

Physical Activity and Dermatology Quality of Life: A Study During COVID-19 Pandemic in Surakarta, Indonesia

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ABSTRACT

Context/Background: Earlier studies have shown a possible correlation between skin health and physical activity. Moreover, the COVID-19 pandemic has impacted physical activity levels due to many reasons.

Aims/Objectives: This study aims to analyze the correlation between physical activity and dermatology quality of life during the COVID-19 pandemic.

Methodology: A cross-sectional study was conducted in Surakarta, Central Java, Indonesia. This study used Dermatology Life Quality Index (DLQI) and International Physical Activity Questionnaire Short Form (IPAQ-SF) in Bahasa Indonesia to measure dermatology quality of life and physical activity.

Results: A total of 207 adults participated in this study. Our study showed that females are at risk for developing a DLQI score >10 (PR: 1.23, 95% CI: 3.05-4.97). There is no significant relationship between physical activity measured in IPAQ-SF with skin-related quality of life measured by DLQI.

Conclusions: A significant relationship was observed between the female sex and comorbidity with a skin condition that impairs life quality. However, this study found no significant relationship between physical activity measured in IPAQ-SF with skin-related quality of life measured in DLQI.

Key-words: Dermatology quality of life, physical activity, COVID-19 pandemic

INTRODUCTION

The COVID-19 pandemic has been going on for about 2 years since its first recognition in China in December 2019. In April 2022, Indonesia recorded 6 million COVID-19 cases with 156,000 death cases.^{1,2} The widespread pandemic has affected many sectors in a health area.³ Governments' COVID-19 containment measures have evolved to include the shutdown of public parks, gyms, sports facilities, and clubs. Because access to such recreational facilities is an important facilitator of physical activity (PA), a lack of space and chances to move, exercise may promote

sedentary behavior.^{4,5}

During the social distancing period, an earlier study has reported a decreasing number of physical activity from 69% to 39% and its impact on the increased number of depression and anxiety during the pandemic.⁶ Other published systematic review has shown that most studies report a decrease in physical activity and an increase in sedentary behavior during the lockdown in patients with various medical conditions, like type 1 and 2 diabetes.⁷ A study involving nationally representative data concluded that adults in Indonesia should live more active life-

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styles since more than one-third of Indonesians do not get adequate physical activity.⁸ The significant decrease in physical activity during the pandemic could worsen this situation.

Nevertheless, physical activity has been widely known for its numerous health benefits and its impact on the good quality of life. Regular moderate physical exercise improves cell tolerance to oxidative stress and improves skin health.^{9,10} The Maastricht Study, a cohort of type 2 DM patients, showed that higher physical activity levels increased cutaneous microvascular vasodilation.^{11,12} A meta-analysis showed a clear benefit of exercise in increasing skin microvascular reactivity in a group of adults, especially the elderly and adults who were previously sedentary.¹³ Another study found that exercise improves the skin's ability to retain moisture and can prevent future skin problems.¹⁴ Physical activity might impact the quality of life, especially the dermatology quality of life in those impacted by chronic skin diseases.

Additionally, many studies have reported fewer non-COVID-19 patients visiting the hospital. In the non-emergency department, a previous study in Italy reported an 80-90% decrease in dermatology consults.¹⁵ In Indonesia, an earlier study in Dr. Sardjito General Hospital showed a 61.2% decrease in patients visiting outpatient dermatology and venereology clinic.¹⁶ These decreases manifest from lockdown regulation from the government, patients' hesitation to visit hospitals for non-urgent matters, and concerns of virus exposure at the health center.¹⁶ Patients with chronic skin diseases are especially disadvantaged during the COVID-19 pandemic.

A limited number of studies reported the dermatological condition and the decrease of physical activity during COVID-19 separately, but to our knowledge, a study about the correlation between physical activity and dermatologic quality of life, especially during the COVID-19 pandemic, has yet to exist. Thus, this study aims to analyze the correlation between physical activity and dermatology quality of life during the COVID-19 pandemic.

METHODOLOGY

Study design: This cross-sectional, observational study was conducted in Surakarta, Central Java, Indonesia, from May to June 2022.

Participants: The inclusion criteria for this study are adults aged 18-59 years old and currently living in Surakarta, Central Java, Indonesia. Participants are asked to join the study by online invitation through chat messengers and flyers.

Data collection: The data was collected through an online questionnaire in Google Forms. The study was performed in accordance with the Declaration of Helsinki principles, and all subjects provided their written informed consent before participating. De-

mographic data such as sex, age, income, job, education, weight (kg), height (cm), and comorbidity were collected. Education is reported as low and high; ones are said to have a low education status when they did not or only complete high school as stated per Presidential Degree of Indonesia.¹⁷ We use the Asia-Pacific standard for BMI classification.¹⁸ Comorbidity is stated as having an underlying condition such as hypertension, diabetes mellitus, cancer, and autoimmune disorder.

The dermatological quality of life was measured using the Bahasa Indonesia version of the Dermatology Life Quality Index (DLQI), which was already validated.¹⁹ DLQI, a specific instrument to measure the quality of life impacted by skin diseases, is used to measure the quality of life in this study because specific instruments focus more on the relevant domains, characteristics, or complaints about a particular disease. Disease-specific instruments are also more responsive to assessing changes in quality of life than generic instruments.¹⁹ DLQI consists of 10 questions with a minimum score of 0 and a maximum score of 30. Different band of DLQI score indicates a change in the patient's quality of life. A score of 0-1 indicates no effect at all; 2-5 small effect; 6-10 moderate effect; 11-20 very large; and 21-30 indicates an extremely large effect on the quality of life.

Physical activity during the COVID-19 pandemic is measured using the International Physical Activity Questionnaire Short Form (IPAQ-SF) in Bahasa Indonesia. IPAQ-SF has been validated in the Indonesian population.²⁰ IPAQ-SF consists of 7 items. The interpretation of IPAQ-SF is aided by automatic scoring Microsoft Excel spreadsheet.²¹ IPAQ-SF scores were classified into 3 categories (1-3), each for low, moderate, and high, respectively.

Statistical analysis:

Data were incorporated into a Microsoft Excel spreadsheet. The analysis was run using SPSS version 26 (IBM corp, USA) and STATA version 14 software (StataCorp, USA). Kolmogorov-Smirnov and Shapiro-Wilk tests were used to assess the normality of data. The prevalence ratio (PR) and 95% confidence interval (95% CI) were then calculated using the Poisson regression with a robust variance estimator test.

RESULTS

207 participants completed the survey. The demographic data are listed in Table 1. In short, the majority of the respondents were female (77.8%, n = 161), completed a higher education (87.0%, n = 180), and having no comorbidity (94.2%, n = 195). IPAQ scores were evenly distributed, with the moderate score being the most common (51.2%, n = 106). DLQI scores were left-skewed, typical with a score of 0-1.

The distribution of the response to the DLQI questionnaire is listed in Table 2.

Table 1: Characteristics of the subject population

Variables	Frequency (%) or Median (Range)
Female sex	161 (77.8)
Age (years)	32.17 (19-70)
Income (per month)	
<USD 135	79 (38.2)
USD 135 - 270	63 (40.4)
>USD 270	65 (31.4)
Job	
Healthcare worker	79 (38.2)
Private sector	93 (44.9)
Public servant	12 (5.8)
Not working	23 (11.1)
Education	
Low	27 (13.0)
High	180 (87.0)
Body mass index (Kg/ M²)	
Underweight (<18.5)	13 (6.3)
Normal (18.5 - 22.9)	111 (53.6)
Overweight (23 - 26.9)	35 (16.9)
Obese (≥27)	48 (23.2)
Comorbidity	
Without	195 (94.2)
With comorbidity	12 (5.8)
IPAQ score	
Low (1)	75 (36.2)
Moderate (2)	106 (51.2)
High (3)	26 (12.6)
DLQI score (0-30)	
0-1 (no effect at all)	91 (43.96)
2-5 (small effect)	60 (28.98)
6-10 (6-10 moderate effect)	45 (21.74)
11-20 very large	9 (4.35)
21-30 (extremely large effect)	2 (0.97)

Almost all items consistently had a “not at all” as an answer, with question 1 being the exception. A “very much response” was the least common answer to every question. The item with the most “very much” answer was the Q2 (embarrassment and discomfort). DLQI score showed a variation in the health-related quality of life (HRQOL), with a predominance of no impact on HRQOL (43.96% were between 0-1). DLQI score with an extremely large impact on patients' HRQOL was the least common (0.97% were between 21-30).

Listed in Table 3 and Picture 3, comorbidity has the most significant risk of DLQI score being >10, with PR: 9.71 (95% CI: 1.12-84.27). Another risk was fe-

male sex (1.23 (95% CI: 3.05-4.97). Other variables showed an insignificant result of PR. The relationship between DLQI and IPAQ-SF showed an inconsistent result, as observed as being higher in “moderate” compared to “low” IPAQ-SF and went lowest in the “high” category of IPAQ-SF (Figure 1).

DISCUSSION

Our study showed that females are at risk for developing a DLQI score >10 (PR: 1.23, 95% CI: 3.05-4.97). Previous studies also showed that the female sex risks developing a higher DLQI score.^{22,23} The finding could be associated with the general female stereotype that shows greater interest in appearance. Thus females tend to have a worse disease-specific health-related quality of life than their male counterparts.^{23,24}

We also found that comorbidity is a significant risk factor for developing a higher DLQI score (PR: 9.71, 95% CI: 1.12-84.27). It has been long known that patients with skin disease have a lower quality of life than those who do not.^{25,26} Chronic skin conditions may lead to psychological problems such as anxiety and insomnia, as well as physical distress such as pain and discomfort.^{27,28}

Other predictors showed no significant risk with the DLQI score >10, as stated in table 3 by their 95% CI, including the IPAQ-SF score. The association between the DLQI and IPAQ-SF was inconsistent, as it was discovered to be greater in the “moderate” IPAQ-SF category than in the “low” IPAQ-SF category and lowest in the “high” IPAQ-SF category. A previous study in South Korea on female students also found similar results. In the study, physical activity level, measured by IPAQ, has little or no effect on skin health outcomes in South Korean female college students.²⁹

In contrast, previous evidence showed that subjects with moderate and high physical activity have a moister skin than those with low physical activity as measured with IPAQ-SF.¹⁴

However, it is also known that too much physical activity has a negative effect on skin health, which might explain the inconsistency in the results.

Table 2: Distribution of the response on DLQI items

DLQI items	Not at all/ Not relevant	A little	A lot	Very much
Q1 (sore, itchy, painful)	81 (39.13%)	101 (48.80%)	19 (9.18%)	6 (2.89%)
Q2 (embarrassment, discomfort)	109 (52.66%)	75 (36.23%)	14 (6.76%)	9 (4.35%)
Q3 (shopping/ home)	141 (68.12%)	52 (25.12%)	10 (4.83%)	4 (1.93%)
Q4 (clothes)	156 (75.36%)	37 (17.87%)	13 (6.28%)	1 (0.04%)
Q5 (social activities)	144 (69.57%)	50 (24.15%)	13 (6.28%)	0
Q6 (sport)	164 (79.22%)	34 (16.43%)	7 (3.38%)	2 (0.09%)
Q7 (working/ studying)	144 (69.57%)	58 (28.20%)	5 (2.41%)	0
Q8 (interpersonal problems)	159 (76.81%)	38 (18.35%)	10 (4.84%)	0
Q9 (sexual difficulties)	188 (90.82%)	15 (7.25%)	4 (1.93%)	0
Q10 (treatment difficulties)	175 (84.54%)	26 (12.56%)	6 (2.90%)	0

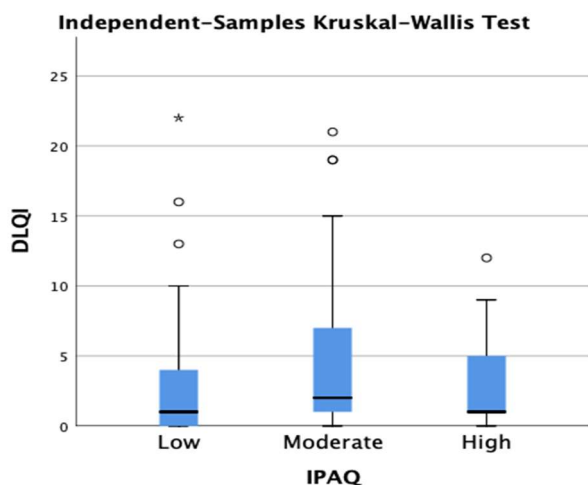


Figure 1: DLQI score based on IPAQ-SF

Table 3: Prevalence Ratio (PR) on DLQI score being >10

Variables	PR (95% CI)
Female sex	1.23 (3.05-4.97)
Age (years)	0.98 (0.93-1.04)
BMI (Kg/ M²)	
Underweight (<18.5)	1.90 (0.17-21.45)
Normal (18.5 - 22.9)	Reference
Overweight (23 - 26.9)	3.43 (0.69-16.82)
Obese (≥27)	1.17 (0.22-6.33)
Income (per month)	
<USD 135	Reference
USD 135 - 270	5.70 (0.83-38.78)
>USD 270	0.65 (0.06-7.47)
Low Education	0.75 (0.13-4.10)
Having Comorbidity	9.71 (1.12-84.27)
IPAQ-SF	
Low (1)	Reference
Moderate (2)	2.56 (0.52-12.60)
High (3)	1.64 (0.18-15.08)

Previous findings highlighted that high-intensity exercise could lower skin hydration than before exercise. The decrease in skin hydration following physical activity is transient. It is caused by sweating, which causes swelling in the stratum corneum and thus, increases the outflow of moisturizing factors.³⁰ A study on skin mechanical properties found that habitual moderate-to-vigorous physical activity is a factor in influencing the mechanical properties of the skin.³¹ Vierck et al. concluded that physical activity above a particular threshold causes oxidative stress in the skin, accompanied by a drop in antioxidant content.³² In addition, a review found that physical exercise had a twofold effect on the skin. Regular moderate physical activity provided protection against oxidative damage, but endurance exercise performed without training caused oxidative stress.¹⁰

Further research should delve deeper into the difference between populations and consider the threshold of physical activity advantageous to skin health.

It is also recommended to use other means of skin health measurements.

This study is not without limitations. As this study used convenience sampling, it might not reflect the general population. This study also used a self-administered questionnaire, which might cause bias. A previous study reported inequivalence of the DLQI questionnaire amongst different cultures despite being validated with the local language. Skin conditions were perceived differently amongst different cultures.^{33,34} These conditions might result in the study bias.

CONCLUSION

A significant relationship was observed between the female sex and having comorbidity with a skin condition that impairs life quality. However, we found no significant relationship between physical activity measured in IPAQ-SF with skin-related quality of life measured in DLQI.

REFERENCES

- Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases*. 2020 May;20(5):533-4.
- Prasetyo WH, Wijaya GPA, Rachman RF, Amini MZ, Wijaya EJ, Ati DL, et al. Peningkatan Kesadaran Protokol Kesehatan Covid-19 pada Masyarakat Desa Baleharjo, Sragen (Increasing Health Protocol Awareness of COVID-19 of Villagers of Baleharjo, Sragen). *Buletin KKN Pendidikan*. 2021 Jul 2;3(1):91-9.
- Emanuel EJ, Persad G, Upshur R, Thome B, Parker M, Glickman A, et al. Fair Allocation of Scarce Medical Resources in the Time of Covid-19. *The New England journal of medicine*. 2020 May;382(21):2049-55.
- Niruri R, Farida Y, Prihapsara F, Yugatama A, Ma'rufah S. Perilaku Masyarakat dalam Pelaksanaan Protokol Kesehatan sebagai Upaya Pencegahan Covid-19 di Punggawan, Banjarsari Surakarta (Citizens behaviour and implementation of health protocol against COVID-19 at Punggawan, Banjarsari, Surakarta). *Pharmacon: Jurnal Farmasi Indonesia*. 2021 Jun 30;18(1):75-81.
- Wilke J, Mohr L, Tenforde AS, Edouard P, Fossati C, González-Gross M, et al. A Pandemic within the Pandemic? Physical Activity Levels Substantially Decreased in Countries Affected by COVID-19. *Int J Environ Res Public Health*. 2021 Feb 24;18(5):2235.
- Puccinelli PJ, da Costa TS, Seffrin A, de Lira CAB, Vancini RL, Nikolaidis PT, et al. Reduced level of physical activity during COVID-19 pandemic is associated with depression and anxiety levels: an internet-based survey. *BMC Public Health*. 2021 Dec;21(1):1-11.
- Stockwell S, Trott M, Tully M, Shin J, Barnett Y, Butler L, et al. Changes in physical activity and sedentary behaviours from before to during the COVID-19 pandemic lockdown: a systematic review. *BMJ Open Sport & Exercise Medicine*. 2021 Jan;7(1):e000960.
- Patria B. Modeling the effects of physical activity, education, health, and subjective wealth on happiness based on Indonesian national survey data. *BMC Public Health*. 2022 May 13;22(1):959.

9. Paramitha GM. Hubungan Aktivitas Fisik dengan Kadar Gula Darah pada Pasien Diabetes Melitus Tipe 2 di Rumah Sakit Umum Daerah Karanganyar (Relationship of Physical Activity and Blood Glucose Levels in Type 2 Diabetes Mellitus Patients in General Hospital of Karanganyar). [Surakarta]: Universitas Muhammadiyah Surakarta; 2014.
10. Kruk J, Duchnik E. Oxidative stress and skin diseases: possible role of physical activity. *Asian Pac J Cancer Prev*. 2014;15(2):561–8.
11. Sörensen BM, van der Heide FCT, Houben AJHM, Koster A, T.J.M. Berendschot T, S.A.G. Schouten J, et al. Higher levels of daily physical activity are associated with better skin microvascular function in type 2 diabetes—The Maastricht Study. *Microcirculation*. 2020 May;27(4):e12611.
12. Adhita PM, Pramuningtyas R. Perbedaan Angka Kejadian Hipertensi antara Pria dan Wanita Penderita Diabetes Mellitus Berusia \geq 45 Tahun. *Biomedika [Internet]*. 2010 [cited 2022 Jun 6];2(2). Available from: <http://publikasiilmiah.ums.ac.id/handle/11617/1043>
13. Lanting SM, Johnson NA, Baker MK, Catterson ID, Chuter VH. The effect of exercise training on cutaneous microvascular reactivity: A systematic review and meta-analysis. *J Sci Med Sport*. 2017 Feb;20(2):170–7.
14. Ryosuke O, Yoshie S, Hiromi A. The association between activity levels and skin moisturising function in adults. *Dermatology Reports [Internet]*. 2021 Mar 3 [cited 2022 Jun 1];13(1). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8018252/>
15. Paterlini M. On the front lines of coronavirus: the Italian response to covid-19. *BMJ (Clinical research ed)*. 2020 Mar;368.
16. Alfieri A, Yogianti F. Impact of pandemic COVID-19 on dermatology and venereology outpatient clinic in a tertiary referral hospital in Yogyakarta, Indonesia. *Dermatology Reports*. 2021 Oct;13(3).
17. Government R of I. PP No. 47 Tahun 2008 tentang Wajib Belajar [Presidential Degree of Indonesia No. 47 (2008) concerning Compulsory Education] [Internet]. 47 Jul 4, 2008. Available from: <https://peraturan.bpk.go.id/Home/Details/4861/pp-no-47-tahun-2008>
18. WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet*. 2004 Jan 10;363(9403):157–63.
19. Rahmatina. Uji validitas dan reliabilitas Dermatology Life Quality Index (DLQI) berbahasa indonesia pada pasien di Poliklinik Ilmu Kesehatan Kulit Dan Kelamin Rumah Sakit Dr Cipto Mangunkusumo = Validity and reliability test of indonesian version of Dermatology Life Quality Index (DLQI) on patients attending the dermatovenereology clinic at Dr Cipto Mangunkusumo Hospital [Internet]. Universitas Indonesia; 2013 [cited 2022 Jun 1]. Available from: <https://lib.ui.ac.id>
20. Suyoto P, Huriyati E, Rinasusilowati R, Julia M. Relative Validity of Administered Indonesian Version of the Short-Form International Physical Activity Questionnaire (IPAQ-SF) among Obese Adolescent Girl Population. *Pakistan Journal of Nutrition*. 2016 Sep 1;15:816–20.
21. Cheng HL (Helen). A simple, easy-to-use spreadsheet for automatic scoring of the International Physical Activity Questionnaire (IPAQ) Short Form. 2016.
22. Krajewski PK, Matusiak Ł, von Stebut E, Schultheis M, Kirschner U, Nikolakis G, et al. Quality-of-Life Impairment among Patients with Hidradenitis Suppurativa: A Cross-Sectional Study of 1795 Patients. *Life (Basel, Switzerland)*. 2021 Jan;11(1).
23. Mabuchi T, Yamaoka H, Kojima T, Ikoma N, Akasaka E, Ozawa A. Psoriasis affects patient's quality of life more seriously in female than in male in Japan. *The Tokai journal of experimental and clinical medicine*. 2012 Sep;37(3):84–8.
24. Kayarkatte MN, Singal A, Pandhi D. Impact of Onychomycosis on the Quality of Life: Dermatology Life Quality Index-Based Cross-Sectional Study. *Skin appendage disorders*. 2020 Mar;6(2):115–9.
25. Sanclemente G, Burgos C, Nova J, Hernández F, González C, Reyes MI, et al. The impact of skin diseases on quality of life: A multicenter study. *Actas dermo-sifiliograficas*. 2017 Apr;108(3):244–52.
26. He Z, Marrone G, Ou A, Liu H, Ma L, Huang Y, et al. Factors affecting health-related quality of life in patients with skin disease: cross-sectional results from 8,789 patients with 16 skin diseases. *Health and Quality of Life Outcomes*. 2020;18(1):298.
27. Abolfotouh MA, Al-Khowailed MS, Suliman WE, Al-Turaif DA, Al-Bluwi E, Al-Kahtani HS. Quality of life in patients with skin diseases in central Saudi Arabia. *International journal of general medicine*. 2012;5:633–42.
28. Pärna E, Aluoja A, Kingo K. Quality of life and emotional state in chronic skin disease. *Acta dermato-venereologica*. 2015 Mar;95(3):312–6.
29. Lee JH, Kim Y, So WY. Differences in Skin Health Outcomes according to Physical Activity Level among Korean Female College Students. *Iran J Public Health*. 2019 Oct;48(10):1924–6.
30. Eda N, Shimizu K, Suzuki S, Lee E, Akama T. Effects of High-Intensity Endurance Exercise on Epidermal Barriers against Microbial Invasion. *Journal of sports science & medicine*. 2013;12(1):44–51.
31. Nakagawa N, Shimizu N, Sugawara T, Sakai S. The relationship between habitual physical activity and skin mechanical properties. *Skin Res Technol*. 2021 May;27(3):353–7.
32. Vierck HB, Darvin ME, Lademann J, Reissauer A, Baack A, Sterry W, et al. The influence of endurance exercise on the antioxidative status of human skin. *Eur J Appl Physiol*. 2012 Sep;112(9):3361–7.
33. Nijsten T, Meads DM, de Korte J, Sampogna F, Gelfand JM, Ongenaes K, et al. Cross-cultural inequivalence of dermatology-specific health-related quality of life instruments in psoriasis patients. *The Journal of investigative dermatology*. 2007 Oct;127(10):2315–22.
34. Kassir M, Abdelmaksoud A, Grabbe S, Goldust M. Dermatology Life Quality Index among Different Cultures: A Neglected Bias Needs to Be Addressed. *Dermatology (Basel, Switzerland)*. Switzerland; 2021. p. 1–2.

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