. Sidharta & W.M.N. Ghani</i>	17
Knowledge regarding dental and oral health among pregnant women (study at Palmerah Community Health Center, West Jakarta) <i>P.A. Salsabila, L.H. Andayani & A.G. Soulissa</i>	24
The xerostomia's effect on methadone therapy program patients' oral-health-related quality of life <i>T.T. Theresia, A.N. Fitri & W. Sudhana</i>	31
The differences in work strategy and work fatigue between female and male dentists during the COVID-19 pandemic in Indonesia <i>D. Ranggaini, W. Anggraini, A.P. Ariyani, I. Sulistyowati & M.F.C. Musa</i>	42
Dental students' perceptions and behaviors concerning oral hygiene and eating habits during the COVID-19 pandemic in Indonesia <i>A. Asia, L. Astuti, T.E. Astoeti, A.S. Widyarman & W. Sudhana</i>	49
Analyzing teledentistry consultation during the pandemic Covid-19: A challenge of images in online consultation <i>M. Chandra & R. Tjandrawinata</i>	56
<i>Conservative dentistry</i>	
Mandibular first molar with radix entomolaris: An endodontic case report <i>F. Farasdrita, W. Widyastuti & E. Fibryanto</i>	67
Walking bleach technique on endodontically treated caninus with tetracycline discoloration <i>J.D. Susanto, A.P. Dwisaptarini & S. Wulansari</i>	73

Successful management of primary periodontal lesion with secondary endodontic involvement: A case report <i>F. Katrini, W. Widyastuti & Aryadi</i>	77
Non-surgical treatment for extensive perapical lesion: A case report <i>M.P. Darmawanti, A.P. Dwisaptarini & D. Ratnasari</i>	84
Monolithic zirconia endocrown: Indirect restoration for endodontically treated teeth <i>W. Wulandari, T. Suwartini & E. Fibryanto</i>	90
Effect of air-abrasive particle and universal bonding to shear bond strength of zirconia <i>F. Witoko, M.F. Amin, D. Ratnasari & R. Tjandrawinata</i>	95
Composite as a post-obturation restorative material on a non-vital tooth with endodontically treatment: A case report <i>R. Landy, W. Widyastuti & S. Wulansari</i>	101
Caries detection effectiveness of two techniques assessed using FACE method <i>Y. Winardi & A.P. Dwisaptarini</i>	112
<i>Pluchea indica</i> less leaves extract as a root canal irrigant against <i>Enterococcus faecalis</i> Colonies: <i>Ex vivo</i> study <i>E. Fibryanto, A. Tio, J.A. Gunawan, A. Hidayat & N.Z.M. Noh</i>	116
Differences in resin polishing technique of nanofiller and nanohybrid composites <i>E.A.W. Yanti, A.P. Dwisaptarini, Elline & M.S. Jamil</i>	124
Differences in the effect of two Nickel Titanium rotary files preparation toward the changes on root canal curvature <i>A. Darkim, W. Widyastuti, S. Wulansari & E.A. Budiyanti</i>	129
Effect of high refractive index composite resin thickness on CIELAB value <i>A.P. Dwisaptarini, D. Ratnasari, I. Hadiutomo, R. Tjandrawinata & R. Trushkowsky</i>	136
Single-visit retreatment in underfilled root canal of mandible second premolar: A case report <i>G. Jesslyn, B.O. Iskandar & T. Suwartini</i>	141
Antibiofilm effect of avocado (<i>Persea Americana</i>) seed ethanol extract on <i>Streptococcus mutans</i> and <i>Enterococcus faecalis</i> (<i>ex vivo</i>) <i>S. Wulansari, A.S. Widyarman, R.U. Nadhifa & M.J. Fatya</i>	146
Three-dimensional obturation in maxillary first molar with MB2: A case report <i>A. Sutanto, E. Fibryanto & A.E. Prahasti</i>	154
Semi-direct composite overlay restoration as an alternative restoration for endodontically treated tooth: A case report <i>N. Brians, J.A. Gunawan, A.E. Prahasti, E. Istanto & S.M. Khazin</i>	160
Comprehensive treatment of immature necrotic permanent teeth: A case report <i>A.E. Prahasti, E. Fibryanto, E. Elline & W. Widyastuti</i>	166
Diastemas management using direct composite resin restoration: The digital smile design approach <i>E. Elline, D. Ratnasari, E. Fibryanto, A.E. Prahasti & R. Iffendi</i>	173

Removal of broken file using ultrasonics at one-third apical second molar distal: A case report <i>Y. Sujiono, B.O. Iskandar, A.E. Prahasti, A. Subrata & S.M. Khazin</i>	178
<i>Apis mellifera</i> honey and miswak (<i>Salvadora persica</i>) effect on tooth color changes <i>N.D. Iskandar, D. Ratnasari & R. Stefani</i>	182
Fiber reinforced composite in endodontically treated tooth: A case report <i>J. Setiawan, T. Ariwibowo & M.F. Amin</i>	188
The management of post-endodontic treatment using fiber-reinforced composite: A case report <i>R. Lambertus, T. Suwartini, E. Elline, A.E. Prahasti & S.A. Asman</i>	195
Management of crown-root fracture with pulp exposure: A case report <i>Y. Susanti, B. Iskandar & T. Ariwibowo</i>	201
Management of molar with C-shape root canal configuration: Case reports <i>F. Antonius, T. Suwartini & J.A. Gunawan</i>	207
Endodontic treatment on young age molar with pulp polyp and diffuse calcification finding in a radiograph <i>P. Andriani, A.P. Dwisaptarini & J.A. Gunawan</i>	214
Cyclic fatigue of three heat-treated NiTi rotary instruments after multiple autoclave sterilization: An <i>in-vitro</i> study <i>S.A. Putri, W. Widyastuti, A. Aryadi & R. Amtha</i>	221
Endodontic management of S-shaped root canal on mandibular first molar: A case report <i>N. Tanuri, M.F. Amin & S. Wulansari</i>	226
Root canal treatment on the complex case using ultrasonics: A case report <i>L.H. Wibowo, E. Elline, E. Fibryanto, A.E. Prahasti & D. Qurratuani</i>	231
Management of iatrogenic problems during root canal treatment <i>Y.N. Argosario, M.F. Amin & E. Elline</i>	236
Non-surgical endodontic retreatment of maxillary first premolar with direct composite restoration: A case report <i>A.R. Pradhista, B.O. Iskandar & Aryadi</i>	243
 <i>Dental materials</i>	
The effect of soft drinks containing citric and phosphoric acid toward enamel hardness <i>A. Aryadi, D. Pratiwi & C. Cindy</i>	249
Microhardness of a flowable bulk-fill resin composite in immediate and 24-hour storage <i>R. Tjandrawinata, D. Pratiwi, F.L. Kurniawan & A. Cahyanto</i>	255
The effect of halogen mouthwash on the stretch distance of the synthetic elastomeric chain <i>M. Wijaya, R. Tjandrawinata & A. Cahyanto</i>	261

Synthesis and characterization of β -tricalcium phosphate from green mussel shells with sintering temperature variation <i>M.R. Kresnatri, E. Eddy, H.A. Santoso, D. Pratiwi, D.L. Margareta & T. Suwandi</i>	267
The effect of immersion in 75% concentration tomato juice on the mechanical properties of nanohybrid composites resin <i>J. Kamad, D. Liliany & E. Eddy</i>	277
Evaluation of setting time of glass ionomer cement mixed with ethanolic extracts of propolis <i>T.S. Putri, D. Pratiwi & A.E.Z. Hasan</i>	285
The knowledge level of dental students on adequate composite resin polymerization in the COVID-19 pandemic era <i>O. Oetarina & L.A.L. Ongkaruna</i>	290
<i>Dento-maxillofacial radiology</i>	
The role of dental record data in the mass disaster identification process: A case report of the Sriwijaya SJ-182 airplane crash <i>V. Utama, R. Tanjung, A. Quendangen, A. Fauzi, A. Widagdo, M.S. Haris & A.S. Hartini</i>	299
Management of postmortem dental radiography procedure in mass disaster victim identification <i>R. Tanjung & I. Farizka</i>	305
Radiomorphometric analysis of gonion angle and upper ramus breadth as a parameter for gender determination <i>I. Farizka & R. Tanjung</i>	312
<i>Medical sciences and technology</i>	
Artificial intelligence application in dentistry: Fluid behaviour of EDDY tips <i>H.H. Peeters, E.T. Judith, F.Y. Silitonga & L.R. Zuhul</i>	321
<i>MTHFR</i> C677T, A1298C*, and its interaction in nonsyndromic orofacial cleft phenotypes among Indonesian <i>S.L. Nasroen & A.M. Maskoen</i>	328
<i>Oral and maxillofacial surgery</i>	
The effectiveness of giving forest honey (<i>Apis Dorsata</i>) and livestock honey (<i>Apis Cerana</i> and <i>Trigona</i>) on the number of fibroblast in wound healing after tooth extraction (<i>in vivo</i> research in Wistar rats) <i>T.A. Arbi, I.N. Aziza & T. Hidayatullah</i>	341
Reconstruction of large post-enucleation mandibular defect with buccal fat pad <i>N.A. Anggayanti, A.D. Sastrawan & O. Shuka</i>	348
Challenge and management of dental implant during COVID-19 pandemic: Bone formation on second stage implant surgery <i>D. Pratiwi, H. Pudjowibowo & F. Sandra</i>	354

The evaluation of maxillary sinus for implant planning through CBCT <i>A.P.S. Pahupi, W. Poedjiastoeti, M.N.P. Lubis, I. Farizka, B. Claresta & J. Dipankara</i>	360
The jawbone quantity assessment of dental implant sites <i>W. Poedjiastoeti, M.N.P. Lubis, Y. Ariesanti, I. Farizka, J. Dipankara & S. Inglam</i>	366
Comparative assessment of the distance between the maxillary sinus floor and maxillary alveolar ridge in dentulous and edentulous using panoramic radiography <i>A.S.D. Audrey, W. Poedjiastoeti, M.N.P. Lubis, J. Dipankara & S. Inglam</i>	372
Comparison between impacted mandibular third molar against mandibular angle and canal <i>N. Marlina, W. Poedjiastoeti, I. Farizka, J. Dipankara & S. Inglam</i>	379
 <i>Oral biology</i>	
Saliva as a diagnostic tool for COVID-19: Bibliometric analysis <i>M.I. Rizal, R.A. Hayuningtyas, F. Sandra, M.S. Djamil & B.O. Roeslan</i>	387
Cytotoxicity activity of <i>Allium sativum</i> extracts against HSC-3 cells <i>I.J. Pardenas & M.O. Roeslan</i>	393
Effectiveness of probiotic lozenges in reducing salivary microorganism growth in patients with fixed orthodontic appliances: A pilot study <i>A.S. Widyanman, S. Vilita, G.C. Limarta, S.M. Sonia & F. Theodora</i>	399
Potential anticancer properties of <i>Apium graveolens</i> Linn. against oral cancer <i>T. Hartono, F. Sandra, R.A. Hayuningtyas, S. Jauhari & J. Sudiono</i>	407
Antibacterial activity of bromelain enzyme from pineapple knob (<i>Ananas comosus</i>) against <i>Streptococcus mutans</i> <i>D. Liliany, E. Eddy & A.S. Widyanman</i>	414
<i>Elephantopus scaber</i> Linn.: Potential candidate against oral squamous cell carcinoma <i>T. Pang, F. Sandra, R.A. Hayuningtyas & M.I. Rizal</i>	424
Effectiveness of gargling with 100% coconut oil to prevent plaque accumulation and gingival bleeding <i>A.G. Soulissa, M. Juslily, M. Juliawati, S. Lestari, N.P. Ramli, Albert & A. Ismail</i>	429
Hydroxamate HDAC inhibitors potency in mediating dentine regeneration: A review <i>I. Sulistyowati, W. Anggraini, A.P. Ariyani & R.B. Khalid</i>	435
Various compounds that are used as oxidative stress inducers on fibroblast cell <i>Komariah, P. Trisfilha & R. Wahyudi</i>	443
Nano encapsulation of lemongrass leaves extract (<i>Cymbopogon citratus</i> DC) on fibroblast viability with oxidative stress <i>N. Ericka, K. Komariah, R. Wahyudi & T. Trisfilha</i>	450

Arumanis mango leaves (<i>Mangifera indica</i> L.) extract efficacy on <i>Porphyromonas gingivalis</i> biofilm <i>in-vitro</i> <i>S. Soesanto, Yasnill, A.S. Widyarman & B. Kusnoto</i>	461
A systematic review to evaluate the role of antibiotics in third molar extraction <i>R.A. Hayuningtyas, S. Soesanto, P. Natassya & S.B. Gutierrez</i>	468
Efficacy of epigallocatechin gallate gel on VEGF and MMP-9 expression on ulcerations <i>L.A. Porjo, R. Amtha & M.O. Roeslan</i>	472
 <i>Oral medicine and pathology</i>	
Salivary interleukin (IL)-6 in elderly people with stomatitis aphthous and gingivitis associated with the occurrence of cognitive impairment <i>D. Priandini, A. Asia, A.G. Soulissa, I.G.A. Ratih, T.B.W. Rahardjo & E. Hogervorst</i>	481
The uses of palm fruit (<i>Borassus flabellifer</i> L.) in dentistry <i>J. Sudiono & T.G.R. Susanto</i>	489
Endodontic irrigation solution administration induces oral mucosal deformity: A case report <i>R. Amtha, D. Agustini, N. Nadiah, F.K. Hartanto & R.B. Zain</i>	496
Profile of oral mucosa changes and perception of e-cigarettes smoker <i>R. Amtha, A.P. Rahayu, I. Gumardi, N. Nadiah & W.M.N. Ghani</i>	502
Potency of <i>Solanum betaceum</i> Cav. Peel skin ethanol extract towards TNF- α blood level (Study <i>in vivo</i> on inflammatory rats model) <i>J. Sudiono & M.T. Suyata</i>	508
Stomatitis venenata due to nickel as inlay materials in a 24-year-old woman: A case report <i>F. Mailiza, A. Bakar & U. Nisa</i>	518
Treatment challenge of oral lichenoid lesion associated with glass ionomer cement restoration: A case report <i>F.K. Hartanto, I. Gunardi, M.L. Raiyon, N. Nadiah & H. Hussaini</i>	526
Validity and reliability of the Indonesian version of COMDQ-26: A pilot study <i>J.V. Winarto, I. Gunardi, C.D. Marpaung, R. Amtha & W.M.N. Ghani</i>	531
 <i>Orthodontics</i>	
Interceptive orthodontic treatment needs and its relating demographic factors in Jakarta and Kepulauan Seribu <i>Y. Yusra, J. Kusnoto, H. Wijaya, T.E. Astoeti & B. Kusnoto</i>	539
Diastema closure and midline shifting treatment with standard technique (Case report) <i>H.F. Lubis & J.X. Ongko</i>	543
Intrusion and uprighting using TADs in mutilated four first permanent molar case <i>H.F. Lubis & F. Rhiyanthy</i>	548

Moringa and papaya leaf inhibit <i>Streptococcus mutans</i> and <i>Candida albicans</i> <i>H.F. Lubis & M.K. Hutapea</i>	554
Intruding upper first molar using double L-Loop in an adult patient: A retreatment case <i>H.F. Lubis & Joselin</i>	561
Profile changes in Class III malocclusion using protraction facemask in Indonesian patients (Cephalometric study) <i>H. Halim & I.A. Halim</i>	565
<i>Pediatric dentistry</i>	
Oral microbiome dysbiosis in early childhood caries (Literature review) <i>T. Putriany & H. Suadi</i>	575
<i>Periodontology</i>	
Permanent splint using removable partial denture framework on reduced periodontium: A case report <i>V. Hartono, F.M. Tadjoeidin, A. Widaryono & T.A. Mahendra</i>	587
The effect of electric smoking on the severity of chronic periodontitis <i>A.P. Fathinah & M. Louisa</i>	594
Periodontitis effects toward the extent of COVID-19 severity (Scoping review) <i>S.A. Arthur & M. Louisa</i>	603
Scaffold-based nano-hydroxyapatite for periodontal regenerative therapy <i>N.A. Harsas, Y. Soeroso, N. Natalina, E.W. Bachtiar, L.R. Amir, S. Sunarso, R. Mauludin & C. Sukotjo</i>	614
Defect management using hydroxyapatite and platelet-rich fibrin in advanced periodontitis <i>V. Wibianty, V. Paramitha & N.A. Harsas</i>	621
The relationship between age with caries status and periodontal treatment needs on visually impaired individuals <i>P. Wulandari, M.A.L. Tarigan, K. Nainggolan, M.F. Amin & J. Maharani</i>	630
Effects of COVID-19 on periodontitis (Scoping review) <i>A.R. Somawihardja & M. Louisa</i>	638
Concentrated growth factor for infrabony defect in periodontitis treatment: A review <i>F.C. Maitimu & T. Suwandi</i>	643
Subcutaneous emphysema after dental stain removal with airflow: A case report and anatomical review <i>A. Albert, W. Anggraini & W. Lestari</i>	651
Bonding agents for dentine hypersensitivity treatment: A review <i>O.N. Komala, L. Astui & F.C. Maitimu</i>	657
Advantages and disadvantages of 2017 new classification of periodontitis (<i>Scoping review</i>) <i>R. Anggara & K. Yosvara</i>	668

Comparison of periodontal disease severity in COVID-19 survivors and non-COVID-19 individuals <i>M. Louisa, R.A. Putranto, O.N. Komala & W. Anggraini</i>	677
Aerosol spread simulation during ultrasonic scaling and strategies to reduce aerosol contamination <i>M. Sundjojo, V. Nursolihati & T. Suwandi</i>	685
The effect of pineapple (<i>Ananas comosus</i> L.) juice on biofilm density of streptococcus sanguinis ATCC 10556 <i>T. Suwandi & Y.V. Thionadewi</i>	689
 <i>Prosthodontics</i>	
Prevalence and risk indicators of bruxism in Indonesian children <i>C. Marpaung, I. Hanin, A. Fitriyanur & M.V. Lopez</i>	697
Validity and reliability of temporomandibular disorders screening questionnaire for Indonesian children and adolescents <i>C. Marpaung, N.L.W.P. Dewi & M.V. Lopez</i>	704
Effect of submersion of alginate molds in povidone iodine concentration of 0,47 % solution toward dimensional change <i>N. Adrian & I.G.P. Panjaitan</i>	710
Effect of pure basil leaf extract on surface roughness of heat cured acrylic resin <i>I.G.P. Panjaitan & N. Adrian</i>	715
Prosthetic rehabilitation after mandibular reconstruction in young adult patient with ameloblastoma history <i>I. Hanin & I. Setiabudi</i>	720
Treatment of tooth supported magnet retained maxillary complete overdenture: Case report <i>I.G.A.R.U Mayun</i>	725
Complete denture management with torus palatinus: A case report <i>E.S.I. Sari, I.K. Julianton & G.G. Gunawan</i>	730
Management of rehabilitation for partial tooth loss with immediate removable dentures in the era of the COVID-19 pandemic: A case report <i>A. Wirahadikusumah</i>	734
Management of anterior mandibular lithium disilicate crown fracture <i>J. Handojo & L.A. Halim</i>	742
Author index	747

Preface

Faculty of Dentistry Universitas Trisakti (Usakti) presents FORIL XIII 2022 Scientific Forum Usakti conjunction with International Conference on Technology of Dental and Medical Sciences (ICTDMS) on December 8th–10th 2022. The theme of the conference is “Quality Improvement in Dental and Medical Knowledge, Research, Skills and Ethics Facing Global Challenges”.

The triennial conference has served as a meeting place for technical and clinical studies on health, ethical, and social issues in field medical and dentistry. It is organized around 12 major themes, including behavioral, epidemiologic, and health services, conservative dentistry, dental materials, dento-maxillofacial radiology, medical sciences and technology, oral and maxillofacial surgery, oral biology, oral medicine and pathology, orthodontics, pediatrics dentistry, periodontology, and prosthodontics.

The most recent findings in fundamental and clinical sciences related to medical and dental research will be presented in the conference that will be published as part of the conference proceeding. This proceeding will be useful for keeping dental and medical professionals up to date on the latest scientific developments.

Dr. Aryadi Subrata
Chairman FORIL XIII conjunction with ICTDMS



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Acknowledgements

- Prof. Shinya Murakami, D.D.S., Ph.D. (*Department of Periodontology, Osaka University, Japan*)
Prof. Adrian Yap (*Department of Dentistry, Ng Teng Fong General Hospital, Singapore*)
Prof. Dr. Rosnah Binti Mohd Zain (*Department of Oro-Maxillofacial Surgical & Medical Sciences, Malaya University*)
Prof. Chaminda Jayampath Seneviratne, BDS (Hons.), M.Phil., Ph.D (*University of Queensland, Australia*)
Cortino Sukotjo, DDS, Ph.D., MMSc (*Department of Restorative Dentistry, University of Illinois at Chicago, United States*)
Prof. Dr. Nicola De Angelis (*Department of Periodontology, University of Genoa, Italy*)
Prof. Hirotaka Kuwata, D.D.S., Ph.D. (*Department of Oral Microbiology and Immunology, Showa University, Japan*)
Prof. Dr. drg. Tri Erri Astoeti, M.Kes (*Universitas Trisakti, Jakarta, Indonesia*)
Prof. drg. Rahmi Amtha, MDS, Ph.D, Sp.PM(K) (*Department of Oral Medicine, Universitas Trisakti, Jakarta, Indonesia*)
Prof. Dr. Siriwan Suebnukarn, D.D.S (*Thammasat University, Bangkok, Thailand*)



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Committee Members

Scientific Committee

- Prof. Dr. drg. David Buntoro Kamadjaja, Sp.BM(K) (*Oral Maxillofacial Surgeon, Universitas Hassanudin, Makasar, Indonesia*)
- Prof. Dr. drg. Diah Savitri Ernawati, Sp.PM(K), M.Si (*Oral Medicine, Universitas Airlangga, Surabaya, Indonesia*)
- Prof. Dr. drg. Maria Francisca Lindawati Soetanto, Sp.Pros(K) (*Prosthodontic, Universitas Indonesia, Jakarta, Indonesia*)
- Prof. drg. Boy Muchlis Bachtiar, M.S., Ph.D., PBO (*Oral Biology, Universitas Indonesia, Jakarta, Indonesia*)
- Prof. Dr. drg. Inne Suherna Sasmita, Sp.KGA(K) (*Pediatric Dentistry, Universitas Padjajaran, Bandung, Indonesia*)
- Prof. drg. Sondang Pintauli, Ph.D (*Public Health, Universitas Sumatera Utara, Indonesia*)
- Prof. Dr. drg. Miesje Karmiati Purwanegara, S.U., Sp.Orto (*Orthodontic, Universitas Indonesia, Indonesia*)
- Prof. Dr. drg. Sri Lelyati, S.U, Sp.Perio (K) (*Periodontic, Universitas Indonesia, Indonesia*)
- drg. Diatri Nari Ratih, M.Kes., Ph.D., Sp.KG(K) (*Conservative Dentistry, Universitas Gadjah Mada, Indonesia*)

Organizing Committee

- Drg. Aryadi Subrata, Sp.KG(K), (*Conservative Dentistry, Universitas Trisakti, Jakarta, Indonesia*)
- Dr. drg. Armelia Sari W., M.Kes., PBO (*Microbiology Oral, Universitas Trisakti, Jakarta, Indonesia*)
- Dr. drg. Anggraeny Putri Sekar Palupi, Sp.BM (*Oral Maxillofacial Surgeon, Universitas Trisakti, Jakarta Indonesia*)
- Dr. drg. Muhammad Ihsan Rizal, M.Kes (*Oral Biology, Universitas Trisakti, Jakarta, Indonesia*)
- drg. Isya Hanin, Sp.Pros (*Prosthodontic, Universitas Trisakti, Jakarta, Indonesia*)
- drg. Muhammad Orliando Roeslan, M.Kes., PhD (*Oral Biology, Universitas Trisakti, Jakarta, Indonesia*)
- drg. Dina Ratnasari, Sp.KG(K) (*Conservative Dentistry, Universitas Trisakti, Jakarta, Indonesia*)
- drg. Carolina Damayanti Marpaung, Sp.Pros, PhD (*Prosthodontic, Universitas Trisakti, Jakarta, Indonesia*)

Author index

- Adrian, N. 710, 715
Agustini, D. 496
Albert, A. 651
Albert 429
Amin, M.F. 95, 188, 226, 236, 630
Amir, L.R. 614
Amtha, R. 221, 472, 496, 502, 531
Andayani, L.H. 3, 24
Andriani, P. 214
Anggara, R. 668
Anggayanti, N.A. 348
Anggraini, W. 42, 435, 651, 677
Antonius, F. 207
Arbi, T.A. 341
Argosurio, Y.N. 236
Ariesanti, Y. 366
Ariwibowo, T. 188, 201
Ariyani, A.P. 42, 435
Arthur, S.A. 603
Aryadi, A. 221, 249
Aryadi 77, 243
Asia, A. 49, 481
Asman, S.A. 195
Astoeti, T.E. 49, 539
Astuti, L. 49, 657
Audrey, A.S.D. 372
Aziza, I.N. 341

Baethiar, E.W. 614
Bakar, A. 518
Brians, N. 160
Budiyanti, E.A. 129

Cahyanto, A. 255, 261
Chandra, M. 56

Cindy, C. 249
Claresta, B. 360

Darkim, A. 129
Darmawanti, M.P. 84
Dewi, N.L.W.P. 704
Dipankara, J. 360, 366, 372, 379
Djamil, M.S. 387
Dwisaptarini, A.P. 73, 84, 112, 124, 136, 214

Eddy, E. 267, 277, 414
Elline, E. 166, 173, 195, 231, 236
Elline 124
Ericka, N. 450

Farasdhita, F. 67
Farizka, I. 305, 312, 360, 366, 379
Fathinah, A.P. 594
Fatya, M.J. 146
Fauzi, A. 299
Fibryanto, E. 67, 90, 116, 154, 166, 173, 231
Fitri, A.N. 31
Fitryanur, A. 697

Ghani, W.M.N. 17, 502, 531
Gunardi, I. 3, 17, 502, 526, 531
Gunawan, G.G. 730
Gunawan, J.A. 116, 160, 207, 214
Gutierrez, S.B. 468

Hadiutomo, I. 136
Halim, H. 565

Halim, I.A. 565
Halim, L.A. 742
Handoyo, J. 742
Hanin, I. 697, 720
Haris, M.S. 299
Harsas, N.A. 614, 621
Hartanto, F.K. 17, 496, 526
Hartini, A.S. 299
Hartono, T. 407
Hartono, V. 587
Hasan, A.E.Z. 285
Hayuningtyas, R.A. 387, 407, 424, 468
Hidayat, A. 116
Hidayatullah, T. 341
Hogervorst, E. 481
Hussaini, H. 526
Hutapea, M.K. 554

Iffendi, R. 173
Inglam, S. 366, 372, 379
Iskandar, B. 201
Iskandar, B.O. 141, 178, 243
Iskandar, N.D. 182
Ismail, A. 429
Istanto, E. 160

Jamil, M.S. 124
Jauhari, S. 407
Jesslyn, G. 141
Joselin 561
Judith, E.T. 321
Julianton, I.K. 730
Juliawati, M. 429
Juslily, M. 429

Kamad, J. 277
Katrini, F. 77

Khalid, R.B. 435
 Khazin, S.M. 160, 178
 Komala, O.N. 657, 677
 Komariah, K. 450
 Komariah 443
 Kresnatri, M.R. 267
 Kurniawan, A. 17
 Kurniawan, F.L. 255
 Kusnoto, B. 461, 539
 Kusnoto, J. 539

 Lambertus, R. 195
 Landy, R. 101
 Lestari, S. 429
 Lestari, W. 651
 Liliyany, D. 277, 414
 Limarta, G.C. 399
 Lopez, M.V. 697, 704
 Louisa, M. 594, 603, 638, 677
 Lubis, H.F. 543, 548, 554, 561
 Lubis, M.N.P. 360, 366, 372

 Maharani, J. 630
 Mahendra, T.A. 587
 Mailiza, F. 518
 Maitimu, F.C. 643, 657
 Margareita, D.L. 267
 Marlina, N. 379
 Marpaung, C. 697, 704
 Marpaung, C.D. 531
 Maskoen, A.M. 328
 Mauludin, R. 614
 Mayun, I.G.A.R.U. 725
 Monthanapisut, P. 9
 Musa, M.F.C. 42

 Nadhifa, R.U. 146
 Nadiyah, N. 496, 502, 526
 Nainggolan, K. 630
 Nasroen, S.L. 328
 Natalina, N. 614
 Natassya, P. 468

 Nisa, U. 518
 Noh, N.Z.M. 116
 Nursolihati, V. 685

 Octarina, O. 290
 Ongkaruna, L.A.L. 290
 Ongko, J.X. 543

 Palupi, A.P.S. 360
 Pang, T. 424
 Panjaitan, I.G.P. 710, 715
 Paramitha, V. 621
 Pardenas, I.J. 393
 Peeters, H.H. 321
 Poedjiastoeti, W. 3, 360, 366, 372, 379
 Porjo, L.A. 472
 Pradhista, A.R. 243
 Prahasti, A.E. 154, 160, 166, 173, 178, 195, 231
 Pratiwi, D. 249, 255, 267, 285, 354
 Priandini, D. 481
 Pudjowibowo, H. 354
 Putranto, R.A. 677
 Putri, S.A. 221
 Putri, T.S. 285
 Putriany, T. 575

 Quendangen, A. 299
 Qurratuani, D. 231

 Rahardjo, T.B.W. 481
 Rahayu, A.P. 502
 Raiyon, M.L. 526
 Ramli, N.P. 429
 Ranggaini, D. 42
 Ratih, I.G.A. 481
 Ratnasari, D. 84, 95, 136, 173, 182
 Rhiyanthy, F. 548
 Rizal, M.I. 387, 424
 Roeslan, B.O. 387
 Roeslan, M.O. 9, 393, 472

 Salsabila, P.A. 24
 Sandra, F. 354, 387, 407, 424
 Santoso, H.A. 267
 Sari, E.S.I. 730
 Sastrawan, A.D. 348
 Setiabudi, I. 720
 Setiawan, J. 188
 Shuka, O. 348
 Sidharta, A.J. 3, 17
 Silitonga, F.Y. 321
 Soeroso, Y. 614
 Soesanto, S. 461, 468
 Somawihardja, A.R. 638
 Soma, S.M. 399
 Soulissa, A.G. 24, 429, 481
 Stefani, R. 182
 Subrata, A. 3, 178
 Sudhana, W. 31, 49
 Sudiono, J. 407, 489, 508
 Suebnukam, S. 3
 Sukotjo, C. 614
 Sulistyowati, I. 42, 435
 Sunarso, S. 614
 Sundjojo, M. 685
 Susanti, Y. 201
 Susanto, J.D. 73
 Susanto, T.G.R. 489
 Sutadi, H. 575
 Sutanto, A. 154
 Sutjiono, Y. 178
 Suwandi, T. 267, 643, 685, 689
 Suwartini, T. 90, 141, 195, 207
 Suyata, M.T. 508

 Tadjoeidin, F.M. 587
 Tanjung, R. 299, 305, 312
 Tanuri, N. 226
 Tarigan, M.A.L. 630
 Theodorea, F. 399
 Theresia, T.T. 31
 Thionadewi, Y.V. 689
 Tio, A. 116

Tjandrawinata, R. 56, 95,
136, 255, 261
Trisfilha, P. 443
Trisfilha, T. 450
Trushkowsky, R. 136
Utama, V. 299
Vilita, S. 399
Wahyudi, R. 443, 450
Wibianty, V. 621
Wibowo, L.H. 231
Widagdo, A. 299
Widaryono, A. 587
Widyarman, A.S. 49, 146,
399, 414, 461
Widyastuti, W. 67, 77,
101, 129, 166, 221
Wijaya, H. 539
Wijaya, M. 261
Winardi, Y. 112
Winarto, J.V. 531
Wirahadikusumah, A. 734
Witoko, F. 95
Wulandari, P. 630
Wulandari, W. 90
Wulansari, S. 9, 73, 101,
129, 146, 226
Yanti, E.A.W. 124
Yasnill 461
Yosvara, K. 668
Yusra, Y. 539
Zain, R.B. 496
Zuhul, L.R. 321

DO NOT COPY
rosalina@trisakti.ac.id

The relationship between age with caries status and periodontal treatment needs on visually impaired individuals

P. Wulandari, M.A.L. Tarigan & K. Nainggolan

Department of Periodontology, Faculty of Dentistry, University Sumatera Utara, Medan, Indonesia

M.F. Amin

Department of Dental Conservation, Faculty of Dentistry, Trisakti University, Jakarta, Indonesia

J. Maharani

Postgraduate, Faculty of Dentistry, University Sumatera Utara, Medan, Indonesia

ABSTRACT: Poor periodontal conditions could affect health in general. Age, sex, control plaque habits, and other factors influence periodontal health conditions. Limitations for visually impaired people to control plaque could also affect the tooth's condition and periodontal health. This study aims to analyze the relationship between age with caries status and periodontal treatment needs in visually impaired people. This is a cross-sectional study conducted on 60 people with the visually impaired. Research process conducted with health protocol during a pandemic. Caries' status was measured by measuring DMFT score, and Periodontal treatment needs using the Community Periodontal Index of Treatment Needs (CPITN). This study shows that age-related to periodontal status ($p = 0.001$) but is not related to caries status ($p = 0.805$) and needs periodontal treatment ($p = 0.205$). Procedure control of less plaque appropriate could trigger plaque formation because of limitations of visual. Age is a factor involved in changing periodontal tissue so that it is more susceptible to experiencing a periodontal breakdown. Age is one contributing factor affecting periodontal health in visually impaired people.

1 INTRODUCTION

The Basic Health Research 2018 reports that the largest proportion of dental health problems in Indonesia is cavities (45.3%), while the majority of dental and oral health problems experienced by the Indonesian population are swollen gums or abscesses (14%) (Kementerian Kesehatan RI 2018). This dental and oral health problem requires healthcare facilities to provide comprehensive medical measures, but the COVID-19 pandemic has disrupted public access to health services. According to the United Nations (2020), the coronavirus pandemic poses a serious threat to persons with disabilities since they are already socially and economically marginalized and have restricted access to information and public services, including those for the visually impaired. Visually impaired, according to the Indonesian Blind Association (*Persatuan Tunanetra Indonesia*/PERTUNI) (2021), are individuals who cannot see (totally blind) and people who still have a residual vision but are unable to use their vision to read 12-point ordinary writing with normal light conditions and normal distances, although assisted by using glasses (*less alert/low vision*). Global Blindness and Visual Impairment in 2015 reported that there were 253 million people with visual impairments, and of that number, 217 million people had moderate to severe visual

impairment, and the rest were blind (Ackland *et al.* 2017). Southeast Asia is the region with the fourth highest number of blind people in the world, and Indonesia is in the third highest position with a prevalence of 0.9% in Southeast Asia. The current population of Indonesia is around 250 million, meaning that currently, there are at least 3,750,000 blind people, both blind and *low vision categories* (Lisinus & Sembiring 2020).

Visually impaired individuals have limited functional conditions, so they find it difficult to get information from the surrounding environment through their vision and have a higher challenge in carrying out daily activities, including maintaining hygiene and dental and oral health (Dioni *et al.* 2014; Husniyah 2019; Puteri *et al.* 2020). The poor condition of the oral cavity of blind people is due to the lack of ability to see in, understand, and do dental and oral hygiene practices. Poor oral hygiene in blind people is caused by cariogenic food, the shape of the tooth position, and the lack of knowledge about oral dental health due to a lack of education on how to maintain dental and oral hygiene, resulting in plaque buildup (Sabilillah *et al.* 2016).

Plaque plays an important role in the process of damage to the hard tissues of the teeth and the soft tissues around the teeth and oral cavity. The bacteria in plaque will ferment glucose and sucrose to form acids which will cause demineralization of the teeth, leading to caries (Park *et al.* 2018). The bacteria in plaque will produce toxins that stimulate the gingiva so that inflammation occurs, and the gingiva bleeds easily. Plaque that undergoes remineralization will form calculus and migrate into the gingival sulcus, which can cause inflammation, alveolar bone resorption, formation of periodontal pockets, and finally, tooth loss, all of which are signs of periodontal disease (Angelino *et al.* 2017; Utama *et al.* 2017). Periodontal disease is an inflammatory process that occurs due to an unbalanced interaction between plaque microorganisms and the immune response that causes irreversible damage to the periodontal tissue (Cunha *et al.* 2015).

Various studies on the condition of caries and periodontal tissue in blind people have been carried out. Research by Liu *et al.* (2019) conducted to assess the oral health condition of visually impaired individuals found that blind individuals had a high prevalence of caries, poor periodontal health, and severe malocclusion. The prevalence of visually impaired persons with caries is 78.64%, 44.66% have gingival bleeding, and 67.96% have calculus. Research results by Turkistani & Elmarsafy (2019) also showed that the prevalence of caries in blind people was 78.7%. Research by Reddy & Sharma (2011) showed that the prevalence of caries in blind people was higher at 40%, while in normal individuals, it was only 11.5%. Increasing age will increase a person's susceptibility to periodontal disease due to degenerative changes. This relates to the duration of a person's exposure to other risk factors that trigger the occurrence of periodontal disease (Soulissa 2020; Wulandari *et al.* 2022).

Periodontal disease that is not given proper treatment will cause loose teeth to lose teeth. One of the steps to overcome this is to examine the periodontal tissue to determine the status and need for periodontal treatment through the measurement of the Community Periodontal Index of Treatment Needs (CPITN) (Dewi *et al.* 2020). The Community Periodontal Index of Treatment Needs is an index used to describe and evaluate the status of periodontal tissues in the study population (Ermawati *et al.* 2012). The purpose of the CPITN is to estimate the prevalence of the disease, measure the level of patient need for periodontal treatment, and recommend the appropriate type of treatment (Gasner & Schure 2021).

Research conducted by Dewi *et al.* (2020) shows the periodontal tissue health status of blind people in Jember Regency by 50% is a score of two; namely, there is subgingival calculus and supragingival calculus. Indications for periodontal tissue treatment that are needed are improving oral hygiene and accompanied by professional scaling. Zero scores or normal periodontal health status are very rare.

The results of these studies indicate that blind people need special attention to their oral health because it also greatly affects the quality of life of the blind individuals themselves.

Therefore, this study aims to assess caries status, periodontal condition, and the need for periodontal treatment in blind people.

2 METHODS

This type of research is cross-sectional, with the number of research subjects as many as 60 people with visual impairments aged 13 to 65 years. This research has received ethical approval from the ethics committee of the Faculty of Medicine, Universitas Sumatera Utara. Before the study was conducted, all subjects who were willing to participate in the study signed and gave a thumbprint on the informed consent. Demographic data were obtained by questionnaire. Blind people who smoked actively, pregnant women, users of fixed orthodontic appliances, users of dentures and taking blood thinners, and who were taking periodontal treatment in the last six months were excluded from this study.

The status of the blind person was determined through interviews. All subjects who met the inclusion criteria were examined Caries status with Decay, Missing, Filled Tooth (DMFT) index, periodontal status, and the level of periodontal treatment needs with the CPITN index. Examination of caries status using the DMFT index was carried out by looking at the number of carious teeth that could still be filled (decay), teeth lost due to caries (missing), and teeth filled with caries that appeared during fixed orthodontic treatment (filling). The average number of DMFTs was calculated by adding up the number of caries, missing and filling teeth, and then dividing by the total population. The caries status category is based on the average number of DMFTs according to the World Health Organization (WHO), ranging from very low (0.0 – 1.1), low (1.2 – 2.6), moderate (2.7 – 4.4), high (4.5 – 6.5), to very high (>6.6) (Hiremath 2011).

Examination of the level of need for periodontal treatment (CPITN) was performed by measuring gingival bleeding, the presence of calculus, and pocket depth. Examination of the level of need for periodontal treatment (CPITN) was performed on teeth 17, 16, 11, 26, 27, 37, 36, 31, 46, and 47 for subjects aged over 20 years, while for subjects aged 19 years or younger, on teeth 16, 11, 26, 36, 31, and 46. Subjects under 15 years of age were only examined and recorded for calculus and gingival bleeding to avoid the presence of false pockets. The examination is carried out once by one examiner with the help of an assistant to record data (Hiremath 2011; John 2017). Before carrying out the examination, an inter-examiner calibration test was carried out. The results of data analysis were carried out through statistical tests carried out with the Spearman correlation test for bivariate analysis, with a significance level of 5%.

3 RESULTS

The study was conducted on 60 blind people with an average age of 25.15 ± 13.23 , where the number of male subjects (58.3%) was more than the number of female subjects (41.7%). Based on the DMFT index, most subjects experienced caries with an average of 3.07 ± 2.80 , with the highest caries status at the moderate level (31.6%). Based on the CPITN index, the majority of the subjects' periodontal status level was at level two (71.7%), while the least was at level 0 (1.7%), and the majority of the subjects were at level II care needs (98.3%) (Table 1).

A significant relationship was found between age and periodontal status ($p = 0.001$), but there was no difference between age and caries status ($p = 0.805$) and the need for periodontal treatment ($p = 0.205$) (Table 2). Table 3 shows a significant relationship between sex and DMFT ($p = 0.034$), but there is no difference between sex with periodontal status ($p = 0.955$) and the need for periodontal treatment ($p = 0.250$).

Table 1. Subject distribution.

Variables (n = 60)	Mean ± SD	Frequency (n,%)
Age	25.15 ± 13.23	
Sex		
Males		35 (58.3%)
Females		25 (41.7%)
DMFT		
Decay	3.07 ± 2.80	
Missing	1.15 ± 1.76	
Filled	0.15 ± 0.63	
DMFT	4.37 ± 3.52	
Caries status		
Very low		12 (20.1%)
Low		6 (10%)
Moderate		19 (31.6%)
High		13 (21.7%)
Very high		10 (16.7%)
Periodontal status		
0 (Healthy)		1 (1.7%)
2 (Supragingival calculus)		43 (71.7%)
3 (Periodontal pockets of 4-5 mm)		16 (26.7%)
Periodontal care needs		
0 (No treatment needs)		1 (1.7%)
II (Oral hygiene improvement, scaling)		59 (98.3%)

Table 2. Relationship between age and caries status, periodontal status, and periodontal care needs.

Variables (n = 60)	Age	
	Coefficient correlation	p-value
Caries status (DMFT)	-0.033	0.805
Periodontal status	0.427	0.001*
Periodontal care needs	-0.166	0.205

Spearman Correlation Test; *significant $p < 0.05$.

Table 3. Relationship between sex and caries status, periodontal status, and periodontal care needs.

Variables (n = 60)	Sex	
	Coefficient correlation	p-value
Caries status (DMFT)	0.274	0.034*
Periodontal status	-0.007	0.955
Periodontal care needs	-0.154	0.240

Spearman Correlation Test; *significant $p < 0.05$.

4 DISCUSSION

The oral health condition of blind people is influenced by the lack of ability to see, understand, and master the practice of dental and oral hygiene. Dental plaque is the main cause of dental caries and periodontal disease. The buildup of plaque and debris causes gingivitis; if it occurs in the long term, plaque can cause the loss of periodontal attachment because plaque produces collagenase enzymes that can degrade collagen in the periodontal tissue; besides that, it can also cause demineralization and tooth decay by plaque microbes, resulting in caries (Alghamdi *et al.* 2018; John 2017).

The gender of the subjects of this study was mostly male (58.3%) because most of the subjects in this study came from schools. The culture and mindset of parents prioritize men for education and careers over women (Laksono & Nurchayati 2018; Prasad *et al.* 2020). This study is not in line with the results of research by Sabilillah *et al.* (2016), Samnieng *et al.* (2014), and Zahara & Andriani (2019). The Basic Health Research 2013 data shows that the highest disability in Indonesia is blindness, with the number of people with disabilities in women being higher than in men (Ministry of Health of the Republic of Indonesia 2014). The number of women with visual impairments is higher than that of men. This can be due to the longer average life expectancy of women and can be accompanied by macular degeneration, cataracts, and glaucoma. Women have low access to eye health services due to various socioeconomic and cultural factors (Prasad *et al.* 2020; Ulldemolins *et al.* 2019).

Based on research conducted by Shetty *et al.* (2010), 66% of blind people have difficulty brushing their teeth, so plaque cleaning is inadequate and has a poor level of oral hygiene. The results of this study showed that 31.6% of visually impaired persons had moderate caries rates and 21.7% had high caries rates, with a mean DMFT index score of 4.37 ± 3.52 , and according to WHO, these results indicate a moderate category (Table 1). This may be due to the visually impaired's difficulty in carrying out plaque control properly and the limitations in carrying out the procedure. Oktadewi *et al.* (2020) in their research showed that the average DMFT score in blind students was 4.8 ± 2.74 (high category) and previous studies also showed that blind individuals had high caries scores and poor oral hygiene (Parkar *et al.* 2014; Prashanth *et al.* 2011). The occurrence of caries is influenced by four main factors, namely agent, host, substrate, and time. Supporting factors that can cause dental caries are rough tooth structure, crowded tooth arrangement, little saliva, and microorganisms (Wende 2019).

The results of the periodontal status examination in blind people showed that 71.7% of blind people had periodontal status with a score of two, 26.7% had periodontal status with a score of three, and 1.7% had a healthy periodontium (score 0), and none had periodontal status with a score of 4 (6 mm pathological pocket) (Table 1). The results of the periodontal status examination will determine the level of need for periodontal treatment in blind people. The results of this study showed that as many as 98.3% of blind people needed improved dental care at home/improved oral hygiene and scaling (TN II), only 1.7% did not require treatment (TN 0) and no blind people were included in the treatment categories of TN I and TN III. The high percentage of TN II care needs is because blind individuals cannot perform oral hygiene measures (brushing teeth) properly.

The results of this study are not in line with the research of Samnieng *et al.* (2014), which shows that 34.37% of blind people suffer from periodontal disease, 13.7% require scaling treatment (TN II), and 36.2% require professional treatment (TN III). This condition occurs because of the low physical ability of blind people, so it has an impact on the difficulty of brushing their teeth. The ability to brush the teeth of subjects who are totally blind tend to overbrush (brushing their teeth with too strong a pressure), besides the high gingival bleeding in the total blind is the result of the buildup and retention of plaque on the tooth surface that has occurred in the long-term, resulting in periodontal disease (Mohd-Dom *et al.* 2010).

This study showed that there was a significant relationship between age and periodontal status ($p = 0.001$). The older the age, the higher the periodontal status value or the more

periodontal disorders (Table 2). The age of the subjects of this study was in the range of 13–67 years, where the increasing age, the higher the potential for the degeneration of the periodontal tissue, and age is one of the risk factors for the occurrence of periodontal disease (Lumentut *et al.* 2013; Tadjoeidin *et al.* 2017; Wulandari *et al.* 2022). Various changes occur in the periodontal tissue due to the increased vulnerability to irritation from bacterial plaque. The accumulation of plaque in the elderly is getting faster because the older the age, the physiological changes in saliva occur, and the opening of the cementum, which has a rough surface, facilitates the formation of dental plaque (Setiawati *et al.* 2022).

In this study, there was no significant relationship between age and the level of need for periodontal care in blind people ($p = 0.205$); generally, the subjects of this study required improvement in dental care at home/improved oral hygiene and initial treatments such as scaling (Table 2). Based on the research of Chellappa *et al.* (2021) there is a significant relationship between age and the need for periodontal treatment. In this study, there was also no significant relationship between age and caries status ($p = 0.805$). As a person's age increases, dental caries will increase because teeth that are longer in the mouth have more interactions with caries-causing factors (Pitt Ford 1993).

A significant relationship was found between caries status and gender ($p = 0.034$) (Table 3). Suwelo & Sukarsono's (1992) study showed that tooth eruption was faster in women than in men. This is different from the results of Kiswaluyo (2010) study, which stated that the prevalence of caries in men was higher because men usually rarely paid attention to oral hygiene and were lazier at brushing their teeth compared to women. The results of this study indicate that there is no relationship between gender and periodontal status and the level of need for periodontal treatment. This study is not in line with Setiawati *et al.* (2022) research which states that there is a relationship between the occurrence of periodontitis and gender. Men have a high risk of periodontal tissue damage because they have bad habits such as smoking and consuming alcohol compared to women. Dental caries that continue to be left untreated and untreated periodontal conditions will cause further damage, and this will affect the health condition of the sufferer, especially the health condition of the oral cavity. Dental check-ups and care, as well as regular visits to the dentist, are very much needed for blind people to help overcome the damage and disorders that occur in their oral cavities. It is hoped that a healthy oral cavity will help improve the quality of life related to teeth and mouth in visually impaired people.

5 CONCLUSION

Dental and oral health is one topic that has an effect on people's quality of life. Caries or even tooth loss can disrupt masticatory function, which is a common complaint among the general population. Poor plaque management is one of the causes which the visually impaired frequently encounter because of their limited functional conditions. Age is one of the elements that affect periodontal disease in the visually impaired, whereas gender is one of the factors that affect caries status, necessitating intensive and collaborative treatment of the visually impaired.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

ACKNOWLEDGMENTS

Thank you to YAPENTRA in North Sumatra and all people who have supported this research.

REFERENCES

- Ackland, P., Resnikoff, S. & Bourne, R. 2017. World blindness and visual impairment: despite many successes, the problem is growing. *Community Eye Heal Int Cent Eye Heal* 30(100): 71–73.
- Alghamdi, N., Alshehri, M. & Abdellatif, H. 2018. Oral health findings, needs and demands of visually impaired children in Saudi Arabia. *J Dent Heal Oral Disord Ther* 9(3): 222–227.
- Angelino, K., Shah, P., Edlund, D.A., Mohit, M. & Yauney, G. 2017. Clinical validation and assessment of a modular fluorescent imaging system and algorithm for rapid detection and quantification of dental plaque. *BMC Oral Health* 17(1): 1–10.
- Chellappa, L.R., Leelavathi, L. & Jayashri, P. 2021. Age and gender distribution of community periodontal index of treatment needs – a record-based study. *Journal of Contemporary Issues in Business and Government* 27(2): 2324–2335.
- Cunha, L., Proença, M., Rodrigues, V., Pereira, A. & Benatti, B. 2015. Relationship between periodontal status and degree of visual impairment in institutionalized individuals. *Eur J Dent* 9(3): 324–328.
- Dewi, N., Budirahardjo, R. & Sulistiyani. 2020. Periodontal health status and treatment needs of visually impaired student attending extraordinary school in Jember regency. *Health Notions*: 4(11): 358–363.
- Dioni, A., Prasetyo, F. & Budijanto, D. 2014. *Situasi Penyandang Disabilitas*. Jakarta: Kemenkes RI.
- Ermawati, T., Sari, D. & Kundari, M. 2012. Status kesehatan periodontal dan tingkat kebutuhan perawatan pasien yang datang ke klinik periodonsia rsgm universitas jember tahun 2011. *J K G Unej* 9(2): 86–89.
- Gasner, N.S. & Schure, R.S. 2021. *Periodontal Disease* 15: 1–180.
- Hiremath, S. 2011. *Textbook of Preventive and Community Dentistry* (2nd ed.). Amsterdam: Elsevier.
- Husniyah, N. 2019. The effects of visual impairment upon oral health care. *Journal of Pharmaceutical Sciences and Research* 11(8): 3067–3071.
- John, J. 2017. *Textbook of Preventive and Community Dentistry*. New Delhi: CBS Publishers & Distributors Pvt. Ltd.
- Kementerian Kesehatan RI. 2018. *Hasil Riset Kesehatan Dasar (Riskesdas) 2018*. Jakarta: Badan Penelitian Dan Pengembangan Kesehatan Kementerian RI.
- Kiswalyo. 2010. Hubungan karies gigi dengan umur dan jenis kelamin siswa sekolah dasar di wilayah kerja puskesmas kaliwates dan puskesmas wuluan kabupaten Jember. *Jurnal Stomatognathic* 7(1): 26–30.
- Laksono, A. & Nurchayati. 2018. Life history pada perempuan penyandang tunanetra yang menempuh pendidikan tinggi anom tri laksono. *Jurnal Psikologi Pendidikan* 5(2): 1–8.
- Lisinus, R. & Sembiring, P. 2020. *Pembinaan Anak Kebutuhan Khusus: Sebuah Perspektif Bimbingan dan Konseling* (M. Iqbal (ed.)). Medan: Yayasan Kita Menulis.
- Liu, L., Zhang, Y., Wu, W., He, M., Lu, Z., Zhang, K., Li, J., Lei, S., Guo, S. & Zhang, Y. 2019. Oral health status among visually impaired schoolchildren in Northeast China. *BMC Oral Health* 19(1): 1–7.
- Lumentut, R.A.N., Gunawan, P.N. & Mintjelungan, C.N. 2013. Status periodontal dan kebutuhan perawatan pada usia lanjut. *J E-GIGI* 1(2): 79–83.
- Ministry of Health of the Republic of Indonesia. 2014. Situation of persons with disabilities. *Health Information and Data Window Bulletin*, 1–17.
- Mohd-Dom, T.N., Omar, R., Abdul Malik, N.A., Saiman, K. & Rahmat, N. 2010. Self-reported oral hygiene practices and periodontal status of visually impaired adults. *Global Journal of Health Science* 2(2): 184–191.
- Oktadewi, F., Soeprihati, I. & Hanindriyo, L. 2020. The correlation between dental caries and oral health-related quality of life among visually impaired children. *ODONTO Dental Journal* 7(2): 82–89.
- Park, S., Cho, S. & Han, J. 2018. Effective professional intraoral tooth brushing instruction using the modified plaque score: a randomized clinical trial. *J Periodontal Implant Sci* 48(1): 22–33.
- Parkar, S., Patel, N. & Zinzuwadia, H. 2014. Dental health status of visually impaired individuals attending special school for blind in Ahmedabad city, India. *Indian J Oral Sci* 5(2): 73.
- Persatuan Tunanetra Indonesia. 2021. *Siapa Tunanetra?* [Online]. Available at: <https://pertuni.or.id>
- Pitt Ford, T.R. 1993. *Restorasi Gigi*. Jakarta: EGC.
- Prasad, M., Malhotra, S., Kalaivani, M., Vashist, P. & Gupta, S.K. 2020. Gender differences in blindness, cataract blindness and cataract surgical coverage in India: A systematic review and meta-analysis. *British Journal of Ophthalmology* 104(2): 220–224.
- Prashanth, S., Bhatnagar, S., Das, U. & Gopu, H. 2011. Oral health knowledge, practice, oral hygiene status, and dental caries prevalence among visually impaired children in Bangalore. *J Indian Soc Pedod Prev Dent* 29(2): 102–105.
- Puteri, M.M., Ruslan, F.K.D.R. & Wibowo, T.B. 2020. Oral health behavior and its association with the Caries Index in visually impaired children. *Special Care in Dentistry* 40(1): 79–83.

- Reddy, K. & Sharma, A. 2011. Prevalence of oral health status in visual impaired people. *Journal of Indian Society of Pedodontics and Preventive Dentistry* 29(1): 25–27.
- Sabilillah, M.F., Taftazani, R.Z., Sopianah, Y. & Fatmasari, D. 2016. Pengaruh Dental Braille Education (DBE) terhadap oral hygiene pada anak tunanetra. *Jurnal Kesehatan Gigi* 03(2): 7–13.
- Samnieng, P., Sechaumpai, P., Wichachai, S. & Yosoekh, P. 2014. Oral health status and treatment needs of visual impairment in Phitsanuloke, Thailand. *Journal of Dentistry Indonesia* 21(2): 63–67.
- Setiawati, T., Robbihi, H.I. & Dewi, T.K. 2022. Hubungan usia dan jenis kelamin dengan periodontitis pada lansia puskesmas pabuarantumpeng tangerang. *Journal of Dental Hygiene and Therapy* 3(1): 43–48.
- Shetty, V., Hegde, A., Bhandary, S. & Rai, K. 2010. Oral health status of the visually impaired children—a South Indian study. *J Clin Pediatr Dent* 34: 213–166.
- Soulissa, A. 2020. A review of the factors associated with periodontal diseases in the elderly. *J Indones Dent Assoc* 3(1): 47–53.
- Suwelo, & Sukarsono, I. 1992. *Karies Gigi Pada Anak Dengan Pelbagai Faktor Etiologi*. Jakarta: EGC.
- Tadjoedin, F.M., Fitri, A.H., Kuswandani, S.O., Sulijaya, B. & Soeroso, Y. 2017. The correlation between age and periodontal diseases. *Journal of International Dental and Medical Research* 10(2): 327–332.
- Turkistani, B. & Elmarsafy, S. 2019. Caries experience among visually impaired and norma female students aged 6–18 years in Makkah, Saudi Arabia: A comparative study. *International Journal of Health Sciences and Research* 9(12): 286–292.
- Ulldemolins, A., Benach, J., Guisasola, L. & Artazcoz, L. 2019. Why are there gender inequalities in visual impairment? *Eur J Public Health* 29(4): 661–666.
- United Nations. 2020. *Joint Statement Local Governments and Persons with Disabilities in Relation to COVID-19*. New York: United Nations.
- Utama, I., Widyastuti, I. & Kartikasari, C. 2017. Prevalensi dan distribusi plak gigi pada gigi anjing (*Canis familiaris*) di Daerah Denpasar–Bali. *Indonesia Medicus Veterinus* 6(5): 378–385.
- Wende, M. 2019. Faktor-faktor yang berhubungan dengan kejadian karies gigi pada anak sekolah dasar kelas 1 di SD Inpres OEBUFU. *CHM-K Applied Scientific Journal* 2(1): 11–18.
- Wulandari, P., Widkaja, D., Nasution, A.H., Syahputra, A. & Gabrina, G. 2022. Association between age, gender and education level with the severity of periodontitis in pre-elderly and elderly patients. *Dental Journal (Majalah Kedokteran Gigi)* 55(1): 16–20.
- Zahara, E. & Andriani, A. 2019. Hubungan perilaku tuna netra dengan status kebersihan gigi dan mulut pada komunitas pertuni di Kota Banda Aceh. *Jurnal Bahana Kesehatan Masyarakat (Bahana of Journal Public Health)* 3(1): 30–34.

The Relationship between Age with Caries Status and Periodontal Treatment Needs on Visually Impaired People

by Meiny Faudah Amin

Submission date: 08-Jan-2025 10:57AM (UTC+0700)

Submission ID: 2440174618

File name: English_Full_Paper_FORIL_TRISAKTI_2022_3_Sept_2022.docx (72.29K)

Word count: 4254

Character count: 22999

The Relationship between Age with Caries Status and Periodontal Treatment Needs on Visually Impaired People

Pitu Wulandari (a*), Melly Ashna Laterzia Tarigan (a), Kristina Nainggolan (a), Meini F Amin (b), Julia Maharani (c)

a *) Department of Periodontology, Faculty of Dentistry, University Sumatera Utara, Medan, Indonesia

b) Department of Dental Conservation, Faculty of Dentistry, Trisakti University, Jakarta, Indonesia

c) Postgraduate, Faculty of Dentistry, University Sumatera Utara, Medan, Indonesia

Corresponding author email: pitu.wulandari@usu.ac.id; puput_seven@yahoo.co.id

Abstract

Introduction: Poor periodontal conditions could affect health in general. Age, gender, control plaque habits, and other factors influence periodontal health conditions. Limitations for visually impaired people to control plaque also could affect the tooth's condition and periodontal health. This study aims to analyze the relationship between age with caries status and periodontal treatment needs in visually impaired people. **Result:** This is a cross-sectional study conducted on 60 people with the visually impaired. Research process conducted with health protocol during a pandemic. Caries' status was measured by measuring DMFT score, and Periodontal treatment needs using the Community Periodontal Index of Treatment Needs (CPITN). This study shows that age-related to periodontal status ($p=0.001$) but is not related to caries status ($p=0.805$) and needs periodontal treatment ($p=0.205$). **Discussion:** Procedure control less plaque appropriate could trigger plaque formation besides because of limitations of visual. Age is a factor involved in changing periodontal tissue, so that is more susceptible to experiencing a periodontal breakdown. **Conclusion:** Age is one contributing factor affecting periodontal health in visually impaired people.

Keywords: Age, visually impaired, Periodontal Status, Plaque Control, Dental Caries.

Introduction

The Basic Health Research 2018 reports that the largest proportion of dental health problems in Indonesia is cavities (45.3%), while the majority of dental and oral health problems experienced by the Indonesian population are swollen gums or abscesses (14%).¹ This dental and oral health problem requires health care facilities to provide comprehensive medical measures, but the COVID-19 pandemic has disrupted public access to health services.

Global Blindness and Visual Impairment in 2015 reported that there were 253 million people with visual impairments, and of that number, 217 million people had moderate to severe visual impairment, and the rest were blind.² Southeast Asia is the region with the fourth highest number of blind people in the world, and Indonesia is in the third highest position with a prevalence of 0.9 % in Southeast Asia. The number of blind people in Indonesia is 1.5 % of the total population, according to the estimation of the Ministry of Health of the Republic of Indonesia. The current population of Indonesia is around 250

million, meaning that currently, there are at least 3,750,000 blind people, both blind and *low vision categories*.³

Blind people, according to the Indonesian Blind Association (Persatuan Tunanetra Indonesia/PERTUNI), are individuals who cannot see (totally blind) and people who still have a residual vision but are unable to use their vision to read 12-point ordinary writing with normal light conditions and normal distances, although assisted by using glasses (less alert/*low vision*).⁴ The definition explains that the blind have no vision at all to distinguish light and dark, so they are referred to as "totally blind".⁵ Blind people who have a residual vision that can still function are called "less alert," the general term is *low vision*.⁵

Blindness can be caused by prenatal factors, natal factors, and postnatal factors. Prenatal factors are related to history from parents, abnormalities during pregnancy that results in impaired growth of the child in the womb, such as pregnant women who are infected with or injured by the rubella virus or chickenpox, toxoplasmosis infection, or tuberculosis infection, which can damage certain blood cells. During fetal growth in the womb.^{5,6} The natal factor (when the baby is born) occurs due to damage to the eyes or the optic nerve during the birth process, such as the impact of tools or hard objects during childbirth eyes, so the baby has a risk of loss of vision.⁵ Postnatal factors (during growth and development / after birth) occur due to suffering from eye diseases, such as xerophthalmia, trachoma, cataracts, diabetic retinopathy, macular degeneration, and retinopathy of prematurity, hazardous chemicals, and other unforeseen events.⁵

Blind people have limited functional conditions, so they find it difficult to get information from the surrounding environment through their vision and have a higher challenge in carrying out daily activities, including maintaining hygiene and dental and oral health.⁷⁻⁹

The poor condition of the oral cavity of blind people is due to the lack of ability to see in, understand, and do dental and oral hygiene practices. Poor oral hygiene in blind people is caused by cariogenic food, the shape of the tooth position, and the lack of knowledge about oral dental health due to a lack of education on how to maintain dental and oral hygiene, resulting in plaque buildup.¹⁰

Plaque plays an important role in the process of damage to the hard tissues of the teeth and the soft tissues around the teeth and oral cavity. The bacteria in plaque will ferment glucose and sucrose to form acids which will cause demineralization of the teeth, leading to caries. The bacteria in plaque will produce toxins that stimulate the gingiva so that inflammation occurs, and the gingiva bleeds easily. Plaque that undergoes remineralization

will form calculus and migrate into the gingival sulcus, which can cause inflammation, alveolar bone resorption, formation of periodontal pockets, and finally, tooth loss, all of which are signs of periodontal disease.^{12,13} Periodontal disease is an inflammatory process that occurs due to an unbalanced interaction between plaque microorganisms and the immune response that causes irreversible damage to the periodontal tissue.¹⁴

Various studies on the condition of caries and periodontal tissue in blind people have been carried out. Research by Liu et al. conducted to assess the oral health condition of visually impaired individuals found that blind individuals had a high prevalence of caries, poor periodontal health, and severe malocclusion. The prevalence of visually impaired persons with caries is 78.64%, 44.66% have gingival bleeding, and 67.96% have calculus.¹⁵ Research results Turkistani et al., also showed that the prevalence of caries in blind people was 78.7%.¹⁶ Research by Reddy et al. showed that the prevalence of caries in blind people was higher at 40%, while in normal individuals, it was only 11.5%.¹⁷

Periodontal disease that is not given proper treatment will cause loose teeth to lose teeth. One of the steps to overcome this is to examine the periodontal tissue to determine the status and need for periodontal treatment through the measurement of the Community Periodontal Index of Treatment Needs (CPITN).¹⁸ Community Periodontal Index of Treatment Needs is an index used to describe and evaluate the status of periodontal tissues in the study population.¹⁹ The purpose of the CPITN is to estimate the prevalence of the disease, measure the level of patient need for periodontal treatment and recommend the appropriate type of treatment.²⁰

Research conducted by Dewi et al., shows the periodontal tissue health status of blind people in Jember Regency by 50% is a score of two; namely, there is subgingival calculus and supragingival calculus. Indications for periodontal tissue treatment that are needed are improving oral hygiene and accompanied by professional scaling. Zero scores or normal periodontal health status are very rare.¹⁸

The results of these studies indicate that blind people need special attention to their oral health because it also greatly affects the quality of life of the blind individuals themselves. Therefore, this study aims to assess caries status, periodontal condition, and the need for periodontal treatment in blind people.

Materials and Methods

This type of research is cross-sectional, with the number of research subjects as many as 60 people with visual impairments aged 13 to 65 years. This research has received ethical

approval from the ethics committee of the Faculty of Medicine, Universitas Sumatera Utara. Before the study was conducted, all subjects who were willing to participate in the study signed and gave a thumbprint on the informed consent. Demographic data were obtained by questionnaire. Blind people who smoked actively, pregnant women, users of fixed orthodontic appliances, users of dentures and taking blood thinners, and who taking periodontal treatment in the last six months were excluded from this study.

The status of the blind person was determined through interviews. All subjects who met the inclusion criteria were examined Caries status with Decay, Missing, Filled Tooth (DMFT) index, periodontal status, and the level of periodontal treatment needs with the CPITN index. Examination of caries status using the DMF-T index was carried out by looking at the number of carious teeth that could still be filled (decay), teeth lost due to caries (missing), and teeth filled with caries that appeared during fixed orthodontic treatment (filling). The average number of DMFTs was calculated by adding up the number of caries, missing and filling teeth, and then dividing by the total population. The caries status category is based on the average number of DMFT according to the World Health Organization (WHO), ranging from very low (0.0-1.1), low (1.2-2.6), moderate (2.7-4, 4), high (4.5-6.5), to very high (>6.6).²¹

Examination of the level of need for periodontal treatment (CPITN) was performed by measuring gingival bleeding, the presence of calculus, and pocket depth. Examination of the level of need for periodontal treatment (CPITN) was performed on teeth 17, 16, 11, 26, 27, 37, 36, 31, 46, and 47 for subjects aged over 20 years, while for subjects aged 19 years or younger, on teeth 16, 11, 26, 36, 31, and 46. Subjects under 15 years of age were only examined and recorded for calculus and gingival bleeding to avoid the presence of false pockets. The examination is carried out once by one examiner with the help of an assistant to record data.^{21,22} Before carrying out the examination, an inter-examiner calibration test was carried out. The results of data analysis were carried out through statistical tests carried out with the Spearman correlation test for bivariate analysis, with a significance level of 5%.

Result

The study was conducted on 60 blind people with an average age of 25.15 ± 13.23 , where the number of male subjects (58.3%) was more than the number of female subjects (41.7%). Based on the DMFT index, most subjects experienced caries with an average of 3.07 ± 2.80 , with the highest caries status at the moderate level (31.6%). Based on the CPITN index, the majority of the subjects' periodontal status level was at level two (71.7%) while the

least was at level 0 (1.7%), and the majority of the subjects were at level II care needs (98.3%) (Table 1).

Table 2 shows a significant relationship between age and periodontal status ($p=0.001$), but there was no difference between age and caries status ($p=0.805$) and the need for periodontal treatment ($p=0.205$). Table 3 shows a significant relationship between gender and DMFT ($p=0.034$), but there is no difference between sex with periodontal status ($p=0.955$) and the need for periodontal treatment ($p=0.250$).

Table 1. Subject Distribution

Variables (n=60)	Mean \pm SD	Frequency (n, %)
Age	25.15 \pm 13.23	
Gender		
Man		35 (58.3%)
Woman		25 (41.7%)
DMFT		
Decay	3.07 \pm 2.80	
Missing	1.15 \pm 1.76	
Filled	0.15 \pm 0.63	
DMFT	4.37 \pm 3.52	
Caries Status		
Very low		12 (20.1%)
Low		6 (10%)
Moderate		19 (31.6%)
High		13 (21.7%)
Very high		10 (16.7%)
Periodontal Status		
0 (Healthy)		1 (1.7%)
2 (Supragingival calculus)		43 (71.7%)
3 (Periodontal pockets of 4-5 mm)		16 (26.7%)
Periodontal Care Needs		
0 (No treatment needs)		1 (1.7%)
II (Oral hygiene improvement, scaling)		59 (98.3%)

Table 2. Relationship between Age and Caries Status, Periodontal Status, and Periodontal Care Needs

Variables (n=60)	Coefficient correlation	Age	p-value
Caries Status (DMFT)	-0.033		0.805
Periodontal Status	0.427		0.001*
Periodontal Care Needs	0.166		0.205

Speaman Correlation Test; *significant $p<0.05$

Table 3. Relationship between Sex and Caries Status, Periodontal Status, and Periodontal Care Needs

Variables (n=60)	Gender	
	Coefficient correlation	p-value
Caries Status (DMFT)	0.274	0.034*
Periodontal Status	-0.007	0.955
Periodontal Care Needs	-0.154	0.240

Spearmen Correlation Test; *significant $p < 0.05$

Discussion

The oral health condition of blind people is influenced by the lack of ability to see, understand, and master the practice of dental and oral hygiene. Dental plaque is the main cause of dental caries and periodontal disease. The buildup of plaque and debris causes gingivitis; if it occurs in the long term, plaque can cause the loss of periodontal attachment because plaque produces collagenase enzymes that can degrade collagen in the periodontal tissue; besides that, it can also cause demineralization and tooth decay by plaque microbes, resulting in caries.^{22,23}

The gender of the subjects of this study was mostly male (58.3%) because most of the subjects in this study came from schools. The culture and mindset of parents prioritize men for education and careers over women.^{24,25} This study is not in line with the results of research by Sabilillah et al., Zahara et al., Samnieng et al.^{10,26,27}

The Basic Health Research 2013 data shows that the highest disability in Indonesia is blindness, with the number of people with disabilities in women being higher than in men.²⁸ The number of women with visual impairments is higher than in men. This can be due to the longer average life expectancy of women and can be accompanied by macular degeneration, cataracts, and glaucoma. Women have low access to eye health services due to various socio-economic and cultural factors.^{24,29}

Based on research conducted by Shetty et al., 66% of blind people have difficulty brushing their teeth, so plaque cleaning is inadequate and has a poor level of oral hygiene.³⁰ The results of this study showed that 31.6% of visually impaired persons had moderate caries rates and 21.7% had high caries rates, with a mean DMFT index score of 4.37 ± 3.52 , and according to WHO, these results indicate a moderate category (Table 1). This may be due to the difficulty of the visually impaired to carry out plaque control properly and the limitations in carrying out the procedure. Octadewi et al., in their research, showed that the average DMFT score in blind students was 4.8 ± 2.74 (high category) and previous studies also showed that blind individuals had high caries scores and poor oral hygiene.³¹⁻³³ The occurrence of caries is influenced by four main factors, namely agent, host, substrate, and time. Supporting factors that can cause dental caries are rough tooth structure, crowded tooth arrangement, little saliva, and microorganisms.³⁴

The results of the periodontal status examination in blind people showed that 71.7% of blind people had periodontal status with a score of two, 26.7% had periodontal status with a score of three, and 1.7% had a healthy periodontium (score 0), and none had periodontal status with a score of 0. 4 (6 mm pathological pocket) (Table 1). The results of the periodontal status examination will determine the level of need for periodontal treatment in blind people. The results of this study showed that as many as 98.3% of blind people needed improved dental care at home/improved oral hygiene and scaling (TN II), only 1.7% did not require treatment (TN 0) and no blind people were included in the treatment categories of TN

I and TN III. The high percentage of TN II care needs is because blind individuals cannot perform oral hygiene measures (brushing teeth) properly.

The results of this study are not in line with the research of Samnieng et al., which shows that 34.37% of blind people suffer from periodontal disease, 13.7% require scaling treatment (TN II), and 36.2% require professional treatment (TN III). This condition occurs because of the low physical ability of blind people, so it has an impact on the difficulty of brushing teeth.²⁷ The ability to brush the teeth of subjects which are totally blind tend to overbrush (brushing their teeth with too strong a pressure), besides the high gingival bleeding in the total blind is the result of the buildup and retention of plaque on the tooth surface that has occurred in the long term, resulting in periodontal disease.³⁵

This study showed that there was a significant relationship between age and periodontal status ($p=0.001$). The older the age, the higher the periodontal status value or the more periodontal disorders (Table 2). The age of the subjects of this study was in the range of 13 to 67 years, where the increasing age, the higher the potential for the degeneration of the periodontal tissue, and age is one of the risk factors for the occurrence of periodontal disease.³⁶⁻³⁸ Various changes occur in the periodontal tissue due to the increased vulnerability to irritation from bacterial plaque. The accumulation of plaque in the elderly is getting faster because the older the age, the physiological changes of saliva occur, and the opening of the cementum, which has a rough surface, facilitates the formation of dental plaque.³⁹

In this study, there was no significant relationship between age and the level of need for periodontal care in blind people ($p=0.205$); generally, the subjects of this study required improvement in dental care at home/improved oral hygiene and initial treatments such as scaling (Table 2). Based on the research of Chellappa et al., there is a significant relationship between age and the need for periodontal treatment.⁴⁰ In this study, there was also no significant relationship between age and caries status ($p=0.805$). As a person's age increases, dental caries will increase because teeth that are longer in the mouth have more interactions with caries-causing factors.⁴¹

Table three shows that there is a relationship between caries status and gender ($p=0.034$). Suwelo's study showed that tooth eruption was faster in women than in men.⁴² This is different from the results of Kiswaluyo's study, which stated that the prevalence of caries in men was higher because men usually rarely paid attention to oral hygiene and were lazier at brushing their teeth compared to women.⁴³ The results of this study indicate that there is no relationship between gender and periodontal status and the level of need for periodontal treatment. This study is not in line with Setiawati's research which states that there is a relationship between the occurrence of periodontitis and gender. Men have a high risk of periodontal tissue damage because they have bad habits such as smoking and consuming alcohol compared to women.³⁹ Dental caries that continue to be left untreated and untreated periodontal conditions will cause further damage, and this will affect the health condition of the sufferer, especially the health condition of the oral cavity. Dental check-ups and care, as well as regular visits to the dentist, are very much needed for blind people to help overcome the damage and disorders that occur in their oral cavity. It is hoped that a healthy oral cavity will help improve the quality of life related to teeth and mouth in visually impaired people.

Conclusion

Age is one of the factors related to the condition of periodontal destruction, while gender is one of the factors related to caries status in blind people.

Bibliography

1. Ministry of Health RI. Report on the results of Basic Health Research. RISKESDAS INDONESIA. 2019;
2. Ackland P, Resnikoff S, Bourne R. World blindness and visual impairment: despite many successes, the problem is growing. *Community Eye Heal Int Cent Eye Heal*. 2017; 30(100): 71–3.
3. Lisinus R, Sembiring P. Development of children with special needs: a guidance and counseling perspective. Iqbal M, editor. Medan: Our Writing Foundation, 2020: 41–2.
4. PERTUNI. Who is Blind? [Internet]. Available from: <https://pertuni.or.id/>. Retrieved October 5, 2021.
5. Utomo, Muniroh N. Education of children with visual impairments. 1st ed. Mashud, editor. Banjarbaru : Study Program. PJ JPOK FKIP ULM Press, 2019: 183.
6. Janicijevic Petrovic M, Sarenac Vulovic T, Janicijevic K, Vujic D, Dejan D, Vulovic D. Congenital blindness and visual impairment cause infection or non-infection. *Mater Socio Medica*. 2013;25(2):101.
7. Husniyah N. The effects of visual impairment upon oral health care. *J Pharm Sci Res*. 2019;11(8):3067–71.
8. Putri MM, Ruslan FKDR, Wibowo TB. Oral health behavior and its association with the caries index in visually impaired children. *Spec Care Dent*. 2020;40(1):79–83.
9. Dioni A, Prasetyo FA, Budijanto D. Situation of persons with disabilities. Indonesian Ministry of Health. Jakarta, 2014.
10. Sabilillah MF, Taftazani RZ, Sopianah Y, Fatmasari D. Effect of dental braille education (DBE) on oral hygiene in blind children. *J Dental Health*. 2016;03(2):7–13.
11. Park S, Cho S, Han J. Effective professional intraoral tooth brushing instruction using the modified plaque score: a randomized clinical trial. *J Periodontal Implant Sci* 2018; 48(1): 22–33.
12. Utama I, Widyastuti I , Kartikasari C. Prevalence and distribution of dental plaque on dog teeth (*Canis familiaris*) in Denpasar – Bali. *Indonesia Medicus Veterinus*. 2017;6(5):378–85.
13. Angelino K, Shah P, Edlund DA, Mohit M, Yauney G. Clinical validation and assessment of a modular fluorescent imaging system and algorithm for rapid detection and quantification of dental plaque. *BMC Oral Health*. 2017;17(1):1–10.
14. Cunha L, Proença M, Rodrigues V, Pereira A, Benatti B. Relationship between periodontal status and degree of visual impairment in institutionalized individuals. *Eur J Dent*. 2015;9(3):324–8.
15. Liu L, Zhang Y, Wu W, He M, Lu Z, Zhang K, et al. Oral health status among visually impaired schoolchildren in Northeast China. *BMC Oral Health*. 2019;19(1):1–7.
16. Turkistani B, Elmarsafy SM. Caries experience among visually impaired and norm female students aged 6-18 years in Makkah, Saudi Arabia: A comparative study. *International Journal of Health Sciences and Research* 2019; 9(12): 286-92.
17. Reddy KVKK, Sharma A. Prevalence of oral health status in visually impaired people. *Journal of Indian Society of Pedodontics and Preventive Dentistry* 2011; 29(1): 25-7.
18. Dewi N, Budirahardjo R, Sulistiyani. Periodontal health status and treatment needs of visually impaired student attending extraordinary school in Jember Regency. *Heal the Notions*. 2020;4(11):358–63.

19. Ermawati T, Sari DS, Kundari MA Periodontal health status and level of care needs of patients who come to the periodontics clinic of RSGM Jember University in 2011. *JKG Unej*. 2012; 9(2): 86-9.
20. Gasner NS, Schure RS. Periodontal Disease. *Periodontal Dis.* 2021 May 10;15:1–180.
21. Hiremath S. Textbook of preventive and community dentistry. 2nd ed. New Delhi: Elsevier; 2011.
22. John J. Textbook of preventive and community dentistry. Chennai: CBS Publishers & Distributors Pvt.Ltd; 2017.
23. Alghamdi N, Alshehri M, Abdellatif H. Oral health findings, needs and demands of visually impaired children in Saudi Arabia. *J Dent Heal Oral Disord Ther.* 2018;9(3):222–7.
24. Prasad M, Malhotra S, Kalaivani M, Vashist P, Gupta SK. Gender differences in blindness, cataract blindness and cataract surgical coverage in India: A systematic review and meta-analysis. *Br J Ophthalmol.* 2020;104(2):220–4.
25. Laksono A, Nurchayati. Life history of blind women who are pursuing higher education. *J Psychology of Education.* 2018;5(2):1–8.
26. Zahara E, Andriani A. The relationship between the behavior of the visually impaired and the status of oral hygiene in the Pertuni community in Banda Aceh City. *J Bahana Kesehatan Masy (Bahana J Public Heal.* 2019;3(1):30–4.
27. Samnieng P, Seehaumpai P, Wichachai S, Yosookh P. Oral health status and treatment needs of visual impairment in Phitsanuloke, Thailand. *J Dent Indonesia.* 2014; 21(2): 63–7.
28. Ministry of Health of the Republic of Indonesia. Situation of persons with disabilities. *Health Information and Data Window Bulletin.* 2014;1–17.
29. Rius A, Benach J, Guisasola L, et al. Why are there gender inequalities in visual impairment?. *EUR J Public Health* 2019; 29(4): 661-6.
30. Shetty V, Hegde AM, Bhandary S, Rai K. Oral health status of the visually impaired children - a south Indian study. *J Clin Pediatr Dent* 2010; 34: 213–6.
31. Oktadewi F, Soeprihati I, Hanindriyo L. The correlation between dental caries and oral health-related quality of life among visually impaired children. *ODONTO Dent J.* 2020;7(2):82–9.
32. Prashanth S, Bhatnagar S, Das U, Gopu H. Oral health knowledge, practice, oral hygiene status, and dental caries prevalence among visually impaired children in Bangalore. *J Indian Soc Pedod Prev Dent.* 2011;29(2):102–5.
33. Parkar S, Patel N, Zinzuwadia H. Dental health status of visually impaired individuals attending special school for blind in Ahmedabad city, India. *Indian J Oral Sci.* 2014;5(2):73.
34. Wende M. Factors related to the incidence of dental caries in grade 1 elementary school children at SD Inpres Oebufu. *CHM-K Appl Sci J.* 2019;2(1):11–8.
35. Mohd-Dom TN, Omar R, Abdul Malik NA, Saiman K, Rahmat N. Self-reported oral hygiene practices and periodontal status of visually impaired adults. *Glob J Health Sciences.* 2010;2(2):184–91.
36. Lumentut RAN, Gunawan PN, Mintjelungan CN. Periodontal status and care needs in the elderly. *J e-GIGI.* 2013;1(2):79–83.
37. Tadjoedin FM, Fitri AH, Kuswandani SO, Sulijaya B, Soeroso Y. The correlation between age and periodontal diseases. *J Int Dent Med Res.* 2017;10(2):327–32.
38. Wulandari P, Widkaja D, Nasution AH, Syahputra A, Gabrina G. Association between age, gender and education level with the severity of periodontitis in pre-elderly and elderly patients. *Dent J (Dentistry Magazine).* 2022;55(1):16–20.
39. Setiawati T, Robbihi HI, Dewi TK. The relationship between age and sex with

periodontitis in the elderly at Pabuarantumpeng Public Health Center, Tangerang. *J Dent Hyg Ther.* 2022;3(1):43–8.

40. Chellappa LR, Leelavathi L, Jayashri P. Age and gender distribution of community periodontal index of treatment needs - a record-based study. *J Contemp Issues Bus Gov.* 2021;27(02).
41. Pitt Ford TR. *Dental restoration* . Jakarta: EGC; 1993.
42. Suwelo, Sukarsono I. *Dental caries in children with various etiologic factors*. Jakarta: EGC; 1992.
43. Kiswaluyo. Relationship of dental caries with age and sex of elementary school students in the working area of Kaliwates Public Health Center and Wuluhan Public Health Center, Jember Regency. *J Stomatognatic.* 2010;7(1):2630.

The Relationship between Age with Caries Status and Periodontal Treatment Needs on Visually Impaired People

ORIGINALITY REPORT

13%

SIMILARITY INDEX

10%

INTERNET SOURCES

10%

PUBLICATIONS

6%

STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Sumatera Utara Student Paper	2%
2	Submitted to School of Business and Management ITB Student Paper	1%
3	worldwidescience.org Internet Source	1%
4	www.grafiati.com Internet Source	1%
5	www.repositorio.unicamp.br Internet Source	1%
6	pinpdf.com Internet Source	1%
7	Borhan Moradveisi, Shirin Behzadi, Farima Zakaryaei, Ali Jalili, Khaled Rahmani, Avat Karimi. "Evaluation of Anti-SARS-CoV-2 IgG Antibody in Healthcare Professionals Infected with COVID-19", Jundishapur Journal of Microbiology, 2021	1%

8 Yeni Maryani, Rita Herlina, M. Ibraar Ayatullah. "Effectiveness of Dents-Voice to Increase Knowledge of Dental and Mouth Health and Decrease the Debris Index", **JURNAL INFO KESEHATAN**, 2019 1 %

Publication

9 Devi Nur, Tantut Susanto, Latifa Aini. "The relationship of family separation and nutrition status among under-five children: a cross-sectional study in Panti Public Health Center, Jember Regency of East Java, Indonesia", **Nursing Communications**, 2022 1 %

Publication

10 www.ijhsr.org 1 %

Internet Source

11 www.thieme-connect.com 1 %

Internet Source

12 journal2.um.ac.id 1 %

Internet Source

13 ijahst.org 1 %

Internet Source

14 jurnal.ugm.ac.id 1 %

Internet Source

15 www.foodandnutritionjournal.org 1 %

Internet Source

16

medcraveonline.com

Internet Source

1 %

17

Submitted to Universitas Jenderal Soedirman

Student Paper

<1 %

Exclude quotes On

Exclude matches < 15 words

Exclude bibliography On