

ABSTRACT

Background: The use of masks is one of the efforts to prevent the transmission of COVID-19. On the other hand, there are currently many reports of skin disorders due to the use of masks within short-term of several types of masks in which pathomechanism is related to changes in the skin barrier. Research comparing the effect of several used widely such as N95 and surgical masks on skin barrier still needs to be completed. One method of assessing the skin barrier is a non-invasive method by measuring TEWL, hydration of the stratum corneum, skin surface pH, and erythema index.

Objective: To analyze and compare the short-term effects of surgical and N95 masks on the skin barrier.

Methods: This study used a crossover, randomized, repeated measurement design by recruiting 30 healthy subjects. Skin parameters were measured in the area covered by the mask before and 4 hours after wearing the mask with a non-invasive method. Parameters measured included stratum corneum hydration, transepidermal water loss (TEWL), skin surface pH, and erythema index measured with *Multi Probe Adaptor System* (MPAS) 5 of Courage Khazaka.

Results: Four hours after using the N95 mask, a significant increase in TEWL and erythema index was found. In the surgical mask group, there was a significant increase in TEWL, but not in the erythema index. The skin surface pH in both groups did not increase significantly. Meanwhile, the hydration of the stratum corneum decreased significantly from baseline. The increase of TEWL and erythema index in the N95 mask group was significantly higher than in surgical masks. The hydration of the stratum corneum in the N95 mask group was significantly lower than in the surgical masks. As many as 73.3% of subjects using N95 masks complained of skin reactions compared to surgical masks. Itching and pressure in areas covered by masks were the most common complaints, 60%, and 56.7% respectively.

Conclusion: The increase of TEWL and erythema index in N95 is significantly higher while the decrease of stratum corneum hydration is significantly lower than surgical masks. While the skin surface pH increased not significantly on N95 compared to surgical masks. The clinical skin reaction is significantly higher in N95 than in surgical masks.

Keywords: N95 mask, surgery, skin surface pH, TEWL, stratum corneum hydration, erythema index

ABSTRAK

Latar Belakang: Pemakaian masker merupakan salah satu upaya untuk mencegah penularan COVID-19, disisi lain saat ini banyak dilaporkan gangguan kulit akibat penggunaan berbagai jenis masker yang patomekasnismenya berhubungan dengan perubahan sawar kulit. Penelitian yang membandingkan pengaruh masker N95 dan bedah terhadap sawar kulit masih terbatas. Salah satu metode penilaian sawar kulit dilakukan dengan metode noninvasif melalui pengukuran TEWL, hidrasi stratum korneum, pH permukaan kulit dan indeks eritema.

Tujuan: Untuk menganalisis dan membandingkan efek jangka pendek dari masker N95 dan bedah terhadap sawar kulit.

Metode: Penelitian ini menggunakan rancangan *crossover* dengan merekrut 30 subjek yang sehat. Parameter kulit diukur pada area yang tertutup masker pada sebelum dan 4 jam setelah memakai masker dengan metode noninvasif. Parameter yang diukur meliputi hidrasi stratum korneum, *transepidermal water loss* (TEWL), pH permukaan kulit dan indeks eritema dengan alat *Multi Probe Adaptor System* (MPAS) 5 merek Courage Khazaka.

Hasil: Empat jam setelah pemakaian masker N95 didapatkan peningkatan TEWL dan indeks eritema yang signifikan. Pada kelompok masker bedah didapatkan peningkatan signifikan pada TEWL, tetapi tidak pada indeks eritema. Nilai pH permukaan kulit pada kedua kelompok meningkat tidak bermakna. Sedangkan hidrasi stratum korneum mengalami penurunan signifikan dari *baseline*. Perubahan TEWL dan indeks eritema pada kelompok masker N95 lebih tinggi signifikan dibandingkan masker bedah. Penurunan hidrasi stratum korneum pada kelompok masker N95 lebih rendah signifikan dibandingkan masker bedah. Sebanyak 73,3% subjek yang menggunakan masker N95 mengeluhkan reaksi pada kulit dibandingkan masker bedah. Gatal dan tekanan pada area yang tertutup masker merupakan keluhan terbanyak, masing-masing 60% dan 56,7%.

Kesimpulan: Terdapat perbedaan peningkatan TEWL dan indeks eritema yang bermakna serta penurunan hidrasi stratum korneum pada kelompok masker N95 dibandingkan masker bedah. Peningkatan pH permukaan kulit masker N95 lebih tinggi tetapi tidak signifikan dibandingkan masker bedah. Reaksi kulit klinis secara signifikan lebih tinggi pada N95 dibandingkan pada masker bedah.

Kata Kunci: Masker N95, bedah, pH permukaan kulit, TEWL, hidrasi stratum korneum, indeks eritema