Editorial

Dental Caries and Habit of Eating Sweet Foods, Drinking Sweet Drinks, and Brushing Teeth Correctly in the Community Aged 15-64 Years

The Implications of the Covid-19 Pandemic on the Utilization and Catastrophic Costs of National Health Insurance

The Effect of Transcendental Meditation on Immune System and Psychological Profile in Bali Mandara Students

Body Mass Index and Working Period Associated with Low Back Pain in Pedicab Drivers

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Editorial Note

The article "Dental Caries and Habit of Eating Sweet Foods, Drinking Sweet Drinks, and Brushing Teeth Properly in the Community Aged 15-64 Years in Indonesia" by Made Ayu Lely Suratri, et all explained about dental caries was caused by many factors, including consuming sweet foods and brushing teeth properly. This study aimed to analyze the relationship between the incidence of dental caries with the habit of eating sweet foods and sweet drinks and the habit of brushing teeth properlyin the community aged 15-64 years in Indonesia. The result of study showed that the respondent's characteristics, that is age, gender, education, and residence had a significant relationship with the incidence of dental caries, with p-value<0.05 (p=0.0001). The habit of eating sweet foods and drinking sweet drinks and brushing teeth had a significant relationship with the incidence of dental caries, with p-value<0.005 (p= 0.0001). The number of respondents with dental caries was caused by eating sweet foods 45.70%, drinking sweet drinks 45.70%, and brushing teeth properly 45.90%. Then, the multivariate test showed that almost all factors affect the incidence of dental caries, except for the occupational factor with p-value>0.05 (p=0.260). Therefore, the habit of eating sweet foods, drinking sweet drinks and brushing teeth properly is significant related to the incidence of dental caries in the community aged 15-64 years.

The Covid-19 has significantly impacted to the global economy, including Indonesia. After being declared pandemic, several sectors worldwide were affected by economic problems such as the transportation, tourism, trade, and health sectors. Social distancing policies have implemented in various countries, also hampered the improvement of the health economy in Indonesia. Indonesia, the optimization of the health system has become less than optimal after the Covid-19 pandemic. The Effect of Covid-19 Pandemic on Utilization and Catastrophic Costs of National Health Insurance by Wahyu Pudji Nugraheni, et all explained the COVID-19 pandemic has significantly impacted the health care system and insurance schemes in Indonesia. Social distancing policies during the pandemic have led to changes to the utilization of health facilities, especially those related to catastrophic diseases that cost a lot of money. In 2020 the pandemic has impacted decreasing the utilization of National Health Insurance participants to health facilities and significantly affected the financing of catastrophic diseases. There was also a change in the ranking diseases pattern before and during pandemic. But, before the outbreaks, the disease with the highest claim fee was ischemic heart disease and after the pandemic the highest claim fee was chronic kidney disease. Thus, the referral program strengthens efforts to control JKN financing costs with conditions that increased during the Covid-19 pandemic. In the future, National Health Insurance financing needs to expand the scope of the advantage of control and promotion services.

Meditation can increase immune cells that play role in self-protection. The study "Effect of Transcendental Meditation on the Immune Response of Bali Mandara High School Students" by Kartika Sari, et all provided information that transcendental meditation has health benefits, especially for boosting the immune system. Meditation has become an increasingly popular form of alternative medicine. Many studies have been conducted to assess the health benefits of meditation. In particular, Transcendental Meditation (TM) was effective for treating psychological disorders, hypertension, cardiovascular disease, and high cholesterol. It was assumed that TM can enhance the individual immune system. The results showed that high rates immune cell among the control group compared to the TM 1 and TM 2 groups. The number of immune response cells showed that the TM 2 group differed significantly from the control group and the TM 1 group for eosinophils, neutrophil, and monocyte (P<0.05). And for leukocytes, neutrophils, and lymphocytes showed a decrease not significantly different in the TM 2 group (P>0.05). The correlation value showed strong correlation between immune response cells (leukocytes, lymphocytes, eosinophils, monocyte, and hematocrit) with an increase in meditation duration.

Low back pain (LBP) commonly referred to radiating low back pain or sciatica is the discomfort between the ribcage and the gluteal folds. A risk factor for LBP is being overweight because weak abdominal muscles lead the center of gravity to shift forward, increasing lumbar lordosis and promoting exhaustion in the paravertebral muscles. A working period is an accumulation of one work activities over a long period. In case the activity was carried out continuously over the years, it can be cause health problems. The "Body Mass Index and Working Period Associated with Low Back Pain for Pedicab Drivers" by Amardeep Kaur Kaur Singh, et all provided that fifty-seven pedicab drivers met the requirements for participation. Bivariate analysis using the Chi-Square Test yielded a p-value of 0.038 indicated a significant association between BMI and low back pain, and a p-value of 0.025 indicated a significant association between length of employment and lower back pain. Thus, BMI and working period had a significant relationship with lower back pain.

The study "Intake of macromolecular nutrition status in pulmonary tuberculosis subjects at the Seputih Raman Health Center, Central Lampung" by I Putu Priamaji Girinaja, et all explained that based on nutrition survey data, it was found that 60% of patients were underweight, with the highest carbohydrate intake deficit (80%) compared to protein (46.67%) and fat (53.33%) intakes. The condition of pulmonary tuberculosis patients was affected by low nutritional status and this slowed recovery time. The problem of this research is the need to describe the calorie intake of pulmonary tuberculosis patients after receiving education on nutritional patterns high in protein and fat in pulmonary tuberculosis patients at the start of their treatment. In the initial conditions, TB patients generally experience protein and energy deficits then during the course of treatment for approximately six months, it is necessary to evaluate the nutritional intake profile of TB patients. Therefore the expected goal of this research is to obtain profile data on the intake of energy, protein, fat, and carbohydrates as well as micronutrient. This showed through study result, the need to emphasize the balance of nutritional intake in the nutrition education of Pulmonary Tuberculosis subjects not only protein and fat intake. Thus, tuberculosis patients also need to pay attention to a balanced intake of carbohydrates.

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WU 270

Made Ayu Lely Suratri, Rudi Hendro Putranto, Noerendah Pracoyo, Lelly Andayasari, Vebby Amelia Edwin, and Tati Suryati

Dental Caries and Habit of Eating Sweet Foods, Drinking Sweet Drinks, and Brushing Teeth Properly in the Community Aged 15-64 Years in Indonesia

Latar belakang: Karies gigi atau dental caries adalah salah satu masalah kesehatan gigi dan mulut yang banyak dikeluhkan masyarakat Indonesia. Karies gigi banyak disebabkan oleh kebiasaan yang tidak baik, diantaranya mengkonsumsi makanan yang manis manis dan menggosok gigi yang tidak teratur. Tujuan dari analisis ini untuk mengetahui hubungan kejadian karies gigi dengan kebiasaan makan makanan dan minuman yang manis dan kebiasaan menggosok gigi pada masyarakat umur 15-64 tahun di Indonesia.

Metode: Penelitian merupakan analisis lanjut data Riskesdas 2018 dengan disain potong lintang (cross-sectional) dan non intervensi. Sampel penelitian adalah seluruh anggota rumah tangga (ART) dalam rumah tangga terpilih. Sampel yang dianalisis adalah anggota rumah tangga berumur 15-64 tahun. Pelaksanaan pengumpulan data dilakukan melalui wawancara dengan menggunakan kuesioner. Analisis lanjut data ini dilakukan secara univariat, bivariat dan multivariat.

Hasil: Hasil penelitian menunjukkan bahwa karakteristik responden yaitu umur, jenis kelamin, pendidikan, dan tempat tinggal terdapat hubungan yang signifikan dengan kejadian karies gigi, dengan p value <0,05 (p=0,0001). Kebiasaan makan makanan dan minuman yang manis dan kebiasaan menggosok gigi terdapat hubungan yang signifikan dengan kejadian karies gigi, dengan p value < 0,005 (p=0,0001). Hasil uji multivariat, hampir semua faktor berpengaruh terhadap kejadian karies gigi, kecuali faktor pekerjaan dengan p-value > 0,05 (p=0,260).

Kesimpulan: Kebiasaan makan makanan manis, minum minuman manis dan kebiasaan menggosok gigi dengan benar berhubungan secara signifikan dengan kejadian karies gigi pada masyarakat umur 15-64 tahun.

Kata kunci: Karies gigi, makan makanan manis, minum minuman manis, menggosok gigi yang baik, Riskesdas, Indonesia.

W 100

Wahyu Pudji Nugraheni, Syarifah Nuraini, Risky Kusuma Hartono

The Effect of the Covid-19 Pandemic on the Utilization and Catastrophic Costs of National Health Insurance

Latar belakang: Pandemi COVID-19 di Indonesia berdampak signifikan terhadap sistem pelayanan kesehatan dan skema asuransi. Kebijakan social distancing selama pandemi telah menyebabkan perubahan penggunaan fasilitas kesehatan, terutama yang terkait dengan penyakit katastropik yang memakan biaya besar. Penelitian ini bertujuan untuk menganalisis dampak pandemi Covid-19 terhadap pemanfaatan dan pembiayaan penyakit katastropik dalam program Jaminan Kesehatan Nasional.

Metode: Desain penelitian ini adalah kuantitatif dan kualitatif. Studi kuantitatif menganalisis data sekunder yang diperoleh dari Badan Penyelenggara Jaminan Sosial Kesehatan dan Dewan Jaminan Sosial Nasional. Penelitian ini juga memiliki data kualitatif dari wawancara mendalam dengan informan rumah sakit pemerintah dan swasta, ekonom kesehatan, dan pakar asuransi kesehatan sosial.

Hasil: Pandemi COVID-19 tahun 2020 berdampak pada penurunan utilisasi peserta Jaminan Kesehatan Nasional ke fasilitas kesehatan dan berpengaruh signifikan terhadap pembiayaan penyakit katastropik. Sebelum pandemi, penyakit dengan biaya klaim tertinggi adalah penyakit jantung iskemik, dan setelah pandemi, penyakit dengan biaya klaim tertinggi adalah penyakit ginjal kronis. Perubahan pola peringkat penyakit juga terjadi sebelum dan selama pandemi Covid-19.

Kesimpulan: Pandemi Covid-19 berdampak pada pemanfaatan dan pembiayaan program Jaminan Kesehatan Nasional. Program rujukan memperkuat upaya pengendalian biaya pembiayaan Jaminan Kesehatan Nasional dengan kondisi yang semakin meningkat di masa pandemi Covid-19. Pembiayaan Jaminan Kesehatan Nasional ke depan perlu memperluas cakupan manfaat pelayanan preventif dan promotive.

Kata kunci: Pandemi Covid-19, Jaminan Kesehatan Nasional, Utilisasi, Biaya

WB 545

Kartika Sari, Novitasari, Irawan Sukma, Putu Asih Primatanti, Saktivi Harkitasari, I Gusti Ngurah Dwija Putra

The Effect of Transcendental Meditation on the Immune Response of Bali Mandara High School Students

Latar belakang: Meditasi telah menjadi bentuk pengobatan alternatif yang semakin populer. Banyak penelitian telah dilakukan untuk menilai manfaat meditasi pada kesehatan. Secara khusus, Meditasi Transendental (TM) telah terbukti efektif dalam mengobati gangguan psikologis, hipertensi, penyakit kardiovaskular, dan kolesterol tinggi. Hal ini diasumsikan bahwa TM dapat meningkatkan sistem imun individu. Penelitian ini bertujuan untuk mengetahui jumlah sel respon imun pada siswa SMA yang melakukan meditasi transedental pada periode waktu tertentu.

Metode: Penelitian ini memiliki total sampel 150 siswa. Kelompok studi terdiri dari 3 kelompok, yaitu kelompok kontrol, kelompok TM 1 (berlatih TM selama 1 tahun), dan kelompok TM 2 (berlatih TM selama 2 tahun). Tiap grup terdiri dari 50 siswa. Kelompok kontrol terdiri dari 50 siswa yang tidak menggunakan teknik relaksasi apa pun. Total eosinofil, neutrofil, limfosit, monosit dan hematokrit dihitung dengan hematologi kuantitatif otomatis.

Hasil: Hasil menunjukkan terdapat perbedaan bermakna di antara kelompok kontrol dibandingkan dengan kelompok TM 1 dan kelompok TM 2. Jumlah sel respon imun menunjukkan bahwa kelompok TM 2 berbeda secara signifikan dibandingkan kelompok kontrol dan kelompok TM 1 pada eosinofil, netrofil dan monosit (P <0,05). Hal berbeda ditunjukkan oleh leukosit, neutrofil, dan limfosit yang menurun walaupun tidak berbeda bermakna pada kelompok TM 2 (P> 0,05). Nilai korelasi menunjukkan adanya korelasi kuat antara sel-sel respon imun (leukosit, limfosit, eosinofil, monosit, leukosit, dan hematokrit) dengan peningkatan durasi meditasi (p>0.4).

Kesimpulan: Meditasi dapat meningkatkan sel imun yang berperan dalam perlindungan diri. Studi ini memberikan informasi bahwa meditasi transendental mempunyai manfaat bagi kesehatan khususnya meningkatkan sistem kekebalan tubuh.

Kata kunci: Meditasi Transdesental (TM), respon imun

WE 755

Amardeep Kaur Kaur Singh, Indri Seta Septadina, Eka Febri Zulissetiana

Body Mass Index and Working Period Associated with Low Back Pain in Pedicab Drivers

Pendahuluan: Nyeri Punggung Bawah (NPB) adalah nyeri di daerah punggung di antara tulang rusuk dan lipatan gluteal, termasuk juga nyeri ekstremitas yang menjalar karena gangguan punggung. Berat badan yang berlebih menyebabkan tonus otot abdomen lemah, sehingga pusat gravitasi seseorang akan terdorong ke depan dan menyebabkan lordosis lumbalis akan bertambah yang kemudian menimbulkan kelelahan pada otot paravertebra, hal ini merupakan risiko terjadinya LBP. Lama kerja merupakan akumulasi aktivitas kerja seseorang yang dilakukan dalam jangka waktu panjang yang apabila

aktivitas tersebut dilakukan terus-menerus dalam jangka waktu bertahun-tahun dapat mengakibatkan gangguan kesehatan.

Metode: Penelitian ini adalah penelitian analitik observasional dengan menggunakan rancangan potong lintang (cross-sectional study). Populasi penelitian pengayuh becak di Kec.Kemuning, Kota Palembang. Data klasifikasi meliputi usia, jenis kelamin, indeks massa tubuh. Ditemukan 57 pengayuh becak yang memenuhi kriteria inklusi.

Hasil: Hasil analisis bivariat yang diperolehi dengan Uji Chi Square diperoleh nilai p sebesar 0.038, artinya terdapat hubungan yang signifikan antara IMT dengan nyeri punggung bawah dan nilai p sebesar 0.025 artinya terdapat hubungan yang signifikan antara lama kerja dengan nyeri punggung *bawah*.

Kesimpulan: IMT dan lama kerja mempunyai hubungan yang signifikan dengan nyeri punggung bawah.

Kata kunci: nyeri punggung bawah, usia, IMT

QU 145

I Putu Priamaji Girinaja, Rahayu Yekti, Pratiwi Dyah Kusumo

Intake of Macromolecular Nutrition Status in Pulmonary Tuberculosis Subjects at the Seputih Raman Health Center, Central Lampung

Pendahuluan : Kondisi pasien tuberkulosis paru dipengaruhi status gizi yang rendah dan hal ini akan memperlambat waktu pemulihan. Permasalahan penelitian ini perlunya gambaran asupan kalori penderita tuberkulosis paru setelah mendapat edukasi pola gizi tinggi protein dan lemak pada pasien tuberkolusis paru pada awal pengobatan mereka. Dalam kondisi awal, pada umumnya pasien Tuberkulosis mengalami defisit protein dan energi kemudian dalam perjalanan pengobatan selama kurang lebih enam bulan, perlu dilakukan evaluasi melihat profil asupan nutrisi pasien Tuberkulosis. Oleh karenanya tujuan yang diharapkan dalam penelitian ini adalah didapatkan profil data asupan energi, protein, lemak dan karbohidrat juga mikronutrien.

Metode: Penelitian pendekatan deskriptif wawancara dengan alat ukur kuesioner *food recall* 24 jam dan analisa www.nutrisurvey.com di daerah kerja puskesmas Seputih Raman, Lampung Tengah Tahun 2021.

Hasil: Berdasarkan data analisa nutrisurvey, didapatkan 60% pasien status gizi kurus, dengan angka defisit asupan karbohidrat paling tinggi (80%) dibandingkan asupan protein (46,67%) dan lemak (53,33%).

Kesimpulan: Melalui hasil penelitian kami, hal ini menunjukkan perlunya menekankan keseimbangan asupan gizi pada edukasi gizi pasien Tuberkulosis Paru bukan hanya pada asupan protein dan lemak, dengan demikian pasien Tuberkulosis juga perlu memperhatikan asupan karbohidrat yang seimbang.

Kata kunci: Tuberkulosis paru, asupan nutrisi, Seputih Raman.

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WU 270

Made Ayu Lely Suratri, Rudi Hendro Putranto, Noerendah Pracoyo, Lelly Andayasari, Vebby Amelia Edwin, and Tati Suryati

Dental Caries and Habit of Eating Sweet Foods, Drinking Sweet Drinks, and Brushing Teeth Properly in the Community Aged 15-64 Years in Indonesia

Health Science Journal of Indonesia 2022; 13;1-8

Background: Dental caries is one of the most common dental and oral health problems in Indonesians. Dental caries were caused by many factors, including consuming sweet foods and brushing teeth properly. This study aimed to analyze the relationship between the incidence of dental caries with the habit of eating sweet foods and sweet drinks and the habit of brushing teeth properly in the community aged 15-64 years in Indonesia.

Methods: The research method is a further analysis of the data from the National Basic Health Research (Riskesdas 2018) with a cross-sectional and non-interventional design. The study population included Indonesians from 34 provinces, 514 districts/cities. The research sample was all household members in the selected households. The samples analyzed were household members aged 15-64 years. Implementation of data collection was done through interviews using a questionnaire.

Results: The results showed that the respondent's characteristics, that is age, gender, education, and residence had a significant relationship with the incidence of dental caries, with p-value <0.05 (p=0.0001). The habit of eating sweet foods and drinking sweet drinks and brushing teeth properly had a significant relationship with the incidence of dental caries, with p-value < 0.005 (p= 0.0001).The number of respondents with dental caries caused by eating sweet foods 45.70%, drinking sweet drinks 45.70%, and brushing teeth properly 45.90%. The results of the multivariate test, almost all factors affect the incidence of dental caries, except for the occupational factor with p-value > 0.05 (p=0.260).

Conclusion: The habit of eating sweet foods, drinking sweet drinks and brushing teeth properly is significantly related to the incidence of dental caries in the community aged 15-64 years.

Keywords: Dental caries, eating sweet foods, drinking sweet drinks, brushing teeth properly, basic health research, Indonesia

W 100

Wahyu Pudji Nugraheni, Syarifah Nuraini, Risky Kusuma Hartono

The Effect of the Covid-19 Pandemic on the Utilization and Catastrophic Costs of National Health Insurance

Health Science Journal of Indonesia 2022; 13; 9-16

Background: The COVID-19 pandemic in Indonesia has significantly impacted the health care system and insurance schemes. Social distancing policies during the pandemic have led to changes in the utilization of health facilities, especially those related to catastrophic diseases that cost a lot of money. This study aims to analyze the impact of the Covid-19 pandemic on the utilization and financing of catastrophic diseases in the National Health Insurance (NHI) program.

Methods: The research design is quantitative and qualitative. The quantitative study analyzed secondary data obtained from the Social Security Administrator for Health and the nat. This study also has qualitative data from in-depth interviews with government and private hospital informants, health economists, and social health insurance experts.

Results: 2020 COVID-19 pandemic has impacted

decreasing the utilization of National Health Insurance participants to health facilities and significantly affected the financing of catastrophic diseases. There was also a change in the ranking diseases pattern before and during the covid-19 pandemic. Before pandemic, the disease with the highest claim fee was ischemic heart disease, and after the pandemic, the disease with the highest claim fee was chronic kidney disease.

Conclusion: Covid-19 pandemic has impacted the catastrophic utilization and financing of the National Health Insurance program. The referral program has strengthened National Health Insurance financing cost containment efforts with conditions increasing during the Covid-19 pandemic. In the future, National Health Insurance financing needs to expand the scope of the benefits of preventive and promotive services.
Keywords: Covid-19 Pandemic, National Health Insurance, Utilization, Cost

WB 545

Kartika Sari, Novitasari, Irawan Sukma, Putu Asih Primatanti, Saktivi Harkitasari, I Gusti Ngurah Dwija Putra

The Effect of Transcendental Meditation on the Immune Response of Bali Mandara High School Students

Background: Meditation has become an increasingly popular form of alternative medicine. Many studies have been conducted to assess the health benefits of meditation. In particular, Transcendental Meditation (TM) is effective in treating psychological disorders, hypertension, cardiovascular disease, and high cholesterol. It is assumed that TM can enhance the individual immune system. This study aims to determine the number of immune response cells in high school students who do transcendental meditation for a certain period of time.

Methods: This study has a total sample of 150 students. The study group consisted of 3 groups, namely the control group, TM group 1 (students who regularly practiced TM for 1 year), TM group 2 (students who regularly practiced TM for 2 years). Each group consists of 50 students. The control group consisted of 50 students who did not use any relaxation techniques. Total eosinophils, neutrophils, lymphocytes, monocyte, and hematocrit are counted by an automated quantitative hematology analyzer.

Results: The results showed high rates immune cell among the control group compared to the TM 1 and TM 2 groups. The number of immune response cells showed that the TM 2 group differed significantly from the control group and the TM 1 group in eosinophils, neutrophil, and monocyte ($P < 0.05$). Even though, leukocytes, neutrophils, and lymphocytes showed an decrease although not significantly different in the TM 2 group ($P > 0.05$). The correlation value shows a strong correlation between immune response cells (leukocytes, lymphocytes, eosinophils, monocyte, and hematocrit) with an increase in meditation duration.

Conclusion: Meditation can increase immune cells that play a role in self-protection. This study provides information that transcendental meditation has health benefits, especially in boosting the immune system.

Keywords: Transcendental Meditation (TM), immune respond

WE 755

Amardeep Kaur Kaur Singh, Indri Seta Septadina, Eka Febri Zulissetiana

Body Mass Index and Working Period Associated with Low Back Pain in Pedicab Drivers

Background: Low back pain (LBP), commonly referred to radiating low back pain or sciatica, is the discomfort between the ribcage and the gluteal folds. A risk factor for LBP is being overweight because weak abdominal muscles lead the center of gravity to shift forward, increasing lumbar lordosis and promoting exhaustion in the paravertebral muscles. A working period is an accumulation of one's work activities over a long period. If the activity is carried out continuously over the years can cause health problems.

Methods: This study was an observational analytic study using a cross-sectional study—a research population of pedicab drivers in Kemuning District, Palembang City. Classification data include age, gender, and body mass index

Results: Fifty-seven pedicab drivers met the

requirements for participation. Bivariate analysis using the Chi-Square Test yielded a p-value of 0.038, indicating a significant association between BMI and low back pain, and a p-value of 0.025, indicating a significant association between length of employment and lower back pain.

Conclusion: BMI and working period had a significant relationship with lower back pain.

Keywords: low back pain, working period, body mass index

QU 145

I Putu Priamaji Girinaja, Rahayu Yekti, Pratiwi Dyah Kusumo

Intake of Macromolecular Nutrition Status in Pulmonary Tuberculosis Subjects at the Seputih Raman Health Center, Central Lampung

Background: The condition of pulmonary tuberculosis patients is affected by low nutritional status and this will slow recovery time. The problem of this research is the need to describe the calorie intake of pulmonary tuberculosis patients after receiving education on nutritional patterns high in protein and fat in pulmonary tuberculosis patients at the start of their treatment. In the initial conditions, TB patients generally experience protein and energy deficits, then during the course of treatment for approximately six months, it is necessary to evaluate the nutritional intake profile of TB patients. Therefore the expected goal of this research is to obtain profile data on the intake of energy, protein, fat, and carbohydrates as well as micronutrients.

Methods: Research using a descriptive interview approach using a 24-hour food recall questionnaire and www.nutrisurvey.com analysis in the work area of the Seputih Raman Public Health Center, Central Lampung in 2021.

Results: Based on nutrisurvey data, subjects were found to be underweight (60%), with the highest carbohydrate intake deficit (80%) compared to intake of protein (46.67%) and fat (53.33%).

Conclusion: This shows through our result, the need to emphasize the balance of nutritional intake in the nutrition education of Pulmonary Tuberculosis subjects not only protein and fat intake. Thus tuberculosis patients also need to pay attention to a balanced intake of carbohydrates

Keywords: Pulmonary tuberculosis, nutrition intake. Seputih Raman

Dental Caries and Habit of Eating Sweet Foods, Drinking Sweet Drinks, and Brushing Teeth Properly in the Community Aged 15-64 Years in Indonesia

Made Ayu Lely Suratri[1], Rudi Hendro Putranto[1], Noerendah Pracoyo[1], Lelly Andayasari[1], Vebby Amelia Edwin[2], and Tati Suryati[1]

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Abstract

Background: Dental caries is one of the most common dental and oral health problems in Indonesians. Dental caries were caused by many factors, including consuming sweet foods and brushing teeth properly. This study aimed to analyze the relationship between the incidence of dental caries with the habit of eating sweet foods and sweet drinks and the habit of brushing teeth properly in the community aged 15-64 years in Indonesia.

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Conclusion: The habit of eating sweet foods, drinking sweet drinks and brushing teeth properly is significantly related to the incidence of dental caries in the community aged 15-64 years.

Keywords: Dental caries, eating sweet foods, drinking sweet drinks, brushing teeth properly, basic health research, Indonesia

Abstrak

Latar belakang: Karies gigi atau dental caries adalah salah satu masalah kesehatan gigi dan mulut yang banyak dikeluhkan masyarakat Indonesia.Karies gigi banyak disebabkan oleh kebiasaan yang tidak baik, diantaranya mengkonsumsi makanan yang manis manis dan menggosok gigi yang tidak teratur. Tujuan dari analisis ini untuk mengetahui hubungan kejadian karies gigi dengan kebiasaan makan makanan dan minuman yang manis dan kebiasaan menggosok gigi pada masyarakat umur 15-64 tahun di Indonesia.

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Hasil: Hasil penelitian menunjukkan bahwa karakteristik responden yaitu umur, jenis kelamin, pendidikan, dan tempat tinggal terdapat hubungan yang signifikan dengan kejadian karies gigi, dengan p value <0,05 (p=0,0001). Kebiasaan makan makanan dan minuman yang manis dan kebiasaan menggosok gigi

terdapat hubungan yang signifikan dengan kejadian karies gigi, dengan p value < 0,005 (p=0,0001). Hasil uji multivariat, hampir semua faktor berpengaruh terhadap kejadian karies gigi, kecuali faktor pekerjaan dengan p-value > 0,05 (p=0,260).

Kesimpulan:*kebiasaan makan makanan manis, minum minuman manis dan kebiasaan menggosok gigi dengan benar berhubungan secara signifikan dengan kejadian karies gigi pada masyarakat umur 15-64 tahun.*

Kata kunci: *Karies gigi, makan makanan manis, minum minuman manis, menggosok gigi yang baik, Riskesdas, Indonesia*

INTRODUCTION

Dental caries is one of the dental and oral health problems that many Indonesian people complain about.[1]Dental caries is a disease of dental tissue characterized by tissue damage, starting from the tooth surface and extending towards the pulp. Dental caries is also said to be a chronic process caused by disruption of the balance between the teeth and the environment in the oral cavity. Dental caries disease occurs due to demineralization of tooth surface tissue by organic acids derived from foods containing sugar. Many dental caries were caused by bad habits, including consuming sweet foods. This disease can attack all levels of society in all age groups regardless of gender and social status.[2]According to Tarigan (2013)[3], dental caries can be experienced by everyone and can occur on one or more tooth surfaces, and can extend to the affected part. deeper than the tooth, for example from the enamel to the dentin or to the pulp. The causative factor of dental caries consist of direct factors in the mouth that are associated with dental caries (host, microorganism, substrate and time) and indirect factors called external risk factors which are predisposing factors and inhibiting factors for dental caries (age, gender, education, environment, economic status, attitudes and behavior on dental health).

Reported by Widayati N (2014), there is a strong relationship or correlation between the habit of buying sweet foods, sticky foods and drinking milk with the incidence of dental caries in children aged 4-6 years.[4] In line with the results of research conducted by Sumini, et. al (2014), which explains that the occurrence of dental caries will be influenced by the habit of consuming cariogenic foods.[5] The results of Ernawati, et al., 2011, stated that there is a relationship between dental caries and tooth brushing behavior.[6]

Based on data from Basic Health Research (Riskesdas) 2018, 45.3% of the Indonesian population who have dental problems.The prevalence of dental caries (age ≥3 years old) in Indonesiais 88.8%, this means that out of ten people in Indonesia as many as 9 people suffer from dental caries. People who live in rural areas have a higher prevalence of dental caries than in urban areas.[7]

Reported by Talibo, et. al (2016) that there is a relationship between consuming cariogenic foods, and brushing teeth with the incidence of dental caries. [8] In accordance with the results of research Wandini R, et.al. (2019), there is a relationship between consuming cariogenic foods, and brushing teeth with the incidence of dental caries in kindergarten children. [9] The results of research from Rehena Z (2020) which support previous research, it is known that the type and frequency of consuming cariogenic foods is associated with the incidence of dental caries in students of SD Negeri 5 Waai, Central Maluku District.[10]Based on the results of these studies, further analysis was carried out to determine the relationship between the incidence of dental caries andthe habit of eating sweet foods, drinking sweet drinks, and brushing teeth properly.

Dental and oral health status is very close relation to the behavior or habits ofcommunity in the maintenance of dental and oral health. The behavior or habits in maintaining dental and oral health by reducingeating sweet foods, drinking sweet drinks, and brushing teeth properly.On the Basic Health Research 2018, available data are dental caries and other habit variables such as data on eating sweet foods, drinking sweet drinks, and brushing teeth properly.Data on characteristics such as age, gender, education, occupation, and residence. The purpose of this analysis is to determine the relationship between dental caries with the habit of eating sweet foods, drinking sweet drinks and the habit of brushing

teeth properly in the community aged 15-64 years in Indonesia.Furthermore, it is hoped that the prevention of dental caries in the community can be done by reducing the habit of eating sweet foods, drinking sweet drinks and always brushing teeth properly.

METHODS

This research is a further analysis of the Riskesdas data 2018. The design of research is a cross sectional study. Data collection was carried out by the National Institute of Health Research and Development, Ministry of Health of the Republic of Indonesia in 2018. The research population was the entire population of Indonesia, covering 34 provinces, 514 districts/cities. The research sample was all household members in the selected households. As the research sample for dental health, all respondents aged 15-64 years who were sampled for Riskesdas 2018.[7] The implementation of data collection on the incidence of dental caries and habits or behavior of eating sweet foods and drinking sweet drinks and brushing teeth properly was carried out through interviews using questionnaires. Variables in research were the dependent variable, and independent variable. The dependent variable was incidence of dental caries, while the independent variable consists of characteristics age, gender, education, occupation, eating sweet foods, drinking sweet drinks and brushing teeth properly. Eating sweet foods, and drinking sweet drinks can be at risk of causing dental caries. The meaning of brushing teeth properly is brushing teeth in the morning after eating and at night before going to the bed. For the grouping of education was divided into lower education (junior high school and below) and higher education (high school up). Data collection was obtained well trained enumerators.

This data analysis was carried out using univariate, bivariate and multivariate methods. Univariate analysis includes the frequency distribution of the independent and dependent variables. Bivariate analysis is to see the relationship between the independent variable and the dependent variable, this test is to analyze the relationship between categorical variables and categorical variables. This analysis aims to examine differences in the proportions of two or more sample groups. Meanwhile, to see the effect of the independent variables together on the incidence of dental caries, multivariate analysis was performed using a complex sample approach. Multivariate logistic regression analysis aims to see or study the relationship of several independent

variables with one dependent variable at the same time. From this multivariate analysis, it can be seen which independent variable has the greatest influence on the dependent variable.[11]

Conseptual Framework
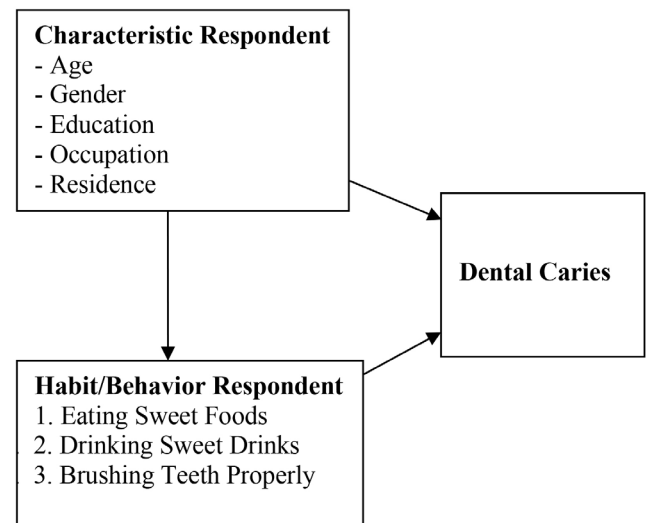
Figure 1. Conseptual Framework to Know the Relationship between Dental Caries with Habit or Behavior

Figure 1. shows the conceptual framework used in analyzing the data, to determine the relationship between dental caries and the habit of eating sweet foods and drinking sweet drinks and brushing teethproperly. The predisposing factors are the respondent's characteristics (age, gender, education, occupation, residence) and the respondent's habits or behavior (eating sweet foods, drinking sweet drinks, and brushing teeth properly).

Ethical Clearance

This research has received ethical approval from the Health Research Ethics Committee National Institute of Health Research and Development, Ministry of Health, Republic of Indonesia (No. LB.02.01/2/ KE.024/2018 on January 24, 2018).

RESULTS

The number of respondents aged 15-64 years as many as 653,113 people, with the number of men as many as 312,684 people (47.90%) and women as many as 340,429 people (52.10%). Respondents with dental caries were 306,759 people (45.60%), and those without dental caries were 346,354 people (54.40%).

Table 1. Frequency Distribution of Respondents by Characteristics

Characteristics	Total Respondent (n)	Percentase (%)
Age Groups (year)		
15 – 24	144,375	22.10
25 – 44	290,197	44.40
45 – 64	218,541	33.50
Gender		
Male	312,684	47.87
Female	340,429	52.13
Education		
Lower	409,326	62.67
Higher	243,787	37.33
Occupation		
Not Work	173,217	26.52
Work	479,896	73.48
Residence		
Urban	285,061	43.65
Rural	368,052	56.35
Eating Sweet Foods		
Yes	561,305	86.40
No	91,808	13.60
Drinking Sweet Drinks		
Yes	588,707	90.70
No	64,46	9.30
Brush Teeth Properly		
Yes	212,349	66.60
No	440,764	33.40
Total	**653,113**	**100.0**

In table 1. It can be seen that the highest number of respondents is in the age group of 25-44 years (44.40%), where there are more female respondents than male (52.13%). Respondents with lower education are more than those with higher education (62.67%), respondents who work are more than those who do not work (73.48%), and respondents who live in rural areas are more than in urban areas (56.35%).

In table 2 shows that there is a significant relationship between the characteristics of the respondents (age, gender, education, occupation, and residence) with the incidence of dental caries, with a p-value <0.05, this means that the characteristics of the respondents are age, gender, education, occupation, and residence related to the occurrence of dental caries.

There is a significant relationship between the respondents habits or behavior (eating sweet foods, drinking sweet drinks and brushing teeth properly with the occurrence of dental caries, with a p value <0.05.This means that the occurrence of dental caries is related to the habit or behavior of eating sweet foods, drinking sweet drinks and brushing teeth properly with p-value = 0.0001. On the tooth brushing proferly variable with OR below 1, thats means tooth brushing proferly was protective factor. (Table 3).

Table 2. Relationship between Dental Caries and Characteristic of Respondent

Characteristic Respondent	Dental Caries				p-value	Odds Ratio (95% CI)
	Yes		**No**			
	n	**%**	**n**	**%**		
Age Groups (year)						
15 – 24	57,222	39.60	87,153	60.40		
25 – 44	138,918	47.90	151,279	52.10	0.0001	1.426
45 – 64	110,619	50.60	107,922	49.40		1.613
Gender						
Male	145,320	46.50	167,364	53.50	0.0001	1.055
Female	161,439	47.40	178,990	52.60		
Education						
Lower	200,916	49.10	208,410	50.90	0.0001	1.248
Higher	105,843	43.40	137,944	56.60		
Occupation						
Not Work	80,936	46.70	92,281	53.30	0.0180	1.005
Work	225,823	47.10	254,073	52.90		
Residence						
Urban	124,402	43.60	160,659	56.40	0.0001	1.188
Rural	182,357	49.50	85,698	50.50		

Table 4. Factors Related to the Occurrence of Dental Caries in Respondents
Aged 15-64 years

Variable	Odds Ratio	SE	*p-Value*	B	95% CI
Age Groups (year)					
15 – 24					
25 – 44	1.437	0,0001	0.0001	0,363	1.436-1.438
45 – 64	1.584	0,0001		0,460	1.583-1.586
Gender					
Male	1.038	0,0001	0.0001	0,037	1.037-1.039
Female					
Education					
Lower	1.185	0,0001	0.0001	0,170	1.002-1.003
Higher					
Occupation					
Not Work	1.002	0,0001	0.260	0,002	0.980-1.005
Work					
Residence					
Urban	1.147	0,0001	0.0001	0,137	1.146-1.148
Rural					
Eating Sweet Foods					
Yes	1.052	0,0001	0.0001	0,051	1.051-1.053
No					
Drinking Sweet Drinks					
Yes	1.052	0,001	0.0001	0,051	1.051-1.053
No					
Brushing Teeth Properly					
Yes	0.925	0,0001	0.0001	-0,078	0.924-0.925
No					

From the results of multivariate tests carried out on all variables, both characteristic variables (age, gender, education, occupation, residence) and habit or behavior variables (eating sweet foods, drinking sweet drinks, and brushing teeth properly), almost all variables have an effect on on the occurrence of dental caries except occupation variable, with p-value > 0.05 (p=0.260), where OR 1.002 (95% CI: 0.980-1.005)

DISCUSSIONS
In this study, it was found that respondents with dental caries were 306,759 people (45.60%) and those without dental caries were 346,354 people (54.40%). The incidence of dental caries with the highest percentage in the age group 45-64 years (50.60%), and the lowest in the age group 15-24 years (39.60%). Dental caries was found a lot in women than men. The proportion of dental caries in people with low

education (49.10%) is more than those with higher education (43.40%), the proportion of dental caries in people who work (47.10%) is more than those who do not work (46.70 %), and the proportion of dental caries in people living in rural areas (49.50%) is higher than in urban areas (43.60%).

The high prevalence of dental caries in women and the age group 45 years and over is caused by eating sweet foods, drinking sweet drinks, and brushing teeth inproferly.

According to result of research from Martinez-Mier, EA et al. (2013), that sex differences in dental caries experience have also been widely observed, with most studies showing that women and girls are at higher risk and experience more carious lesions than do men and boys.[12]The result study from Marwa MMS et al. (2019), concluded that age, BMI (Body Mass Index) , SES (Socio Economic Status), education level and

brushing frequency are risk factors significantly associated with caries prevalence amongst Egyptian adults.[13]

The results of Riskesdas 2013 showed that the incidence of dental caries in rural and urban communities was almost the same. [14] Research in Lithuhania in 2016, reported that the prevalence of dental caries was relatively highthat was 78.3%,with a p-value <0.001 and the mean DMF-T score 2.93 (SD, 2.81). There were differences in the experience ofdental caries between people in urban and rural areas. This is influenced by socio-economic differences, where the caries value in rural areas is higher than in urban areas, and for males the caries value is higher than for females. [15]In oral health reports, the prevalence of dental cariesusually is defined as the percentage of population affected bydental caries, and caries severity or experience is calculatedbased on D (decayed) M (missing) and F (filled) T (teeth) index following the WHO criteria (1997).

In Riskesdas 2018, it is known that there is a significant relationship between the habits or behavior of respondents who eating sweet foods, drinking sweet drinks and brushing teeth properly with the occurrence of dental caries, with a p-value <0.05.[7] Nurhaeni (2020),there was a significant relationship between the habit of eating sweet foods with the incidence of caries in elementary school children.[16] Results of research from Lendrawati L, et.al, (2019), supports previous research that consuming sweet foods is significantly associated with the occurrence of dental caries.[17] Skinner J, et.al. (2016), reported that there was a high increase in the incidence of dental caries in adolescents aged 14-15 years who consumed high sugary drinks in New South Wales, Australia.[18] The results of the study are in line with previous studies, it is said that the high prevalence of caries in grade 3 students in Georgia is associated with high consumption of sugary drinks.[19]

Dental caries can be prevented by brushing teeth properly and regularly at least twice a day, ie. after every meal and going to bed at night. The habit of brushing teeth, can also affect the severity of caries, respondents who brush their teeth regularly have a tendency to have milder caries than those who do not brush their teeth.[20] The results of research from Kurdaningsih SV, (2017), there is a significant relationship between the habit of brushing teeth with dental caries.[21] The correct tooth brushing

behavior, after breakfast and at night before going to bed has a close relationship with the occurrence of caries.[22]Brushing teeth properly can prevent or reduce the occurrence of dental caries, by inhibiting the growth of bacteria that can cause tooth decay.The most people know how to brush their teeth properly, but it is not applied in their usual daily brushing habits.

This study is in line with previous research, which states that there is a relationship between eating patterns and brushing teeth habits with dental and oral health (caries) in Indonesia, respondents who have a habit of consuming sweet foods tend to get caries above the average (>2) is 1.157 times compared to respondents who do not have the habit of consuming sweet foods.[23]

The results of multivariate tests carried out on all variables, both on characteristic variables, that is age, gender, education, occupation, residence and habit or behavior variables, that is eating sweet foods, drinking sweet drinks, and brushing teeth properly, almost all variables have an effect/related with the occurrence of dental caries (p<0.05) except occupation variable, with p-value > 0.05 (p = 0.260). It was reported that occupational factors did not significantly influence the occurrence of dental caries.[14]

CONCLUSION

Dental caries is mostly found in people aged 45-64 years, in respondents who work, respondents with lower education, and those who live in rural areas. The habit of eating sweet foods, drinking sweet drinks, and brushing teeth properly is significantly associated with the incidence of dental caries in people aged 15-64 years in Indonesia. People aged 45-64 years are likely to experience dental caries 1.6 times than other age groups.

Conflict of Interest

The authors declare that there are no competing or potential conflicts of interest.

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The Effect of the Covid-19 Pandemic on the Utilization and Catastrophic Costs of National Health Insurance

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Abstract

Background: The COVID-19 pandemic in Indonesia has significantly impacted the health care system and insurance schemes. Social distancing policies during the pandemic have led to changes in the utilization of health facilities, especially those related to catastrophic diseases that cost a lot of money. This study aims to analyze the impact of the Covid-19 pandemic on the utilization and financing of catastrophic diseases in the National Health Insurance (NHI) program.

Methods: The research design is quantitative and qualitative. The quantitative study analyzed secondary data obtained from the Social Security Administrator for Health and the nat. This study also has qualitative data from in-depth interviews with government and private hospital informants, health economists, and social health insurance experts.

Results: 2020 COVID-19 pandemic has impacted decreasing the utilization of National Health Insurance participants to health facilities and significantly affected the financing of catastrophic diseases. There was also a change in the ranking diseases pattern before and during the covid-19 pandemic. Before pandemic, the disease with the highest claim fee was ischemic heart disease, and after the pandemic, the disease with the highest claim fee was chronic kidney disease.

Conclusion: Covid-19 pandemic has impacted the catastrophic utilization and financing of the National Health Insurance program. The referral program has strengthened National Health Insurance financing cost containment efforts with conditions increasing during the Covid-19 pandemic. In the future, National Health Insurance financing needs to expand the scope of the benefits of preventive and promotive services.

Keywords: Covid-19 Pandemic, National Health Insurance, Utilization, Cost

Abstrak

Latar belakang: Pandemi COVID-19 di Indonesia berdampak signifikan terhadap sistem pelayanan kesehatan dan skema asuransi. Kebijakan social distancing selama pandemi telah menyebabkan perubahan penggunaan fasilitas kesehatan, terutama yang terkait dengan penyakit katastropik yang memakan biaya besar. Penelitian ini bertujuan untuk menganalisis dampak pandemi Covid-19 terhadap pemanfaatan dan pembiayaan penyakit katastropik dalam program Jaminan Kesehatan Nasional.

Metode: Desain penelitian ini adalah kuantitatif dan kualitatif. Studi kuantitatif menganalisis data sekunder yang diperoleh dari Badan Penyelenggara Jaminan Sosial Kesehatan dan Dewan Jaminan Sosial Nasional. Penelitian ini juga memiliki data kualitatif dari wawancara mendalam dengan informan rumah sakit pemerintah dan swasta, ekonom kesehatan, dan pakar asuransi kesehatan sosial.

Hasil: Pandemi COVID-19 tahun 2020 berdampak pada penurunan utilisasi peserta Jaminan Kesehatan Nasional ke fasilitas kesehatan dan berpengaruh signifikan terhadap pembiayaan penyakit katastropik. Sebelum pandemi, penyakit dengan biaya klaim tertinggi adalah penyakit jantung iskemik, dan setelah pandemi, penyakit dengan biaya klaim tertinggi adalah penyakit ginjal kronis. Perubahan pola peringkat penyakit juga terjadi sebelum dan selama pandemi Covid-19.

Kesimpulan: Pandemi Covid-19 berdampak pada pemanfaatan dan pembiayaan program Jaminan Kesehatan Nasional. Program rujukan memperkuat upaya pengendalian biaya pembiayaan Jaminan Kesehatan Nasional dengan kondisi yang semakin meningkat di masa pandemi Covid-19. Pembiayaan

Jaminan Kesehatan Nasional ke depan perlu memperluas cakupan manfaat pelayanan preventif dan promotive.

Kata kunci: *Pandemi Covid-19, Jaminan Kesehatan Nasional, Utilisasi, Biaya*

INTRODUCTION

The increase in Covid-19 cases has significantly impacted the global economy, including Indonesia (1). After being declared a pandemic, several sectors worldwide were affected by economic problems, including the transportation, tourism, trade, and health sectors (2,3). Social distancing policies implemented in various countries, including Indonesia, have also hampered the improvement of the health economy in Indonesia. The health system in Indonesia is not optimal after being affected by the Covid-19 pandemic (4).

In health services, social distancing policies can reduce the utilization of health facilities to prevent coronavirus transmission. Moreover, there are cases of health workers exposed to Covid-19, making some health facilities have to be temporarily closed and not provide health services (4,5). The experience of the spike in Covid-19 cases resulted in hospitals no longer having sufficient capacity to treat all Covid-19 and other patients in March and April 2020. Hospitals must intervene by increasing the availability of nurses ready to work, raising beds, and accelerating the procurement of junior doctors (5). Moreover, there is an appeal by the association of specialist doctors in Indonesia to postpone visits to health facilities to suppress the transmission of Covid-19.

Patients with chronic diseases such as diabetes, hypertension, and kidney disease require expensive health financing. Based on the Social Security Administrator for Health (BPJS Kesehatan) report, the cost of services for catastrophic illnesses in 2018 (until September) reached 22 percent of the total health costs or 14.5 trillion rupiahs; with the three highest diseases, namely heart disease, cancer, and stroke (6). In the same year as the Covid-19 pandemic, the National Health Insurance (NHI) program reported financial performance, ending the financing deficit in 2020 (7). The surplus of NHI financing can potentially affect the utilization of health services for NHI participants after the pandemic because there is an increase in visits by Covid-19 patients and public concerns for treatment during the pandemic.

However, changes in utilization and claims for high-cost diseases on BPJS Kesehatan make it uncertain whether the increase or decrease will be confirmed. If there is a decrease, visit delays in patients with the catastrophic disease can potentially result in abnormal symptoms, severity, and a spike in mortality in the future. (8). Therefore, this study aims to analyze the effect of the Covid-19 pandemic on the catastrophic utilization and financing of the NHI program.

METHODS

This study uses a cross-sectional design with a mixed-method method (quantitative and qualitative). This study uses primary and secondary data. Primary data were obtained from in-depth interviews with selected informants from government-owned and private hospitals and in-depth interviews with experts according to the topic of study. Hospital information is management related to medical services and National Health Insurance management, while expert informants are experts in the field of National Health Insurance and health financing. The interview was conducted in 2021 with discussions on topics before and during the pandemic. Three hospitals became informants, consisting of two local government hospitals and one private hospital. All three are type B hospitals. Two hospitals are in South Tangerang City, and one is in Sleman Regency. The three were chosen so that there are variations in the type of hospital, ownership, and region.

Secondary data were obtained from the Social Security Administrator for Health and National Social Security Council. The secondary data obtained from the Social Security Administrator for Health are claim data and visit data from all hospitals in Indonesia in 2019 and 2020. The secondary data from the National Social Security Council is on visits by National Health Insurance participants to primary and secondary health facilities in 2019 and 2020. The quantitative method in this study was carried out by analyzing secondary data by comparing and looking at data trends in two observation periods, namely before and during the covid-19 pandemic.

The variables of this study are related to the financing of catastrophic diseases of the National Health Insurance program, namely the utilization of health services and claims for catastrophic diseases. The utilization of health services is seen from the visits of National Health Insurance participant patients to First Level Health Facilities, visits to hospitals, referrals of participants from First Level Health Facilities to hospitals, and Referral Program participants from hospitals to First Level Health Facilities. The utilization data from the Social Security Administrator for Health is sorted according to the highest utilization based on primary diagnosis in outpatient and inpatient settings. Meanwhile, data on claims for catastrophic diseases are sorted based on the top 10 rankings of diseases that are expensive. The inclusion criteria for this study are the data on the utilization of participants to health service providers, which can be found on the website page for the National Social Security Council data or Social Security Administrator for Health data. The selection of primary data is a National Health Insurance provider hospital determined based on representatives of government and private hospitals. Meanwhile, the exclusion criteria for this study are the utilization and financing of non-National Health Insurance participants.

Data analysis was carried out in an exploratory, descriptive manner by comparing conditions before and during the Covid-19 pandemic regarding utilization, medical services, and National Health Insurance financing. Qualitative data were analyzed by content from visit data and claim data at the hospital with in-depth interview data with hospital management regarding utilization patterns and claim data for National Health Insurance participants. Data validation was carried out by triangulating secondary data sources with primary data.

The ethical clearance of this study was granted by the ethics committee of the Agency for Health Research and Development, Ministry of Health of Indonesia (No. LB.02.01/2/KE.41/2021).

RESULTS

Figure 1 shows the changes in visits by National Health Insurance participants at First Level Health Facilities before and during the Covid-19 pandemic. During the COVID-19 pandemic, participant visits for non-COVID-19 to health care facilities decreased. Participant visits that experienced the most significant decline during the COVID-19 pandemic were visits to puskesmas (public health centers) and Pratama clinics. After confirmation to the hospitals, the results showed the same pattern: a decreasing trend of outpatient and inpatient visits for National Health Insurance participants during the Covid-19 pandemic (in 2020). According to study informants, being afraid to visit hospitals (and other health facilities) due to the transmission of COVID-19 is the main reason why the number of visits has decreased—supported by government regulations that limit community activities, including activities in health facilities.
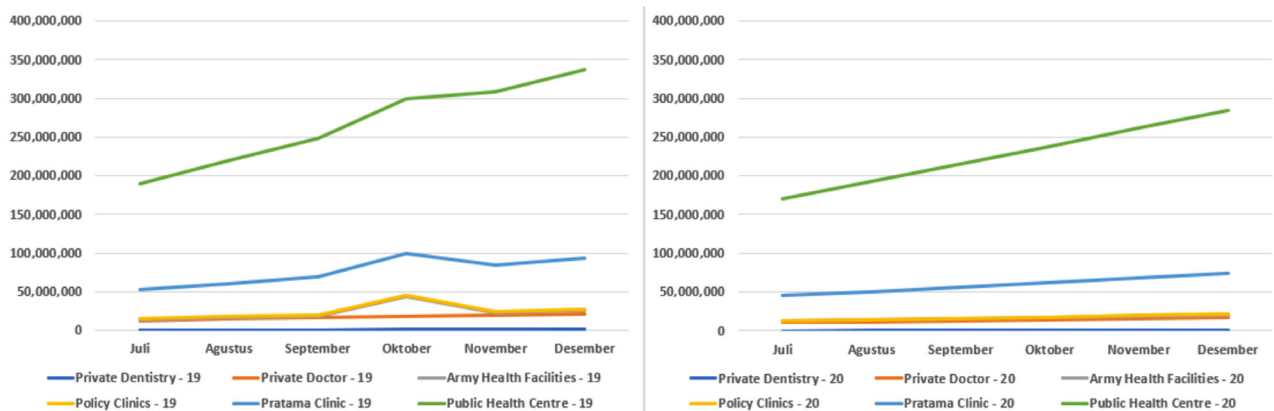

Figure 1. Changes in Utilization of NHI Participants in FKTP Before and After the Covid-19 Pandemic
(Source: Processed from DJSN Data)

Based on the results of in-depth interviews with the management at the hospital, the hospital management's efforts to maintain the stability of patient visits to the hospital were carried out with several strategies. Among them are visits to patients' homes so that health service control can still be carried out. Hospitals also make use of telemedicine with patients.

Referrals for National Health Insurance participants in First Level Health Facilities before and during the Covid-19 pandemic generally showed a downward trend. Most of the referrals occurred at puskesmas and pratama clinics in 2019 and 2020, and a trend of decreasing referrals for National Health Insurance participants after the Covid-19 pandemic.

According to diagnosis, the referral program distribution in First Level Health Facilities was dominated by DM, heart disease, and hypertension before and during the Covid-19 pandemic. The referral program in cases of diabetes, hypertension, and heart disease experienced an increasing trend before and during the Covid-19 pandemic. Meanwhile, the distribution of the referral program at First Level Health Facilities according to disease diagnoses in Asthma, Stroke, COPD, Epilepsy, and Schizophrenia was relatively similar before and during the Covid-19 pandemic.

Table 1 shows that the National Health Insurance utilization based on primary diagnosis before the Covid-19 pandemic was highest in Type 2 Diabetes (5,382,994) and the lowest for Breast Cancer (1,018,573). Meanwhile, National Health Insurance utilization based on primary diagnosis during the Covid-19 pandemic was highest in cases of chronic kidney disease (5,633,476) and lowest for asthma (801,769). From table 1, it can also be seen that only chronic kidney disease experienced an increase in the percentage of visits by 14 percent, while the other nine diseases experienced a decrease in the percentage.

Table 1. Changes in the 10 Highest Utilization of National Health Insurance Participants in Outpatient and Inpatient Based on Primary Diagnosis Before and During the Covid-19 Pandemic

2019			2020			
No.	Diagnosis	Number of Visits	No.	Diagnosis	Number of Visits	Changes %
1	Type 2 Diabetes	5.382.994	1	Chronic Kidney Disease	5.633.476	+ 14.2
2	Essential hypertension	5.005.988	2	Type 2 Diabetes	4.896.926	- 9.0
3	Chronic Kidney Disease	4.930.848	3	Essential hypertension	4.236.600	- 15.4
4	Ischemic Heart Diseases	3.903.597	4	Ischemic Heart Diseases	3.715.564	- 4.8
5	Hypertensive Heart Diseases	3.046.401	5	Hypertensive Heart Diseases	2.718.879	- 10.7
6	Low Back pain	2.035.717	6	Low Back pain	1.490.269	- 26.8
7	COPD	1.529.660	7	COPD	1.248.883	- 18.3
8	Asthma	1.223.991	8	Breast cancer	1.011.625	- 0.7
9	Senile Cataract	1.196.036	9	Senile Cataract	881.181	- 26.3
10	Breast cancer	1.018.573	10	Asthma	801.769	- 34.5

Source: Social Security Administrator for Health Claims Data for 2019 and 2020

In the ten highest cases, before and during the pandemic, National Health Insurance utilization varied quite a bit on 1-3 and 8-10. In the order of 4-7 before and during the pandemic, National Health Insurance utilization did not differ, namely, ischemic heart disease, hypertensive heart diseases, low back pain, and chronic obstructive pulmonary disease. Most of the highest cases are non-communicable diseases that require expensive (catastrophic) treatment.

In the case of catastrophic financing, there was a change in National Health Insurance's catastrophic financing pattern before and during the Covid-19 pandemic (Table 2). Before the Covid-19 pandemic, the disease with the highest claim fee was heart disease, namely ischemic heart disease, with total financing of 5.5 trillion rupiahs. However, after the COVID-19 pandemic, there was a change. The disease with the highest claim fee was chronic kidney disease, with total financing of 5.6 trillion rupiahs. In line with utilization, in terms of financing, chronic kidney disease has also increased in percentage, while other diseases have decreased

Table 2. The 10 Highest Changes in National Health Insurance Financing Before and After the Covid-19 Pandemic

	2019			2020		
No.	Diagnosis	Costs (in Rupiah)	No.	Diagnosis	Costs (in Rupiah)	Change %
1	Ischemic Heart Diseases	5.535.274.250.242	1	Chronic Kidney Disease	5.698.985.411.646	+ 6.7
2	Chronic Kidney Disease	5.340.159.287.135	2	Type 2 Diabetes	4.351.189.174.319	- 17.5
3	Type 2 Diabetes	5.277.158.428.234	3	Ischemic Heart Diseases	4.090.839.679.444	- 26.1
4	Essential hypertension	3.324.105.730.882	4	Essential hypertension	2.621.697.602.517	- 21.1
5	Hypertensive Heart Diseases	2.038.913.164.815	5	Hypertensive Heart Diseases	1.554.673.706.222	- 23.7
6	Senile Cataract	1.985.497.922.080	6	Senile Cataract	1.395.339.745.300	- 29.7
7	Ischemic stroke	1.711.416.888.715	7	Ischemic stroke	1.287.512.603.580	-24.7
8	Other Cataract	1.287.651.156.530	8	Breast cancer	986.508.392.118	- 7.9
9	Chronic obstructive pulmonary disease	1.149.172.111.525	9	Other Cataract	867.367.019.214	-32.6
10	Breast cancer	1.071.678.888.600	10	Hypertensive Renal Diseases	766.047.244.646	-

Source: Social Security Administrator for Health Claims Data for 2019 and 2020

In addition, there was a change in the ranking diseases pattern before and during the covid-19 pandemic. Before the COVID-19 pandemic, the top 10 diseases with high costs were ischemic heart disease, chronic kidney disease, type 2 diabetes, essential hypertension, hypertensive heart diseases, senile cataract, ischemic stroke and other cataracts, COPD, and breast cancer. Meanwhile, during the COVID-19 pandemic, the top ten diseases with high costs were chronic kidney disease, type 2 diabetes, ischemic heart diseases, essential hypertension, hypertensive heart diseases, senile cataract, ischemic stroke, breast cancer, other cataracts, and hypertensive renal diseases.

DISCUSSIONS

Visits of NHI Participants at FKTP before and during the Covid-19 pandemic, the results of this study generally showed a downward trend. Meanwhile, in 2021, the number of NHI participants will be 222.4 million of the total Indonesian population of 273.8 million. The decline in the utilization of patients to health facilities also occurred in other countries (9–11). In Singapore, the Covid-19 pandemic was associated with a 9.3% reduction in doctor visits, a decrease in inpatient visits, and a 2.7% decrease in being diagnosed with a chronic condition (9). Xiao et al.'s study in China also showed decreased outpatient and more inpatient visits in urban areas after the Covid-19 pandemic (11).

In the case of kidney failure, patient utilization increased. This increase occurred because hemodialysis could not be postponed, so patients visited health services during the pandemic and ruled out the coronavirus risk. International data shows that the fatality rate in dialysis patients has increased to 30% after the Covid-19 pandemic, so medical personnel prefers to do dialysis at home (12). Through the NHI program, the Government of the Republic of Indonesia is faced with the choice to provide coverage for dialysis patients in hospital or at home and the decision to provide kidney transplant benefits, both of which require considerable costs. The philosophy of "prevention is better than cure" provides an option for the government to expand the coverage of the benefits of screening in people with a high risk of developing kidney failure (13).

Most of the highest cases of patients participating in NHI are non-communicable diseases that require expensive (catastrophic) treatment. However, this study's findings revealed that these patients' utilization decreased during the Covid-19 pandemic. In other countries, visits to critically ill patients also significantly reduced with a difference in the incidence rate of 3.1 per 100,000 person-months, including stroke patients (10). Moreover, the Indonesian people are faced with various risk factors for non-communicable diseases that can contribute to the increase in disease cases in the future (14). These risk factors include consuming junk food, cigarette smoke that triggers cancer cases and not exercising regularly (15,16).

Based on the Presidential Decree on Health Insurance No. 82 of 2018, Article 46 paragraph 1 states that the benefits of comprehensive NHI include individual preventive, promotive, curative, and rehabilitative benefits (17). A study revealed that the NHI program's individual preventive and promotive benefits could improve the health of NHI participants to avoid various costly diseases. (18). This opportunity signals NHI to further develop individual preventive and promotive benefits, especially on claims of high-cost diseases.

The screening benefits contained in the NHI are based on Presidential Regulation no. 82 of 2018 concerning Health Insurance, namely screening for the detection of diabetes, hypertension, breast cancer, and cervical cancer (17). According to the results of this study, this individual preventive benefit needs to be increased by looking at the ten highest-cost expensive cases. The NHI must also screen for other necessary diseases based on the results of this study, in addition to diabetes, hypertension, cancer, kidney failure, cataracts, stroke, and low back pain. Increasing the benefits of this NHI must be done by restricting drugs, procedures, and medical devices guaranteed through the Health Technology Assessment (HTA) procedure (19). The NHI health facility network can expand screening coverage, such as in pharmacies, implemented in Germany. (20).

Based on the results of confirmation to the hospital in this study, the hospital management carried out outpatient visits to the home to maintain the stability of patient visits. The home visit helps monitor the improvement of the condition of chronic disease patients and provides education to patients to implement a healthy lifestyle. Meanwhile, visits by medical personnel to patients' homes that NHI can cover have the potential to be applied to the coverage of contact numbers contained in the Commitment-Based Capitation services. Improving the quality of the coverage of contact numbers on capitation payments is very much needed in the future to reduce the high cost of abnormality in chronic disease patients.

In addition to home visits, the hospital management revealed that telemedicine was used to reduce the decrease in inpatient visits through the findings of this study. The BPJS Kesehatan has developed an NHI mobile application with the potential for telemedicine services to be guaranteed by NHI. The advantages of the current NHI Mobile application are teleconsultation, development of online prescribing, online queues, and health education to

NHI participants. (21). Technology-based screening, historical recording of participant claims history, and real-time data based on best practices can be a direction for future development of the NHI program implemented by the Korean state since the Covid-19 pandemic (22). These efforts are carried out to prevent a spike in high-cost claims cases and prepare for another pandemic. The Government of the Republic of Indonesia needs to strengthen regulations regarding telemedicine in Indonesia so that its operations become more focused on improving public health status (23).

In this study, the Refer Back Program in DM, hypertension, and heart disease cases experienced an increasing trend before and during the Covid-19 pandemic. Even though the pandemic status has been declared, this condition must be maintained. Increasing Refer Back Program is essential to strengthening the cost containment of NHI financing. Patients with high-cost diseases still receive financial protection under the NHI scheme. On the other hand, paying for health facilities on a fee-for-service or out-of-pocket basis should be avoided because this payment method can be more wasteful and impoverish patients (8). This momentum needs to be used as a benchmark for the Indonesian people to stay involved and remain active as NHI participants, especially patients with chronic diseases, in financial protection from increasingly expensive health costs (24).

The importance of social distancing during the Covid-19 pandemic has made the NHI provider health facility business adapt to providing services to chronic disease patients. Moreover, during the Covid-19 pandemic, the government implemented various social distancing policies, namely Large-Scale Social Restrictions and Enforcement of Community Activity Restrictions. This policy requires health facilities also to adapt. Studies before the pandemic revealed that the hospital's strategies to survive in the NHI era were operational cost efficiency, digitalization, increasing HR capabilities, customer relationship management, and collaboration (25). A study conducted during the Covid-19 pandemic found that health workers had not received training on data processing that was useful for strengthening patient screening practices (4).

The advantage of this study is that it uses three sources of data, both secondary and primary data. Secondary data with national coverage is obtained from BPJS Health and DJSN data. While primary data was obtained from confirmation of health facilities (RS) in several regions in Indonesia, better data accuracy

was obtained compared to using only secondary data without data confirmation. In comparison, the weakness of this study is that the BPJS Health data is in a one-year format, both in 2019 (before the pandemic) and 2020 (during the pandemic). The pandemic started in March 2020, so three months in 2020 shouldn't be counted as a pandemic. For the study, it is better if the data provided is monthly so that a firm selection can be made before and during the Covid-19 pandemic.

Compared to other studies, particularly in Indonesia, this study discusses specific diseases other than covid, which has been proven to have cost the NHI a lot (6). In contrast, other studies explain more about the costs incurred by the government from covid itself. This study also does not discuss how much the government has spent on Covid-19, even though it can be said that the COVID-19 disease has become catastrophic during this pandemic. In addition, because the pandemic has not ended, how much the costs of high-cost diseases after the pandemic have not been determined. So, further studies, especially regarding this catastrophic disease, must also be carried out after the pandemic ends.

CONCLUSION

This study concludes that the Covid-19 pandemic has impacted the catastrophic utilization and financing of the National Health Insurance program. This impact can be seen in the downward trend in utilization and referrals of NHI participants. However, The referral program has strengthened National Health Insurance financing cost containment efforts with conditions increasing during the Covid-19 pandemic. Visits of patients with chronic kidney disease have an increasing trend because hemodialysis procedures cannot be postponed. National Health Insurance funding for the top 10 catastrophic diseases reached more than 25 trillion before the Covid-19 pandemic and decreased to around 20 trillion during the Covid-19 pandemic.

This study suggests to the Ministry of Health that it is necessary to immediately end the Covid-19 pandemic status because there are dangerous implications for catastrophic diseases in the future. In the future, National Health Insurance financing needs to expand the scope of the benefits of preventive and promotive services, especially the prevention of catastrophic diseases, to reduce the burden of National Health Insurance claims. Health facilities provided by National Health Insurance providers need to prepare for better management of health services after the pandemic, including the actual cost of health services for catastrophic diseases, the efficiency of health services for catastrophic diseases, and digitization of the provision of health services to patients.

Acknowledgment

Conflict of Interest

We have no conflicts of interest to disclose.

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The Effect of Transcendental Meditation on the Immune Response of Bali Mandara High School Students

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Abstract

Background: Meditation has become an increasingly popular form of alternative medicine. Many studies have been conducted to assess the health benefits of meditation. In particular, Transcendental Meditation (TM) is effective in treating psychological disorders, hypertension, cardiovascular disease, and high cholesterol. It is assumed that TM can enhance the individual immune system. This study aims to determine the number of immune response cells in high school students who do transcendental meditation for a certain period of time.

Methods: This study has a total sample of 150 students. The study group consisted of 3 groups, namely the control group, TM group 1 (students who regularly practiced TM for 1 year), TM group 2 (students who regularly practiced TM for 2 years). Each group consists of 50 students. The control group consisted of 50 students who did not use any relaxation techniques. Total eosinophils, neutrophils, lymphocytes, monocyte, and hematocrit are counted by an automated quantitative hematology analyzer.

Results: The results showed high rates immune cell among the control group compared to the TM 1 and TM 2 groups. The number of immune response cells showed that the TM 2 group differed significantly from the control group and the TM 1 group in eosinophils, neutrophil, and monocyte (P < 0.05). Even though, leukocytes, neutrophils, and lymphocytes showed an decrease although not significantly different in the TM 2 group (P > 0.05). The correlation value shows a strong correlation between immune response cells (leukocytes, lymphocytes, eosinophils, monocyte, and hematocrit) with an increase in meditation duration.

Conclusion: Meditation can increase immune cells that play a role in self-protection. This study provides information that transcendental meditation has health benefits, especially in boosting the immune system.

Keywords: Transcendental Meditation (TM), immune respond

Abstrak

Latar belakang: Meditasi telah menjadi bentuk pengobatan alternatif yang semakin populer. Banyak penelitian telah dilakukan untuk menilai manfaat meditasi pada kesehatan. Secara khusus, Meditasi Transendental (TM) telah terbukti efektif dalam mengobati gangguan psikologis, hipertensi, penyakit kardiovaskular, dan kolesterol tinggi. Hal ini diasumsikan bahwa TM dapat meningkatkan sistem imun individu. Penelitian ini bertujuan untuk mengetahui jumlah sel respon imun pada siswa SMA yang melakukan meditasi transedental pada periode waktu tertentu.

Metode: Penelitian ini memiliki total sampel 150 siswa. Kelompok studi terdiri dari 3 kelompok, yaitu kelompok kontrol, kelompok TM 1 (berlatih TM selama 1 tahun), dan kelompok TM 2 (berlatih TM selama 2 tahun). Tiap grup terdiri dari 50 siswa. Kelompok kontrol terdiri dari 50 siswa yang tidak menggunakan teknik relaksasi apa pun. Total eosinofil, neutrofil, limfosit, monosit dan hematokrit dihitung dengan hematologi kuantitatif otomatis.

Hasil: *Hasil menunjukkan terdapat perbedaan bermakna di antara kelompok kontrol dibandingkan dengan kelompok TM 1 dan kelompok TM 2. Jumlah sel respon imun menunjukkan bahwa kelompok TM 2 berbeda secara signifikan dibandingkan kelompok kontrol dan kelompok TM 1 pada eosinofil, netrofil dan monosit (P <0,05). Hal berbeda ditunjukkan oleh leukosit, neutrofil, dan limfosit yang menurun walaupun tidak berbeda bermakna pada kelompok TM 2 (P> 0,05). Nilai korelasi menunjukkan adanya korelasi kuat antara sel-sel respon imun (leukosit, limfosit, eosinofil, monosit, leukosit, dan hematokrit) dengan peningkatan durasi meditasi (p>0.4).*

Kesimpulan: *Meditasi dapat meningkatkan sel imun yang berperan dalam perlindungan diri. Studi ini memberikan informasi bahwa meditasi transendental mempunyai manfaat bagi kesehatan khususnya meningkatkan sistem kekebalan tubuh.*

Kata kunci: *Meditasi Transdesental (TM), respon imun*

INTRODUCTION

Transcendental Meditation (TM) is another type of stress reduction technique that individuals utilize a mantra during the process of transcendent.[1] TM focused on the integration of the mind and body with a sound without meaning repeated within the mind and the body will enter transcendental consciousness wherein it is calmed and quieted if the individual is successful.[2,3,4] This simple technique has been proven useful for several clinical and psychological conditions, even in healthy individuals. A few studies showed the TM effects on the immune system demonstrating modulation on leukocyte deoxyribonucleic acid repair and low percentage of functional lymphocyte beta-adrenergic receptor in practitioners.[5]

Most of the research has shown that TM may improve good outcomes and decrease for those diagnosed with cardiovascular disease, hypertension, and high cholesterol. Even, the physiological state can have positive impacts on stress-related ailments and diseases.[2,3] In previous studies reported modifications in the daily secretion pattern and lowered blood levels of catecholamine, β-endorphins and adrenocorticotropic hormone. Stress is a condition that contains a psychological and physiological response to pressure carried by someone. The response caused negative emotions and changes in balance in the body and various variations in the brain.

The emergence of negative emotions due to stress triggers mental disorders, ranging from mild to severe mental disorders. The Riskesdas data of 2013 has shown the prevalence of mental-emotional disorders as indicated by symptoms of depression and anxiety. It is shown at the age of 15 years and overreaching around 14 million people or 6% of the population of Indonesia. While the prevalence of severe mental disorders, such as schizophrenia reaches around 400,000 people or as much as 1.7 per 1,000 populations.[6]

One of the major changes that occur along with the stress conditions experienced is the process of thymus involution. The thymus is an organ where T cells mature. T cells are very important as lymphocytes to kill bacteria and help other types of cells in the immune system.[7] The immune system on stress conditions also decreases the margination of neutrophils. Other research showed that acute stress in younger adults elicited similar changes in neutrophil function, in specifically reduced superoxide production.[8,9] Song and colleagues showed that subacute intra cerebrum ventricular administration of corticotropin-releasing factor for 5 days in rats reduced lymphocyte proliferation, decreased the percentage of lymphocytes, and increased the percentage of neutrophils.[10]

High school youth is a transition from early adolescence to late adolescence. New high school students determine the transition period, in which all reviews per period will divert doubts about the role that must be performed.[11] In this transition, students are vulnerable to stress because they need themselves and their new environment.

A study found that the incidence of stress in Gorontalo high school students was 62.3%. Students in grades 1 and 3 experienced the least amount of stressors with a percentage of 29.6% and 29.7%, respectively. Whereas the second-grade students most experienced mild stressors with a percentage of 22%. Research conducted by Putri in 2014 of grade XII students of the Natural Sciences (IPA) and Social Sciences (IPS) education studies in the 6th Senior High School (SMA) Denpasar found a prevalence of mild psycho social stress of 51.8%, moderate 36.9% and weight 11.3%.[12]

The study was conducted to look at changes in the number of immune system cell count in students who do transcendental meditation. In addition to the relationship between stress conditions and neutrophils, the immune system that tackle infection is the different types of white blood cells (eosinophil leukocytes, monocytes, lymphocytes and neutrophils). At the start of the immune response, neutrophils and macrophages are the innate immune system cells. In this study, the number of various types of white blood cells becomes a parameter as well, considering that routine blood tests on white blood cells can be a signal that the immune system is good or lacking in dealing with these infections. SMA Negeri Bali Mandara Buleleng Bali, a high school, has implemented transcendental meditation as a routine activity for students. It purposes to decrease student stress conditions and also to the best of our knowledge no previous research has been published on leukocyte, eosinophils, monocyte and hematocrite levels with this technique.

METHODS

This study was approved by the Research and Development Unit of Udayana University, Denpasar with ethical clearance number is 095/Unwar/FKIK/EC-KEPK/II/2020 and date on Feb, 25th 2020.

Subjects Technical of TM

TM group consisted 150 single healthy students at SMA Negeri Bali Mandara, Buleleng, Bali from July to December 2020. All students in this high school completed a questionnaire about their health status, such as physical and mental conditions, and also signed a written consent form. None of them were undergoing medical treatment. Only students with good condition and have no allergies who join in this study as sample. The students have done the TM technique for 20 minutes twice a day before and after attending the lesson. TM technique is an effortless, systematic procedure and sitting comfortably with eyes closed.[13]

The mind effortlessly settles down through increasingly quiet levels of thought until it naturally reaches its quietest state, beyond the finest level of thinking during the technique. This process is known transcending. During this process of transcending, individuals utilize a mantra, meaningless sounds repeated within the mind. This mantra purposes to quiet their thoughts until their mind reaches the silent state of transcendental consciousness. When mental activity is transcended, a state of inner silence, called transcendental consciousness or pure consciousness is experienced. Therefore, the participants have transcendental consciousness when the correct initial conditions are set during TM practice.[14]

Participants must meet inclusion criteria of (a) students who have been doing transcendental meditation for several months, one year and two years, (b) have a normal blood pressure range based on American Heart Association definitions of hypertension and hypotension, (c) have no history of systemic disease, hypertension, hypotension, hypoglycemia, and coronary heart disease.

The participant who had recent symptoms of illness were excluded from this study, so no participants were receiving any therapy or drugs during this experiment.

Procedure

This study used a comparative cross-sectional study design as the research method. Several cell subtype of white blood cell (WBC) count are an inexpensive. WBC can be simple biomarker of systemic inflammations, these component are monocytes, lymphocytes, basophils, eosinophils, and basophils. All WBC components play various role in the host immunity and inflammatory response. 2 ml blood samples were taken and collected from students of SMA Negeri Bali Mandara (tenth grade as control group or TM0 group, eleventh as TM1 group, and twelfth grade as TM2 group) by clinicians who are the research team taking the blood of students at school. Tenth (TM0) grade as a beginner's meditation group, eleventh grade is a group that has been doing meditation for a year (TM1) and, senior or twelfth grade (TM2) as a group that has been doing meditation for two years. The students had filled out an informed consent explaining the purpose of the study and the risks that might be encountered during and after sampling. Sample size by using single proportion formula is 18 sample, but we tried to take as much as possible in, so we used 50 students per group in this study.[15]

$$N = \frac{(Z\alpha)^2 \, p.q}{d2}$$

$$= \frac{(1,96)^2 \, (0,25)\,(0,75)}{(0,2)^2}$$

$$= \mathbf{18}$$

Blood sampling was conducted at SMA Negeri Bali Mandara and the results were analyzed at the Faculty of Medicine and Health Sciences, Warmadewa University.

Then, blood sample calculation of the number of immune cell (Eosinophil, Neutrophil, Monocyte, Leukocyte, Lymphocyte and Hematocrit) was carried out using the flow cytometry method (Prodia Clinical Laboratories).

Statistical analyses

Through the application of the statistical program SPSS 22, data were analyzed using the Anova One Way test for unpaired data. $P < 0.05$ were considered to be statistically significant. The correlation between TM and immune response counted too with Pearson correlation.

RESULTS

The characteristics of the sample in this study were the students of SMA Negeri Bali Mandara which were grouped by education level. SMA Negeri Bali Mandara has applied transcendental meditation to every student from the first level of education at the high school. The grouping in this study was in the form of the first group of 50 first-year students who had just meditated, the second group was 50 second-year students who had been meditating for one year, and the third group was a third-year student of 50 students who had meditated for 2 years.

Table 1. Characteristic of Research Subject

Characteristics	Group of TM		
	TM0	TM1	TM2
Sample size (N)	50	50	50
Grade of students			-
First grade	50	-	-
Second grade	-	50	-
Time of TM (year)			
First grade	0	-	-
Second grade	-	1	-
Third grade	-	-	2
Third grade	-	-	50
Gender			
Male	25	25	26
Female	25	25	24
Object	blood	blood	blood
Health status			
C Allergy	none	none	none
Infectious disease	none	none	none
Mental health	none	none	none
Immune system cell			
Eosinophil	1.58(1.29)	0.86(1.71)	0.58(0.97)
Neutrophils	65.34(9.35)	65.48(10.63)	69.02(6.94)
Monocyte	2.94(1.59)	4.60(1.52)	3.98(1.53)
Leukocytes	7.55(1.58)	7.50(1.46)	6.95(1.32)
Lymphocytes	30.14(8.81)	29.06(9.92)	26.42(6.64)
Hematocrit	39.22(2.82)	41.97(4.63)	42.19(3.79)

The general characteristics of the research subjects were male and female students who underwent transcendental meditation successively. The students were not experiencing a decline in their health condition when the students' blood sample was taken. Immune system cells calculated in this study include eosinophil, neutrophil, monocyte, lymphocyte, and leukocyte. Meditation may influence psychological mechanisms. They are also shown to influence of immune system directly. These immune responses were the reaction of cells and fluids towards the presence of an entity. It was typically not recognized as a constituent of body. The ability of immune response to tackle infectious diseases was thought to be influenced by the psychological status. Tackling infections is the job of different types of white blood cell. Early in an immune response, the most important of these are the innate immune system cells, which are the first at the scene of an environmental breach.[16,17] Hematocrit was calculated too. The distribution can calculate the probability of any one particular observation in the sample space, or the likelihood that observation has a value that is less than (or greater than) a point of interest and to decide the post hoc ANOVA.

The distribution of leukocytes and lymphocytes did not differ between each group. Unlike the case with the distribution of hematocrit, data showed median differences compared to other groups. The distribution of immune system cells and hematocrit showed relevance with ANOVA and its correlation.

The total eosinophil, neutrophil, and monocyte were statistically significant differences between groups ($P < 0.005$) (table 2). Games-Howell Post Hoc from eosinophil significantly differs between TM0 and TM1 group ($F = 0.72$) and TM0 with TM2 group ($F = 2.0$). Whereas, Games-Howell Post Hoc from monocyte significantly differ between TM0 group with TM1 group ($F = -1.66$) and TM2 group ($F = -1.04$).

Table 2. Immune Cells Level in 3 Groups

Variable (cell/μl)	TM0 (no meditation)	TM1 (1 year meditation)	TM2 (2 year meditation)	Significance (p)
Eosinophil	1.58±1.83	0.86±1.71	0.58±0.97	0.001
Neutrophil	65.34±1.32	65.48±1.50	69.02±0.98	0.003
Monocyte	2.94±0.22	4.60±0.21	3.98±0.21	0.000
Leukocyte	7.55±0.22	7.50±0.20	6.95±0.18	NS
Lymphocyte	30.14±1.24	29.06±1.40	26.42±0.93	NS
Hematocrit	39.22±0.39	41.97±0.65	42.19±0.53	NS

Mean values±SE together with the statistical significance differences. NS=Not significant; TM=Transcendental meditation; SE=Standard error, p < 0.005=significant

Table 3. TM0 correlation immune cells level with duration of meditation (year)

Variable (cell/ μl)	TM1			TM2		
	n	r	p	n	r	p
Eosinophil	50	-0.05	0.70	50	0.13	0.43
neutrophil	50	0.09	0.50	50	-0.10	0.48
monocyte	50	0.03	0.82	50	-0.26	0.06
leucocyte	50	-0.77	0.59	50	0.06	0.06
lymphocyte	50	0.43	0.43	50	-0.15	0.28
hematocrit	50	0.00	0.00	50	0.33	0.01

Significance (p) > 0.4

Based on table 3, eosinophil, neutrophil, monocytes and leucocyte of TM0 have strong correlation (p>0.4) with TM1. This was different from the lymphocyte and hematocrit TM0 with TM1 showed no correlation (p=0.003). Leukocytes have a strong negative (inversely proportional) correlation (r value is close to -1). The direction of this correlation indicates that the longer the meditation, the lower the eosinophils, although in TM2 leukocytes show the opposite direction (positive/unidirectional) but the direction of this correlation tends to be weak. Different things are shown in eosinophils, neutrophils, monocytes, lymphocytes and hematocrit which have a positive or negative correlation direction, but this correlation direction is very weak.

Eosinophil and neutrophil of TM0 has strong correlation with TM2 after two-year (2 year) meditation (p>0.43). However, it was different from the correlation between monocyte, leucocyte, lymphocyte, and hematocrit TM0 with TM2, it showed no correlation (p<0.4).

The duration of meditation affects the increase in the value of the cell's immune system in the body, it showed eosinophil, neutrophil, monocyte, leukocyte, and lymphocyte elevated after a year of meditation (TM1 group). After two-year meditation (TM2 group) showed a decrease in the leukocyte and lymphocyte. No significant difference was seen in neutrophils between the control group and others.

DISCUSSIONS

Transcendental meditation is a systematic technique taught by specially trained instructors and it is a simple way that elicits an innate physiological response and requires no particular changes in lifestyle or adherence to a belief system.[4] Recent evidence suggests a bidirectional communication between the gut microbiota and the central nervous system.[18] A few studies have reported on the TM effects on the immune system demonstrating low percentage of functional lymphocyte beta-adrenergic receptor in practitioners and modulation on leukocyte deoxyribonucleic acid repair. Transcending is also correlated with alpha wave EEG coherence and synchrony. Additionally, two meta-analyses have found that the TM technique was more effective than other methods of meditation and relaxation for individuals with high levels of anxiety.[19,20,21,22]

The fluctuated regulation of immune function may be seen as one of the adaptive mechanism regulated by stress hormones. Many studies have reported chronic stress impairs immune system response as well as triggering inflammation and the reduction of stress associated with meditative practices can undo many of the physiological reactions leading to inflammation and vice versa. One of the major changes that occur along with the stress conditions experienced is the process of the thymus involution. The thymus is an organ in which T cells are mature. T cells are very important as lymphocytes to kill bacteria and help other types of cells in the immune system.[2]

In addition to WBC, in this study the hematocrit value was also calculated. Hematocrit is the level of red blood cells in the blood. Red blood cell levels that are too low or too high can be a sign that you are suffering from certain diseases, such as anemia or dehydration.

It has been well-established that psychological stress and depression impair anti-viral immune responses and activate innate immunity or markers of inflammation via effector pathways, such as the sympathetic nervous system and the hypothalamus-pituitary-adrenal (HPA) axis. Meditation, including more integrative, mindfulness-based, stress-reduction programs, has also been shown to regulate emotional and affective responses to stress and therefore may influence the immune system even in the absence of physical activity.[23,24,25,26]

Several studies have shown the ability of meditation to increase natural-killer (NK) cells and B-lymphocytes. NK cells are white blood cells that target and kill stressed or abnormal cells, playing a role in tumor prevention and serve as an initial defense against viral infections. A decrease in these cells may result in then the development or progression of different forms of cancer acute and chronic viral infections and various autoimmune diseases[27]. The hypothalamic-pituitary-adrenal axis that release of neuropeptide such as corticotropin-releasing factor hormone was triggered by stressful conditions. These stress hormones have been modulated immune function with decrease lymphocyte in blood compared with normal. Song and colleagues showed that corticotropin-releasing-factor in rats as animal testing reduced lymphocyte proliferation, decreased the percentage of lymphocyte and increased the percentage of neutrophils, compared with normal rats[28]. It showed there was no significance different on leucocyte and monocyte counts of academic stress, but relative and absolute

neutrophil counts were significantly higher in the stress samples than normal, also the stress participants as sample had a lower lymphocyte count.[29]

Based on that, it can be assumed that the WBC component can also be a reference in determining the immune response of students who have done meditation. In addition to the relatively inexpensive WBC examination, this examination has also become a common blood test in diagnosing an individual's health status. Concerning the preliminary study, this study showed the increase of lymphocyte and leukocyte from the control group (TM0) that have no experience on routine meditation to a year meditation (TM1). Nevertheless, the lymphocyte value was decreased on two-year meditation (TM2).

However, eosinophil, neutrophil, and monocyte showed a significant difference between the TM0 with TM1 and TM2 group. It is relevant with the result of previous studies, that showed there was a significant increase in neutrophils and no significant change in monocytes compared to normal under stress conditions, whereas in the results of participants using TM techniques, the longer the meditation duration there was a significant decrease in eosinophils, stable neutrophil counts and a significant increase in monocytes. This illustrates the transcendent meditation can release a negative vibration then it made the process of those maturation cells goes well. As previously reported that chronic stress can suppress immune function. The maturation cells of immunological responses to stress have been clinically related to increased susceptibility to infections. One pathway through which this occurs is the inflammatory response. In brief, immune cells produce inflammatory cytokines—proteins that regulate the immune response to injury and infection—which have either pro-inflammatory or anti-inflammatory effects.[30,31]

Pearson Correlation analysis shows that there is a strong correlation between eosinophil, neutrophil, leukocyte, lymphocyte, and monocyte with the duration of meditation (Table 3). The table shows the correlation of TM0 with TM1 and TM2 in various WBC components with each significance value. Similarly, the table shows the correlation of WBC components between TM1 and TM2. Mostly the correlation shows a positive correlation. It means the increase of each immune cell related to another cell. However, eosinophil, monocyte, and hematocrit showed significantly difference correlation between TM0 group with TM1 group and TM2 group. This

illustrate the transcendent meditation can release a negative vibration then it made the process of those maturation cell goes well. As previously reported that chronic stress can be suppresses immune function. One pathway through which this occurs is the inflammatory response. In brief, immune cells produce inflammatory cytokines—proteins that regulate the immune response to injury and infection—which have either pro-inflammatory or anti-inflammatory effects.[31]

It means the increase of each immune cell-related to another cell. A major finding of this study is that the increase of immune system cells (WBC) may be attributable to an increase in neutrophil counts. A systematic review demonstrated the possibility that some other causes that can be a source of stress for students are grouped into four factors.[32] These factors are relationship factors (adapting to new people), environmental factors (home or school environment), academic factors (facing the many tasks assigned), and personal factors. This condition in students can lead to less than optimal academic performance. Students experience difficulty concentrating, productivity and creativity decline, reduced readiness to face exams which results in unsatisfactory results, sometimes disrupt sleep quality, and have an impact on physical health.[33,34,35] It may negatively impact immune responses (such as WBC components activity).

Limitations on this study include the number of secondary parameters such as characteristics of respondents, blood pressure, quality of sleep and activity, even psychological survey to make this study complete. The increase of immune system cells in this study did not statistically significant because the data did not separate by sex and also the number of samples is too small, a small sample size is the major limitation of our paper. Many previous studies showed the differences white blood cells produce in men and women.

CONCLUSION

Transcendental meditation (TM) seems to have a significant effect on immune cells. TM was proposed to be effective and efficient as an effort to improve body immune response was strengthening psychological balance in context of psychological well-being. The mechanism of increase and decrease of immune cells after TM as routine activity is the inflammatory cytokines, it explains our result and suggest the path of its mechanism to be further studies.

Conflict of Interest

All authors declare no conflict of interest.

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Body Mass Index and Working Period Associated with Low Back Pain in Pedicab Drivers

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Abstract

Background: Low back pain (LBP), commonly referred to radiating low back pain or sciatica, is the discomfort between the ribcage and the gluteal folds. A risk factor for LBP is being overweight because weak abdominal muscles lead the center of gravity to shift forward, increasing lumbar lordosis and promoting exhaustion in the paravertebral muscles. A working period is an accumulation of one's work activities over a long period. If the activity is carried out continuously over the years can cause health problems.

Methods: This study was an observational analytic study using a cross-sectional study—a research population of pedicab drivers in Kemuning District, Palembang City. Classification data include age, gender, and body mass index

Results: Fifty-seven pedicab drivers met the requirements for participation. Bivariate analysis using the Chi-Square Test yielded a p-value of 0.038, indicating a significant association between BMI and low back pain, and a p-value of 0.025, indicating a significant association between length of employment and lower back pain.

Conclusion: BMI and working period had a significant relationship with lower back pain.

Keywords: low back pain, working period, body mass index

Abstrak

Pendahuluan: Nyeri Punggung Bawah (NPB) adalah nyeri di daerah punggung di antara tulang rusuk dan lipatan gluteal, termasuk juga nyeri ekstremitas yang menjalar karena gangguan punggung. Berat badan yang berlebih menyebabkan tonus otot abdomen lemah, sehingga pusat gravitasi seseorang akan terdorong ke depan dan menyebabkan lordosis lumbalis akan bertambah yang kemudian menimbulkan kelelahan pada otot paravertebra, hal ini merupakan risiko terjadinya LBP. Lama kerja merupakan akumulasi aktivitas kerja seseorang yang dilakukan dalam jangka waktu panjang yang apabila aktivitas tersebut dilakukan terus-menerus dalam jangka waktu bertahun-tahun dapat mengakibatkan gangguan kesehatan.

Metode: Penelitian ini adalah penelitian analitik observasional dengan menggunakan rancangan potong lintang (cross-sectional study). Populasi penelitian pengayuh becak di Kec.Kemuning, Kota Palembang. Data klasifikasi meliputi usia, jenis kelamin, indeks massa tubuh. Ditemukan 57 pengayuh becak yang memenuhi kriteria inklusi.

Hasil: Hasil analisis bivariat yang diperolehi dengan Uji Chi Square diperoleh nilai p sebesar 0.038, artinya terdapat hubungan yang signifikan antara IMT dengan nyeri punggung bawah dan nilai p sebesar 0.025 artinya terdapat hubungan yang signifikan antara lama kerja dengan nyeri punggung bawah.

Kesimpulan: IMT dan lama kerja mempunyai hubungan yang signifikan dengan nyeri punggung bawah.

Kata kunci: nyeri punggung bawah, usia, IMT

INTRODUCTION

Low back pain, often known as radiating low back pain or sciatica, is a type of back discomfort that occurs between the ribs and the gluteal folds. Most causes of lower back pain, a common health issue in the population, are related to work.[1] The World Health Organization (WHO) estimates that over 150 million people worldwide suffer from musculoskeletal conditions, including LBP, which can cause psychological and social issues due to chronic pain, inflammation, and functional impairment.[2] About 70% to 80% of people worldwide experience low back discomfort at least once in their lifetime.[3] The prevalence of lower back pain in drivers, motorbike riders, or pedicab drivers is higher than in other jobs. Lower back pain from long sitting is a phenomenon that often occurs today.[4] Pedicab is a modified tricycle widely used as a mode of transportation to carry passengers and baggage. Drivers of pedicabs perform strenuous physical labor while transporting people. Towers must also operate during the rainy and hot months. Pedicab drivers sometimes have to pull 2 or 3 times more weight than their weight. When pulling a rickshaw, they maintain a flexed lumbar position for a long time.[5] The dominant position that causes discomfort in the lower back is prolonged flexion. Rickshaw pullers have the same body mechanics as cyclists while driving but have the added burden of pulling seats next to them.[5]

The Health and Safety Executive Seating at Work Guidance for Adults states that an unsuitable sitting position can cause changes in body posture leading to discomfort, back pain, and disorders of the upper extremities. Prolonged static sitting without rest can cause excessive burden, increased intradiscus pressure, and tissue damage to the lumbar spine.[6] Prolonged sitting has a negative effect on the nutrient flow in the intervertebral disc. Sitting for a long time in the wrong position will cause muscle tension and stretch the spinal ligament.[6,7] Incorrect body position during sitting puts abnormal pressure on the tissue causing pain.[8] Posture errors such as forward curved shoulders, forward protruding abdomen, and excessive lumbar lordosis can cause muscle spasms (muscle tension).[4,9] This study aims to determine the relationship between mass index body and working period on pedicab drivers in Palembang. This is important to study until it can be an effort to prevent lower back pain in pedicab drivers.

METHODS

This study was an observational analytic study with a cross-sectional design. This research was conducted in Palembang. There were 57 Pedicab drivers in the Kemuning Subdistrict of Palembang City provided the information by filling out questionnaires by the proportionate stratified random sampling technique. The sampling technique first sets the units of population members in the form of strata based on the general characteristics of different population members. The selected sample is given a direct explanation of the purpose and objectives of the study. Then the sample is asked to fill in the personal data sheet and sign the consent sheet stating that the sample is understood and willing to be the research sample. Directly. The data taken in this study are primary data which include gender, age, and body mass index.

The inclusion criteria in this study were subjects who were willing to participate in the study and signed informed consent, a pedicab male who was> 20 years old, and a pedicab driver who pulled a rickshaw for more than one year. Exclusion criteria in this study were subjects with lower back pain due to disease or abnormalities in the spine, such as fractures, trauma to the spine, spinal abnormalities, scoliosis, lordosis, and others. Univariate analysis was carried out to obtain an overview of the frequency distribution of each variable under study, following data collection, tabulation, and presentation of categorical data utilizing frequency distribution tables. The results of the univariate analysis will be presented in the form of narratives and tables. Bivariate analysis was carried out to test the correlation between shared items with the occurrence of scabies. The Chi-square technique will carry out the bivariate analysis with the significance level (α) used is 0.05 by SPSS 2.0

This research has got the Ethical Approval from Health Research Review Commitee of Faculty of Medicine Universitas Sriwijaya No: 017/kepkrsmhfkunsri/2019 referring to National Ethical Guidelines on Health and its supplements that the proposed health research is ethically liable and is approved to be carried out within.

RESULTS

The distribution of research subjects in this research can be seen in table 1. Most of the respondents are more than 40 years old with normal body mass index, and more than ten years of working period and there were 71.9% of them in low back pain condition.

Table 1. Distribution of Respondents

Characteristic	Amount (n)	Percentage (%)
Age		
≥ 40 years old	49	86,0
< 40 years old	8	14,0
Body Mass Index		
Overweight	9	15,8
Normal	42	73,7
Underweight	6	10,5
Duration of work		
>10 years	31	54,4
6-10 years	9	15,8
1-5 years	17	29,8
Low Back Pain		
(+)	41	71,9
(-)	16	28,1

Table 2 shows the relationship of BMI with lower back pain. Of 57 subjects, 15.8% had lower back pain, and 0.0% had no lower back pain with BMI> 25. Of 57 subjects, 49.1% had lower back pain, and 24.6% had no low back pain with BMI of 18.5-24.9. Of 57 subjects, 7.0% had lower back pain, and 3.5% had no low back pain with BMI <= 18.4.

Table 3 shows the length of work relationship with lower back pain. Of 57 subjects, 35.1% had lower back pain, and 19.3% had no lower back pain within a working period of> 10 years. Of the 57 subjects, 8.8% had low back pain, and 7.0% had no low back pain with 6-10 years of work. Of the 57 subjects, 28.1% had low back pain, and 1.8% had no low back pain with 1-5 years of work.

Table 2. Relationship between BMI and Lower Back Pain

BMI	LBP (+)	(%)	LBP (-)	(%)	P value
Overweight	9	15,8	0	0,0	0.038
Normal	28	49,1	14	24,6	
Underweight	4	7,0	2	3,5	
Total	41	71,9	16	28,1	

* Chi-square Test

Table 3. Relationship of Duration of Work with Lower Back Pain

Working Period	LBP +	(%)	-	(%)	P-value
>10 years	20	35,1	11	19,3	0,025
6-10 years	5	8,8	4	7,0	
1-5 years	16	28,1	1	1,8	
Total	41		16		

DISCUSSIONS

Relationship Between BMI With Lower Back Pain

The results of the bivariate analysis obtained by the Chi-Square Test obtained a p-value of 0.038, meaning a significant relationship exists between BMI and low back pain. From these results, the subjects were less weight than six people (10%), normal body weight of 42 people (73.7%), and had an excessive body weight of nine people (15.8%).

This study examined the relationship between body mass index (BMI) categories of overweight and obesity and complaints of low back pain (LBP) in Udayana University medical faculty students in Denpasar, Bali. The results revealed that 33 respondents (54.1%) and 28 respondents (45.9%) had BMI categories of overweight or obesity, respectively.[1011] From the results of univariate analysis, it can be seen that there are quite a several students of the Medical Faculty of Udayana University who suffer from being overweight. For LBP complaints data, respondents in

this study experienced LBP complaints as many as 35 respondents (57.4%), while 26 did not experience LBP complaints (42.6%). This shows that LBP complaints are often experienced by overweight people, especially among Udayana University Medical Faculty students. The literature review states that someone with excess weight has a greater risk of experiencing LBP. Data obtained from the cross table results of the relationship between BMI in overweight and obesity with LBP complaints showed that respondents in the overweight BMI category had 14 people (23%) who experienced LBP complaints and 19 people (31.1%) who did not experience LBP complaints. In the BMI category obesity, respondents who experienced LBP complaints were 21 people (34.4%) and among those who did not experience LBP complaints were 7 people (11.5%). The study's results after the chi-square test to find the relationship between the overweight and obese categories of body mass index with complaints of low back pain in Udayana University Medical School students obtained a p-value of 0.01 (p <0.05). The results of these statistical tests show a significant relationship between body mass index in the category of overweight and obesity with complaints of low back pain in students of the Faculty of Medicine, Udayana University. From the results of the cross table, the prevalence ratio that shows PR (prevalence ratio) with the number 0.25 means that the obesity category BMI tends to be 0.25 times riskier for experiencing LBP complaints compared to the overweight category BMI.[10]

The overweight has the risk of developing greater pain because the burden on the weighting joint will increase to allow low back pain. Excessive weight can cause tugging in the softback tissue.[12] Weight gain accompanied by changes in the projection of forwarding central gravity increases the burden borne by the paraspinal muscles (back muscles) and vertebrae (vertebrae) as a lever. Vertebrae (vertebrae) as pedophiles are located between the paraspinal muscle force and body weight protection. The quality of the paraspinal muscles' attraction when determining the body position's stability. Increasing the burden borne by the paraspinal and vertebral muscles is the beginning of complaints of back pain when standing. In chronic conditions, the body compensates by shifting the position of the vertebrae as the more advanced feeder follows a shift in central gravity and weight gain. The angle between vertebrae segments changes so that the body posture also changes while still being able to stand upright. For example, in central obesity patients and pregnant women, [13]

Excessive weight causes weak abdominal muscle tone so that the center of gravity of a person will be pushed forward and cause lumbar lordosis will increase, which then causes fatigue in paravertebral muscles. This is a risk of LBP.[14] Weight also affects pressure compression of the spine in the lumbar region when making movements.[10] From this, it is possible to have a relationship that overweight people can affect the flexibility of lumbar motion, which affects LBP complaints. A cross-sectional in 135 participants aged 25-62 years in Australia found that with the increasing BMI, significantly overweight and obesity, the duration of the onset of LBP symptoms also increased. This study also states that every 5 kg increase in body mass will cause an increase in pain intensity of up to 19%. 8 Based on the research, it can be seen that the increase in BMI is closely related to the incidence of LBP.[15]

Relationship Between Working period and Lower Back Pain

The results of the bivariate analysis with the Chi-Square Test obtained a p-value of 0.025 means a significant relationship between the length of work and lower back pain. Regarding the relationship between BMI and working period on low back pain (LBP) in Farmers in Munca Village, Pesawaran District, with data of dengan5 years, as many as 18 people (22.2%) and respondents with a working period of more than 5 years were 63 people (77.8%). The study's results after the chi-square test to find the relationship between BMI and duration of work on low back pain (LBP) in Farmers in Munca Village, Pesawaran District, were p-value of 0.295 (p = 0.042). Based on the results of the test statistically, it shows that there is a significant relationship between the length of work and the incidence of lower back pain.[16] A working period is an accumulation of one's work activities over a long period. If the activity is carried out continuously over the years can lead to health problems.[17] A person who works for more than five years will increase the risk of LBP compared to workers with fewer than five years of work. This is because someone with a more extended working period will be exposed to longer risk factors and also cause the disc cavity to constrict permanently, resulting in spinal degeneration, which is also influenced by the increase in the worker's age.[18]

According to the results of a statistical test analysis between years of work and complaints of lower back pain, the longer a person does the work, the higher the risk of experiencing a Musculoskeletal event, and in this case is a complaint of lower back pain.

Because complaints of lower back pain are a chronic symptom that takes time to develop, the longer a person is exposed to hearing musculoskeletal risk, the greater the risk of complaints of lower back pain. In addition, the length of work will also make the disc cavity narrow permanently and result in degeneration of the spine which will cause lower back pain.[10] The researchers did not evaluate other factors (spinal bone anomalies, such as scoliosis in the elderly, smoking history, the type of pedicab, the Wall Test, etc.) that also affected lower back discomfort, which could have skewed the results of this study.[19]

CONCLUSION

Based on the research on the relationship between BMI and working period with low back pain in pedicab drivers in the city of Palembang, it can be concluded that there were 41 (71.9%) subjects who had low back pain. The average has a normal body weight; most have worked as pedicab drivers for over ten years. The data obtained in this study indicate that BMI and working period have a significant relationship with lower back pain.

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Intake of Macromolecular Nutrition Status in Pulmonary Tuberculosis Subjects at the Seputih Raman Health Center, Central Lampung

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Abstract

Background: The condition of pulmonary tuberculosis patients is affected by low nutritional status and this will slow recovery time. The problem of this research is the need to describe the calorie intake of pulmonary tuberculosis patients after receiving education on nutritional patterns high in protein and fat in pulmonary tuberculosis patients at the start of their treatment. In the initial conditions, TB patients generally experience protein and energy deficits, then during the course of treatment for approximately six months, it is necessary to evaluate the nutritional intake profile of TB patients. Therefore the expected goal of this research is to obtain profile data on the intake of energy, protein, fat, and carbohydrates as well as micronutrients.

Methods: Research using a descriptive interview approach using a 24-hour food recall questionnaire and www.nutrisurvey.com analysis in the work area of the Seputih Raman Public Health Center, Central Lampung in 2021.

Results: Based on nutrisurvey data**,** subjects were found to be underweight (60%), with the highest carbohydrate intake deficit (80%) compared to intake of protein (46.67%) and fat (53.33%).

Conclusion: This shows through our result, the need to emphasize the balance of nutritional intake in the nutrition education of Pulmonary Tuberculosis subjects not only protein and fat intake. Thus tuberculosis patients also need to pay attention to a balanced intake of carbohydrates

Keywords: Pulmonary tuberculosis, nutrition intake. Seputih Raman

Abstrak

Pendahuluan : Kondisi pasien tuberkulosis paru dipengaruhi status gizi yang rendah dan hal ini akan memperlambat waktu pemulihan. Permasalahan penelitian ini perlunya gambaran asupan kalori penderita tuberkulosis paru setelah mendapat edukasi pola gizi tinggi protein dan lemak pada pasien tuberkolusis paru pada awal pengobatan mereka. Dalam kondisi awal, pada umumnya pasien Tuberkulosis mengalami defisit protein dan energi kemudian dalam perjalanan pengobatan selama kurang lebih enam bulan, perlu dilakukan evaluasi melihat profil asupan nutrisi pasien Tuberkulosis. Oleh karenanya tujuan yang diharapkan dalam penelitian ini adalah didapatkan profil data asupan energi, protein, lemak dan karbohidrat juga mikronutrien.

Metode: Penelitian pendekatan deskriptif wawancara dengan alat ukur kuesioner food recall 24 jam dan analisa www.nutrisurvey.com di daerah kerja puskesmas Seputih Raman, Lampung Tengah Tahun 2021.

Hasil: Berdasarkan data analisa nutrisurvey, didapatkan 60% pasien status gizi kurus, dengan angka defisit asupan karbohidrat paling tinggi (80%) dibandingkan asupan protein (46,67%) dan lemak (53,33%).

Kesimpulan: Melalui hasil penelitian kami, hal ini menunjukkan perlunya menekankan keseimbangan asupan gizi pada edukasi gizi pasien Tuberkulosis Paru bukan hanya pada asupan protein dan lemak, dengan demikian pasien Tuberkulosis juga perlu memperhatikan asupan karbohidrat yang seimbang.

Kata kunci: Tuberkulosis paru, asupan nutrisi, Seputih Raman.

INTRODUCTION

Tuberculosis (TB) will develop into a disease because poor nutrition makes it more difficult for the body to fight TB bacteria. Our bodies produce antibodies from various nutrients, including proteins, lipids, polysaccharides, nucleic acids, lipopolysaccharides, and lipoproteins, which shows a correlation between our eating habits and our immune function. Therefore, someone who is considered malnourished will have a compromised immune system. Malnutrition often occurs in pulmonary subjects due to decreased nutritional status they experience.[1,2] The Indonesian government has a national target of 90% of the treatment threshold, however, the success rate of pulmonary TB treatment in West Nusa Tenggara and Lampung Provinces in 2018 was lower at 87.0%.[3]

Tuberculosis sufferers are susceptible to changes in appetite, a condition when the body cannot fully absorb nutrients from the food consumed. Moreover, tuberculosis treatment can also affect the work of the digestive system. It is not uncommon for people with tuberculosis to experience nausea, vomiting, and cramps in the abdomen due to the side effects of antituberculosis drugs. Therefore, it is important for TB sufferers to adopt a healthy and regular diet by consuming foods that can speed up the healing process. Puspitasari et al. found a direct and statistically significant relationship between the nutritional status of subjects and their treatment recovery from pulmonary tuberculosis. Recovery is possible with adequate nutrition.[4] In cases of active pulmonary TB, increased catabolic processes usually begin before the patient is diagnosed, whereas the basal metabolic rate or resting energy expenditure increases, resulting in increased energy requirements to meet the basic demands for bodily functions. At the same time, energy consumption tends to decrease as a result of anorexia. This combination resulted in drastic weight loss. TB infection increases the need for energy to maintain normal body function, which is characterized by an increase in energy use at rest resting energy expenditure (REE). This increase reaches 10-30% of the energy needs of normal people.[5,6,7]

An increase in REE will result in an increased lipolysis, but consumption of nutrition intake will decrease which causes malnutrition. Anorexia also occurs due to the increased production of leptin which reduces food intake and causes malabsorption. Protein and carbohydrate degradation and fat breakdown are accelerated in tuberculosis subjects. When metabolic and dietary disturbances inhibit endogenous protein and fat synthesis, the result is an increase in REE. A deficiency of energy building blocks is associated with this wasting process which ultimately results in nutritional deficiencies (anabolic blocks). Every TB patient receives nutrition education when receiving TB treatment, and will continue to be evaluated during treatment. Based on the importance of nutritional status in improving the condition of pulmonary tuberculosis subjects, the researchers are interested in knowing the description of nutritional status (based on nutritional intake) of pulmonary tuberculosis sufferers in the working area of the Seputih Raman Health Center, Central Lampung in 2021. As part of the educational evaluation of TB patient nutritional intake, researchers want to provide suggestions for educational patterns of nutritional intake of TB subjects.[5,6,7]

METHODS

Research planning with a quantitative descriptive approach was carried out for two to four weeks, in December 2021 at the Seputih Raman Health Center in Central Lampung. The design of this study analyzed the intake of macronutrients and micronutrients in Tuberculosis patients. The research was carried out in the Seputih Raman Centre of Lampung, the subjects of this study amounted to 30 pulmonary tuberculosis subjects at the Seputih Raman Health Center, Central Lampung. This research was carried out based on institutional permission number 1034/UKI.F5/D. PP.5.2/2021.

Population and Sampling

Based on Krejcie and Morgan formula, the smallest sample was 28 subjects, therefore, in this study, the number of samples used was 30 subjects from TB subjects in Seputih Raman Health Center. Inclusion criteria subjects were still being treated for tuberculosis at the Seputih Raman Health Center, Central Lampung, where at the beginning of treatment they received patient nutrition education, aged 19-80 years, male or female.

Data collection and food analysis instrument

Evaluation of the patient's nutritional status parameters Body Mass Index, while the 24-hour food recall method is used to evaluate the patient's diet food recall form and then analyzed with http://www. nutrisurvey.de/ The food consumed is converted by the interviewer/enumerator into units of weight (grams) or by URT estimates.   The nutritional

parameters measured were the adequacy of calories, macromolecules (carbohydrates, protein, fat), micromolecules (Vitamins A, B6, C, E), fe, folic acid, and selenium (se). Macronutrient and micronutrient nutritional adequacy based on the reference of the Minister of Health No. 28 of 2019 (Good 100-119% moderate: 80-99% Low 70-80%, Deficit <70%). Data analysis, frequency distribution, and percentage details are provided, SPSS 22 was used to help analyze data for this research.[8] Based on food recall interviews and nutrisurvey analysis, the nutritional adequacy rate was obtained based on energy, protein, fat, and carbohydrates. Energy requirements for TB sufferers per 10 years will decrease by 5%. Energy output that is not proportional to the amount of energy input will result in an energy imbalance resulting in weight loss and the ideal body weight will not be achieved.[9]

RESULTS

Anthropology data

The population of pulmonary TB subjects in the service area served by the Seputih Raman Health Center, 53.33% of the samples were male and 46.67% were female. Most of them were 14 subjects (40%) aged 41-60 years old, the other side 9 subjects (30%) were aged 19-40 years old, and 9 subjects (30%) were aged 61-80 years old. In terms of education, most of them (50) graduated from high school, while the rest had elementary school education (20%), junior high school (26.67%), and bachelor's degree (33.33%). Based on the profession data most of them were farmers 13 (43.33%), 8 (26.67%) were housewives, 4 (13.33%) were business owners, 3 (10%) were students, and 2 (6.67%) were government employees, as indicated by the distribution results.

Nutrition status

The nutritional and energy needs of the food can be observed through anthropometric measurements. In adults over the age of 18, body mass index (BMI) is a direct method of assessing a person's nutritional status by comparing their weight and height. Subjects with diseases and cases such as ascites, hepatomegaly, infants, children, adolescents, athletes, and pregnant women were excluded from BMI measurements.

Table 1. Nutrition Status Tuberculosis Subject

No	Categori	frequency	Percentage
1	**Underweight**	**18**	**60**
2	Normal	11	36,67
3	Obese	1	3,33
Total		30	100

From Table 1, the majority, eighteen TB subjects (60%) are in the category of underweight (<18.5) while the rest are in normal (18.5-24.9) categories (36.67%), and interestingly, there is one subject who is included in the obese (25-29.9) category.

Adequacy of energy and nutrition intake (macronutrient and micronutrient)

Based on food recall interviews and nutrisurvey analysis, the nutritional adequacy rate was obtained based on energy, protein, fat, and carbohydrates. The nutritional adequacy rate is determined based on an analysis of age relations (remembering that each age has a different value) and also refers to the provisions of the ministry of health regarding nutritional adequacy rates. As we see on Tables 2,3 and 4 below.

Table 2. Adequacy of Energy Intake*

No	Category	Frequency	Percentage
1	Good	0	0
2	Moderate	3	10
3	Low	3	10
4	**Deficit**	**24**	**80**
Total		30	100

*Subject

From Table 2, most of the subjects (80%) during the treatment process had energy deficits, and we will continue to explore what kind of nutrient (carbohydrate, protein, lipid, and also micronutrient) profile deficiency in TB subjects.

Table 3 showed that most of the subjects were deficient in carbohydrates (80%) more than in protein (46.67%) and lipids (53,33%) deficiency. This condition is slightly different from the initial condition of the subjects who are generally protein deficit.

Table 3. Macronutrient Adequacy Intake

No	Category	Value	Subject*		
			Protein	Lipid	Carbohydrat
1	Good	110-100	1(3,33%)	3(10%)	0
2	Moderate	99-80	7(23,33%)	7(23,33%)	3(10%)
3	Low	79-70	8(26,67%)	4(13,33%)	3(10%)
4	**Deficit**	69-0	**14(46,67%)**	**16(53,33%)**	**24(80%)**
	Total		30 (100%)	30 (100%)	30 (100%)

*total number subject(percentage)

Table 4. Micronutrient Adequacy Intake (mg)

Age	Vit. A	Vit. B6	Vit, C	Vit, E	Fe	Folic acid	Se
19-40	463.87	0.7111	61.744	2.628	6.183	103.444	38.311
41-60	766.42	0.8375	64.821	3.621	7.667	108.535	36.7
61-80	647.55	0.7222	75.172	3.8	6.333	115.211	40.822

Based on the mapping of micronutrient adequacy figures, globally it is seen that the age group of 21-40 years old had higher micronutrient adequacy rates than the age group 19-20 and 41-60 years old.

DISCUSSIONS

Subjects with pulmonary tuberculosis usually have lower energy intake because respondents do not eat the right foods, which are high in calories and high in protein and also fat and carbohydrate. Furthermore, eating habits and socioeconomic status can contribute to low energy and nutrient intake in TB subjects.[9] The results of the TB prevalence survey corroborate national TB control guidelines, which state that males are more likely to be exposed to TB than females. woman. Compared to women, men are far more likely to be involved in extracurricular activities, which increases their exposure to people who may be infected with pulmonary tuberculosis. This is in line with data on the age distribution of TB subjects and the results of Salsabela and Octavia studies where the majority are in the productive age range, one of which is their high mobility. The risk of contracting pulmonary tuberculosis decreases with increasing education levels. Higher education increases health literacy, which in turn increases individual awareness and motivation to take part in health improvement initiatives. Most people with pulmonary TB work as farm or factory laborers, as shown by this study, which is in line with a 2018 study by Susilawati. Economic difficulties are generally an obstacle to the difficulty in obtaining access to medicine and a balanced diet.[10,11]

Yusuf and Nurleli found a correlation between malnutrition and the development of pulmonary tuberculosis. Research conducted by Yuniar and Oktavia found that compared to those who were adequately nourished, those who were malnourished had a 3.4-16.7% increased risk of developing pulmonary tuberculosis. Loss of appetite and subsequent weight loss can negatively impact nutritional status, especially if the patient has a weakened immune system due to pulmonary tuberculosis infection. Several factors such as socioeconomic status, level of knowledge about good nutritional intake, sufficient energy, and protein intake, and duration of illness can affect nutritional status.[4,12] Pulmonary TB subjects do not comply with the dietary rules of pulmonary TB subjects, resulting in insufficient caloric intake and an inability to improve nutritional status. Loss of appetite is a common side effect of the response. Subjects with pulmonary tuberculosis usually have lower energy intake because respondents do not eat the right foods, which are high in calories and high in protein. The Director General of Health Services of the Republic of Indonesia recommends that the standard calorie

requirement that must be consumed by tuberculosis sufferers is 40-45 kcal of body weight.[9]

Even though hemoglobin was not measured in this study, it is assumed that low nutritional status also correlates with the possibility of anemia. As Indonesia is the moment worldwide donor to the recently analyzed tuberculosis, and dynamic aspiratory tuberculosis patients are frailer, tuberculosis additionally contributes to the expanding chance of anemia. [13]

Particularly, deficiency in micronutrients contributes to the impairment of an immune system through several mechanisms. For example, vitamin deficiency could reduce the phagocytosis of macrophages, as well as the production of antibacterial peptides like cathelicidin, which are important for the intracellular killing of mycobacteria. On the other hand, Zn and Cu deficiency limited the killing of mycobacteria through the mechanism of metal poisoning in phagosomes.[14] In pulmonary tuberculosis subjects, high protein intake is needed to replace damaged cells and increase low serum albumin levels. Subjects with pulmonary TB need to consume more protein than the average person because protein aids recovery from TB infection. In subjects with pulmonary TB who experience shortness of breath, fat can be given higher because the fat will not raise CO_2 levels in the blood. In tuberculosis subjects Lung carbohydrate intake is low, this is due in general, to subjects with pulmonary tuberculosis experiencing shortness of breath. If the intake of carbohydrates is high, then the CO_2 levels in the blood will increase so that sufferers of pulmonary tuberculosis will experience shortness of breath getting worse.[15,16]

Interestingly, in our study, we found that the number of subjects who experienced carbohydrate deficits (80%) was very much different than protein (46,67%) and fat deficits (53,33%). This is what we focus on as part of the evaluation of nutrition management education on tuberculosis subjects. it seems that the emphasis on the need for high energy and protein has more or less affected the subject's lack of attention to carbohydrates. This condition is in line with research by Rina et al and several other studies which found that the mean difference in carbohydrates was more significant than protein and fat in BTA (+) and BTA (-) sputum. Muchtadi (2014) argues that Carbohydrates are the cheapest main energy source because the glucose they produce is the main source of energy for the network of nerves and lungs. The relationship between carbohydrates and fat in the diet is reciprocal because a diet rich in fat has levels of low carbohydrates, and vice versa.[9]

Vitamins and minerals can play an imperative part in the treatment of tuberculosis. In a trial among 110 modern cases of active tuberculosis, subjects got tuberculosis chemotherapy alone, or in expansion to injectable thiamin, vitamin B6, and vitamin C, or a verbal multivitamin supplement. All bunches getting any vitamin supplementation had significantly superior lymphocyte expansion responses than the bunch accepting no supplement. Another trial showed that vitamins C and E were compelling in improving immune reactions to tuberculosis when given as adjuvant to multidrug tuberculosis therapy. The supplementation with vitamin A and zinc made strides in the viability of the antituberculosis drugs within the, to begin with, two months. The improved result was shown by the higher number of patients with sputum negative for bacilli and significantly lower mean injury range within the lung.[17]

CONCLUSION

The results obtained from this study are that most nutritional status of TB patients is underweight (60%) and deficit (80%) energy intake consumed per day by pulmonary TB subjects. Interestingly, most TB subjects have carbohydrate deficits, compared with protein and lipid deficiencies. This study provides an overview of the nutritional education evaluation of TB patients at the start of treatment with an emphasis on a protein and high-energy diet, therefore this study illustrates the need for an evaluation with an emphasis on balanced nutrition including a carbohydrate diet on TB patients in the working area of the Seputih Raman Health Center

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